

Northern Kentucky Water District  
2835 Crescent Springs Road  
Erlanger, KY 41018

PROJECT MANUAL VOL. 1

TECHNICAL SPECIFICATIONS OF THE CONTRACT (DIVISION 00-06)

for the construction of the  
Fort Thomas Treatment Plant Advanced Treatment

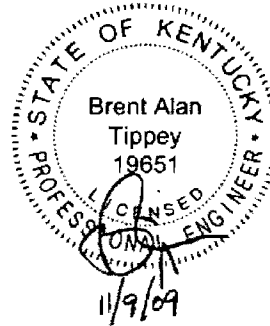
Contract No. 184-447



**CH2MHILL**

CH2M HILL

300 E-Business Way, Suite 400  
Cincinnati, Ohio 45241



**HDR**

HDR/Quest

2517 Sir Barton Way  
Lexington, Kentucky 40509

December 1, 2009

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Project No. 380723

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# FORT THOMAS WTP ADVANCED TREATMENT

**DATE OF ADVERTISEMENTS (12/03/09 AND 12/31/09)**

## **INVITATION TO BID**

Sealed Bids for construction of Advanced Treatment Facilities at the Fort Thomas Treatment Plant, addressed to (Northern Kentucky Water District, P.O. Box 18640, 2835 Crescent Springs Road, Erlanger, KY 41018), will be received at the office of the Northern Kentucky Water District, (Owner), until 2:00 p.m., local time, on the 12th day of January, 2010. Any Bids received after the specified time will not be considered.

Bids will then be publicly opened and read.

The Project contemplated consists of a concrete and masonry Advanced Treatment building housing 8 Granular Activated Carbon contactors with 12 feet of media depth, a rotary positive displacement blower for contactor air scour, a low lift pump station, 3 medium pressure high output ultraviolet disinfection reactors, a 2 ton bridge crane in the UV Disinfection Room, a concrete equalization tank beneath the building with submersible pumps, and ancillary systems including but not limited to controls, security systems, chemical feed, plumbing, heating, air conditioning and ventilating. The pump room contains vertical turbine pumps with adjustable frequency drives including 3 GAC feed pumps, 2 backwash pumps and 2 slurry water supply pumps and is served by a 5 ton bridge crane. A service elevator, and monorail crane will be installed. Roofing systems include a pitched vegetated roofing system, a metal roof, and a flat modified bituminous roof with pavers.

A standby electrical power system is provided with capacity to serve a majority of the plant systems. Site work including excavation, yard piping, concrete valve vaults, a splitter box with sluice gates, a concrete outfall structure, fencing, concrete and asphalt paving, grading and landscaping.

Demolition of existing backwash pumps and connections of piping to existing piping and concrete flumes will be completed in the existing filter building.

The existing treatment facilities and laboratory must be kept in operation during construction.

Alternate bid items for which prices must be supplied include stainless steel and plastic GAC contactor underdrain systems, two alternate UV system manufacturers, deletion of the UV system, deletion of the air scour system, deletion of the service elevator, and substitution of a metal roof for the vegetated roof.

The Work will be completed in all respects within 790 calendar days from the date when the Contract Times commence to run.

## FORT THOMAS WTP ADVANCED TREATMENT

Bidding Documents may be examined in Owner's office, (Northern Kentucky Water District, 2835 Crescent Springs Road Erlanger, KY 41018, or at Engineer's office, CH2M HILL, (300 E-Business Way, Suite 400, Cincinnati OH, 45241 or at the offices of HDR Engineers, 2517 Sir Barton Way, Lexington, KY, 40509.

Copies of the Bidding Documents may be obtained from the office of QCR Imaging and Supply, located at 2456 Fortune Drive, Suite 120, Lexington, Kentucky 40509 (859-699-5105 or 800-966-2260 and [www.qcrepro.com](http://www.qcrepro.com)), at the address indicated herein. Charges for all documents obtained will be made on the following basis:

<u>Charge</u>	
Complete Set of Bidding Documents With Half Size Drawings	\$600.00
Complete Set of Bidding Documents With Full Size Drawings	\$900.00
Copy of Geotechnical Reports	\$75.00

Return of the documents is not required, and the amount paid for the documents is nonrefundable.

The following plan room services have received sets of Bidding Documents for the Work contemplated herein:

Reed Construction Data  
30 Technology Parkway South, Suite 500  
Norcross, GA 30092  
Ph: 800-424-3996  
Fax: 800-317-0870

McGraw Hill Construction  
Kenwood Executive Center  
7265 Kenwood Road, Suite 202  
Cincinnati, Ohio 45236  
Ph: 513-345-8218  
Fax: 888-376-4319

Builders Exchange  
9555 Rockside Road, Suite 300  
Valley View, Ohio 44125  
Ph: 216-393-6300  
Fax: 866-907-6304

Allied Construction Industries (ACI)  
3 Kovach Drive  
Cincinnati, Ohio 45215  
Ph: 513-221-8020, ext. 1010  
Fax: 513-221-8023

Each Bid must be submitted on the prescribed Bid Form and accompanied by Bid security as prescribed in the Instructions to Bidders.

The Successful Bidder will be required to furnish the additional bond(s) prescribed in the Bidding Documents.

## FORT THOMAS WTP ADVANCED TREATMENT

Bidders are not required to be prequalified by the Owner to perform the type and size of Work contemplated herein but will be subject to the qualifications requirements set forth in the bidding documents.

The project advertised will be funded by the Kentucky Infrastructure Authority (KIA) through a Federally Assisted Drinking Water State Revolving Fund (DWSRF) Loan and Local Funds.

All Bidders must comply with the President's Executive Order 11246 (EEO) as amended.

All Bidders must comply with Title VI of the Civil Rights Act of 1964, the Anti-Kickback Act, and the Contract Work Hours Standard Act, and 40 CFR, and 40 CFR 33.1016.

All Bidders, Contractors and Subcontractors must comply with 41 CFR 60-4, in regard to Affirmative Action, to ensure equal opportunity to females and minorities and will apply the timetables and goals set forth in 41 CFR 60-4 as applicable.

All Bidders must comply with OSHA (P.C. 91-596) and the Contract Work Hours and Safety Standards Act (P.E. 91-54).

The Successful Bidder and all Subcontractors will be required to conform to the labor standards set forth in the Contract Documents. This project falls under the provisions of KRS 337.505 to 337.550 for prevailing wage rates.

Owner reserves the right to reject any or all Bids, including without limitation the right to reject any or all nonconforming, non-responsive, incomplete, unbalanced, or conditional Bids, to waive informalities, and to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of Owner to make an award to that Bidder. Owner also reserves the right to negotiate with the apparent Successful Bidder to such an extent as may be determined by Owner.

A non-mandatory prebid conference will be held for prospective Bidders on December 15, 2009 at 10:00 a.m. at the District's Central Facility located at 2835 Crescent Spring Road, Erlanger, Kentucky 41018. Site visits will begin at 1:00 p.m. on December 15, 2009 at the Fort Thomas Treatment Plant located at 700 Alexandria Pike, Fort Thomas, Kentucky 41075.

Minority Bidders are encouraged to bid and bidders must employ Good Faith Effort steps to solicit participation of Disadvantaged Business Enterprises.

Bids shall remain subject to acceptance for 90 days after the day of bid opening or for such longer period of time to which a Bidder may agree in writing upon request of the Owner. If a Contract is to be awarded, the Owner will give the Successful Bidder a Notice of Award during the period of time during which the Successful Bidder's bid remains subject to acceptance.

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Award of the Contract will be in accordance with Article 21, Evaluation of Bids and Award of Contract, specified in the Instructions to Bidders.

For information concerning the proposed Work, contact Nick Winnike, CH2M HILL, telephone: 513-337-9351.

For an appointment to visit the Site, refer to the District's website [www.nkywater.org](http://www.nkywater.org) for scheduling at least 48 hours in advance. Questions about site visits should be directed to Jeff Schuchter, NKWD, Staff Engineer, telephone: 859-426-2703.

Dated this 3<sup>rd</sup> day of December, 2009.

Northern Kentucky Water District

By: Bari L. Joslyn, V.P., Water Quality &  
Production

**END OF SECTION**



INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS

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

1.1.1. *Issuing Office*—The office from which the Bidding Documents are to be issued.

2. COPIES OF BIDDING DOCUMENTS

2.1. Complete sets of the Bidding Documents in the number and for the sum, if any, stated in the Invitation to Bid may be obtained from the Issuing Office.

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

2.3. Drawings bound in the Bidding Documents are photographic reductions of original tracings. Amount of reduction is indicated by a note or scale bar on Drawing. Full-size Drawings may be obtained from Issuing Office at cost of reproduction and handling. Drawings will only be made available to firms listed as having complete sets of Bidding Documents. No return of any documents or Drawings is required, and no refund will be made.

2.4. Owner, Engineer and Issuing Office, 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.

3. QUALIFICATIONS OF BIDDERS

3.1. In order to perform public work, Bidder and its Subcontractors, prior to award of Contract, shall hold or obtain such licenses as required by State Statutes, and federal and local Laws and Regulations.

3.2. Each Bidder must submit with its bid an experience record with at least three projects listed that are similar to this project in size and scope. To further demonstrate Bidder's qualifications to perform the Work, within 5 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 requested.

4. EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.1. Subsurface and Physical Conditions:

4.1.1. The Supplementary Conditions identify:

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

4.1.1.2. 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.

4.1.2. Copies of reports and drawings referenced 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, or information contained in such reports or show or indicated in such drawings. Costs associated with making available copies of reports and drawings shall be borne by Bidder.

4.2. Underground Facilities:

4.2.1. 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.

4.3. Hazardous Environmental Condition:

4.3.1. 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.

4.3.2. Copies of reports and drawings referenced 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

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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. Costs associated with making available copies of reports and drawings shall be borne by Bidder.

4.4. 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 through 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.

4.5. On request, with at least 48 hours advance notice, Owner will provide each 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. Arrangements for site visits should be scheduled through the District's website at [www.nkywater.org](http://www.nkywater.org). Questions about site visits or cancellations with less than 48 hours notice should be directed to Jeff Schuchter, Staff Engineer, at 859-426-2703. The Owner reserves the right to deny access to Bidders arriving at the site without an appointment.

4.6. Reference is made to the General Requirements for 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.

4.7. It is responsibility of each Bidder before submitting a Bid to:

4.7.1. Examine and carefully study the Bidding Documents, other related data identified in the Bidding Documents, and any Addenda.

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

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4.7.3. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

4.7.4. Carefully study all:

4.7.4.1. 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.

4.7.4.2. 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.

4.7.5. Obtain and carefully study (or accept consequences of not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

4.7.6. 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.

4.7.7. 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.

4.7.8. 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.

4.7.9. 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.

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4.7.10. Determine Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance of the Work.

4.8. The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this article; that without exception the Bid is premised upon performing and furnishing the Work required by Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by 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 Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing the Work.

### 5. PREBID CONFERENCE

5.1. A non-mandatory prebid conference will be held at 10:00 a.m. local time on December 15, 2009 at the NKWD Central Facility, 2835 Crescent Springs Road, Erlanger, KY. A tour of the Fort Thomas Treatment Plant, 700 Alexandria Pike, Fort Thomas, KY, will follow. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

### 6. SITE AND OTHER AREAS

6.1. 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.

### 7. INTERPRETATIONS AND ADDENDA

7.1. 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 the office issuing documents as having received the Bidding Documents. Questions received less than 7 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.

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

8. BID SECURITY

8.1. Bid shall be accompanied by Bid security made payable to Owner in an amount of 10 percent of Bidder's maximum Bid price and in the form of a certified check or bank money order or a penal Bid Bond (on the attached form), issued by a surety meeting the requirements of Paragraph 5.01 and Paragraph 5.02 of the General Conditions.

8.2. 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 the time period specified in Article Signing of Agreement, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. 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 the 7th day after the Effective Date of the Agreement or the number of days specified for all Bids to remain subject to acceptance in Article Bids to Remain Subject to Acceptance, whereupon Bid security furnished by such Bidders will be returned.

9. CONTRACT TIMES

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

10. LIQUIDATED DAMAGES AND UV SYSTEM PERFORMANCE WARRANTIES AND PRICE GUARANTEES

10.1. Provisions for liquidated damages and UV System performance warranties and price guarantees are set forth in the Agreement.

11. SUBSTITUTE AND "OR-EQUAL" ITEMS

11.1. The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

12. SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.1. 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, apparent Successful Bidder, and any other Bidder so requested, shall within 5 days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner.

12.2. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute in which case apparent Successful Bidder shall submit an acceptable substitute. Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award without an increase in Bid.

12.3. If apparent Successful Bidder declines to make any such substitution Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in General Conditions Paragraph 6.06.B.

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

13. EMPLOYMENT REQUIREMENTS

13.1. In order to be awarded the Contract, Successful Bidder will be required to comply with 41 CFR 60-4 and the Kentucky Equal Opportunity Act of 1978 (KRS 45.550 et. seq.) regarding affirmative action, to ensure equal opportunity to females and minorities and will apply the timetables and goals set forth in 41 CFR 60-4 as applicable.

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### 14. WAGE RATES

14.1. The Work under these Bidding Documents is to be paid for by public funds; therefore, minimum prevailing wage rates published by Kentucky Department of Labor. This project falls under the provisions of KRS 337.505 to 337.550 for prevailing wage rates. Refer to Paragraph 6.09.D of the Supplementary Conditions for more information.

14.2. Subcontractor wage rate requirements, including hauling, are covered under 803 KAR 1:055.

### 15. PREPARATION OF BID

15.1. With each copy of the Bidding Documents, a Bidder will be furnished one separate unbound copy of the Bid Form, and, if applicable, the Bid Bond Form. No substitution of the Bid Form will be allowed.

15.2. All blanks on the Bid Form shall be completed by typing or printing with black ink 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, unit price item, and alternate listed therein or the words "No Bid," "No Change," or "Not Applicable" entered.

15.3. A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

15.4. A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.

15.5. A Bid by a limited liability company shall be executed in the name of the firm by a member or manager and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.

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

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

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



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15.9. The Bid shall contain an acknowledgement of receipt of all Addenda; the numbers of which shall be filled in on the Bid Form.

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

15.11. 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 contractors' license number and class, if any, shall also be shown on the Bid Form.

### 16. BASIS OF BID; COMPARISON OF BIDS

#### 16.1. Lump Sum:

16.1.1. Bidders shall submit a Bid on a lump sum basis for the Base Bid and include a separate price for each alternate described in the Bidding Documents as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the Base Bid if Owner selects the alternate. Bidder is required to provide a bid amount for each alternate.

16.1.2. The Base Bid Schedule will include an item for all labor, material and equipment required to furnish and install the medium pressure ultraviolet (UV) system. Two equipment manufacturers have been identified as acceptable to the Owner. Bidder shall provide bid amounts for both manufacturers along with specific operating data requested on the UV Guaranteed Present Worth Table (2 each) which is considered part of the Bid Form. Failure to provide any of the required information may be grounds to declare a Non-responsive Bid. Likewise, any grossly inflated values entered for one vendor over another may be grounds for declaration of a Non-responsive Bid. For the purposes of determining the Bidder's Total Lump Sum Bid for the project, the lowest capital cost of the two UV equipment options (shown on the UV Bid Detail Sheet) shall be entered in the appropriate location on the Bid Form. The Owner will evaluate the information provided for both equipment options and make a determination within 7 days of the Bid Opening as to the actual equipment to be supplied. The only increase in costs that will be provided to the Bidder if the Owner decides to select the option with the higher capital cost is the difference between the two options that is reflected on the UV Guaranteed Present Worth Table.

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

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16.3. Contingency Allowance(s): If applicable, are described in General Conditions' Paragraph 11.02, Section 01 29 00, Payment Procedures, and in the Bid Form. The Base Bid amount is understood to include the sum of all such contingency allowances.

### 16.4. Alternates:

16.4.1. Alternates requiring pricing in the Bid Form are described in Section 01 11 00, Summary of Work, and in the Bid Form.

16.4.2. Indicate in Bid Form the amount to be added or subtracted from the Base Bid for alternates described.

16.4.3. Include cost of all related work, including modifying surrounding work to integrate the Work of each alternate.

16.4.4. Alternates listed on Bid Form will be reviewed and accepted or rejected at Owner's option. Accepted alternates will be identified in the Agreement.

## 17. SUBMISSION OF BID

17.1. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the following data:

17.1.1. Certification Regarding Debarment, Suspension and Other Responsibilities (EPA Form 5700-49)

17.1.2. Certification Regarding Lobbying, Certification for Contracts, Grants, Loans and Cooperative Agreements

17.1.3. Non-Collusion Affidavit

17.1.4. Statement of Bidder's Qualifications

17.1.5. Bidder's Experience Record

17.1.6. UV Procurement Evaluation and UV Guaranteed Present Worth Tables – (1 each Calgon and Trojan)

17.1.7. Proposed Subcontractors

17.1.8. Proposed Major Equipment Manufacturers

17.2. A Bid shall be submitted no later than the date and time prescribed, and at the place, and in the manner set forth in the Invitation to Bid. Enclose Bid in an opaque sealed envelope, marked with the Project title (and, if applicable, the designated

portion of the Project for which the Bid is submitted) and name and address of Bidder and 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 marked on the outside with the notation "BID ENCLOSED."

18. MODIFICATION AND WITHDRAWAL OF BID

18.1. 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.

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

19. OPENING OF BIDS

19.1. Bids will be opened at the time and place indicated in the Invitation to Bid and unless obviously nonresponsive, read aloud publicly. An abstract of the amounts of the Base Bids and major alternates if any will be made available to Bidders after the opening of Bids.

20. BIDS TO REMAIN SUBJECT TO ACCEPTANCE

20.1. All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period. If the Contract is to be awarded, Owner will give successful Bidder a Notice of Award within the number of days stated in the Bid Form. Should there be any reasons why the Contract cannot be awarded within the specified period, the time may be extended in writing by mutual agreement between the Owner and the Bidder.

21. EVALUATION OF BIDS AND AWARD OF CONTRACT

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

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21.2. 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.

21.3. 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.

21.4. In evaluating Bidders, Owner may 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 either with the Bid, or otherwise prior to issuance of the Notice of Award.

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

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

21.7. If the contract is to be awarded, it will be awarded to the lowest Base Bid Bidder exclusive of any additive or deductive alternatives. Additive or deductive alternates will be considered after selection of the lowest Base Bidder. Each additive and deductive alternate will be considered and selected individually, or none selected, for inclusion in the work.

## 22. CONTRACT SECURITY AND INSURANCE

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

## 23. DRINKING WATER STATE REVOLVING FUND LOAN

23.1. A portion of the funding for this project comes from a Drinking Water State Revolving Fund (DWSRF) loan. This loan originates with the United States Environmental Protection (USEPA) and has several provisions that directly impact the Bidder. These include:

## FORT THOMAS WTP ADVANCED TREATMENT

23.1.1. A certification that the Bidder, and any subcontractors used by the Bidder, are not on the Federal List of Debarred Contractors. (CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER MATTERS – EPA Form 5700-49) addresses this item and must be executed and included with the Bid.

23.1.2. A certification from the Bidder that no appropriated funds were or will be used for the purposes of lobbying the legislative or executive branches of the Federal government. (CERTIFICATION REGARDING LOBBYING) addresses this item and must be submitted with the Bid.

23.2. The DWSRF loan creates additional documentation requirements on both the Contractor and the Owner. These are set forth in the Supplemental General Conditions for Drinking Water State Revolving Fund Loans (DWSRF Supplemental General Conditions). The items identified in Paragraph 23.1 of this section must be submitted with the Bid. The remaining items identified in the DWSRF Supplemental General Conditions Section will be submitted by the low bidder within 21 days of the Bid opening. The project will not be awarded until this information is received.

23.2.1. DWSRF funding requires a recipient to utilize minority or women owned businesses as subcontractors where possible. Certain information and documentation is required by the funding agencies and other governing bodies prior to awarding a necessary approval for this project. The BIDDER acknowledges, through the act of submitting a Bid, a commitment to submit the following documentation or information within 7 days of Bid Opening or within 5 days of the formal request to do so, whichever is greater. Failure to produce any of this documentation or information within the prescribed period will serve as grounds for rejection of the Bid. If the information is required from a subcontractor or vendor and is not produced within the prescribed, it will serve as grounds to replace the subcontractor or vendor with another company or product.

Specific items to be submitted within 7 days of the Bid opening include:

- A. EPA Form 6100-2 DBE Participation (Attachment 12 – Section 00 74 00).
- B. EPA Form 6100-3 DBE Subcontractor Performance (Attachment 12 – Section 00 74 00).
- C. EPA Form 6100-4 DBE Subcontractor Utilization (Attachment 12 – Section 00 74 00).
- D. Disadvantage Enterprise Participation Policy (Attachment 12 – Section 00 74 00).
- E. Validation Report and Other Requested Information from Ultraviolet Disinfection (UV) Vendor.

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### 24. SIGNING OF AGREEMENT

24.1. Successful Bidder will be required to submit a statement of intent to comply in full with all requirements of the Kentucky Civil Rights Act, and to submit data required by KRS 45.560 to 45.640 upon being designated the Successful Bidder.

24.2. In addition to the above requirements, Successful Bidder will be required to submit a breakdown of their existing work, indicating the race, sex, age, position held, county and state of residence, and date of employment of each employee.

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

### 25. RETAINAGE

25.1. Provisions concerning retainage and Contractor's rights to deposit securities in lieu of retainage, if applicable, are set forth in the Agreement.

### 26. "BUY AMERICAN" PROVISION

26.1. In accordance with Section 215 of the Clean Water Act (33 U.S.C. 1251 et seq.) and implementing EPA regulations, the Contractor agrees that preference will be given to domestic construction materials by the Contractor, subcontractors, materialmen and suppliers in the performance of the Work.

**END OF SECTION**

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NOTE TO BIDDER: Use typewriter or BLACK ink for completing this Bid Form.

**BID FORM  
(STIPULATED PRICE BASIS)**

1. BID RECIPIENT

1.1. This Bid is submitted to:

Owner: Northern Kentucky Water District  
Address: P.O. Box 18640, 2835 Crescent Springs Road, Erlanger, KY  
41018  
Project Identification: Fort Thomas Treatment Plant Advanced Treatment  
Contract No.: 184-447

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

2. BIDDER'S ACKNOWLEDGEMENTS

2.1. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 90 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

3. BIDDER'S REPRESENTATIONS

3.1. In submitting this Bid, Bidder represents that:

3.1.1. 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
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

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(Bidder shall insert number of each Addendum received.)

3.1.2. 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.

3.1.3. 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.

3.1.4. Bidder has carefully studied all: i) 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 Paragraph 4.02 of the Supplementary Conditions; and ii) reports and drawings of Hazardous Environmental Conditions that have been identified in Paragraph 4.06 of the Supplementary Conditions.

3.1.5. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

3.1.6. 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.

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

3.1.8. 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.



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3.1.9. 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.

3.1.10. 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.

3.1.11. 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.

### 4. FURTHER REPRESENTATIONS

#### 4.1. Bidder further represents that:

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

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

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

4.1.4. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner; and

4.1.5. All required sales and use taxes are included in the stated Bid prices for the Work unless provision is made herein for the Bidder to separately itemize the estimated amount of sales tax.

### 5. BASIS OF BIDS

5.1. Bidder will complete the Work in accordance with the Contract Documents for the following price(s). Amounts will be shown in both words and figures. In case of discrepancy, the amount in words will govern.

#### 5.2. CONTINGENCY ALLOWANCE

5.2.1. The contingency allowance that has been identified for inclusion with the Base Bid of the project is the following.

5.2.1.1. Unanticipated Changes in the Work: \$100,000.

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5.3. LUMP SUM BID PRICE

Item 1 – Ultraviolet (UV) Disinfection System \*\*

For furnishing all labor, equipment and materials necessary for the installation of the medium pressure UV system to include the reactors, controls, sensors and other components identified in the Specifications or shown on the Drawings, the lump sum amount of:

\_\_\_\_\_ Dollars  
(words)

and \_\_\_\_\_ Cents \$ \_\_\_\_\_  
(numerals)]

\*\* Note - This amount is the lowest of the capital cost amounts provided for different equipment vendors on the Guaranteed Present Worth Table which is included as a Supplement to this Bid Form.

Item 2 – Advanced Treatment Facility

For furnishing all materials, equipment and labor necessary to complete and put into operation a new Advanced Treatment Facility , including all work shown on the Drawings or as specified herein but not included in Item 1 of the Base Bid Schedule, the lump sum amount of:

\_\_\_\_\_ Dollars  
(words)

and \_\_\_\_\_ Cents \$ \_\_\_\_\_  
(numerals)]

BASE BID (TOTAL OF ABOVE) \$ \_\_\_\_\_

6. ALTERNATE BID SCHEDULE

6.1. The following is included for the Bidder to provide a lump sum amount for the addition or deletion of certain work, if so desired by the Owner. All Bidders are required to complete this portion of the Bid Form. Failure to complete this portion shall cause the Owner to declare the Bid non-responsive and give it no further consideration.

6.2. Bidder shall identify whether the price for each alternate bid item is an addition or deduction from the Total Base Bid Amount.

7. ALTERNATE NO. 1 DEDUCT AIR SCOUR SYSTEM

Delete all materials, equipment and labor associated with the installation of the air scour system consisting of the Rotary Positive Displacement Blower specified in Section 44 42 19.04 and ancillary electrical, controls and mechanical systems. Electrical and controls deletions associated with the blower include: the electrical disconnect switch at the blower, the Hand Off Remote selector switch at the blower, and all power and control wiring from the blower to the starter in the MCC. The conduits with a pull-wire are to remain. Stub-up conduits at the blower location and cap off for future use. Delete the blower RVSS in the MCC. The MCC section is to remain. Label the empty section as "Space". Delete the control cable from the MCC starter to LCP-AT. The conduit with pull wire are to remain. Piping and fittings deletions associated with the air scour system include all air piping, fittings and instruments in the system connected to the blower and running through the building to the connection with the underdrain system as the location as shown on Drawings FT-D-131 and FT-D-132. Wall and floor penetrations are to remain and be filled with intumescent fire-resistant material consistent with the rating of the wall or floor. Air piping at the connection to the underdrain system are to be capped with a blind flange. Delete blower intake piping from the blower to the connection to the louver at the wall and fill the opening with intumescent fire-resistant material consistent with the rating of the wall

\_\_\_\_\_ Dollars

(words)

and \_\_\_\_\_ Cents     \$ \_\_\_\_\_

(numerals)]

7.1. ALTERNATE NO. 2 DEDUCT Electric Traction Elevator

Delete all materials, equipment and labor associated with the installation of the electric traction elevator system as specified in Section 14 21 23. Electrical and controls deletions associated with the elevator include: the electrical disconnect switch at the drive motor, and all power and control wiring from the machine room to the starter in the MCC. The conduits with a pull-wire are to remain. Stub-up conduits at the machine room and cap off for future use. Delete the elevator RVSS in the MCC. The MCC section is to remain. Label the empty section as "Space". Delete the control cable from the MCC starter to LCP-AT. The conduit with pull wire are to remain. Delete power and control wires to hall fixtures at each floor but conduit and pull wire are to remain. Cover hall fixture opening with stainless steel plate. Fill openings to elevator shaft at each level with a 4-inch concrete masonry knock out wall and finish wall consistent with surrounding area. Cap any ventilation ducts at face of shaft.

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\_\_\_\_\_ Dollars  
(words)  
and \_\_\_\_\_ Cents \$ \_\_\_\_\_  
(numerals)]

7.2. ALTERNATE NO. 3 DEDUCT VEGETATED ROOF ASSEMBLY

Delete the vegetated roof assembly on the pitched roof portion of the Advanced Treatment Building as specified in section 07 59 90 and shown on Drawings FT-A-160, and FT-A-170 and FT-A-301. Substitute Metal Roofing Panels as specified in section 07-41-13 and shown on Drawings FT-A1-160 and FT-A1-301. Delete water supply piping for irrigation of Vegetated Roof Assembly but hose bibs and water supply to roof area are to remain.

\_\_\_\_\_ Dollars  
(words)  
and \_\_\_\_\_ Cents \$ \_\_\_\_\_  
(numerals)]

7.3. ALTERNATE NO. 4 ADD or DEDUCT Stainless Steel Underdrain System in lieu of Plastic Underdrain System Delete all materials, equipment and labor associated with the installation of the plastic underdrains/ HDPE media support cap in the six contactors and replace it with all labor, material and equipment needed to install stainless steel underdrains in conformance with the specification section 44 43 34 and as shown on Drawings FT-D-131 and FT-D-132.

Add or Deduct (circle one) the following lump sum:

\_\_\_\_\_ Dollars  
(words)  
and \_\_\_\_\_ Cents \$ \_\_\_\_\_  
(numerals)]

7.4. ALTERNATE NO. 5 ADD UV SYSTEM ALTERNATE MANUFACTURER

Delete all materials, equipment and labor associated with the installation of the UV system indicated in Item 1 of the LUMP SUM BID PRICE in Article 5.2 above and replace it with all labor, material and equipment needed to install the UV system provided by the alternate UV manufacturer in conformance with the specification section 44 44 73.

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\_\_\_\_\_ Dollars  
(words)

and \_\_\_\_\_ Cents \$ \_\_\_\_\_  
(numerals)]

7.5. ALTERNATE NO. 6 DEDUCT UV SYSTEM

Delete all materials, equipment and labor associated with the installation of the medium pressure UV system as specified in section 44 44 73 including the reactors, controls, sensors and other components. Replace the three reactors with ductile iron spool pieces of appropriate length and diameter to serve as a placeholder for future installation of the UV equipment. Electrical and controls deletions associated with the UV system include: the cables from the UV module to the control panel, the power wiring from the UV control panel back to the MDP, the UV breaker in the MDP and label space as "Future", and the UV UPS system complete. The conduits with a pull-wire are to remain. Stub-up conduits at the UV module and control panel. Cap off for future use. Delete any cooling water piping, fittings, controls and valves to UV reactor and any drain piping, fittings, controls and valves from the UV reactors to a location 6 inches above the floor. Cap connections of the cooling water and drain piping with blind flange.

\_\_\_\_\_ Dollars  
(words)

and \_\_\_\_\_ Cents \$ \_\_\_\_\_  
(numerals)]

8. TIME OF COMPLETION

8.1. Bidder agrees that the Work, and any Milestones specified in Section 01 31 13, Project Coordination, will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

8.2. Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work, and any specified Milestones, within the Contract Times.

9. ATTACHMENTS TO THIS BID

9.1. The following documents are attached to and made a condition of this Bid:

9.1.1. Required Bid security in the form of Bid bond.

FORT THOMAS WTP ADVANCED TREATMENT

9.1.2. Certification Regarding Debarment, Suspension and Other Responsibilities (EPA Form 5700-49)

9.1.3. Certification Regarding Lobbying, Certification for Contracts, Grants, Loans and Cooperative Agreements

9.1.4. Non-Collusion Affidavit

9.1.5. Bidder's Experience Record

9.1.6. Statement of Bidder's Qualifications

9.1.7. UV Procurement Evaluation

9.1.7.1. Guaranteed Present Worth Table – Option 1 Trojan Technologies

9.1.7.2. Guaranteed Present Worth Table – Option 2 Calgon Corporation

9.1.8. Proposed Subcontractors

9.1.9. Proposed Major Equipment Manufacturers

10. DEFINED TERMS

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

11. BID SUBMITTAL

11.1. This Bid submitted by:

If Bidder is:

An Individual

Name (*typed or printed*): \_\_\_\_\_

By (*signature*): \_\_\_\_\_

Doing business as: \_\_\_\_\_

FORT THOMAS WTP ADVANCED TREATMENT

A Partnership

Partnership Name: \_\_\_\_\_(SEAL)

By: \_\_\_\_\_  
(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): \_\_\_\_\_

A Corporation

Corporation Name: \_\_\_\_\_(SEAL)

State of Incorporation: \_\_\_\_\_

Type (For profit, Professional, Service): \_\_\_\_\_

By: \_\_\_\_\_  
(Signature of Vice President, Vice President, or other Officer –  
attach evidence of authority to sign)

Name (typed or printed): \_\_\_\_\_

Title: \_\_\_\_\_(CORPORATE SEAL)

Attest: \_\_\_\_\_  
(Signature of Corporate Secretary)

Original Date of Qualification to do business in Kentucky is: \_\_\_\_\_

A Joint Venture

Joint Venturer Name: \_\_\_\_\_(SEAL)

By: \_\_\_\_\_  
(Signature of joint venture partner – attach evidence of authority to sign)

Name (typed or printed): \_\_\_\_\_

Title: \_\_\_\_\_

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

FORT THOMAS WTP ADVANCED TREATMENT

Bidder's Business Address: \_\_\_\_\_  
\_\_\_\_\_

Phone No.: \_\_\_\_\_ FAX No.: \_\_\_\_\_

BID SUBMITTED on \_\_\_\_\_, 20\_\_\_\_

(State) Contractor's License No.: \_\_\_\_\_

Contractor's License Class (where applicable): \_\_\_\_\_

A Limited Liability Company

LLC Name: \_\_\_\_\_(SEAL)

State of Organization: \_\_\_\_\_

By: \_\_\_\_\_

*(Signature of Member or Manager – attach evidence of authority to sign)*

Name *(typed or printed)*: \_\_\_\_\_

Title: \_\_\_\_\_(CORPORATE SEAL)

Original Date of Qualification to do business in Kentucky is: \_\_\_\_\_

**END OF SECTION**



# FORT THOMAS WTP ADVANCED TREATMENT

## SECTION \_00 41 13.1 – SUPPLEMENTS TO BID FORM

### 1. FORMS TO BE SUBMITTED WITH BID

- A. Certification Regarding Debarment, Suspension and Other Matters – EPA Form 5700-49 (Attachment No. 1)
- B. Certification Regarding Lobbying (Attachment No. 2)
- C. Non-Collusion Affidavit from Bidder (Attachment No. 3)
- D. Bidder's Qualifications (Attachment No. 4)
- E. Bidder's Experience Record (Attachment No. 5)
- F. UV Procurement Evaluation Guaranteed Present Worth Tables (Attachments 6A and 6B)
- G. Proposed List of Subcontractors (Attachment No. 7)
- H. Proposed Major Equipment Manufacturers ( Attachment No. 8)
- I. Bid Security (Specification Section 00 43 13L)

### 2. FORMS TO BE SUBMITTED WITHIN 7 DAYS OF BID OPENING

Certain information and documentation is required by the funding agencies and other governing bodies prior to awarding a necessary approval for this project. The BIDDER acknowledges, through the act of submitting a Bid, a commitment to submit the following documentation or information within 7 days of Bid Opening or within 5 days of the formal request to do so, whichever is greater. Failure to produce any of this documentation or information within the prescribed period will serve as grounds for rejection of the Bid. If the information is required from a subcontractor or vendor and is not produced within the prescribed, it will serve as grounds to replace the subcontractor or vendor with another company or product.

Specific items to be submitted within 7 days of the Bid opening include:

- A. EPA Form 6100-2 DBE Participation (Attachment 12 – Section 00 74 00)
- B. EPA Form 6100-3 DBE Subcontractor Performance (Attachment 12 – Section 00 74 00)
- C. EPA Form 6100-4 DBE Subcontractor Utilization (Attachment 12 – Section 00 74 00)
- D. Disadvantage Enterprise Participation Policy (Attachment 12 – Section 00 74 00)
- E. List of DBE Bidders of Subcontracts (Attachment 12 – Section 00 74 00)
- F. Validation Report and Other Requested Information from Ultraviolet Disinfection (UV) Vendor

FORT THOMAS WTP ADVANCED TREATMENT

EPA Form 5700-49

Attachment Number 1

**CERTIFICATION REGARDING DEBARMENT,  
SUSPENSION AND OTHER RESPONSIBILITIES**

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 participation in this transaction by any Federal department or agency;

(B) Have not within a three-year period preceding this certification been convicted of or had a civil judgment rendered for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.

(C) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1) (b) of this certification; and

(D) Have not within a three-year period preceding this certification 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 ground 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 appropriate 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 appropriate 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.

FORT THOMAS WTP ADVANCED TREATMENT

Attachment Number 3

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

STATE OF \_\_\_\_\_)

COUNTY OF \_\_\_\_\_)

\_\_\_\_\_ being first duly sworn, deposes and says that:

(1) He/She is \_\_\_\_\_  
(OWNER, PARTNER, REPRESENTATIVE OR AGENT)

of \_\_\_\_\_, the Bidder that has submitted the attached bid;

(2) He/She is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents or representatives, employees or parties in interest, including the affinity has in any way colluded, conspired, connived or agree, directly or indirectly with any other bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the \_Owner of the Project or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees or parties, including this affiant.

SIGNED \_\_\_\_\_

TITLE \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, of this year \_\_\_\_\_

\_\_\_\_\_  
(NAME) (TITLE)

MY COMMISSION EXPIRES: \_\_\_\_\_

CIN380723

NOVEMBER 23, 2009

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SUPPLEMENTS TO BID FORM

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# FORT THOMAS WTP ADVANCED TREATMENT

## Attachment Number 4

### STATEMENT OF BIDDER'S QUALIFICATIONS

All questions shall be answered or the bid document will be incomplete. All data given shall be clear and comprehensive. This statement shall be notarized. If necessary, questions may be answered on separate sheets. The bidder may submit any additional information it desires. If bidder is a joint venture, submit previous joint venture projects. If joint venture has not completed prior projects of this magnitude then submit projects completed by joint venture partners.

1. Name of Bidder:
2. Permanent main office address:
3. When organized:
4. If a corporation, where incorporated:
5. How many years have you been engaged in operation of your business under your present firm or trade name?
6. Contracts on hand. (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion.)
7. General character of work performed by your company (general contractor, electrical contractor, etc.).
8. Have you ever failed to complete any job awarded to you? If so, where and why?
9. Have you ever defaulted on a contract? If so, where and why?
10. List the more important projects completed by your firm, stating the approximate cost for each, and the month and year completed on attached sheet.
11. List your major equipment available for this work.
12. Experience in work similar in complexity, size and/or dollar value to this project. List and describe at least four on the table "Project References."
13. Background and experience of the principal members of your organization, including the officers in this type work. (Attach.)
14. Credit available: \$ \_\_\_\_\_.
15. Give bank reference: \_\_\_\_\_.

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SUPPLEMENTS TO BID FORM

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FORT THOMAS WTP ADVANCED TREATMENT

- 16. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the Owner?  Yes  No
- 17. The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information required by the Owner in verification of the statements made comprising this Statement of Bidder's Qualifications.

Dated at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_, of this year \_\_\_\_\_.

\_\_\_\_\_  
NAME OF BIDDER

BY \_\_\_\_\_

TITLE \_\_\_\_\_

STATE OF \_\_\_\_\_ )

COUNTY OF \_\_\_\_\_ )

ss.

\_\_\_\_\_ being duly sworn deposes and says that he is

\_\_\_\_\_ of \_\_\_\_\_  
(NAME OF ORGANIZATION)

and that the answers to the foregoing questions and all statements contained therein are true and correct.

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, of this year \_\_\_\_\_.

\_\_\_\_\_  
(NOTARY PUBLIC)

My Commission expires \_\_\_\_\_.

**BIDDERS EXPERIENCE RECORD**  
 (PROJECTS NEED TO BE OF SIMILIAR SIZE AND NATURE)

Project Name, Owner, Address, Telephone #	Architect/Engineer, Contact Name, Telephone #	Project Type, Year of Completion	Size of Project (Capacity, Contract Duration)	Contra

FORT THOMAS WTP ADVANCED TREATMENT

Attachment Number 6

UV PROCUREMENT BID EVALUATION

ARTICLE 1 – CALCULATION OF LIFE CYCLE COST

- 1.01 In the preparation and submission of a Bid, the Bidder and its proposed UV System Supplier will provide information required by the Owner in the Bid and Bid Evaluation Forms. This information will be used by the Bidder to calculate Life Cycle Cost using the Present Worth method of analysis. This form shall be completed by each Bidder and its proposed UV System Supplier and shall be submitted with the Bid.
- 1.02 The Bidder and its proposed UV System Supplier acknowledges that the calculation of Life Cycle Cost shall only include those items as identified in this Section. The Owner will not consider or include any item not listed herein. The Owner will not consider any other method of calculation other than what has been provided.
- 1.03 The Bidder and its proposed UV System Supplier acknowledges that the Owner shall be the sole judge of the values used to calculate the Present Worth. The Bidder and its proposed UV System Supplier acknowledges that the design and operational parameters of the Proposed UV System shall be evaluated by the Owner to justify the proposed cost criteria. Inaccurate or unjustifiable data shall be subject to disqualification which shall render the Bidder unresponsive.
- 1.04 The Bidder and its proposed UV System Supplier acknowledges review and acceptance of the performance warranty, component life warranty, price guarantee, and liquidated damage requirements of Sections including the Agreement and UV System.
- 1.05 The Bidder and its proposed UV System Supplier shall submit life cycle cost information for each UV system proposed. Bidder recognizes that Owner reserves the right to award the UV system based on either the lowest capital cost or the lowest lifecycle cost or based on other financial and non-financial considerations as the Owner determines to be in the best interest of the project.

ARTICLE 2 -- CALCULATION OF COSTS

2.01 Basis of Calculation

A. Cost Factors

1.	Present Worth Factor (PWF)	13.41 (25 yrs @ 5.5%)
2.	Cost of Energy (EC)	\$0.08/kW-hr
3.	Hours per Year	8,766
4.	BHP / kW Conversion	0.7457



FORT THOMAS WTP ADVANCED TREATMENT

B. Ultraviolet Disinfection System

1. UV System equipment design parameters shall be as specified in Section 44 44 73. For the purposes of calculating life-cycle costs, the following information shall be considered:
  - a. Average Daily Flow (ADF) is 23.5 MGD
  - b. Average UV Transmittance is 95%
  - c. Reduction Equivalent Dose is 8.5 mJ/CM<sup>2</sup>

FORT THOMAS WTP ADVANCED TREATMENT

Attachment Number 6A

GUARANTEED PRESENT WORTH TABLE - OPTION 1 TROJAN TECHNOLOGIES

LINE	ITEM	UNITS	AMOUNT
<b><i>LUMP SUM BID PRICE FOR TROJAN EQUIPMENT</i></b>			
A	For furnishing all materials, equipment and labor needed to install the complete UV disinfection system as shown on the Drawings or specified herein- Lump Sum Amount of:	\$	
B	UV Reactor Model		
C	UV Reactor Flange Diameter (inches)		
D	Number of lamps installed per UV reactor		
E	Number of duty reactors (excluding standby reactor)		
<b><i>SYSTEM OPERATING PERFORMANCE INFORMATION AT ADF</i></b>			
1	Number of Reactors operating at ADF	EA	
2	Total number of Lamps in service at ADF	EA	
3	Total number of Ballasts Size 1 in service at ADF Size = _____ kW	EA	
4	Total number of Ballasts Size 2 in service at ADF Size = _____ kW	EA	
5	Total number of Sensors in service at ADF	EA	
6	Warranted Lamp Life (Not to Exceed 12,000 Hours)	Hours	
7	Warranted Ballast Life (Not to Exceed 10 Years)	Years	
8	Warranted Sensor Life (Not to Exceed 10 Years)	Years	
9	Warranted Lamp Sleeve Life	Years	
10	Guaranteed Lamp Replacement Cost	\$	
11	Guaranteed Ballast Size 1 Replacement Cost	\$	
12	Guaranteed Ballast Size 2 Replacement Cost	\$	
13	Guaranteed UV Sensor Replacement Cost	\$	
14	Guaranteed Lamp Sleeve Replacement Cost	\$	
15	Guaranteed Maximum Total UV System Power Consumption at ADF	kW	

FORT THOMAS WTP ADVANCED TREATMENT

<b>LIFECYCLE COST EVALUATIONS</b>			
16	Annual Power Consumption (Line 15 x 8,766 hrs/yr)	kW-h/yr	
17	Annual Power Cost (Line 16 x \$.08/kw-H)	\$/yr	
18	POWER -PRESENT WORTH VALUE (LINE 17 X 13.41 )	\$	
19	Lamps Replaced Annually [(8,766/Line 6) x Line 2]	Lamps/Yr	
20	Annual Lamp Replacement Cost (Line 19 x Line 10)	\$	
21	LAMP REPLACEMENT PRESENT WORTH (Ln 20 x 13.41)	\$	
22	Ballasts Size 1 Replaced Annually(Line 3 /Line 7)	Blst1/yr	
23	Annual Ballast Size 1 Replacement Cost (Line 22 x Line 11)	\$	
24	BALLAST Size 1 REPLACEMENT PRES WORTH (Ln 23 x 13.41)	\$	
25	Ballasts Size 2 Replaced Annually(Line 4 /Line 7)	Blst2/yr	
26	Annual Ballast Size 2 Replacement Cost (Line 25 x Line 12)	\$	
27	BALLAST Size 2 REPLACEMENT PRES WORTH (Ln 26 x 13.41)	\$	
28	Sensors Replaced Annually (Line 5 /Line 8)	Snsr/yr	
29	Annual Sensor Replacement Cost (Line 28 x Line 13)	\$	
30	SENSOR REPLACEMENT PRES WORTH (Ln 29 x 13.41)	\$	
<b>TOTAL LIFECYCLE COST</b>			
31	Trojan Present Worth (Ln A+ Ln18+ Ln21+ Ln 24+ Ln27+Ln30)	\$	
<b>Certification by:</b>			
<b>Bidder:</b>			
			(signature)
Name: _____			(typed or printed)
<b>UV System Supplier:</b>			
			(signature)
Name: _____			(typed or printed)

FORT THOMAS WTP ADVANCED TREATMENT

Attachment Number 6B

GUARANTEED PRESENT WORTH TABLE - OPTION 2 CALGON CORPORATION

LINE	ITEM	UNITS	AMOUNT
<b><i>LUMP SUM BID PRICE FOR CALGON EQUIPMENT</i></b>			
A	For furnishing all materials, equipment and labor needed to install the complete UV disinfection system as shown on the Drawings or specified herein– Lump Sum Amount of:	\$	
B	UV Reactor Model		
C	UV Reactor Flange Diameter (inches)		
D	Number of lamps installed per UV reactor		
E	Number of duty reactors (excluding standby reactor)		
<b><i>SYSTEM OPERATING PERFORMANCE INFORMATION AT ADF</i></b>			
1	Number of Reactors operating at ADF	EA	
2	Total number of Lamps in service at ADF	EA	
3	Total number of Ballasts Size 1 in service at ADF Size = _____ kW	EA	
4	Total number of Ballasts Size 2 in service at ADF Size = _____ kW	EA	
5	Total number of Sensors in service at ADF	EA	
6	Warranted Lamp Life (Not to Exceed 12,000 Hours)	Hours	
7	Warranted Ballast Life (Not to Exceed 10 Years)	Years	
8	Warranted Sensor Life (Not to Exceed 10 Years)	Years	
9	Warranted Lamp Sleeve Life	Years	
10	Guaranteed Lamp Replacement Cost	\$	
11	Guaranteed Ballast Size 1 Replacement Cost	\$	
12	Guaranteed Ballast Size 2 Replacement Cost	\$	
13	Guaranteed UV Sensor Replacement Cost	\$	
14	Guaranteed Lamp Sleeve Replacement Cost	\$	
15	Guaranteed Maximum Total UV System Power Consumption at ADF	kW	

FORT THOMAS WTP ADVANCED TREATMENT

<b>LIFECYCLE COST EVALUATIONS</b>			
16	Annual Power Consumption (Line 15 x 8,766 hrs/yr)	kW-h/yr	
17	Annual Power Cost (Line 16 x \$.08/kw-H)	\$/yr	
18	POWER -PRESENT WORTH VALUE (LINE 17 X 13.41 )	\$	
19	Lamps Replaced Annually [(8,766/Line 6) x Line 2]	Lamps/Yr	
20	Annual Lamp Replacement Cost (Line 19 x Line 10)	\$	
21	LAMP REPLACEMENT PRESENT WORTH (Ln 20 x 13.41)	\$	
22	Ballasts Size 1 Replaced Annually(Line 3 /Line 7)	Blst1/yr	
23	Annual Ballast Size 1 Replacement Cost (Line 22 x Line 11)	\$	
24	BALLAST Size 1 REPLACEMENT PRES WORTH (Ln 23 x 13.41)	\$	
25	Ballasts Size 2 Replaced Annually(Line 4 /Line 7)	Blst2/yr	
26	Annual Ballast Size 2 Replacement Cost (Line 25 x Line 12)	\$	
27	BALLAST Size 2 REPLACEMENT PRES WORTH (Ln 26 x 13.41)	\$	
28	Sensors Replaced Annually (Line 5 /Line 8)	Snsr/yr	
29	Annual Sensor Replacement Cost (Line 28 x Line 13)	\$	
30	SENSOR REPLACEMENT PRES WORTH (Ln 29 x 13.41)	\$	
<b>TOTAL LIFECYCLE COST</b>			
31	Calgon Present Worth (Ln A+ Ln18+ Ln21+ Ln 24+ Ln27+Ln30)	\$	
<b>Certification by:</b>			
_____		(signature)	
Name: _____		(typed or printed)	
<b>UV System Supplier:</b>			
_____		(signature)	
Name: _____		(typed or printed)	

FORT THOMAS WTP ADVANCED TREATMENT

ARTICLE 3 – NOTES ON TABLE ENTRIES

- 3.01 For determining Guaranteed Maximum Total UV System Power Consumption at ADF, include power use in the lamps, power transformers, ballasts and other miscellaneous power consuming components.
- 3.02 Owner will use the Guaranteed Maximum Total UV System Power Consumption at ADF for determination of Excess power consumption penalties as specified in Section 44 44 73 paragraph 3.06.
- 3.03 This analysis will be based on average daily flow. Assume lamps are at end-of-life.
- 3.04 End of Lamp life shall be defined as 80 percent of initial 100-hour output for the purposes of this analysis.
- 3.05 Guaranteed Replacement Price per lamp shall include disposal of used lamps.

**END OF ATTACHMENT NO. 6**

FORT THOMAS WTP ADVANCED TREATMENT

ATTACHMENT NO. 7

**PROPOSED SUBCONTRACTORS**

The BIDDER'S proposed subcontractors shall be listed below for the various branches of work included in the proposed contract. All subcontractors are subject to the approval of the OWNER. **Unless rejected by the OWNER, no substitutions or changes to the listing of the entities proposed to perform that branch of the work will be allowed following opening of the Bids.**

Where the BIDDER proposes to perform the work with its own forces, the phrase "Prime Contractor" shall be entered in the box provided.

**Failure to submit a completed list shall be cause for rejection of the Bid.**

Branch of Work	Name of Subcontractor
1. Excavation & Grading	
2. Concrete Work	
3. Masonry	
4. Electrical	
4. Panel Fabricator	
5. Instrumentation & Controls	
6. Mechanical	

FORT THOMAS WTP ADVANCED TREATMENT

ATTACHMENT NO. 8

**PROPOSED MAJOR EQUIPMENT MANUFACTURERS**

The BIDDER'S proposed major equipment manufacturers included in their Base Bid price shall be listed below for the requested items. **For the purposes of determining low Bidder, the Bidder shall include only manufacturers named in the specifications. Substitute or "or equal" manufacturer's will be considered after the Bid.** The OWNER reserves the right to reject any equipment manufacturers not listed in the Specifications. **Unless rejected by the OWNER, no substitutions or changes to this list of the major equipment manufacturers will be allowed after opening of the Bids.**

**Failure to submit a completed list shall be cause for rejection of the Bid.**

Major Equipment Item	Name of Manufacturer
1. Filter Underdrain System	
2. Vertical Turbine Pumps- GAC Feed Pumps GAC and Filter Backwash Pumps	
3. Rotary Postivie Displacement Blower	
4. Granular Activated Carbon Filter Media	
5. Diesel Engine Generator Set	

**End of Section**



FORT THOMAS WTP ADVANCED TREATMENT

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)  
Northern Kentucky Water District  
2835 Crescent Springs Road  
P.O. Box 18640  
Erlanger, Kentucky 41018

BID

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

BOND

Bond Number:  
Date (Not later than Bid due date):

Penal sum \_\_\_\_\_  
(Words) (Figures)

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

BIDDER

SURETY

\_\_\_\_\_(Seal)  
Bidder's Name and Corporate Seal

\_\_\_\_\_(Seal)  
Surety's Name and Corporate 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.

## FORT THOMAS WTP ADVANCED TREATMENT

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 delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
  - 3.2. All Bids are rejected by Owner, or
  - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

**END OF SECTION**

FORT THOMAS WTP ADVANCED TREATMENT

AGREEMENT

This form is a sample that will be executed after the award of the project and may be modified.

THIS AGREEMENT is by and between Northern Kentucky Water District

(Owner) and \_\_\_\_\_  
\_\_\_\_\_  
(Contractor).

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

1. WORK

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

1.1.1. A concrete and masonry Advanced Treatment building housing 10 Granular Activated Carbon contactors with 12 feet of media depth, a rotary positive displacement blower for contactor air scour, a low lift pump station, 3 medium pressure high output ultraviolet disinfection reactors, a 2 ton bridge crane in the UV Disinfection Room, a concrete equalization tank beneath the building with submersible pumps, and ancillary systems including but not limited to controls, security systems, chemical feed, plumbing, heating, air conditioning and ventilating. , The pump room contains vertical turbine pumps with adjustable frequency drives including 3 GAC feed pumps, 2 backwash pumps and 2 slurry water supply pumps and is served by a 5 ton bridge crane. A service elevator, and monorail crane will be installed. Roofing systems include a pitched vegetated roofing system, a metal roof, and a flat modified bituminous roof with pavers.

A standby electrical power system is provided with capacity to serve a majority of the plant systems. Site work including excavation, yard piping, concrete valve vaults, a splitter box with sluice gates, a concrete outfall structure, fencing, concrete and asphalt paving, grading and landscaping.

Demolition of existing backwash pumps and connections of piping to existing piping and concrete flumes will be completed in the existing filter building.

The existing treatment facilities and laboratory must be kept in operation during construction.

## FORT THOMAS WTP ADVANCED TREATMENT

The Bid Form includes some alternate items. See Article 5 of this Agreement for indication of the alternates that are adopted in the Agreement.

### 2. THE PROJECT

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

The Work is the whole construction of the Project.

### 3. ENGINEER

3.1. The Project has been designed by CH2M HILL, HDR, Freeland Harris, and TRG, and Viox & Viox (Engineer), who are to perform duties assigned to Engineer in the Supplementary Conditions in connection with the completion of the Work in accordance with the Contract Documents.

3.2. The Project construction administration will be performed by the Owner as the Construction Contract Administrator, assume all duties and responsibilities, and have the rights and authority assigned to the Construction Contract Administrator in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

### 4. CONTRACT TIMES

4.1. Time is of the Essence: 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.

4.2. Days to Achieve Substantial Completion and Final Payment:

4.2.1. The Work shall be substantially completed within 730 days from the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 790 days after the date when the Contract Times commence to run.

4.3. Liquidated Damages:

4.3.1. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph Contract Times above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of

FORT THOMAS WTP ADVANCED TREATMENT

requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner One Thousand Five Hundred Dollars(\$1,500) for each day that expires after the time specified herein for Substantial Completion until the Work is substantially complete in accordance with Paragraph 14.04 of the General Conditions. .

4.3.2. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner One Thousand Dollars (\$1,000) for each day that expires after the time specified herein for completion and readiness for final payment until the Work is completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions. .

5. CONTRACT PRICE

5.1. Owner will 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 the following:

5.1.1. Lump Sum: For all Base Bid Work including allowances, a lump sum of:

\_\_\_\_\_ Dollars  
(Words)

and \_\_\_\_\_ Cents \$ \_\_\_\_\_  
(Words) (Figures)

5.1.1.1. The above lump sum amount reflects Owner's adoption of the following alternates:

5.1.1.1.1. ALTERNATE NO. 1 DEDUCT Air Scour System

Circle one: ADOPTED \_\_\_\_\_: NOT ADOPTED \_\_\_\_\_

5.1.1.1.2. ALTERNATE NO. 2 DEDUCT Electric Traction Elevator

Circle one: ADOPTED \_\_\_\_\_: NOT ADOPTED \_\_\_\_\_

5.1.1.1.3. ALTERNATE NO. 3 DEDUCT VEGETATED ROOF ASSEMBLY

Circle one: ADOPTED \_\_\_\_\_: NOT ADOPTED \_\_\_\_\_

FORT THOMAS WTP ADVANCED TREATMENT

5.1.1.1.4. ALTERNATE NO. 4 ADD or DEDUCT Stainless Steel Underdrain System in lieu of Plastic Underdrain System

Circle one: ADOPTED \_\_\_\_\_ : NOT ADOPTED \_\_\_\_\_

5.1.1.1.5. ALTERNATE NO. 5 ADD UV SYSTEM ALTERNATE MANUFACTURER

Circle one: ADOPTED \_\_\_\_\_ : NOT ADOPTED \_\_\_\_\_

5.1.1.1.6. ALTERNATE NO. 6 DEDUCT UV SYSTEM

Circle one: ADOPTED \_\_\_\_\_ : NOT ADOPTED \_\_\_\_\_

5.1.1.2. All specific contingency allowances are included in the above lump sum price and have been computed in accordance with Paragraph 11.02 of the General Conditions.

6. PAYMENT PROCEDURES

6.1. Submittal and Processing of Payments: 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.

6.2. Progress Payments and Retainage: Owner will make progress payments on account of the Contract Price on the basis of Contractor's Application for Payment on the date of each month as established in the preconstruction conference during performance of the Work as provided herein. 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.

6.2.1. Retainage: In addition to any amounts withheld from payment in accordance with Paragraph 14.02 of the General Conditions, Owner shall retain from progress payments amounts equal to the following percentages:

6.2.1.1. Ten percent (10%) of the amount of the Work completed. This amount may be reduced by the Owner in its sole and absolute discretion, if the project is substantially completed; and

6.2.1.2. Ten percent (10%) of the value of materials and equipment that are not incorporated in the Work but are delivered, suitably stored, and accompanied by documentation satisfactory to Owner as provided

## FORT THOMAS WTP ADVANCED TREATMENT

in paragraph 14.01.A.1 of the General Conditions. Retainage for stored materials and equipment will be released when the materials and equipment are incorporated in the Work.

6.2.2. All retainage will be paid to Contractor when the Work is completed and ready for final payment in accordance with paragraph 14.07.C of the General Conditions. Consent of the Surety shall be obtained before retainage is paid by Owner. Consent of the Surety, signed by an agent, must be accompanied by a certified copy of such agent's authority to act for the Surety.

### 6.3. Final Payment:

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

## 7. INTEREST

7.1. All monies not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of 12 percent per annum.

## 8. CONTRACTOR'S REPRESENTATIONS

8.1. In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

8.1.1. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

8.1.2. 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.

8.1.3. 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.

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

## FORT THOMAS WTP ADVANCED TREATMENT

Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.

8.1.5. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

8.1.6. 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.

8.1.7. 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.

8.1.8. 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.

8.1.9. 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.

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



## FORT THOMAS WTP ADVANCED TREATMENT

### 9. CONTRACT DOCUMENTS

#### 9.1. Contents:

9.1.1. The Contract Documents that are attached to this Agreement (except as expressly noted otherwise) consist of the following:

9.1.1.1. This Agreement (pages 1 to \_\_\_\_\_, inclusive).

9.1.1.2. Performance bond (pages \_\_\_\_\_ to \_\_\_\_\_, inclusive).

9.1.1.3. Payment bond (pages \_\_\_\_\_ to \_\_\_\_\_, inclusive).

9.1.1.4. General Conditions (pages \_\_\_\_\_ to \_\_\_\_\_, inclusive).

9.1.1.5. Supplementary Conditions (pages \_\_\_\_\_ to \_\_\_\_\_, inclusive).

9.1.1.6. Supplemental Conditions for State Revolving Fund EPA Special Appropriations Grants (pages \_\_\_\_\_ to \_\_\_\_\_, inclusive).

9.1.1.7. Specifications as listed in the table of contents of the Project Manual.

9.1.1.8. Drawings consisting of \_\_\_\_\_ sheets with each sheet bearing the following general title: "Advanced Treatment Fort Thomas Treatment Plant".

9.1.1.9. Addenda (numbers \_\_\_\_\_ to \_\_\_\_\_, inclusive).

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

9.1.2.1. Contractor's Bid including Supplements to Bid Form (pages \_\_\_\_\_ to \_\_\_\_\_, inclusive).

9.1.2.2. Documentation submitted by Contractor prior to Notice of Award (pages \_\_\_\_\_ to \_\_\_\_\_, inclusive).

9.1.3. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

9.1.3.1. Notice to Proceed (pages \_\_\_\_\_ to \_\_\_\_\_, inclusive).

9.1.3.2. Work Change Directives.

9.1.3.3. Change Order(s).

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

## FORT THOMAS WTP ADVANCED TREATMENT

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

### 10. COMPLIANCE WITH KENTUCKY LAW

10.1. Contractor represents and warrants that it has revealed to Owner any and all final determinations of a violation of KRS Chapters 136, 139, 141, 337, 338, 341 and 342 by Contractor or any subcontractor within the previous five years. Contractor further represents and warrants that it and each of its subcontractors will remain in continuous compliance with the provisions of KRS Chapters 136, 139, 141, 337, 338, 341 and 342 for the duration of this Agreement. Contractor understands that its failure to reveal a final determination of a violation or to comply with the above statutory requirements constitutes grounds for cancellation of the Agreement and for disqualification of Contractor from eligibility for any contracts for a period of two years.

### 11. EQUAL OPPORTUNITY

11.1. Unless exempted under KRS 45.590, during the performance of the Agreement, the Contractor agrees as follows:

11.1.1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, age forty (40) and over, disability, veteran status, or national origin;

11.1.2. The Contractor will take affirmative action in regard to employment, upgrading, demotion, transfer, recruitment, recruitment advertising, layoff, termination, rates of pay or other forms of compensation, and selection for training, so as to ensure that applicants are employed and that employees during employment are treated without regard to their race, color, religion, sex, age forty (40) and over, disability, veteran status, or national origin.

11.1.3. The Contractor will state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, age forty (40) and over, disability, veteran status, or national origin.

11.1.4. The Contractor will post notices in conspicuous places, available to employees and applicants for employment, setting forth the provisions of the nondiscrimination clauses required by this section; and

11.1.5. The Contractor will send a notice to each labor union or representative of workers with which it has collective bargaining agreement or other contract or understanding advising the labor union or workers' representative of the Contractor's commitments under the nondiscrimination clauses.

12. MISCELLANEOUS

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

12.2. Successors and Assigns: 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.

12.3. Severability: 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 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.

12.4. Assignment of Contract:

12.4.1. No assignment by a party hereto of any rights under or interests in the Contract shall 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 shall release or discharge the assignor from any duty or responsibility under the Contract Documents.

FORT THOMAS WTP ADVANCED TREATMENT

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

This Agreement will be effective on \_\_\_\_\_, 20\_\_ (which is the Effective Date of the Agreement).

OWNER: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: \_\_\_\_\_

Attest: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Address for giving notices:

Address for giving notices:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Owner-Contractor Agreement.)

License No. \_\_\_\_\_  
(Where applicable)

Agent for service or process: \_\_\_\_\_

\_\_\_\_\_

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

END OF SECTION

FORT THOMAS WTP ADVANCED TREATMENT

PERFORMANCE BOND FORM

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):  
Northern Kentucky Water District  
2835 Crescent Springs Road  
P.O. Box 18640  
Erlanger, Kentucky 41018

CONTRACT

Date:  
Amount:  
Description (Name and Location): Fort Thomas Treatment Plant, 700 Alexandria Pike, Fort Thomas, KY 41075. The Project contemplated consists of constructing a 3-story concrete and masonry Advanced Treatment building with concrete water holding structures beneath and granular activated carbon treatment contactors, medium pressure high output Ultra violet reactors, pumping systems and air scour system. Modifications to piping and channels in and around an existing filter building are included along with addition of a standby electrical power generator. Project includes necessary piping, electrical, instrumentation, and other appurtenances for the Advanced Treatment systems, including SCADA system and site paving and grading.

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

SURETY

Company:  
Signature: \_\_\_\_\_ (Seal)  
Name and Title

\_\_\_\_\_  
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

FORT THOMAS WTP ADVANCED TREATMENT

CONTRACTOR AS PRINCIPAL

SURETY

Company:

Signature: \_\_\_\_\_ (Seal)  
Name and Title

\_\_\_\_\_  
Surety's Name and Corporate Seal

By: \_\_\_\_\_  
Signature and Title

(Attach Power of Attorney)

Attest: \_\_\_\_\_  
Signature and Title

## FORT THOMAS WTP ADVANCED TREATMENT

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;

# FORT THOMAS WTP ADVANCED TREATMENT

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)

**END OF SECTION**



**PAYMENT BOND FORM**

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):  
Northern Kentucky Water District  
2835 Crescent Springs Road  
P.O. Box 18640  
Erlanger, Kentucky 41018

**CONTRACT**

Date:  
Amount:  
Description (Name and Location): Fort Thomas Treatment Plant, 700 Alexandria Pike, Fort Thomas, KY 41075. The Project contemplated consists of constructing a 3-story concrete and masonry Advanced Treatment building with concrete water holding structures beneath and granular activated carbon treatment contactors, medium pressure high output Ultra violet reactors, pumping systems and air scour system. Modifications to piping and channels in and around an existing filter building are included along with addition of a standby electrical power generator. Project includes necessary piping, electrical, instrumentation, and other appurtenances for the Advanced Treatment systems, including SCADA system and site paving and grading.

**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

\_\_\_\_\_  
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

\_\_\_\_\_  
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. Reserved.

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):

**END OF SECTION**

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

# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

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and

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Endorsed by



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

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## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

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

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

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be 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.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *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 Subcontractor.
48. *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.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *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.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

## 1.02 Terminology

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

### B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

### C. *Day:*

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

### D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
  - a. does not conform to the Contract Documents; or
  - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
  - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

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

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
  2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
  3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
  4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## ARTICLE 2 – PRELIMINARY MATTERS

### 2.01 *Delivery of Bonds and Evidence of Insurance*

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

### 2.02 *Copies of Documents*

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

### 2.03 *Commencement of Contract Times; Notice to Proceed*

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



2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
  - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
  - 2. a preliminary Schedule of Submittals; and
  - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
  - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of

the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

### **ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE**

#### **3.01 *Intent***

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

#### **3.02 *Reference Standards***

- A. Standards, Specifications, Codes, Laws, and Regulations
  1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
  2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

#### **3.03 *Reporting and Resolving Discrepancies***

- A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

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

3.04 *Amending and Supplementing Contract Documents*

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

3. Engineer's written interpretation or clarification.

### 3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
  2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

### 3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

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

### 4.01 *Availability of Lands*

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

Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

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

#### 4.02 *Subsurface and Physical Conditions*

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

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

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the 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 officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

- 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
- 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

#### 4.03 *Differing Subsurface or Physical Conditions*

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

- 1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
- 2. is of such a nature as to require a change in the Contract Documents; or

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

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

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

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
  - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
  - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
  - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
  - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
  - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other

professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

#### 4.04 *Underground Facilities*

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

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
  - a. reviewing and checking all such information and data;
  - b. locating all Underground Facilities shown or indicated in the Contract Documents;
  - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
  - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

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

or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the 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 officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
  - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
  - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
  - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by



Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

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

- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

## ARTICLE 5 – BONDS AND INSURANCE

### 5.01 *Performance, Payment, and Other Bonds*

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

### 5.02 *Licensed Sureties and Insurers*

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

### 5.03 *Certificates of Insurance*

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

- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
  - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
  - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
  - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
  - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
    - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
    - b. by any other person for any other reason;
  - 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
  - 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, 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, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 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);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
  - a. Such insurance shall remain in effect for two years after final payment.
  - b. Contractor shall furnish Owner and each other additional insured identified in the 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.

#### 5.05 *Owner's Liability Insurance*

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

#### 5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
  2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, 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 that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
  3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
  4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
  5. allow for partial utilization of the Work by Owner;
  6. include testing and startup; and
  7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown 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, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property

insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

#### 5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:
  - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
  - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery

against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

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

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

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

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

## ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

### 6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

### 6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

### 6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.



#### 6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
  2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

#### 6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
    - a. in the exercise of reasonable judgment Engineer determines that:
      - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
      - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
      - 3) it has a proven record of performance and availability of responsive service.
    - b. Contractor certifies that, if approved and incorporated into the Work:
      - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
      - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
  - 1) shall certify that the proposed substitute item will:
    - a) perform adequately the functions and achieve the results called for by the general design,
    - b) be similar in substance to that specified, and
    - c) be suited to the same use as that specified;
  - 2) will state:
    - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
    - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
    - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
  - 3) will identify:
    - a) all variations of the proposed substitute item from that specified, and
    - b) available engineering, sales, maintenance, repair, and replacement services; and

- 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

#### 6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or

other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
  - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
  - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

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

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all

court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

#### 6.10 *Taxes*

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

#### 6.11 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

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

- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor

shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

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

#### 6.12 *Record Documents*

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

#### 6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. all persons on the Site or who may be affected by the Work;
  2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

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

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.



1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

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

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

C. *Submittal Procedures:*

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

Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

*D. Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

*E. Resubmittal Procedures:*

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

6.18 *Continuing the Work*

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

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
  2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
1. observations by Engineer;
  2. recommendation by Engineer or payment by Owner of any progress or final payment;
  3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
  4. use or occupancy of the Work or any part thereof by Owner;
  5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
  6. any inspection, test, or approval by others; or
  7. any correction of defective Work by Owner.

#### 6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor,

Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
  - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
  - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

#### 6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

## ARTICLE 7 – OTHER WORK AT THE SITE

### 7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
  - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
  - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

### 7.02 *Coordination*

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

7.03 *Legal Relationships*

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

**ARTICLE 8 – OWNER'S RESPONSIBILITIES**

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

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

8.03 *Furnish Data*

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

8.04 *Pay When Due*

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

8.05 *Lands and Easements; Reports and Tests*

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

8.06 *Insurance*

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

8.07 *Change Orders*

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

8.08 *Inspections, Tests, and Approvals*

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

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

**ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION**

9.01 *Owner's Representative*

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

9.02 *Visits to Site*

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

and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

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

#### 9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

#### 9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

#### 9.05 *Rejecting Defective Work*

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

#### 9.06 *Shop Drawings, Change Orders and Payments*

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



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

9.07 *Determinations for Unit Price Work*

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

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

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

**ARTICLE 10 – CHANGES IN THE WORK; CLAIMS**

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

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

### 10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
  2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
  3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

### 10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

### 10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The

opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
  2. approve the Claim; or
  3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

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

### **11.01 *Cost of the Work***

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

Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
  - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
  - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
  - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
  - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
  - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

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

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
  - 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
  - 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
  - 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
  - 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

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

#### 11.02 *Allowances*

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances:*

1. Contractor agrees that:

- a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
- b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

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

- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

#### 11.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
  2. there is no corresponding adjustment with respect to any other item of Work; and
  3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

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

### **12.01 *Change of Contract Price***

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
  3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
  2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
    - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
    - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;



- c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
- d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

#### 12.02 *Change of Contract Times*

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

#### 12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the

control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

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

### *13.01 Notice of Defects*

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

### *13.02 Access to Work*

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

### *13.03 Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
  - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
  - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
  - 3. as otherwise specifically provided in the Contract Documents.

- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

#### 13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

### 13.05 *Owner May Stop the Work*

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

### 13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

### 13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. repair such defective land or areas; or
  - 2. correct such defective Work; or
  - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
  - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute

resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

#### 13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

#### 13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and

equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

## **ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION**

### **14.01 *Schedule of Values***

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

### **14.02 *Progress Payments***

#### **A. *Applications for Payments:***

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

Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

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

B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
  - a. the Work has progressed to the point indicated;
  - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
  - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
  - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
  - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
  - a. to supervise, direct, or control the Work, or

- b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
  - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
  - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
  - b. the Contract Price has been reduced by Change Orders;
  - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
  - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

*C. Payment Becomes Due:*

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

*D. Reduction in Payment:*

- 1. Owner may refuse to make payment of the full amount recommended by Engineer because:
  - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
  - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
  - c. there are other items entitling Owner to a set-off against the amount recommended; or



- d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

#### 14.03 *Contractor's Warranty of Title*

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

#### 14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities

pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

#### 14.05 *Partial Utilization*

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

#### 14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

## 14.07 *Final Payment*

### A. *Application for Payment:*

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

### B. *Engineer's Review of Application and Acceptance:*

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

### C. *Payment Becomes Due:*

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

#### 14.08 *Final Completion Delayed*

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

#### 14.09 *Waiver of Claims*

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

### **ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION**

#### 15.01 *Owner May Suspend Work*

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

#### 15.02 *Owner May Terminate for Cause*

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

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
  2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
  3. Contractor's repeated disregard of the authority of Engineer; or
  4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
  2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
  3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

#### 15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
  2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
  3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
  4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

#### 15.04 *Contractor May Stop Work or Terminate*

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

## ARTICLE 16 – DISPUTE RESOLUTION

### 16.01 *Methods and Procedures*

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
  - 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
  - 2. agrees with the other party to submit the Claim to another dispute resolution process; or
  - 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

## ARTICLE 17 – MISCELLANEOUS

### 17.01 *Giving Notice*

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

### 17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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



**SUPPLEMENTARY CONDITIONS**

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

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

SC-1.01.A.19 Add the following new sentences at the end of the Paragraph:

Where ever the terms "Engineer" or "Engineer's" appears in these Contract Documents it shall be understood that the terms apply to the position of the Construction Contract Administrator. Exceptions to this are where both "Engineer" and "Construction Contract Administrator" appear in the same sentence or where referring to the following activities: review of technical submittals such as shop drawings, preparation of the overall project operations manual that will incorporate equipment manuals from the Contractor, and configuration of controls software and operations screens. Engineer will assist Construction Contract Administrator in review of Change Orders, Field Orders, Work Change Directives, and requests for information. The terms "Construction Contract Administrator" or "Construction Contract Administrator's" have been inserted in the Contract Documents in some places, but the terms "Engineer" or "Engineer's" are frequently used in these Contract Documents.

The Engineer will retain full responsibility for its design. The Construction Contract Administrator is not authorized to change the design intent without Engineer's written approval.

SC-1.01. Add the following language at the end of Paragraph 1.01.A.45:

Substantial Completion is further defined as (i) that degree of completion of the Project's operating facilities or systems sufficient to provide Owner the full time, uninterrupted, and continuous beneficial operation of the Work; and (ii) all required functional, performance and acceptance or startup testing has been successfully demonstrated for all components, devices, equipment, and instrumentation and control to the satisfaction of Construction Contract Administrator in accordance with the requirements of the Specifications. Final paving and installation of vegetated roof shall be completed but seeding and landscape planting are not required to be completed for substantial completion.

SC-1.01. Add the following new paragraphs immediately after Paragraph 1.01.A.52:

1.01.A.53 *Construction Contract Administrator* – The individual or entity with whom the Owner has entered into an agreement for administration of construction activities. The term Construction Contract Administrator is understood to be substituted for the word “Engineer” everywhere in these Contract Documents except where both terms appear in the same sentence or where the duties described are those set forth for the Engineer in paragraph SC-1.01.A.19..

1.01.A.54 *Final Completion* - The time when all work is complete, including all punch list items, and all documents required for occupancy of the facility are completed and submitted to the Owner. These documents include but are not limited to, Certificate of Occupancy, Letters of Approval from various regulatory agencies, inspection certificates and all other items as required in paragraph 14.07.

1.01.A.55 *General Contractor* – The person, firm, or corporation with whom Owner has entered into Agreement for a complete project, general trades, or complete project less a part of the project.

1.01.A.56 *Without exception*- The term “without exception” when used in the Contract Documents following the name of a Supplier or a proprietary item of equipment, product, or material, shall mean that the sources of the product are limited to the listed Suppliers or products and that no like, equivalent, or “or-equal” item and no substitution will be considered.

1.01.A.57 *Written Notice* – Notice to any party that is in writing and which shall be considered delivered and the service thereof completed once posted by certified or registered mail to the party to whom the notice is sent at its last given address or delivered in person to said party or its authorized representative on the work.

1.01.A.58 *Specialist*—The term Specialist refers to a person, partnership, firm, corporation or other entity of established reputation (or if newly organized, whose personnel have previously established a reputation in the same field), which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the Contract Documents, or otherwise performing Work required by the Contract Documents. Where the Specifications require the installation by a Specialist, that term shall also be deemed to mean either the manufacturer of the item, a person, partnership, firm, corporation, or other entity licensed by the manufacturer, or a person, partnership, firm, corporation, or other entity who will perform the Work under the manufacturer’s direct supervision.

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SC-1.01. Add the following language at the end of Article 1:

G. Imperative Mood. These specifications are written to the BIDDER before the award of the Contract and to the CONTRACTOR after award of the Contract. The sentences that direct the CONTRACTOR to perform work are mostly written as commands. For example, a requirement to provide cold-weather protection would be expressed as, "Provide cold-weather protection for concrete," rather than "the Contractor shall provide cold-weather protection for concrete." In the imperative mood, the subject "the Bidder" or "the Contractor" is understood.

H. Construction Contract Administrator Interpretations. In order to avoid cumbersome and confusing repetition of expressions in these specifications, it is provided that whenever anything is, or is to be done, if, as, or when or where "demonstrated, contemplated, required, directed, specified, authorized, ordered, given, designated, indicated, considered necessary, deemed necessary, permitted, reserved, suspended, established, approval, approved, disapproved, acceptable, unacceptable, suitable, satisfactory, sufficient, insufficient, rejected or condemned," it shall be understood as if the expression were followed by the words, "by the Construction Contract Administrator", "to the Construction Contract Administrator", and/or "by the Engineer" or "to the Engineer" depending on whether the activity is of the type to be performed by the Engineer.

I. Shown. When this term is used in the Specifications, it means "shown on the Drawings" unless stated otherwise.

SC-2.03. *Commencement of Contract Times; Notice to Proceed* Delete Paragraph 2.03.A in its entirety and insert the following in its place:

A. The Contract Times will commence to run on the day indicated in the Notice to Proceed. The date for the Contract Times may be extended by mutual agreement between the Owner and the Contractor.

SC-2.06.A Amend Paragraph 2.06.A (by making the following revision):

In the first line after the word "Contractor", add the word "Construction Contract Administrator"

SC-3.01. Add the following new paragraph immediately after Paragraph 3.01.C:

3.01.D. Sections of Division 1, General Requirements, govern the execution of the Work of all sections of the Specifications.

SC-3.03.A.3 Amend Paragraph 3.03.A.3 (by making the following revision):

In the first line after the word "Owner" add the words "Construction Contract Administrator,".

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SC-3.06.A. Amend Paragraph 3.06.A (by making the following revision):

In the first and second lines after the word "Owner" add the words "Construction Contract Administrator,".

SC-4.02. Add the following new paragraph(s) immediately after Paragraph 4.02.B:

4.02.C. In preparation of Drawings and Specifications, Engineer or Related Entities relied upon the following reports of explorations and tests of subsurface conditions at the Site:

4.02.C.1. Report dated July 22, 2009 prepared by (Thelen Associates, Inc, 1398 Cox Avenue, Erlanger, KY,) entitled "Geotechnical Exploration Advanced Treatment, GAC NKWD Fort Thomas Treatment Plant, Ft. Thomas, KY". The "technical data" contained in such report upon which Contractor may rely is he lab test data and boring logs as presented in the Appendix Data contained in such report upon which Contractor may not rely is the interpretations and opinions presented in the report and the Cross Section Drawings presented in the Appendix. The Drawings and the descriptions of the proposed facilities contained in the report were prepared before the completion of the Bidding Documents and may not accurately reflect the final configuration of the facilities or include all the intended facilities.

4.02.C.2. Report dated November, 2009 prepared by Thelen Associates, Inc, 1398 Cox Avenue, Erlanger, KY, entitled "Geotechnical Exploration Advanced Treatment, GAC Additional Site Improvements, Ft. Thomas, Kentucky". The "technical data" contained in such report upon which Contractor may rely is the lab test data and boring logs as presented in the Appendix. Data contained in such report upon which Contractor may not rely is the interpretations and opinions presented in the report and the Cross Section Drawings presented in the Appendix. The Drawings and the descriptions of the proposed facilities contained in the report were prepared before the completion of the Bidding Documents and may not accurately reflect the final configuration of the facilities or include all the intended facilities.

4.02.D. In preparation of Drawings and Specifications, Engineer or Related Entities 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:

4.02.D.1. 4.02.D.1. Drawings dated December of 2003 prepared by (CH2M HILL, 3428 Hauck Road, Cincinnati OH entitled "Northern Kentucky Water District, Fort Thomas Plant, Phase 1 Automation Improvements. All

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the information in such drawings constitutes "technical data" on which Contractor may rely, except for specific locations of buried piping systems and electrical systems appearing on Drawing Nos. aa and zz

4.02.D.1. Drawings dated September 19 of 1995 prepared by (Black & Veatch, Cincinnati, OH, entitled "Clearwell Baffles" consisting of 7 sheets numbered 1 to 7 inclusive. All the information in such drawings constitutes "technical data" on which Contractor may rely, except for specific locations of buried piping systems and electrical systems.4.02.D.1. 4.02.D.1. Drawings dated December 16, of 1935 prepared by (JS Watkins, Lexington, KY), entitled "Water Purification Works Covington, KY" consisting of 50 sheets numbered 1 to 50 inclusive. All the information in such drawings constitutes "technical data" on which Contractor may rely, except for specific locations of buried piping systems and electrical systems.

4.02.D.1. Drawings dated December 14 of 1998 prepared by (Humpert Wulnizek Architects, 501 Main Street, Suite 250, Covington, KY 41011), entitled "New Water Quality Lab" consisting of 39 sheets numbered 0.0 to E-9 inclusive. All the information in such drawings constitutes "technical data" on which Contractor may rely, except for Topographic Survey.

4.02.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 Northern Kentucky Water District, 2835 Crescent Springs Road, Erlanger, KY 41018 during regular business hours. These reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which 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 and Related Entities in the preparation of Drawings and Specifications.

SC-4.03.C.3 Amend Paragraph 4.03.C.3 (by making the following revision):

In the fourth line after the word "Owner", add the words "Construction Contract Administrator,"

SC-4.04.A.2.d Amend Paragraph 4.04.A.2.d (by making the following revision):

Add the paragraph "1) The Contractor shall alert immediately the occupants of nearby premises as to any emergency that it may create or discover at or near such premises."

SC-4.04.A.2 Amend Article 4.04.A.2 (by making the following revisions):

After paragraph 4.04.A.2.d.1 add the following paragraphs,  
"3. The Contractor shall have full responsibility for coordination of the work with owners of such underground facilities during construction, for the safety and

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protection thereof as provided in paragraph 6.13 and repairing any damage thereto resulting from the work, the cost of which will be considered as having been included in the Contract Price.

4. Where existing utilities and structures are indicated as being in the line of the proposed improvement; the Contractor shall expose them sufficiently in advance of the construction operations to permit adjustments in line or grade, if required, to eliminate interferences.

5. Existing pipes or conduits crossing a trench, or otherwise exposed, shall be adequately braced and supported to prevent movement during construction.

### 6. Broken Utility Services.

- a. Utility services broken or damaged shall be repaired at once to avoid inconvenience to customers and utility owners.
- b. Temporary arrangements, as approved by the Construction Contract Administrator, may be used until any damaged items can be permanently repaired.
- c. All items damaged or destroyed by construction and subsequently repaired must be properly maintained by the Contractor.
- d. Contractor must work 24 hours a day until service is restored to a damaged utility.

### 7. Existing Utility Relocation.

- a. Where it is necessary to relocate an existing utility or structure, the work shall be done in such manner as is necessary to restore it to a condition equal to that of the original utility or structure.
- b. No such relocation shall be done until approval is received from the authority responsible for the utility or structure being changed.”

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

4.06.A. No reports or drawings related to Hazardous Environmental Conditions are known to Owner, Construction Contract Administrator, or Engineer.

SC-4.06.C Amend Article 4.06.C (by making the following revision):

In the fourth line after the words “Environmental Condition” add the words, “that is created by, or”

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SC-4.06.G Amend Article 4.06.G (by making the following revisions):

In the second line after the word "Subcontractors", add the words "Construction Contract Administrator," and starting in line seven delete the words "(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 the Contractor or by anyone for whom the Contractor is responsible. Nothing in this Paragraph 4.06 G shall obligate the Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence."

and replace with the words

"was created by Owner or by anyone for whom the Owner is responsible, other than Contractor and all persons, subcontractors and entities for which the Contractor is responsible."

SC-4.06. Add the following language at the end of Paragraph 4.06.A:

In preparing Drawings and Specifications, Engineer or Related Entity has utilized the following reports or drawings relating to a Hazardous Environmental Condition:

4.06.A.1. Report dated August 2005 prepared by Abatement Solutions on behalf of Jordan, Jones and Goulding, Inc and Quest Engineers, Inc. entitled Report of Lead/Asbestos Investigation of Memorial Parkway Treatment Plant

SC-5.02. Add the following new paragraph immediately after Paragraph 5.02.A:

SC-5.02.B. Surety and insurance companies from which the bonds and insurance for this Project are purchased shall have an A.M. Best's rating of no less than A in addition to other requirements specified herein.

After the paragraph, add the following sentence, "Contractor shall deliver to Owner properly completed certificates of insurance prior to start of any Work at the Site, on the forms included in the Contract Documents."

SC-5.04A.7 Add the following new paragraph immediately after Paragraph 5.04.A.6:

"7. Claims arising out of pollution and excluded from the Contractor's general liability and comprehensive automobile liability policies. This insurance shall be coordinated with the Contractor's general liability policy and shall provide bodily injury and property damage coverage similar to the Contractor's general liability policy. Coverage shall include contractual liability."

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SC-5.04. Add the following language after Paragraph 5.04.B.1:

Include the following parties or entities as additional insured:

5.04.B.1.a. Northern Kentucky Water District, 2835 Crescent Springs Road, Erlanger, KY 41018 .

5.04.B.1.b. (Private Firm to be named later).

5.04.B.1.c. CH2M HILL, 10123 Alliance Road, Suite 300, Cincinnati, Ohio 45242.

5.04.B.1.d. HDR/Quest , 2517 Sir Barton Way, Lexington, KY 40509.

5.04.B.1.e. Freeland Harris Consulting Engineers, 201 West Short Street, Suite 410, Lexington, KY 40507.

5.04.B.1.f. Thelen Associates, Inc. 1398 Cox Avenue, Erlanger, Kentucky.

5.04.B.1.g. Viox & Viox Inc., 466 Erlanger Road, Erlanger, Kentucky 41018.

5.04.B.1.h. The Roberts Group, 239 Southland Drive, Suite C, Lexington, Kentucky 40503.

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

"7. contain a cross liability or severability of interest clause or endorsement insurance covering the specified additional insureds shall be primary insurance, and all other insurance carried by the additional insureds shall be excess insurance;

8. with respect to workers' compensation and employers' liability, comprehensive automobile liability, commercial general liability, and umbrella liability insurance, and all other liability insurance specified herein to be provided by Contractor, Contract shall require its insurance carriers to waive all rights of subrogation against Owner, Construction Contract Administrator, Engineer, and their respective officers, directors, partners, employees, and agents.

C. The limits of liability for the insurance required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts but shall provide coverage in greater amounts where required by Laws and Regulations. This coverage may be primary or a combination of primary and umbrella excess liability.

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

a. State: Statutory.



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b. Applicable Federal: Statutory.

c. Employer's Liability: \$1,000,000 each occurrence.

2. Commercial General Liability under paragraphs 5.04.A.3 through 5.04.A.6 of the General Conditions shall be occurrence type, written in comprehensive form, and shall protect Contractor, Owner, Construction Contract Administrator, and Engineer, as additional insureds, against claims arising from injuries, sickness, disease, or death of any person or damage to property arising out of performance of the Work. The policy shall also include a per project aggregate limit endorsement, personal injury liability coverage, contractual liability coverage for blasting, explosion, collapse of buildings, and damage to underground property.

a. General Aggregate: \$1,000,000.

b. Products – Completed Operations: \$1,000,000 aggregate.

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 coverage's where applicable.

3. Automobile Liability under paragraph 5.04.A.6 of the General Conditions shall be occurrence type, written in comprehensive form, and shall protect Contractor, Owner, Construction Contract Administrator, and Engineer as additional insureds, against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, either on or off the project site whether they are owned, nonowned, or hired. The liability limit shall be not less than:

a. Bodily Injury:

Each Person: \$1,000,000.

Each Accident: \$1,000,000.

b. Property Damage:

Each Accident: \$1,000,000.

c. Combined Single Limit: \$1,000,000.

4. Umbrella Liability insurance shall protect Contractor, Owner, and Engineer as additional insureds, against claims in excess of the limits provided under workers' compensation and employers' liability, comprehensive automobile

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liability, and commercial general liability policies. The umbrella policy shall follow the forms of the primary insurance, including the application of the primary limits. The liability limits shall be not less than:

Bodily injury and      \$4,000,000 combined single  
Property damage      limit for each occurrence

1.05 Owner's Liability Insurance:

A. Owner's Liability Insurance: This insurance shall be obtained by Contractor and issued in the name of Owner, and shall protect and defend Owner against claims arising as a result of the operations of Contractors or Contractor's Subcontractors. The liability limits shall be not less than:

- a. Bodily Injury:
  - Each Occurrence: \$1,000,000.
  - General Aggregate: \$1,000,000.
- b. Property Damage:
  - Each Occurrence: \$1,000,000.
  - General Aggregate: \$1,000,000.

SC-5.06. Delete Paragraph 5.06.A in its entirety and insert the following in its place:

A. Contractor shall purchase and maintain property insurance coverage upon the Work at the Site in the amount of the full replacement cost thereof. This insurance shall:

- 1. include the interest of Owner, Contractor, Subcontractors, Engineer, Engineer's Consultants, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, commissioners, partners, members, managers, employees, agents, and other 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 additional insured;
- 2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment, 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, flood, damage caused by frost and freezing, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

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3. 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 accepted by Owner.
4. include expenses incurred in the repair or replacement of any insured property (including, but not limited to, fees and charges of engineers and architects);
5. allow for partial utilization of the Work by Owner;
6. include testing and startup; and
7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer, with 30 days' written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Contractor shall be responsible for any deductible or self-insured retention.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with paragraph 5.06 shall contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.07.

D. If Owner requests in writing that other special insurance be included in the property insurance policies provided under paragraph 5.06, Contractor shall, if possible, include such insurance and the cost thereof will be charged to Owner by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the site, Contractor shall in writing advise Owner whether or not Contractor has procured such other special insurance.

SC-5.07.A Amend Paragraph 5.07.A (by making the following revisions):

In the second line and the thirteenth line after the word "Subcontractors", add the words "Construction Contract Administrator"

SC-5.07.B Amend Paragraph 5.07.B (by making the following revision):

In the first line after the word "Subcontractors", add the words "Construction Contract Administrator"

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SC-5.07.C Amend Paragraph 5.07.C (by making the following revision):

In the fourth line after the word "Subcontractors", add the words "Construction Contract Administrator"

SC-5.08. Delete Paragraph 5.08.A in its entirety and insert the following in its place:

5.08.A. 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 insured, 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 and the Work and the cost thereof covered by an appropriate Change Order.

SC-5.08. Delete Paragraph 5.08.B in its entirety and insert the following in its place:

5.08.B. 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.

SC-5.10. Add the following language to the end of Paragraph 5.10.A:

The property insurance shall contain no partial occupancy restriction for utilization of the Project by Owner for the purpose intended.

SC-6.02. Add the following language at the end of Paragraph 6.02.B:

C. C. In accordance with Kentucky Revised Statute 337.540, no laborer, worker, or mechanic shall be permitted to Work more than 8 hours in 1 day nor more than 40 hours in 1 week except in cases of emergency caused by fire, flood, or damage to life or property. This shall not prohibit any laborer, worker, or mechanic from working more than 8 hours in 1 day, but not more than 10 hours in 1 day, where the employee and employer enter into an agreement prior to the working of any 1 day in excess of 8 hours, or where provided for in a collective bargaining agreement. Owner shall determine when an emergency exists. Any time worked in excess of 8 hours per

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day or 40 hours per week shall be paid at least 1-1/2 times the basic hourly rate. No Work shall be done between 6:00 p.m. and 7:00 a.m. without permission of Owner. However, emergency work may be done without prior permission.

D. Any laborer, worker, or mechanic worked in excess of 8 hours in 1 day or 40 hours in 1 week, except in cases of emergency shall be paid at not less than 1 -1/2 times the basic hourly rate for all overtime worked. In a case where the agreement between the employee and employer provides for not more than 10 hours in 1 day, any hours worked in excess of 10 hours in 1 day or 40 hours in 1 week, except in cases of emergency, shall be paid at not less than 1-1/2 times the basic hourly rate for all overtime worked.

E. Night Work may be undertaken as a regular procedure with the permission of Owner: such permission, however, may be revoked at any time by Owner if Contractor fails to maintain adequate equipment and supervision for the proper persecution and control of the Work at Night.

SC-6.02. Add the following new paragraph immediately after Paragraph 6.02.B:

6.02.C. Contractor shall reimburse Owner for Engineer's additional extraordinary costs for onsite personnel overtime work resulting from Contractor's overtime operations. Overtime work is work in excess of 40 hours per week Reimbursement shall be on the cost basis defined in Paragraph 14.02.D.4 of these Supplementary Conditions.

SC-6.05.A.4 Add the following new paragraph immediately after Paragraph 6.05.A.4 "a. If a proposed substitute item is accepted, all incidental costs associated with the use of the substitute including, but not limited to, redesign, claims of other Contractors, changes to electrical supply equipment, additional equipment or material required for the installation, changes in the controls software development and operator screens, etc., shall be at the expense of the Contractor proposing the substitute unless otherwise agreed to by the Owner."

SC-6.05.E Delete Paragraph 6.05.E and replace with the following:

"E. *Construction Contract Administrator's and Engineer's Cost Reimbursement:* Construction Contract Administrator will record Construction Contract Administrator's and Engineer's costs in evaluating a substitute proposed or submitted by the Contractor pursuant to Paragraphs 6.05A.2 and 6.05.B. Whether or not the Construction Contract Administrator approves a substitute so proposed or submitted by the Contractor, Contractor shall reimburse Owner for the reasonable charges of Construction Contract Administrator and Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Construction Contract Administrator and 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. "

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SC-6.05. Add the following language at the end of Paragraph 6.05.E:

Reimbursement rates for Engineer or Related Entities for evaluation of proposed substitutes shall be on the basis as established in Paragraph 14.02.D.4 of these Supplementary Conditions.

Insert the term "Construction Contract Administrator" between the words "Owner and Engineer" or the words "Owner or Engineer".

Insert the term "Construction Contract Administrator" between the words "Owner and Engineer" or the words "Owner or Engineer".

SC-6.07. Add the following new paragraphs immediately after Paragraph 6.07.C:

6.07.D. Contractor shall, at its sole expense, defend and pay all damages, fees, royalties, and costs awarded in any proceeding brought against Owner, its employees and Related Entities, in which it is claimed that the use of any treatment process, material, equipment, or parts thereof furnished constitutes an infringement of any patent or other proprietary information right, provided Contractor is promptly notified of the commencement of any such proceedings. Contractor's indemnity applies only when infringement occurs from the normal use for which such treatment process, material, or equipment were designed. Owner may, at its option, be represented at any such proceeding. If use is held in any such proceeding to constitute an infringement and is enjoined, Contractor, at its expense, shall either procure for Owner the right to use such treatment process, material and equipment or manufacture and sell product generated from the use of the treatment process; or pay the costs for damages, fees, or royalties.

SC-6.08. Add the following new paragraphs immediately after Paragraph 6.08.A:

6.08.B. Owner will obtain and pay for the following construction permits and licenses if needed:

6.08.B.1. Road and Highway Encroachment Permits

6.08.B.2. Kentucky Division of Water Construction Permit.

6.08.B.3. Stream Crossing Permit.

6.08.C. A copy of each permit is available at Owner's office. Contractor shall examine the permits and conform to the requirements contained therein, including the purchase of additional bonds or insurance as specified therein, and such requirements are hereby made a part of these Contract Documents as fully and completely as though the same were set forth herein. Failure to examine the permit(s) will not relieve Contractor from compliance with the requirements stated therein. Within

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15 days after the date of signing the Agreement, Contractor shall confer with an agent of the permitting agency so that insurance requirements and similar matters can be arranged prior to the time set for that portion of the Work.

Insert the term "Construction Contract Administrator" between the words "Owner or Engineer".

SC-6.09. Add the following new paragraph immediately after Paragraph 6.09.C:

6.09.D. While not intended to be inclusive of all Laws or Regulations for which Contractor may be responsible under Paragraph 6.09, the following Laws or Regulations are included as mandated by statute or for the convenience of Contractor:

6.09.D.1. Prevailing Wages: All laborers, workmen, and mechanics performing work under the Contract shall be paid not less than the prevailing hourly rate of wages as determined by the Commissioner of Workplace Standards. Wage rates are provided at the end of this section.

6.09.D.2. Contractor agrees as follows:

6.09.D.2.a. Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, age, or national origin;

6.09.D.2.b. Contractor will take affirmative action in regard to employment, upgrading, demotion, transfer recruitment, recruitment advertising, layoff, termination, rates of pay or other forms of compensation, and selection for training, so as to ensure that applicants are employed and that employees during employment are treated without regard to their race, color, religion, sex, age, or national origin; however, when layoffs occur, employees shall be laid off according to seniority with the youngest employee being laid off first. When employees are recalled, this shall be done in the reverse of the way the employees were laid off;

6.09.D.2.c. Contractor will state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, age, or national origin;

6.09.D.2.d. Contractor will post notices in conspicuous places, available to employees and applicants for employment, setting forth the provisions of nondiscrimination clauses; and

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6.09.D.2.e. Contractor will send a notice to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding advising the labor union or workers' representative of the Contractor's commitments under the nondiscrimination clauses.

6.09.D.2.f Employment requirements shall be as specified herein and in the attachments at the end of Supplementary Conditions.

SC-6.10. Add the following new paragraphs immediately after Paragraph 6.10.A:

B. Portions of this project may be exempt from taxes. It is the Contractor's responsibility to determine any applicable exemptions.

SC-6.11. Add the following language to the end of Paragraph 6.11.A.1:

Contractor shall not enter upon nor use property not under Owner control until appropriate easements have been executed and a copy is on file at the Site.

SC-6.11. Amend Paragraph 6.11.A.3 (by making the following revisions):

In lines two and seven, insert the term "Construction Contract Administrator" between the words "Owner, Engineer".

SC-6.12. Amend Paragraph 6.12 (by making the following revisions):

In the fifth line after the words "available to" add the term "Owner, Construction Contract Administrator, and".

SC-6.13. Delete Paragraph 6.13.D. and replace with the following:

"D. Contractor shall inform Owner, Construction Contract Administrator, and Engineer of the specific requirements of Contractor's safety program with which Owner's, Construction Contract Administrator's and Engineer's employees and representatives must comply while at the site."

SC-6.13. Amend Paragraph 6.13.E. (by making the following revision):

Insert the term "Construction Contract Administrator" between the words "Owner or Engineer".

SC-6.17.D Amend paragraphs 6.17.D and 6.17.E (by making the following revisions):

Where ever the word "Engineer" appears, insert the term "Construction Contract Administrator and" before "Engineer".



SC-6.17. Add the following new paragraphs immediately after Paragraph 6.17.E.1:

6.17.E.2. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than the number of submittals specified in Paragraph 14.02.D.4 of these Supplementary Conditions. Construction Contract Administrator and Engineer will record time for reviewing subsequent submittals of Shop Drawings, samples or other items requiring approval and Contractor shall reimburse Owner for Construction Contract Administrator and Engineer's charges for such time in accordance with Paragraph 14.02.D.4 of these Supplementary Conditions.

6.17.E.3. In the event that Contractor requests a substitution for a previously approved item, Contractor shall reimburse Owner for Construction Contractor and Engineer's charges for such time, unless the need for such substitution is beyond the control of Contractor.

SC-6.19.C. Delete Paragraph 6.19.C in its entirety and replace with the following:

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

1. observations by Construction Contract Administrator or Engineer;
2. review of daily inspection reports by Construction Contract Administrator or Engineer;
3. recommendation by Construction Contract Administrator for, or payment by Owner of any progress or final payment;
4. the issuance of a certificate of Substantial Completion by Construction Contract Administrator or any payment related thereto by Owner;
5. use or occupancy of the Work or any part thereof by Owner;
6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Construction Contract Administrator or Engineer;
7. any inspection, test, or approval by others;
8. any correction of defective Work by Owner; or
9. any expiration of a correction period.

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SC-6.19 After Paragraph 6.19.C add the following:

D. The warranty period for all project components will commence upon the date of Substantial Completion in accordance with Article 13.07 of these Supplementary Conditions. No warranty period for any individual piece of equipment or material will start prior to this even if it has been put into beneficial service prior to Substantial Completion.

SC-6.20. Amend paragraph 6.20A (by making the following revisions):

Where the word "Engineer" appears, add the term "Construction Contract Administrator and " before the word "Engineer".

SC-6.20. Amend Paragraph 6.20.B. (by making the following revisions):

In the first line add the term "Construction Contract Administrator" before the word "Engineer".

SC-6.20. Amend Paragraph 6.20.C. (by making the following revisions):

Where the word "Engineer" appears, add the term "Construction Contract Administrator and " before the word "Engineer" and where the word "Engineer's" appears add the term "Construction Contract Administrator's and" before the word "Engineer's).

SC-7.02. Add the following new paragraph immediately following Paragraph 7.02.B:

7.02.C. Other work anticipated to be performed at the Site by others that is either directly or indirectly related to the scheduled performance of the Work under these Contract Documents is described in Section 01 31 13, Project Coordination.

SC-7.04. Add the following new paragraph immediately after Paragraph 7.03:

SC-7.04. Claims Between Contractors:

7.04.A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Construction Contract Administrator, Engineer, or the construction coordinator, Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law.

7.04.B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, Construction Contract Administrator, Engineer, the Construction Coordinator (if applicable) and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them

from and against all Claims, costs, losses and damages (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any other contractor against Owner, Construction Contract Administrator, Engineer, Related Entities, or the Construction Coordinator (if applicable) to the extent said Claim is based on or arises out of Contractor's performance of the Work. Should another contractor cause damage to the Work or property of Contractor or should the performance of work by any other contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, Construction Contract Administrator, Engineer, or the Construction Coordinator (if applicable) or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner, Construction Contract Administrator, Engineer, or the Construction Coordinator (if applicable) on account of any such damage or Claim.

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

SC-8.01.A Delete the Paragraph in its entirety and replace with the following:

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

SC-9.01 Amend Paragraph 9.01.A. (by making the following revision):

Where the word "Engineer" appears, add the term "Construction Contract Administrator or" before the word "Engineer".

SC-9.02 Insert the following Paragraph after Paragraph 9.02.B:

C. Construction Contract Administrator and Engineer will make visits to the site as described in Paragraph 9.02 but communications by Engineer with Contractor will be transmitted through Construction Contract Administrator.

SC-9.03. Add the following new paragraphs immediately after Paragraph 9.03.A:

9.03.B. Resident Project Representative (RPR) will be furnished by Construction Contract Administrator. The responsibilities, authority, and limitations of the RPR are limited to those of Engineer in accordance with Paragraph 9.09 and as set forth elsewhere in the Contract Documents and are further limited and described below.

9.03.C. Responsibilities and Authority:

9.03.C.1. Schedules: Review and monitor Progress Schedule, Schedule of Submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.

9.03.C.2. Conferences and Meetings: Conduct or attend meetings with Contractor, such as preconstruction conferences, progress meetings, Work conferences and other Project related meetings.

9.03.C.3. Liaison: (i) Serve as Construction Contract Administrator's liaison with Contractor, working principally through Contractor's superintendent and assist in understanding the intent of the Contract Documents; (ii) assist Construction Contract Administrator in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's onsite operations; (iii) assist in obtaining from Owner additional details or information when required for proper execution of the Work.

9.03.C.4. Submittals: Receive Submittals that are furnished at the Site by Contractor, and notify Construction Contract Administrator and Engineer of availability for examination. Advise Construction Contract Administrator, Engineer, and Contractor of the commencement of any Work or arrival of Products at Site, when recognized, requiring a Shop Drawing or Sample if the Submittal has not been approved by Construction Contract Administrator or Engineer.

9.03.C.5. Review of Work, Rejection of defective Work, Inspections and Tests: (i) Conduct onsite observations of the Work in progress to assist Construction Contract Administrator in determining if the Work is in general proceeding in accordance with the Contract Documents; (ii) inform Engineer and Contractor whenever RPR believes that any Work is defective; (iii) advise Engineer whenever RPR believes that any Work will not produce a completed Project that conforms generally to the Contract Documents or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or whenever RPR believes Work should be uncovered for observation, or requires special testing, inspection, or approval; (iv) monitor that tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate personnel, and that Contractor maintains adequate records

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thereof; (v) observe, record and report to Construction Contract Administrator appropriate details relative to the test procedures and startups; and (vi) accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to Construction Contract Administrator.

9.03.C.6. Interpretation of Contract Documents: Inform Construction Contract Administrator when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Construction Contract Administrator and approved by Engineer.

9.03.C.7. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and provide recommendations to Engineer; transmit to Contractor the decisions issued by Engineer.

9.03.C.8. Records: (i) Maintain at the Site files for correspondence, conference records, Submittals including Shop Drawings and Samples, reproductions of original Contract Documents including all Addenda, signed Agreement, Work Change Directives, Change Orders, Field Orders, additional Drawings issued after the Effective Date of the Agreement, Construction Contract Administrator's written clarifications and interpretations, progress reports, and other Project related documents; (ii) keep a diary or log book recording pertinent Site conditions, activities, decisions and events.

9.03.C.9. Reports: (i) Furnish Construction Contract Administrator periodic reports of progress of the Work and of Contractor's compliance with the Progress Schedule and Schedule of Submittals; (ii) consult with Construction Contract Administrator in advance of scheduled major tests, inspections or start of important phases of the Work; and (iii) assist in drafting proposed Change Orders, Work Change Directives, and Field Orders, obtain backup material from Contractor as appropriate.

9.03.C.10. Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Construction Contract Administrator, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed and materials and equipment delivered at the Site but not incorporated in the Work.

9.03.C.11. Certificates, Operation and Maintenance Manuals, Record Documents, and Site Records: During the course of the Work, monitor that these documents and other data required to be assembled, maintained, and furnished by Contractor are applicable to the items actually installed and in

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accordance with the Contract Documents, and have this material delivered to Construction Contract Administrator and Engineer as appropriate for review and forwarding to Owner prior to final payment for the Work.

9.03.C.12. Substantial Completion: (i) Conduct an inspection in the company of Construction Contract Administrator, Engineer, Owner, and Contractor and prepare a list of items to be completed or corrected; (ii) submit to Construction Contract Administrator a list of observed items requiring completion or correction.

9.03.C.13. Completion: (i) Conduct final inspection in the company of Construction Contract Administrator, Engineer, Owner and Contractor; and (ii) notify Contractor and Engineer in writing of all particulars in which this inspection reveals that the Work is incomplete or defective; and (iii) observe that all items on final list have been completed, corrected, or accepted by Owner and make recommendations to Construction Contract Administrator concerning acceptance.

9.03.D. Limitations of Authority: Resident Project Representative will not:

9.03.D.1. have authority to authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by Construction Contract Administrator and Engineer; or

9.03.D.2. undertake any of the responsibilities of Contractor, Subcontractors, or Contractor's superintendent; or

9.03.D.3. accept Submittals from anyone other than Contractor; or

9.03.D.4. authorize Owner to occupy the Project in whole or in part; or

9.03.D.5. participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Engineer.

SC-9.10.A Amend Paragraph 9.10.A (by making the following revision):

Insert the term "Construction Contract Administrator's and" before the word "Engineer's".

SC-10.01. Add the following new paragraph immediately after Paragraph 10.01.A:

10.01.A.1. In accordance with Kentucky Revised Statute 45A.120, when accepting a Change Order, Contractor shall certify that, to the best of its knowledge and belief, the data submitted is accurate, complete, and current for performing the additional work or supplying the additional materials.

SC-12.03: Add the following language to the end of Paragraph 12.03.E:

F. In no event shall Owner, Construction Contract Administrator, or Engineer be liable to Contractor, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages, (including acceleration costs) arising out of or resulting from any delay.”

SC-13.02. Access to Work. Add the following new paragraph immediately after paragraph 13.02.A:

B. Authorized representatives of the U.S. Environmental Protection Agency, the Kentucky Division of Water, and the Kentucky Infrastructure Authority shall have access to the Work wherever it is in preparation or progress. Contractor shall provide proper facilities for such access and inspection.

SC-13.03 Amend paragraph 13.03.D (by making the following revision):

In the second line insert the term “Construction Contract Administrator’s” after the word “Owner’s” and in the last line insert the term “Construction Contract Administrator, and” after the word “Owner”.

SC-13.04.A Amend Paragraphs 13.04.A (by making the following change):

In the second line insert the term “Construction Contract Administrator’s or” before the words “Engineer’s observation”.

SC-13.04.B Amend Paragraphs 13.04.B (by making the following changes):

In the first and third line in insert the term “Construction Contract Administrator or” before the word “Engineer” wherever the word “Engineer” appears.

SC-13.07 At the end of Paragraph 13.07.E insert the following:

“F. Nothing in Article 13 concerning the correction period shall establish a period of limitation with respect to any other obligation which Contractor has under the Contract Documents. The establishment of time periods relates only to the specific obligations of the Contractor to correct the Work, and has no relationship to the time within which Contractor’s obligations under the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish Contractor’s liability with respect to Contractor’s obligations other than to specifically correct the Work.”

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SC-13.09.B Amend Paragraphs 13.09.B (by making the following change):

In the second to last line insert the term "Construction Contract Administrator, Construction Contract Administrator's consultant's" before the words "and Engineer".

SC-14.02.A Add the following language to the end of Paragraph 14.02.A.3:

"4. Contractor's Applications for Payment shall be accompanied by the documentation specified herein.

5. Payments for stored materials and equipment shall be based only upon the actual cost to the Contractor of the materials and equipment and shall not include any overhead or profit to Contractor. Partial payments will not be made for undelivered materials or equipment.

6. During the progress of the Work, each Application for Payment shall be accompanied by Contractor's updated schedule of operations, or progress report, with such shop drawing schedules, procurement schedules, value of material on hand included in application, and other data specified in Contract Documents or reasonably required by Owner."

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

14.02.C.1. Twenty-five days after presentation of the Application for Payment to Owner with Construction Contract Administrator'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.

SC-14.02. Add the following new paragraph(s) immediately after Paragraph 14.02.D.3:

14.02.D.4. Items entitling Owner to retain set-offs from the amount recommended, including but not limited to:

14.02.D.4.a. Owner compensation to Construction Contract Administrator or Engineer at an estimated average rate of \$140 per each extra personnel hour for labor plus expenses, if applicable, because of the following Contractor-caused events:

(1). return visits to manufacturing facilities to witness factory testing or retesting;

(2). Submittal review in excess of three reviews by Construction Contract Administrator or Engineer for substantially the same Submittal, in accordance with Paragraph 6.17.E of these Supplementary Conditions;



(3). evaluation of proposed substitutes and in making changes to Contract Documents occasioned thereby, in accordance with Paragraph 6.05. of these Supplementary Conditions;

(4). Overtime worked by Contractor necessitating Construction Contract Administrator, Engineer, Related Entities, Resident Project Representative or Resident Project Representative's Site staff, if any, to work extraordinary overtime in accordance with Paragraph 6.02.C. of these Supplementary Conditions.

14.02.D.4.b. Liability for liquidated damages incurred by Contractor as set forth in the Agreement.

SC-14.04.A Add the following new paragraphs immediately after Paragraph 14.04.A:

1. To be considered substantially complete, the following portions of the Work must be operational and ready for Owner's continuous use as intended: all equipment and systems in the GAC pump station, associated with the GAC contactors (including the air scour blower and system) the UV disinfection system, all pumping systems, the emergency generator system, the splitter box, building HVAC and plumbing systems, all building systems, pairing, and all valves and instrumentation systems connected to the process control system.

2. Portions of the Work not essential to operation, which can be completed without interruption of the Owner's operation, may be completed after the Work is accepted as substantially complete, and may include the following items: seeding, sodding, and landscape planting.

SC-14.07 Add the following sentences to the end of Paragraph 14.07.A.2.b:

"Consent of the surety, signed by an agent, must be accompanied by a certified copy of such agent's authority to act for the surety. The Contractor shall be responsible for providing all the documents identified in this paragraph:"

SC-15.03.A. Delete the first sentence of Paragraph 15.03.A in its entirety and insert the following in its place:

Upon 7 days written notice to Contractor and Construction Contract Administrator, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract or any portion of the Contract.

SC-16.01 Delete Article 16 in its entirety and insert the following new Article in its place

"D. Arbitration will not be acceptable as a means for settling claims, disputes, and other matters."

SC-17.01 Add the following language to the end of Paragraph 17.01.A.2:

“B. Contractor shall obtain from all suppliers and manufacturers any and all warranties and guarantees of such Suppliers and manufacturers, whether or not specifically required by the Specifications, and shall render reasonable assistance to Owner when requested, in order to enable Owner to enforce such warranties and guarantees. The assignment of any warranties or guarantees shall not affect the Correction Period or any other provisions of these Contract Documents.”

SC-17.05 Add the following language at the end of Paragraph 17.05.A:

Any suit involving any dispute or other matter arising under this Contract may only be brought in the state as federal courts for the county or district in which the project is located. All parties hereby consent to the exercise of personal jurisdiction by any such court with respect to any such proceeding.

**END OF SECTION**

**SUPPLEMENTAL GENERAL CONDITIONS**  
**FOR**  
**CLEAN WATER STATE REVOLVING FUND**  
**DRINKING WATER STATE REVOLVING FUND**  
**EPA SPECIAL APPROPRIATION GRANTS**  
**(Drinking Water and Wastewater)**

**Project Name: Advanced Treatment Project**  
**Northern Kentucky Water District**

**Project Number: WX 21117208**

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

	<u>Attachment No.</u>
SRF/EPA Special Provisions.....	1
Requirements for Sub-agreements Awarded by Prime Contractors .....	2
40 CFR 31.36 (Procurement)-grants only.....	3A
KRS Chapter 45A-Kentucky Model Procurement Code-loans only .....	3B
<b>Equal Employment Opportunity (EEO) Documents:</b>	
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 Provisions for Federally Assisted Construction (Form 5720-4).....	9
<b>Certifications</b>	
Debarment, Suspension and Other Responsibility Matters .....	10
Anti-lobbying .....	11
Region 4 Disadvantaged Business Enterprise (DBE) .....	12
Negotiated Rates as of October 1, 2006.....	13
Bonds and Insurance .....	14
Outlay Management Schedule .....	15
Storm Water General Permit .....	16
Wage Rates .....	17

**EPA SPECIAL PROVISIONS**

- a) The construction of the project shall conform to the applicable requirements for state, territorial and local laws and ordinances to the extent that such requirements do not conflict with Federal laws.
- b) The EPA shall have access to the site and the project.
- c) Any contract(s) awarded under this invitation for Bids are expected to be funded in part by a grant from the U.S. Environmental Protection Agency. Neither the United States nor any of its departments, agencies or employees are or will be a part to this Invitation for Bids or any resulting contract.
- d) The Method of Award is to the lowest responsible responsive bidder.
- e) A statement that the bidder must make positive efforts to use small and minority owned business and women business enterprises.

**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.
- (c) 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. To apply, the contractor must submit the "Notice of Intent" form at least 48 hours prior to start of construction. See Attachment 16 for the "Notice of Intent" form.
- (d) Restore disturbed areas to original or better condition.
- (c) 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.
- (f) 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.
- (g) The owner shall provide and maintain competent and adequate supervision and inspection.
- (h) The Kentucky Infrastructure Authority and Kentucky Division of Water shall have access to the site and the project work at all times.
- (i) 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.

**GRANT REQUIREMENTS FOR SUB-AGREEMENTS**  
**AWARDED BY A PRIME CONTRACTOR**

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

- (a) 40 CFR Part 32 (Debarment and Suspension Under EPA Assistance Programs);
- (b) The limitations and sub-agreement award in 40 CFR 31.35, and 31.36(i) (3,4,6,10,12) ;
- (c) The requirement for small, small rural, minority, women's and labor surplus area business in 40 CFR 31.36(e);
- (d) The specifications requirements of 40 CFR 31.36(c) (1);
- (e) The Federal cost principles in 40 CFR 31.22 and 31.36(f)(3);
- (f) The prohibited types of sub-agreements in 40 CFR 31.36(f)(4);
- (g) 40 CFR Part 34 (Anti-Lobbying under EPA Assistance Programs).

**TITLE 40--PROTECTION OF ENVIRONMENT  
CHAPTER I--ENVIRONMENTAL PROTECTION AGENCY**

**PART 31--UNIFORM ADMINISTRATIVE REQUIREMENTS FOR GRANTS AND  
COOPERATIVE AGREEMENTS TO STATE AND LOCAL GOVERNMENTS**

**Subpart C--Post-Award Requirements**

**Sec. 31.36 Procurement.**

(a) States. When procuring property and services under a grant, a State will follow the same policies and procedures it uses for procurements from its non-Federal funds. The State will ensure that every purchase order or other contract includes any clauses required by Federal statutes and executive orders and their implementing regulations. Other grantees and sub-grantees will follow paragraphs (b) through (i) in this section.

(b) Procurement standards. (1) Grantees and sub-grantees will use their own procurement procedures which reflect applicable State and local laws and regulations, provided that the procurements conform to applicable federal law, the standards identified in this section, and if applicable, Sec. 31.38.

(2) Grantees and sub-grantees will maintain a contract administration system which ensures that contractors perform in accordance with the terms, conditions, and specifications of their contracts or purchase orders.

(3) Grantees and sub-grantees will maintain a written code of standards of conduct governing the performance of their employees engaged in the award and administration of contracts. No employee, officer or agent of the grantee or sub-grantee shall participate in selection, or in the award or administration of a contract supported by Federal funds 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 his immediate family,

(iii) His or her partner, or

(iv) An organization which employs, or is about to employ, any of the above, has a financial or other interest in the firm selected for award. The grantee's or sub-grantee's officers, employees or agents will neither solicit nor accept gratuities, favors or anything of monetary value from contractors, potential contractors, or parties to sub-agreements. Grantee and sub-grantees may set minimum rules where the financial interest is not substantial or the gift is an unsolicited item of nominal intrinsic value. To the extent permitted by State or local law or regulations, such standards or conduct will provide for penalties, sanctions, or other disciplinary actions for violations of such standards by the grantee's and sub-grantee's officers, employees, or agents, or by contractors or their agents. The awarding agency may in regulation provide additional prohibitions relative to real, apparent, or potential conflicts of interest.

(4) Grantee and sub-grantee procedures will provide for a review of proposed procurements to avoid purchase of unnecessary or duplicative items. Consideration should be given to consolidating or breaking out procurements to obtain a more economical purchase. Where appropriate, an analysis will be made of lease versus purchase alternatives, and any other appropriate analysis to determine the most economical approach.

(5) To foster greater economy and efficiency, grantees and sub-grantees are encouraged to enter into State and local intergovernmental agreements for procurement or use of common goods and services.

(6) Grantees and sub-grantees are encouraged to use Federal excess and surplus property in lieu of purchasing new equipment and property whenever such use is feasible and reduces project costs.

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- (7) Grantees and sub-grantees are encouraged to use value engineering clauses in contracts for construction projects of sufficient size to offer reasonable opportunities for cost reductions. Value engineering is a systematic and creative analysis of each contract item or task to ensure that its essential function is provided at the overall lower cost.
- (8) Grantees and sub-grantees will make awards only to responsible contractors possessing the ability to perform successfully under the terms and conditions of a proposed procurement. Consideration will be given to such matters as contractor integrity, compliance with public policy, record of past performance, and financial and technical resources.
- (9) Grantees and sub-grantees will maintain records sufficient to detail the significant history of a procurement. These records will include, but are not necessarily limited to the following: rationale for the method of procurement, selection of contract type, contractor selection or rejection, and the basis for the contract price.
- (10) Grantees and sub-grantees will use time and material type contracts only--
- (i) After a determination that no other contract is suitable, and
  - (ii) If the contract includes a ceiling price that the contractor exceeds at its own risk.
- (11) Grantees and sub-grantees alone will be responsible, in accordance with good administrative practice and sound business judgment, for the settlement of all contractual and administrative issues arising out of procurements. These issues include, but are not limited to source evaluation, protests, disputes, and claims. These standards do not relieve the grantee or sub-grantee of any contractual responsibilities under its contracts. Federal agencies will not substitute their judgment for that of the grantee or sub-grantee unless the matter is primarily a Federal concern. Violations of law will be referred to the local, State, or Federal authority having proper jurisdiction.
- (12) Grantees and sub-grantees will have protest procedures to handle and resolve disputes relating to their procurements and shall in all instances disclose information regarding the protest to the awarding agency. A protestor must exhaust all administrative remedies with the grantee and sub-grantee before pursuing a protest with the Federal agency. Reviews of protests by the Federal agency will be limited to:
- (i) Violations of Federal law or regulations and the standards of this section (violations of State or local law will be under the jurisdiction of State or local authorities) and
  - (ii) Violations of the grantee's or sub-grantee's protest procedures for failure to review a complaint or protest. Protests received by the Federal agency other than those specified above will be referred to the grantee or sub-grantee.
- (c) Competition. (1) All procurement transactions will be conducted in a manner providing full and open competition consistent with the standards of Sec. 31.36. Some of the situations considered to be restrictive of competition include but are not limited to:
- (i) Placing unreasonable requirements on firms in order for them to qualify to do business,
  - (ii) Requiring unnecessary experience and excessive bonding,
  - (iii) Noncompetitive pricing practices between firms or between affiliated companies,
  - (iv) Noncompetitive awards to consultants that are on retainer contracts,
  - (v) Organizational conflicts of interest,
  - (vi) Specifying only a "brand name" product instead of allowing "an equal" product to be offered and describing the performance of other relevant requirements of the procurement, and
  - (vii) Any arbitrary action in the procurement process.
- (2) Grantees and sub-grantees will conduct procurements in a manner that prohibits the use of statutorily or administratively imposed in-State or local geographical preferences in the evaluation of bids or proposals, except in those cases where applicable Federal statutes expressly mandate or encourage geographic preference. Nothing in this section preempts State licensing laws. When contracting for architectural and engineering (A/E) services, geographic location may be a selection criteria provided its application leaves an appropriate number of qualified firms, given the nature and size of the project, to compete for the contract.



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(3) Grantees will have written selection procedures for procurement transactions. These procedures will ensure that all solicitations:

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

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

(4) Grantees and sub-grantees will ensure that all pre-qualified lists of persons, firms, or products which are used in acquiring goods and services are current and include enough qualified sources to ensure maximum open and free competition. Also, grantees and sub-grantees will not preclude potential bidders from qualifying during the solicitation period.

(5) Construction grants awarded under Title II of the Clean Water Act are subject to the following "Buy American" requirements in paragraphs (c)(5)(i)-(iii) of this section. Section 215 of the Clean Water Act requires that contractors give preference to the use of domestic material in the construction of EPA-funded treatment works.

(i) Contractors must use domestic construction materials in preference to nondomestic material if it is priced no more than 6 percent higher than the bid or offered price of the nondomestic material, including all costs of delivery to the construction site and any applicable duty, whether or not assessed. The grantee will normally base the computations on prices and costs in effect on the date of opening bids or proposals.

(ii) The award official may waive the Buy American provision based on factors the award official considers relevant, including:

(A) Such use is not in the public interest;

(B) The cost is unreasonable;

(C) The Agency's available resources are not sufficient to implement the provision, subject to the Deputy Administrator's concurrence;

(D) The articles, materials or supplies of the class or kind to be used or the articles, materials or supplies from which they are manufactured are not mined, produced or manufactured in the United States in sufficient and reasonably available commercial quantities or satisfactory quality for the particular project; or

(E) Application of this provision is contrary to multilateral government procurement agreements, subject to the Deputy Administrator's concurrence.

(iii) All bidding documents, subagreements, and, if appropriate, requests for proposals must contain the following "Buy American" provision: In accordance with section 215 of the Clean Water Act (33 U.S.C. 1251 et seq.) and implementing EPA regulations, the contractor agrees that preference will be given to domestic construction materials by the contractor, subcontractors, materialmen and suppliers in the performance of this subagreement.

(d) Methods of procurement to be followed--(1) Procurement by small purchase procedures. Small purchase procedures are those relatively simple and informal procurement methods for securing services, supplies, or other properties that do not cost more than the simplified acquisition threshold fixed at 41 U.S.C. 403(11) (currently set at \$100,000). If small purchase procedures are used, price or rate quotations shall be obtained from an adequate number of qualified sources.

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(2) Procurement by sealed bids (formal advertising). Bids are publicly solicited and a firm-fixed-price contract (lump sum or unit price) is awarded to the responsible bidder whose bid, conforming with all the material terms and conditions of the invitation for bids, is the lowest in price. The sealed bid method is the preferred method for procuring construction, if the conditions in 31.36(d)(2)(i) apply.

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

(A) A complete, adequate, and realistic specification or purchase description is available;  
(B) Two or more responsible bidders are willing and able to compete effectively and for the business; and  
(C) The procurement lends itself to a firm fixed price contract and the selection of the successful bidder can be made principally on the basis of price.

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

(A) The invitation for bids will be publicly advertised and bids shall be solicited from an adequate number of known suppliers, providing them sufficient time prior to the date set for opening the bids;  
(B) The invitation for bids, which will include any specifications and pertinent attachments, shall define the items or services in order for the bidder to properly respond;  
(C) All bids will be publicly opened at the time and place prescribed in the invitation for bids;  
(D) A firm fixed-price contract award will be made in writing to the lowest responsive and responsible bidder. Where specified in bidding documents, factors such as discounts, transportation cost, and life cycle costs shall be considered in determining which bid is lowest. Payment discounts will only be used to determine the low bid when prior experience indicates that such discounts are usually taken advantage of; and  
(E) Any or all bids may be rejected if there is a sound documented reason.

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

(i) Requests for proposals will be publicized and identify all evaluation factors and their relative importance. Any response to publicized requests for proposals shall be honored to the maximum extent practical;

(ii) Proposals will be solicited from an adequate number of qualified sources;

(iii) Grantees and sub-grantees will have a method for conducting technical evaluations of the proposals received and for selecting awardees;

(iv) Awards will be made to the responsible firm whose proposal is most advantageous to the program, with price and other factors considered; and

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

(4) Procurement by noncompetitive proposals is procurement through solicitation of a proposal from only one source, or after solicitation of a number of sources, competition is determined inadequate.

(i) Procurement by noncompetitive proposals may be used only when the award of a contract is infeasible under small purchase procedures, sealed bids or competitive proposals and one of the following circumstances applies:

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

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

(C) The awarding agency authorizes noncompetitive proposals; or

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

(ii) Cost analysis, i.e., verifying the proposed cost data, the projections of the data, and the evaluation of the specific elements of costs and profits, is required.

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(iii) Grantees and sub-grantees may be required to submit the proposed procurement to the awarding agency for pre-award review in accordance with paragraph (g) of this section.

(e) Contracting with small and minority firms, women's business enterprise and labor surplus area firms.

(1) The grantee and sub-grantee will take all necessary affirmative steps to assure that minority firms, women's business enterprises, and labor surplus area firms are used when possible.

(2) Affirmative steps shall include:

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

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

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

(iv) Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority business, and women's business enterprises;

(v) Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce; and

(vi) Requiring the prime contractor, if subcontracts are to be let, to take the affirmative steps listed in paragraphs (e)(2) (i) through (v) of this section.

(f) Contract cost and price.

(1) Grantees and sub-grantees must perform a cost or price analysis in connection with every procurement action including contract modifications. The method and degree of analysis is dependent on the facts surrounding the particular procurement situation, but as a starting point, grantees must make independent estimates before receiving bids or proposals. A cost analysis must be performed when the offerer is required to submit the elements of his estimated cost, e.g., under professional, consulting, and architectural engineering services contracts. A cost analysis will be necessary when adequate price competition is lacking, and for sole source procurements, including contract modifications or change orders, unless price reasonableness can be established on the basis of a catalog or market price of a commercial product sold in substantial quantities to the general public or based on prices set by law or regulation. A price analysis will be used in all other instances to determine the reasonableness of the proposed contract price.

(2) Grantees and sub-grantees will negotiate profit as a separate element of the price for each contract in which there is no price competition and in all cases where cost analysis is performed.

To establish a fair and reasonable profit, consideration will be given to the complexity of the work to be performed, the risk borne by the contractor, the contractor's investment, the amount of subcontracting, the quality of its record of past performance, and industry profit rates in the surrounding geographical area for similar work.

(3) Costs or prices based on estimated costs for contracts under grants will be allowable only to the extent that costs incurred or cost estimates included in negotiated prices are consistent with Federal cost principles (see Sec. 31.22). Grantees may reference their own cost principles that comply with the applicable Federal cost principles.

(4) The cost plus a percentage of cost and percentage of construction cost methods of contracting shall not be used.

(g) Awarding agency review.

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

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(2) Grantees and sub-grantees must on request make available for awarding agency pre-award review procurement documents, such as requests for proposals or invitations for bids, independent cost estimates, etc. when:

- (i) A grantee's or sub-grantee's procurement procedures or operation fails to comply with the procurement standards in this section; or
- (ii) The procurement is expected to exceed the simplified acquisition threshold and is to be awarded without competition or only one bid or offer is received in response to a solicitation; or
- (iii) The procurement, which is expected to exceed the simplified acquisition threshold, specifies a "brand name" product; or
- (iv) The proposed award is more than the simplified acquisition threshold and is to be awarded to other than the apparent low bidder under a sealed bid procurement; or
- (v) A proposed contract modification changes the scope of a contract or increases the contract amount by more than the simplified acquisition threshold.

(3) A grantee or sub-grantee will be exempt from the pre-award review in paragraph (g)(2) of this section if the awarding agency determines that its procurement systems comply with the standards of this section.

(i) A grantee or sub-grantee may request that its procurement system be reviewed by the awarding agency to determine whether its system meets these standards in order for its system to be certified. Generally, these reviews shall occur where there is a continuous high-dollar funding, and third-party contracts are awarded on a regular basis.

(ii) A grantee or sub-grantee may self-certify its procurement system. Such self-certification shall not limit the awarding agency's right to survey the system. Under a self-certification procedure, awarding agencies may wish to rely on written assurances from the grantee or sub-grantee that it is complying with these standards. A grantee or sub-grantee will cite specific procedures, regulations, standards, etc., as being in compliance with these requirements and have its system available for review.

(h) Bonding requirements. For construction or facility improvement contracts or subcontracts exceeding the simplified acquisition threshold, the awarding agency may accept the bonding policy and requirements of the grantee or sub-grantee provided the awarding agency has made a determination that the awarding agency's interest is adequately protected. If such a determination has not been made, the minimum requirements shall be as follows:

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

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

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

(i) Contract provisions. A grantee's and sub-grantee's contracts must contain provisions in paragraph (i) of this section. Federal agencies are permitted to require changes, remedies, changed conditions, access and records retention, suspension of work, and other clauses approved by the Office of Federal Procurement Policy.

(1) Administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as may be appropriate.

(Contracts more than the simplified acquisition threshold)

(2) Termination for cause and for convenience by the grantee or sub-grantee including the manner by which it will be effected and the basis for settlement. (All contracts in excess of \$10,000)

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- (3) Compliance with Executive Order 11246 of September 24, 1965, entitled "Equal Employment Opportunity," as amended by Executive Order 11375 of October 13, 1967, and as supplemented in Department of Labor regulations (41 CFR chapter 60). (All construction contracts awarded in excess of \$10,000 by grantees and their contractors or sub-grantees)
- (4) Compliance with the Copeland "Anti-Kickback" Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR part 3). (All contracts and sub-grants for construction or repair)
- (5) Compliance with the Davis-Bacon Act (40 U.S.C. 276a-7) as supplemented by Department of Labor regulations (29 CFR part 5). (Construction contracts in excess of \$2000 awarded by grantees and sub-grantees when required by Federal grant program legislation)
- (6) Compliance with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330) as supplemented by Department of Labor regulations (29 CFR part 5). (Construction contracts awarded by grantees and sub-grantees in excess of \$2000, and in excess of \$2500 for other contracts which involve the employment of mechanics or laborers)
- (7) Notice of awarding agency requirements and regulations pertaining to reporting.
- (8) Notice of awarding agency requirements and regulations pertaining to patent rights with respect to any discovery or invention which arises or is developed in the course of or under such contract.
- (9) Awarding agency requirements and regulations pertaining to copyrights and rights in data.
- (10) Access by the grantee, the sub-grantee, the Federal grantor agency, the Comptroller General of the United States, or any of their duly authorized representatives to any books, documents, papers, and records of the contractor which are directly pertinent to that specific contract for the purpose of making audit, examination, excerpts, and transcriptions.
- (11) Retention of all required records for three years after grantees or sub-grantees make final payments and all other pending matters are closed.
- (12) Compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h)), section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR part 15). (Contracts, subcontracts, and sub-grants of amounts in excess of \$100,000)
- (13) Mandatory standards and policies relating to energy efficiency which are contained in the State energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Pub. L. 94-163, 89 Stat. 871).
- (j) Payment to consultants.
  - (1) EPA will limit its participation in the salary rate (excluding overhead) paid to individual consultants retained by grantees or by a grantee's contractors or subcontractors to the maximum daily rate for a GS-18. (Grantees may, however, pay consultants more than this amount). This limitation applies to consultation services of designated individuals with specialized skills who are paid at a daily or hourly rate. This rate does not include transportation and subsistence costs for travel performed; grantees will pay these in accordance with their normal travel reimbursement practices. (Pub. L. 99-591).
  - (2) Sub-agreements with firms for services which are awarded using the procurement requirements in this part are not affected by this limitation.
- (k) Use of the same architect or engineer during construction.
  - (1) If the grantee is satisfied with the qualifications and performance of the architect or engineer who provided any or all of the facilities planning or design services for a waste-water treatment works project and wishes to retain that firm or individual during construction of the project, it may do so without further public notice and evaluation of qualifications, provided:
    - (i) The grantee received a facilities planning (Step 1) or design grant (Step 2), and selected the architect or engineer in accordance with EPA's procurement regulations in effect when EPA awarded the grant; or
    - (ii) The award official approves noncompetitive procurement under Sec. 31.36(d)(4) for reasons other than simply using the same individual or firm that provided facilities planning or design services for the project; or
    - (iii) The grantee attests that:

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(A) The initial request for proposals clearly stated the possibility that the firm or individual selected could be awarded a sub-agreement for services during construction; and

(B) The firm or individual was selected for facilities planning or design services in accordance with procedures specified in this section.

(C) No employee, officer or agent of the grantee, any member of their immediate families, or their partners have financial or other interest in the firm selected for award; and

(D) None of the grantee's officers, employees or agents solicited or accepted gratuities, favors or anything of monetary value from contractors or other parties to sub-agreements.

(2) However, if the grantee uses the procedures in paragraph (k)(1) of this section to retain an architect or engineer, any Step 3 sub-agreements between the architect or engineer and the grantee must meet all of the other procurement provisions in Sec. 31.36.

[53 FR 8068 and 8087, Mar. 11, 1988, and amended at 53 FR 8075, Mar. 11, 1988; 60 FR 19639, 19644, Apr. 19, 1995; 66 FR 3794, Jan. 16, 2001]

**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 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 shall be given a sufficient time prior to the date set forth for the opening of bids. 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. 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 at the time and place designated in the invitation for bids. At the time the bids are opened, 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 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 bids shall be allowed only to the extent permitted by regulations issued by the secretary.

**Effective:** July 14, 2000

**History:** 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 (1<sup>st</sup> 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

**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.

(2) Adequate public notice of the request for proposals 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.

(6) Award shall be made to the responsible offerer 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.

(7) Written or oral discussions shall be conducted with all responsible offerers 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 offerers. Discussions need not be conducted:

(a) With respect to prices, where the prices are fixed by law 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 offerers of the possibility that award may be made on the basis of the initial offers.

**Effective:** June 24, 2003

**History:** 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,

**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. 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 offerer, all other potential offerers 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:** June 24, 2003

**History:** 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.

**45A.100 Small purchases.**

(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. 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, 2002

## FORT THOMAS WTP ADVANCED TREATMENT

**History:** 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.

**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

FORT THOMAS WTP ADVANCED TREATMENT

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

## FORT THOMAS WTP ADVANCED TREATMENT

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.

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- c. 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 compiled 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.



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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.

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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).

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Attachment Number 6

**EEO Goals for Economic Areas in Region 4**

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

**Kentucky:**

056 Paducah, KY:	
Non-SMSA Counties	5.2
IL Hardin; IL Massac; IL Pope; KY Ballard; KY Caldwell; KY Calloway; KY Carlisle;	
KY Crittenden; KY Fulton; KY Graves; KY Hickman; KY Livingston; KY Lyon; KY	
McCracken; KY Marshall.	
057 Louisville, KY:	
SMSA Counties:	
4520 Louisville, KY-IN	11.2
IN Clark; IN Floyd; KY 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.	

**EEO Goals for Project Area**

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

1640 Cincinnati, OH-KY-IN	11.0
OH Hamilton; OH Warren. IN Dearborn; KY Boone; KY Campbell; KY Kenton; OH Clermont;	
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 Robertson; OH Adams; OH Brown; OH Clinton; OH Highland. KY Fleming; KY Gallatin; KY Grant; KY	
Lewis; KY Mason; KY Owen; KY Pendleton;	

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

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

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

When filing for the EEO-1 Report for the first time, go to the web site at: <http://www.mimdms.com/jrc.html> and select "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. Once 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

## FORT THOMAS WTP ADVANCED TREATMENT

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)).

## FORT THOMAS WTP ADVANCED TREATMENT

- 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).

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- 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.

**SRF Requirements:**

Form	Requirements	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

FORT THOMAS WTP ADVANCED TREATMENT

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



Environmental  
 Protection Agency

Disadvantaged Business Enterprise Program  
 DBE Subcontractor Participation Form

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

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

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CONTRACT ITEM NO.	ITEM OF WORK OR DESCRIPTION OF SERVICES RECEIVED FROM THE PRIME CONTRACTOR	AMOUNT SUBCONTRACTOR WAS PAID BY PRIME CONTRACTOR
Subcontractor Signature		Title/Date

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

EPA FORM 6100-2 (DBE Subcontractor Participation Form)

# FORT THOMAS WTP ADVANCED TREATMENT

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



Environmental  
Protection Agency

## Disadvantaged Business Enterprise Program DBE Subcontractor Participation Form

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

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

EPA FORM 6100-2 (DBE Subcontractor Participation Form)

# FORT THOMAS WTP ADVANCED TREATMENT

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



Environmental  
 Protection Agency

## Disadvantaged Business Enterprise Program DBE Subcontractor Performance Form

NAME OF SUBCONTRACTOR,		PROJECT NAME	
ADDRESS		BID/PROPOSAL NO.	
TELEPHONE NO.		E-MAIL ADDRESS	
PRIME CONTRACTOR NAME			
CONTRACT ITEM NO.	ITEM OF WORK OR DESCRIPTION OF SERVICES BID TO PRIME	PRICE OF WORK SUBMITTED TO PRIME CONTRACTOR	
Currently certified as an MBE or WBE under EPA's DBE Program? <input type="checkbox"/> Yes <input type="checkbox"/> No Signature of Prime Contractor Date Print Name Title _____ _____ Signature of Subcontractor Date _____ Print Name Title _____			

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

EPA FORM 6100-3 (DBE Subcontractor Performance Form)



# FORT THOMAS WTP ADVANCED TREATMENT

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



Environmental  
Protection Agency

## Disadvantaged Business Enterprise Program DBE Subcontractor Performance Form

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

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

# FORT THOMAS WTP ADVANCED TREATMENT

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



Environmental  
 Protection Agency

## Disadvantaged Business Enterprise Program DBE Subcontractor Utilization Form.

BID/PROPOSAL NO.	PROJECT NAME
NAME OF PRIME BIDDER/PROPOSER	E-MAIL ADDRESS
ADDRESS	
TELEPHONE NO.	FAX NO.

The following subcontractors will be used on this project:			
COMPANY NAME, ADDRESS, PHONE NUMBER, AND E-MAIL ADDRESS	TYPE OF WORK TO BE PERFORMED	ESTIMATED DOLLAR AMOUNT	CURRENTLY CERTIFIED AS AN MBE OR WBE?

I certify under penalty of perjury that the foregoing statements are true and correct. In the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302(c).

\_\_\_\_\_  
 Signature of Prime Contractor

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 Print Name

\_\_\_\_\_  
 Title

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

# FORT THOMAS WTP ADVANCED TREATMENT

OMB Control No: 2090-0030

Approved: 05/01/2008

Approval Expires: 01/31/2011



Environmental  
Protection Agency

## Disadvantaged Business Enterprise Program DBE Subcontractor Utilization Form

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

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

**DISADVANTAGED 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:  
\_\_\_\_\_

5. Total dollar amount/percent of contract of MBE participation:

\_\_\_\_\_

6. Total dollar amount/percent of contract of WBE participation:

\_\_\_\_\_

7. Certifications\* for each subcontractor enclosed:  Yes  No

8. Subcontracts or letters of intent signed by both parties enclosed:  Yes  No

9. **List of MBE Subcontractors:**

Name: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Cell Phone: \_\_\_\_\_

Email: \_\_\_\_\_

Type of Contract: \_\_\_\_\_

Work to be Done: \_\_\_\_\_

Amount: \_\_\_\_\_

10. **List of WBE Subcontractors:**

Name: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Cell Phone: \_\_\_\_\_

Email: \_\_\_\_\_

Type of Contract: \_\_\_\_\_

Work to be Done: \_\_\_\_\_

Amount: \_\_\_\_\_

FORT THOMAS WTP ADVANCED TREATMENT

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.

**Information concerning the efforts for obtaining subcontractor(s)**

11. Information to be submitted by the bidder concerning good faith efforts taken

- a. Advertisements, etc.: List each publication in which an announcement or notification was placed and attach the tear sheet of each announcement from each publication

Name of publication: \_\_\_\_\_

Address: \_\_\_\_\_

Dates of advertisement: \_\_\_\_\_

Specific subcontract areas announced: \_\_\_\_\_

- b. List each DBE construction firm or supplier to which a letter of solicitation was sent or with whom negotiations were held.

Company name and phone number: \_\_\_\_\_

Area of Work Expertise: \_\_\_\_\_

Date of any follow-up call and person spoke to: \_\_\_\_\_

- c. Copies of returned envelopes.  
d. Copies of faxes sent.  
e. Copies of certified mail return receipts.  
f. Copies of letters or e-mails from solicited firms declining offer.  
g. Copy of bidders list (see sheet below):

**FORT THOMAS WTP ADVANCED TREATMENT**

**BIDDER'S LIST FORM**

**OWNER** \_\_\_\_\_

**LOAN NO:** \_\_\_\_\_

**PROJECT TITLE** \_\_\_\_\_

**BID DATE:** \_\_\_\_\_

**Instructions:**

1. This list must include all firms that bid or quote on prime or subcontracts under EPA assisted projects (i.e. SRF Projects), included both MBE/WBE's and non MBE/WBE'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 SRF.
4. The following information must be obtained from all prime and sub-contractor's. Please complete the form below:

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

**REGION 4**  
**DISADVANTAGED BUSINESS ENTERPRISE (DBE) NEGOTIATED RATES**  
**(Subject to change - refer to grant award for specific fair share objectives)**

KENTUCKY

SRF Construction: (both programs)	0.70% MBE and 7.60% WBE
Equipment:	1.20% MBE and 1.10% WBE
Services:	1.20% MBE and 16.30% WBE
Supplies:*	3.70% MBE and 4.60% 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 owners requirements on Flood Insurance are contained in the Special Conditions Section of the Contracts Documents.

**OUTLAY MANAGEMENT**

The contractor must provide a contract progress schedule of percentage of work in place and costs against time; and a schedule of projected payments (cumulative) for construction and for the architectural/engineering contract when the contract is awarded. The payment schedule must be submitted, in a format similar to the attached sample, to the owner for forwarding to the State when the contract is awarded, and whenever actual payments on a project vary beyond -5 percent and +10 percent from the schedule, as determined by the grantee.

Contractor will be required to review each of these contract schedules during the month of June and to submit revised schedules, as necessary, no later than July 1<sup>st</sup> of each year.

FORT THOMAS WTP ADVANCED TREATMENT

THIS FORMAT IS A SAMPLE ONLY.

CONSTRUCTION AND OUTLAY SCHEDULE

Project No.: \_\_\_\_\_

Applicant: \_\_\_\_\_

Contract Identification: \_\_\_\_\_

Description of Contract: \_\_\_\_\_

(INSTRUCTIONS FOR USE ON REVERSE SIDE)

SCHEDULE I - CONSTRUCTION SCHEDULE

Date for Advertisement: \_\_\_\_\_

Date for Opening Bids: \_\_\_\_\_

Pre-Construction Conference Date: \_\_\_\_\_

Date of Contract Award: \_\_\_\_\_

Contract Period: \_\_\_\_\_ days Projected Contract Completion Date: \_\_\_\_\_

Total Eligible Contract Amount: \_\_\_\_\_

Work Order Date: \_\_\_\_\_

Start Construction Date: \_\_\_\_\_

Contract Completed: \_\_\_\_\_

SCHEDULE II - CUMULATIVE OUTLAY SCHEDULE (55% EPA Share) - Projection  
only for quarters that remain in the fiscal year (FY) plus cumulative  
annual amount for the next FY.

Cum EPA Amount thru 1 <sup>st</sup> Qtr. Oct./Dec.:	\$ _____
Cum EPA Amount thru 2 <sup>nd</sup> Qtr. Jan./Mar.:	\$ _____
Cum EPA Amount thru 3 <sup>rd</sup> Qtr. Apr./June:	\$ _____
Cum EPA Amount thru 4 <sup>th</sup> Qtr. July/Sept.:	\$ _____
Cum EPA Amount for Next Fiscal Year:	\$ _____

**INSTRUCTIONS (Construction and Outlay Schedules)**

To insure timely achievement of the grant objectives the owner (grantee) must provide EPA with a grants activities schedule, contract construction schedules and corresponding payment outlay schedules for the grant and each contract under the grant. One copy of information similar to that showing the Construction and Outlay Schedule Form will be submitted for the grant schedule with the grant acceptance. A separate form will accompany each contract at time of contract award.

- A. The grant activities schedule shall depict the period from grant award through grant closeout and cover all major milestone date. The grant activities schedule shall include Schedule I information items as well as other appropriate items necessary to monitor the grant. Schedule II shall be filled out to estimate the cumulative (all construction and architectural/engineering contracts) payment schedule to be requested by the grantee from EPA during the grant period, and whenever actual outlays vary beyond -5% and +10% from the schedule.
  
- B. Individual contractor's construction schedules for each contract will be submitted to support the grant activities schedule. The Schedule I shall be submitted prior to date of advertisement of each contract and Schedule II along with the contractor's construction schedule shall be submitted seven (7) calendar days prior to the dates of the pre-construction conference. The contractor's construction schedule shall depict the contractor's plan for completing all contract requirements and show work placement in dollars versus contract time. Schedule II shall depict the contract payment outlay by month or quarter. The contract schedule will be coordinated with all parties at the pre-construction conference.

The grants activities schedule, contractor construction schedules, will be the basis for monitoring progress towards completion of the project. The schedules shall be maintained at the available for inspection and updated at least monthly. The schedules shall be revised to incorporate approved change orders as they occur.

All of the schedules will be submitted to the State Division of Water.

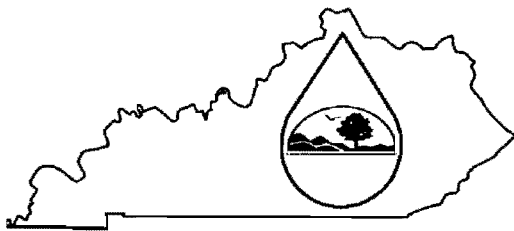
**NOTICE OF INTENT**

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 contractor must complete and submit the attached form at least 48 hours prior to start of construction to the address below:

Section Supervisor  
Permits Support Branch  
Surface Water Permits Branch  
Kentucky Division of Water  
14 Reilly Road, Frankfort Office Park  
Frankfort, Kentucky 40601

# FORT THOMAS WTP ADVANCED TREATMENT

KPDES FORM NOI-SW



Kentucky Pollutant Discharge Elimination System (KPDES)  
 Notice of Intent (NOI)  
 for Storm Water Discharges  
 Associated with Industrial Activity Under the  
 KPDES General Permit

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a KPDES permit issued for storm water discharges associated with industrial activity. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit.

**ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM (See Instructions on back)**

**I. Facility Operator Information**

Name:	Phone:	
Address:	Status of Owner/Operator:	
City, State, Zip Code:		

**II. Facility/Site Location Information**

Name:	
Address:	
City, State, Zip Code:	
County:	
Site Latitude: (degrees/minutes/seconds)	Site Longitude: (degrees/minutes/seconds)

**III. Site Activity Information**

MS4 Operator Name:				
Receiving Water Body:				
Are there existing quantitative data?	Yes <input type="checkbox"/> If Yes, submit with this form. No <input type="checkbox"/>			
SIC or Designated Activity Code Primary	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	
If this facility is a member of a Group Application, enter Group Application Number:				
If you have other existing KPDES Permits, enter Permit Numbers:				

**IV. Additional Information Required FOR CONSTRUCTION ACTIVITIES ONLY**

Project Start Date:	Completion Date:	
Estimated Area to be disturbed (in acres):		
Is the Storm Water Pollution Prevention Plan in Compliance with State and/or Local Sediment and Erosion Plans?	Yes <input type="checkbox"/> No <input type="checkbox"/>	

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, 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.

CIN380723

NOVEMBER 23, 2009

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DWSRF SUPPLEMENTAL GEN COND

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Printed or Typed Name:	
Signature:	Date:

Kentucky Pollutant Discharge Elimination System (KPDES)  
 Instructions  
 Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity  
 To Be Covered Under The KPDES General Permit

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, Industrial Section, Kentucky Division of Water at (502) 564-3410.

WHERE TO FILE NOI FORM

NOIs must be sent to the following address:

Section Supervisor  
 Inventory & Data Management Section  
 KPDES Branch, Division of Water  
 Frankfort Office Park  
 14 Reilly Road  
 Frankfort, KY 40601

COMPLETING THE FORM

Type or print legibly in the appropriate areas only. If you have any questions regarding the completion of this form call the Storm Water Contact, Industrial Section, at (502) 564-3410.

SECTION I - FACILITY OPERATOR INFORMATION

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same as the name of the facility. The responsible party is the legal entity that controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

Enter the appropriate letter to indicate the legal status of the operator of the facility.

- F = Federal                      M = Public (other than federal or state)
- S = State                         P = Private

SECTION II - FACILITY/SITE LOCATION INFORMATION

Enter the facility's or site's official or legal name and complete street address, including city, state, and ZIP code.

SECTION III - SITE ACTIVITY INFORMATION

If the storm water discharges to a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4 (e.g., municipality name, county name) and the receiving water of the discharge from the MS4. (A MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is

## FORT THOMAS WTP ADVANCED TREATMENT

owned or operated by a state, city, town, borough, county, parish, district, association, or other public body which is designed or used for collecting or conveying storm water.)

If the facility discharges storm water directly to receiving water(s), enter the name of the receiving water.

Indicate whether or not the owner or operator of the facility has existing quantitative data that represent the characteristics and concentration of pollutants in storm water discharges.

If data is available submit with this form.

List, in descending order of significance, up to four 4-digit standard industrial classification (SIC) codes that best describe the principal products or services provided at the facility or site identified in Section II of this application.

If the facility listed in Section II has participated in Part I of an approved storm water group application and a group number has been assigned, enter the group application number in the space provided.

If there are other KPDES permits presently issued for the facility or site listed in Section II, list the permit numbers.

### SECTION IV - ADDITIONAL INFORMATION REQUIRED FOR CONSTRUCTION ACTIVITIES ONLY

Construction activities must complete Section IV in addition of Sections I through III. Only construction activities need to complete Section IV.

Enter the project start date and the estimated completion date for the entire development plan.

Provide an estimate of the total number of acres of the site on which soil will be disturbed (round to the nearest acre).

Indicate whether the storm water pollution prevention plan for the site is in compliance with approved state and/or local sediment and erosion plans, permits, or storm water management plans.

### SECTION V - CERTIFICATION

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

*For a corporation:* by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

*For a partnership or sole proprietorship:* by a general partner or the proprietor; or

*For a municipality, state, Federal, or other public facility:* by either a principal executive officer or ranking elected official.



**WAGE RATES**

Federal Davis-Bacon rates are not applicable for these funds. This determination applies only to the grant/loan portion of this project. Please contact the other funding sources, if applicable, for their requirements pertaining to federal wage rates. You must contact the Kentucky Labor Cabinet for determination of applicable state wages.

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**SECTION 01 11 00  
SUMMARY OF WORK**

**PART 1 GENERAL**

**1.01 WORK COVERED BY CONTRACT DOCUMENTS**

- A. The Project contemplated consists of a concrete and masonry Advanced Treatment building housing 10 Granular Activated Carbon contactors with 12 feet of media depth, a rotary positive displacement blower for contactor air scour, a low lift pump station, 3 medium pressure high output ultraviolet disinfection reactors, a 2 ton bridge crane in the UV Disinfection Room, a concrete equalization tank beneath the building with submersible pumps, and ancillary systems including but not limited to controls, security systems, chemical feed, plumbing, heating, air conditioning and ventilating. The pump room contains vertical turbine pumps with adjustable frequency drives including 3 GAC feed pumps, 2 backwash pumps and 2 slurry water supply pumps and is served by a 5 ton bridge crane. A service elevator, and monorail crane will be installed. Roofing systems include a pitched vegetated roofing system, a metal roof, and a flat modified bituminous roof with pavers.

A standby electrical power system is provided with capacity to serve a majority of the plant systems. Site work including excavation, yard piping, concrete valve vaults, a splitter box with sluice gates, a concrete outfall structure, fencing, concrete and asphalt paving, grading and landscaping.

Demolition of existing backwash pumps and connections of piping to existing piping and concrete flumes will be completed in the existing filter building.

The existing treatment facilities and laboratory must be kept in operation during construction.

The Work will be completed in all respects within 790 calendar days from the date when the Contract Times commence to run.

B. Alternates:

1. Only those alternates that were selected by the Owner, as evidenced in the Agreement, are made a part of this Contract.
2. Alternates that were Bid were as described below:
  - a. Deductive Alternate No. 1- Air Scour System.
  - b. Deductive Alternate No. 2-Electric Traction Elevator.
  - c. Deductive Alternate No. 3- Vegetated Roof Assembly.
  - d. Additive or Deductive Alternate No. 4- Stainless Steel Underdrain.

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- e. Additive Alternate No. 5 UV System Alternate Manufacturer.
- f. Deductive Alternate No.6 – UV System.

1.02 WORK NOT COVERED BY CONTRACT DOCUMENTS

- A. Engineer will develop control system programming including operator interface screens, control system configuration, and data storage.
- B. Engineer will compile an electronic O&M manual that will incorporate electronic vendor operations and maintenance files provided by the Contractor.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 01 26 00  
CONTRACT MODIFICATION PROCEDURES**

**PART 1 GENERAL**

**1.01 PROPOSAL REQUESTS**

- A. Owner may, in anticipation of ordering an addition, deletion, or revision to the Work, request Contractor to prepare a detailed proposal of cost and times to perform contemplated change.
- B. Proposal request will include reference number for tracking purposes and detailed description of and reason for proposed change, and such additional information as appropriate and as may be required for Contractor to accurately estimate cost and time impact on Project.
- C. Proposal request is for information only; Contractor is neither authorized to execute proposed change nor to stop Work in progress as result of such request.
- D. Contractor's written proposal shall be transmitted to Construction Contract Administrator (CCA) promptly, but not later than 14 days after Contractor's receipt of Owner's written request. Proposal shall remain firm for a maximum period of 45 days after receipt by CCA.
- E. Owner's request for proposal or Contractor's failure to submit such proposal within the required time period will not justify a Claim for an adjustment in Contract Price or Contract Times.

**1.02 CLAIMS**

- A. Include, at a minimum:
  - 1. Specific references including (i) Drawing numbers, (ii) Specification section and article/paragraph number, and (iii) Submittal type, Submittal number, date reviewed, CCA's comment, as applicable, with appropriate attachments.
  - 2. Stipulated facts and pertinent documents, including photographs and statements.
  - 3. Interpretations relied upon.
  - 4. Description of (i) nature and extent of Claim, (ii) who or what caused the situation, (iii) impact to the Work and work of others, and (iv) discussion of claimant's justification for requesting a change to price or times or both.

## FORT THOMAS WTP ADVANCED TREATMENT

5. Estimated adjustment in price claimant believes it is entitled to with full documentation and justification.
6. Requested Change in Contract Times: Include at least (i) Progress Schedule documentation showing logic diagram for request, (ii) documentation that float times available for Work have been used, and (iii) revised activity logic with durations including sub-network logic revisions, duration changes, and other interrelated schedule impacts, as appropriate.
7. Documentation as may be necessary as set forth below for Work Change Directive, and as CCA may otherwise require.

### 1.03 WORK CHANGE DIRECTIVES

#### A. Procedures:

1. CCA will:
  - a. Initiate, including a description of the Work involved and any attachments.
  - b. Affix signature, demonstrating CCA's recommendation.
2. Upon completion of Work covered by the Work Change Directive or when final Contract Times and Contract Price are determined, Contractor shall submit documentation for inclusion in a Change Order.
3. Contractor's documentation shall include but not be limited to:
  - a. Appropriately detailed records of Work performed to enable determination of value of the Work.
  - b. Full information required to substantiate resulting change in Contract Times and Contract Price for Work. On request of Engineer, provide additional data necessary to support documentation.
  - c. Support data for Work performed on a unit price or Cost of the Work basis with additional information such as:
    - 1) Dates Work was performed, and by whom.
    - 2) Time records, wage rates paid, and equipment rental rates.
    - 3) Invoices and receipts for materials, equipment, and subcontracts, all similarly documented.

- B. Effective Date of Work Change Directive: Date of signature by Owner, unless otherwise indicated thereon.

1.04 CHANGE ORDERS

A. Procedure:

1. CCA will prepare six copies of proposed Change Order and transmit such with CCA's written recommendation and request to Contractor for signature.
2. Contractor shall, upon receipt, either: (i) promptly sign copies, retaining one for its file, and return remaining five copies to CCA for Owner's signature, or (ii) return unsigned five copies with written justification for not executing Change Order.
3. CCA will, upon receipt of Contractor signed copies, promptly forward CCA's written recommendation and partially executed five copies for Owner's signature, or if Contractor fails to execute the Change Order, CCA will promptly so notify Owner and transmit Contractor's justification to Owner.
4. Upon receipt of Contractor-executed Change Order, Owner will promptly either:
  - a. Execute Change Order, retaining three copies for its file and returning two copies to CCA; or
  - b. Return to CCA unsigned copies with written justification for not executing Change Order.
5. Upon receipt of Owner-executed Change Order, CCA will transmit two copies to Contractor, or if Owner fails to execute the Change Order, CCA will promptly so notify Contractor and transmit Owner's justification to Contractor.
6. Upon receipt of Owner-executed Change Order, Contractor shall:
  - a. Perform Work covered by Change Order.
  - b. Revise Schedule of Values to adjust Contract Price and submit with next Application for Payment.
  - c. Revise Progress Schedule to reflect changes in Contract Times, if any, and to adjust times for other items of Work affected by change.
  - d. Enter changes in Project record documents after completion of change related Work.

B. In signing a Change Order, Owner and Contractor acknowledge and agree that:

1. Stipulated compensation (Contract Price or Contract Times, or both) set forth includes payment for (i) the Cost of the Work covered by the Change Order, (ii) Contractor's fee for overhead and profit, (iii) interruption of Progress Schedule, (iv) delay and impact, including cumulative impact, on other Work under the Contract Documents, and (v) extended overheads.

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2. Change Order constitutes full mutual accord and satisfaction for the change to the Work.
3. Unless otherwise stated in the Change Order, all requirements of the original Contract Documents apply to the Work covered by the Change Order.

### 1.05 COST OF THE WORK

- A. In determining the supplemental costs allowed in Paragraph 11.01.A.5 of the General Conditions for rental equipment and machinery, the following will apply.
- B. Rental of construction equipment and machinery and the parts thereof having a replacement value in excess of \$1,000, whether owned by Contractor or rented or leased from others, shall meet the following requirements:
  1. Full rental costs for leased equipment shall not exceed rates listed in the Rental Rate Blue Book published by Equipment Watch, San Jose, California, as adjusted to the regional area of the Project. Owned equipment costs shall not exceed the single shift rates established in the Cost Reference Guide (CRG) also published by Equipment Watch. The most recent published edition in effect at commencement of actual equipment use shall be used.
  2. Rates shall apply to equipment in good working condition. Equipment not in good condition, or larger than required, may be rejected by Engineer or accepted at reduced rates.
  3. Leased Equipment: For equipment leased or rented in arm's length transactions from outside vendors, maximum rates shall be determined by the following actual usage/Blue Book Payment Category:
    - a. Less than 8 hours: Hourly Rate.
    - b. 8 or more hours but less than 7 days: Daily Rate.
    - c. 7 or more days but less than 30 days: Weekly Rate.
    - d. 30 days or more: Monthly Rate.
  4. Arm's length rental and lease transactions are those in which the firm involved in the rental or lease of equipment is not associated with, owned by, have common management, directorship, facilities and/or stockholders with the firm renting the equipment.
  5. Leased Equipment in Use: Actual equipment use time documented by CCA shall be the basis that equipment was on and utilized at the Project Site. In addition to the leasing rate above, equipment operational costs shall be paid at the estimated hourly operating cost rate set forth in the Blue Book if not already included in the lease rate. Hours of operation shall be based upon actual equipment usage to the nearest quarter hour, as recorded by CCA.



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6. Leased Equipment, When Idle (Standby): Idle or standby equipment is equipment onsite or in transit to and from the Work Site and necessary to perform the Work under the modification, but not in actual use. Idle equipment time, as documented by CCA, shall be paid at the leasing rate determined above, excluding operational costs.
7. Owned and Other Equipment in Use: Equipment rates for owned equipment or equipment provided in other than arm's length transaction shall not exceed the single shift total hourly costs rate developed in accordance with the CRG and as modified herein for multiple shifts. This total hourly rate will be paid for each hour the equipment actually performs work. Hours of operation shall be based upon actual equipment usage as recorded by CCA. This rate shall represent payment in full for Contractor's direct costs.
8. Owned and Other Equipment, When Idle (Standby): Equipment necessary to be onsite to perform the Work on single shift operations, but not utilized, shall be paid for at the ownership hourly expense rate developed in accordance with the CRG, provided its presence and necessity onsite has been documented by CCA. Payment for idle time of portions of a normal workday, in conjunction with original contract Work, will not be allowed. In no event shall idle time claimed in a day for a particular piece of equipment exceed the normal Work or shift schedule established for the Project. It is agreed that this rate shall represent payment in full for Contractor's direct costs. When CCA determines that the equipment is not needed to continuously remain at the Work Site, payment will be limited to actual hours in use.
9. Owned and Other Equipment, Multiple Shifts: For multiple shift operations, the CRG single shift total hourly costs rate shall apply to the operating equipment during the first shift. For subsequent shifts, up to 2 in a 24-hour day, operating rate shall be the sum of the total hourly CRG operating cost and 60 percent of the CRG ownership and overhaul expense. Payment for idle or standby time for second and third shifts shall be 20 percent of the CRG ownership and overhaul expense.
10. When necessary to obtain owned equipment from sources beyond the Project limits, the actual cost to transfer equipment to the Work Site and return it to its original location will be allowed as an additional item of expense. Move-in and move-out allowances will not be made for equipment brought to the Project if the equipment is also used on original Contract or related Work.
11. If the move-out destination is not to the original location, payment for move-out will not exceed payment for move-in.
12. If move is made by common carrier, the allowance will be the amount paid for the freight. If equipment is hauled with Contractor's own forces, rental will be allowed for the hauling unit plus the hauling unit operator's

## FORT THOMAS WTP ADVANCED TREATMENT

wage. If equipment is transferred under its own power, the rental will be 75 percent of the appropriate total hourly costs for the equipment, without attachments, plus the equipment operator's wage.

13. Charges for time utilized in servicing equipment to ready it for use prior to moving and similar charges will not be allowed.
14. When a breakdown occurs on any piece of owned equipment, payment shall cease for that equipment and any other owned equipment idled by the breakdown.
15. If any part of the Work is shut down by Owner, standby time will be paid during nonoperating hours if diversion of equipment to other Work is not practicable. CCA reserves the right to cease standby time payment when an extended shutdown is anticipated.
16. If a rate has not been established in the CRG for owned equipment, Contractor may:
  - a. If approved by CCA, use the rate of the most similar model found, considering such characteristics as manufacturer, capacity, horsepower, age, and fuel type, or
  - b. Request Equipment Watch to furnish a written response for a rate on the equipment, which shall be presented to CCA for approval; or
  - c. Request CCA to establish a rate.

### 1.06 FIELD ORDER

- A. CCA will issue Field Orders, with three copies to Contractor.
- B. Effective date of the Field Order shall be the date of signature by CCA, unless otherwise indicated thereon.
- C. Contractor shall acknowledge receipt by signing and returning one copy to CCA.
- D. Field Orders will be incorporated into subsequent Change Orders, as a no-cost change to the Contract.

### PART 2 PRODUCTS (NOT USED)

### PART 3 EXECUTION (NOT USED)

**END OF SECTION**

**SECTION 01 29 00  
PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

**A. Informational Submittals:**

1. Schedule of Values: Submit on Owner's form.
2. Schedule of Estimated Progress Payments:
  - a. Submit with initially acceptable Schedule of Values.
  - b. Submit adjustments thereto with Application for Payment.
3. Application for Payment.
4. Final Application for Payment.

**1.02 SCHEDULE OF VALUES**

- A. Prepare a separate Schedule of Values for each schedule of the Work under the Agreement.
- B. Upon request of CCA, provide documentation to support the accuracy of the Schedule of Values.
- C. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.
- D. Lump Sum Work:
  1. Reflect specified contingency allowances and alternates, as applicable.
  2. List bonds and insurance premiums, mobilization, demobilization, preliminary and detailed progress schedule preparation, equipment testing, facility startup, and contract closeout separately.
  3. Break down by Division 2 through 49 with appropriate subdivision of each Specification for each Project facility.
- E. An unbalanced or front-end loaded schedule will not be acceptable.
- F. Summation of the complete Schedule of Values representing all the Work shall equal the Contract Price.
- G. Submit Schedule of Values as prepared on Primavera P6 platform in a spreadsheet format compatible with latest version of Excel as directed by CCA.

## FORT THOMAS WTP ADVANCED TREATMENT

### 1.03 SCHEDULE OF ESTIMATED PROGRESS PAYMENTS

- A. Show estimated payment requests throughout Contract Times aggregating initial Contract Price.
- B. Base estimated progress payments on initially acceptable progress schedule. Adjust to reflect subsequent adjustments in progress schedule and Contract Price as reflected by modifications to the Contract Documents.

### 1.04 APPLICATION FOR PAYMENT

- A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of Contractor.
- B. Use detailed Application for Payment Form suitable to CCA.
- C. Provide separate form for each schedule as applicable.
- D. Include accepted Schedule of Values for each schedule or portion of lump sum Work and the unit price breakdown for the Work to be paid on a unit priced basis.
- E. Include separate line item for each Change Order and Work Change Directive executed prior to date of submission. Provide further breakdown of such as requested by CCA.
- F. Preparation:
  - 1. Round values to nearest dollar.
  - 2. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by Engineer.

### 1.05 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

- A. Payment will not be made for following:
  - 1. Loading, hauling, and disposing of rejected material.
  - 2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
  - 3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.

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4. Material not unloaded from transporting vehicle.
5. Defective Work not accepted by Owner.
6. Material remaining on hand after completion of Work.

1.06 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings and preliminary operation and maintenance data is acceptable to CCA.
- B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

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**SECTION 01 31 13  
PROJECT COORDINATION**

**PART 1 GENERAL**

**1.01 RELATED WORK AT SITE**

**A. General:**

1. Other work that is either directly or indirectly related to scheduled performance of the Work under these Contract Documents, listed henceforth, is anticipated to be performed at Site by others. –
  - a. Filter Renovations in and around Filter Building intended start October 2009 and expected completion June 1, 2010.
  - b. Sedimentation Basin Protective Grids, intended start December 2009 and expected completion April 1, 2010.
  - c. Sedimentation Basin and Mixer Improvements, intended start October 2011 and expected completion May 1, 2012.
2. Coordinate the Work of these Contract Documents with work of others as specified in General Conditions.
3. Include sequencing constraints specified herein as a part of Progress Schedule.
4. The Advanced Treatment project construction schedule at Fort Thomas Treatment Plant will overlap the construction schedule for the Advanced Treatment project at the Owner's Memorial Parkway Treatment Plant. The coordination of shutdowns is critically important between the two plants as they serve as back-up facilities to each other. The Contractor's superintendent shall meet at least monthly with his counterpart on the Memorial Parkway Treatment Plant project as well as the Construction Contract Administrator, and any other representatives of the Owner as the Construction Contract Administrator deems necessary. One purpose of these meetings will be discuss, schedule and coordinate partial or full plant shutdowns. In the event that a partial or full shutdown of both plants is planned for the same period, the purpose of the meetings is to cooperatively re-schedule one of the planned shutdowns to avoid overlap. The operation of the Fort Thomas Treatment Plant is more critical to the Owner and affords less flexibility than the Memorial Parkway Treatment Plant. The Fort Thomas Treatment Plant work will be given priority by the Owner in the event that a schedule conflict cannot be resolved by the contractors and the Memorial Parkway contractor will be directed to revise the planned dates of the shutdown activities to avoid a conflict.

- B. Separate Engineer will perform programming of applications software for certain portions of Process Instrumentation and Control Subsystem. Refer to Section 40 90 00, Instrumentation and Control for Process Systems, for detailed information pertaining to Engineer programming.
1. Coordinate and deliver to Engineer's office hardware and standard software components, as specified for PICS.
  2. Sequencing: Include sequencing constraints specified herein as part of Progress Schedule.
  3. Engineer will confirm delivery date with Contractor 10 days prior to scheduled delivery, and within 24 hours of expected delivery time.
  4. Deliver hardware specified in Sections 40 9100, Instrumentation and Control Components to Engineer within constraints detailed in Section 40 90 00, Instrumentation and Control for Process Systems but no later than 120 days after Effective Date of the Agreement.
  5. Return delivery of hardware to Project Site within constraints detailed in Section 40 90 00, Instrumentation and Control for Process Systems.
  6. Allowance for interruptions to the Work due to testing by Engineer of Engineer developed applications software:
    - a. During Functional Testing and Performance Testing, Contractor shall plan for interruption of testing of the Work to allow Engineer to investigate software problems, make software configuration changes, and conduct additional testing.
    - b. Allowance for Interruptions: 20 days total.
    - c. When applications software testing is delayed due to altered equipment interfaces or receipt of incorrect Shop Drawing information, duration of delay will be excluded from interruption allowance, unless notified otherwise by Construction Contract Administrator or Engineer.

1.02 KDOT COORDINATION

- A. KDOT has been made aware of this project. KDOT indicated no special provisions associated with 80,000 pound over the road truck deliveries and hauling. Any special deliveries should be coordinated with KDOT, District 6. KDOT will not allow the public roads to be blocked with trucks awaiting entrance to plant roads. Contractor shall secure off-site staging if needed to meet this condition.

1.03 UTILITY NOTIFICATION AND COORDINATION

- A. Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work, if damage occurs, or if conflicts or emergencies arise during Work.



1.04 WORK SEQUENCING/CONSTRAINTS

- A. Contractor shall make provisions to address challenges normally present in existing treatment plants with aging equipment and materials. This shall include provisions to handle watertight problems or leakage with valves and piping. In addition, Contractor shall be prepared for connection and jointing challenges with existing facilities.
- B. The Work involving connections to existing facilities and piping systems that will result in partial or complete shutdown of processes is restricted to the low production period from November 1 to March 31 of each year as described in Section 1.05. The number of such connections is extensive and Contractor shall schedule the Work to conduct some of these activities during the first low production period so as to preserve time for completing the remaining activities during the second such period.
- C. Include the following work sequences and constraints in the Progress Schedule:
  - 1. Construction of temporary parking lot for use by NKWD in the area near sedimentation basin number 1 as shown on the Drawings shall be completed before any existing parking spaces on the plant site are removed from service in any manner.
  - 2. Widening of the plant entrance road and installing asphalt pavement as shown on the Drawings shall be completed within the first 90 days of construction so that the road will have adequate width to permit two-way truck traffic during and after construction.
  - 3. After widening the road, Contractor shall pave the new roadway surface with asphalt pavement and maintain the pavement in suitable condition for two-way chemical truck passage. Final concrete road pavement shall be placed before Substantial Completion and can be placed earlier at such time as Contractor, Owner and Construction Contract Administrator agree.
  - 4. Startup testing and operation of the UV System will rely on water quality after GAC treatment. GAC System shall be placed in service before testing and startup of the UV System.
  - 5. Backwash water and slurry water are needed for placing GAC in the contactors and removing carbon fines. The backwash and slurry water pumping systems shall be tested and fully functional before starting the placement of GAC in any contactor.
  - 6. Backwash water and slurry water will drain to the equalization basin during carbon placement. The equalization basin pumps shall be tested and fully functional and the discharge piping and outfall to the raw water reservoir in service before starting placement of GAC in any contactor.

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7. The overflow system from the equalization basin to the existing backwash recovery tank will be installed and fully functional before starting placement of GAC in any contactor.
8. The air scour system shall be used for placing GAC in the contactors and removing fines unless alternate deduct is accepted to delete it. The air scour system shall be tested and fully functional before starting the placement of GAC in any contactor.
9. Installation, testing and disinfection of the filter effluent connections and the GAC/UV bypass systems serving both the north and south filters shall be complete and fully functional before the GAC and UV systems can be started up.
10. The changes to the post-filtration chemical feed systems for Clearwell No 1 and Clearwell No 2 shall be installed, tested and fully functional (including controls system modifications and programming for flow pacing) before the GAC and UV systems are placed in service.
11. The post-filter chemical feed system changes for Clearwell No. 1 shall be installed, tested, and be fully functional concurrently with the installation of the south filter effluent GAC/UV bypass system to permit the south filters to be placed in service in the GAC/UV bypass mode until the GAC/UV system is placed in service.
12. The filter-to-waste piping and valves for filters no. 1 and 2 shall be relocated as shown prior to installation of the two new 30-inch tie ins to the existing south filter effluent flume.
13. The piping and valves required for the south filter effluent to by-pass GAC and UV shall be installed, tested and disinfected before doing the following work to minimize the time the south filters (Nos. 1-6) are off line during this part of the work:
  - a. Cut-in to the south filter effluent flume and install 30-inch piping connection to this flume.
  - b. Demolish the Clearwell No. 1 inlet structure weir box. Install two permanent bulkheads in the filter effluent flume near the Clearwell No. 1 inlet box.
  - c. Cut-in to the Clearwell No. 1 inlet structure and install 36-inch pipe and elbow.
14. The air release valve systems on the existing filter building backwash header shall be installed and fully functional before the backwash pump system in the Advanced Treatment Building can be operated in any manner.
15. Before beginning any excavation work on site Contractor shall meet with Owner, Construction Contract Administrator and Engineer to identify areas of the plant where excavation shall be preceded by exploratory excavation to verify existing underground assets. Contractor

shall conduct such exploratory excavation before proceeding with Work in identified areas. Up to 12 such exploratory excavations shall be completed.

1.05 FACILITY OPERATIONS

- A. Continuous operation of Owner's facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.
- B. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of Owner's operations.
- C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of Owner's facility.
- D. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization by Owner and Construction Contract Administrator. Such authorization will be considered within 48 hours after receipt of Contractor's written request.
- E. Construct Work in the following stages to allow for Owner's continuous occupancy and for uninterrupted operation during construction.
  - 1. The backwash water supply for the existing sand filters is provided by a 24 -inch water main that feeds water to a header running between the filter building and an existing backwash supply tank buried in the hillside northeast of the location of the proposed Advanced Treatment Building. The water main will require relocation to allow for excavation of the Advanced Treatment Building. A temporary water main shall be installed to provide a supply of backwash water during construction. A permanent water main shall be installed at such time as the site work can support removal of the temporary main. The supply of backwash water for the filters cannot be interrupted for more than 4 consecutive days at any time during the period from November 1 through March 31 or for more than 2 consecutive days during the period from April 1 through October 31.
    - a. Construct the discharge structure for the Equalization Basin effluent in the South Reservoir during the November 1 through March 31 low water production period. Provide 30 days advance notice of intent to construct the structure and complete the construction within 14 days to allow the South Reservoir to be returned to normal service.

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2. Connections to existing sanitary sewer lines or potable water lines can be made with at least 1 week notice at any time provided that the existing utility pipe is out of service for no more than 8 hours.
3. Installation of any piping and ductwork between the existing filter building and the existing Flocculator/Clarifier Basins 2 and 3 shall be completed between November 1 and March 31. The work will be conducted in two non-consecutive periods such that Basins 2 and 3 will be out of service for not more than 1 week and will not be out of service concurrently. Only one such outage for each basin will be allowed for all construction in the area.
4. Connections to filter effluent piping and flumes in the existing filter building and GAC/UV bypass piping and systems near the building will occur during the November 1 through March 31 low water production period. The work will be conducted in two non-consecutive periods such that the north filters (Nos. 7-12) and the south filters (Nos. 1-6) will not be out of service concurrently.
5. The relocation of filter-to-waste piping for filters nos. 1 and 2 shall be completed concurrently with the modification to the south filter effluent piping and flume so as to avoid the need for a second interruption of service for any of the south filters.
6. Disconnect existing emergency electrical generator between November 1 through March 31 and provide a temporary standby power supply for the entire time between when the existing generator is taken off line and the new generator is connected and ready for service. The allowable duration of power outage to the plant during this activity is 4 hours .
7. The following activities listed in the following table are to be completed during the November 1 through March 31 low water production period. Clearwell No 1 and Clearwell No 2 nor Filters 1-6 and 7-12 cannot be out of service concurrently at any time. The existing plant facilities allowed to be off line during the activities and the allowable duration are:

Activity	Facilities Off Line	Maximum Outage Duration
Filter effluent pipe disconnection to Clearwell No 1	Filters 1-6	4 days
Filter effluent pipe disconnection to Clearwell No 2	Filters 7-12	4 days

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Activity	Facilities Off Line	Maximum Outage Duration
Advanced treatment effluent pipe connection and all chemical feed pipe connections to Clearwell No 1, concurrent with filter effluent pipe disconnection to Clearwell No. 1	Filters 1-6 and Clearwell No 1	5 days for work by Contractor. Duration does not include draining or disinfection of clearwell to be completed by Owner.
Advanced treatment effluent pipe connection and all chemical feed pipe connections to Clearwell No 2	Filters 7-12 and Clearwell No 2	4 days
Connection of drain pipe from Advanced Treatment Building to existing drain pipe	Plant drain system discharging to Backwash Holding Basin	1 day

Existing laboratory facilities will remain in continuous operation but access interruptions are permitted as noted herein. Access to the top floor is needed to provide for delivery of specialty gas cylinders. The Contractor shall provide at least 15 days notice prior to any extended top floor outages. Contractor shall assist in delivery to the top floor of any gas cylinders that arrive during outages. Assistance shall include transporting cylinders between top floor of laboratory and the delivery vehicle. Up to two deliveries per month shall be anticipated. A list of gas cylinder contents and weight is provided here:

- a. Acetylene 2.6 – Cylinder size 5 approximate weight 150 lbs.
  - b. Argon Grade 5 – Cylinder size 300 approximate weight 150 lbs.
  - c. Argon Hydrogen 5% - Cylinder size 200 approximate weight 125 lbs.
  - d. Helium 5.0 - Cylinder size 300 approximate weight 150 lbs.
  - e. Nitrogen 5.0 - Cylinder size 300 approximate weight 150 lbs.
  - f. Nitrous Oxide Medical Drug G - Cylinder size 200 approximate weight 125 lbs.
8. Access to the first floor of the laboratory is needed for delivery of samples. In no instance will access to both the top floor and first floor of the laboratory for delivery of samples be interrupted concurrently. Prior notice of 72 hours shall be provided for any interruption of access to the first floor.

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9. There are 3 entrances to the first floor of the laboratory. At least 2 entrances to the building must be accessible for emergency egress at all times. If the south or west entrance to the lower floor of the laboratory is one of the 2 means of egress Contractor shall construct temporary sidewalk and stairs, if necessary, to provide passage between a plant road and the accessible entrance.
- F. Process or Facility Shutdown:
1. Plant entrance road from Highway US-27 may be shut down for a morning or afternoon with a minimum of 24 hours notice if an alternate road for passenger vehicle access is available. Owner reserves right to reject request if advance notice is less than 7 days.
  2. Provide 30 days advance written request for approval of need to shut down a process or facility to Owner and Construction Contract Administrator.
  3. Power outages will be considered upon 72 hours written request to Construction Contract Administrator. Describe the reason, anticipated length of time, and areas affected by the outage. Provide temporary provisions for continuous power supply to critical facility components. Any scheduled complete power outages shall be limited to 30 minute duration and shall occur between November 1 and March 31 and between the hours of 1:00 A.M. and 6:00 A.M.
  4. Contractor shall produce a shutdown plan for each process or facility shutdown with an expected duration of 4 or more hours 1 week prior to the event. Plan shall include the following at a minimum.
    - a. Location
    - b. Duration
    - c. Actions to be taken
    - d. Contingencies
    - e. Contractor point of contact and cell phone number
    - f. Workforce participating
    - g. Sketches of work to be performed
    - h. Expected impact on plant operations
- G. Install and maintain temporary connections required to keep Owner's emergency power system operations on line. Sequences other than those specified will be considered upon written request to Owner and Construction Contract Administrator, provided they afford equivalent continuity of operations.
- H. Do not proceed with Work affecting a facility's operation without obtaining Owner's and Construction Contract Administrator's advance approval of the need for and duration of such Work.

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- I. Water used for equipment and start-up testing may be disposed of in the Equalization Basin for return to the south reservoir. In the event that the water were to be contaminated during the testing Contractor shall provide pumping system to remove water from Equalization Basin and discharge to sanitary sewer in a manner approved by Construction Contract Administrator.
- J. Relocation of Existing Facilities:
  1. During construction, it is expected that minor relocations of existing facilities will be necessary as part of the Work.
  2. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.
  3. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
  4. Perform relocations to minimize downtime of existing facilities.
  5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Engineer.

### 1.06 ADJACENT FACILITIES AND PROPERTIES

#### A. Examination:

1. After Effective Date of the Agreement and before Work at Site is started, Contractor, Construction Contract Administrator, and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements within 500 feet of Work, as applicable, which could be damaged by construction operations. Examinations of private property shall be made from public right of way.
2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.

#### B. Documentation:

1. Record and submit documentation of observations made on examination inspections in accordance with paragraph Construction Photographs.
2. Upon receipt, Construction Contract Administrator will review, sign, and return one record copy of documentation to Contractor to be kept on file in field office.
3. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and is for the protection of adjacent property owners, Contractor, and Owner.

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## 1.07 REFERENCE POINTS AND SURVEYS

### A. Contractor's Responsibilities:

1. Provide survey required to layout the Work.
2. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
3. In event of discrepancy in data provided by Owner, request clarification before proceeding with Work.
4. Retain professional land surveyor or civil engineer registered in state of Project who shall perform or supervise engineering surveying necessary for construction staking and layout.
5. Maintain complete accurate log of survey Work as it progresses as a Record Document.
6. On request of Construction Contract Administrator, submit documentation.
7. Provide competent employee(s), tools, stakes, and other equipment and materials as Construction Contract Administrator may require to:
  - a. Check layout, survey, and measurement Work performed by others.
  - b. Measure quantities for payment purposes.

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION**

**END OF SECTION**



**SECTION 01 31 19  
PROJECT MEETINGS**

**PART 1 GENERAL**

**1.01 GENERAL**

- A. CCA will schedule physical arrangements for meetings throughout progress of the Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within 5 days after each meeting to participants and parties affected by meeting decisions.

**1.02 PRECONSTRUCTION CONFERENCE**

- A. Contractor shall be prepared to discuss the following subjects, as a minimum:
1. Required schedules.
  2. Status of Bonds and insurance.
  3. Sequencing of critical path work items.
  4. Progress payment procedures.
  5. Project changes and clarification procedures.
  6. Use of Site, access, office and storage areas, security and temporary facilities.
  7. Major product delivery and priorities.
  8. Contractor's safety plan and representative.
- B. Attendees will include:
1. Owner's representatives.
  2. Contractor's office representative.
  3. Contractor's resident superintendent.
  4. Contractor's quality control representative.
  5. Subcontractors' representatives whom Contractor may desire or CCA may request to attend.
  6. Engineer's representatives.
  7. CCA's representatives.
  8. Others as appropriate.

**1.03 PRELIMINARY SCHEDULES REVIEW MEETING**

- A. As set forth in General Conditions and Section 01 32 00, Construction Progress Documentation.

## FORT THOMAS WTP ADVANCED TREATMENT

### 1.04 PROGRESS MEETINGS

- A. CCA will schedule regular progress meetings at Site, conducted monthly to review the Work progress, Progress Schedule, Schedule of Submittals, Application for Payment, contract modifications, and other matters needing discussion and resolution.
- B. Attendees will include:
  - 1. Owner's representative(s), as appropriate.
  - 2. Contractor, Subcontractors, and Suppliers, as appropriate.
  - 3. Engineer's representative(s).
  - 4. CCA's representative(s).
  - 5. Others as appropriate.

### 1.05 QUALITY CONTROL MEETINGS

- A. In accordance with Section 01 45 16.13, Contractor Quality Control.
- B. Scheduled by Engineer on regular basis and as necessary to review test and inspection reports, and other matters relating to quality control of the Work and work of other Contractors.
- C. Attendees will include:
  - 1. Contractor.
  - 2. Contractor's designated quality control representative.
  - 3. Subcontractors and Suppliers, as necessary.
  - 4. Engineer's representatives.

### 1.06 PROCESS INSTRUMENTATION AND CONTROL SYSTEMS (PICS) COORDINATION MEETINGS

- A. Engineer will schedule meetings at Site, conducted bi-monthly starting in the seventh month of the project to review specific requirements of PICS work.
- B. Attendees will include:
  - 1. Contractor.
  - 2. Owner.
  - 3. PICS Subcontractor/Installer.
  - 4. Engineer's representatives.
  - 5. CCA's representatives.

1.07 PREINSTALLATION MEETINGS

- A. When required in individual Specification sections, convene at Site prior to commencing the Work of that section.
- B. Require attendance of entities directly affecting, or affected by, the Work of that section.
- C. Notify CCA 5 days in advance of meeting date.
- D. Provide suggested agenda to CCA to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.

1.08 FACILITY STARTUP MEETINGS

- A. Schedule and attend a minimum of two facility startup meetings. The first of such meetings shall be held prior to submitting Facility Startup Plan, as specified in Section 01 91 14, Equipment Testing and Facility Startup, and shall include preliminary discussions regarding such plan.
- B. Agenda items shall include, but not be limited to, content of Facility Startup Plan, coordination needed between various parties in attendance, and potential problems associated with startup.
- C. Attendees will include:
  - 1. Contractor.
  - 2. Contractor's designated quality control representative.
  - 3. Subcontractors and equipment manufacturer's representatives whom Contractor deems to be directly involved in facility startup.
  - 4. Engineer's representatives.
  - 5. Owner's operations personnel.
  - 6. Others as required by Contract Documents or as deemed necessary by Contractor.
  - 7. CCA's representatives.

1.09 OTHER MEETINGS

- A. In accordance with Contract Documents and as may be required by Owner and CCA.

FORT THOMAS WTP ADVANCED TREATMENT

**PART 2      PRODUCTS (NOT USED)**

**PART 3      EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 01 32 00**  
**CONSTRUCTION PROGRESS DOCUMENTATION**

**PART 1 GENERAL**

1.01 SCOPE

- A. The CCA will coordinate the construction progress documentation using a project management software system. The primary function of the system is to facilitate timely processing and approval of all contract documentation. This system will utilize Primavera Portfolio Management P6 for scheduling and Primavera Contract Management for document tracking and control. The system will:
1. Facilitate communication among the Owner, CCA, Engineer, and Contractor;
  2. Facilitate turnaround time with regard to responses and approvals;
  3. Provide a central location for all project information;
  4. Provide a standard system for project reporting and administration with accountability.
- B. The system will physically reside on a host server. All users of the system shall have a software license to access the system.
- C. The Owner, CCA, Engineer, and Contractor will utilize the system to create the required project documents. All project documents generated by the Owner, CCA, Engineer, and Contractor will be created and maintained within the database.
- D. The system will be used to create and track the following documents:
1. Contact List: name, address, regular and emergency phone numbers, etc.
  2. Shop drawing submittal log.
  3. Transmittals.
  4. Requests for Information (RFIs).
  5. Change Documents including but not limited to:
    - a. Requests for Proposals (RFPs)
    - b. Change Order Requests (CORs)
    - c. Change Orders (COs)
  6. Daily Reports.
  7. Field Orders and Clarification Memos.
  8. Notices of Non-Compliance.
  9. Construction Issue Memos.
  10. Punchlists.

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11. Meeting Minutes and Agendas.
12. Correspondence.
13. Progress Payments.
14. Work plans including shut-downs and tie-ins .
15. Start-up plans.
16. Training and vendor requirements.

### E. Contractor Software Requirements:

1. The Contractor shall include in its bid the cost for procuring software and current licenses of the following software programs:
  - a. Primavera Portfolio Management P6
  - b. Primavera Contract Management
  - c. The software may be obtained by contacting Oracle Corporation.
2. The Contractor shall also purchase at the initiation of the Project technical support, maintenance, and upgrades, for the duration of the Project, for all software listed above.
3. The Contractor shall procure at least two licenses of each program for its use, one for the field office and one for the main office where project administration will be conducted. Additional licenses may be purchased by the Contractor at its sole discretion.
4. The Contractor shall attend a minimum two-day training session provided by the Owner's consultant at one of the Owner's facilities in Northern Kentucky. The Contractor shall be responsible for providing its own computers loaded with the Primavera software listed above for the training.
5. The procedures for maintaining a secure site with appropriate levels of access for each user will be discussed by the Owner, CCA, Contractor, and Engineer.

### F. Contractor Hardware Requirements:

1. The contractor shall have for its use on site in the field office for the entire duration of the Project the following hardware:
  - a. Computer with Primavera software installed.
  - b. Laser printer capable of printing 11" x 17" color documents.

## 1.02 TRANSMITTALS AND CORRESPONDENCE

- A. All project correspondence shall be generated utilizing the document control system and logged in the system.
- B. The Contractor shall generate transmittals for sending submittals, Requests for Information, work plans, shut-down plans, start-up plans, reports, training requirements, and other data to the CCA using the document control system.

## FORT THOMAS WTP ADVANCED TREATMENT

- C. The Contractor shall electronically transmit documents to the CCA by placing documents in the CCA's InBox in the document control system.
- D. All Change Documents will be generated within the document control system and will be monitored and managed by the CCA.

### 1.03 SUBMITTALS

- A. The CCA will manage the submittal review process through review and distribution of reviewed documents. The document control system will be utilized by the CCA to log and track submittals.
- B. The Contractor shall create a submittal log and send it electronically to the CCA for review within 30 days of the Notice to Proceed. The CCA will post the approved log on the document control system. The Contractor shall inform the CCA of any updates or modifications required to the log entries.
- C. To the maximum extent possible, the Contractor shall transmit Action Submittals and Informational submittals to the CCA electronically in color pdf format. The Owner reserves the right to require submittals in electronic format. Exceptions are samples and color charts.
- D. The Contractor shall be responsible for printing copies of the approved shop drawings for itself, the Owner, CCA, and the Engineer.

### 1.04 DAILY INSPECTION REPORTS

- A. The Contractor shall prepare daily inspection reports in the Contract Management program and enter them in the document control system.
- B. The Contractor shall complete each daily report by 11:00 a.m. of the subsequent day for each day that Contractor performs Work.
- C. Required information shall include the Contractor's name, date the work was performed, description of work performed, equipment utilized, field force, visitors, key materials and equipment delivered, and list the scheduled activities utilizing the P6 schedule activity codes.

### 1.05 CONSTRUCTION ISSUE MEMOS

- A. The CCA will manage and monitor the Construction Issue Memo log.
- B. Memos will identify the responsible "ball in court" party, date of issue, and track it through completion.

## FORT THOMAS WTP ADVANCED TREATMENT

### 1.06 PUNCHLISTS

- A. The CCA shall prepare the punchlist and manage tracking punchlist items within the document control system.

### 1.07 MEETING AGENDA AND MINUTES

- A. The CCA will prepare the meeting agenda and be responsible for preparing and placing meeting minutes on the document control system within 7 days of the meeting.
- B. The Contractor shall notify the CCA of any changes to meeting minutes within 60 days of the meeting.

### 1.08 PROGRESS PAYMENTS

- A. The Contractor shall review the format of the progress payment requests with the CCA prior to submitting the first request.
- B. The Contractor shall prepare progress payment requests electronically by inputting the activity code and approved schedule of values into the P6 program.

### 1.09 PROGRESS SCHEDULE

- A. The Contractor shall prepare progress schedules using the P6 program.
- B. The format shall be Critical Path Network (CPN) unless otherwise approved by the CCA. The schedule shall follow the method as generally outlined in Associated General Contractors of America (AGC) 580, "Construction Project Planning and Scheduling Guidelines." If a conflict occurs between the AGC publication and this Specification, this Specification shall govern.
- C. In the title block, show name of Project, Owner, date submitted, revision or update number, and the name of the scheduler. Updated schedules shall indicate data date.
- D. Identify horizontally across top of schedule the time frame by year, month, and day.
- E. Identify each activity with a unique number and a brief description of the Work associated with that activity.
- F. Indicate the critical path.
- G. Provide a legend to describe standard and special symbols used.



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- H. Cost-Loading:
1. Note the estimated cost to perform each Work activity, with the exception of Submittals or Submittal reviews, in the network in a tabular listing.
  2. The sum of all activity costs shall equal the Contract Price. An unbalanced or front-end-loaded schedule will not be acceptable.
  3. The accepted cost-loaded Progress Schedule shall constitute the Schedule of Values specified in Section 01 29 00, Payment Procedures.
- I. The Contractor shall submit a Preliminary Progress Schedule with 14 days of the Notice to Proceed. In addition to the basic requirements outlined in the General Conditions, show a detailed schedule beginning with Notice to Proceed for minimum duration of 120 days, and a summary of balance of the Project through Final Completion. Show activities including but not limited to the following:
1. Notice to Proceed.
  2. Permits.
  3. Submittals, with review time.
  4. Early procurement activities for long lead equipment and materials.
  5. Initial Site work.
  6. Earthwork.
  7. Specified Work sequences and construction constraints including shut-downs and tie-ins.
  8. Contract Completion Dates.
  9. Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work.
  10. System startup summary.
  11. Project close-out summary.
  12. Demobilization summary.
- J. The Contractor shall submit a Detailed Progress Schedule within 30 days of the Notice to Proceed. Show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by Contractor.
- K. When accepted by CCA, the Detailed Progress Schedule will replace the Preliminary Progress Schedule and become the baseline CPN Progress Schedule.
- L. The CPN Progress Schedule will be updated by the Contractor monthly, at a minimum, to reflect actual progress and occurrences to date, including any weather delays. Identify Work on a calendar basis using days as a unit of measure. Show complete interdependence and sequence of construction and

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Project-related activities reasonably required to complete the Work. Identify the Work of separate stages and other logically grouped activities, and clearly identify critical path of activities. Include as applicable, at a minimum:

1. Obtaining permits, submittals for early product procurement, and long lead time items.
  2. Mobilization and other preliminary activities.
  3. Initial Site work.
  4. Specified Work sequences, constraints, and Contract Times including shut-downs and tie-ins
  5. Major equipment design, fabrication, factory testing, and delivery dates.
  6. Sitework.
  7. Concrete Work.
  8. Structural Steel Work.
  9. Architectural features Work.
  10. Conveying systems Work.
  11. Equipment Work.
  12. Mechanical Work.
  13. Electrical Work.
  14. Instrumentation and control Work.
  15. Other important Work for each major facility.
  16. Equipment and system startup and test activities.
  17. Project closeout and cleanup.
  18. Demobilization.
- M. No activity duration, exclusive of those for Submittals review and product fabrication/delivery, shall be less than 1 day nor more than 14 days, unless otherwise approved by the CCA. Activity duration for Submittal review shall not be less than review time specified unless clearly identified and prior written acceptance has been obtained from the CCA.
- N. Updated Progress Schedules shall reflect:
1. Progress of Work to within 5 working days prior to submission.
  2. Approved changes in Work scope and activities modified since submission.
  3. Delays in Submittals or resubmittals, deliveries, or Work.
  4. Adjusted or modified sequences of Work.
  5. Other identifiable changes.
  6. Revised projections of progress and completion.
  7. Report of changed logic.
- O. The Contractor shall produce detailed subschedules during the Project upon request of CCA to further define critical portions of the Work.

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- P. If the Contractor fails to complete activity by its latest scheduled completion date and this failure is anticipated to extend Contract Times, the Contractor shall, within 7 days of such failure, submit a written statement as to how Contractor intends to correct nonperformance and return to acceptable current Progress Schedule. Actions by Contractor to complete the Work within the Contract Times will not be justification for adjustment of Contract Price or Contract Times.
- Q. Owner may order Contractor to increase plant, equipment, labor force, or working hours if Contractor fails to satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to Owner.

### 1.10 NARRATIVE PROGRESS REPORT

- A. The Contractor shall prepare a monthly narrative progress report in the following format:
  - 1. Organize same as Progress Schedule.
  - 2. Identify, on a cover letter, reporting period, date submitted, and name of author of report.
  - 3. On 8-1/2-inch by 11-inch white paper, unless otherwise approved.
  - 4. List information for each activity in tabular format, including at a minimum:
    - a. Activity Identification Number.
    - b. Activity Description.
    - c. Original Duration.
    - d. Remaining Duration.
    - e. Early Start Date (Actual start on Updated Progress Schedules).
    - f. Early Finish Date (Actual finish on Updated Progress Schedules).
    - g. Late Start Date.
    - h. Late Finish Date.
    - i. Total Float.
  - 5. Sort reports, in ascending order, as listed below:
    - a. Activity number sequence with predecessor and successor activity.
    - b. Activity number sequence.
    - c. Early-start.
    - d. Total float.

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### B. Contents:

1. Number of days worked over the period, work force on hand, construction equipment on hand (including utility vehicles such as pickup trucks, maintenance vehicles, stake trucks).
2. General progress of Work, including a listing of activities started and completed over the reporting period, mobilization/demobilization of subcontractors, and major milestones achieved.
3. Contractor's plan for management of Site (e.g., lay down and staging areas, construction traffic), utilization of construction equipment, buildup of trade labor, and identification of potential Contract changes.
4. Identification of new activities and sequences as a result of executed Contract changes.
5. Documentation of weather conditions over the reporting period, and any resulting impacts to the work.
6. Description of actual or potential delays, including related causes, and the steps taken or anticipated to mitigate their impact.
7. Changes to activity logic.
8. Changes to the critical path.
9. Identification of, and accompanying reason for, any activities added or deleted since the last report.
10. Steps taken to recover the schedule from Contractor-caused delays.

### 1.11 SCHEDULE ACCEPTANCE

#### A. CCA's acceptance will demonstrate agreement that:

1. Proposed schedule is accepted with respect to:
  - a. Contract Times, including Final Completion and all intermediate Milestones are within the specified times.
  - b. Specified Work sequences and constraints are shown as specified.
  - c. Specified Owner-furnished Equipment or Material arrival dates, or range of dates, are included.
  - d. Access restrictions are accurately reflected.
  - e. Startup and testing times are as specified.
  - f. Submittal review times are as specified.
  - g. Startup testing duration is as specified and timing is acceptable.
2. In all other respects, CCA's acceptance of Contractor's schedule indicates that, in CCA's judgement, schedule represents reasonable plan for constructing Project in accordance with the Contract Documents. CCA's review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless Contractor has explicitly called the nonconformance to CCA's attention in submittal. Schedule remains Contractor's responsibility and

## FORT THOMAS WTP ADVANCED TREATMENT

Contractor retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct Project in accordance with the Contract Documents.

- B. Unacceptable Preliminary Progress Schedule:
  - 1. Make requested corrections; resubmit within 10 days.
  - 2. Until acceptable to CCA as Baseline Progress Schedule, continue review and revision process, during which time Contractor shall update schedule on a monthly basis to reflect actual progress and occurrences to date.
- C. Unacceptable Detailed Progress Schedule:
  - 1. Make requested corrections; resubmit within 10 days.
  - 2. Until acceptable to CCA as Baseline Progress Schedule, continue review and revision process.
- D. Narrative Report: All changes to activity duration and sequences, including addition or deletion of activities subsequent to CCA's acceptance of Baseline Progress Schedule, shall be delineated in Narrative Report current with proposed Updated Progress Schedule.

### 1.12 ADJUSTMENT OF CONTRACT TIMES

- A. Reference General Conditions and Section 01 26 00, Contract Modification Procedures.
- B. Evaluation and reconciliation of Adjustments of Contract Times shall be based on the Updated Progress Schedule at the time of proposed adjustment or claimed delay.
- C. Float:
  - 1. Float time is a Project resource available to both parties to meet contract Milestones and Contract Times.
  - 2. Use of float suppression techniques such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times are prohibited, and use of float time disclosed or implied by use of alternate float-suppression techniques shall be shared to proportionate benefit of Owner and Contractor.
  - 3. Pursuant to above float-sharing requirement, no time extensions will be granted nor delay damages paid until a delay occurs which (i) impacts Project's critical path, (ii) consumes available float or contingency time, and (iii) extends Work beyond contract completion date.

## FORT THOMAS WTP ADVANCED TREATMENT

### D. Claims Based on Contract Times:

1. Where CCA has not yet rendered formal decision on Contractor's Claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in Progress Schedule, Contractor shall reflect an interim adjustment in the Progress Schedule as acceptable to CCA.
2. It is understood and agreed that such interim acceptance will not be binding on either Contractor or Owner, and will be made only for the purpose of continuing to schedule Work until such time as formal decision has been rendered as to an adjustment, if any, of the Contract Times.
3. Contractor shall revise Progress Schedule prepared thereafter in accordance with CCA's formal decision.

### 1.13 CONSTRUCTION PHOTOGRAPHS

#### A. Information:

1. Color Prints: Submit one copy, within 5 days of being taken.
2. Digital Images: Submit on compact disc of preconstruction photographs and with monthly or weekly reports as directed by CCA.

#### B. Photographically document all phases of the project including preconstruction, construction progress, and post-construction.

#### C. Photography shall be by a photographer experienced in shooting interior/exterior construction photos, in daylight and nighttime conditions, and in good and inclement weather.

#### D. Photo printing shall be done by a commercial laboratory.

#### E. Construction Contract Administrator shall have the right to select the subject matter and vantage point from which photographs are to be taken.

#### F. Preconstruction and Post-Construction:

1. After Effective Date of the Agreement and before Work at Site is started, and again upon issuance of Substantial Completion, take a minimum of 48 exposures of Construction Site and property adjacent to perimeter of Construction Site.
2. Particular emphasis shall be directed to structures both inside and near the Site to indicate general condition of structures and the presence of cracks and other defects.
3. Format: Digital, minimum resolution of 756 by 504 pixels and 24 bit, millions of color.

## FORT THOMAS WTP ADVANCED TREATMENT

4. Preconstruction photographs shall be printed on durable photo quality paper and labeled with file name, date taken, plant name and subject description and the photographs shall be bound in a 3 ring binder.

### G. Construction Progress Photos:

1. Photographically demonstrate progress of construction, showing every aspect of Site and adjacent properties as well as interior and exterior of new or impacted structures.
2. Weekly: Take 48 exposures using Digital, minimum resolution of 756 by 504 pixels and 24 bit, millions of color.

### H. Digital Images:

1. Archive using a commercially available photo management system with jpg high resolution files.
2. Label each disk with Project and Owner's name, and week and year images were produced and subject description. Label each photograph on the disc with date and subject.

## 1.14 AUDIO-VIDEO RECORDINGS

- A. Prior to beginning Work, videograph Construction Site and property adjacent to Construction Site and submit one copy on DVD.
- B. No Work shall begin at the site prior to Construction Contract Administrator's review and approval of content and quality of video.
- C. Particular emphasis shall be directed to physical condition of existing vegetation, structures, and pavements within project site and areas adjacent to and near the plant, and Contractor storage and staging areas (if requested by Construction Contract Administrator).
- D. Construction Contract Administrator shall have right to select subject matter and vantage point from which videos are to be taken.
- E. Video taping shall be by a person experienced in shooting exterior and interior construction videos.
- F. Video Format and Quality:
  1. DVD format, with sound.
  2. Video:
    - a. Produce bright, sharp, and clear images with accurate colors, free of distortion and other forms of picture imperfections.

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- b. Electronically, and accurately display the month, day, year, and time of day of the recording.
- 3. Audio:
  - a. Audio documentation shall be done clearly, precisely, and at a moderate pace. Contractor shall review audio before submitting DVDs to verify that the spoken words are audible over background noises. If the Construction Contract Administrator finds that the audio is not clear the Contractor shall create discs with acceptable audio.
  - b. Indicate date, project name, and a brief description of the location of taping, including:
    - 1) Facility name.
    - 2) Street names or easements.
    - 3) Addresses of private property.
    - 4) Direction of coverage.

G. Documentation:

- 1. Video DVD Label:
  - a. Disc number (numbered sequentially, beginning with 001).
  - b. Project name.
  - c. Property address outside plant and structure name within plant boundary.
  - d. Date and time of coverage.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**



**SECTION 01 33 00  
SUBMITTAL PROCEDURES**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Action Submittal: Written and graphic information submitted by Contractor that requires CCA's or Engineer's approval.
- B. Informational Submittal: Information submitted by Contractor that does not require CCA's or Engineer's approval.

1.02 PROCEDURES

- A. Direct submittals to Engineer at the following address, unless specified otherwise or directed by CCA.
  - 1. Dave Greenfield  
CH2M HILL  
Field Office  
1103 Schrock Road  
Columbus, OH 43229.
- B. Transmittal of Submittal:
  - 1. Contractor shall:
    - a. Review each submittal and check for compliance with Contract Documents.
    - b. Stamp each submittal with uniform approval stamp before submitting to Engineer.
      - 1) Stamp to include Project name, submittal number, Specification number, Contractor's reviewer name, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with Contract Documents.
      - 2) Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
  - 2. Complete, sign, and transmit with each submittal package, one Transmittal of Contractor's Submittal form attached at end of this section or in format approved by CCA. Contractor shall send transmittal electrically to CCA and Engineer on the same day as submittals are sent to Engineer.

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3. Identify each submittal with the following:
    - a. Numbering and Tracking System:
      - 1) Sequentially number each submittal.
      - 2) Resubmission of submittal shall have original number with sequential alphabetic suffix.
    - b. Specification section and paragraph to which submittal applies.
    - c. Project title and project number.
    - d. Date of transmittal.
    - e. Names of Contractor, Subcontractor or Supplier, and manufacturer as appropriate.
  4. Identify and describe each deviation or variation from Contract Documents.
- C. Format:
1. Do not base Shop Drawings on reproductions of Contract Documents. Some CADD files from Design Drawings may be available for use by Contractor in preparing Shop Drawings.
  2. Package submittal information by individual Specification section. Do not combine different Specification sections together in submittal package, unless otherwise directed in Specification.
  3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
  4. Index with labeled tab dividers in orderly manner.
- D. Timeliness: Schedule and submit in accordance Schedule of Submittals, and requirements of individual Specification sections.
- E. Processing Time:
1. Time for review shall commence on CCA's or Engineer's receipt of submittal.
  2. CCA or Engineer, as appropriate, will act upon Contractor's submittal and transmit response to Contractor not later than 30 days after receipt, unless otherwise specified.
  3. Resubmittals will be subject to same review time.
  4. No adjustment of Contract Times or Price will be allowed due to delays in progress of Work caused by rejection and subsequent resubmittals.
- F. Resubmittals: Clearly identify each correction or change made.

G. Incomplete Submittals:

1. CCA or Engineer will return entire submittal for Contractor's revision if preliminary review deems it incomplete.
2. When any of the following are missing, submittal will be deemed incomplete:
  - a. Contractor's review stamp, completed and signed.
  - b. Transmittal of Contractor's Submittal, completed and signed.
  - c. Insufficient number of copies.

H. Submittals not required by Contract Documents:

1. Will not be reviewed and will be returned stamped "Not Subject to Review."
2. CCA will keep one copy and return all remaining copies to Contractor.

1.03 ACTION SUBMITTALS

A. Prepare and submit Action Submittals required by individual Specification sections.

B. Shop Drawings:

1. Copies: Seven.
2. Identify and Indicate:
  - a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
  - b. Equipment and Component Title: Identical to title shown on Drawings.
  - c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
  - d. Project-specific information drawn accurately to scale.
3. Manufacturer's standard schematic drawings and diagrams as follows:
  - a. Modify to delete information that is not applicable to the Work.
  - b. Supplement standard information to provide information specifically applicable to the Work.
4. Product Data: Provide as specified in individual Specifications.
5. Foreign Manufacturers: When proposed, include following additional information:
  - a. Names and addresses of at least two companies that maintain technical service representatives close to Project.
  - b. Complete list of spare parts and accessories for each piece of equipment.

## FORT THOMAS WTP ADVANCED TREATMENT

6. Drawings shall be 11 inch by 17 inch or 22 inch by 34 inch format unless otherwise approved by CCA.
- C. Samples:
1. Copies: Two unless otherwise specified in individual Specifications.
  2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
    - a. Manufacturer name.
    - b. Model number.
    - c. Material.
    - d. Sample source.
  3. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.
  4. Full-size Samples:
    - a. Size as indicated in individual Specification section.
    - b. Prepared from same materials to be used for the Work.
    - c. Cured and finished in manner specified.
    - d. Physically identical with product proposed for use.
- D. Action Submittal Dispositions: Engineer will review, mark, and stamp as appropriate, and distribute marked-up copies as noted:
1. Approved:
    - a. Contractor may incorporate product(s) or implement Work covered by submittal.
    - b. Distribution:
      - 1) Two copies furnished to CCA for Owner files.
      - 2) Two copies retained in Engineer's file.
      - 3) Remaining copies returned to Contractor appropriately annotated.
  2. Approved as Noted:
    - a. Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.
    - b. Distribution:
      - 1) Two copies furnished to CCA/Owner.
      - 2) Two copies retained in Engineer's file.
      - 3) Remaining copies returned to Contractor appropriately annotated.
  3. Partial Approval, Resubmit as Noted:
    - a. Make corrections or obtain missing portions, and resubmit.
    - b. Except for portions indicated, Contractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.

## FORT THOMAS WTP ADVANCED TREATMENT

- c. Distribution:
  - 1) Two copies furnished to CCA/Owner.
  - 2) Two copies retained in Engineer's file.
  - 3) One copy retained in CCA's file.
  - 4) Remaining copies returned to Contractor appropriately annotated.
- 4. Revise and Resubmit:
  - a. Contractor may not incorporate product(s) or implement Work covered by submittal.
  - b. Distribution:
    - 1) One copy retained in Engineer's file.
    - 2) One copy retained in CCA's file.
    - 3) Remaining copies returned to Contractor appropriately annotated.

### 1.04 INFORMATIONAL SUBMITTALS

#### A. General:

- 1. Copies: Submit Four copies, unless otherwise indicated in individual Specification section.
- 2. Refer to individual Specification sections for specific submittal requirements.
- 3. Engineer will review each submittal. If submittal meets conditions of the Contract, Engineer will forward copies to appropriate parties. If Engineer determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Engineer and CCA will retain one copy and return remaining copies with review comments to Contractor, and require that submittal be corrected and resubmitted.

#### B. Application for Payment: In accordance with Section 01 29 00, Payment Procedures.

#### C. Certificates:

- 1. General:
  - a. Provide notarized statement that includes signature of entity responsible for preparing certification.
  - b. Signed by officer or other individual authorized to sign documents on behalf of that entity.
- 2. Welding: In accordance with individual Specification sections.
- 3. Installer: Prepare written statements on manufacturer's letterhead certifying that installer complies with requirements as specified in individual Specification sections.

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4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
  5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual Specification sections.
  6. Manufacturer's Certificate of Compliance: In accordance with Section 01 43 33, Manufacturers' Field Services.
  7. Manufacturer's Certificate of Proper Installation: In accordance with Section 01 43 33, Manufacturers' Field Services.
- D. Construction Photographs: In accordance with Section 01 31 13, Project Coordination, and as may otherwise be required in Contract Documents.
- E. Contract Closeout Submittals: In accordance with Section 01 77 00, Closeout Procedures.
- F. Contractor-Design Data:
1. Written and graphic information.
  2. List of assumptions.
  3. List of performance and design criteria.
  4. Summary of loads or load diagram, if applicable.
  5. Calculations.
  6. List of applicable codes and regulations.
  7. Name and version of software.
  8. Information requested in individual Specification section.
- G. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual Specification sections.
- H. Operation and Maintenance Data: As required in Section 01 78 23, Operation and Maintenance Data.
- I. Schedules:
1. Schedule of Submittals: Prepare separately or in combination with Progress Schedule as specified in Section 01 32 00, Construction Progress Documentation.
    - a. Show for each, at a minimum, the following:
      - 1) Specification section number.
      - 2) Identification by numbering and tracking system as specified under Paragraph Transmittal of Submittal.

## FORT THOMAS WTP ADVANCED TREATMENT

- 3) Estimated date of submission to Engineer, including reviewing and processing time.
    - b. On a monthly basis, submit updated schedule to Engineer if changes have occurred or resubmittals are required.
  2. Schedule of Values: In accordance with Section 01 29 00, Payment Procedures.
  3. Schedule of Estimated Progress Payments: In accordance with Section 01 29 00, Payment Procedures.
  4. Progress Schedules: In accordance with Section 01 32 00, Construction Progress Documentation.
- J. Special Guarantee: Supplier's written guarantee as required in individual Specification sections.
- K. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty Subcontractor, trade, Specialist, consultant, installer, and other professionals. Reference Paragraph 1.01.A.53 of Supplementary Conditions for definition of Specialist.
- L. Submittals Required by Laws, Regulations, and Governing Agencies:
1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
  2. Transmit to CCA for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.
- M. Test and Inspection Reports:
1. General: Shall contain signature of person responsible for test or report.
  2. Factory:
    - a. Identification of product and Specification section, type of inspection or test with referenced standard or code.
    - b. Date of test, Project title and number, and name and signature of authorized person.
    - c. Test results.
    - d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
    - e. Provide interpretation of test results, when requested by Engineer.
    - f. Other items as identified in individual Specification sections.

## FORT THOMAS WTP ADVANCED TREATMENT

3. Field: As a minimum, include the following:
  - a. Project title and number.
  - b. Date and time.
  - c. Record of temperature and weather conditions.
  - d. Identification of product and Specification section.
  - e. Type and location of test, Sample, or inspection, including referenced standard or code.
  - f. Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
  - g. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
  - h. Provide interpretation of test results, when requested by Engineer.
  - i. Other items as identified in individual Specification sections.

N. Testing and Startup Data: In accordance with Section 01 91 14, Equipment Testing and Facility Startup.

O. Training Data: In accordance with Section 01 43 33, Manufacturers' Field Services.

### 1.05 SUPPLEMENTS

A. The supplements listed below, following "End of Section", are part of this Specification.

1. Forms: Transmittal of Contractor's Submittal.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**





**TRANSMITTAL OF CONTRACTOR'S SUBMITTAL**  
(ATTACH TO EACH SUBMITTAL)

**CH2MHILL**

DATE: \_\_\_\_\_

TO: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Submittal No.: \_\_\_\_\_

New Submittal     Resubmittal

Project: \_\_\_\_\_

Project No.: \_\_\_\_\_

Specification Section No.: \_\_\_\_\_

(Cover only one section with each transmittal)

Schedule Date of Submittal: \_\_\_\_\_  
 \_\_\_\_\_

FROM: \_\_\_\_\_  
                     Contractor  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

SUBMITTAL TYPE:     Shop Drawing                       Sample                       Informational

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: \_\_\_\_\_  
 Contractor (Authorized Signature)

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**SECTION 01 42 13**  
**ABBREVIATIONS AND ACRONYMS**

**PART 1 GENERAL**

**1.01 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES**

- A. Reference to standards and specifications of technical societies and reporting and resolving discrepancies associated therewith shall be as provided in Article 3 of the General Conditions, and as may otherwise be required herein and in the individual Specification sections.
- B. Work specified by reference to published standard or specification of government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall meet requirements or surpass minimum standards of quality for materials and workmanship established by designated standard or specification.
- C. Where so specified, products or workmanship shall also meet or exceed additional prescriptive or performance requirements included within Contract Documents to establish a higher or more stringent standard of quality than required by referenced standard.
- D. Where two or more standards are specified to establish quality, product and workmanship shall meet or exceed requirements of most stringent.
- E. Where both a standard and a brand name are specified for a product in Contract Documents, proprietary product named shall meet or exceed requirements of specified reference standard.
- F. Copies of standards and specifications of technical societies:
  - 1. Copies of applicable referenced standards have not been bound in these Contract Documents.
  - 2. Where copies of standards are needed by Contractor, obtain a copy or copies directly from publication source and maintain in an orderly manner at the Site as Work Site records, available to Contractor's personnel, Subcontractors, Owner, and Engineer.

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## 1.02 ABBREVIATIONS

A. Abbreviations for trade organizations and government agencies: Following is a list of construction industry organizations and government agencies to which references may be made in the Contract Documents, with abbreviations used.

1.	AA	Aluminum Association
2.	AABC	Associated Air Balance Council
3.	AAMA	American Architectural Manufacturers Association
4.	AASHTO	American Association of State Highway and Transportation Officials
5.	ABMA	American Bearing Manufacturers' Association
6.	ACI	American Concrete Institute
7.	AEIC	Association of Edison Illuminating Companies
8.	AGA	American Gas Association
9.	AGMA	American Gear Manufacturers' Association
10.	AI	Asphalt Institute
11.	AISC	American Institute of Steel Construction
12.	AISI	American Iron and Steel Institute
13.	AITC	American Institute of Timber Construction
14.	ALS	American Lumber Standards
15.	AMCA	Air Movement and Control Association
16.	ANSI	American National Standards Institute
17.	APA	APA – The Engineered Wood Association
18.	API	American Petroleum Institute
19.	APWA	American Public Works Association
20.	AHRI	Air-Conditioning, Heating, and Refrigeration Institute
21.	ASA	Acoustical Society of America
22.	ASABE	American Society of Agricultural and Biological Engineers
23.	ASCE	American Society of Civil Engineers
24.	ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
25.	ASME	American Society of Mechanical Engineers
26.	ASNT	American Society for Nondestructive Testing
27.	ASSE	American Society of Sanitary Engineering
28.	ASTM	ASTM International
29.	AWI	Architectural Woodwork Institute
30.	AWPA	American Wood Preservers' Association
31.	AWPI	American Wood Preservers' Institute
32.	AWS	American Welding Society

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33.	AWWA	American Water Works Association
34.	BHMA	Builders Hardware Manufacturers' Association
35.	CBM	Certified Ballast Manufacturer
36.	CDA	Copper Development Association
37.	CGA	Compressed Gas Association
38.	CISPI	Cast Iron Soil Pipe Institute
39.	CMAA	Crane Manufacturers' Association of America
40.	CRSI	Concrete Reinforcing Steel Institute
41.	CS	Commercial Standard
42.	CSA	Canadian Standards Association
43.	CSI	Construction Specifications Institute
44.	DIN	Deutsches Institut für Normung e.V.
45.	DIPRA	Ductile Iron Pipe Research Association
46.	EIA	Electronic Industries Alliance
47.	EJCDC	Engineers Joint Contract Documents' Committee
48.	ETL	Electrical Test Laboratories
49.	FAA	Federal Aviation Administration
50.	FCC	Federal Communications Commission
51.	FDA	Food and Drug Administration
52.	FEMA	Federal Emergency Management Agency
53.	FIPS	Federal Information Processing Standards
54.	FM	FM Global
55.	Fed. Spec.	Federal Specifications (FAA Specifications)
56.	FS	Federal Specifications and Standards (Technical Specifications)
57.	GA	Gypsum Association
58.	GANA	Glass Association of North America
59.	HI	Hydraulic Institute
60.	HMI	Hoist Manufacturers' Institute
61.	IBC	International Building Code
62.	ICBO	International Conference of Building Officials
63.	ICC	International Code Council
64.	ICEA	Insulated Cable Engineers' Association
65.	IFC	International Fire Code
66.	IEEE	Institute of Electrical and Electronics Engineers, Inc.
67.	IESNA	Illuminating Engineering Society of North America
68.	IFI	Industrial Fasteners Institute
69.	IGMA	Insulating Glass Manufacturer's Alliance
70.	IMC	International Mechanical Code
71.	INDA	Association of the Nonwoven Fabrics Industry
72.	IPC	International Plumbing Code

## FORT THOMAS WTP ADVANCED TREATMENT

73.	ISA	Instrumentation, Systems, and Automation Society
74.	ISO	International Organization for Standardization
75.	ITL	Independent Testing Laboratory
76.	JIC	Joint Industry Conferences of Hydraulic Manufacturers
77.	MIA	Marble Institute of America
78.	MIL	Military Specifications
79.	MMA	Monorail Manufacturers' Association
80.	MSS	Manufacturer's Standardization Society
81.	NAAMM	National Association of Architectural Metal Manufacturers
82.	NACE	NACE International
83.	NBGQA	National Building Granite Quarries Association
84.	NEBB	National Environmental Balancing Bureau
85.	NEC	National Electrical Code
86.	NECA	National Electrical Contractor's Association
87.	NEMA	National Electrical Manufacturers' Association
88.	NESC	National Electrical Safety Code
89.	NETA	InterNational Electrical Testing Association
90.	NFPA	National Fire Protection Association
91.	NHLA	National Hardwood Lumber Association
92.	NICET	National Institute for Certification in Engineering Technologies
93.	NIST	National Institute of Standards and Technology
94.	NRCA	National Roofing Contractors Association
95.	NRTL	Nationally Recognized Testing Laboratories
96.	NSF	NSF International
97.	NSPE	National Society of Professional Engineers
98.	NTMA	National Terrazzo and Mosaic Association
99.	NWWDA	National Wood Window and Door Association
100.	OSHA	Occupational Safety and Health Act (both Federal and State)
101.	PCI	Precast/Prestressed Concrete Institute
102.	PEI	Porcelain Enamel Institute
103.	PPI	Plastic Pipe Institute
104.	PS	Product Standards Section-U.S. Department of Commerce
105.	RMA	Rubber Manufacturers' Association
106.	RUS	Rural Utilities Service
107.	SAE	Society of Automotive Engineers
108.	SDI	Steel Deck Institute
109.	SDI	Steel Door Institute
110.	SJI	Steel Joist Institute

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111. SMACNA	Sheet Metal and Air Conditioning Contractors National Association
112. SPI	Society of the Plastics Industry
113. SSPC	The Society for Protective Coatings
114. STI/SPFA	Steel Tank Institute/Steel Plate Fabricators Association
115. SWI	Steel Window Institute
116. TEMA	Tubular Exchanger Manufacturers' Association
117. TCA	Tile Council of North America
118. TIA	Telecommunications Industry Association
119. UBC	Uniform Building Code
120. UFC	Uniform Fire Code
121. UL	Underwriters Laboratories Inc.
122. UMC	Uniform Mechanical Code
123. USBR	U.S. Bureau of Reclamation
124. WCLIB	West Coast Lumber Inspection Bureau
125. WI	Wood Institute
126. WWPA	Western Wood Products Association

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

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**SECTION 01 43 33  
MANUFACTURERS' FIELD SERVICES**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Person-Day: One person for 8 hours within regular Contractor working hours.

1.02 SUBMITTALS

- A. Informational Submittals:

1. Training Schedule: Submit, in accordance with requirements of this specification, not less than 30 days prior to start of equipment installation and revise as necessary for acceptance.
2. Lesson Plan: Submit, in accordance with requirements of this specification, proposed lesson plan not less than 30 days prior to scheduled training and revise as necessary for acceptance.
3. Training Session DVDs: Furnish Owner with two complete sets of DVDs fully indexed and cataloged with printed label stating session and date taped.

1.03 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

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

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

- A. Furnish manufacturers' services when required by an individual specification section, to meet the requirements of this section.

## FORT THOMAS WTP ADVANCED TREATMENT

- B. Where time is necessary in excess of that stated in the Specifications for manufacturers' services, or when a minimum time is not specified, the time required to perform the specified services shall be considered incidental.
- C. Schedule manufacturer' services to avoid conflict with other onsite testing or other manufacturers' onsite services.
- D. Determine, before scheduling services, that all conditions necessary to allow successful testing have been met.
- E. Only those days of service approved by CCA will be credited to fulfill the specified minimum services.
- F. When specified in individual specification sections, manufacturer's onsite services shall include:
  - 1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.
  - 2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.
  - 3. Providing, on a daily basis, copies of all manufacturers' representatives field notes and data to CCA.
  - 4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to CCA.
  - 5. Resolution of assembly or installation problems attributable to, or associated with, respective manufacturer's products and systems.
  - 6. Assistance during functional and performance testing, and facility startup and evaluation.
  - 7. Training of Owner's personnel in the operation and maintenance of respective product as required.
  - 8. Additional requirements may be specified elsewhere.

### 3.02 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

- A. When so specified, a Manufacturer's Certificate of Compliance, a copy of which is attached to this section, shall be completed in full, signed by the entity supplying the product, material, or service, and submitted prior to shipment of product or material or the execution of the services.
- B. CCA may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.

- C. Such form shall certify that the proposed product, material, or service complies with that specified. Attach supporting reference data, affidavits, and certifications as appropriate.
- D. May reflect recent or previous test results on material or product, if acceptable to CCA.

3.03 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

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

3.04 TRAINING

- A. General:
  - 1. Furnish manufacturers' representatives for detailed classroom and hands-on training to Owner's personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.
  - 2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with Owner, and familiar with operation and maintenance manual information specified in Section 01 78 23, Operation and Maintenance Data.
  - 3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.
  - 4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.
- B. Training Schedule:
  - 1. List specified equipment and systems that require training services and show:
    - a. Respective manufacturer.
    - b. Estimated dates for installation completion.
    - c. Estimated training dates.
  - 2. Allow for multiple sessions when several shifts are involved.

## FORT THOMAS WTP ADVANCED TREATMENT

3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by Owner, and to allow full participation by manufacturers' representatives. Adjust schedule for interruptions in operability of equipment.
  4. Coordinate with Section 01 32 00, Construction Progress Documentation, and Section 01 91 14, Equipment Testing and Facility Startup.
- C. Lesson Plan: When manufacturer or vendor training of Owner personnel is specified, prepare a lesson plan for each required course containing the following minimum information:
1. Title and objectives.
  2. Recommended attendees (e.g., managers, engineers, operators, maintenance).
  3. Course description, outline of course content, and estimated class duration.
  4. Format (e.g., lecture, self-study, demonstration, hands-on).
  5. Instruction materials and equipment requirements.
  6. Resumes of instructors providing the training.
- D. Pre-startup Training:
1. Coordinate training sessions with Owner's operating personnel and manufacturers' representatives, and with submission of operation and maintenance manuals in accordance with Section 01 78 23, Operation and Maintenance Data.
  2. Complete at least 21 days prior to beginning of facility startup.
- E. Post-startup Training: If required in Specifications, furnish and coordinate training of Owner's operating personnel by respective manufacturer's representatives.
- F. Taping of Training Sessions:
1. Video training DVDs shall be produced by a qualified, professional video production company.
  2. Include only one training session on a single DVD
  3. Contractor shall review DVD for quality of audio. If audio, including instructions and Owner questions, is not clear, the disc shall be re-dubbed to render all the materials audible. Construction Contract Administrator will review draft DVD submitted by Contractor. If CCA finds audio to be deficient, draft DVD will be rejected and re-dub or rerecord to produce audible copy will be required

3.05 SUPPLEMENTS

A. The supplements listed below, following "End of Section", are part of this Specification.

1. Form: Manufacturer's Certificate of Compliance.
2. Form: Manufacturer's Certificate of Proper Installation.

**END OF SECTION**

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FORT THOMAS WTP ADVANCED TREATMENT

MANUFACTURER'S CERTIFICATE OF COMPLIANCE

OWNER:

PRODUCT, MATERIAL, OR SERVICE  
SUBMITTED:

PROJECT NAME:

PROJECT NO:

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I hereby certify that the above-referenced product, material, or service called for by the contract for the named project will be furnished in accordance with all applicable requirements. I further certify that the product, material, or service are of the quality specified and conform in all respects with the contract requirements, and are in the quantity shown.

Date of Execution: \_\_\_\_\_, 20\_\_

Manufacturer: \_\_\_\_\_

Manufacturer's Authorized Representative (*print*): \_\_\_\_\_

\_\_\_\_\_  
(Authorized Signature)

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FORT THOMAS WTP ADVANCED TREATMENT

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER \_\_\_\_\_ EQPT SERIAL NO: \_\_\_\_\_

EQPT TAG NO: \_\_\_\_\_ EQPT/SYSTEM: \_\_\_\_\_

PROJECT NO: \_\_\_\_\_ SPEC. SECTION: \_\_\_\_\_

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

(Check Applicable)

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

Note: Attach any performance test documentation from manufacturer.

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

Date: \_\_\_\_\_, 20\_\_

Manufacturer: \_\_\_\_\_

By Manufacturer's Authorized Representative: \_\_\_\_\_  
(Authorized Signature)

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**SECTION 01 45 16.13  
CONTRACTOR QUALITY CONTROL**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this Section:
1. ASTM International (ASTM):
    - a. D3740, Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
    - b. E329, Use in the Evaluation of Testing and Inspection Agencies as Used in Construction.

**1.02 DEFINITIONS**

- A. Contractor Quality Control (CQC): The means by which Contractor ensures that the construction, to include that performed by subcontractors and suppliers, complies with the requirements of the Contract.

**1.03 SUBMITTALS**

- A. Informational Submittals:
1. CQC Plan: Submit, not later than 30 days after receipt of Notice to Proceed.
  2. CQC Report: Submit, weekly, an original and one copy in report form.

**1.04 OWNER'S QUALITY ASSURANCE**

- A. All Work is subject to Owner's quality assurance inspection and testing at all locations and at all reasonable times before acceptance to ensure strict compliance with the terms of the Contract Documents.
- B. Owner's quality assurance inspections and tests are for the sole benefit of Owner and do not:
1. Relieve Contractor of responsibility for providing adequate quality control measures;
  2. Relieve Contractor of responsibility for damage to or loss of the material before acceptance;
  3. Constitute or imply acceptance; or
  4. Affect the continuing rights of Owner after acceptance of the completed Work.

## FORT THOMAS WTP ADVANCED TREATMENT

- C. The presence or absence of a quality assurance inspector does not relieve Contractor from any Contract requirement.
- D. Promptly furnish all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by Engineer.
- E. Owner may charge Contractor for any additional cost of inspection or test when Work is not ready at the time specified by Contractor for inspection or test, or when prior rejection makes re-inspection or retest necessary. Quality assurance inspections and tests will be performed in a manner that will not unnecessarily delay the Work.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION**

#### 3.01 GENERAL

- A. Maintain an adequate inspection system and perform such inspections as will ensure that the Work conforms to the Contract Documents.
- B. Maintain complete inspection records and make them available at all times to Owner, CCA, and Engineer.
- C. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product that complies with the Contract Documents. The system shall cover all construction and demolition operations, both onsite and offsite, including Work by subcontractors, fabricators, suppliers and purchasing agents, and shall be keyed to the proposed construction sequence.

#### 3.02 COORDINATION MEETING

- A. After the Preconstruction Conference, but before start of construction, and prior to acceptance of the CQC Plan, schedule a meeting with CCA and Owner to discuss the quality control system.
- B. Develop a mutual understanding of the system details, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite Work, and the interrelationship of Contractor's management and control with the Owner's Quality Assurance.
- C. There may be occasions when subsequent conferences may be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by Contractor.

3.03 QUALITY CONTROL ORGANIZATION

A. CQC System Manager:

1. Designate an individual within Contractor's organization who will be responsible for overall management of CQC and have the authority to act in CQC matters for the Contractor.
2. CQC System Manager may perform other duties on the Project.
3. CQC System Manager shall be an experienced construction person, with a minimum of 3 years construction experience on similar type Work.
4. CQC System Manager shall report to the Contractor's project manager or someone higher in the organization. Project manager in this context shall mean the individual with responsibility for the overall quality and production management of the Project.
5. CQC System Manager shall be onsite during construction; periods of absence may not exceed 2 weeks at any one time.
6. Identify an alternate for CQC System Manager to serve with full authority during the System Manager's absence. The requirements for the alternate will be the same as for designated CQC System Manager.

B. CQC Staff:

1. Designate a CQC staff, available at the Site at all times during progress, with complete authority to take any action necessary to ensure compliance with the Contract. CQC staff members shall be subject to acceptance by CCA.
2. CQC staff shall take direction from CQC System Manager in matters pertaining to QC.
3. CQC staff must be of sufficient size to ensure adequate QC coverage of Work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities.
4. The actual strength of the CQC staff may vary during any specific Work period to cover the needs of the Project. Add additional staff when necessary for a proper CQC organization.

C. Organizational Changes: Obtain CCA's acceptance before replacing any member of the CQC staff. Requests for changes shall include name, qualifications, duties, and responsibilities of the proposed replacement.

3.04 QUALITY CONTROL PHASING

A. CQC shall include at least three phases of control to be conducted by CQC System Manager for all definable features of Work, as follows:

## FORT THOMAS WTP ADVANCED TREATMENT

1. Preparatory Phase:
  - a. Notify Owner at least 48 hours in advance of beginning any of the required action of the preparatory phase.
  - b. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The CQC System Manager shall instruct applicable CQC staff as to the acceptable level of workmanship required in order to meet Contract requirements.
  - c. Document the results of the preparatory phase meeting by separate minutes prepared by the CQC System Manager and attached to the QC report.
  - d. Perform prior to beginning Work on each definable feature of Work:
    - 1) Review applicable Contract Specifications.
    - 2) Review applicable Contract Drawings.
    - 3) Verify that all materials and/or equipment have been tested, submitted, and approved.
    - 4) Verify that provisions have been made to provide required control inspection and testing.
    - 5) Examine the Work area to verify that all required preliminary Work has been completed and is in compliance with the Contract.
    - 6) Perform a physical examination of required materials, equipment, and sample Work to verify that they are on hand, conform to approved Shop Drawing or submitted data, and are properly stored.
    - 7) Review the appropriate activity hazard analysis to verify safety requirements are met.
    - 8) Review procedures for constructing the Work, including repetitive deficiencies.
    - 9) Document construction tolerances and workmanship standards for that phase of the Work.
    - 10) Check to verify that the plan for the Work to be performed, if so required, has been accepted by CCA.
2. Initial Phase:
  - a. Accomplish at the beginning of a definable feature of Work:
    - 1) Notify Owner at least 48 hours in advance of beginning the initial phase.
    - 2) Perform prior to beginning Work on each definable feature of Work:
      - a) Review minutes of the preparatory meeting.
      - b) Check preliminary Work to verify compliance with Contract requirements.
      - c) Verify required control inspection and testing.

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- d) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Comparison with sample panels is appropriate.
  - e) Resolve all differences.
  - f) Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- 3) Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the QC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
  - 4) The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.
3. Follow-up Phase:
    - a. Perform daily checks to verify continuing compliance with Contract requirements, including control testing, until completion of the particular feature of Work.
    - b. Daily checks shall be made a matter of record in the CQC documentation and shall document specific results of inspections for all features of Work for the day or shift.
    - c. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of Work that will be affected by the deficient Work. Constructing upon or concealing nonconforming Work will not be allowed.
  4. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be conducted on the same definable features of Work as determined by Owner if the quality of ongoing Work is unacceptable; or if there are changes in the applicable QC staff or in the onsite production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

### 3.05 CONTRACTOR QUALITY CONTROL PLAN

#### A. General:

1. Plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used.
2. An interim plan for the first 30 days of operation will be considered.
3. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of Work to be started.

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4. Work outside of the features of Work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of Work to be started.

### B. Content:

1. Plan shall cover the intended CQC organization for the entire Contract and shall include the following, as a minimum:
  - a. Organization: Description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff will implement the three-phase control system (see Paragraph QC Phasing) for all aspects of the Work specified.
  - b. CQC Staff: The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a QC function.
  - c. Letters of Authority: A copy of a letter to the CQC System Manager signed by an authorized official of the firm, describing the responsibilities and delegating sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop Work which is not in compliance with the Contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities and responsibilities. Copies of these letters will also be furnished to Owner.
  - d. Submittals: Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers and purchasing agents.
  - e. Testing: Control, verification and acceptance testing procedures for each specific test to include the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required.
  - f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests, including documentation.
  - g. Procedures for tracking deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
  - h. Reporting procedures, including proposed reporting formats; include a copy of the CQC report form.

- C. Acceptance of Plans: Acceptance of the Contractor's basic and addendum CQC plans is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the



construction. Owner reserves the right to require Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

- D. Notification of Changes: After acceptance of the CQC plan, Contractor shall notify CCA, in writing, a minimum of 7 calendar days prior to any proposed change. Proposed changes are subject to acceptance by CCA.

### 3.06 CONTRACTOR QUALITY CONTROL REPORT

- A. As a minimum, prepare a CQC report for every 7 calendar days. Account for all days throughout the life of the Contract. Reports shall be signed and dated by CQC System Manager. Include copies of test reports and copies of reports prepared by QC staff.
- B. Maintain current records of quality control operations, activities, and tests performed, including the Work of subcontractors and suppliers.
- C. Records shall be on an acceptable form and shall be a complete description of inspections, the results of inspections, daily activities, tests, and other items, including but not limited to the following:
1. Contractor/subcontractor and their areas of responsibility.
  2. Operating plant/equipment with hours worked, idle, or down for repair.
  3. Work performed today, giving location, description, and by whom. When a network schedule is used, identify each phase of Work performed each day by activity number.
  4. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
  5. Material received with statement as to its acceptability and storage.
  6. Identify submittals reviewed, with Contract reference, by whom, and action taken.
  7. Offsite surveillance activities, including actions taken.
  8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
  9. List instructions given/received and conflicts in Drawings and/or Specifications.
  10. Contractor's verification statement.
  11. Indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered.

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12. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in file work and workmanship comply with the Contract.

### 3.07 SUBMITTAL QUALITY CONTROL

- A. Submittals shall be as specified in Section 01 33 00, Submittal Procedures. The CQC organization shall be responsible for certifying that all submittals are in compliance with the Contract requirements. Owner will furnish copies of test report forms upon request by Contractor. Contractor may use other forms as approved.

### 3.08 TESTING QUALITY CONTROL

- A. Testing Procedure:
  1. Perform tests specified or required to verify that control measures are adequate to provide a product which conforms to Contract requirements. Procure services of a licensed testing laboratory. Perform the following activities and record the following data:
    - a. Verify testing procedures comply with contract requirements.
    - b. Verify facilities and testing equipment are available and comply with testing standards.
    - c. Check test instrument calibration data against certified standards.
    - d. Verify recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
    - e. Documentation:
      - 1) Record results of all tests taken, both passing and failing, on the CQC report for the date taken.
      - 2) Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test.
      - 3) Actual test reports may be submitted later, if approved by CCA, with a reference to the test number and date taken.
      - 4) Provide directly to CCA an information copy of tests performed by an offsite or commercial test facility. Test results shall be signed by an engineer registered in the state where the tests are performed.
      - 5) Failure to submit timely test reports, as stated, may result in nonpayment for related Work performed and disapproval of the test facility for this Contract.

## FORT THOMAS WTP ADVANCED TREATMENT

- B. Testing Laboratories: Laboratory facilities, including personnel and equipment, utilized for testing soils, concrete, asphalt and steel shall meet criteria detailed in ASTM D3740 and ASTM E329, and be accredited by the American Association of Laboratory Accreditation (AALA), National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP), the American Association of State Highway and Transportation Officials (AASHTO), or other approved national accreditation authority. Personnel performing concrete testing shall be certified by the American Concrete Institute (ACI).

### 3.09 COMPLETION INSPECTION

- A. CQC System Manager shall conduct an inspection of the Work at the completion of all Work or any milestone established by a completion time stated in the Contract.
- B. Punchlist:
  - 1. CQC System Manager shall develop a punchlist of items which do not conform to the Contract requirements.
  - 2. Include punchlist in the CQC report, indicating the estimated date by which the deficiencies will be corrected.
  - 3. CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Owner.
  - 4. These inspections and any deficiency corrections required will be accomplished within the time stated for completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.

**END OF SECTION**

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**SECTION 01 45 33**  
**SPECIAL INSPECTION, OBSERVATION, AND TESTING**

**PART 1 GENERAL**

1.01 SUMMARY

- A. This section covers requirements for Special Inspection, and Testing required in accordance with Chapter 17 of the 2006 International Building Code and is in addition to and supplements requirements included in Statement of Special Inspections (Plan) shown on Drawings. The content of these inspections is provided for the Contractor's understanding but the cost of these independent inspections will be borne by the OWNER as described herein.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. International Code Council (ICC):
    - a. 2006 International Building Code (IBC).
    - b. Evaluation Service (ICC-ES) Reports and Legacy Reports.
  2. American Society of Civil Engineers (ASCE): 7-05, Minimum Design Loads for Buildings and Other Structures.

1.03 DEFINITIONS

- A. Agencies and Personnel:
1. Approved Agency: An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved.
  2. Registered Design Professional in Responsible Charge: An individual who is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the Project is to be constructed.
  3. Special Inspector: Qualified person employed by Owner who will demonstrate competence to the satisfaction of the building official for inspection of a particular type of construction or operation requiring Special Inspection.

## FORT THOMAS WTP ADVANCED TREATMENT

### B. Special Inspection:

1. Special Inspection: Inspection required of materials, installation, fabrication, erection, or placement of components and connections requiring special expertise to ensure compliance with approved Contract Documents and referenced standards.
2. Special Inspection, Continuous: Full-time observation of work requiring Special Inspection by an approved Special Inspector who is present in the area where the Work is being performed.
3. Special Inspection, Periodic: Part-time or intermittent observation of work requiring Special Inspection by an approved Special Inspector who is present in the area where the Work has been or is being performed, and at the completion of the Work.

### C. Structural Systems and Components:

1. Diaphragm: Component of structural lateral load resisting system consisting of roof, floor, or other membrane or bracing system acting to transfer lateral forces to vertical resisting elements of structure.
2. Drag Strut or Collector: Component of structural lateral load resisting system consisting of a diaphragm or shear wall element that collects and transfers diaphragm shear forces to vertical force-resisting elements or distributes forces within diaphragm or shear wall.
3. Seismic-Force-Resisting System: That part of structural lateral load resisting system that has been considered in the design to provide required resistance to seismic forces identified on Drawings.
4. Shear Wall: Component of structural lateral load resisting system consisting of a wall designed to resist lateral forces parallel to the plane of the wall. Unless noted otherwise on Drawings, load-bearing walls with direct in-plane connections to roof and floors shall be considered to be shear walls.
5. Wind Force Resisting System: That part of the structural system that has been considered in the design to provide required resistance to wind forces identified on Drawings.

### D. Nonstructural Components:

1. Architectural Component Supports: Structural members or assemblies of members which transmit loads and forces from architectural systems or components to the structure, including braces, frames, struts, and attachments.
2. Electrical Component Supports: Structural members or assemblies which transmit loads and forces from electrical equipment to the structure, including braces, frames, legs, pedestals, and tethers, as well as elements forged or cast as part of component for anchorage.

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3. Mechanical Component Supports: Structural members or assemblies which transmit loads and forces from mechanical equipment to the structure, including braces, frames, skirts, legs, saddles, pedestals, snubbers, and tethers, as well as elements forged or cast as part of component for anchorage.

E. Professional Observation:

1. Does not include or waive responsibility for required Special Inspection or inspections by building official.
2. Requirements are indicated on Statement of Special Inspections (Plan) provided on Drawings.
3. Geotechnical Observation: Visual observation of selected subgrade bearing surfaces by a registered design professional for general conformance to Contract Documents.
4. Structural Observation: Visual observation of structural system(s) by a registered design professional for general conformance to Contract Documents.
5. Statement of Special Inspections (Plan): Detailed written procedure contained on Drawings establishing systems and components subject to Special Inspection, Observation, and Testing during construction, type and frequency of testing, extent and duration of Special Inspection, and reports to be completed and distributed by Special Inspector.

1.04 STATEMENT OF SPECIAL INSPECTIONS (PLAN) REQUIREMENTS

A. Designated Systems for Inspection:

1. Seismic-force-resisting systems designated under IBC Section 1705 and subject to Special Inspection under Section 1707: None required.
2. Wind-force-resisting systems designated under IBC Section: None required.
3. Architectural, Mechanical, and Electrical Components subject to Special Inspection and testing under IBC Section 1707 for Seismic Resistance: None required.

<b>Architectural, Mechanical, and Electrical Components designated under IBC Section 1705</b>		
<b>Mechanical and Electrical Components Require Certification of Compliance for Seismic Testing or Analysis under IBC Section 1708.5</b>		
Facility	Component	Component Importance Factor, IP
09—Electrical Site Work	Standby Engine Generators	1.5
09—Electrical Site Work	Switchgear	1.5

<b>Architectural, Mechanical, and Electrical Components designated under IBC Section 1705</b> <b>Mechanical and Electrical Components Require Certification of Compliance for Seismic Testing or Analysis under IBC Section 1708.5</b>		
Facility	Component	Component Importance Factor, IP
09—Electrical Site Work	Secondary Unit Substation	1.5

- B. Statement of Special Inspections (Plan):
1. As included in Drawings and in support of the building permit application, the Project specific plan was prepared by the registered design professional in responsible charge. The following identifies elements of the inspection and testing program to be followed in construction of the Work:
    - a. Special Inspection and testing required by IBC Section 1704 and Section 1708, and other applicable sections and referenced standards therein.
    - b. Type and frequency of Special Inspection required.
    - c. Type and frequency of testing required.
    - d. Required frequency and distribution of testing and Special Inspection reports to be distributed by Special Inspector to Engineer, Contractor, building official, and Owner.
    - e. Geotechnical Observation to be Performed: Required frequency and distribution of Geotechnical Observation reports by registered design professional to Contractor, building official, and Owner.
- C. Special Inspection and associated testing of shop fabrication and field construction will be performed by an approved accredited independent agency. Owner will secure and pay for the services of the agency to perform Special Inspection and associated testing.
- D. Owner's plan for code required Special Inspection with associated testing, as provided in Statement of Special Inspections (Plan) on Drawings and further provided in this section, is for the sole benefit of Owner and does not:
1. Relieve Contractor of responsibility for providing adequate quality control measures.
  2. Relieve Contractor of responsibility for damage to or loss of material before acceptance.
  3. Constitute or imply acceptance.
  4. Affect continuing rights of Owner after acceptance of completed Work.



## FORT THOMAS WTP ADVANCED TREATMENT

- E. The presence or absence of code required Special Inspector does not relieve Contractor from Contract requirements.
- F. Contractor is responsible for additional costs associated with Special Inspection and Testing when Work is not ready at time identified by Contractor, and Special Inspectors are on Site but not able to provide contracted services.
- G. Contractor is responsible for associated costs for additional Special Inspection and Testing by Special Inspectors required due to rejection of materials of in place Work that cannot be made compliant to Contract Document without additional Site visits or testing.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION**

#### 3.01 GENERAL

- A. Provide access to shop or Site for Special Inspection and Testing.
- B. Notify Engineer in advance of required Special Inspection no later than 48 hours prior to date of Special Inspection.
- C. Materials and systems, inclusive, shall be inspected during placement where Continuous Special Inspection is required.
- D. Materials and systems shall be inspected during or at completion of their placement where Periodic Special Inspection is allowed.
  - 1. Periodic Special Inspection shall be performed so that Work inspected after, but not during, its placement can be corrected prior to other related Work proceeding and covering inspected Work.
  - 2. Periodic Special Inspection does not allow sampling of a portion of the Work. All Work shall be inspected.

#### 3.02 TESTING

- A. The 2006 IBC requires registered design professional in responsible charge to state applicable requirements. Verify methods listed are appropriate or modify for specific seismic systems. See ASCE 7-05 Sections 13.2.2, 13.2.5, and 13.2.6 for guidance on acceptable methods. Item [B], certification by experience data, is added by the 2006 code; check with jurisdictional authorities before allowing under the 2003 code. [C] below references ASCE 7-05 but can be used in conjunction with the 2003 IBC since 2003 did not completely cover this requirement.

# FORT THOMAS WTP ADVANCED TREATMENT

## 3.03 SUPPLEMENTS

- A. The supplements listed below, following "End of Section," are a part of this Specification:
1. Contractor's Statement of Responsibility.
  2. Seismic Qualification of Mechanical and Electrical Equipment Certificate of Compliance.

**END OF SECTION**

**CONTRACTOR'S STATEMENT OF RESPONSIBILITY**

\_\_\_\_\_  
(Project)

\_\_\_\_\_  
(Name of Contracting Company)

\_\_\_\_\_  
(Business Address)

( ) \_\_\_\_\_  
(Telephone)

( ) \_\_\_\_\_  
(Fax)

I, (We) hereby certify that I am (we are) aware of the Special Inspection and Testing and component certification requirements contained in Contract Documents for this Project for wind and force-resisting systems, and for components including architectural, mechanical, and electrical components, as listed in Statement of Special Inspections (Plan) on Drawings, and that:

- I, (We) are responsible for construction of the following components:

Facility	Component
Electrical Site Work	Standby Engine Generators
Electrical Site Work	Switchgear
Electrical Site Work	Secondary Unit Substation

- Control of this Work will be exercised to obtain conformance with the Contract Documents approved by the building official.
- Procedures to be used for exercising control of the Work, the method and frequency of reporting, and distribution of reports required under the Statement of Special Inspections (Plan) for this Project are attached.
- I, (We) will provide 48-hour notification to Engineer and approved agency as required for structural tests and Special Inspection for this Project.

FORT THOMAS WTP ADVANCED TREATMENT

5. The following person is hereby identified as exercising control over the requirements of this section for the Work designated above:

Name: \_\_\_\_\_

Qualifications: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

(Print name and official title of person signing this form)

Signed by: \_\_\_\_\_

Date: \_\_\_\_\_

Project Name: \_\_\_\_\_

COMPONENT MANUFACTURER'S SEISMIC QUALIFICATION OF  
MECHANICAL AND ELECTRICAL EQUIPMENT

**CERTIFICATE OF COMPLIANCE**

\_\_\_\_\_  
(Component under Certification)

\_\_\_\_\_  
(Name of Manufacturer)

\_\_\_\_\_  
(Tag Number or Equipment ID)

\_\_\_\_\_  
(Business Address)

\_\_\_\_\_  
(Drawing/Detail Number)

(\_\_\_\_\_)\_\_\_\_\_  
(Telephone)

This is to certify that above-referenced component meets or exceeds requirements of the 2006 IBC for seismic qualification. Basis of qualification is by:

(Check Applicable)

- Shake-table Test
- Three-dimensional Shock Test
- Analytical Method
- Experience Data
- Other \_\_\_\_\_

under the acceptance criteria of:

- ICC-ES AC156, "Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems"
- IEEE 693, "IEEE Recommended Practice for Seismic Design of Substations"
- IEEE 344, "IEEE Recommended Standard Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations" for experience data
- ASCE 7-05 Chapter 13 for analytical methods
- Other \_\_\_\_\_

for the following earthquake hazard rating:

IEEE Seismic Qualification Level: \_\_\_\_\_

FORT THOMAS WTP ADVANCED TREATMENT

Mapped MCE, 5 Percent Damped, Short Period Spectral Response  
Acceleration,  $S_s$ : \_\_\_\_\_

Design, 5 Percent Damped, Short Period Spectral Response Acceleration,  
 $S_{DS}$ : \_\_\_\_\_

Component Importance Factor,  $I_p$ : \_\_\_\_\_

Component Response Modification Factor,  $R_p$ : \_\_\_\_\_

Height of Point of Attachment as Factor of Average Roof Height,  
 $z/h$ : \_\_\_\_\_

Required mounting and anchorage details are shown on the attached Seismic Outline  
Drawing for the most seismically vulnerable component covered by this Certification.

Signed by: \_\_\_\_\_

Address: \_\_\_\_\_

Date: \_\_\_\_\_

Project Name: \_\_\_\_\_

**SECTION 01 50 00**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of Nurserymen (AAN): American Standards for Nursery Stock.
  2. Federal Emergency Management Agency (FEMA).
  3. National Fire Prevention Association (NFPA): 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.
  4. Telecommunications Industry Association (TIA); Electronic Industries Alliance (EIA): 568B, Commercial Building Telecommunications Cabling Standard.
  5. U.S. Department of Agriculture (USDA): Urban Hydrology for Small Watersheds.
  6. U.S. Weather Bureau: Rainfall-Frequency Atlas of the U.S. for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years.

1.02 SUBMITTALS

- A. Informational Submittals:
1. Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
  2. Temporary Utility Submittals:
    - a. Electric power supply and distribution plans.
    - b. Drainage plans.
    - c. Sanitary.
  3. Temporary Construction Submittals:
    - a. Access Roads: Routes, cross-sections, and drainage facilities.
    - b. Parking area plans.
    - c. Contractor's field office, storage yard, and storage building plans, including gravel surfaced area.
    - d. Fencing and protective barrier locations and details.
    - e. Staging area location plan.
    - f. Traffic Routing Plans: For plant roads or as specified herein, and proposed revisions thereto.
    - g. Plan for maintenance of existing plant operations.

## FORT THOMAS WTP ADVANCED TREATMENT

4. Temporary Control Submittals:
  - a. Noise control plan.
  - b. Dust control plan.
  - c. Plan for disposal of waste materials and intended haul routes.
  - d. Traffic Control Plan for highway US 27 near plant entrance.

### 1.03 MOBILIZATION

- A. Mobilization shall include, but not be limited to, these principal items:
  1. Obtaining required permits.
  2. Moving Contractor's field office and equipment required for first month operations onto Site.
  3. Installing temporary construction power, wiring, and lighting facilities.
  4. Providing onsite communication facilities, including telephones.
  5. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
  6. Arranging for and erection of Contractor's work and storage yard.
  7. Posting OSHA required notices and establishing safety programs and procedures.
  8. Having Contractor's superintendent at Site full time.
- B. Use area designated for Contractor's temporary facilities as shown on Drawings and supplemented as needed by additional space off the Owner's property obtained by the Contractor

### 1.04 PROTECTION OF WORK AND PROPERTY

- A. Comply with Owner's safety rules while on Owner's property.
- B. Keep Owner informed of serious onsite accidents and related claims.
- C. Use of Explosives: No blasting or use of explosives will be allowed onsite.

### 1.05 VEHICULAR TRAFFIC

- A. Traffic Control Plan:
  1. Adhere to traffic control plan reviewed and accepted by CCA. Changes to this plan shall be made only by written approval of appropriate public authority and CCA. Secure approvals for necessary changes so as not to delay progress of the Work.



- B. Traffic Routing Plan: Show sequences of construction affecting use of roadways, time required for each phase of the Work, provisions for decking over excavations and phasing of operations to provide necessary access, and plans for signing, barricading, and striping to provide passages for pedestrians and vehicles.

**PART 2 PRODUCTS**

2.01 PROJECT SIGN

- A. Provide and maintain one, 8-foot wide by 4-foot high sign constructed of 3/4-inch exterior high density overlaid plywood. Sign shall bear name of Project, Owner, Contractor, Construction Contract Administrator and Engineer, and other participating agencies. Lettering shall be blue applied on a white background by an experienced sign painter. Paint shall be exterior type enamel. Information to be included will be provided by Construction Contract Administrator

**PART 3 EXECUTION**

3.01 TEMPORARY UTILITIES

- A. Power:
  - 1. Electric power will be available at or near Site. Determine type and amount available and make arrangements for obtaining temporary electric power service, metering equipment, and pay all costs for electric power used during contract period, except for portions of the Work designated in writing by Engineer as substantially complete.
  - 2. Cost of electric power will be borne by Contractor.
- B. Lighting: Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.
- C. Heating, Cooling, and Ventilating:
  - 1. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for installation of materials, and to protect materials, equipment, and finishes from damage due to temperature or humidity.
  - 2. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.

## FORT THOMAS WTP ADVANCED TREATMENT

3. Pay all costs of installation, maintenance, operation, removal, and fuel consumed.
4. Provide portable unit heaters, complete with controls, oil- or gas-fired, and suitably vented to outside as required for protection of health and property.
5. If permanent natural gas piping is used for temporary heating units, do not modify or reroute gas piping without approval of utility company. Provide separate gas metering as required by utility.

### D. Water:

1. Potable Water for Contractor Use during Project :
  - a. Owner will provide the Contractor a connection to the plant water system using a 2-inch diameter yard hydrant with a meter as indicated on the Drawings. The Contractor is responsible for providing a suitable backflow preventer and any other fittings or lines needed to route water connection to point or points where needed.
  - b. The Owner will track the usage of water through the meter. The Owner will not charge for water used for project purposes unless the Contractor is found to be careless with control of the usage. Secure written permission for connection and use from Owner and meet requirements for use. Notify fire department before obtaining water from fire hydrants.
  - c. Use only special hydrant-operating wrenches to open hydrants. Make certain hydrant valve is open full, since cracking valve causes damage to hydrant. Repair damaged hydrants and notify Owner as quickly as possible. Hydrants shall be completely accessible to fire department at all times.
  - d. Include costs to connect and transport water to construction areas in Contract Price.
2. Contractor will furnish and install temporary piping and facilities to transport water to the Work.
3. Provide a means to prevent water used for testing from flowing back into source pipeline.

### E. Sanitary and Personnel Facilities

1. Provide and maintain facilities for Contractor's employees, Subcontractors, and all other onsite employers' employees. Service, clean, and maintain facilities and enclosures.
2. Use of Owner's existing sanitary facilities by construction personnel will not be allowed.

- F. Fire Protection: Furnish and maintain on Site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of NFPA 241.

3.02 PROTECTION OF WORK AND PROPERTY

A. General:

1. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.
2. No residence or business shall be cut off from vehicular traffic for a period exceeding 4 hours, unless special arrangements have been made.
3. Maintain in continuous service all existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and all other utilities encountered along line of the Work, unless other arrangements satisfactory to owners of said utilities have been made.
4. Where completion of the Work requires temporary or permanent removal or relocation of existing utility, coordinate all activities with owner of said utility and perform all work to their satisfaction.
5. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
6. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
7. In areas where Contractor's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.
8. Notify property owners and utility offices that may be affected by construction operation at least 2 days in advance: Before exposing a utility, obtain utility owner's permission. Should service of utility be interrupted due to Contractor's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.
9. Do not impair operation of existing sewer system. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.
10. Maintain original Site drainage wherever possible.

## FORT THOMAS WTP ADVANCED TREATMENT

### B. Site Security:

1. Erect a temporary security fence for protection of site where existing fence is removed, as specified in Section 32 31 13, Chain Link Fences and Gates. Maintain fence throughout construction period. Obtain Construction Contract Administrator's written permission before removal of temporary security fencing.
2. Provide and maintain additional temporary security fences as necessary to protect the Work and Contractor-furnished products not yet installed.
3. Plant gate will be open during work day for access by construction staff. Contractor will secure the work site each night.
4. Owner will issue security badges to Contractor for use by foreman with instructions on procedures for use of badge.

### C. Barricades and Lights:

1. Provide as required by the KY Vehicle Code and in sufficient quantity to safeguard public and the Work.
2. Provide as necessary to prevent unauthorized entry to construction areas and affected roads, streets, and alleyways, inside and outside of fenced area, and as required to ensure public safety and the safety of Contractor's employees, other employer's employees, and others who may be affected by the Work.
3. Provide to protect existing facilities and adjacent properties from potential damage.
4. Locate to enable access by facility operators and property owners.
5. Protect streets, roads, highways, and other public thoroughfares that are closed to traffic by effective barricades with acceptable warning signs.
6. Locate barricades at the nearest intersecting public thoroughfare on each side of the blocked section.
7. Illuminate barricades and obstructions with warning lights from sunset to sunrise.

### D. Signs and Equipment:

1. Conform to requirements of manual published by the State Department of Transportation.
2. Provide signs on US 27 near plant entrance compliant with KDOT standards indicating to traffic in both directions that trucks will be entering and leaving ahead.

## FORT THOMAS WTP ADVANCED TREATMENT

### E. Trees and Plantings:

1. Protect from damage and preserve trees, shrubs, and other plants outside limits of the Work and within limits of the Work, which are designated on the Drawings to remain undisturbed.
  - a. Where practical, tunnel beneath trees when on or near line of trench.
  - b. Employ hand excavation as necessary to prevent tree injury.
  - c. Do not stockpile materials or permit traffic within drip lines of trees.
  - d. Provide and maintain temporary barricades around trees.
  - e. Water vegetation as necessary to maintain health.
  - f. Cover temporarily exposed roots with wet burlap, and keep burlap moist until soil is replaced around roots.
  - g. No trees, except those specifically shown on Drawings to be removed, shall be removed without written approval of Engineer.
  - h. Dispose of removed trees in a legal manner off the Site.
2. Balling and burlapping of trees indicated for replacement shall conform to recommended specifications set forth in the American Standards for Nursery Stock, published by American Association of Nurserymen. All balls shall be firm and intact and made-balls will not be accepted. Handle ball and burlap trees by ball and not by top.
3. In event of damage to bark, trunks, limbs, or roots of plants that are not designated for removal, treat damage by corrective pruning, bark tracing, application of a heavy coating of tree paint, and other accepted horticultural and tree surgery practices.
4. Replace each plant that dies as a result of construction activities.

### F. Existing Structures:

1. Where Contractor contemplates removal of small structures such as mailboxes, signposts, and culverts that interfere with Contractor's operations, obtain approval of property owner and CCA.
2. Move mailboxes to temporary locations accessible to postal service.
3. Replace items removed in their original location and a condition equal to or better than original.

### G. Finished Construction: Protect finished floors and concrete floors exposed as well as those covered with composition tile or other applied surfacing.

### H. Waterways:

1. Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.

## FORT THOMAS WTP ADVANCED TREATMENT

- I. Dewatering: Construct, maintain, and operate cofferdams, channels, flume drains, sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain foundations and parts of the Work free from water.

### 3.03 TEMPORARY CONTROLS

#### A. Air Pollution Control:

1. Minimize air pollution from construction operations.
2. Burning:
  - a. Of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention. Provide dust control plan to Construction Contract Administrator for approval, follow plan, and adjust as directed by Construction Contract Administrator to minimize off-site dust emissions.
4. Provide and maintain temporary dust-tight partitions, bulkheads, or other protective devices during construction to permit normal operation of existing facilities. Construct partitions of plywood, insulating board, plastic sheets, or similar material. Construct partitions in such a manner that dust and dirt from demolition and cutting will not enter other parts of existing building or facilities. Remove temporary partitions as soon as need no longer exists.

#### B. Noise Control:

1. Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels.
2. Noise Control Ordinance
3. Noise Control Plan: Propose plan to mitigate construction noise and to comply with noise control ordinances, including method of construction, equipment to be used, and acoustical treatments.

## FORT THOMAS WTP ADVANCED TREATMENT

### C. Water Pollution Control:

1. Divert sanitary sewage and nonstorm waste flow interfering with construction and requiring diversion to sanitary sewers. Do not cause or permit action to occur which would cause an overflow to existing waterway.
2. Prior to commencing excavation and construction, obtain Engineer's agreement with detailed plans showing procedures intended to handle and dispose of sewage, groundwater, and stormwater flow, including dewatering pump discharges.
3. Comply with procedures outlined in U.S. Environmental Protection Agency manuals entitled, "Guidelines for Erosion and Sedimentation Control Planning" and "Implementation, Processes, Procedures, and Methods to Control Pollution Resulting from All Construction Activity," and "Erosion and Sediment Control-Surface Mining in Eastern United States."
4. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

### D. Erosion, Sediment, and Flood Control:

1. Provide, maintain, and operate temporary facilities to control erosion and sediment releases, and to protect the Work and existing facilities from flooding during construction period.
2. Design erosion and sediment controls to handle peak runoff resulting from 25-year, 24-hour storm event based on U.S. Weather Bureau, "Rainfall-Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years," Technical Paper No. 40, 1981.
3. Size temporary stormwater conveyances based on procedures presented in U.S. Department of Agriculture, "Urban Hydrology for Small Watersheds," Soil Conservation Service Engineering Technical Release No. 55, 1986.
4. Design temporary flood control facilities for design flood with minimum of 3 feet of freeboard. Design flood shall be as published by FEMA for 100-year recurrence interval.

## 3.04 STORAGE YARDS AND BUILDINGS

- A. Coordinate requirements with Section 01 61 00, Common Product Requirements.

## FORT THOMAS WTP ADVANCED TREATMENT

- B. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions.
- C. Temporary Storage Buildings:
  - 1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.
  - 2. Arrange or partition to provide security of contents and ready access for inspection and inventory.
  - 3. Store combustible materials (paints, solvents, fuels) in a well-ventilated and remote building meeting safety standards.

### 3.05 ACCESS ROADS AND DETOURS

- A. Construct access roads as shown and within easements, rights-of-way, or Project limits. Utilize existing roads where shown. Alignments for new routes shall be approved by Engineer.
- B. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.
- C. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.
- D. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.
- E. Coordinate with CCA detours and other operations affecting traffic and access. Provide at least 72 hours' notice to CCA of operations that will alter access to the Site and Chemical and Sodium Hypochlorite Buildings.
- F. Where access road crosses existing fences, install and maintain gates. Gates and gate posts shall conform to those as specified in Section 32 31 26, Chain Link Fences and Gates.
- G. Upon completion of construction, restore ground surface disturbed by access road construction to original grade. Leave access roads in condition suitable for future use by Owner. Replace damaged or broken culverts with new culvert pipe of same diameter and material.
- H. Contractors shall use only plant entrances that are designated for their use by the Construction Contract Administrator.



## FORT THOMAS WTP ADVANCED TREATMENT

### 3.06 PARKING AREAS

- A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.
- B. Provide parking facilities for personnel working on the Project. No employee or equipment parking will be permitted on Owner's existing paved areas, except as specifically designated for Contractor's use.
- C. Use area designated on Drawings for parking of Contractor's and Contractor's employees' vehicles. Any parking needs for Contractor's and Contractor's employees' vehicles in excess of the designated parking area shall be provided for by the Contractor off-site.

### 3.07 VEHICULAR TRAFFIC

- A. Comply with Laws and Regulations regarding closing or restricting use of public streets or highways. No public or private road shall be closed, except by written permission of proper authority. Assure the least possible obstruction to traffic and normal commercial pursuits.
- B. Conduct the Work to interfere as little as possible with public travel, whether vehicular or pedestrian.
- C. Whenever it is necessary to cross, close, or obstruct roads, driveways, and walks, whether public or private, provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.
- D. Maintenance of traffic is not required if Contractor obtains written permission from Owner and tenant of private property, or from authority having jurisdiction over public property involved, to obstruct traffic at designated point.
- E. In making street crossings, do not block more than one-half the street at a time. Whenever possible, widen shoulder on opposite side to facilitate traffic flow. Provide temporary surfacing on shoulders as necessary.
- F. Maintain top of backfilled trenches before they are paved, to allow normal vehicular traffic to pass over. Provide temporary access driveways where required. Cleanup operations shall follow immediately behind backfilling.
- G. When flaggers and guards are required by regulation or when deemed necessary for safety, furnish them with approved orange wearing apparel and other regulation traffic control devices.

## FORT THOMAS WTP ADVANCED TREATMENT

- H. Provide snow removal to facilitate normal vehicular traffic on public or private roads affected by construction. Perform snow removal promptly and efficiently by means of suitable equipment whenever necessary for safety, and as may be directed by proper authority.
- I. Notify fire department and police department before closing street or portion thereof. Notify said departments when streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without written permission from fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access. Furnish Contractor's night emergency telephone numbers to police department.
- J. Temporary Bridges:
  - 1. Construct temporary bridges at points where maintenance of traffic across pipeline construction is necessary.
  - 2. Make bridges over public streets, roads, and highways acceptable to authority having jurisdiction thereover.
  - 3. Bridges erected over private roads and driveways shall be adequate for service to which they will be subjected.
  - 4. Provide substantial guardrails and suitably protected approaches.
  - 5. Provide footbridges not less than 4 feet wide with handrails and uprights of dressed lumber.
  - 6. Maintain bridges in place as long as conditions of the Work require their use for safety of public, except that when necessary for proper prosecution of the Work in immediate vicinity of bridge. Bridge may be relocated or temporarily removed for such period as Engineer may permit.
- K. Detours:
  - 1. Where authority having jurisdiction requires that traffic be maintained over construction work in a public street, road, or highway, and traffic cannot be maintained on original roadbed or pavement, construct and maintain detour around the Work.
  - 2. Detour Striping:
    - a. 5 days prior to starting Work on each sequence of the Project where detour striping is required, notify City Traffic Engineer's office to allow City sufficient time to paint approved detour striping.
    - b. Clean pavement in area to be marked and have personnel available to assist painting crew by adjusting barricading for detour modification.

## FORT THOMAS WTP ADVANCED TREATMENT

- c. When detour striping is no longer needed, notify City Traffic Engineer's office and sandblast off temporary detour lane markings which would not conform to permanent existing striping.
- L. Coordinate traffic routing with that of others working in same or adjacent areas.

### 3.08 CLEANING DURING CONSTRUCTION

- A. In accordance with General Conditions, as may be specified in other Specification sections, and as required herein.
- B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep all floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up all debris and dispose.
- C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.
- D. At least weekly, brush sweep entry drive, roadways, and all other streets and walkways affected by the Work and where adjacent to the Work. On any day when soil is deposited on plant roadways or public highways by the actions of Contractor or by erosion of surfaces disturbed by Contractor, remove soil before end of work day.

**END OF SECTION**

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**SECTION 01 57 13**  
**TEMPORARY EROSION AND SEDIMENT CONTROL**

**PART 1 GENERAL**

1.01 WORK OF THIS SECTION

- A. This section covers work necessary for stabilization of soil to prevent erosion during and after construction and land disturbing activities. The Contractor shall furnish all labor, materials and equipment necessary to install sediment controls as shown on the Drawings or specified herein to prevent the transport of sediments and sediment-laden water outside the work area. Further, the work shall include installation, maintenance, and final removal of all temporary soil erosion and sediment control measures.
- B. The minimum areas requiring soil erosion and sediment control measures are indicated on the Drawings. The right is reserved to modify the use, location, and quantities of soil erosion and sediment control measures based on activities of the Contractor and as the Engineer considers to be to the best interest of the Owner.
- C. The Contractor shall not employ any construction methods that violate federal, state or local regulations, rules, guidelines or procedures established by agencies having jurisdiction over the environmental effects of construction.
- D. Pollutants such as chemicals, fuels, lubricants, bitumen, raw sewage and other harmful waste shall not be discharged into or alongside any body of water or into natural or man-made channels leading thereto.
- E. See additional information noted on the Drawings.

1.02 GENERAL

- A. See Conditions of the Contract and Division 1, General Requirements, which contain information and requirements that apply to the Work specified herein and are mandatory for this project.
- B. All activities shall conform to the rules and regulations of Sanitation District No. 1 of Northern Kentucky Other applicable organizations and reference documents include:
  - 1. Kentucky Division of Water /Division of Conservation – Best Management Practices for Controlling Erosion, Sediment and Pollutant Runoff from Construction Sites.

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2. Kentucky Division of Conservation/Division of Water – Erosion Prevention and Sediment Control Field Guide.
  3. United States Environmental Protection Agency – Storm Water Management for Construction Activities ( 1992).
  4. United States Soil Conservation Service – Water Management and Sediment Control for Urbanizing Areas (1987).
- C. Soil erosion stabilization and sedimentation control consist of the following elements:
1. Maintenance of existing permanent or temporary storm drainage piping and channel systems, as necessary.
  2. Construction of new permanent and temporary storm drainage piping and channel systems, as necessary.
  3. Construction of temporary erosion control facilities such as silt fences, check dams, etc.
  4. Topsoil and Seeding:
    - a. Placement and maintenance of Temporary Seeding on all areas disturbed by construction.
    - b. Placement of permanent topsoil, fertilizer, and seed, etc., in all areas not occupied by structures or pavement, unless shown otherwise.
  5. Soil Stabilization Seeding: Placement of fertilizer and seed, etc., in areas as specified hereinafter.
- D. The Contractor shall be responsible for phasing Work in areas allocated for his exclusive use during this Project, including any proposed stockpile areas, to restrict sediment transport. This will include installation of any temporary erosion control devices, ditches, or other facilities.
- E. The areas set aside for the Contractor's use during the Project may be temporarily developed to provide satisfactory working, staging, and administrative areas for his exclusive use. Preparation of these areas shall be in accordance with other requirements contained within these Specifications and shall be done in a manner to both control all sediment transport away from the area.
- F. All permanent stockpiles shall be seeded with soil stabilization seed and protected by construction of silt fences and permanent 2-foot, minimum depth, ditches, completely surrounding stockpiles and located within 10 feet of the toes of the stockpile slopes.
- G. Sediment transport and erosion from working stockpiles shall be controlled and restricted from moving beyond the immediate stockpile area by construction of temporary toe-of-slope ditches and accompanying silt fences,

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as necessary. The Contractor shall keep these temporary facilities in operational condition by regular cleaning, regrading, and maintenance. Stockpiles remaining in place longer than 14 calendar days shall be considered permanent stockpiles for purposes of erosion and sediment control.

- H. The Contractor shall maintain all elements of the Soil Erosion Stabilization and Sedimentation Control systems and facilities to be constructed during this Project for the duration of his activities on this Project. Formal inspections made jointly by the Contractor and the Engineer shall be conducted every 2 weeks to evaluate the Contractor's conformance to the requirements of both these Specifications and Loudoun County Regulations.
- I. All silt traps shall be cleaned of collected sediment after every storm or as determined from the biweekly inspections. Cleaning shall be done in a manner that will not direct the sediment into the storm drain piping system. Removed sediment shall be taken to an area selected by the Engineer where it can be cleaned of sticks and debris, then allowed to dry. Final sediment and debris disposal shall be onsite as designated by Engineer.
- J. Replacement or repair of failed or overloaded silt fences, check dams, or other temporary erosion control devices shall be accomplished by the Contractor within 2 days after receiving written notice from the Engineer.
- K. Unpaved earth drainage ditches shall be regraded as needed to maintain original grade and remove sediment buildup. If a ditch becomes difficult to maintain, the Contractor shall cooperate with the Engineer and install additional erosion control devices such as check dams, temporary paving, or silt fences as directed by the Engineer.
- L. If the Contractor has not complied with any of the above maintenance efforts to the satisfaction of the Engineer within 2 working days after receiving written notification from the Engineer, the Owner shall have the prerogative of engaging others to perform any needed maintenance or cleanup, including removal of accumulated sediment at constructed erosion control facilities, and deduct from the Contractor's monthly partial payment the costs for such efforts plus a \$500 administration fee.

### 1.03 SUBMITTALS

- A. Submittals shall be made in accordance with Section 01 33 00, Submittal Procedures.
- B. The Contractor is required to secure a Grading Permit from the Sanitation District No.1 of Northern Kentucky (or confirm that a permit has been secured) prior to beginning any land disturbance activities on the project.

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- C. In addition, the Contractor shall provide the following specific information:
1. Certificates of inspection of seed by state or federal authorities and copies of delivery invoices or other proof of quantities of fertilizer.
  2. Manufacturer's certificate of compliance attesting that the geotextile meets the requirements of these Specifications.

### **PART 2 PRODUCTS**

#### 2.01 PERMANENT SEED

- A. Seed for those areas where topsoil is to be applied shall be 75 percent Kentucky 31, and 25 percent Annual Ryegrass.

#### 2.02 SOIL STABILIZATION AND TEMPORARY SEED

- A. Summer seed mix shall be 50 percent by weight Tall Fescue, 30 percent by weight Sericea Lespedeza, and 20 percent by weight German Millet.
- B. Winter seed mix shall be 50 percent by weight Tall Fescue, 30 percent by weight Sericea Lespedeza, 15 percent by weight Annual Ryegrass, and 5 percent by weight Redtop.

#### 2.03 TOPSOIL

- A. Topsoil shall be as specified under Section 31 23 23, Fill and Backfill.

#### 2.04 FERTILIZER

- A. Fertilizer shall be commercial, chemical type, uniform in composition, free-flowing, conforming to state and federal laws, and suitable for application with equipment designed for that purpose.
- B. Fertilizer shall have a minimum percentage of plant food by weight for the following: Permanent fertilizer mix shall be 10 percent nitrogen, 10 percent phosphoric acid, and 10 percent potash.

#### 2.05 LIME

- A. Ground dolomitic limestone not less than 85 percent total carbonates and magnesium, ground so that 50 percent passes through a 100-mesh sieve and 90 percent passes a 20-mesh sieve. Coarser material will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing the 100-mesh sieve.



2.06 STRAW MULCH

- A. Threshed straw of oats, wheat, barley, or rye, free from seed of noxious weeds, or clean salt hay.
- B. Silt Checks/Fence Silt Checks shall be constructed of No. 1 coarse aggregate as defined by the Kentucky Transportation Cabinet
- C. Silt Fence material and manufacturer will be approved by Engineer prior to installation.

**PART 3 EXECUTION**

3.01 GENERAL

- A. The Contractor shall install erosion and sediment control measures and maintain in accordance with the Drawings. The sequence of construction shown on the Drawings is made a part of these Contract Documents.
- B. Silt fence will be installed in conformance with the Best Management Practices and Field Guide documents issued jointly by the Kentucky Division of Conservation and the Division of Water.
- C. The Contractor shall provide and maintain Temporary Seeding at all times.

3.02 SEEDING

- A. General:
  - 1. The Contractor shall give at least 3 days notice to the Engineer prior to seeding to allow the Owner to inspect the prepared areas. The Contractor shall rework any areas not approved for seeding to the Owner's satisfaction.
  - 2. The Contractor shall keep the Engineer advised of schedule of operations.
  - 3. Seed shall be clean, delivered in original unopened packages and bearing an analysis of the contents, guaranteed 95 percent pure with minimum germination rate of 85 percent.
- B. Schedules:
  - 1. Seeding shall be performed in accordance with the following schedule:
    - a. Summer Seeding: Between March 15 and June 15, or September 1 to November 15.

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- b. Winter Seeding: All other times of year, except when weather conditions prohibit further construction operations as determined by the Engineer.

### C. Soil Stabilization and Temporary Seeding:

1. Soil stabilization seeding shall consist of the application of the following materials in quantities as further described herein for stockpiles and disturbed areas left inactive for more than 14 days.
  - a. Lime.
  - b. Fertilizer.
  - c. Seed.
  - d. Mulch.
  - e. Maintenance.
2. Hydroseeding will be permitted as an alternative method of applying seed and associated soil conditioning agents described above. Should the Contractor elect to apply soil stabilization seeding by hydroseeding methods, he shall submit his operational plan and methods to the Engineer.
3. Temporary Seeding is to be placed and maintained over all disturbed areas prior to Permanent Seeding. Maintain Temporary Seeding until such time as areas are approved for Permanent Seeding. As a minimum, maintenance shall include the following:
  - a. Fix-up and reseeded of bare areas or redisturbed areas.
  - b. Mowing for stands of grass or weeds exceeding 6 inches in height.

### D. Topsoil and Permanent Seeding:

1. Topsoil and Permanent Seeding shall consist of the application of the following materials in quantities as further described herein:
  - a. 4-inch depth of topsoil.
  - b. Lime.
  - c. Fertilizer.
  - d. Permanent seed mix.
  - e. Mulch.
2. Topsoil is to be placed over all disturbed areas that are not surfaced with concrete, asphalt, or pavers.
3. Preparation:
  - a. After rough grading is completed and reviewed by the Engineer, Contractor shall spread topsoil as hereinbefore specified over all areas to receive Permanent Seeding to a minimum compacted depth of 6 inches with surface elevations as shown. Loosen the finished surface to a depth of 2 inches and leave in smooth condition, free from depressions or humps, ready for seeding.

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- b. Finish Grading:
  - 1) Contractor shall rake the topsoiled area to a uniform grade, so that all areas drain as indicated on the grading plan.
  - 2) Contractor shall remove all trash and stones exceeding 1 inch in diameter from area to a depth of 2 inches.
- 4. Permanent Seed:
  - a. After soil has been scarified, apply seed and other products at the rate and proportion specified below:
    - 1) Seed Mix: 150 pounds per acre.
    - 2) 10-10-10 Fertilizer: 1,000 pounds per acre.
    - 3) Lime: 3 tons per acre.
    - 4) Water: As necessary.
- 5. Maintenance:
  - a. Maintenance Period: Contractor shall begin maintenance immediately after each portion of permanent grass is planted and continue for 8 weeks after all planting is completed.
  - b. Maintenance Operations: Contractor shall water to keep surface soil moist. Repair washed out areas by filling with topsoil, liming, fertilizing, and seeding. Replace mulch on banks when washed or blown away. Mow to 2 inches after grass reaches 3 inches in height, and mow frequently enough to keep grass from exceeding 3-1/2 inches. Weed by local spot application of selective herbicide only after first planting season when grass is established.
- 6. Guarantee:
  - a. If, at the end of the 8-week maintenance period, a satisfactory stand of grass has not been produced, the Contractor shall renovate and reseed the grass or unsatisfactory portions thereof immediately, or, if after October 15 during the next planting season. If a satisfactory stand of grass develops by July 1 of the following year, it will be accepted. If it is not accepted, a complete replanting will be required during the planting season meeting all of the requirements specified under paragraph Permanent Seed.
  - b. A satisfactory stand is defined as grass or section of grass that has a substantial establishment of new grass, strongly rooted, and uniformly green in appearance from a distance of 50 feet. No noticeable thin or bare areas as determined by the Engineer.

**END OF SECTION**

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**SECTION 01 61 00**  
**COMMON PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

1.01 DEFINITIONS

A. Products:

1. New items for incorporation in the Work, whether purchased by Contractor or Owner for the Project, or taken from previously purchased stock, and may also include existing materials or components required for reuse.
2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.
3. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.02 DESIGN REQUIREMENTS

A. Where Contractor design is specified, design of installation, systems, equipment, and components, including supports and anchorage, shall be in accordance with provisions of latest edition of International Building Code (IBC) by International Code Council.

1. Wind: Basic wind speed,  $V$ : 90 mph, with exposure category "C", and an importance factor,  $I$ , of 1.15.
2. Snow Load: Basic ground snow load  $P_g$  20 psf, with snow exposure coefficient  $C_e$  of 1.0, with a snow thermal factor  $C_t$  of 1.0, and an importance factor,  $IV$  of 1.2.
3. Seismic: Use Group , importance factor,  $IV$ , of 1.5, Site Class Definition B, mapped maximum considered earthquake, 5 percent damped, spectral response at short periods,  $S_s$  0.179, mapped maximum considered earthquake, 5 percent damped, spectral response at a period of 1 second,  $S_1$  0.075, unless specified otherwise.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Altitude: Provide materials and equipment suitable for installation and operation under rated conditions at 800 feet above sea level.

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- B. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of -10 degrees F to 115 degrees F.

1.04 PREPARATION FOR SHIPMENT

- A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.
- B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.
- C. Extra-Materials, Special Tools, Test Equipment, and Expendables:
  - 1. Furnish as required by individual Specifications.
  - 2. Schedule:
    - a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.
    - b. Transfer to Owner shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.
  - 3. Packaging and Shipment:
    - a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.
    - b. Prominently displayed on each package, the following:
      - 1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
      - 2) Applicable equipment description.
      - 3) Quantity of parts in package.
      - 4) Equipment manufacturer.
  - 4. Deliver materials to Site or to the following address:

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Name

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Street City State Zip

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5. Notify Engineer or Owner or Construction Manager upon arrival for transfer of materials.
  6. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to Owner.
- D. Request a minimum 7-day advance notice of shipment from manufacturer. Upon receipt of manufacturer's advance notice of shipment, promptly notify Engineer of anticipated date and place of the equipment arrival.
- E. Factory Test Results: Reviewed and accepted by Engineer before product shipment as required in individual Specification sections.

### 1.05 DELIVERY AND INSPECTION

- A. Deliver products in accordance with accepted current Progress Schedule and coordinate to avoid conflict with the Work and conditions at Site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.
- B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable.
- C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at Site. Promptly inspect for completeness and evidence of damage during shipment.
- D. Remove damaged products from Site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

### 1.06 HANDLING, STORAGE, AND PROTECTION

- A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01 50 00, Temporary Facilities and Controls. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.
- B. Manufacturer's instructions for material requiring special handling, storage, or protection shall be provided prior to delivery of material.

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- C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.
- D. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulate against moisture, water, and dust damage. Connect and operate continuously space heaters furnished in electrical equipment.
- E. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
- F. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.
- G. After installation, provide coverings to protect products from damage due to traffic and construction operations. Remove coverings when no longer needed.
- H. Hazardous Materials: Prevent contamination of personnel, storage area, and Site. Meet requirements of product specification, codes, and manufacturer's instructions.

### **PART 2 PRODUCTS**

#### 2.01 GENERAL

- A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.
- B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.
- C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare



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parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.

- D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.
- F. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.
- G. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.
- H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated 1/2-inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.
- I. Authority Having Jurisdiction (AHJ):
  - 1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
  - 2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.
- J. Equipment Finish:
  - 1. Provide manufacturer's standard finish and color, except where specific color is indicated.
  - 2. If manufacturer has no standard color, provide equipment with gray finish as approved by Owner or CCA.

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- K. Special Tools and Accessories: Furnish to Owner, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.
- L. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by Owner.

### 2.02 FABRICATION AND MANUFACTURE

#### A. General:

1. Manufacture parts to U.S.A. standard sizes and gauges.
2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
3. Design structural members for anticipated shock and vibratory loads.
4. Use 1/4-inch minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
5. Modify standard products as necessary to meet performance Specifications.

#### B. Lubrication System:

1. Require no more than weekly attention during continuous operation.
2. Convenient and accessible; oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.
3. Provide constant-level oilers or oil level indicators for oil lubrication systems.
4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

### 2.03 SOURCE QUALITY CONTROL

- A. Where Specifications call for factory testing to be witnessed by CCA, notify CCA not less than 14 days prior to scheduled test date, unless otherwise specified.

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- B. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).
- C. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

### PART 3 EXECUTION

#### 3.01 INSPECTION

- A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

#### 3.02 INSTALLATION

- A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.
- B. No shimming between machined surfaces is allowed.
- C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.
- D. Repaint painted surfaces that are damaged prior to equipment acceptance.
- E. Do not cut or notch any structural member or building surface without specific approval of Engineer.
- F. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at Site, available for review at all times.
- G. For material and equipment specifically indicated or specified to be reused in the Work:
  - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.
  - 2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.

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3.03 FIELD FINISHING

- A. In accordance with Section 09 90 00, Painting and Coating, and individual Specification sections.

3.04 ADJUSTMENT AND CLEANING

- A. Perform required adjustments, tests, operation checks, and other startup activities.

3.05 LUBRICANTS

- A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by Owner.

**END OF SECTION**

**SECTION 01 77 00  
CLOSEOUT PROCEDURES**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

**A. Informational Submittals:**

1. Submit prior to application for final payment.
  - a. Record Documents: As required in General Conditions.
  - b. Approved Shop Drawings and Samples: As required in the General Conditions.
  - c. Special bonds, Special Guarantees, and Service Agreements.
  - d. Consent of Surety to Final Payment: As required in General Conditions.
  - e. Releases or Waivers of Liens and Claims: As required in General Conditions.
  - f. Releases from Agreements.
  - g. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01 29 00, Payment Procedures.
  - h. Extra Materials: As required by individual Specification sections.

**1.02 RECORD DOCUMENTS**

**A. Quality Assurance:**

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
2. Accuracy of Records:
  - a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
  - b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.
3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.

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4. Prior to submitting each request for progress payment, request CCA's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by CCA to recommend whole or any part of Contractor's Application for Payment, either partial or final.

### 1.03 RELEASES FROM AGREEMENTS

- A. Furnish Owner written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within the Owner's construction right-of-way.
- B. In the event Contractor is unable to secure written releases:
  1. Inform Owner of the reasons.
  2. Owner or its representatives will examine the Site, and Owner will direct Contractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
  3. Should Contractor refuse to perform this Work, Owner reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory bond in a sum to cover legal Claims for damages.
  4. When Owner is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) Contractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate Claims that Contractor has failed to fulfill terms of side agreement or special easement, or (ii) Contractor is unable to contact or has had undue hardship in contacting grantor.

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION**

### 3.01 MAINTENANCE OF RECORD DOCUMENTS

- A. General:
  1. Promptly following commencement of Contract Times, secure from CCA at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.
  2. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.

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3. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

### B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by Engineer and CCA.

### C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
  - a. Color Coding:
    - 1) Green when showing information deleted from Drawings.
    - 2) Red when showing information added to Drawings.
    - 3) Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by "cloud" drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including, but not limited to:
  - a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
  - b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
  - c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
  - d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
  - e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Engineer's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
  - a. Clearly identify the item by accurate note such as "cast iron drain," "galv. water," and the like.

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- b. Show, by symbol or note, vertical location of item ("under slab," "in ceiling plenum," "exposed," and the like).
- c. Make identification so descriptive that it may be related reliably to Specifications.

### 3.02 FINAL CLEANING

- A. At completion of the Work or of a part thereof and immediately prior to Contractor's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor's notice of completion, clean entire Site or parts thereof, as applicable.
  - 1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner and CCA.
  - 2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
  - 3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
  - 4. Clean all windows.
  - 5. Clean and wax wood, vinyl, or painted floors.
  - 6. Broom clean exterior paved driveways and parking areas.
  - 7. Hose clean sidewalks, loading areas, and others contiguous with principal structures.
  - 8. Rake clean all other surfaces.
  - 9. Remove snow and ice from access to buildings.
  - 10. Replace air-handling filters and clean ducts, blowers, and coils of ventilation units operated during construction.
  - 11. Leave water courses, gutters, and ditches open and clean.
- B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

**END OF SECTION**



**SECTION 01 78 23  
OPERATION AND MAINTENANCE DATA**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Detailed information for the preparation, submission, and Engineer's review of Operations and Maintenance (O&M) Data, as required by individual Specification sections.

1.02 DEFINITIONS

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

1.03 SEQUENCING AND SCHEDULING

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

1.04 DATA FORMAT

- A. Prepare preliminary and final data in the form of an instructional manual. Prepare final data in data compilation format on electronic media.

## FORT THOMAS WTP ADVANCED TREATMENT

### B. Instructional Manual Format:

1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
2. Size: 8-1/2 inches by 11 inches, minimum.
3. Cover: Identify manual with typed or printed title "OPERATION AND MAINTENANCE DATA" and list:
  - a. Project title.
  - b. Designate applicable system, equipment, material, or finish.
  - c. Identity of separate structure as applicable.
  - d. Identify volume number if more than one volume.
  - e. Identity of general subject matter covered in manual. Identity of equipment number and Specification section.
4. Spine:
  - a. Project title.
  - b. Identify volume number if more than one volume.
5. Title Page:
  - a. Contractor name, address, and telephone number.
  - b. Subcontractor, Supplier, installer, or maintenance contractor's name, address, and telephone number, as appropriate.
    - 1) Identify area of responsibility of each.
    - 2) Provide name and telephone number of local source of supply for parts and replacement.
6. Table of Contents:
  - a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
  - b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
7. Paper: 20-pound minimum, white for typed pages.
8. Text: Manufacturer's printed data, or neatly typewritten.
9. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
10. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.
11. Provide three (3) copies of final Engineer approved manuals.
12. Compile all Engineer-accepted preliminary O&M data into a hard-copy, hard-bound set.
13. Each set shall consist of the following:
  - a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
  - b. Cover: Identify each volume with typed or printed title "OPERATION AND MAINTENANCE DATA, VOLUME NO. \_\_\_ OF \_\_\_", and list:
    - 1) Project title.

## FORT THOMAS WTP ADVANCED TREATMENT

- 2) Contractor's name, address, and telephone number.
- 3) If entire volume covers equipment or system provided by one Supplier include the following:
  - a) Identity of general subject matter covered in manual.
  - b) Identity of equipment number and Specification section.
- c. Provide each volume with title page and typed table of contents with consecutive page numbers. Place contents of entire set, identified by volume number, in each binder.
- d. Table of contents neatly typewritten, arranged in a systematic order:
  - 1) Include list of each product, indexed to content of each volume.
  - 2) Designate system or equipment for which it is intended.
  - 3) Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
- e. Section Dividers:
  - 1) Heavy, 80 pound cover weight, tabbed with numbered plastic index tabs.
  - 2) Fly-Leaf:
    - a) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.
    - b) List with Each Product:
      - (1) Name, address, and telephone number of Subcontractor, Supplier, installer, and maintenance contractor, as appropriate.
      - (2) Identify area of responsibility of each.
      - (3) Provide local source of supply for parts and replacement.
    - c) Identity of separate structure as applicable.
- f. Assemble and bind material, as much as possible, in same order as specified in the Contract Documents.

### C. Electronic Media Format:

1. Portable Document Format (PDF):
  - a. After all preliminary data has been found to be acceptable to Engineer, submit Operation and Maintenance data in PDF format on CD.
  - b. Files to be exact duplicates of Engineer-accepted preliminary data. Arrange by specification number and name.
  - c. Files to be fully functional and viewable in most recent version of Adobe Acrobat.
2. Manufacturers' standard electronic format.

## FORT THOMAS WTP ADVANCED TREATMENT

### 1.05 SUBMITTALS

#### A. Informational:

1. Data Outline: Submit two copies of a detailed outline of proposed organization and contents of Final Data prior to preparation of Preliminary Data.
2. Preliminary Data:
  - a. Submit three copies to CCA for Engineer's review.
  - b. If data meets conditions of the Contract:
    - 1) One copy will be returned to Contractor.
    - 2) One copy will be forwarded to Resident Project Representative.
    - 3) One copy will be retained in Engineer's file.
    - 4) One copy will be retained in CCA's file.
  - c. If data does not meet conditions of the Contract:
    - 1) All copies will be returned to Contractor with CCA's comments (on separate document) for revision.
    - 2) CCA's comments will be retained in Engineer's file.
    - 3) Resubmit two copies revised in accordance with Engineer's comments.
3. Final Data: Submit three copies in format specified herein.

### 1.06 DATA FOR EQUIPMENT AND SYSTEMS

#### A. Content For Each Unit (or Common Units) and System:

1. Product Data:
  - a. Include only those sheets that are pertinent to specific product.
  - b. Clearly annotate each sheet to:
    - 1) Identify specific product or part installed.
    - 2) Identify data applicable to installation.
    - 3) Delete references to inapplicable information.
  - c. Function, normal operating characteristics, and limiting conditions.
  - d. Performance curves, engineering data, nameplate data, and tests.
  - e. Complete nomenclature and commercial number of replaceable parts.
  - f. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
  - g. Spare parts ordering instructions.
  - h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).

## FORT THOMAS WTP ADVANCED TREATMENT

2. As-installed, color-coded piping diagrams.
3. Charts of valve tag numbers, with the location and function of each valve.
4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
  - a. Format:
    - 1) Provide reinforced, punched, binder tab; bind in with text.
    - 2) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.
    - 3) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.
    - 4) Identify Specification section and product on Drawings and envelopes.
  - b. Relations of component parts of equipment and systems.
  - c. Control and flow diagrams.
  - d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.
5. Instructions and Procedures: Within text, as required to supplement product data.
  - a. Format:
    - 1) Organize in consistent format under separate heading for each different procedure.
    - 2) Provide logical sequence of instructions for each procedure.
    - 3) Provide information sheet for Owner's personnel, including:
      - a) Proper procedures in event of failure.
      - b) Instances that might affect validity of guarantee or Bond.
  - b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
  - c. Operating Procedures:
    - 1) Startup, break-in, routine, and normal operating instructions.
    - 2) Test procedures and results of factory tests where required.
    - 3) Regulation, control, stopping, and emergency instructions.
    - 4) Description of operation sequence by control manufacturer.
    - 5) Shutdown instructions for both short and extended duration.
    - 6) Summer and winter operating instructions, as applicable.
    - 7) Safety precautions.
    - 8) Special operating instructions.
  - d. Maintenance and Overhaul Procedures:
    - 1) Routine maintenance.
    - 2) Guide to troubleshooting.
    - 3) Disassembly, removal, repair, reinstallation, and re-assembly.
6. Guarantee, Bond, and Service Agreement: In accordance with Section 01 77 00, Closeout Procedures.

# FORT THOMAS WTP ADVANCED TREATMENT

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

1. Description of Unit and Component Parts:
  - a. Function, normal operating characteristics, and limiting conditions.
  - b. Performance curves, engineering data, nameplate data, and tests.
  - c. Complete nomenclature and commercial number of replaceable parts.
  - d. Interconnection wiring diagrams, including control and lighting systems.
2. Circuit Directories of Panelboards:
3. Electrical service.
4. Control requirements and interfaces.
5. Communication requirements and interfaces.
6. List of electrical relay settings, and control and alarm contact settings.
7. Electrical interconnection wiring diagram, including as applicable, single-line, three-line, schematic and internal wiring, and external interconnection wiring.
8. As-installed control diagrams by control manufacturer.
9. Operating Procedures:
  - a. Routine and normal operating instructions.
  - b. Startup and shutdown sequences, normal and emergency.
  - c. Safety precautions.
  - d. Special operating instructions.
10. Maintenance Procedures:
  - a. Routine maintenance.
  - b. Guide to troubleshooting.
  - c. Adjustment and checking.
  - d. List of relay settings, control and alarm contact settings.
11. Manufacturer's printed operating and maintenance instructions.
12. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

## C. Maintenance Summary:

1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.
2. Format:
  - a. Use Maintenance Summary Form bound with this section or electronic facsimile of such.
  - b. Each Maintenance Summary may take as many pages as required.
  - c. Use only 8-1/2-inch by 11-inch size paper.
  - d. Complete using typewriter or electronic printing.

## FORT THOMAS WTP ADVANCED TREATMENT

3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
  - a. Data to be consistent with manufacturer's Bill of Materials/Parts List furnished in O&M manuals.
  - b. "Unit" is the unit of measure for ordering the part.
  - c. "Quantity" is the number of units recommended.
  - d. "Unit Cost" is the current purchase price.

### 1.07 DATA FOR MATERIALS AND FINISHES

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

1. Manufacturer's data, giving full information on products:
  - a. Catalog number, size, and composition.
  - b. Color and texture designations.
  - c. Information required for reordering special-manufactured products.
2. Instructions for Care and Maintenance:
  - a. Manufacturer's recommendation for types of cleaning agents and methods.
  - b. Cautions against cleaning agents and methods that are detrimental to product.
  - c. Recommended schedule for cleaning and maintenance.

#### B. Content for Moisture Protection and Weather Exposed Products:

1. Manufacturer's data, giving full information on products:
  - a. Applicable standards.
  - b. Chemical composition.
  - c. Details of installation.
2. Instructions for inspection, maintenance, and repair.

### 1.08 SUPPLEMENTS

- #### A. The supplements listed below, following "End of Section", are part of this Specification.
1. Forms: Maintenance Summary Form.

### **PART 2 PRODUCTS (NOT USED)**

### **PART 3 EXECUTION (NOT USED)**

### **END OF SECTION**

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FORT THOMAS WTP ADVANCED TREATMENT

MAINTENANCE SUMMARY FORM

PROJECT: \_\_\_\_\_ CONTRACT NO.: \_\_\_\_\_

1. EQUIPMENT ITEM \_\_\_\_\_

2. MANUFACTURER \_\_\_\_\_

3. EQUIPMENT/TAG NUMBER(S) \_\_\_\_\_

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) \_\_\_\_\_

5. NAMEPLATE DATA (hp, voltage, speed, etc.) \_\_\_\_\_

6. MANUFACTURER'S LOCAL REPRESENTATIVE \_\_\_\_\_

a. Name \_\_\_\_\_ Telephone No. \_\_\_\_\_

b. Address \_\_\_\_\_

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

FORT THOMAS WTP ADVANCED TREATMENT

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER'S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost

Note: Identify parts provided by this Contract with two asterisks.

**SECTION 01 91 14**  
**EQUIPMENT TESTING AND FACILITY STARTUP**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Facility: Entire Project, or an agreed-upon portion, including all of its unit processes.
- B. Functional Test: Test or tests in presence of CCA and Owner to demonstrate that installed equipment meets manufacturer's installation, calibration, and adjustment requirements and other requirements as specified.
- C. Performance Test: Test or tests performed after any required functional test in presence of CCA and Owner to demonstrate and confirm individual equipment meets performance requirements specified in individual sections.
- D. Unit Process: As used in this section, a unit process is a portion of the facility that performs a specific process function, such as Granular Activated Carbon adsorption UV disinfection and pumping systems.
- E. Facility Performance Demonstration:
  - 1. A demonstration, conducted by Contractor, with assistance of Owner, to demonstrate and document the performance of the entire operating facility, both manually and automatically (if required), based on criteria developed in conjunction with Owner and as accepted by CCA.
  - 2. Such demonstration is for the purposes of (i) verifying to Owner entire facility performs as a whole, and (ii) documenting performance characteristics of completed facility for Owner's records. Neither the demonstration nor the evaluation is intended in any way to make performance of a unit process or entire facility the responsibility of Contractor, unless such performance is otherwise specified.

1.02 SUBMITTALS

- A. Informational Submittals:
  - 1. Facility Startup and Performance Demonstration Plan.
  - 2. Functional and performance test results.
  - 3. Completed Unit Process Startup Form for each unit process.
  - 4. Completed Facility Performance Demonstration/Certification Form.

# FORT THOMAS WTP ADVANCED TREATMENT

## 1.03 FACILITY STARTUP AND PERFORMANCE DEMONSTRATION PLAN

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

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION

### 3.01 GENERAL

- A. Facility Startup Meetings: Schedule, in accordance with requirements of Section 01 31 19, Project Meetings, to discuss test schedule, test methods, materials, chemicals and liquids required, facilities operations interface, and Owner involvement.
- B. Contractor's Testing and Startup Representative:
  - 1. Designate and furnish one or more personnel to coordinate and expedite testing and facility startup.
  - 2. Representative(s) shall be present during startup meetings and shall be available at all times during testing and startup.

## FORT THOMAS WTP ADVANCED TREATMENT

- C. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required for testing and startup.
- D. Provide Subcontractor and equipment manufacturers' staff adequate to prevent delays. Schedule ongoing work so as not to interfere with or delay testing and startup.
- E. Owner will:
  - 1. Provide water, power, chemicals, and other items as required for startup, unless otherwise indicated.
  - 2. Operate process units and facility with support of Contractor.
  - 3. Provide labor and materials as required for laboratory analyses.

### 3.02 EQUIPMENT TESTING

- A. Preparation:
  - 1. Complete installation before testing.
  - 2. Furnish qualified manufacturers' representatives, when required by individual Specification sections.
  - 3. Obtain and submit from equipment manufacturer's representative Manufacturer's Certificate of Proper Installation Form, in accordance with Section 01 43 33, Manufacturers' Field Services, when required by individual Specification sections.
  - 4. Equipment Test Report Form: Provide written test report for each item of equipment to be tested, to include the minimum information:
    - a. Owner/Project Name.
    - b. Equipment or item tested.
    - c. Date and time of test.
    - d. Type of test performed (Functional or Performance).
    - e. Test method.
    - f. Test conditions.
    - g. Test results.
    - h. Signature spaces for Contractor and CCA as witness.
  - 5. Cleaning and Checking: Prior to beginning functional testing:
    - a. Calibrate testing equipment in accordance with manufacturer's instructions.
    - b. Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
    - c. Lubricate equipment in accordance with manufacturer's instructions.
    - d. Turn rotating equipment by hand when possible to confirm that equipment is not bound.

## FORT THOMAS WTP ADVANCED TREATMENT

- e. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
  - f. Check power supply to electric-powered equipment for correct voltage.
  - g. Adjust clearances and torque.
  - h. Test piping for leaks.
6. Ready-to-test determination will be by CCA based at least on the following:
- a. Acceptable Operation and Maintenance Data.
  - b. Notification by Contractor of equipment readiness for testing.
  - c. Receipt of Manufacturer's Certificate of Proper Installation, if so specified.
  - d. Adequate completion of work adjacent to, or interfacing with, equipment to be tested.
  - e. Availability and acceptability of manufacturer's representative, when specified, to assist in testing of respective equipment.
  - f. Satisfactory fulfillment of other specified manufacturer's responsibilities.
  - g. Equipment and electrical tagging complete.
  - h. Delivery of all spare parts and special tools.

### B. Functional Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Owner and Engineer in writing at least 10 days prior to scheduled date of testing.
3. Prepare Equipment Test Report summarizing test method and results.
4. When, in Engineer's opinion, equipment meets functional requirements specified, such equipment will be accepted for purposes of advancing to performance testing phase, if so required by individual Specification sections. Such acceptance will be evidenced by Engineer/Owner's signature as witness on Equipment Test Report.

### C. Performance Testing:

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

## FORT THOMAS WTP ADVANCED TREATMENT

7. When, in Engineer's opinion, equipment meets performance requirements specified, such equipment will be accepted as to conforming to Contract requirements. Such acceptance will be evidenced by Engineer's signature on Equipment Test Report.

### 3.03 STARTUP OF UNIT PROCESSES

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

### 3.04 FACILITY PERFORMANCE DEMONSTRATION

- A. When, in the opinion of Engineer, startup of all unit processes has been achieved, sequence each unit process to the point that facility is operational.

## FORT THOMAS WTP ADVANCED TREATMENT

- B. Demonstrate proper operation of required interfaces within and between individual unit processes.
- C. After facility is operating, complete performance testing of equipment and systems not previously tested.
- D. Document, as defined in Facility Startup and Performance Demonstration Plan, the performance of the facility including its computer system, until all unit processes are operable and under control of computer system.
- E. Certify, on the Facility Performance Demonstration/Certification Form, that facility is capable of performing its intended function(s), including fully automatic and computerized operation.

### 3.05 SUPPLEMENTS

- A. Supplements listed below, following "End of Section," are a part of this Specification:
  - 1. Unit Process Startup Form.
  - 2. Facility Performance Demonstration/Certification Form.

**END OF SECTION**



**UNIT PROCESS STARTUP FORM**

**OWNER:** \_\_\_\_\_ **PROJECT:** \_\_\_\_\_

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

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

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**Startup Requirements (Water, power, chemicals, etc.):** \_\_\_\_\_

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**Evaluation Comments:** \_\_\_\_\_

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**FACILITY PERFORMANCE DEMONSTRATION/CERTIFICATION FORM**

OWNER: \_\_\_\_\_ PROJECT: \_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

Contractor: \_\_\_\_\_ Date: \_\_\_\_\_, 20\_\_

Engineer: \_\_\_\_\_ Date: \_\_\_\_\_, 20\_\_

(Authorized Signature)

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**SECTION 02 41 00  
DEMOLITION**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this Section:
1. Air-Conditioning, Heating, and Refrigeration Institute (AHRI): Guideline K, Containers for Recovered Non-flammable Fluorocarbon Refrigerants.
  2. American National Standards Institute (ANSI): A10.6, Safety Requirements for Demolition Operations.
  3. Occupational Safety and Health Administration (OSHA), U.S. Code of Federal Regulations (CFR) Title 29 Part 1926—Occupational Safety and Health Regulations for Construction.
  4. Environmental Protection Agency (EPA), U.S. Code of Federal Regulations (CFR), Title 40:
    - a. Part 61—National Emission Standards for Hazardous Air Pollutants.
    - b. Part 82—Protection of Stratospheric Ozone.
    - c. Part 273—Standards for Universal Waste Management.

**1.02 DEFINITIONS**

- A. ACM: Asbestos-containing material.
- B. Demolition: Dismantling, razing, destroying, or wrecking of any fixed building or structure or any part thereof.
- C. Modify: Provide all necessary material and labor to modify an existing item to the condition indicated or specified.
- D. Relocate: Remove, protect, clean and reinstall equipment, including electrical, instrumentation, and all ancillary components required to make the equipment fully functional, to the new location identified on the Drawings.
- E. Renovation: Altering a facility or one or more facility components in any way.
- F. Salvage/Salvageable: Remove and deliver, to the specified location(s), the equipment, building materials, or other items so identified to be saved from destruction, damage, or waste; such property to remain that of Owner. Unless otherwise specified, title to items identified for demolition shall revert to Contractor.

## FORT THOMAS WTP ADVANCED TREATMENT

- G. Universal Waste Lamp: In accordance with 40 CFR 273, the bulb or tube portion of an electric lighting device, examples of which include, but are not limited to, fluorescent, high-intensity discharge, neon, mercury vapor, high-pressure sodium, and metal halide lamps.
- H. Universal Waste Thermostat: A temperature control device that contains metallic mercury in an ampule attached to a bimetal sensing element, and mercury-containing ampules that have been removed from these temperature control devices in compliance with the requirements of 40 CFR 273.

### 1.03 SUBMITTALS

- A. Informational Submittals:
  - 1. Submit proposed Demolition Plan, in accordance with requirements specified herein, for approval before such Work is started.
  - 2. Submit copies of any notifications, authorizations and permits required to perform the Work.

### 1.04 REGULATORY AND SAFETY REQUIREMENTS

- A. When applicable, demolition Work shall be accomplished in strict accordance with 29 CFR 1926-Subpart T.
- B. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the General Conditions, Contractor's safety requirements shall conform to ANSI A10.6.
- C. Furnish timely notification of this demolition work to applicable federal, state, regional, and local authorities in accordance with 40 CFR 61-Subpart M.

### 1.05 DEMOLITION PLAN

- A. Demolition Plan shall provide for safe conduct of the Work and shall include:
  - 1. Detailed description of methods and equipment to be used for each operation;
  - 2. The Contractor's planned sequence of operations, including coordination with other work in progress;
  - 3. Procedures for removal and disposition of materials specified to be salvaged.
  - 4. Disconnection schedule of utility services.
  - 5. Procedures for keeping existing treatment plant in operation .

## FORT THOMAS WTP ADVANCED TREATMENT

- B. Include statements affirming Contractor inspection of the existing roof deck, floors, walls, and framing members, and their suitability to perform as a safe working platform or, if inspection reveals a safety hazard to workers, state provisions for securing the safety of the workers throughout the performance of the Work.

### 1.06 SEQUENCING AND SCHEDULING

- A. The Work of this Specification shall not commence until Contractor's Demolition Plan has been approved by Engineer.
- B. Include the Work of this Specification in the progress schedule, as specified in Section 01 32 00, Construction Progress Documentation.
- C. Areas in which the demolition Work is to be accomplished will be available at the beginning of the work except where precedence constraints are given in Section 01 31 13 Project Coordination and where constraints are noted on the drawings.

### 1.07 USE OF EXPLOSIVES

- A. Prohibited for demolition on this project.

### 1.08 ENVIRONMENTAL PROTECTION

- A. Provide air and water pollution control measures during all demolition work.

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION**

### 3.01 EXISTING FACILITIES TO BE DEMOLISHED

- A. Facilities:
  - 1. Portions of buildings, facilities, equipment and other areas scheduled for selective demolition or partial demolition Work are as shown.
- B. Structures:
  - 1. Existing above-grade structures indicated shall be removed as shown.
  - 2. Interior walls, other than retaining walls and partitions, shall be removed as shown.
  - 3. Partition walls shall be removed as shown.
  - 4. Core drill concrete slabs and other concrete improvements scheduled to remain in place below ground, or break holes at the structure's lowest point to allow water to freely migrate through.

## FORT THOMAS WTP ADVANCED TREATMENT

5. Sidewalks, curbs, gutters and street light bases shall be removed as indicated.
6. Where only part of an existing concrete structure is to be removed use neat saw cuts to separate demolished part from remaining part.
7. Black ornamental fence removed by the Contractor shall be given to the Owner.

### C. Utilities and Related Equipment:

1. Notify Owner or appropriate utilities to turn off affected services at least 48 hours before starting demolition activities.
2. Remove existing utilities as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by Engineer.
3. When utility lines are encountered that are not indicated on the Drawings, notify Engineer prior to further work in that area.
4. Remove meters and related equipment and deliver to a location as determined by the Owner.
5. Excavate and remove utility lines serving buildings to be demolished to a distance of 5 feet beyond the outside perimeter of the demolition.
6. Provide a permanent leak-proof closure for water and gas lines.
7. Plug sewer lines with concrete to a minimum plug length of 2 feet to prevent groundwater infiltration.

### D. Paving and Slabs:

1. Remove concrete and asphaltic concrete paving and slabs as indicated to a depth of 8 inches below existing adjacent grade.
2. Provide neat sawcuts at limits of pavement removal as indicated.

### E. Masonry: Sawcut and remove masonry so as to prevent damage to surfaces to remain and to facilitate the installation of new Work. Where new masonry adjoins existing, the new Work shall abut or tie into the existing construction as indicated

### F. Concrete: Saw concrete along straight lines to a depth of not less than 2 inches. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished Work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete. Where new concrete adjoins existing, the new Work shall abut or tie into the existing construction as indicated Patching:



## FORT THOMAS WTP ADVANCED TREATMENT

1. Where removals leave holes and damaged surfaces exposed in the finished Work, patch and repair to match adjacent finished surfaces as to texture and finish.
  2. Where new Work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new Work.
  3. Patching shall be as specified and indicated, and shall include:
    - a. Fill holes and depressions caused by previous physical damage or left as a result of removals in existing masonry or concrete walls with an approved patching material, applied in accordance with the manufacturer's printed instructions.
    - b. Holes in concrete structures caused by removals or to be plugged shall be filled with an appropriate concrete or grout patch material and shall include appropriately sized steel dowel rods installed in the opening to anchor the patch or plug.
- G. Door Locksets: Remove all locksets from all doors indicated to be removed and disposed of. Turn locksets over to Owner immediately after their removal.
- H. Electrical:
1. Cut off concealed or embedded conduit, boxes, or other materials a minimum of 3/4 inch below final finished surface.
  2. When removing designated equipment, conduit and wiring may require rework to maintain service to other equipment.
  3. Rework existing circuits, or provide temporary circuits as necessary during renovation to maintain service to existing lighting and equipment not scheduled to be renovated. Existing equipment and circuiting shown are based upon limited field surveys. Verify existing conditions, make all necessary adjustments, and record the Work on the Record Drawings. This shall include, but is not limited to, swapping and other adjustments to branch circuits and relocation of branch circuit breakers within panelboards as required to accomplish the finished work.
  4. Reuse of existing luminaires, devices, conduits, boxes, or equipment will be permitted only where specifically indicated.
  5. Raceways and cabling not scheduled for reuse.
  6. Inaccessibly Concealed: Cut off and abandon in place.
  7. Exposed or Concealed Above Accessible Ceilings: Remove.
  8. Raceways and Cabling Scheduled for Future Use: Cap/seal and tag.
  9. Relocating Equipment: Extend existing wiring or run new wiring from the source.
  10. Where the existing raceway is concealed, the outlet box shall be cleaned, and a blank cover plate installed.
  11. Where the concealed raceway is uncovered remove raceway (or extended to new location if appropriate).

## FORT THOMAS WTP ADVANCED TREATMENT

12. Provide new typewritten panelboard circuit directory cards.
13. Site electrical demolition:
  - a. Remove existing generator complete and deliver to a location specified by Owner.
  - b. Remove generator concrete pad to a depth of 8 inches below grade; backfill to existing ground level.
  - c. Existing underground pull boxes and manholes designated for demolition shall be removed complete. Backfill openings to existing ground level.
  - d. Notify Owner 48 hours prior to any demolition of any existing underground wire and conduit.
  - e. Where underground wire and conduit feeders are encountered that are not indicated on the Drawings, notify Engineer prior to further work in that area.
  - f. Excavate and remove underground wire and conduit to be demolished to a distance of 5 feet beyond buildings, pull boxes or manholes. The remaining wire and conduit to be abandoned in place.
- I. Interior piping, equipment and related accessories.
  1. Cut and suitably cap remaining existing piping where designated demolition of existing piping ends.
  2. Remove accessories associated with equipment to be demolished unless shown otherwise on the drawings.
- J. Universal Waste Lamps and Thermostats: Manage, contain, package, and label in strict accordance with 40 CFR 273.

### 3.02 PROTECTION

- A. Building Occupancy: Refer to Section 01 31 13, Project Coordination, for specific requirements related to concurrent occupancy of facilities to be partially demolished.
- B. Dust and Debris Control:
  1. Prevent the spread of dust and debris to occupied portions of the building and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.
  2. Vacuum and dust the Work area daily.
  3. Sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to vehicular traffic.

## FORT THOMAS WTP ADVANCED TREATMENT

- C. Traffic Control Signs: Where pedestrian and driver safety is endangered in the area of removal Work, use traffic barricades with flashing lights.
- D. Existing Work:
  - 1. Survey the site and examine the Drawings and Specifications to determine the extent of the Work before beginning any demolition or renovation.
  - 2. Take necessary precautions to avoid damage to existing items scheduled to remain in place, to be reused, or to remain the property of Owner; any Contractor-damaged items shall be repaired or replaced as directed by Engineer.
  - 3. Provide temporary weather protection during interval between removal of existing exterior surfaces and installation of new to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
  - 4. Ensure that structural elements are not overloaded as a result of or during performance of the Work. Responsibility for additional structural elements or increasing the strength of existing structural elements as may be required as a result of any Work performed under this Contract shall be that of the Contractor. Repairs, reinforcement, or structural replacement must have Engineer approval.
  - 5. Do not overload pavements to remain.
- E. Weather Protection: For portions of the building scheduled to remain, protect building interior and materials and equipment from weather at all times. Where removal of existing roofing is necessary to accomplish the Work, have materials and workmen ready to provide adequate and temporary covering of exposed areas so as to ensure effectiveness and to prevent loss.
- F. Trees: Protect trees within the Site that might be damaged during demolition and are indicated to be left in place, by a 6-foot-high fence. The fence shall be securely erected a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Any tree designated to remain that is damaged during the Work shall be replaced in kind, as approved by the Engineer.
- G. Facilities:
  - 1. Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities.

## FORT THOMAS WTP ADVANCED TREATMENT

2. Floors, roofs, walls, columns, pilasters, and other structural elements that are designed and constructed to stand without lateral support or shoring, and are determined by Contractor to be in stable condition, shall remain standing without additional bracing, shoring, or lateral support until demolished, unless directed otherwise by the Engineer.
3. Protect all facility elements not scheduled for demolition.
4. Provide interior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities.

### H. Protection of Personnel:

1. During demolition, continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site.
2. Provide temporary barricades and other forms of protection to protect Owner's personnel and the general public from injury due to demolition Work.
3. Provide protective measures as required to provide free and safe passage of Owner's personnel and the general public to occupied portions of the structure.

### 3.03 BURNING

- A. The use of burning at the Site for the disposal of refuse and debris will not be permitted.

### 3.04 RELOCATIONS

- A. Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Clean all items to be relocated prior to reinstallation, to the satisfaction of Engineer. Repair items to be relocated which are damaged or replace damaged items with new undamaged items as approved by Engineer.

### 3.05 BACKFILL

- A. Do not use demolition debris as backfill material unless specifically noted on the Drawings to be used at a particular location.
- B. Fill excavations, open basements and other hazardous openings to existing ground level or foundation level of new construction in accordance with Section 31 23 23, Fill and Backfill.

## FORT THOMAS WTP ADVANCED TREATMENT

### 3.06 TITLE TO MATERIALS

- A. All salvaged equipment and materials will remain the property of Owner.
- B. Title to equipment and materials resulting from demolition is vested in the Contractor upon approval by Engineer of Contractor's Demolition Plan, and the resulting authorization by Engineer to begin demolition.

### 3.07 DISPOSITION OF MATERIAL

- A. Do not remove equipment and materials without approval of Contractor's Demolition/ Plan by Engineer.
- B. Salvage equipment and material to the maximum extent possible.
- C. Remove salvaged items designated as the property of Owner in a manner to prevent damage, and pack or crate to protect the items from damage while in storage or during shipment. Properly identify containers as to contents.
- D. Repair or replace, at the discretion of Engineer, items damaged during removal or storage.
- E. Deliver salvaged items that are designated as the property of Owner to a storage site as directed on the Site.
- F. Owner will not be responsible for the condition or loss of, or damage to, property scheduled to become Contractor's property after Engineer's authorization to begin demolition. Materials and equipment shall not be viewed by prospective purchasers or sold on the site.
- G. Owner will not be responsible for the condition or loss of, or damage to, such property after Engineer's authorization to begin demolition.
- H. Store salvaged items as approved by Engineer and remove them from Owner's property before completion of the Contract. Materials and equipment shall not be either viewed by prospective purchasers or sold on the Site.

### 3.08 REUSE OF MATERIALS AND EQUIPMENT

- A. Remove and store materials and equipment listed in Article Title To Materials to be reused or relocated to prevent damage, and reinstall as the Work progresses.
- B. Properly store and maintain equipment and materials in same condition as when removed.

## FORT THOMAS WTP ADVANCED TREATMENT

- C. Store equipment and material designated to be reused in a location designated by Owner.
- D. Equipment and material designated to be reused shall be cleaned, serviced and checked for proper operability before being put back into service.
- E. Engineer will determine condition of equipment and materials prior to removal.

### 3.09 SPECIALIZED SALVAGE

- A. Ozone Depleting Substances (ODS):
  - 1. Class I and Class II ODS are defined in Section 602(a) and (b), of The Clean Air Act. Prevent discharge of Class I and Class II ODS to the atmosphere. Place recovered ODS in cylinders meeting AHRI Guideline K suitable for the type ODS (filled to no more than 80 percent capacity) and provide appropriate labeling.
  - 2. Dispose of all Class I and Class II ODS refrigerants in accordance with the Clean Air Act Amendment of 1990.
  - 3. Products, equipment and appliances containing ODS in a sealed, self-contained system (e.g., residential refrigerators and window air conditioners) shall be disposed of in accordance with 40 CFR 82.
- B. Fire Suppression Containers: Fire suppression system cylinders and canisters with electrical charges or initiators shall be deactivated prior to shipment. Also, safety caps shall be used to cover exposed actuation mechanisms and discharge ports on these special cylinders.

### 3.10 UNSALVAGEABLE MATERIAL

- A. Concrete, masonry, and other noncombustible material, except concrete permitted to remain in place, shall be disposed of off site, unless the drawings specifically note the use of such materials for fill at a particular location.
- B. Combustible material shall be disposed of off the Site.
- C. Universal Waste Lamps and Thermostats: Dispose of in strict accordance with 40 CFR 273.

### 3.11 CLEANUP

- A. Debris and rubbish shall be removed from basement and similar excavations.

FORT THOMAS WTP ADVANCED TREATMENT

- B. Debris and rubbish shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

**END OF SECTION**

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**SECTION 03 01 32**  
**REPAIR OF VERTICAL AND OVERHEAD CONCRETE SURFACES**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Concrete Institute (ACI):
    - a. 503R, Use of Epoxy Compounds with Concrete.
    - b. 506R, Guide to Shotcrete.
  2. ASTM International (ASTM):
    - a. A82/A82M, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
    - b. A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
    - c. C78, Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading).
    - d. C109/C109M, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50mm] Cube Specimen).
    - e. C157/C157M, Standard Test Method for Length Change of Hardened Hydraulic-Cement, Mortar, and Concrete.
    - f. C348, Standard Test Method for Flexural Strength of Hydraulic Cement Mortars.
    - g. C496/C496M, Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.
    - h. C596, Standard Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement.
    - i. C666/C666M, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
    - j. C882, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
    - k. C1202, Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration.
  3. International Concrete Repair Institute (ICRI): 03730, Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.

1.02 DEFINITIONS

- A. Low-Pressure Spray Mortar: Mortar applied by low-pressure spraying, or in small areas by hand troweling.

## FORT THOMAS WTP ADVANCED TREATMENT

- B. Nonstructural Defects:
  - 1. Areas with defects that meet the following:
    - a. Deemed by Engineer to be superficial.
    - b. Less than 1 inch in depth.
    - c. Not subjected to structural loads or heavy wear.
- C. Rebound: Shotcrete material, mostly aggregates, that bounce off a surface against which it is projected.
- D. Shotcrete: Mortar pumped through a hose and projected at high velocity.
- E. Structural Defects: Condition or characteristic that detracts from appearance, strength, or durability of concrete.
  - 1. Structural defects may be in the following areas:
    - a. Areas subject to structural loading.
    - b. Areas subject to heavy wear.
    - c. Interior of hydraulic structure.
    - d. Belowgrade structure.
    - e. Display defects or parts of defect that extend 1 inch or deeper into concrete and deemed by Engineer as structural defect.

### 1.03 SUBMITTALS

- A. Action Submittals:
  - 1. Product data sheets for each material supplied.
  - 2. Samples: Mesh reinforcement and mesh anchor.
- B. Informational Submittals:
  - 1. Mortar System:
    - a. Manufacturer's installation bulletin.
    - b. Manufacturer's recommended fabric size for mesh reinforcement.
  - 2. Mesh manufacturer's installation instructions and allowable load criteria.
  - 3. Written description of equipment proposed for hydrodemolition for surface preparation.
  - 4. Certificates:
    - a. Certificate of Compliance that proposed product system meets or exceeds specified performance criteria when tested in accordance with Article Field Quality Control.
    - b. Mortar system Manufacturer's Certificate of Proper Installation.
    - c. Shotcrete Nozzleman: Current ACI Certification.

## FORT THOMAS WTP ADVANCED TREATMENT

5. Statements of Qualification:
  - a. Shotcrete nozzleman.
  - b. Mortar system manufacturer's representative.
6. Mortar system manufacturer's proposed modified test procedures for ASTM C109/C109M and ASTM C882 test methods.

### 1.04 QUALITY ASSURANCE

#### A. Qualifications:

1. Mortar System Applicator:
  - a. Experienced applicator endorsed by mortar system manufacturer.
  - b. For low-pressure spray mortar system in lieu of endorsement, complete mortar system manufacturer's demonstration in accordance with Article Manufacturer's Services.
2. Mortar System Manufacturer's Representative: As specified in Section 01 43 33, Manufacturers' Field Services.
3. Shotcrete Nozzleman: ACI Certification in accordance with ACI 506R.

#### B. Mockups:

1. Mortar System Manufacturer's Demonstration:
  - a. Schedule time for manufacturer's demonstration of repair system proposed for Project. Prepare mortar to specified consistency, for testing and placement. Initiate curing on portions of each type of surface to be repaired to include overhead and vertical applications.
  - b. Prepare surface area in advance of demonstration and obtain manufacturer's acceptance of preparation for each type of application.
  - c. Demonstrate:
    - 1) Mixing and application equipment capabilities and procedures, including the flow of material from nozzle or sprayer.
    - 2) Nozzle operator and person in charge of low-pressure sprayer, capabilities and ability to follow prescribed application procedures and properly operate equipment and apply surface repair materials.
  - d. Make compression test samples during demonstration and deliver to an independent testing laboratory for testing at 1 day, 7 days, and 28 days. Take a core of the demonstration placement and test for tensile bond at 1 day.
2. For each type of mortar system application demonstration, prepare area of at least 10 feet by 10 feet by the average thickness required for Project.

# FORT THOMAS WTP ADVANCED TREATMENT

## 1.05 PREREPAIR CONFERENCE

- A. Required Meeting Attendees:
  - 1. Contractor.
  - 2. Repair Subcontractor.
  - 3. Technical representative for repair material manufacturer.
  - 4. Engineer.
- B. Schedule and conduct prior to incorporation of respective products into Project. Notify Engineer of location and time.
- C. Agenda shall include:
  - 1. Review of field conditions. Conduct field observations of Work to be performed.
  - 2. Based on above observations, repair material manufacturer's technical representative shall make material selection and repair method recommendations.
  - 3. Technical representative for repair material manufacturer shall review proposed surface preparation, material application, consolidation, finishing, curing, and protection of repair material from weather conditions.
  - 4. Other specified requirements requiring coordination.

## PART 2 PRODUCTS

### 2.01 SHOTCRETE MORTAR SYSTEM (STRUCTURAL)

- A. Mortar Materials:
  - 1. Blend of selected portland cements, microsilica, and specially graded aggregates and fibers applicable for vertical and overhead surfaces.
  - 2. Materials shall not contain asbestos, chlorides, nitrates, added gypsum, added lime, or high aluminum cements.
  - 3. Noncombustible before and after cure.
  - 4. Furnish in a factory proportioned unit.
  - 5. Workability from 1/4 inch in depth and greater.
- B. Mixed Mortar Properties:
  - 1. Working Time: 5 minutes to 10 minutes.
  - 2. Finishing Time: 10 minutes to 20 minutes.
  - 3. Color: Dark gray.

## FORT THOMAS WTP ADVANCED TREATMENT

### C. Cured Mortar Properties:

1. Compressive strength for 2-inch cubes and in accordance with ASTM C109/C109M, or 3-inch cubes in accordance with manufacturer's modification to ASTM C109/C109M:
  - a. 7 Days: 6,000 psi minimum.
  - b. 28 Days: 7,000 psi minimum.
2. Flexural Strength (Modulus of Rupture) ASTM C78 at 28 Days: 1,100 psi minimum.
3. Tensile Strength, ASTM C496/C496M at 28 Days: 400 psi minimum.
4. Chloride Ion Penetrability Based on Charge Passed, ASTM C1202: 800 coulombs maximum.
5. Mortar shall not produce a vapor barrier.

### D. Manufacturers and Products:

1. BASF Building Systems, Shakopee, MN; MBT P&R Shotpatch 21F.
2. Sika Corp., Lyndhurst, NJ; SIKACEM 103 with fibers added in accordance with manufacturer's recommendations.
3. Euclid Chemical Co., Cleveland, OH; Eucoshot with Tuf-Strand SF added per manufacturer's recommendations.

## 2.02 LOW-PRESSURE SPRAY MORTAR SYSTEM (STRUCTURAL)

### A. Mortar:

1. One component, cement based, fiber reinforced, shrinkage compensated, gray in color, with a minimum 30-minute working time.
2. Cured materials mixed to a flow of 70 percent at five drops shall conform to the following criteria:
  - a. Minimum Slant Shear Bond Strength: 3,000 psi in 28 days in accordance with ASTM C882 test method modified with no bonding agent.
  - b. Minimum Compressive Strength: 6,000 psi at 28 days in accordance with ASTM C109/C109M.
  - c. Minimum Tensile Bond Strength ACI 503R, Appendix A or ASTM C496/C496M: 300 psi in 28 days.
  - d. Minimum Flexural Strength: 1,100 psi in 28 days in accordance with ASTM C348.
  - e. Chloride Ion Penetrability Based on Charge Passed, ASTM C1202: 800 coulombs maximum.
  - f. Drying Shrinkage at 28 Days: 0.1 percent maximum in accordance with ASTM C157 Modified.
  - g. System shall not produce a vapor barrier.

## FORT THOMAS WTP ADVANCED TREATMENT

- B. Sprayable, extremely low permeability, sulfate resistant, easy to use and requiring only the addition of water.
- C. Free of chlorides and other chemicals causing corrosion.
- D. Manufacturers and Products:
  - 1. BASF Building Systems, Shakopee, MN; MBT P& R Emaco S88C1.
  - 2. Sika Corp., Lyndhurst, NJ; SikaRepair 224.

### 2.03 POLYMER-MODIFIED REPAIR MORTAR (NONSTRUCTURAL)

- A. Polymer-modified, cementitious based, chloride resistant, flowable, gray in color, working time of 20 minutes minimum, surface renovation mortar conforming to the following properties:
  - 1. Minimum Slant Shear Bond Strength: 2,000 psi in 28 days in accordance in with ASTM C882 test method modified with no bonding agent.
  - 2. Compressive Strength, ASTM C109/C109M at 28 Days: Minimum 7,000 psi.
  - 3. Flexural Strength, ASTM C348 at 28 Days: Minimum 1,200 psi.
  - 4. Chloride Ion Penetrability Based on Charge Passed, ASTM C1202: 800 coulombs maximum.
  - 5. Splitting Tensile Strength, ASTM C496/C496M at 28 days: 500 psi minimum.
  - 6. Drying Shrinkage, ASTM C596 at 28 Days: Maximum 0.12 percent.
  - 7. Freeze Thaw Resistance, ASTM C666/C666M, at 300 Cycles: 90 percent RDF.
- B. Manufacturers and Products:
  - 1. BASF Building Systems, Shakopee, MN; MBT P&R Emaco R300 C1 and MBT P&R Gel Patch.
  - 2. Sika Corp., Lyndhurst, NJ; SikaTop 123 Plus.

### 2.04 BONDING AGENT

- A. Epoxy resin concrete cement adhesive, specifically formulated for bonding plastic portland cement concrete or mortar to hardened portland cement concrete.
  - 1. Mixed Bonding Agent Properties:
    - a. Pot Life: 75 minutes to 105 minutes.
    - b. Contact Time: 24 hours.
    - c. Concrete Color: Gray.

## FORT THOMAS WTP ADVANCED TREATMENT

2. Cured Epoxy Resin Portland Cement Adhesive Properties:
  - a. Splitting Tensile Strength, ASTM C496/C496M at 28 Days: 500 psi minimum.
  - b. Flexural Strength, ASTM C348: 1,000 psi minimum.
  - c. Bond Strength, ASTM C882 at 14 Days:
    - 1) 0 Hour Open Time: 2,500 psi minimum.
    - 2) 24 Hours Open Time: 2,000 psi minimum.
  - d. Bonding agent shall not produce a vapor barrier.
  - e. Compatible with mortar system.

B. Manufacturers and Products:

1. BASF Building Systems, Shakopee, MN; MBT P&R Emaco P24.
2. Sika Corp., Lyndhurst, NJ; Sika Armatec 110.

### 2.05 WATER

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

### 2.06 ACCESSORIES

- A. Mesh Reinforcement: Welded wire fabric with spacing of wires, and wire size in accordance with ASTM A185/A185M, ASTM A82/A82M, and mortar system manufacturer's recommendations.

- B. Tie Wire: 16 gauge, galvanized.

C. Mesh Anchors:

1. Manufacturers and Products:

- a. Powers Fastening, Inc.; Tie Wire Version of Power-Stud.
- b. Hilti Fastener Systems; Kwik Bolt II HHDCA.
- c. UCAN Fastening Products; UCAN Tie Wire Wedge Anchor.

D. Finishing Aid:

1. Manufacturers and Products:

- a. BASF Building Systems, Shakopee, MN; MBT P&R Confilm.
- b. Euclid Chemical Co., Cleveland, OH; Eucobar.
- c. Sika Corp., Lyndhurst, NJ; Sikafilm.

## FORT THOMAS WTP ADVANCED TREATMENT

- E. Flexible Cementitious Reinforcing Bar Coating:
  - 1. Manufacturers and Products:
    - a. BASF Building Systems, Shakopee, MN; MBT P&R Emaco P24.
    - b. Sika Corp., Lyndhurst, NJ; Armatec 110.

### PART 3 EXECUTION

#### 3.01 GENERAL

- A. Concrete surface repair system may either be shotcrete mortar or low-pressure spray mortar for structural repairs, and hand or low-pressure spray applied polymer-modified mortar for nonstructural surface applications.

#### 3.02 PREPARATION

- A. Identify unsound and deteriorated concrete by sounding techniques and review proposed extent of repair with Engineer.
- B. Remove unsound, honeycombed, deteriorated or otherwise defective concrete from work areas by high-pressure water blasting machine capable of removing concrete surfaces to a minimum amplitude roughness of 3/16 inch or as shown on Drawings. Where final surface is required to be flush with existing surface remove existing concrete depth as required for application of minimum thickness of mortar.
- C. To avoid tapered shoulders square edges of patch areas by sawing or chipping.
- D. Collect and dispose of water from removal operations in manner and location acceptable to Owner.
- E. Do not use power-driven jackhammers and chipping hammers, unless water blasting is not practical or may cause other damage.
- F. Where reinforcing steel is corroded, remove concrete minimum of 1-inch clear around reinforcing bar for application and bonding of new mortar to entire surface of exposed reinforcing steel if the following surface conditions exist:
  - 1. 50 percent or more of reinforcing bar surface is exposed during removal of concrete.
  - 2. 25 percent or more of reinforcing steel surface is exposed during removal of concrete and extent of reinforcing bar corrosion is such that more than 25 percent of material is lost.



## FORT THOMAS WTP ADVANCED TREATMENT

3. Bond between existing concrete and reinforcement has deteriorated as determined by Engineer.

- G. Clean exposed reinforcing steel of rust and concrete per recommendations of repair material manufacturer and in accordance with recommendations ICRI 03730. Coat exposed reinforcing steel with flexible cementitious reinforcing bar coating.
- H. Remove slurry from prepared areas before new mortar is applied.
- I. Clean surface of laitance and contamination. Dampen area to be patched and an area at least 6 inches beyond for at least 24 hours to prevent absorption of water from patching mortar. Provide saturated surface dry (SSD) condition for existing concrete at time of application of mortar.

### 3.03 MESH REINFORCEMENT INSTALLATION

- A. Provide reinforcement when existing reinforcement is not exposed, and when mortar application is more than 3 inches deep, unless otherwise shown on Drawings.
- B. Install mesh anchors in accordance with mesh manufacturer's instructions.
- C. Fasten reinforcement to mesh anchors with tie wire.
- D. Lap reinforcement a minimum of one mesh spacing and secure with tie wire at intervals no less than 12 inches.

### 3.04 SHOTCRETE MORTAR APPLICATION

- A. Apply mortar in accordance with manufacturer's instructions.
- B. Do not reuse rebound materials.
- C. Apply mortar utilizing dry mix process.
- D. Mortar shall emerge from nozzle in a steady, uninterrupted flow. If flow becomes intermittent, direct flow away from Work until flow of mortar becomes constant.
- E. Minimum thickness of applied mortar 1-1/2 inches or 2 inches of cover over existing reinforcement which ever results in a thicker coat.
- F. Slice off excess material with a wire screed approximately 5 minutes to 10 minutes after initial set.

## FORT THOMAS WTP ADVANCED TREATMENT

- G. Apply finish to exposed mortar surfaces to match existing surfaces and in accordance with manufacturer's instructions. Steel trowel finish when finish coat is not applied. Apply full strength finishing aid.
- H. Rebound Removal: Continuously throughout mortar application, remove rebound, sand, and miscellaneous debris.
- I. Nozzle Position: Hold nozzle approximately at right angles to and at a distance from surface in accordance with mortar system manufacturer's instructions for type of application, nozzle, and air pressure used.
- J. Reinforcing Steel Encasement: Modify procedure of shooting mortar to better direct material around reinforcement bars. Prevent mortar from building up on reinforcement steel when shooting on, around, through, and behind steel to eliminate voids. Provide dense void-free encasement of reinforcement steel.
- K. Shotcreting More than One Layer: In accordance with mortar system manufacturer's instructions.

### 3.05 LOW-PRESSURE SPRAY MORTAR APPLICATION

- A. Mix mortar in mortar-concrete mixer attached to pump-spray equipment for spray application. Mix with a slow speed drill and jiffler type paddle or small mortar type mixer for hand trowel application.
- B. After priming substrate per manufacturer's recommendations, apply mortar by low pressure spraying equipment unless noted otherwise.
- C. Bonding Agent:
  - 1. Use bonding agent for hand applied areas.
  - 2. Application of repair mortar over the bonding agent shall be completed within time frame recommended by bonding agent manufacturer.
  - 3. Consult with manufacturer for optimum and minimum acceptable degrees of surface tackiness of coat.
- D. Work mortar firmly and quickly into repair area.
- E. Finish mortar with hand float application to smooth even surface matching adjacent concrete. Provide finishing aid at full strength.

3.06 POLYMER-MODIFIED REPAIR MORTAR APPLICATION  
(NONSTRUCTURAL)

- A. Mix mortar in mortar-concrete mixer attached to pump-spray equipment for spray application. Mix with a slow speed drill and jiffler type paddle or small mortar type mixer for hand trowel application.
- B. Hand Troweling: Apply bond coat of the repair mortar to the SSD prepared substrate before application of mortar. Do not apply more of the bond coat than can be covered with mortar before the bond coat dries. Do not retemper this bond coat.
- C. Place mortar by hand or low-pressure spray and trowel to specified surface finish.

3.07 CURING

- A. Prior to curing, apply water fog to mortar system in accordance with mortar system manufacturer's instructions.
- B. Commence water curing after mortar system application and when curing will not cause erosion of mortar.
- C. Continuously cure mortar system for a period of 7 days.
- D. Do not membrane cure, unless method is part of mortar system manufacturer's instructions and approval is obtained from Engineer.
- E. Cure intermediate layers of mortar in accordance with manufacturer's instructions.

3.08 FIELD QUALITY CONTROL

- A. Testing laboratory will be retained by Owner and will test the following per "modified" ASTM C109/C109M and ASTM C882.
  - 1. Production Samples of mixed materials during construction for compliance with the Specifications. A minimum of three Samples will be tested for each 1,000 square feet of mortar repair.
  - 2. Core Samples from the completed repair Work.
    - a. Two Samples will be tested for each 2,000 square feet of mortar repair.
    - b. Cores will be 2-1/2 inches or 3 inches in diameter to a depth equal to a minimum of 2.5 times repair mortar thickness.

## FORT THOMAS WTP ADVANCED TREATMENT

3. Bond strength of mortar to structural concrete. Failure or movement of Sample when subjected to a minimum of 300 psi in direct tension will be unacceptable.
- B. Repair and fill holes using same repair mortar where core Samples have been removed.
- C. Remove and replace unacceptable Work.

### 3.09 MANUFACTURER'S SERVICES

- A. Provide mortar system manufacturer's representative at Site in accordance with Section 01 43 33, Manufacturers' Field Services, for installation assistance, inspection and Certification of Proper Installation, and training of mortar system applicators.

### 3.10 PROTECTION

- A. Protect adjacent surfaces, and equipment, from being damaged by overshooting shotcrete mortar and low-pressure spray mortar.

### 3.11 CLEANING

- A. Remove overshot mortar and rebound materials as Work proceeds. Remove from Work waste materials, unsound material from concrete surfaces, material chipped from walls, and water used in preparation of application and finishing.

**END OF SECTION**

**SECTION 03 01 33**  
**REPAIR OF HORIZONTAL CONCRETE SURFACES**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
    - a. C78, Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third Point Loading).
    - b. C109/C109M, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
    - c. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
    - d. C348, Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.
    - e. C469, Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression.
    - f. C496/C496M, Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.
    - g. C596, Standard Test Method of Drying Shrinkage of Mortar Containing Hydraulic Cement.
    - h. C672, Standard Test Method for Scaling Resistance for Concrete Surfaces Exposed to Deicing Chemicals.
    - i. C779, Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
    - j. C882, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
    - k. C928, Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs.
    - l. C1012, Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution.
    - m. C1042, Standard Test Method for Bond Strength of Latex Systems Used with Concrete by Slant Shear.
    - n. C1202, Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration.
    - o. E699, Standard Practice for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating of Building Components.

## FORT THOMAS WTP ADVANCED TREATMENT

2. Environmental Protection Agency (EPA), U.S. Code of Federal Regulations (CFR), Title 40: 52.254, Approval and Promulgation of Implementation Plans.
3. International Concrete Repair Institute (ICRI): 03730, Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.

### 1.02 SUBMITTALS

- A. Action Submittals: Mortar system manufacturer's test and product data.
- B. Informational Submittals:
  1. Mortar System Manufacturer's:
    - a. Certificate of Compliance that repair products are one component with added water only, shrinkage compensated, specially designed for use on horizontal surfaces that are weather exposed, and receive traffic.
    - b. Confirmation material meets the requirements of ASTM C928.
    - c. Confirmation latex bonding agents conform to ASTM C1042.
    - d. Manufacturer's Certificate of Proper Installation.
    - e. Recommended preparation and installation instructions.
  2. Written test report for each production and core Sample.
  3. Statements of Qualification:
    - a. Independent Testing Laboratory.
    - b. Mortar System Applicator.

### 1.03 QUALIFICATIONS

- A. Independent Testing Laboratory: Meet criteria stated in ASTM E699.
- B. Mortar System Applicator: Trained and approved by mortar system manufacturer.

### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Package mortar system products in 55-pound moisture-resistance bags, 50-pound pails, or 3,300-pound bulk bags.

**PART 2 PRODUCTS**

**2.01 MORTAR SYSTEMS**

**A. System No. 1:**

1. Magnesium-Ammonium-Phosphate Concrete Mortar:
  - a. Slant Shear Bond: ASTM C882, 1 day, 2,000 psi minimum.
  - b. Application Temperature Range: 20 degrees F to 80 degrees F.
  - c. Compressive Strength: ASTM C109/C109M modified, 1 hour, 2,000 psi minimum.
  - d. Resistant to freeze-thaw cycles and deicing chemicals.
  - e. Sulfate Resistance: ASTM C1012, maximum of 0.09 percent length change after 52 weeks.
  - f. Flexural Strength: ASTM C78 modified 3-inch by 4-inch prism, 1 day, 550 psi minimum.
  - g. Modulus of Elasticity: ASTM C469, 7 days,  $4.18 \times 10^6$ .
2. Manufacturer and Product: BASF Building System; SET 45.

**B. System No. 2:**

1. Slant Shear Bond: ASTM C882, 1 day, 2,500 psi minimum.
2. Application Temperature Range: 20 degrees F to 85 degrees F.
3. Compressive Strength: ASTM C109/C109M, 1 day, 4,500 psi minimum.
4. Resistant to freeze-thaw cycles.
5. Modulus of Elasticity: ASTM C469, 1 day,  $3.8 \times 10^6$ .
6. Flexural Strength: ASTM C348, 1 day, 850 psi minimum.
7. Split Tensile Strength: ASTM C496/C496M, 1 day, 850 psi minimum.
8. Scaling Resistance: ASTM C672 and weight loss (lbs/ft<sup>2</sup>) in accordance with ASTM C672:
  - a. 25 Cycles: CaCl<sub>2</sub> 0.003 and NaCl 0.067, maximum weight loss.
  - b. 50 Cycles: CaCl<sub>2</sub> 0.005 and NaCl 0.084, maximum weight loss.
9. Chloride Ion Penetrability Based on Charge Passed, ASTM C1202: 3 days moist cured and 39 days air cured, 960 coulombs maximum.
10. Manufacturer and Product: BASF Building Systems; Emaco T415.

**C. System No. 3:**

1. One-component cement based, rheoplastic, flowable shrinkage compensated repair mortar system:
  - a. Slant Shear Bond: ASTM C882 modified, 7 days, 2,150 psi minimum.
  - b. Application Temperature Range: 40 degrees F to 100 degrees F.

## FORT THOMAS WTP ADVANCED TREATMENT

- c. Compressive Strength: ASTM C109/C109M, 7 days, 6,000 psi minimum.
  - d. Resistant to freeze-thaw cycles and deicing chemicals.
  - e. Flexural Strength: ASTM C348, 28 days, 770 psi minimum.
  - f. High slump design for improved placement, 4 inches to 6 inches.
  - g. Chloride Ion Penetrability Based on Charge Passed, ASTM C1202: 650 coulombs at 28 days.
  - h. Sulfate Resistance: ASTM C1012, maximum 0.006 percent length change after 6 months.
  - i. Modulus of Elasticity: ASTM C469, 28 days,  $5.9 \times 10^6$ .
2. Manufacturer and Product: BASF Building Systems; Emaco S66-Cl.
- D. System No. 4:
1. One-component cement-based, rheoplastic, flowable, metallic-aggregate repair mortar system:
    - a. High slump design for improved placement, 5 inches to 7 inches.
    - b. Application Temperature Range: 40 degrees F to 90 degrees F.
    - c. Compressive Strength: ASTM C109/C109M, 1 day, 5,000 psi; 7 days, 8,800 psi minimum.
    - d. Abrasion Resistance: Eight times more wear resistance than plain concrete.
    - e. Impact Resistance: Four times greater than plain concrete.
    - f. Density: 9 pounds per square foot at a minimum of 1/2 inch thickness.
    - g. Manufacturer and Product: BASF Building Systems; Mastertop Anvil-Top 300.
  2. Bonding Agent Manufacturer and Product: BASF Building Systems; Concrevis LPL Liquid when ambient temperature is 50 degrees F.
- E. System No. 5:
1. One-Component, Fast-Setting, Polymer Modified Cementitious Based Mortar System:
    - a. Slant Shear Bond: ASTM C882, 7 days, 1,750 psi.
    - b. Flexural Strength: ASTM C348, 7 days, 1,000 psi.
    - c. Abrasion Resistance Depth of Wear: ASTM C779, 60 minutes, 0.033 inch.
    - d. Splitting Tensile Strength: ASTM C496/C496M, 7 days, 450 psi.
    - e. Drying Shrinkage: ASTM C596, 28 days, 0.093 percent.
    - f. Chloride Ion Penetrability Based on Charge Passed, ASTM C1202: 28 days under 500 coulombs.
    - g. Compressive Strength: ASTM C109/C109M, 1 day, 2,500 psi; 7 days, 5,500 psi; 28 days, 7,500 psi minimum.
  2. Manufacturer and Product: BASF Building Systems; Emaco R310 Cl.



2.02 ACCESSORY MATERIALS

- A. Flexible Cementitious Reinforcing Bar Coating: BASF Building Systems; Emaco P24.
- B. Epoxy Bonding Agent: BASF Building Systems; Concreative LPL liquid.
- C. Finishing Aid:
  - 1. Containing a yellow fugitive dye.
  - 2. Manufacturer and Product: BASF Building Systems; Confilm.
- D. Membrane Forming Curing Compounds: BASF Building Systems; Cure and Seal WB.

2.03 MIXING

- A. In accordance with mortar manufacturer's instructions.

**PART 3 EXECUTION**

3.01 PREPARATION

- A. General:
  - 1. For patch areas 1/4 inch or deeper, follow IRIC Guideline 03730.
  - 2. Remove unsound and deteriorated concrete by special 16,000 psi to 20,000 psi high pressure water blasting machines capable of removing concrete to depths of 3/16-inch minimum amplitude roughness when measured with a straightedge.
  - 3. Square edges of patch areas by sawing or chipping to avoid tapered shoulders.
  - 4. Collect and dispose of water from removal operations in manner and location acceptable to Owner.
  - 5. Remove concrete adjacent to reinforcing bar to a minimum of 1-inch clearance around reinforcing bar to permit new mortar to bond to entire periphery of exposed reinforcing bar if following surface conditions exist:
    - a. 50 percent or more of periphery around reinforcing bar is exposed during concrete removal.
    - b. 25 percent or more of periphery around reinforcing bar is exposed during concrete removal and corrosion is present to extent that loss of section has occurred.
    - c. Otherwise evident that bond between existing concrete and reinforcement has been destroyed.
  - 6. Clean exposed reinforcing bars of loose rust and concrete.

## FORT THOMAS WTP ADVANCED TREATMENT

7. Replace deteriorated reinforcing with new reinforcing equivalent in cross-sectional area to original reinforcing.
8. Coat exposed reinforcing bar with flexible cementitious reinforcing bar coating before repair mortar is applied.
9. Keep areas from which concrete has been removed free of dirt, dust, and water blasting slurry. Remove contaminants from prepared areas before new mortar is placed.
10. Areas to receive mortar System Nos. 1, 2, 3, or 5 shall be saturated and surface dry at time of application.
11. Areas to receive System No. 4 mortar repair shall be dry.

### B. Spalled Joints:

1. Saw edge 1 inch deep and 6 inches back from the old joint.
2. Remove unsound concrete between saw cut and the joint.
3. Place wood or fiber spacer to thickness of joint at joint line.

### C. Overlays:

1. Square cut edges to a minimum of 1/4 inch deep.
2. Do not feather edge area.
3. Perform special preparation recommended by mortar manufacturer.

## 3.02 APPLICATION

- A. System No. 1: Patches, joints, and overlays 1/2 inch to 3 inches thick. Return to service in 1 hour.
- B. System No. 2: Patches, joints, or overlays 1/2 inch to 3 inches thick. Return to service in 3 hours to 7 days.
- C. System No. 3: Patches, joints, or overlays 1 inch or greater in thickness. Return to service in 7 days or more.
- D. System No. 4: Heavy-duty joints or overlays 2 inches thick or more. Return to service in 7 days or more.
- E. System No. 5:
  1. Patches and Overlays: 1/4 inch up to 3 inches thick.
  2. Return to service for foot traffic in 4 hours; wheel traffic in 7 days.
  3. Working Time: 30 minutes at 70 degrees F (21 degrees C).
  4. Application Temperature Range: 45 degrees F to 90 degrees F.

3.03 INSTALLATION

A. System Nos. 1, 2, 3, or 5:

1. Remove standing water.
2. Apply bond coat slurry to prepared surface.
3. Immediately place mixed repair mortar into prepared area from one side to the other.
4. Work material firmly into bottom and sides of patch to assure a good bond.
5. Level repair mortar and screed to elevation of existing concrete.
6. Finish to same texture as existing concrete around patch.
7. For System No. 5, screed or use self-leveling mixture to obtain a uniform and plane surface.

B. System No. 4:

1. Blow or vacuum out free water from prepared area.
2. Apply bonding agent to prepared surface. Do not apply more bonding agent than can be covered with mortar before bonding agent cures, past tacky to the touch.
3. Immediately place mixed repair mortar into prepared area from one side to the other.
4. Work material firmly into bottom and sides of patch to assure a good bond.
5. Level repair mortar and screed to elevation of existing concrete.
6. Finish to same texture as existing concrete around patch.

C. Joint Repair:

1. Remove joint spacer when repair mortar is hard enough that a pointed trowel will only penetrate surface less than 1/2 inch.
2. When repair mortar is cured and ready for use, fill joint in accordance with mortar system manufacturer's instructions.

3.04 BONDING

- A. Provide a slurry coat of mortar for mortar System Nos. 1, 2, 3, and 5 in accordance with manufacturer's instructions.
- B. Provide bonding agent for mortar System No. 4 in accordance with manufacturer's instructions.

## FORT THOMAS WTP ADVANCED TREATMENT

### 3.05 FINISHING

- A. Spray full strength finishing aid on fresh concrete to prevent rapid drying during hot and windy weather.

### 3.06 CURING

- A. System No. 1: No curing is required, but protect from rain immediately after placing. Liquid-membrane curing compounds or plastic sheeting may be used to protect the early surface from precipitation, but never wet cure.
- B. System Nos. 2, 3, 4, or 5:
  - 1. Provide water-based wax emulsion in accordance with moisture retention requirements of ASTM C309, Type I when applied at 250 square feet per gallon. Apply in compliance with EPA 40 CFR 52.254.
  - 2. Apply membrane forming curing compound at no more than 250 square feet per gallon, as soon as finishing operation is complete.
  - 3. Apply second coat of curing compound at no more than 250 square feet per gallon, after 3 hours, or when first coat is not tacky to the touch.

### 3.07 FIELD QUALITY CONTROL

- A. Tests and Inspection:
  - 1. Production Samples:
  - 2. Prepare and cure Samples of mixed mortar material from mixer.
  - 3. Provide minimum of three compressive Samples per ASTM C109/C109M for each test specified for each 200 square feet of mortar repair.
- B. Chain drag or light hammer tap repaired areas listening for hollow sound to determine areas that have not properly bonded to the old concrete:
  - 1. Mark hollow areas for removal and replacement.
  - 2. Saw hollow sounding areas to a new square edge, and reapply mortar as specified.
- C. Core Samples:
  - 1. Core two 2-1/2- or 3-inch-diameter Samples for each 2,000 square feet of repair work.
  - 2. Cut cores through cured mortar repair and into base concrete to total depth equal to at least 2.5 times the repair mortar thickness.

## FORT THOMAS WTP ADVANCED TREATMENT

3. Sawcut cores after removal to trim base concrete thickness to same thickness as mortar so bond line is at center of prepared Sample.
4. Bond Samples to steelplates at each end using epoxy bonding agent.
5. Perform tension testing using calibrated independent test laboratory equipment and eyebolts or threaded connectors tapped and threaded into the baseplate so that the tension load is concentric with the center of the core Sample.
6. Bond line shall sustain minimum of 300 psi in direct tension without failure or movement.

D. Retest mortar repairs that do not meet test requirements.

E. Fill and repair test holes as specified herein.

### 3.08 MANUFACTURERS' SERVICES

- A. Provide mortar manufacturer's representative at Site in accordance with Section 01 43 33, Manufacturers' Field Services, for advice on product selection, surface preparation, mixing and installation assistance, and inspection and certification of proper installation.

**END OF SECTION**

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**SECTION 03 10 00  
CONCRETE FORMING AND ACCESSORIES**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
  - 1. American Concrete Institute (ACI):
    - a. 117/117R, Standard Tolerances for Concrete Construction and Materials.
    - b. 318/318R, Building Code Requirements for Structural Concrete and Commentary.
    - c. 347, Guide to Formwork for Concrete.

**1.02 DESIGN REQUIREMENTS**

- A. Design formwork in accordance with ACI 347 and ACI 318/318R to provide concrete finishes specified in Section 03 30 00, Cast-in-Place Concrete.
- B. When high range water reducer (superplasticizer) is used in concrete mix, forms shall be designed for full hydrostatic pressure per ACI 347.
- C. Make joints in forms watertight.
- D. Limit panel deflection to 1/360th of each component span to achieve tolerances specified.

**1.03 SUBMITTALS**

- A. Action Submittals:
  - 1. Shop Drawings:
    - a. Layout of panel joints and tie hole pattern.
    - b. Double Wall Construction: Show details of double wall forming and premolded joint filler attachment; refer to details shown.
    - c. Form Ties-Tapered Through-Bolts: Proposed method of sealing form tie hole; coordinate with details shown.
    - d. Manufacturer's data for form release agent.
  - 2. Samples: One each as follows:
    - a. Form ties.

# FORT THOMAS WTP ADVANCED TREATMENT

## B. Informational Submittals:

1. Statement of qualification for formwork designer.
2. Manufacturer's Certificate of Proper Installation in accordance with Section 01 43 33, Manufacturers' Field Services.

## 1.04 QUALIFICATIONS

- A. Formwork Designer: Formwork, falsework, and shoring design shall be by an engineer licensed in the State of Kentucky.

## PART 2 PRODUCTS

### 2.01 FORM MATERIALS

#### A. Wall Forms and Underside of Slabs and Beams:

1. Materials: Plywood, hard plastic finished plywood, overlaid waterproof particle board, or steel in "new and undamaged" condition, of sufficient strength and surface smoothness to produce specified finish.
2. Circular Structures:
  - a. Wall forms shall conform to the circular shape of the structure.
  - b. Straight panels may be substituted for circular forms provided panels do not exceed 2 feet in horizontal width and angular deflection is no greater than 3-1/2 degrees per joint.

#### B. Column Forms:

1. Rectangular Columns: As specified for walls.
2. Circular Columns: Fabricated steel or fiber reinforced plastic with bolted together sections or spirally wound laminated fiber form internally treated with release agent for height of column.

#### C. Sandblasted Surface Forms: Medium density overlay plywood for flat concrete surfaces to be sandblasted.

#### D. Painted Surface Forms: High-density overlay plywood for flat concrete surfaces to be painted.

#### E. All Other Forms: Materials as specified for wall forms.

#### F. Form Release Agent:

1. Material: Release agent shall not bond with, stain, or adversely affect concrete surfaces, and shall not impair subsequent treatments of concrete surfaces when applied to forms. A ready-to-use water based



## FORT THOMAS WTP ADVANCED TREATMENT

material formulated to reduce or eliminate surface imperfections, containing no mineral oil or organic solvents. Environmentally safe, meeting local, state, and federal regulations and can be used in potable water facilities.

2. Manufacturers and Products:

- a. BASF, Shakopee, MN; MBT, Rheofinish 211.
- b. Cresset Chemical Company; Crete-Lease 20-VOC.
- c. Unitex Chemicals; Farm Fresh.
- d. Atlas Construction Supply, Inc.; Bio-Guard.

G. Rustication Grooves and Beveled Edge Corner Strips: Nonabsorbent material, compatible with form surface, fully sealed on all sides prohibiting loss of paste or water between the two surfaces.

H. Form Ties:

1. Material: Steel.
2. Spreader Inserts:
  - a. Conical or spherical type.
  - b. Design to maintain positive contact with forming material.
  - c. Furnish units that will leave no metal closer than 1.5 inches to concrete surface when forms, inserts, and tie ends are removed.
3. Wire ties not permitted.
4. Flat bar ties for panel forms; furnish plastic or rubber inserts with minimum 1.5-inch depth and sufficient dimensions to permit patching of tie hole.
5. Water Stop Ties: For water-holding structures, basements, pipe galleries, and accessible spaces below finish grade, furnish one of the following:
  - a. Integral steel water stop 0.103 inch thick and 0.625 inch in diameter tightly and continuously welded to tie.
  - b. Neoprene water stop 3/16 inch thick and 15/16 inch diameter whose center hole is one half diameter of tie, or molded plastic water stop of comparable size.
  - c. Orient water stop perpendicular to tie and symmetrical about center of tie.
  - d. Design ties to prevent rotation or disturbance of center portion of tie during removal of ends and to prevent water leaking along tie.
6. Through-Bolts: Tapered minimum 1-inch diameter at smallest end.
7. Elastic Vinyl Plug:
  - a. Design and size of plug to allow insertion with tool to enable plug to elongate and return to original length, and diameter upon removal forming watertight seal.

- b. Manufacturer and Product: Dayton/Richmond Co., Miamisburg, OH; A58 Sure Plug or Greenstreek Group Inc, St. Louis, MO; P120 X-Plug.

### **PART 3 EXECUTION**

#### **3.01 FORM SURFACE PREPARATION**

- A. Thoroughly clean form surfaces that will be in contact with concrete or that have been in contact with previously cast concrete, dirt, and other surface contaminants prior to coating surface.
- B. Exposed Wood Forms in Contact with Concrete: Apply form release agent as recommended by the manufacturer.
- C. Steel Forms: Apply form release agent to steel forms as soon as they are cleaned to prevent discoloration of concrete from rust.

#### **3.02 ERECTION**

- A. General: Unless specified otherwise, follow applicable recommendations of ACI 347.
- B. Beveled Edges (Chamfer):
  - 1. Form 3/4-inch bevels at concrete edges, unless otherwise shown.
  - 2. Where beveled edges on existing adjacent structures are other than 3/4 inch, obtain Engineer's approval of size prior to placement of beveled edge.
- C. Wall Forms:
  - 1. Do not reuse forms with damaged surfaces.
  - 2. Locate form ties and joints in an uninterrupted uniform pattern.
  - 3. Inspect form surfaces prior to installation to assure conformance with specified tolerances.
  - 4. Double-Wall Construction:
    - a. Joint Filler Attachment:
      - 1) Use attachments to secure premolded joint filler to one wall only.
      - 2) Secure premolded joint filler without gaps and separations keeping concrete from second wall pour from penetrating thickness and space occupied by premolded joint filler.
    - b. Do not use form ties or other devices permanently penetrating premolded joint filler between walls or produce a rigid connection between walls.

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- c. First cast wall shall obtain the greater of the wall design concrete strength or the construction strength required, as determine by form design engineer, prior to casting second wall. Strength determination shall be based on field cast and cured test cylinders.
  - d. Do not use formwork that leaks mortar.
  - e. Provide premolded joint filler or sealant to minimize transfer of movement from one structure to the other.
- D. Forms for Curbs, Sidewalks, and Driveways:
- 1. Provide standard steel or wood forms.
  - 2. Set forms to true lines and grades, and securely stake in position.
- E. Form Tolerances: Provide forms in accordance with ACI 117/117R, ACI 347, and ACI 318/318R and the following tolerances for finishes specified:
- 1. Wall Tolerances:
    - a. Straight Vertical or Horizontal Wall Surface: Flat planes within tolerance specified.
    - b. Wall Type W-A:
      - 1) Plumb within 1/4 inch in 10 feet or within 1 inch from top to bottom for walls over 40 feet high.
      - 2) Depressions in Wall Surface: Maximum 5/16 inch when 10-foot straightedge is placed on high points in all directions.
    - c. Wall Type W-B:
      - 1) Plumb within 1/8 inch in 10 feet or within 1/2 inch from top to bottom for walls over 40 feet high.
      - 2) Depressions in Wall Surface: Maximum 1/8 inch when 10-foot straightedge is placed on high points in all directions.
    - d. Thickness: Maximum 1/4 inch minus or 1/2 inch plus from dimension shown.
    - e. Form Offset: Between adjacent pieces of formwork, facing material shall not exceed 1/8 inch.
  - 2. Beams and Columns Tolerances:
    - a. Exposed Straight Horizontal and Vertical Surfaces: Flat planes within tolerances specified.
    - b. Lateral Alignment:
      - 1) Centerlines must be within plus or minus 1/2 inch from dimensions shown.
      - 2) At intersections, centerlines shall intersect within plus or minus 1/2 inch of dimensions shown.

## FORT THOMAS WTP ADVANCED TREATMENT

- c. Beam Type B-A:
  - 1) Physical Dimensions: Maximum 1/4 inch minus or 1/2 inch plus from dimension shown.
  - 2) Elevations: Within plus or minus 1/2 inch, except where tops of beams become part of finished slab. In this case refer to slab tolerances.
- d. Column Type C-A:
  - 1) Physical Dimensions: Maximum 1/4 inch minus or 1/2 inch plus from dimension shown.
  - 2) Plumb within 1/4 inch in 10 feet in all directions with maximum 1/2 inch out-of-plumb at top with respect to bottom.

### 3.03 FORM REMOVAL

- A. Nonsupporting forms (sides of beams, walls, columns, and similar parts of Work) may be removed after cumulatively curing at not less than 50 degrees F for 24 hours from time of concrete placement if:
  - 1. Concrete is sufficiently hard so as not to sustain damage by form removal operations.
  - 2. Curing and protection operations are maintained.
- B. Elevated Structural Slabs or Beams: In accordance with ACI 318/318R, Chapter 6, and at such time as concrete has reached compressive strength equal to 80 percent of specified 28-day compressive strength as determined by test cylinders.

**END OF SECTION**

**SECTION 03 21 00  
REINFORCING STEEL**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Concrete Institute (ACI):
    - a. 318/318R, Building Code Requirements for Structural Concrete and Commentary.
    - b. SP-66, Detailing Manual.
  2. American Welding Society (AWS): D1.4/D1.4M, Structural Welding Code - Reinforcing Steel.
  3. ASTM International (ASTM):
    - a. A82, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
    - b. A185, Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
    - c. A497, Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
    - d. A615/A615M, Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
    - e. A706/A706M, Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.
    - f. A767/767M, Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement.
    - g. A775/A775M, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
  4. Concrete Reinforcing Steel Institute (CRSI):
    - a. Placing Reinforcing Bars.
    - b. Manual of Standard Practice.
  5. International Code Council (ICC): Evaluation Services Report.
  6. Wire Reinforcement Institute (WRI): Manual of Standard Practice, Welded Wire Fabric.

**1.02 SUBMITTALS**

- A. Action Submittals:
1. Shop Drawings prepared in accordance with CRSI Manual of Standard Practice and ACI SP-66 Detailing Manual:
    - a. Bending lists.

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- b. Placing drawings.
  2. Welded, metallic sleeve splice, and mechanical threaded connection.
- B. Informational Submittals:
  1. Lab test reports for reinforcing steel showing stress-strain curves and ultimate strengths.
  2. Mechanical Threaded Connections:
    - a. Current ICC Evaluation Services Report or equivalent code agency report listing findings to include acceptance, special inspection requirements, and restrictions.
    - b. Verification device threads have been tested and meet requirements for thread quality, in accordance with manufacturer's published methods.
    - c. Manufacturer's instructions.
  3. Test results of field testing.

### 1.03 DELIVERY, STORAGE, AND HANDLING

- A. Unload, store, and handle bars in accordance with CRSI publication "Placing Reinforcing Bars."

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Deformed Billet-Steel Reinforcing Bars:
  1. Includes stirrups, ties, and spirals.
  2. ASTM A615, Grade 60, where welding is not required.
  3. ASTM A706/A706M, Grade 60, for reinforcing to be welded.
  4. ASTM A767/767M, Grade 60, for galvanized bars.
- B. Mechanical Splices and Connections:
  1. Metal Sleeve Splice: Furnish with cast filler metal, capable of developing, in tension or compression, 125 percent of minimum tensile strength of bar.
    - a. Manufacturer and Product: Erico Products, Inc., Cleveland, OH; Cadweld T-Series.
  2. Mechanical Threaded Connections: Furnish metal coupling sleeve with internal threads engaging threaded ends of bars developing in tension or compression 125 percent of yield strength of bar.

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### a. Manufacturers and Products:

- 1) Erico Products, Inc., Cleveland, OH; Lenton Reinforcing Steel Couplers.
- 2) Richmond Screw Anchor Co., Inc., Fort Worth, TX; Richmond DB-SAE Dowel Bar Splicers.

### C. Welded Wire Fabric:

1. ASTM A185 or ASTM A497 and ACI 318/318R, using ASTM A82 wire of 75 ksi minimum tensile strength.
2. Furnish flat sheets only, rolled sheets not permitted.

## 2.02 ACCESSORIES

### A. Tie Wire:

1. Black, soft-annealed 16-gauge wire.
2. Nylon-, epoxy-, or plastic-coated wire.

### B. Bar Supports and Spacers:

1. Use precast concrete bar supports or all-plastic bar supports and side form spacers, unless noted otherwise. Do not use other types of supports or spacers.
2. Bar supports shall have sufficient strength and stiffness to carry loads without failure, displacement, or significant deformation. Space bar supports so minimum concrete cover is maintained for reinforcing between supports.
3. Use only precast concrete bar supports where concrete surfaces are exposed to weather, earth, water, chloride intrusion, or corrosive chemicals. Bar supports shall be nonconductive and have geometry and bond characteristics that deter movement of moisture from the surface to the reinforcement.
4. Precast concrete supports shall have same minimum strength and shall be made from same materials as that of the concrete in which they are to be embedded. Precast concrete supports shall be cast and properly cured for at least 7 days before use and shall have a wire or other device cast into each block for the purpose of attaching them securely to the reinforcing steel.
5. In Beams, Columns, Walls, and Slabs Exposed to View after Form Removal: Use small precast concrete blocks made of same color as concrete in which they are embedded. All-plastic bar supports and side form spacers may be used, except where surface is exposed as described above.

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6. Design and fabricate special bar supports for top reinforcing bars in slabs where standard bar supports do not possess necessary geometry, strength, or stiffness.
7. Plastic Bar Supports: Manufactured by Aztec Concrete Accessories, Bloomington, CA.
8. Precast Concrete Supports: Total bond precast high performance concrete bar supports as supplied by Con Sys Inc., Pinawa, MB, Canada.

### 2.03 FABRICATION

- A. Follow CRSI Manual of Standard Practice.
- B. Bend bars cold.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Notify Special Inspector when reinforcing is ready for inspection and allow sufficient time for inspection prior to placing concrete.
- B. Clean reinforcing bars of loose mill scale, oil, earth, and other contaminants.
- C. Coat wire projecting from precast concrete bar supports with dielectric material, epoxy, or plastic.

### 3.02 REINFORCING BAR INSTALLATION

- A. Bundle or space bars, instead of field bending where construction access through reinforcing is necessary.
- B. Spacing and Positioning: Conform to ACI 318/318R.
- C. Location Tolerances: In accordance with CRSI publication, "Placing Reinforcing Bars".
- D. Splicing:
  1. Provide splice lengths as shown on structural drawings.
  2. Follow ACI 318/318R.
  3. Use lap splices, unless otherwise shown or permitted in writing by Engineer.
  4. Stagger splices in adjacent bars where indicated.



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### E. Mechanical Splices and Connections:

1. Use only in areas specifically approved in writing by Engineer.
2. Install threaded rods as recommended by manufacturer with threads totally engaged into coupling sleeve and in accordance with ICC Evaluation Services Report or equivalent code agency report.
3. For metal sleeve splice, follow manufacturer's installation recommendations.
4. Maintain minimum edge distance and concrete cover.

### F. Tying Reinforcing Bars:

1. Tie every other intersection on mats made up of Nos. 3, 4, 5, and 6 bars to hold them firmly at required spacing.
2. Bend tie wire away from concrete surface to provide clearance of 1 inch from surface of concrete to tie wire.

### G. Reinforcement around Openings: On each side and above and below pipe or opening, place an equivalent area of steel bars to replace steel bars cut for opening. Extend steel reinforcing a standard lap length beyond opening at each end.

### H. Welding Reinforcement:

1. Only ASTM A706/A706M bars may be welded.
2. Do not perform welding until welder qualifications are approved.

### I. Straightening and Rebending: Field bending of reinforcing steel bars is not permitted.

### J. Unless permitted by Engineer, do not cut reinforcing bars in field.

## 3.03 WELDED WIRE FABRIC INSTALLATION

- A. Use only where specifically shown.
- B. Extend fabric to within 2 inches of edges of slab, and lap splices at least 1-1/2 courses of fabric or minimum 8 inches.
- C. Tie laps and splices securely at ends and at least every 24 inches with tie wire.
- D. Place welded wire fabric on concrete blocks and rigidly support equal to that provided for reinforced bars. Do not use broken concrete, brick, or stone.
- E. Follow ACI 318/318R and current Manual of Standard Practice, Welded Wire Fabric.

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- F. Do not use fabric that has been rolled. Install flat sheets only.

### 3.04 TESTS AND INSPECTION

- A. An independent testing agency will be retained by Owner to visually inspect and test reinforcing steel welds in accordance with AWS D1.4/D1.4M as specified in Section 05 05 23, Welding.
- B. An independent testing agency will be retained by Owner to inspect each mechanical splice and verify each component is installed in accordance with manufacturer's instructions and ICC Evaluation Services Report or equivalent code agency report.
- C. Special inspection will be provided by Owner as indicated on Drawings.

**END OF SECTION**

**SECTION 03 30 00  
CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 REFERENCES**

A. The following is a list of standards which may be referenced in this section:

1. American Concrete Institute (ACI):
  - a. 211.1, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
  - b. 301, Specifications for Structural Concrete.
  - c. 302.1R, Guide For Concrete Floor and Slab Construction.
  - d. 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
  - e. 305R, Hot Weather Concreting.
  - f. 306.1, Standard Specification for Cold Weather Concreting.
  - g. 309R, Guide for Consolidation of Concrete.
2. ASTM International (ASTM):
  - a. C31/C31M, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  - b. C33, Standard Specification for Concrete Aggregates.
  - c. C39/C39M, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
  - d. C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
  - e. C94/C94M, Standard Specification for Ready-Mixed Concrete.
  - f. C143/C143M, Standard Test Method for Slump of Hydraulic Cement Concrete.
  - g. C150, Standard Specification for Portland Cement.
  - h. C157/C157M, Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
  - i. C192/C192M, Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
  - j. C231, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
  - k. C260, Standard Specification for Air-Entraining Admixtures for Concrete.
  - l. C311, Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete.
  - m. C452, Standard Test Method for Potential Expansion of Portland-Cement Mortars Exposed to Sulfate.

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- n. C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
  - o. C595, Standard Specification for Blended Hydraulic Cements.
  - p. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
  - q. C1012, Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution.
  - r. C1218/C1218M, Standard Test Method for Water-Soluble Chloride in Mortar and Concrete.
  - s. D4580, Standard Practice for Measuring Delaminations in Concrete Bridge Decks by Sounding.
  - t. E1155, Standard Test Method for Determining  $F_F$  Floor Flatness and  $F_L$  Floor Levelness Numbers.
3. National Institute of Standards and Technology (NIST): Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices.
  4. National Ready Mixed Concrete Association (NRMCA).

### 1.02 DEFINITIONS

- A. Basin Train: Series of interconnected basins that will be operated as a unit with the same water level.
- B. Defective Areas: Surface defects that include honeycomb, rock pockets, indentations greater than 3/16 inch, cracks 0.005 inch wide and larger, as well as a crack that leaks for liquid containment basins and belowgrade habitable spaces; cracks 0.010 inch wide and larger in nonfluid holding structures spalls, chips, air bubbles greater than 3/4 inch in diameter, pinholes, bug holes, embedded debris, lift lines, sand lines, bleed lines, leakage from form joints, fins and other projections, form popouts, texture irregularities, and stains and other color variations that cannot be removed by cleaning.
- C. Exposed Concrete: Concrete surfaces that can be seen inside or outside of structures regardless whether concrete is above water, dry at all times, or can be seen when structure is drained.
- D. Hydraulic Structures: Liquid containment basins.
- E. New Concrete: Less than 60 days old.
- F. Slurry Concrete: Mixture of sand, 3/8-inch minus aggregate, cement, and water for wall construction joints.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
  - a. Product Data: Admixtures, bonding agent, bond breaker, and patching materials.
  - b. Design Data: Concrete mix designs signed by qualified mix designer.
  - c. Placement Drawings:
    - 1) Concrete, identifying location of each type of construction joint.
  - d. Gradation for coarse and fine aggregates, and combined together. List gradings, percent passing through each sieve size.
  - e. Detailed plan for cold weather curing and protection of concrete placed and cured in weather below 40 degrees F.
  - f. Detailed plan for hot weather placements including curing and protection for concrete placed in ambient temperatures over 80 degrees F.
  - g. Concrete repair methods and materials.
2. Samples:
  - a. One Sample of each type of architectural concrete wall finish, 24 inches by 24 inches square by 1-1/2 inches thick.
  - b. Prior to starting work on mockup panels, submit Sample for slab finish Type S-4, 24 inches by 24 inches square by 1-1/2 inches thick.
  - c. Demonstrate use of bonding agent.

B. Informational Submittals:

1. Preinstallation Conference minutes.
2. Manufacturer's application instructions for bonding agent and bond breaker.
3. Manufacturers' Certificate of Compliance:
  - a. Portland cement.
  - b. Admixtures.
  - c. Fly ash.
  - d. Aggregates.
  - e. Bonding agent.
  - f. Bond breaker.
  - g. Patching materials.
  - h. Admixtures: Manufacturers' Certificate of Proper Installation.
4. Statements of Qualification:
  - a. Contractor's resident superintendent for concrete installation.
  - b. Mix designer.

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- c. Batch plant.
5. Test Reports:
  - a. Admixtures, test reports showing chemical ingredients and percentage of chloride in each admixture and fly ash.
  - b. Source test analysis report for fly ash, including percentage of chloride content.
  - c. Statement identifying aggregates reactivity. Determine water soluble chloride in each component of aggregates in accordance with ASTM C1218/C1218M.
  - d. For each trial concrete mix design and signed by a qualified mix designer.
  - e. Cylinder compressive test results for laboratory concrete mixes.
6. Concrete Delivery Tickets:
  - a. For each batch of concrete before unloading at Site.
  - b. Record of drum revolution counter, type, brand, test certification, Amount of fly ash if used in accordance with ASTM C94/C94M, Section 16.

### 1.04 QUALITY ASSURANCE

#### A. Qualifications:

1. Mix Designer: Licensed professional engineer registered in the State of Kentucky.
2. Batch Plant: Currently certified by the National Ready Mixed Concrete Association.

#### B. Mockup Panels:

1. Construct one panel for each form liner type specified in Section 03 10 00, Concrete Forming and Accessories.
2. Construct mockup panels to demonstrate wall finish Types W-7, W-8, W-9, W-10, and W-11; slab finish Types S-4, S-5, and S-6.
  - a. Minimum dimensions 10 feet by 8 feet.
  - b. Demonstrate sandblasting on Types W-10 and W-11 to show how uniform appearance will be achieved regardless of age of concrete.
3. Before concrete work starts, construct panels with specified materials, forming systems, reinforcing details, and leakage prevention techniques.
4. Show architectural details, joints, form ties, form liners, and rebar spacers to produce finished surface required.
5. Test form release agent on one mockup panel to ensure no adverse effects are caused on form or form liner materials.
6. Cast panels from minimum of 3-cubic yard truck mixer load.
7. Surface finish uniform in appearance as Samples.

8. Approved panels shall establish standards of quality by which concrete work will be judged.
9. Replace panels if not representative of Work as specified.
10. Panels may be incorporated into Work if approved by Engineer.
11. Construct additional 10-foot by 8-foot panel or use Engineer-selected portion of as-cast wall surface hidden from view to develop and test patching techniques and mixes.
12. Construct additional panels and use to demonstrate repair material and application procedures and obtain approval prior to using material to repair project structures.

C. Preinstallation Conference:

1. Required Meeting Attendees:
  - a. Contractor, including pumping, placing and finishing, and curing subcontractors.
  - b. Ready-mix producer.
  - c. Admixture representative.
  - d. Testing and sampling personnel.
  - e. Engineer.
2. Schedule and conduct prior to incorporation of respective products into Project. Notify Engineer of location and time.
3. Agenda shall include:
  - a. Admixture types, dosage, performance, and redosing at Site.
  - b. Mix designs, test of mixes, and Submittals.
  - c. Placement methods, techniques, equipment, consolidation, and form pressures.
  - d. Slump and placement time to maintain slump.
  - e. Finish, curing, and water retention.
  - f. Protection procedures for weather conditions.
  - g. Other specified requirements requiring coordination.
4. Conference minutes as specified in Section 01 31 19, Project Meetings.

**PART 2 PRODUCTS**

2.01 MATERIALS

- A. Cement: Furnish from one source.
  1. Portland Cement Type I or Type II:
    - a. Meet ASTM C150.
    - b. Alkalies: Maximum 0.60 percent.
    - c. Tricalcium Aluminate Content of Type I Cement: Maximum 12 percent.
    - d. Nonhydraulic Abovegrade Structures: Type I or Type II cement.

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- e. Hydraulic and Belowgrade Structures and Sewers: Type II cement or combination of Type I mixed with fly ash.
  - f. Combine fly ash with cement at batch plant or during production of cement in accordance with ASTM C595, Type IP cement.
- B. Aggregates: Furnish from one source.
- 1. Natural Aggregates:
    - a. Free from deleterious coatings and substances in accordance with ASTM C33, except as modified herein.
    - b. Free of materials and aggregate types causing popouts, discoloration, staining, or other defects on surface of concrete.
  - 2. Nonpotentially Reactive: In accordance with ASTM C33, Appendix XI, Paragraph XI.1.
  - 3. Aggregate Soundness: Test for fine and coarse aggregates in accordance with ASTM C33 and ASTM C88 using sodium sulfate solution.
  - 4. Fine Aggregates:
    - a. Clean, sharp, natural sand.
    - b. ASTM C33.
    - c. Materials Passing 200 Sieve: 4 percent maximum.
    - d. Limit deleterious substances in accordance with ASTM C33, Table 1 with material finer than 200 sieve limited to 3 percent, coal and lignite limited to 0.5 percent.
  - 5. Coarse Aggregate:
    - a. Natural gravels, combination of gravels and crushed gravels, crushed stone, or combination of these materials containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension).
    - b. Materials Passing 200 Sieve: 0.5 percent maximum.
    - c. Limit deleterious substances in accordance with ASTM C33, Table 3 for exposed concrete.
- C. Admixtures: Furnish from one manufacturer.
- 1. Characteristics: Compatible with each other and free of chlorides or other corrosive chemicals.
  - 2. Air-Entraining Admixture:
    - a. ASTM C260, nontoxic after 30 days and contains no chlorides.
    - b. Concrete with air-entrainment admixture added shall maintain air percentage as batched, within plus or minus 2 percent for time required for placement into structure.
  - 3. Water-Reducing Admixture: ASTM C494/C494M, Type A or Type D.
    - a. Manufacturers and Products:
      - 1) BASF Admixtures Inc., Shakopee, MN; Pozzolith or Polyheed.



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- 2) Euclid Chemical Co., Cleveland, OH; Eucon WR-91.
  - 3) W. R. Grace & Co., Cambridge, MA; WRDA with HYCOL.
4. High Range Water Reducing Admixture (Superplasticizer):
- a. ASTM C494/C494M:
  - b. Hold slump of 5 inches or greater for time required for placement.
  - c. Furnish type as recommended by manufacturer for allowed temperature ranges.
  - d. Type F or G.
  - e. Manufacturers and Products:
    - 1) BASF Admixtures Inc., Shakopee, MN; Rheobuild or Polyheed at dosage greater than 10 ounces per 100 pounds of cement.
    - 2) Euclid Chemical Co., Cleveland, OH; Eucon 537.
    - 3) W. R. Grace & Co., Cambridge, MA; Daracem 100.
5. Fly Ash (Pozzolan): Class C or Class F fly ash in accordance with ASTM C618, except as modified herein:
- a. Shall not be produced from process that has utilized hazardous or potentially hazardous materials.
  - b. ASTM C618, Table 1, Loss of Ignition: Maximum 3 percent.
  - c. ASTM C618, Table 2, Water Requirement: Maximum 100 percent of control.
  - d. ASTM C618, Table 3, Effectiveness in Controlling Alkali-Silica Reaction: Maximum 100 percent expansion of test mixture as a percentage of low-alkali cement control at 14 days.
  - e. ASTM C618, Table 3, Uniformity Requirements: Apply when loss on ignition of fly ash furnished exceeds 3 percent.
  - f. ASTM C618, Table 3, Effectiveness in Contributing to Sulfate Resistance: Procedure A after 6-month sulfate exposure, maximum 0.05 percent.
  - g. ASTM C618, Table 3, Effectiveness in Contributing to Sulfate Resistance: Procedure B, expansion of test mixture as a percentage of sulfate resistance cement control, after at least 6-month exposure, maximum 100 percent.
  - h.  $\frac{CaO(\%) - 5}{FE_2O_3(\%)}$ : Maximum 1.5
6. Fly Ash: Maximum 25 percent, minimum 15 percent, of total weight of fly ash plus cement.
7. For fly ash not meeting requirements of chemical ratio listed above, furnish the following:
- a. Test fly ash in accordance with ASTM C1012.
  - b. Furnish test data confirming fly ash in combination with cement used meets strength requirements, is compatible with air-entraining agents and other additives, provides increased sulfate resistance equivalent to or better than Type II cement.

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- c. Conduct tests using proposed fly ash and cement samples together with control samples using Type II cement without fly ash.
8. Fly ash used in concrete containing aggregate classified as potentially reactive for ASR (alkali-silica reactivity) shall be limited to Class F and shall contain low levels of CaO.

### 2.02 SLURRY CONCRETE FOR HORIZONTAL CONSTRUCTION JOINTS IN WALLS

- A. Flowable, consisting of sand, 3/8-inch minus aggregate, water, and minimum 1,128 pounds of cement per cubic yard.

### 2.03 ANCILLARY MATERIALS

- A. Crack Repair Epoxy Manufacturers: As specified in Section 03 64 23, Crack Repair Epoxy Injection Grouting.
- B. Bonding Agent:
  1. Furnish two-component epoxy.
  2. Consult manufacturer for surface finish, pot life, set time, vertical or horizontal application, and forming restrictions.
  3. Manufacturers and Products:
    - a. BASF Building Systems Inc., Shakopee, MN; Concrevic.
    - b. Euclid Chemical Co., Cleveland, OH; Euco Epoxy System.
    - c. Sika Chemical Corp., Lyndhurst, NJ; Sikadur 32.
- C. Bond Breaker:
  1. Nonstaining type, providing positive bond prevention.
  2. Manufacturers and Products:
    - a. Burke Co., San Mateo, CA; Burke Clean Lift Bond Breaker or Burke Tilt Free Bond Breaker.
    - b. Nox-Crete Products Group, Omaha, NE; Silco seal Select.
    - c. Williams Distributors, Inc., Seattle, WA; Williams Tilt-Up Compound.
- D. Repair Material:
  1. Contain no chlorides or other chemicals causing steel corrosion.
  2. Repair mortar specifically mixed and then tested at Job Site for appearance compatibility prior to use in exposed areas.
  3. Low pressure spray or hand applied silica fume mortar, for vertical and overhead repair, as specified in Section 03 01 32, Repair of Vertical and Overhead Concrete Surfaces.

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4. Repair mortar system submitted and approved for horizontal concrete surface repairs from list of repair mortars in Section 03 01 33, Repair of Horizontal Concrete Surfaces.
5. Crack repair material as specified in Section 03 64 23, Crack Repair Epoxy Injection Grouting.

### 2.04 CONCRETE MIX DESIGN

- A. Design: Select and proportion ingredients using trial batches; sample, cure and test concrete mix through approved independent testing laboratory in accordance with ACI 211.1.
  1. Concrete Compressive Strength, F'c:
    - a. 4,500 psi at 28 days, unless otherwise shown, except 3,000 psi at 28 days for secondary concrete elements such as curbs, sidewalks, and pipe/conduit encasements.
    - b. Design lab-cured trial mix cylinders.
    - c. Use additional cement or cement plus fly ash above minimum specified if required to meet average compressive strength, F'cr.
    - d. Use F'cr as basis for selection of concrete proportions as set forth in ACI 301.
    - e. F'cr: Equal to F'c plus 1,200 when data are not available to establish standard deviation.
  2. Concrete Fill:
    - a. Design for 2,500 psi at 28 days using 1-inch aggregate, 4-inch maximum slump and 0.46 maximum water to cementitious materials ratio.
    - b. Use water-reducing admixture.
- B. Proportions:
  1. Design mix to meet aesthetic and structural concrete requirements.
  2. In accordance with ACI 211.1, unless specified otherwise.
  3. Unless specifically stated otherwise, water to cementitious materials ratio shall control amount of total water added to concrete as follows:

<b>Water to Cementitious Materials Ratio</b>		
<b>Coarse Aggregate Top Size</b>	<b>Maximum W/C Ratio w/ Superplasticizer</b>	<b>Maximum W/C Ratio w/o Superplasticizer</b>
1-1/2"	0.40	0.44
1"	0.40	0.44
3/4"	0.40	0.44

4. Minimum Cementitious Materials Content:
    - a. 517 pounds per cubic yard for concrete with 1-1/2-inch maximum size aggregate.
    - b. 540 pounds per cubic yard for 1-inch maximum size aggregate.
    - c. 564 pounds per cubic yard for 3/4-inch maximum size aggregate.
    - d. Increase cementitious materials content as required to obtain strength requirements and water-cement ratio.
  5. The Proportion of coarse aggregate to total aggregate shall be at least 60%.
  6. For concrete slabs, concrete walls, and concrete base mats 2'-0" thick or greater, provide a concrete mix with a 1-1/2-inch coarse aggregate top size.
- C. Aggregate Shrinkage Effects: Design mix for shrinkage characteristics of aggregate. Test for shrinkage in accordance with ASTM C157/C157M, results at 28 days shall not exceed 0.048 percent. Aggregate will be rejected if test values exceed these limits.
- D. Admixtures:
1. Air Content:
    - a. 4 percent to 6 percent when tested in accordance with ASTM C231.
    - b. 3 percent maximum entrapped air for interior slabs where heavy-duty concrete floor finish is required or for interior slabs with dense polished machine-trowel surface. Do not add any air entraining agent to these slabs.
    - c. Use 4 percent minimum for concrete placed under requirements of cold weather concreting, unless noted otherwise.
    - d. All concrete structures utilized to contain liquids shall have 6 percent air content.
  2. Fly Ash: Maximum 25 percent, minimum 15 percent of total weight of fly ash plus cement.

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3. Water Reducers: Use in all concrete.
4. High Range Water Reducers (Superplastizicers): Use at Contractor's option. Control slump and workability to at least 4-1/2-inch slump at discharge into forms by adjusting high range water reducer at batch plant.

E. Slump Range at Site:

1. 4-1/2 inches minimum, 8 inches maximum for concrete with a high range water reducing admixture.
2. 3 inches minimum and 5 inches maximum for concrete without high range water reducing admixture.

F. Combined Aggregate Gradation:

1. Structures: Select one of the gradations shown in the following table.
2. Combined Gradation Limits: Limits shown are for coarse aggregates and fine aggregates mixed together (combined).

Sieve Sizes	Combined Gradation Percentage Passing		
	1-1/2" Max.	1" Max.	3/4" Max.
2"	- 100	-	-
1-1/2"	95 - 100	- 100	-
1"	65 - 85	90 - 100	- 100
3/4"	55 - 75	70 - 90	92 - 100
1/2"	-	-	68 - 86
3/8"	40 - 55	45 - 65	57 - 74
No. 4	30 - 45	31 - 47	38 - 57
No. 8	23 - 38	23 - 40	28 - 46
No. 16	16 - 30	17 - 35	20 - 36
No. 30	10 - 20	10 - 23	14 - 25
No. 50	4 - 10	2 - 10	5 - 14
No. 100	0 - 3	0 - 3	0 - 5
No. 200	0 - 2	0 - 2	0 - 2

2.05 CONCRETE MIXING

- A. General: In accordance with ACI 304R.

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- B. Concrete Mix Temperatures: As shown below for various stages of mixing and placing:

Concrete Temperatures				
Ambient Air Temp.	Concrete Member Size, Minimum Dimension			
	<12"	12"-36"	36"-72"	>72"
Minimum concrete temperature as mixed for indicated air temperature:				
Above 30 deg F	60 deg F	55 deg F	50 deg F	45 deg F
0 to 30 deg F	65 deg F	60 deg F	55 deg F	50 deg F
Below 0 deg F	70 deg F	65 deg F	60 deg F	55 deg F
Maximum allowable gradual temperature drop in first 24 hours after curing period and after end of protection:				
-	50 deg F	40 deg F	30 deg F	20 deg F

- C. Truck Mixers:

1. Equip with electrically actuated counters to readily verify number of revolutions of drum or blades.
2. Counter:
  - a. Resettable, recording type, mounted in driver's cab.
  - b. Actuated at time of starting mixers at mixing speeds.
3. Truck mixer operation shall furnish concrete batch as discharged that is homogeneous with respect to consistency, mix, and grading.
4. If slump tests taken at approximately 1/4 point and 3/4 point of load during discharge give slumps differing by more than 2 inches when specified, slump is more than 4 inches, discontinue use of truck mixer unless causing condition is corrected and satisfactory performance is verified by additional slump tests.
5. Before attempting to reuse unit, check mechanical details of mixer, such as water measuring, and discharge apparatus, condition of blades, speed of rotation, general mechanical condition of unit, admixture dispensing equipment, and clearance of drum.
6. Do not use nonagitating or combination truck and trailer equipment for transporting ready-mixed concrete.
7. Concrete Volume in Truck:
  - a. Limit to 63 percent of total volume capacity in accordance with ASTM C94/C94M when truck mixed.
  - b. Limit to 80 percent of total volume capacity when central mixed.

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8. Mix each batch of concrete in truck mixer for minimum 70 revolutions of drum or blades at rate of rotation designated by equipment manufacturer.
9. Perform additional mixing, if required, at speed designated by equipment manufacturer as agitating speed.
10. Place materials, including mixing water, in mixer drum before actuating revolution counter for determining number of mixing revolutions.

D. Aggregates: Thoroughly and uniformly wash before use.

E. Admixtures:

1. Air-Entraining Admixture: Add at plant through manufacturer-approved dispensing equipment.
2. Water Reducers: Add prior to addition of high range water reducing admixture (superplasticizers).
3. High range water reducing admixture (superplasticizers) and Air-Entraining Admixtures:
  - a. Add at concrete plant only through equipment furnished or approved by admixture manufacturer.
  - b. Accomplish variations in slump, working time, and air content for flowable mixes by increasing or reducing high range water reducing admixture (superplasticizers) dose or air-entraining admixture dose at ready-mix plant only.
  - c. Equipment shall provide for easy and quick visual verification of admixture amount used for each dose.
  - d. Add discharge amount to each load of concrete into separate dispensing container, verify amount is correct, and add to concrete.
  - e. Additional dosage of high range water reducing admixture (superplasticizers) may be added in field using manufacturer-approved dispensing when unexpected delays cause too great of slump loss.

### 2.06 SOURCE QUALITY CONTROL

- A. Cement: Test for total chloride content.
- B. Fly Ash: Test in accordance with ASTM C311.
- C. Batch Plant Inspection: Engineer and Special Inspector shall have access to and have right to inspect batch plants, cement mills, and supply facilities of suppliers, manufacturers, and Subcontractors, providing products included in these Specifications.

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1. Weighing Scales: Tested and certified within tolerances set forth in the NIST Handbook No. 44.
2. Batch Plant Equipment: Either semiautomatic or fully automatic in accordance with ASTM C94/C94M.

### **PART 3 EXECUTION**

#### 3.01 PLACING CONCRETE

- A. Preparation: Meet requirements and recommendations of ACI 304R and ACI 301, except as modified herein.
- B. Inspection: Notify Engineer and Special Inspector at least 1 full working day in advance before starting to place concrete.
- C. Discharge Time:
  1. As determined by set time, do not exceed 1-1/2 hours after adding cement to water unless special approved time delay admixtures are used. Coordinate time delay admixture information with manufacturer and Engineer prior to placing concrete.
  2. Adjust slump or air content at Site by adding admixtures for particular load when approved by Engineer. Then, adjust plant dosage for remainder of placement. Additional dosage at Site shall be through approved dispenser supplied by admixture manufacturer.
  3. Maintain required slump throughout time of concrete placement and consolidation. Discontinue use of high range water reducing admixture (superplasticizers) and provide new mix design if it fails to maintain slump between 4 inches to 8 inches and produce good consolidation for length of time required. Redesign mix adjusting set control admixtures to maintain setting time in range required.
- D. Placement into Formwork:
  1. Before depositing concrete, remove debris from space to be occupied by concrete.
  2. Prior to placement of concrete, dampen fill under slabs on ground, dampen sand where vapor retarder is specified, and dampen wood forms.
  3. Reinforcement: Secure in position before placing concrete.
  4. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 1.5 feet deep, except for slabs which shall be placed full depth. Place and consolidate successive layers prior to initial set of first layer to prevent cold joints.



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5. Use placement devices, for example, chutes, pouring spouts, and pumps.
6. Vertical Free Fall Drop to Final Placement: 5 feet in forms 8 inches or less wide and 8 feet in forms wider than 8 inches, except as specified.
  - a. For placements where drops are greater than specified, use placement device such that free fall below placement device conforms to required value.
  - b. Limit free fall to prevent segregation caused by aggregates hitting reinforcing steel.
7. Do not use aluminum conveying devices.
8. Provide sufficient illumination in the interior of forms so concrete deposition is visible, permitting confirmation of consolidation quality.
9. Joints in Footings and Slabs:
  - a. Ensure space beneath plastic water stop completely fills with concrete.
  - b. During concrete placement, make visual inspection of entire water stop area.
  - c. Limit concrete placement to elevation of waterstop in first pass, vibrate concrete under waterstop, lift waterstop to confirm full consolidation without voids, place remaining concrete to full height of slab.
  - d. Apply procedure to full length of waterstops.
10. If reinforcement is in direct sunlight or is more than 20 degrees F higher in temperature than concrete temperature before placement, wet reinforcement with water fog spray before placing concrete to cool reinforcement.
11. Trowel and round off top exposed edges of walls with 1/4-inch radius steel edging tool.

### E. Conveyor Belts and Chutes:

1. Design and arrange ends of chutes, hopper gates, and other points of concrete discharge throughout conveying, hoisting, and placing system for concrete to pass without becoming segregated.
2. Do not use chutes longer than 50 feet.
3. Minimum Slopes of Chutes: Angled to allow concrete to readily flow without segregation.
4. Conveyor Belts:
  - a. Approved by Engineer.
  - b. Wipe clean with device that does not allow mortar to adhere to belt.
  - c. Cover conveyor belts and chutes.

### F. Retempering: Not permitted for concrete where cement has partially hydrated.

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### G. Pumping of Concrete:

1. Provide standby pump, conveyor system, crane and concrete bucket, or other system onsite during pumping, for adequate redundancy to assure completion of concrete placement without cold joints in case of primary placing equipment breakdown.
2. Minimum Pump Hose (Conduit) Diameter: 4 inches.
3. Replace pumping equipment and hoses (conduits) that are not functioning properly.

### H. Maximum Size of Concrete Placements:

1. Limit size of each placement to allow for strength gain and volume change as a result of shrinkage.
2. Joints:
  - a. Locate expansion, control, contraction, and construction joints where shown.
  - b. When expansion or control joints are not shown, provide construction joints at maximum spacing of 40 feet.
  - c. When expansion or control joint spacing exceeds 60 feet, provide intermediate construction joints at maximum spacing of 40 feet.
  - d. Uniformly space construction joints.
  - e. Vertical construction joint shall not be greater than 20 feet from wall corners or intersections.
3. Consider beams, girders, brackets, column capitals, and haunches as part of floor or roof system and place monolithically with floor or roof system.
4. Should placement sequence result in cold joint located below finished water surface, install waterstop in joint.

### I. Minimum Time between Adjacent Placements:

1. Construction Joints: 14 days (7 days wet cure and 7 days dry cure).
2. Control Joints: 6 days.
3. Expansion Joints/Contraction Joints: 1 day.
4. At least 2 hours shall elapse after depositing concrete in long columns and walls thicker than 8 inches before depositing concrete in beams, girders, or slabs supported thereon.
5. For columns and walls 10 feet in height or less, wait at least 45 minutes prior to depositing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.

### J. Removal of Water: Unless tremie method for placing concrete is specified, remove water from space to be occupied by concrete.

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### K. Consolidation and Visual Observation:

1. Consolidate concrete with internal vibrators with minimum frequency of 8,000 cycles per minute and amplitude as required to consolidate concrete in section being placed.
2. Provide at least one standby vibrator in operable condition at placement Site prior to placing concrete.
3. Consolidation Equipment and Methods: ACI 309R.
4. Provide sufficient windows in forms or limit form height to allow for concrete placement through windows and for visual observation of concrete.
5. Vibration consolidation shall not exceed distance of 3 feet from point of placement.
6. Vibrate concrete in vicinity of joints to obtain impervious concrete.

### L. Hot Weather:

1. Prepare ingredients, mix, place, cure, and protect in accordance with ACI 305R.
2. Placement frequency shall be such that lift lines will not be visible in exposed concrete finishes.
3. Maintain concrete temperature below 90 degrees F at time of placement, or furnish test data or provide other proof that admixtures and mix ingredients do not produce flash set plastic shrinkage, or cracking as a result of heat of hydration. Cool ingredients before mixing to maintain fresh concrete temperatures as specified or less.
4. Provide for windbreaks, shading, fog spraying, sprinkling, ice, wet cover, or other means as necessary to maintain concrete at or below specified temperature.
5. Prevent differential temperature between reinforcing steel and concrete.
6. Evaporation Retardant: As specified in Section 03 39 00, Concrete Curing.

### M. Cold Weather Placement:

1. Do not place concrete when ambient temperature is below 40 degrees F or approaching 40 degrees F and falling, without special protection as specified or approved by Engineer.
2. Do not place concrete against frozen earth or ice, or against forms and reinforcement with frost or ice present.
3. Provide heated enclosures when air temperatures are below 40 degrees F.
4. Maintain surface temperature of concrete above 40 degrees F and cure concrete as specified in Section 03 39 00, Concrete Curing, for minimum of 7 days.

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5. Provide maximum and minimum thermometers placed on concrete surfaces spaced throughout Work to allow monitoring of concrete surface temperatures representative of Work.
6. In accordance with ACI 306.1 and ACI 301.
7. External Heating Units:
  - a. Vent heating units to atmosphere and do not locally heat or dry concrete. Where water cure is specified, maintain wet condition.
  - b. Do not exhaust heater flue gases (causes concrete carbonation as a result of concentrated carbon dioxide) directly into enclosed area.
8. Maintain curing conditions as specified in Section 03 39 00, Concrete Curing.

### 3.02 CONCRETE BONDING

#### A. Horizontal Construction Joints in Reinforced Concrete Walls:

1. Thoroughly clean and saturate surface of joint with water.
2. Limit slurry concrete placement to 2-inch maximum thickness, 1-inch minimum thickness.
3. Use positive measuring device such as bucket or other device that will contain only enough slurry concrete for depositing in visually measurable area of wall to ensure that portion of form receives appropriate amount of slurry concrete to satisfy placement thickness requirements.
4. Do not deposit slurry concrete from pump hoses or large concrete buckets, unless specified placement thickness can be maintained and verified through inspection windows close to joint.
5. Limit concrete placed immediately on top of slurry concrete to 12 inches thick. Thoroughly vibrate to mix concrete and slurry concrete together.

#### B. To Existing Concrete:

1. Thoroughly clean and mechanically roughen existing concrete surfaces to roughness profile of 1/4 inch.
2. Saturate surface with water for 24 hours prior to placing new concrete.

### 3.03 CONSTRUCTION JOINTS

- A. As specified in Section 03 10 00, Concrete Forming and Accessories.

3.04 REPAIRING CONCRETE

A. General:

1. Inject cracks that leak with crack repair epoxy as specified in Section 03 64 23, Crack Repair Epoxy Injection Grouting.
2. Repair horizontal concrete surfaces using one of the materials specified in Section 03 01 33, Repair of Horizontal Concrete Surfaces. Select system, submit for review, and obtain approval from Engineer prior to use.
3. Repair vertical and overhead concrete as specified in Section 03 01 32, Repair of Vertical and Overhead Concrete Surfaces.
4. Develop repair techniques with material manufacturer on mockup panels prior to starting actual repair work and show how finish color will blend with adjacent surfaces. Obtain approval from Engineer.
5. Obtain quantities of repair material and manufacturer's detailed instructions for use to provide repair with finish to match adjacent surface or apply sufficient repair material adjacent to repair to blend finish appearance.
6. Repair of concrete shall provide structurally sound surface finish, uniform in appearance or upgrade finish by other means until acceptable to Engineer.

B. Tie Holes:

1. Fill with nonshrink grout as specified in Section 03 62 00, Nonshrink Grouting.
2. Match color of adjacent concrete and demonstrate on mockup panels first.
3. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

C. Alternate Form Ties; Through-Bolts:

1. Mechanically roughen entire interior surface of through hole. Epoxy coat roughened surface and drive elastic vinyl plug to half depth. Dry pack entire hole from both sides of plug with nonshrink grout, as specified in Section 03 62 00, Nonshrink Grouting. Use only enough water to dry pack grout. Dry pack while epoxy is still tacky. If epoxy has dried, remove epoxy by mechanical means and reapply new epoxy.
2. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

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### D. Exposed Metal Objects:

1. Metal objects not intended to be exposed in as-built condition of structure including wire, nails, and bolts, shall be removed by chipping back concrete to depth of 1 inch and then cutting or removing metal object.
2. Repair area of chipped-out concrete per requirements of Section 03 01 32, Repair of Vertical and Overhead Concrete Surfaces.

### E. Blockouts at Pipes or Other Penetrations:

1. Install per details shown on Drawings or submit proposed blockouts for review.
2. Use nonshrink, nonmetallic grout, Category I or II as specified in Section 03 62 00, Nonshrink Grouting.

## 3.05 CONCRETE WALL FINISHES

### A. Type W-1 (Ordinary Wall Finish):

1. Patch tie holes.
2. Knock off projections.
3. Patch defective areas.

### B. Type W-2 (Smooth Wall Finish):

1. Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch defective areas and repair rough spots resulting from form release agent failure or other reasons to provide smooth uniform appearance.

### C. Type W-4 (Finish for Cementitious Coatings):

1. Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch and repair defective areas as specified for Type W-2.
4. Leave surface ready for cementitious coating specified in Section 09 97 26, Cementitious Coatings.

### D. Type W-5 (Finish for Painting):

1. Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch and repair defective areas as specified for Type W-2.
4. Leave surface ready for painting as specified in Section 09 90 00, Painting and Coating.

E. Type W-7 (Smooth Rubbed Wall Finish):

1. Only water curing will be permitted on walls being rubbed.
2. Perform rubbing while green concrete can be physically worked and smoothed without adding other materials, if structurally possible, the day following placement. Finish no later than 3 days after placement has been completed.
3. Remove forms at such a rate that finishing, form tie filling, fin removal, and patching can be completed on same day forms are removed while curing wall.
4. After pointings have set sufficiently to permit working on surface, thoroughly saturate entire surface with water for period of 3 hours and rub until uniform surface is obtained.
5. Rub either by hand with carborundum stone of medium-coarse grade or abrasive of equal quality, or mechanically operated carborundum stone.
6. Mechanically operated carborundum stones shall be approved by Engineer before concrete finishing.
7. No cement grout, other than cement paste drawn from the concrete itself by the rubbing process shall be used.
8. Finish paste formed by rubbing by either brushing or floating as follows:
  - a. Brushing:
    - 1) Carefully strike with clean brush.
    - 2) Brush in long direction of surface being finished.
  - b. Floating:
    - 1) Spread uniformly over surface and allow to reset.
    - 2) Finish by floating with canvas, carpet face, or cork float, or rub down with dry burlap.
9. Continue water curing of wall during finishing operation in areas not being rubbed.
10. Move water curing onto rubbed areas as soon as water will not erode rubbed surface.

F. Type W-8 (Rubbed Wall Finish):

1. Meet requirements for Type W-7, except allow paste obtained from rubbing to set at least 24 hours.
2. After thoroughly saturating with water, coat surface with mixture of 85 percent cement and 15 percent lime with sufficient water to give creamy consistency. Demonstrate on sample panel prior to production finishing.
3. Rub this mixture into surface with coarse carborundum stone and brush with damp brush.
4. Brush in long direction of surface being finished.

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5. Latex bonding admixture may be used. Consult with Euclid Chemical Co., Cleveland, OH or BASF Building Systems Inc., Shakopee, MN.

### 3.06 CONCRETE SLAB FINISHES

#### A. General:

1. Finish slab concrete per the requirements of ACI 302.1R.
2. Use manual screeds, vibrating screeds, or roller compacting screeds to place concrete level and smooth.
3. Do not use "jitterbugs" or other special tools designed for purpose of forcing coarse aggregate away from surface and allowing layer of mortar, which will be weak and cause surface cracks or delamination, to accumulate.
4. Do not dust surfaces with dry materials.
5. Use evaporation retardant.
6. Round off edges of slabs with steel edging tool, except where cove finish is shown. Steel edging tool radius shall be 1/4 inch for slabs subject to wheeled traffic.

#### B. Type S-1 (Steel Troweled Finish):

1. Finish by screeding and floating with straightedges to bring surfaces to required finish elevation. Use evaporation retardant.
2. While concrete is still green, but sufficiently hardened to bear a person's weight without deep imprint, wood float to true, even plane with no coarse aggregate visible.
3. Use sufficient pressure on wood floats to bring moisture to surface.
4. After surface moisture has disappeared, hand trowel concrete to produce smooth, impervious surface, free from trowel marks.
5. Burnish surface with an additional troweling. Final troweling shall produce ringing sound from trowel.
6. Do not use dry cement or additional water during troweling, nor will excessive troweling be permitted.
7. Power Finishing:
  - a. Approved power machine may be used in lieu of hand finishing in accordance with directions of machine manufacturer.
  - b. Do not use power machine when concrete has not attained necessary set to allow finishing without introducing high and low spots in slab.
  - c. Do first steel troweling for slab S-1 finish by hand.



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- C. Type S-2 (Wood Float Finish):
1. Finish slab to receive fill and mortar setting bed by screeding with straightedges to bring surface to required finish plane.
  2. Wood float finish to compact and seal surface.
  3. Remove laitance and leave surface clean.
  4. Coordinate with other finish procedures.
- D. Type S-3 (Underside Elevated Slab Finish): When forming is removed, grind off projections on underside of slab and patch defective areas, including small shallow air pockets where schedule of concrete finishes requires:
1. Prepare surfaces for cementitious coating as specified in Section 09 97 26, Cementitious Coatings.
  2. Prepare surfaces for painting as specified in Section 09 90 00, Painting and Coating.
- E. Type S-4 (Exposed Aggregate Finish):
1. Embed single layer of selected aggregates at surface of concrete slab immediately after it has been placed, screeded, and smoothed.
  2. Embed aggregates by tamping with wood float, darby, or rolling device.
  3. Accomplish exposure of selected aggregates by removing surface matrix by washing with water and brushing with stiff plastic bristled brush as soon as concrete has set sufficiently to support weight of a person.
  4. Exposure: No greater than 1/3 the average diameter of aggregate, nor less than 1/4.
  5. Next day acid wash until there is no noticeable cement film on aggregate exposed.
  6. Apply clear sealer per manufacturer's recommendations.
- F. Type S-5 (Broomed Finish):
1. Finish as specified for Type S-1 floor finish, except omit final troweling and finish surface by drawing fine-hair broom lightly across surface.
  2. Broom in same direction and parallel to expansion joints, or, in the case of inclined slabs, perpendicular to slope, except for round roof slab, broom surface in radial direction.
- G. Type S-6 (Sidewalk Finish):
1. Slope walks down 1/4 inch per foot away from structures, unless otherwise shown.

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2. Strike off surface by means of strike board and float with wood or cork float to true plane, then flat steel trowel before brooming.
3. Broom surface at right angles to direction of traffic or as shown.
4. Lay out sidewalk surfaces in blocks, as shown or as directed by Engineer, with grooving tool.

### H. Concrete Curbs:

1. Float top surface of curb smooth, and finish all discontinuous edges with steel edger.
2. After concrete has taken its initial set, remove front form and give exposed vertical surface an ordinary wall finish, Type W-1.

## 3.07 CONCRETE SLAB TOLERANCES

### A. Slab Tolerances:

1. Exposed Slab Surfaces: Comprise of flat planes as required within tolerances specified.
2. Slab Finish Tolerances and Slope Tolerances: Crowns on floor surface not too high as to prevent 10-foot straightedge from resting on end blocks, nor low spots that allow block of twice the tolerance in thickness to pass under supported 10-foot straightedge.
3. Slab Type S-A: Steel gauge block 5/16 inch thick.
4. Slab Type S-B: Steel gauge block 1/8 inch thick.
5. Slab Type S-A and S-B: Finish Slab Elevation: Slope slabs to floor drain and gutter, and shall adequately drain regardless of tolerances.
6. Thickness: Maximum 1/4 inch minus or 1/2 inch plus from thickness shown. Where thickness tolerance will not affect slope, drainage, or slab elevation, thickness tolerance may exceed 1/2 inch plus.

- B. Thickness: Maximum 1/4 inch minus or 1/2 inch plus from thickness shown. Where thickness tolerance will not affect slope, drainage, or slab elevation, thickness tolerance may exceed 1/2 inch plus.

## 3.08 BEAM AND COLUMN FINISHES

- A. General: Inject cracks with crack repair epoxy as specified in Section 03 64 23, Crack Repair Epoxy Injection Grouting. Patch and repair defective areas.
- B. Type B-1: Match wall Type W-1.
- C. Type B-2: Match wall Type W-2.

- D. Type B-3:
  - 1. Repair rock pockets.
  - 2. Fill air voids.
  - 3. Match wall Type W-4 or W-5.
- E. Type C-1: Match wall Type W-1.
- F. Type C-2: Match wall Type W-2.
- G. Type C-3:
  - 1. Fill air pockets.
  - 2. Match wall Type W-4 or W-5.

3.09 BACKFILL AGAINST WALLS

- A. Do not backfill against walls until wall concrete and supporting slab concrete has obtained specified 28-day compressive strength. Consult with Engineer prior to backfilling against walls.
- B. Place backfill simultaneously on both sides of wall, where required, to prevent differential pressures.

3.10 CLEANING AND STERILIZING OF POTABLE WATER BASINS

- A. Cleaning:
  - 1. Thoroughly clean interior surfaces using water under pressure, before sterilizing.
  - 2. Entirely isolate basin from system to avoid possibility of contaminating materials entering distribution system.
  - 3. Cleaning shall:
    - a. Remove deposits of foreign nature.
    - b. Remove growths.
    - c. Clean slopes, walls, top, and bottom.
    - d. Avoid damage to structure.
    - e. Avoid pollution or oil deposits by workers and equipment.
  - 4. Dispose of water used in cleaning basin before adding chlorinating agent to basin.
- B. Sterilization of structures for potable water is specified in Section 33 13 00, Disinfecting of Water Utility Distribution.

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### 3.11 FIELD QUALITY CONTROL

#### A. General:

1. Provide adequate facilities for safe storage and proper curing of concrete test cylinders onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
2. Provide concrete for testing of slump, air content, and for making cylinders from the point of discharge into forms. When concrete is pumped, Samples used shall be taken from discharge end of pump hose.
3. Evaluation will be in accordance with ACI 301 and Specifications.
4. Specimens shall be made, cured, and tested in accordance with ASTM C31/C31M and ASTM C39/C39M.
5. Frequency of testing may be changed at discretion of Engineer.
6. Pumped Concrete: Take concrete samples for slump (ASTM C143/C143M) and test cylinders (ASTM C31/C31M and ASTM C39/C39M) and shrinkage specimens (ASTM C157/C157M) at placement (discharge) end of line.
7. Reject concrete represented by cylinders failing to meet strength and air content specified.

#### B. Drying Shrinkage Tests:

1. Perform on concrete for laboratory trial mixes every 5,000 cubic yards of concrete used on job and every 3 months during construction when compression test cylinders are made.
2. Make set of three specimens for each shrinkage test.
3. Prism Specimen Size:
  - a. 4 inches by 4 inches by approximately 11 inches with effective gauge length of 10 inches for all aggregate that passes 2-inch sieve.
  - b. 3 inches by 3 inches by approximately 11 inches with effective gauge length of 10 inches for all aggregate that passes 1-inch sieve.
4. Specimens: Fabricate, cure, dry, and measure as specified in ASTM C157/C157M modified as follows:
  - a. Remove specimens from molds aged 23 hours, plus or minus 1 hour after trial batching.
  - b. Place immediately in water at 73 degrees F, plus or minus 3 degrees for at least 30 minutes.
  - c. Measure within 30 minutes thereafter to determine original length and then submerge in saturated limewater at 73 degrees F, plus or minus 3 degrees.

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- d. Measure at age 7 days to determine expansion expressed as percentage of original length. Length at age 7 days shall be base length for drying shrinkage calculations (0 day drying age).
  - e. Store specimens immediately in humidity control room maintained at 73 degrees F, plus or minus 3 degrees and 50 percent, plus or minus 4 percent relative humidity for remainder of test.
  - f. Measure to determine shrinkage expressed as percentage of base length and report separately for 7 days, 14 days, 21 days, and 28 days of drying after 7 days of moist curing.
5. Computing Drying Shrinkage Deformation:
- a. Deformation of Each Specimen: Difference between base length (at 0-day drying age) and length after drying at each test age.
  - b. Compute average drying shrinkage deformation to nearest 0.001 percent at each test age.
  - c. If drying shrinkage of any specimen departs from average of that test age by more than 0.004 percent, disregard results obtained from that specimen.
6. Compression Test Specimens:
- a. Take in each case from same concrete used for preparing drying shrinkage specimens, and fabricate, cure, and test in accordance with ASTM C192/C192M.
  - b. Onsite, at point of discharge of concrete placement, take test cylinders from concrete with slump equal to that specified for Project.
  - c. Test three specimens at age of 7 days and four at age of 28 days.
  - d. These tests shall be considered part of normal compression tests for Project.
  - e. Concrete Shrinkage at 28-Day Drying Age: 0.048 percent maximum for both laboratory trial mixes and for field specimens during construction.
7. If 7-day or 14-day shrinkage specimen tests for placed concrete exceed shrinkage limits established from acceptable test batch shrinkage tests, furnish additional 14 days of water curing beyond that specified for concrete surfaces of hydraulic structures that drying shrinkage specimens represent. Modify mix design to reduce shrinkage prior to casting additional concrete on Project.

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- C. High Range Water Reducer (Superplasticizer) Admixture Segregation Test:  
Test each truck prior to use on job.
1. Segregation Test Objective: Concrete with 4-inch to 8-inch slump must stay together when slumped. Segregation is assumed to cause mortar to flow out of mix even though aggregate may stay piled enough to meet slump test.
  2. Test Procedure: Make slump test and check for excessive slump and observe to see if mortar or moisture flows from slumped concrete.
  3. Reject concrete if mortar or moisture separates and flows out of mix.
- D. Cold Weather Placement Tests:
1. During cold weather concreting, cast cylinders for field curing as follows. Use method that will produce greater number of specimens:
    - a. Six extra test cylinders from last 100 cubic yards of concrete.
    - b. Minimum three specimens for each 2 hours of placing time or for each 100 cubic yards.
  2. These specimens shall be in addition to those cast for lab testing.
  3. Protect test cylinders from weather until they can be placed under same protection provided for concrete of structure that they represent.
  4. Keep field test cylinders in same protective environment as parts of structure they represent to determine if specified strength has been obtained.
  5. Test cylinders in accordance with applicable sections of ASTM C31/C31M and ASTM C39/C39M.
  6. Use test results to determine specified strength gain prior to falsework removal or for prestressing.
- E. Tolerances:
1. Walls: Measure and inspect walls for compliance with tolerances specified in Section 03 10 00, Concrete Forming and Accessories.
  2. Slab Finish Tolerances and Slope Tolerances:
    - a. Floor flatness measurements shall be made day after floor is finished and before shoring is removed to eliminate effects of shrinkage, curing, and deflection.
    - b. Support 10-foot-long straightedge at each end with steel gauge blocks of thicknesses equal to specified tolerance.
    - c. Compliance with designated limits in four of five consecutive measurements is satisfactory, unless defective conditions are observed.
  3. Slab Finish Tolerances and Slope Tolerances:
    - a. Slab Flatness and Levelness: Measurements shall be made within 72 hours of concrete placement.

## FORT THOMAS WTP ADVANCED TREATMENT

- 1) Flatness measurements are not applicable to unshored form surfaces or shored form surfaces after removal of shores.
  - 2) Levelness measurements are not applicable to cambered or sloped surfaces.
- b. Slab Flatness and Levelness shall be determined in accordance with ASTM E1155.

### F. Water Leakage Tests:

1. Purpose: Determine integrity and watertightness of finished exterior and interior water holding concrete surfaces.
2. Potable Water Supply Reservoirs: Clean and sterilize prior to conducting test as specified in Section 33 13 00, Disinfecting of Water Utility Distribution.
3. Water-Holding Structures:
  - a. Perform leakage tests after concrete structure is complete and capable of resisting hydrostatic pressure of water test. Concrete shall have achieved its full design strength.
  - b. Perform leakage test before backfill, brick facing, grout topping slab, coatings, or other work that will cover concrete surfaces has begun.
  - c. Install temporary bulkheads, cofferdams, and pipe blind flanges, and close valves. Inspect each to see that it provides complete seal.
  - d. Fill with water to test level shown, or maximum liquid level if no test level is given. Maintain this level for 72 hours prior to start of test to allow water absorption, structural deflection, and temperature to stabilize.
  - e. Measure evaporation and precipitation by floating a partially filled, transparent, calibrated, open top container.
  - f. Measure water surface at two points 180 degrees apart when possible where attachments, such as ladders exist, at 24-hour intervals. Using sharp pointed hook gauge and fixed metal measure capable of reading to 1/100 of an inch. Continue test for period of time sufficient to produce at least 1/2-inch drop in water surface based on assumption that leakage would occur at maximum allowable rate specified or for 72 hours, whichever is lesser time.
4. Acceptance Criteria:
  - a. Volume loss shall not exceed 0.050 percent of contained liquid volume in 24-hour period, correcting for evaporation, precipitation, and settlement.

## FORT THOMAS WTP ADVANCED TREATMENT

- b. No damp spots or seepage visible on exposed surfaces. Damp spot is defined as sufficient moisture to be transferred to dry hand upon touching.
- 5. Repairs When Test Fails: Dewater structure; fill leaking cracks with crack repair epoxy as specified in Section 03 64 23, Crack Repair Epoxy Injection Grouting. Patch areas of damp spots previously recorded, and repeat water leakage test in its entirety until the structure successfully passes the test.

### 3.12 MANUFACTURER'S SERVICES

- A. Provide the following representative at Site in accordance with Section 01 43 33, Manufacturers' Field Services, for installation assistance, inspection, and certification of proper installation for concrete ingredients, mix design, mixing, and placement.
  - 1. Batch Plant Representative:
    - a. Observe how concrete mixes are performing.
    - b. Be present during first placement of each type of concrete mix.
    - c. Assist with concrete mix design, performance, placement, weather problems, and problems as may occur with concrete mix throughout Project.
    - d. Establish control limits on concrete mix designs.
  - 2. Admixture Manufacturer's Representative:
    - a. Demonstrate special features, product performance, product mixing, testing, and placement or installation for each type of admixture.
    - b. Observe how concrete mixes are performing.
    - c. Be present during first placement of each type of concrete mix.
    - d. Assist with concrete mix design, performance, placement, weather problems, and problems as may occur with concrete mix throughout Project, including instructions for redosing.
    - e. Provide equipment for control of concrete redosing for air entrainment or high range water reducing admixture (superplasticizers) at Site to maintain proper slump and air content if so needed.
  - 3. Bonding Agent Manufacturer's Representative: Demonstrate product performance, product mixing, and placement.

### 3.13 PROTECTION OF INSTALLED WORK

- A. After curing as specified in Section 03 39 00, Concrete Curing, and after applying final floor finish, cover slabs with plywood or particle board or plastic sheeting or other material to keep floor clean and protect it from material and damage as a result of other construction work.



FORT THOMAS WTP ADVANCED TREATMENT

B. Repair defective areas and areas damaged by construction.

3.14 SCHEDULE OF CONCRETE FINISHES

- A. Form Tolerances: As specified in Section 03 10 00, Concrete Forming and Accessories.
- B. Special Floor Finishes: As specified in Section 03 35 00, Concrete Finishing.
- C. Provide concrete finishes as scheduled:

Area	Type of Finish	Required Form Tolerances
<b>Exterior Wall Surfaces</b>		
Abovegrade/exposed (above a point 6" below finish grade)	W-4	W-B
Abovegrade/covered with brick veneer or other finish material	W-1	W-A
Backfilled/waterproofed (below a point 6" below finish grade)	W-1	W-A
Backfilled/not waterproofed (below a point 6" below final grade)	W-1	W-A
Walls to receive cementitious coatings	W-4	W-B
<b>Interior Wall Surfaces</b>		
Open top water-holding tanks and basins/not painted or coated	W-2	W-A
Covered water-holding tanks and basins/not painted or coated	W-1	W-A
Water-holding tanks, channels, and basins/painted or coated	W-5	W-A
Buildings, pipe galleries, and other dry areas/not painted or coated	W-2	W-A
Buildings, pipe galleries, and other dry areas/painted or coated	W-5	W-A

FORT THOMAS WTP ADVANCED TREATMENT

Area	Type of Finish	Required Form Tolerances
<b>Exterior Slabs</b>		
Roof slab/exposed	S-5	S-B
Roof slab/covered with roofing material	S-1	S-A
Water-holding tanks and basins/top of wall	S-1	S-B
Other water-holding tanks and basins	S-1	S-A
Stairs and landings	S-5	S-B
Sidewalks	S-6	S-B
Other exterior slabs	S-5	S-A
<b>Interior Slabs</b>		
Buildings, pipe galleries, and other dry areas	S-1	S-B
Slabs to receive mortar setting bed for tile	S-2	S-A
Slabs to receive resilient flooring or carpet	S-1	S-A
Hydraulic channels	S-1	S-A
Underside of elevated slabs	S-3	S-A
<b>Beams and Columns</b>		
Beams/coated	B-3	B-A
Beams/not coated	B-2	B-A
Columns/coated	C-3	C-A
Columns/not coated	C-2	C-A

**END OF SECTION**

**SECTION 03 35 00  
CONCRETE FINISHING**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM): C109, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-In. or 50-Mm Cube Specimens).

1.02 SUBMITTALS

- A. Action Submittals: Manufacturer's product data sheet(s).
- B. Informational Submittals:
1. Agenda: Conference prior to slab placement.
  2. Manufacturer's written procedures for slab preparation, product application, protection of finished surface, and post-application cleanup.
  3. Product manufacturers representatives' names and phone numbers.
  4. Manufacturer's Certificate of Compliance for products to be furnished.
  5. Manufacturer's Certificate of Proper Installation.
  6. Statement of Qualifications:
    - a. Manufacturer's Product Service Record.
    - b. Application personnel.
    - c. Manufacturer's representative.
  7. Manufacturer's installation instructions.
  8. Manufacturer's written instructions for maintenance and repair of floor finishes installed.

1.03 QUALITY ASSURANCE

- A. Qualifications:
1. Manufacturer's Product Service Record: Five previous projects at least 5 years old where product was used at representative coverage per square foot.
  2. Floor Product Manufacturer: Manufacture components of floor material, except the epoxy, in own plant and under control of trained quality control manager.
  3. Application Personnel: Four previous projects of successful installation of specified materials or manufacturer's training.

## FORT THOMAS WTP ADVANCED TREATMENT

- B. Preinstallation Training: Manufacturer-approved training of application personnel and quality control inspectors for these floor finishes.
- C. Conference Prior to Slab Placement:
  - 1. Conducted by Contractor.
  - 2. Agenda:
    - a. Concrete mix design.
    - b. Placing techniques.
    - c. Finishing techniques.
    - d. Floor hardener application procedures.
    - e. Equipment required for these procedures.
  - 3. Attendees:
    - a. Contractor's superintendent.
    - b. Subcontractor's representative involved in slab installation and finishing.
    - c. Engineer.
    - d. Special Inspector.
- D. Mockups: Install one 10-foot by 20-foot area for each type of finish floor to demonstrate that the material and methods produce a finished product acceptable to the Engineer.
  - 1. Mockup will establish the standard of quality for floor finishes.
  - 2. Use specified materials at a location designated by Engineer or Owner.
  - 3. Notify Engineer 5 days in advance of commencement of mockup floor slab application and training.
  - 4. Do not purchase floor materials until mockup slab installation has been accepted by the Engineer or Owner.
- E. Color Samples: Minimum 2-inch by 2-inch Sample applications of floor finishes available.

### **PART 2 PRODUCTS**

#### **2.01 CLEAR LIQUID SEALER DUST PROOFER**

- A. Colorless, aqueous solution of zinc and magnesium fluorosilicate.
- B. Each gallon of solution shall contain a minimum of 2 pounds of fluorosilicate compound.

C. Manufacturers:

1. Master Builders Co., Cleveland, OH.
2. Sonneborn, Minneapolis, MN.
3. Euclid Chemical Co., Cleveland, OH.

**PART 3 EXECUTION**

**3.01 CLEAR LIQUID SEALER DUST PROOFER APPLICATION**

- A. Before application, thoroughly cure floors to receive treatment for minimum 28 days, keep clean, unpainted, free from membrane curing compounds, and perfectly dry with all Work above them completed.

**3.02 TESTS AND INSPECTION**

- A. Vapor Transmission Test: Conduct test on new and existing concrete to show that no surface moisture exists prior to application of specified special floor treatment, as follows:
1. Place polyethylene plastic sheet, minimum 4 feet by 4 feet and sealed along four sides with duct tape to prevent moisture transmission by evaporation, over concrete floor area for 24 hours.
  2. Indication of moisture transmission will be apparent by accumulation of moisture on enclosed surface of polyethylene plastic sheet.
  3. Do not apply concrete bonding agent until test results indicate moisture is not being transmitted from concrete surface.
- B. Epoxy Joint Filler:
1. Allow 90 days after slab placement before filling joints.
  2. Mix and install in accordance with manufacturer's instructions.
  3. Fill contraction or construction joints in areas receiving armored joint treatment.

**3.03 MANUFACTURER'S SERVICES**

- A. Provide manufacturer's representative at Site in accordance with Section 01 43 33, Manufacturers' Field Services, for installation assistance, inspection and certification of proper installation, and training of application personnel.
1. Technical assistance with design and adjustment of concrete mixes to receive floor finishes and toppings.
  2. Technical assistance to assure and certify application and installation of system being used.

FORT THOMAS WTP ADVANCED TREATMENT

3. Consultation, direction, and certification of mockup, for full-scale application of floor finishes, and at other times as needed.
4. Attendance at the conference prior to slab placement to finalize proper methods and procedures.

**END OF SECTION**

**SECTION 03 39 00  
CONCRETE CURING**

**PART 1 GENERAL**

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
  - a. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing concrete.
  - b. C1315, Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.

1.02 SUBMITTALS

A. Action Submittals:

1. Manufacturers' data for the following products:
  - a. Exposed aggregate finish retardant on formed surface.
  - b. Evaporation retardant.
  - c. Curing compound.
  - d. Clear sealer.
  - e. Clear floor hardener.
2. Curing methods proposed.

B. Informational Submittals:

1. Curing Compound: Manufacturer's Certificate of Compliance showing moisture retention requirements.
2. Retardants for Exposed Aggregate Finish: Manufacturer's Certification of Compliance.

**PART 2 PRODUCTS**

2.01 MATERIALS

A. Curing Compound:

1. Water-based, high solids content nonyellowing curing compound meeting requirements of ASTM C309 and ASTM C1315.
  - a. Moisture Loss: 0.40 kg/square m/72 hours maximum.

## FORT THOMAS WTP ADVANCED TREATMENT

- b. Capable of meeting moisture retention at manufacturer's specified application rate.
    2. **Manufacturers and Products:**
      - a. Chemrex, Inc., Shakopee, MN; Masterkure.
      - b. Euclid Chemical Co., Cleveland, OH; Super Diamond Clear VOX.
      - c. WR Meadows, Inc., Hampshire, IL; VOCOMP-30.
      - d. Vexcon Chemical, Inc.; Philadelphia, PA; Starseal 1315.
      - e. Dayton Superior; Safe Cure and Seal 30%.
  - B. **Evaporation Retardant:**
    1. Optional: Fluorescent color tint that disappears completely upon drying.
    2. **Manufacturers and Products:**
      - a. Master Builders Co., Cleveland, OH; Confilm.
      - b. Euclid Chemical Co., Cleveland, OH; Eucobar.
  - C. **Clear Sealer (One-Component Penetrating Silane Sealer):**
    1. **Manufacturers and Products:**
      - a. Chemrex, Inc., Shakopee, MN; Masterseal SL.
      - b. Euclid Chemical Co.; Eucoguard 200.
  - D. **Clear Floor Hardener:**
    1. Colorless, aqueous solution of zinc and magnesium fluorosilicate.
    2. Each gallon of solution shall contain a minimum of 2 pounds of fluorosilicate compound.
    3. **Manufacturers:**
      - a. Chemrex, Inc., Shakopee, MN.
      - b. Euclid Chemical Co., Cleveland, OH.
      - c. Sonneborn, Minneapolis, MN.
  - E. **Water:** Clean and potable, containing less than 500 ppm of chlorides.

### **PART 3 EXECUTION**

#### **3.01 CURING OF CONCRETE**

- A. Use one of the following methods as approved by Engineer:
  1. **Walls:**
    - a. **General:** Where walls are to receive coatings, painting, cementitious material, or other similar finishes, use only water curing procedures.



## FORT THOMAS WTP ADVANCED TREATMENT

- b. Method 1: Leave concrete forms in place and keep entire surfaces of forms and concrete wet for 7 days.
  - c. Method 2: Apply curing compound, where allowed, immediately after removal of forms.
  - d. Method 3: Continuously sprinkle with water 100 percent of exposed surfaces for 7 days starting immediately after removal of forms.
2. Slabs and Curbs:
- a. Method 1: Protect surface by water ponding for 7 days.
  - b. Method 2: Cover with burlap or cotton mats and keep continuously wet for 7 days.
  - c. Method 3: Cover with 1-inch layer of wet sand, earth, or sawdust, and keep continuously wet for 7 days.
  - d. Method 4: Continuously sprinkle exposed surface for 7 days.
  - e. Other agreed upon method that will keep moisture present and uniform at all times on surface of slabs. Do not use curing compounds.
  - f. Where water curing for slabs during cold weather is not possible, use Engineer-approved curing compound at manufacturer's recommended coverage per gallon.
  - g. Where curing compound cannot be used, special methods using moisture shall be agreed upon prior to placing the concrete slabs.
  - h. Protect slabs during cold weather with plastic sheets or other material inside required heated enclosure if foot traffic is permitted on slabs.

B. Use only water curing on potable water structures.

C. Use only water curing where additional finishes such as clear sealer, hardeners, painting, and other special coatings are required.

### 3.02 EVAPORATION RETARDANT APPLICATION

A. Spray onto surface of fresh flatwork concrete immediately after screeding to react with surface moisture.

B. Reapply as needed to ensure a continuous moist surface until final finishing is completed.

### 3.03 CLEAR SEALER APPLICATION

A. Apply to floor slabs.

## FORT THOMAS WTP ADVANCED TREATMENT

- B. Before application, water cure concrete walls and floors to receive sealer for a minimum of 28 days, keep clean, unpainted, free from membrane curing compounds, with Work above them completed.
- C. Apply with stiff brush, short nap roller, squeegee, garden sprayer, or conventional paint spray equipment.
- D. Apply at a coverage rate of 125 to 200 square feet per gallon as recommended by manufacturer and cure the sealer on slabs for the following minimum cure time at the ambient temperatures shown prior to allowing foot traffic:
  - 1. 90 degrees F: 2 hours.
  - 2. 75 degrees F: 4 hours.
  - 3. 50 degrees F: 8 hours.
  - 4. 35 degrees F: 16 hours.

### 3.04 CLEAR HARDENER APPLICATION

- A. Before application, water cure floors to receive hardener for minimum 28 days, keep clean, unpainted, free from membrane curing compounds, and perfectly dry with all work above them completed.
- B. Apply hardener evenly, using three coats, allowing 24 hours between coats:
  - 1. First coat 1/3 strength, second coat 1/2 strength, and third coat 2/3 strength, mix with water.
  - 2. Apply each coat so as to remain wet on surfaces for 15 minutes.
  - 3. Apply approved hardeners in accordance with manufacturer's instructions.
  - 4. After final coat is completed and dry, remove surplus hardener from surface by scrubbing and mopping with water.

### 3.05 MANUFACTURER'S SERVICES

- A. Provide manufacturer's representative at Site in accordance with Section 01 43 33, Manufacturers' Field Services, for installation assistance, inspection, and certification of proper installation for products specified.
- B. Provide clear sealer manufacturer's representative to demonstrate proper application of product.
- C. Provide floor hardener manufacturer's representative to demonstrate proper mixing and application of product.

FORT THOMAS WTP ADVANCED TREATMENT

- D. Provide curing compound manufacturer's representative to demonstrate proper application of curing compound to show coverage in one coat.

**END OF SECTION**

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**SECTION 03 40 00  
PRECAST CONCRETE**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Concrete Institute (ACI): 304R, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
  2. ASTM International (ASTM):
    - a. A36, Standard Specification for Structural Steel.
    - b. A416, Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete.
    - c. C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  3. Precast/Prestressed Concrete Institute (PCI):
    - a. MNL-117, Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products.
    - b. MNL-120, Design Handbook for Precast and Prestressed Concrete, Third Edition.

**1.02 SUBMITTALS**

- A. Action Submittals:
1. Sealer for Exterior Surfaces: Product data with mixing/application instructions.
  2. Form Liners: Manufacturer's literature and product data.
  3. Calculations and Technical Data: Proposed details and design calculations for stresses in all critical sections of precast members for all loading conditions including transportation, handling, and erection.
    - a. Tilt-Up Panel Walls: Show type and location of inserts, extra reinforcement for handling, and other pertinent data for proposed tilt-up construction.
- B. Informational Submittals:
1. For Precasting Manufacturers Not Listed in Article Quality Assurance:
    - a. Experience record on production of precast concrete as shown, with information on precasting plant, that will indicate capability to satisfactorily perform the Work.
    - b. Evidence of current PCI plant certification.

## FORT THOMAS WTP ADVANCED TREATMENT

- c. Complete list of architectural panelwork accomplished in past 2 years, including:
  - 1) Type of structure.
  - 2) Name of owner.
  - 3) Address of completed work.
2. Certificate of Compliance: Certify admixtures and concrete do not contain calcium chloride.
3. Test Reports:
  - a. For precast manufacturer's concrete test cylinders.
  - b. Inspection of installed panels.

### 1.03 QUALITY ASSURANCE

#### A. Qualifications of Precasting Manufacturers:

1. Precast Concrete and Precast Prestressed Concrete: Product of manufacturer with 3 years' experience producing precast concrete products of quality specified.
2. Precast Plant: PCI certified plant with current certification.
3. Calculations stamped by an engineer registered in the State of Kentucky.

#### B. Samples for Exposed Aggregate Finish:

1. Before starting tilt-up panels, provide two Sample concrete panels for each aggregate finish required, 4 feet square and 3 inches thick for Engineer's approval.
2. Vary amounts of retardant to be used.
3. Approved Finish: Constitutes standard of quality required in completed Work.

#### C. Mockup Panels for Architectural Precast Panels:

1. Review Sample in Architect's office as a guide in preparation of mockup panels.
2. Construct:
  - a. One full-size mockup panel for each different type of color or finish as shown to be used and installed in their respective places after approval of final precast Shop Drawings and calculations.
  - b. In accordance with details shown using materials, forming systems, reinforcing details, cast-in inserts, and mix proportions, and as specified and approved.

## FORT THOMAS WTP ADVANCED TREATMENT

3. Finish:
  - a. Uniform in appearance and similar in all respects to Samples on display in Architect's office.
  - b. Constitutes standard of quality required in completed Work.
4. If mockup panel does not represent quality required, construct additional mockup panels until approved by Architect.
5. Protect and maintain approved mockup panels at location selected by Architect or until Architect approves installation in their respective locations in the Project.

### **PART 2 PRODUCTS**

#### 2.01 MATERIALS

- A. Formwork:
  1. One-piece, full length and without seams.
  2. As specified in Section 03 10 00, Concrete Forming and Accessories.
- B. Reinforcing Steel: As specified in Section 03 21 00, Reinforcing Steel.
- C. Cement: As specified in Section 03 30 00, Cast-in-Place Concrete.
- D. Pretensioning Strands: Seven-wire, uncoated, stress relieved, ASTM A416, Grade 270.
- E. Aggregates: As specified in Section 03 30 00, Cast-in-Place Concrete, for 3/4-inch maximum size. Furnish of consistent quality, gradation, and color for precast architectural panels to produce uniformity of appearance in all panels.
- F. Admixtures: As specified in Section 03 30 00, Cast-in-Place Concrete.
- G. Embedded Items:
  1. ASTM A36 steel.
  2. Anchor Studs: Headed anchor studs (HAS), deformed bar anchors (DBA), or threaded studs as manufactured by Nelson Stud Welding Co., Lorain, OH.
  3. Furnish inserts for lifting tilt-up walls, bolting stiffeners, attaching braces, and as otherwise required.
- H. Grout: Nonshrink, nonmetallic Type II grout as specified in Section 03 62 00, Nonshrink Grouting.

## FORT THOMAS WTP ADVANCED TREATMENT

- I. Retardant for Exposed Aggregate Finish Manufacturers:
  - 1. Sika Chemical Corp.; Rugasol.
  - 2. Burke Co.; Exposed Aggregate Compound.
  
- J. Sealer for Exterior Surfaces:
  - 1. Silane Sealer: One-component penetrating sealer, hydrophilic (isopropyl alcohol as a carrier) with 40 percent active ingredients.
  - 2. Manufacturers:
    - a. Master Builders Co.
    - b. Euclid Chemical Co.
  
- K. Precast Prestressed Concrete Members: As shown on design documents.

### 2.02 CONCRETE MIX

- A. As specified in Section 03 30 00, Cast-in-Place Concrete.
- B. Design Strength: 5,000 psi at 28 days.
- C. Water/Cement Ratio: 0.38 maximum.
- D. For colored precast concrete, coordinate ingredients and procedures to achieve uniformity of color.

### 2.03 DESIGN REQUIREMENTS

- A. Precast Architectural Wall Panels:
  - 1. Crack Control: PCI MNL-120.
  - 2. Stresses: Limit tensile stress in the panels, from all handling and installation loads, to that less than that which would cause cracking on the exposed face.
  - 3. Impact Design: Minimum 50 percent of member weight.
  - 4. Tensile Stresses: Do not exceed those recommended in Chapter 5 of above referenced manual for a safety factor of 1.5 in critical sections under all loading conditions.
  - 5. Design and reinforce to withstand handling and erection loads.
  
- B. Structural Precast and Prestressed Members, Except for Architectural Panels:
  - 1. Meet applicable sections of PCI MNL-120.
  - 2. Design for spans and superimposed live and dead loads shown plus dead loads of members.



C. Prestressed Members:

1. Calculated tension at full service loads shall not exceed six times the square root of design strength except that in wet or corrosive service conditions and in the calculated tension due to live load and dead load shall not exceed zero.
2. Limit long-term camber growth to span length divided by 360.

2.04 FABRICATION

A. General:

1. Comply with PCI MNL-117.
2. Reinforcing Steel and Pretensioning Strands:
  - a. Place in position before concrete is cast.
  - b. Keep clean and free from form oil or other substances harmful to bond.
3. Pretensioning Force, if Used: Determine by elongation and by gauge pressure.
  - a. Method: Meet requirements of Prestressed Concrete Institute.
4. Forms: Produce smooth surfaces.
5. Concrete: Deposit, vibrate, finish, and cure in accordance with recommended practices of ACI 304R. Steam curing is permitted.
6. Release Strength for Pretensioning Method: Minimum 4,000 psi, unless otherwise approved.
7. Coordinate dimensions, determine type, quantity, size, and location of, and furnish necessary embedded items in precast concrete. Coordinate location of embedded items in cast-in-place concrete necessary to connect precast items.

B. Surface Finish for Precast Structural Units: Furnish concrete finish, as specified in Section 03 30 00, Cast-in-Place Concrete, to additional concrete field placed on precast units.

1. Other Surfaces: Smooth screeded finishes, unless otherwise shown.

C. Surface Finish for Precast Architectural Panels:

1. Exposed Surfaces in Building Interior: As shown.
2. Panel Interior Surface: Steel trowel, Type S-1, as specified in Section 03 30 00, Cast-in-Place Concrete.
3. Meet standard of quality represented by approved mockup panel.
4. Furnish panels from same manufacturer.

## FORT THOMAS WTP ADVANCED TREATMENT

### D. Sealer:

1. Apply to exterior surfaces of architectural panels, at precast plant site, in accordance with manufacturer's instructions.
2. Protect surface until installed in the Work.
3. Repair damage as approved by manufacturer.

### 2.05 SOURCE QUALITY CONTROL

- A. Prepare minimum three standard concrete test cylinders for each 50 cubic yards or fraction thereof of concrete placed in the precast work in accordance with ASTM C31.
- B. Test and record concrete strengths.

## PART 3 EXECUTION

### 3.01 ERECTION

- A. Verify that anchorage inserts are in correct locations.
- B. Handle and erect precast concrete with care as recommended by manufacturer.
- C. Erect precast units plumb, straight, level, square, and in proper alignment.
- D. Fasten units securely in place and brace to maintain position, stability, and alignment until permanently connected and structure is complete and stable.
- E. Field Cutting: Not allowed without prior approval of Engineer.

### 3.02 PATCHING

- A. Mix and place patching mixture to match color and texture of surrounding concrete and to minimize shrinkage.
- B. Demonstrate patching method and obtain acceptance and approval.

### 3.03 CLEANING

- A. After installation, clean soiled precast concrete surfaces with detergent and water, using fiber brush and sponge.
- B. Use acid solution only to clean particularly stubborn stains after more conservative methods have been tried unsuccessfully.

## FORT THOMAS WTP ADVANCED TREATMENT

- C. Use extreme care to prevent damage to precast concrete surfaces and to adjacent materials.
- D. Rinse thoroughly with clean water immediately after using cleaner.

### 3.04 FIELD QUALITY CONTROL

#### A. Inspection:

1. With Engineer, inspect precast architectural wall panels for chips, cracks, discoloration, and other damage.
2. Compare every panel to approved mockup panel and finish sample panel.
3. Record location and condition of damaged or nonmatching panels.

#### B. Resolution:

1. Repair damage to satisfaction of Engineer and Owner.
2. Remove panels with damage or repairs not acceptable to Engineer.
3. Install new acceptable panels in place of those removed.
4. Perform reinspection and obtain acceptance by Engineer.

### 3.05 PROTECTION

- A. Protect precast units from chipping, spalling, cracking, or other damage to the units after delivery to Site.
- B. After erection, protect units from damage.

**END OF SECTION**

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**SECTION 03 62 00  
NONSHRINK GROUTING**

**PART 1 GENERAL**

**1.01 REFERENCES**

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
  - a. C230, Standard Specification for Flow Table for Use in Tests of Hydraulic Cement.
  - b. C621, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrinkable).
  - c. C939, Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
  - d. C1107/C1107M, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

**1.02 SUBMITTALS**

A. Action Submittals:

1. Product data of grouts.
2. Proposed method for keeping existing concrete surfaces wet prior to placing grout.
3. Forming method for fluid grout placements.
4. Curing method for grout.

B. Informational Submittals:

1. Manufacturer's Written Instructions:
  - a. Adding fiber reinforcing to batching.
  - b. Cement-water ratio of grout topping.
  - c. Mixing of grout.
2. Manufacturer's proposed training schedule for grout work.
3. Manufacturer's Certificate of Compliance:
  - a. Grout free from chlorides and other corrosion-causing chemicals.
  - b. Nonshrink grout properties of Category II and Category III, verifying expansion at 3 days or 14 days will not exceed the 28-day expansion and nonshrink properties are not based on gas or gypsum expansion.
4. Manufacturer's Certificate of Proper Installation.

# FORT THOMAS WTP ADVANCED TREATMENT

5. Statements of Qualification: Nonshrink grout manufacturer's representative.
6. Test Reports:
  - a. Test report for 24-hour evaluation of nonshrink grout.
  - b. Test results and service report from demonstration and training session.
  - c. Field test reports and laboratory test results for field-drawn Samples.

## 1.03 QUALIFICATIONS

- A. Nonshrink Grout Manufacturer's Representative: Authorized and trained representative of grout manufacturer. Minimum of 1-year experience that has resulted in successful installation of grouts similar to those for this Project.
- B. For grout suppliers not listed herein, provide completed 24-hour Evaluation of Nonshrink Grout Test Form, attached at the end of this section. Independent testing laboratory to certify that testing was conducted within last 18 months.

## 1.04 GUARANTEE

- A. Manufacturer's guarantee shall not contain disclaimer on the product data sheet, grout bag, or container limiting responsibility to only the purchase price of products and materials furnished.
- B. Manufacturer guarantees participation with Contractor in replacing or repairing grout found defective as a result of faulty materials, as determined by industry standard test methods.

## PART 2 PRODUCTS

### 2.01 NONSHRINK GROUT SCHEDULE

- A. Furnish nonshrink grout for applications in grout category in the following schedule:

Application	Temperature Range	Max. Placing Time	
	40 deg F to 100 deg F	20 Min.	Greater Than 20 Min.
Filling tie holes	I	I	I
Blockouts for gate guides	I or II		II
Precast joints	I or II		II

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Application	Temperature Range	Max. Placing Time	
	40 deg F to 100 deg F	20 Min.	Greater Than 20 Min.
Column baseplates single-story	I or II		II
Machine bases 25 hp or less	II	II	II
Bases for precast wall sections	II	II	II
Baseplates for columns over one story	II	II	II
Precast base joints higher than one story	II	II	II
Through-bolt openings	II	II	II
Machine bases 26 hp and up	III	III	III
Baseplates and/or soleplates with vibration, thermal movement, etc.	III	III	III

2.02 NONSHRINK GROUT

A. Category I:

1. Nonmetallic and nongas-liberating.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Test in accordance with ASTM C1107/C1107M:
  - a. Grout shall have flowable consistency.
  - b. Flowable for 15 minutes.
4. Grout shall not bleed at maximum allowed water.
5. Minimum strength of flowable grout, 3,000 psi at 3 days, 5,000 psi at 7 days, and 7,000 psi at 28 days.
6. Manufacturers and Products:
  - a. BASF Building Systems, Inc., Shakopee, MN; Construction Grout.
  - b. Euclid Chemical Co., Cleveland, OH; NS Grout.
  - c. Dayton Superior Corp., Kansas City, KS; 1107 Advantage Grout.

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- d. US MIX Co., Denver, CO; US Spec MP Grout.
- e. L & M Construction Chemicals, Inc., Omaha, NE; Duragrout.

### B. Category II:

- 1. Nonmetallic, nongas-liberating.
- 2. Prepackaged natural aggregate grout requiring only the addition of water.
- 3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
- 4. Test in accordance with ASTM C1107/C1107M:
  - a. Fluid consistency 20 seconds to 30 seconds in accordance with ASTM C939.
  - b. Temperatures of 40 degrees F, 80 degrees F, and 100 degrees F.
- 5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
- 6. Minimum strength of fluid grout, 3,500 psi at 1 day, 4,500 psi at 3 days, and 7,500 psi at 28 days.
- 7. Maintain fluid consistency when mixed in 1 to 9 yard loads in ready-mix truck.
- 8. Manufacturers and Products:
  - a. BASF Building Systems, Inc., Shakopee, MN; Master Flow 928.
  - b. Five Star Products Inc., Fairfield, CT; Five Star Fluid Grout 100.
  - c. Euclid Chemical Co., Cleveland, OH; Hi Flow Grout.
  - d. Dayton Superior Corp., Kansas City, KS; Sure Grip High Performance Grout.
  - e. L & M Construction Chemicals, Inc., Omaha, NE; Crystex.

### C. Category III:

- 1. Metallic and nongas-liberating.
- 2. Prepackaged aggregate grout requiring only the addition of water.
- 3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
- 4. Test in accordance with ASTM C1107/C1107M:
  - a. Fluid consistency 20 seconds to 30 seconds in accordance with ASTM C939.
  - b. Temperatures of 40 degrees F and 100 degrees F.
- 5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
- 6. Minimum strength of fluid grout, 4,000 psi at 1 day, 5,000 psi at 3 days, and 9,000 psi at 28 days.
- 7. Maintain fluid consistency when mixed in 1-yard to 9-yard loads in ready-mix truck.



## FORT THOMAS WTP ADVANCED TREATMENT

8. Manufacturer and Product:
  - a. BASF Building Systems, Inc., Shakopee, MN; EMBECO 885.
  - b. L & M Construction Chemicals, Inc., Omaha, NE; Ferrogrout.

### PART 3 EXECUTION

#### 3.01 NONSHRINK GROUT

- A. General: Mix, place, and cure nonshrink grout in accordance with grout manufacturer's representative's training instructions.
- B. Form Tie or Through-Bolt Holes: Provide nonshrink grout, Category I and Category II, fill space with dry pack dense grout hammered in with steel tool and hammer. Through-bolt holes; coordinate dry pack dense grout application with vinyl plug in Section 03 10 00, Concrete Forming and Accessories, and bonding agent in Section 03 30 00, Cast-in-Place Concrete.
- C. Grouting Machinery Foundations:
  1. Block out original concrete or finish off at distance shown below bottom of machinery base with grout. Prepare concrete surface by sandblasting, chipping, or by mechanical means to remove any soft material.
  2. Set machinery in position and wedge to elevation with steel wedges, or use cast-in leveling bolts.
  3. Form with watertight forms at least 2 inches higher than bottom of plate.
  4. Fill space between bottom of machinery base and original concrete in accordance with manufacturer's representative's training instructions.

#### 3.02 FIELD QUALITY CONTROL

- A. Evaluation and Acceptance of Nonshrink Grout:
  1. Provide a flow cone and cube molds with restraining plates onsite. Continue tests during Project as demonstrated by grout manufacturer's representative.
  2. Perform flow cone and bleed tests, and make three 2-inch by 2-inch cubes for each 25 cubic feet of each type of nonshrink grout used. Use restraining caps for cube molds in accordance with ASTM C1107/C1107M.
  3. For large grout applications make three additional cubes and one more flow cone test. Include bleed test for each additional 25 cubic feet of nonshrink grout placed.
  4. Consistency: As specified in Article Nonshrink Grout. Grout with consistencies outside range requirements shall be rejected.

## FORT THOMAS WTP ADVANCED TREATMENT

5. Segregation: As specified in Article Nonshrink Grout. Grout when aggregate separates shall be rejected.
6. Nonshrink grout cubes shall test equal to or greater than minimum strength specified.
7. Strength Test Failures: Nonshrink grout work failing strength tests shall be removed and replaced.
8. Perform bleeding test to demonstrate grout will not bleed.
9. Store cubes at 70 degrees F.
10. Independent testing laboratory shall prepare, store, cure, and test cubes in accordance with ASTM C1107/C1107M.

### 3.03 MANUFACTURER'S SERVICES

#### A. General:

1. Coordinate demonstrations, training sessions, and applicable Site visits with grout manufacturer's representative.
2. Provide and conduct onsite, demonstration and training sessions for bleed tests, mixing, flow cone measurement, cube testing, application, and curing for each category and type of nonshrink grout.
3. Necessary equipment and materials shall be available for demonstration.

#### B. Training:

1. Training is required for all Type II and Type III grout installations.
2. Grout manufacturer's representative shall train Contractor to perform grout work.
3. Establish location at Site and schedule time for grout manufacturer's demonstration and training session of proposed nonshrink grouts. Mix nonshrink grouts to required consistency, test, place, and cure on actual Project, such as, baseplates and tie holes to provide actual on-the-job training.
4. Use minimum of five bags for each grout Category II and Category III. Mix grout to fluid consistency and conduct flow cone and two bleed tests, make a minimum of six cubes for testing of two cubes at 1 day, 3 days, and 28 days. Use remaining grout for final Work.
5. Training shall include methods for curing grout.
6. Mix and demonstrate patching through-bolt holes and blockouts for gate guides, and similar items.
7. Transport test cubes to independent test laboratory and obtain test reports.

3.04 SUPPLEMENTS

- A. The supplement listed below, following "End of Section," is part of this Specification.
  - 1. 24-hour Evaluation of Nonshrink Grout Test Form and Grout Testing Procedures.

**END OF SECTION**

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**SUPPLEMENT 1**

\_\_\_\_\_  
(Test Lab Name)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(Phone No.)

**24-HOUR EVALUATION OF NONSHRINK GROUT TEST FORM**

**OBJECTIVE:** Define standard set of test procedures for an independent testing laboratory to perform and complete within a 24-hour period.

**SCOPE:** Utilize test procedures providing 24-hour results to duplicate field grouting demands. Intent of evaluation is to establish grout manufacturer's qualifications.

**PRIOR TO TEST:** Obtain five bags of each type of grout.

1. From intended grout supplier for Project.
2. Five bags of grout shall be of same lot number.

ANSWER THE FOLLOWING QUESTIONS FOR GROUT BEING TESTED FROM LITERATURE, DATA, AND PRINTING ON BAG:

- A. Product data and warranty information contained in company literature and data? Yes \_\_\_\_\_ No \_\_\_\_\_
- B. Literature and bag information meet specified requirements? Yes \_\_\_\_\_ No \_\_\_\_\_
- C. Manufacturer guarantees grout as specified in Article Guarantee? Yes \_\_\_\_\_ No \_\_\_\_\_
- D. Guarantee extends beyond grout replacement value and allows participation with Contractor in replacing and repairing defective areas? Yes \_\_\_\_\_ No \_\_\_\_\_
- E. Water demands and limits printed on bag? Yes \_\_\_\_\_ No \_\_\_\_\_
- F. Mixing information printed on the bag? Yes \_\_\_\_\_ No \_\_\_\_\_
- G. Temperature restrictions printed on bag? Yes \_\_\_\_\_ No \_\_\_\_\_

\*Rejection of a grout will occur if one or more answers are noted NO.

**GROUT TESTING PROCEDURES**

**A. Bagged Material:**

1. List lot numbers. \_\_\_\_\_
2. List expiration date. \_\_\_\_\_
3. Weigh bags and record weight. \_\_\_\_\_

Engineer will disqualify grout if bag weights have misstated measure plus or minus 2 pounds by more than one out of five bags. (Accuracy of weights is required to regulate amount of water used in mixing since this will affect properties.)

**B. Mixing and Consistency Determination:**

1. Mix full bag of grout in 10 gallon pail.
2. Use electric drill with a paddle device to mix grout (jiffy or jiffler type paddle).
3. Use maximum water allowed per water requirements listed in bag instructions.
4. Mix grout to maximum time listed on bag instructions.
5. In accordance with ASTM C939 (flow cone) determine time of mixed grout through the flow cone. \_\_\_\_\_ seconds
6. Add water to attain 20 to 30 second flow in accordance with ASTM C939.
7. Record time of grout through cone at new water demand. \_\_\_\_\_ seconds
8. Record total water needed to attain 20 to 30 second flow. \_\_\_\_\_ pounds
9. Record percent of water. \_\_\_\_\_ percent

**C.** When fluid grout is specified and additional water is required beyond grout manufacturer's listed maximum water, ASTM C1107/C1107M will be run at new water per grout ratio to determine whether grout passes using actual water requirements to be fluid. Use new water per grout ratio on remaining tests.

**D. Bleed Test:**

1. Fill two gallon cans half full of freshly mixed grout at ambient temperatures for each category and at required consistency for each.
2. Place one can of grout in tub of ice water and leave one can at ambient temperature.
3. Cover top of both cans with glass or plastic plate preventing evaporation.
4. Maintain 38 degrees F to 42 degrees F temperature with grout placed in ice and maintain ambient temperature for second container for 1 hour.
5. Visually check for bleeding of water at 15-minute intervals for 2 hours.

FORT THOMAS WTP ADVANCED TREATMENT

6. Perform final observation at 24 hours.

If grout bleeds a small amount at temperatures specified, grout will be rejected.

E. Extended Flow Time and Segregation Test (for Category II and Category III):

1. Divide the remaining grout into two 3 gallon cans. Place the cans into the 40-degree F and 100-degree F containers and leave for 20, 40, and 60 minutes. Every 20 minutes remove and check for segregation or settlement of aggregate. Use a gloved hand to reach to the bottom of the can, if more than 1/4-inch of aggregate has settled to the bottom or aggregate has segregated into clumps reject the grout.
2. Right after the settlement test mix the grout with the drill mixer for 10 seconds. Take a ASTM C939 flow cone test of grout and record flow time. Maintain this process for 1 hour at ambient temperatures of 40 degrees F and 100 degrees F.
  - a. 20 min \_\_\_\_\_, sec. @ 40 degrees F.
  - b. 40 min \_\_\_\_\_, sec. @ 40 degrees F.
  - c. 60 min \_\_\_\_\_, sec. @ 40 degrees F.
  - d. 20 min \_\_\_\_\_, sec. @ 100 degrees F.
  - e. 40 min \_\_\_\_\_, sec. @ 100 degrees F.
  - f. 60 min \_\_\_\_\_, sec. @ 100 degrees F.

All Category II and Category III grout that will not go through the flow cone with continuous flow after 60 minutes will be disqualified.

\_\_\_\_\_  
Qualified

\_\_\_\_\_  
Disqualified

F. 24-hour Strength Test:

1. Using grout left in mixing cans in accordance with ASTM C1107/C1107M for mixing and consistency determination test and for extended time flow test, make minimum of nine cube samples.
2. Store cubes at 70 degrees F for 24 hours.
3. Record average compressive strength of nine cubes at 24 hours.

Grout will be disqualified if 24-hour compressive strengths are under 2,500 psi for grouts claiming fluid placement capabilities.

Grouts that have not been disqualified after these tests are qualified for use on the Project for the application indicated in Nonshrink Grout Schedule.

\_\_\_\_\_  
Signature of Independent Testing Laboratory

\_\_\_\_\_  
Date Test Conducted

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**SECTION 03 63 00  
CONCRETE DOWELING**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American National Standards Institute (ANSI).
  2. ASTM International (ASTM): C881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
  3. International Code Council (ICC): Evaluation Services Report.

1.02 DEFINITIONS

- A. ICC Evaluation Services Report for concrete anchor manufacturers.
- B. Special Inspection: Observation of Work by Special Inspector for conformance to approved design Drawings and Specifications.
- C. Special Inspector: Qualified person who shall demonstrate competence, to satisfaction of building official, for inspection of Work specified within this section.

1.03 SUBMITTALS

- A. Action Submittals:
1. Product Data: Manufacturer's catalog information.
  2. Samples: Two random Samples of each batch of products delivered to Site, for independent testing.
- B. Informational Submittals:
1. Manufacturer's qualifications; include client name, address, contact person, phone number, project location, and description of work.
  2. Manufacturer's instructions for preparation, placement, drilling of holes, installation of anchors and adhesive, and handling of cartridges, nozzles, and equipment.
  3. Manufacturer's written letter of certification identifying installer's qualifications to install products.
  4. ICC Evaluation Services Report:
    - a. Doweling system manufacturer.

## FORT THOMAS WTP ADVANCED TREATMENT

- b. Detailed step-by-step instructions for Special Inspection procedure.
5. Special Inspection report.
6. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.

### 1.04 QUALITY ASSURANCE

#### A. Qualifications:

1. Manufacturer: At least three similar projects with same products within last 3 years.
2. Installer: Trained and certified by manufacturer.

#### B. Regulatory Requirements: Adhesive shall be acceptable to EPA and health agencies for use in potable water structures.

### 1.05 DELIVERY, STORAGE, AND HANDLING

#### A. Store adhesive cartridges and adhesive components on pallets or shelving in a covered storage area.

#### B. Store at temperatures as indicated in manufacturer's literature and ICC Evaluation Services Report.

#### C. Dispose of When:

1. Shelf life has expired.
2. Stored other than per manufacturer's instructions.

#### D. Container Markings: Include manufacturer's name, product name, batch number, mix ratio by volume, product expiration date, ANSI hazard classification, and appropriate ANSI handling precautions.

## PART 2 PRODUCTS

### 2.01 ADHESIVE

#### A. Disposable, self-contained cartridge system capable of dispensing both components in the proper mixing ratio and that fit into manually or pneumatically operated caulking gun.

#### B. Meet requirements of ASTM C881/C881M.

#### C. Two-component, insensitive to moisture, designed to be installed in adverse freeze/thaw environments.

## FORT THOMAS WTP ADVANCED TREATMENT

- D. Cure Temperature, Pot Life, and Workability: Compatible for intended use and anticipated environmental conditions.
- E. Mixed Adhesive: Nonsag light paste consistency with ability to remain in a 1-inch diameter overhead drilled hole without runout.
- F. Adhesive anchor system used in concrete shall be approved by ICC Evaluation Services Report for use in cracked concrete and for short and long-term loads including wind and earthquake, and shall be approved for use with IBC 2006.
- G. Manufacturers and Products:
  - 1. Hilti; HIT RE 500 SD Epoxy Adhesive.
  - 2. Or approved equal.

### 2.02 MIXING NOZZLES

- A. Disposable, manufactured in several sizes to accommodate size of reinforcing dowels.
- B. Nonremovable internal static mixer required to ensure proper blending of components.

### 2.03 REINFORCING DOWELS

- A. As specified in Section 03 21 00, Reinforcing Steel.
- B. Smooth Epoxy-Coated Expansion Joint Dowels:
  - 1. Dowels: ASTM A36/A36M round smooth steel bars.
  - 2. Bar Coating: As specified in Section 09 90 00, Painting and Coating, with factory-applied lubricating coating.

## PART 3 EXECUTION

### 3.01 GENERAL

- A. Dispensing, Metering, and Mixing Adhesive Components: Use portable, automatic metering and mixing device or machine capable of maintaining prescribed mix ratio within deviation of 5 percent or less, by volume.
- B. Install in accordance with manufacturer's recommended instructions.

## FORT THOMAS WTP ADVANCED TREATMENT

- C. Dispense components through specially designed static mixing nozzle that thoroughly mixes components and places mixed adhesive at base of predrilled hole.

### 3.02 DOWEL SIZING AND INSTALLATION

- A. Install per adhesive manufacturer's instructions.
- B. Drilling Equipment:
  - 1. Drilling Hammers for Dowel Holes: Electric or pneumatic rotary type with medium or light impact.
  - 2. Hollow drills with flushing air systems are preferred.
  - 3. Where edge distances are less than 2 inches, use lighter impact equipment to prevent microcracking and concrete spalling during drilling process.
- C. Hole Diameter: Use drill bit diameter meeting ICC Evaluation Services Report requirements and as recommended by the manufacturer.
- D. Obstructions in Drill Path:
  - 1. When existing reinforcing steel is encountered during drilling and when approved by Engineer, enlarge hole by 1/8 inch, core through existing reinforcing steel at the larger diameter, and resume drilling at original hole diameter; or redrill hole 1 inch from original location, beginning in same line at surface, redirecting drill to miss reinforcing steel.
  - 2. Place dowels in both the misdrilled hole and the new one.
  - 3. When using epoxy anchors, dowels may be prebent prior to installation to 15 degrees to align with other bars. Do not heat dowels to bend.
  - 4. If bars have fused epoxy coating and coating is damaged, recoat damaged area with epoxy.
  - 5. Bent Bar Dowels: Where edge distances are critical, and striking reinforcing steel is likely, drill hole at 10-degree angle or less and use prebent reinforcing bars.

### 3.03 FIELD QUALITY CONTROL

- A. Dowel Testing:
  - 1. Test dowels at one per every 25 dowels.
  - 2. Dowels shall be tested to specified yield strength of reinforcing bar.
  - 3. Testing apparatus shall not interfere with development of concrete failure cone at dowel.

## FORT THOMAS WTP ADVANCED TREATMENT

4. Testing shall occur only after adhesive has achieved proper cure per manufacturer's requirements.
5. Failure of reinforcing bar or of base concrete will cause dowel to be rejected. For each rejected dowel, additional dowel shall be tested. Rejected dowels shall be reinstalled in sound concrete and retested.
6. If yield strength of reinforcing bar can not be achieved when tested, manufacturer's representative shall recommend revised installation procedures or adhesive products. Modified installations must be tested at same frequency as specified herein.

### B. Special Inspection:

1. Special Inspector will be onsite during dowel installation.
2. Special Inspector will observe installation in accordance with requirements of the ICC Evaluation Services Report and will submit report containing the following:
  - a. Drill bit compliance.
  - b. Hole depth and cleanliness.
  - c. Product Description: Product name, rod diameter and length.
  - d. Adhesive expiration date.
  - e. Verification of dowel installation in accordance with manufacturer's published instructions.

### C. Manufacturer's Field Services: Provide manufacturer's representative at Site in accordance with Section 01 43 33, Manufacturers' Field Services, for installation assistance, inspection, and certification of proper installation.

**END OF SECTION**

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**SECTION 03 64 23**  
**CRACK REPAIR EPOXY INJECTION GROUTING**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO): T237, Standard Method of Test for Testing Epoxy Resin Adhesive.
  2. American National Standards Institute (ANSI).
  3. ASTM International (ASTM):
    - a. C882, Standard Specification for Test Method for Bond Strength of Epoxy-Resin System Used with Concrete by Slant Shear.
    - b. D570, Standard Test Method for Water Absorption of Plastics.
    - c. D638, Standard Test Method for Tensile Properties of Plastics.
    - d. D648, Standard Test Method for Deflection Temperature of Plastics under Flexural Load in the Edgewise Position.
    - e. D695, Standard Test Method for Compressive Properties of Rigid Plastics.
    - f. D790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

1.02 DEFINITIONS

- A. Crack: Complete or incomplete separation of concrete into two or more parts produced by breaking or fracturing.
- B. Crack Injection: Method of sealing or repairing cracks by injecting a polymer.
- C. Large Cracks: Wider than 0.015 inch.
- D. Small Cracks: Width equal to 0.015 inch or less.

1.03 SUBMITTALS

- A. Action Submittals:
1. Physical and chemical properties for epoxy adhesives.
  2. Technical data for metering, mixing, and injection equipment.

## FORT THOMAS WTP ADVANCED TREATMENT

### B. Informational Submittals:

1. Manufacturer's recommended surface preparation procedures and application instructions for epoxy adhesives.
2. Installation instructions for repairing core holes with epoxy grout.
3. Manufacturer's Certificate of Compliance: Certified test results for each batch of epoxy adhesive.
4. Statements of Qualification for Epoxy Adhesive:
  - a. Manufacturer's Site representative.
  - b. Injection applicator.
  - c. Injection pump operating technician.
5. Epoxy adhesive two component ratio and injection pressure test records for concrete crack repair work.

## 1.04 QUALITY ASSURANCE

### A. Qualifications for Epoxy Injection Staff:

1. Manufacturer's Site Representative:
  - a. Capable of instructing successful methods for restoring concrete structures utilizing epoxy injection process.
  - b. Understands and is capable of explaining technical aspects of correct material selection and use.
  - c. Experienced in the operation, maintenance, and troubleshooting of application equipment.
2. Injection crew and job foreman shall provide written and verifiable evidence showing compliance with the following requirements:
  - a. Licensed and certified by epoxy manufacturer.
  - b. Minimum 3 years' experience in successful epoxy injection for at least 10,000 linear feet of successful crack injection including 2,000 linear feet of wet crack injection to stop water leakage.

## 1.05 DELIVERY, STORAGE, AND HANDLING

### A. Packing and Shipping: Package adhesive material in new sealed containers and label with following information:

1. Manufacturer's name.
2. Product name and lot number.
3. ANSI Hazard Classification.
4. ANSI recommended precautions for handling.
5. Mix ratio by volume.

### B. Storage and Protection: Store adhesive containers at ambient temperatures below 110 degrees F and above 45 degrees F.



**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Materials, equipment, and accessories specified in this section shall be products of:
1. BASF Building Systems, Shakopee, MN; SCB Concrete Series.
  2. Sika Corp., Lyndhurst, NJ; Sikadur Series.
  3. Euclid Chemical Co., Cleveland, OH; Euco Series.

**2.02 EPOXY ADHESIVE**

- A. Two-component A and B structural epoxy adhesive for injection into cracks or other voids in concrete structures for bonding or grouting.
- B. Adhesive Properties:

	Test Method	
7-day, Tensile Strength, psi	ASTM D638	5,000 min.
Tensile Elongation @ Break, percent	ASTM D638	1.0% min.
Compressive Yield Strength, 7 days @ 73°F, psi	ASTM D695 <sup>a</sup>	8,000 min.
Compressive Modulus, psi	ASTM D695 <sup>a</sup>	1.5x10 <sup>5</sup> min.
Heat Deflection Temperature, °F	ASTM D648 <sup>a</sup>	120 min. <sup>a</sup>
Water absorption @ 24 hours, Maximum %	ASTM D570	1.0
Bond Strength @ 2 days psi	ASTM C882	1,000 min.
Bond Strength @ 14 days psi	ASTM C882	1,500 min.
Slant Shear Strength: (5,000 psi Compressive Strength Conc.) <i>Where test results are available psi.</i>	AASHTO T237 <sup>b</sup>	

# FORT THOMAS WTP ADVANCED TREATMENT

	Test Method	
	Cured 3 days @ 40 deg F—Wet Concrete	3,500 min.
	Cured 1 day @ 77 deg F—Dry Concrete	5,000 min.
	Cured 3 days @ 77 deg ± 3 deg F	5,000 min.
<sup>a</sup> Cure test specimens so that peak exothermic temperature of adhesive does not exceed 100°F.		
<sup>b</sup> See referenced specifications for preparation method of test specimens.		

## 2.03 SURFACE SEAL

- A. Sufficient strength and adhesion for holding injection fittings firmly in place, and to resist pressures preventing leakage during injection.
- B. Capable of removal after injection adhesive has cured.

## 2.04 SOURCE QUALITY CONTROL

- A. Test Requirements: Perform tests for each batch of adhesive.
- B. Pot Life Test:
  - 1. Condition Components A and B to required temperature.
  - 2. Measure components in ratio of Component B as stated on manufacturer's label into an 8-fluid ounce paper cup.
  - 3. Start stopwatch immediately and mix components for 60 seconds using wooden tongue depressor, take care to scrape sides and bottom of cup periodically.
  - 4. Probe mixture once with tongue depressor every 30 seconds, starting 2 minutes prior to minimum specified pot life.
  - 5. Pot Life Definition: Time at which a soft stringy mass forms in center of cup.
- C. Fabrication of Slant Shear Specimens for Testing Bond of Injectable Adhesives to Wet Concrete at 40 Degrees F:
  - 1. Scope: Test method for preparation of diagonal concrete mortar blocks used in determining slant shear strength of low viscosity injectable adhesives in accordance with AASHTO T237 when concrete is wet.

## FORT THOMAS WTP ADVANCED TREATMENT

2. Materials:
  - a. Diagonal concrete mortar blocks prepared in accordance with AASHTO Test Method T237 and cured to produce a mortar with compressive strength of 5,000 psi or greater.
  - b. Paraffin wax.
  - c. Masking Tape: 3/4 inch wide.
  - d. Suitable 20-mil-thick shim stock.
3. Preparation:
  - a. Place a 20-mil shim between diagonal faces of two blocks and align so ends and sides are square.
  - b. Bind block with masking tape covering gap between blocks.
  - c. Leave a gap between blocks on one face uncovered for removal of shim and application of adhesive.
  - d. Paint melted paraffin wax over masking tape.
  - e. Shallow dam may be built up around opening using paraffin wax or modeling clay to help retain adhesive.
  - f. Apply suitable capping compound to each end of specimen producing smooth surfaces perpendicular to longitudinal axis of block.
  - g. Remove shim stock from gap opening.
  - h. Soak specimen in water at 40 degrees F, plus or minus 3 degrees F for at least 24 hours.
  - i. After soaking, remove specimen, shake free water from surface and gap opening.
  - j. Prepare liquid adhesive.
  - k. Within 5 minutes after removing specimen from water, start flowing adhesive into crack without entrap air bubbles.
  - l. Place specimen in 40 degrees F, plus or minus 3 degrees F ambient for curing within 15 minutes after removing specimen from water for bonding. Do not expose specimen to temperatures beyond 77 degrees F during the 15-minute period.
  - m. Cure specimen for 72 hours, plus or minus 4 hours at 40 degrees F, plus or minus 3 degrees F.

### PART 3 EXECUTION

#### 3.01 GENERAL

- A. Structurally repair cracks in structures as specified in Section 03 30 00, Cast-in-Place Concrete.
- B. Structurally repair cracks in existing concrete structures as discovered.

## FORT THOMAS WTP ADVANCED TREATMENT

### C. Cracks:

1. Repair by injection of epoxy adhesive.
2. Repair cracks where specified or as shown.

### 3.02 PREPARATION

- A. Free cracks from loose matter, dirt, laitance, oil, grease, salt, and other contaminants.
- B. Clean cracks in accordance with epoxy adhesive manufacturer's instructions.
- C. Clean surfaces adjacent to cracks from dirt, dust, grease, oil, efflorescence, and other foreign matter detrimental to bond of surface seal system.
- D. Do not use acids and corrosives for cleaning, unless neutralized prior to injecting epoxy.

### 3.03 APPLICATION

- A. Sealing: Apply surface seal in accordance with manufacturer's instructions to designated crack face prior to injection. Seal surface of crack to prevent escape of injection epoxy.
- B. Entry Ports:
  1. Establish openings for epoxy entry in surface seal along crack.
  2. Determine space between entry ports equal to thickness of concrete member to allow epoxy to penetrate to the full thickness of the wall.
  3. Provide a means to prevent concrete dusts and fines from contaminating the crack or ports when drilling.
  4. Space entry ports closer together to allow adjustment of injection pressure to obtain minimum loss of epoxy to soil at locations where:
    - a. Cracks extend entirely through wall.
    - b. Backfill of walls on one side.
    - c. Difficult to excavate behind wall to seal both crack surfaces.
  5. Core drill to verify epoxy depth where only one side of wall is exposed.
- C. Epoxy Injection:
  1. Store epoxy at minimum of 70 degrees F.
  2. Start injection into each crack at lowest elevation entry port.
  3. Continue injection at first port until adhesive begins to flow out of port at next highest elevation.
  4. Plug first port and start injection at second port until adhesive flows from next port.

## FORT THOMAS WTP ADVANCED TREATMENT

5. Inject entire crack with same sequence.

D. Finishing:

1. Cure epoxy adhesive after cracks have been completely filled to allow surface seal removal without draining or runback of epoxy material from cracks.
2. Remove surface seal from cured injection adhesive.
3. Finish crack face flush with adjacent concrete.
4. Indentations or protrusions caused by placement of entry ports are not acceptable.
5. Remove surface seal material and injection adhesive runs and spills from concrete surfaces.

### 3.04 EQUIPMENT

A. Portable, positive displacement type pumps with in-line metering to meter and mix two adhesive components, and inject mixture into crack.

B. Pumps:

1. Electric or air powered with interlocks providing positive ratio control of proportions for the two components at nozzle.
2. Primary injection pumps for each material of different mix ratio, including a standby backup pump of similar ratio.
3. Capable of immediate compensation for changes in resins.
4. Do not use batch mix pumps.

C. Discharge Pressure: Automatic pressure controls capable of discharging mixed adhesive at pressures up to 200 psi, plus or minus 5 percent, and able to maintain pressure.

D. Automatic Shutoff Control: Provide sensors on both Component A and B reservoirs for stopping machine automatically when only one component is being pumped to mixing head.

E. Proportioning Ratio Tolerance: Maintain epoxy adhesive manufacturer's prescribed mix ratio within a tolerance of plus or minus 5 percent by volume at discharge pressure up to 160 psi.

F. Ratio/Pressure Check Device:

1. Two independent valved nozzles capable of controlling flow rate and pressure by opening or closing valve to restrict material flow.
2. Pressure gauge capable of sensing pressure behind each valve.

## FORT THOMAS WTP ADVANCED TREATMENT

### 3.05 FIELD QUALITY CONTROL

#### A. Epoxy Adhesive Two Component Ratio Tests:

1. Disconnect mixing head and pump two adhesive components simultaneously through ratio check device.
2. Adjust discharge pressure to 160 psi for both adhesive components.
3. Simultaneously discharge both adhesive components into separate calibrated containers.
4. Compare amounts simultaneously discharged into calibrated containers during same time period to determine mix ratio.
5. Complete test at 160 psi discharge pressure and repeat procedure for 0 psi discharge pressure.
6. Run ratio test for each injection unit at beginning and end of each injection work day, and when injection work has stopped for more than 1 hour.
7. Document and maintain complete accurate records of, ratios and pressure checks.

#### B. Injection Pressure Test:

1. Disconnect mixing head of injection equipment and connect two adhesive component delivery lines to pressure check device.
2. Pressure Check Device:
  - a. Two independent valved nozzles capable of controlling flow rate and pressure by opening or closing of valve.
  - b. Pressure gauge capable of sensing pressure buildup behind each valve.
3. Close valves on pressure check device and operate equipment until gauge pressure on each line reads 160 psi.
4. Stop pumps and observe pressure; do not allow pressure gauge to drop below 150 psi within 3 minutes.
5. Run pressure test for each injection equipment unit:
  - a. Beginning and end of each injection work day.
  - b. When injection work as stop for more than 45 minutes.
6. Check tolerance to verify equipment capable of meeting specified ratio tolerance.

#### C. Crack Injection Tests:

1. Initial Cores:
  - a. 4-inch diameter for full crack depth taken from Engineer selected locations.
  - b. Take three cores in first 100 linear feet of crack repaired and one core sample for each 500 linear feet thereafter.

## FORT THOMAS WTP ADVANCED TREATMENT

2. Provide suitable containers for storage, curing, and transportation of test specimens.
3. Methods of Testing Cores:
  - a. Penetration: Visual examination.
  - b. Bond Strength/Compression Test: Concrete failure prior to adhesive failure.
4. Test Requirements:
  - a. Penetration: Minimum of 90 percent of crack shall be full of epoxy adhesive.
  - b. Bond Strength/Compression Test: Concrete failure before adhesive failure, or 6,500 psi with no failure of either concrete or adhesive.
5. Evaluation and Acceptance of Tests:
  - a. If initial cores pass tests as specified, epoxy adhesive injection Work at area represented by cores will be accepted.
  - b. If initial cores fail either by lack of penetration or bond strength, crack repair Work shall not proceed further until areas represented by cores are reinjected or repaired and retested for acceptance.
  - c. Obtain verifying core samples, number and location as selected by Engineer, after rework of areas represented by failed initial cores is complete.
6. Core Hole Repair:
  - a. Correct Work as result of testing upon notification from Engineer.
  - b. Refill initial and verifying core holes with an epoxy grout tamped and rodded in-place to form a dense fill.
  - c. Finish surface to blend with adjacent concrete.

**END OF SECTION**

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**SECTION 04 21 13.13  
MASONRY VENEER**

**PART 1 GENERAL**

**1.01 REFERENCES**

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
  - a. C91, Standard Specification for Masonry Cement.
  - b. C126, Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.
  - c. C144, Standard Specification for Aggregate for Masonry Mortar.
  - d. C150, Standard Specification for Portland Cement.
  - e. C207, Standard Specification for Hydrated Lime for Masonry Purposes.
  - f. C216, Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).
  - g. C270, Standard Specification for Mortar for Unit Masonry.
  - h. C404, Standard Specification for Aggregates for Masonry Grout.
  - i. C476, Standard Specification for Grout for Masonry.
  - j. C652, Standard Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale).
  - k. D1056, Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber.

**1.02 SUBMITTALS**

A. Action Submittals:

1. Shop Drawings:
  - a. Manufacturer's product information.
  - b. Mix designs for mortar and grout.
  - c. Details for special brickshapes and assemblies.
2. Samples:
  - a. Full-size units for each different exposed masonry unit required showing full range of exposed color, texture, and dimensions to be expected in completed construction. Match selected Samples at Engineer's office or listed in Finish Schedule.
    - 1) Include size variation data verifying that actual range of sizes for brick falls within ASTM C216 dimension tolerances for brick where modular dimensioning is indicated.

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- b. Colored masonry mortar Samples for each color required showing the full range of colors expected in the finished construction. Label Samples to indicate type and amount of colorant used.
- c. Stone trim Samples not less than 12 inches in length showing full range of colors and textures expected in finished construction.
- d. Accessories embedded in the masonry.

### B. Informational Submittals:

- 1. Experience record of mortar color pigment proposed for use.
- 2. Manufacturer's certificate of compliance for the masonry units specified herein.

## 1.03 QUALITY ASSURANCE

- A. Regulatory Requirements: For masonry construction meet requirements of the International Building Code and as supplemented by these Specifications.
- B. Mockups: Lay up a Sample panel for each type of masonry at the Site to show the bond pattern and method of finishing joints. Make Sample panels 4 feet high and 4 feet long, and may be a part of the permanent construction. The acceptable Sample panel serves as a basis of color, texture, pattern, and workmanship for acceptance of the permanent construction.

## 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection:
  - 1. Store all masonry materials off ground and protected from precipitation.
  - 2. Protect veneer materials from mud splatters and staining.

## 1.05 ENVIRONMENTAL REQUIREMENTS

- A. Temperature: Do not lay masonry when the ambient temperature is below 32 degrees F on a rising temperature or below 40 degrees F on a falling temperature, or when there is a probability of such conditions occurring within 48 hours, unless express approval of Engineer is obtained. In such case, make special provisions for heating materials and protecting the finished Work. Protect masonry against freezing for a minimum of 48 hours after being laid. Protect the tops of walls from precipitation at all times. Cover with waterproof paper when rain or snow is imminent and the Work is discontinued.
- B. Humidity: Protect masonry construction from direct exposure to wind and sun when erected in an ambient air temperature of 99 degrees F (37 degrees C) in the shade with relative humidity less than 50 percent.

**PART 2 PRODUCTS**

**2.01 MASONRY UNITS**

- A. Color, Texture, and Pattern: Match the submitted Samples approved by the Engineer.
- B. Facing Brick: ASTM C216, Grade SW Type FBX Minimum compressive strength for individual brick: 2,500 psi; size: 8 inches by 4 inches by 2-2/3 inches.
  - 1. Brick Type 2: Color to match 'red' face brick on existing Laboratory Building.

**2.02 MORTAR AND GROUT MATERIALS**

- A. Masonry Cement: ASTM C91, low alkali content (0.03 percent maximum).
- B. Portland Cement: ASTM C150, Type I, low alkali content (0.60 percent maximum).
- C. Lime: ASTM C207, Type S.
- D. Mortar: ASTM C270, Type S. Consisting of one part portland cement, from 1/4 to 1/2 part lime putty or hydrated lime, and clean well-graded sand in the proportion of three times the sum of the cementitious material; or 1/2 part portland cement, one part masonry cement, and clean well-graded sand in the proportion of three times the sum of the cementitious material.
  - 1. If color is added, add in a consistent manner to provide final uniformity.
  - 2. No antifreeze liquid, salts, or other substances are allowed to lower the freezing point. No calcium chloride is allowed in the mortar.
- E. Tuck-Pointing Mortar: Prehydrated Type N, one part portland cement, one part Type S hydrated lime, and six parts sand, by volume.
- F. Grout: Conform to ASTM C476 and the following.
  - 1. Proportions:
    - a. Grout for pouring of fluid consistency conforming to the requirements of ASTM C476. Coarse grout may be used in grout spaces measuring 4 inches or more in both horizontal dimensions.
    - b. Grout for pumping of fluid consistency and having not less than seven sacks of cement in each cubic yard of grout. Mix design will be reviewed by Engineer.

## FORT THOMAS WTP ADVANCED TREATMENT

- c. Fluid consistency means a fluid suitable for pouring without segregation.
- 2. Grout Admixture:
  - a. Manufacturers and Products:
    - 1) Sika Chemical Corp; Sika Grout Aid, Type II.
    - 2) Concrete Emulsions; Grout Aid GA-II.
    - 3) Master Builders Co; Grout Fluidifier MB-612
  - 3. Amount of admixture and method of introducing admixture shall be in accordance with manufacturer's recommendations.
  - 4. Compressive Strength:
    - a. The average 28-day compressive strength of the grout Samples for each grout pour tested shall not be less than 2,000 psi.
    - b. Aggregate for grout shall conform to ASTM C404.
- G. Sand: ASTM C144, in addition not less than 5 percent passes the No. 100 sieve.
- H. Water: Fresh, clean, and free of deleterious acids, alkalies, chlorides, and organic materials.

### 2.03 MASONRY CONTROL JOINTS

- A. ASTM D1056, closed cell neoprene sponge, 3 inches wide by 3/8 inch thick.

### 2.04 COMPRESSIBLE PADS

- A. ASTM D1056, closed cell neoprene sponge, 3 inches wide by 1/4 inch thick, with pressure sensitive adhesive applied on one side.

### 2.05 CAVITY WALL INSULATION, AIR BARRIER, AIR SEAL AND DAMPPROOF FLASHING

- A. As specified in Section 07 21 00, Thermal Insulation.

### 2.06 ACCESSORIES

- A. Vent- Weep holes Flexible ultraviolet resistant polypropylene cell vent-weephole ventilator as manufactured by Dur-O- Wall.
- B. Expansion /Control joint Filler: Closed cell expanded polyethylene, Kono Bord by Goodco Ltd.
- C. Prefabricated Control joint: As manufactured by Dur-O-Wall.
- D. Metal lath: 0.025 inches thick min. galvanized expanded lath with opening size max 0.16 inches .

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- E. Firestop: as specified in Section 07 84 00 Firestopping.
- F. Bond breaker: 1/16 inches polyethylene.
- G. Mortar Dropping Control Device: Mor-Control by Dur-o-Wall or by Mortar Maze supplied by Form and Build Supply Inc.

2.07 BRICK AND BLOCK VENTS( TYPE BV)

- A. As specified in Section 08.90 00 Louvers and Vents.

2.08 MASONRY ACCESSORIES AND ANCILLARY MATERIALS

- A. Manufacturers, unless noted otherwise:

- 1. Dur-O-Wal, Inc.
- 2. Hohmann and Barnard, Inc.
- 3. Heckmann Building Products.

- B. Corrugated Wall Ties: Form of 20-gauge minimum galvanized sheet steel. Length as required by 7/8 inch wide.

- C. Horizontal Joint Reinforcement:

- 1. Two parallel No. 9 wires, uncoated, weld connected to No. 9 perpendicular cross wire at 15 inches on center.
- 2. Reinforcement: Clean and free from loose rust, scale, and any coatings that reduce bond.
- 3. Furnish special manufactured corner and wall intersection pieces at these locations.

- D. Dovetail Slots and Anchor Ties:

- 1. 20-gauge stainless steel anchor slots.
- 2. 16-gauge stainless steel anchor tie. Length as required by 7/8-inch minimum width.
- 3. Engage or enclose joint reinforcement with anchor tie.
- 4. Manufacturer and Product: Dur-O-Wal, Inc., Arlington Heights, IL; seismic dovetail anchor.

- E. Adjustable Anchor Ties:

- 1. 16-gauge stainless steelplate with slot.
- 2. Anchor Tie: 12-gauge stainless steel pintle plate capable of being inserted into slotted plate.
- 3. Engage or enclose No. 9 gauge wire joint reinforcing with anchor tie.

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4. Manufacturer and Product: Dur-O-Wal, Inc., Arlington Heights, IL; seismic Ladur-eye.

- F. Felt: ASTM D226, Type I (No. 15) plain, unperforated asphalt saturated felt.

### 2.09 MORTAR PREPARATION

- A. Place one-half the water and aggregate in the operating mixer; add cement; add the remaining aggregate and water and mix for at least 2 minutes. Add lime and continue mixing as long as needed to secure a uniform mass, but no less than 3 minutes after the addition of lime. Time the addition of admixture in strict accordance with the manufacturer's instructions and the procedure used for adding it to the mix shall provide good dispersion.
- B. Mix mortar in machine with mixing drums clean and free of debris and dried mortar. Use mortar before the initial setting of the cement has taken place. Do not retemper mortar in which the cement has started to set.
- C. Retemper mortar boards by adding water within a basin formed with the mortar and the mortar reworked into the water. Dashing or pouring water over mortar and retempering of harsh, nonplastic mortar is not permitted.
- D. Where color tinting of mortar is required, add sufficient lime-proof color-fast mineral pigment to the mortar.

### 2.10 GROUT PREPARATION

- A. Mix grout as specified for mortar preparation if onsite mixing is performed or use transit-mixed grout, meeting the requirements of ASTM C476.
- B. Add grout admixtures at the Site, following manufacturer's recommendation. Premix the admixture with water and add resulting solution to the grout and thoroughly mix. Do not exceed quantity of admixture recommended by the manufacturer.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of masonry veneer.
- B. Examine rough-in and built-in construction to verify actual locations of piping connections prior to installation.

- C. Do not proceed until unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

- A. Provide or cut special shapes for corners, jambs, lintels, and other areas as shown or as required. Match color and texture of standard units.
- B. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full-size units without cutting where possible.

### 3.03 BRICK VENEER INSTALLATION

- A. General: Do not install cracked, broken, or chipped masonry units exceeding ASTM C216 allowances. Thoroughly wet brick just before laying except in freezing weather where bricks are laid dry. Prewetting may also be omitted if the brick at the time of laying has a rate of absorption not exceeding 0.025 ounce of water per square inch of surface after being placed in 1/8 inch of water for 1 minute.
  - 1. Coordinate installation with backup walls, through wall flashing, and other construction. Use masonry saws to cut and fit exposed units. Lay brick plumb, true to line, with level courses accurately spaced, and do not furrow bed joints.
  - 2. Finish horizontal run by racking back in each course; toothing not permitted. Adjust all units to final position while mortar is soft and plastic. If units are displaced after mortar has stiffened, remove, clean joints and units of mortar, and relay with fresh mortar.
  - 3. Bond unexposed units in wythe by lapping a minimum of 2 inches. Adjust shelf angles to keep Work level at proper elevation. Provide pressure relieving joints by placing a continuous compressible pad under the shelf angle.
  - 4. When joining fresh masonry to set or partially set masonry:
    - a. Remove loose brick and mortar.
    - b. Clean and lightly wet exposed surface of set masonry prior to laying fresh masonry.
- B. Pattern: Lay brick in running bond and as shown on Drawings.
- C. Mortar Beds: Lay brick with full mortar coverage on horizontal and vertical joints. Rock closures into place with head joints thrown against two adjacent bricks in-place. Do not pound corners or jambs to fit stretcher units after setting in-place. Where adjustment to corners or jambs must be made after mortar has started to set, remove mortar and replace with fresh mortar.

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- D. Horizontal and Vertical Face Joints:
1. Nominal Thickness: 3/8 inch.
  2. Construct uniform joints.
  3. Shove vertical joints tight.
  4. Tool joints concave in exposed surfaces when thumbprint hard using jointing tool.
  5. Concave tool exterior joints below grade.
  6. Flush cut all joints not tooled.
  7. Fill horizontal joints between top of masonry partition and underside of concrete beams with mortar.
- E. Tuck-Point Joints:
1. Rake mortar joints to a depth of 1/2 to 3/4 inch.
  2. Saturate exposed joints with clean water.
  3. Fill joints solidly with pointing mortar.
  4. Tool joints to match existing.
- F. Movement Joints: Keep clean of all mortar and debris.
- G. Masonry Control Joints:
1. Provide continuous vertical control joints in masonry in accordance with Brick Institute of America and as shown on Drawings.
  2. Omit mortar from the vertical joints. Place the control joint material as the wall is built.
- H. Dampproof Flashing:
1. Install as per manufacturer's recommendation.
- I. Flashing: Clean surface of masonry smooth and free from projections that might puncture, gouge, or otherwise damage flashing material.
- J. Weep Holes: Provide weep holes in head joints in first course immediately above all flashing leaving head joint free and where indicated:
1. Maximum Spacing: 24 inches OC.
  2. Keep weep holes and area above flashing free of mortar droppings.
- K. Sealant Joints: Retain sealant joints around outside perimeters of exterior doors, window frames, and other wall openings:
1. Uniform Depth: 3/4 inch.
  2. Uniform Width: 1/4 inch.



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- L. Nonreinforced Brick Masonry: Fill vertical, longitudinal joints by parging. Keep cavity in cavity walls clean:
1. Place wood strips with attached wire pulls on metal ties.
  2. Remove and clean wood strips prior to placing each succeeding row of metal ties.
  3. As the Work progresses, trowel all protruding fins in cavity flat on inner surface of wythe.
- M. Anchoring: Anchor brick veneer to concrete backing with dovetail anchor ties and to CMU backing adjustable anchor ties.
1. Maintain a space not less than 1 inch wide between masonry wall and concrete members.
  2. Keep space free of mortar or other rigid material to permit differential movement between concrete and masonry.
  3. Attach brick veneer to backing with anchor ties.
    - a. Use one dovetail anchor tie for each 2 square feet of wall area and one adjustable anchor tie for each 1.77 square feet of wall area.
    - b. Maximum Space between Adjacent Ties:
      - 1) Vertically: 16 inches.
      - 2) Horizontally: 24 inches for dovetail anchor ties. 16 inches for adjustable anchor ties.
    - c. Embed ties at least 2 inches in horizontal joint of brick veneer.
    - d. Provide additional ties at openings:
      - 1) Maximum Spacing Around Perimeter: 24 inches.
      - 2) Install within 12 inches of opening.
- N. Pointing: Cut out defective joints and holes in exposed masonry and repoint with mortar. Dry brush masonry surface after mortar has set at end of each day's Work and after final pointing.

### 3.04 CLEANING

- A. Remove mortar stains with clear water as Work progresses. Upon completion, clean exposed surfaces with a 10 percent solution of commercial muriatic acid, remove stains with fiber brushes, rinse with clean water. Collect and dispose of water used for cleaning.
- B. Cleaning Agents:
1. Proprietary Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry

## FORT THOMAS WTP ADVANCED TREATMENT

surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned.

- C. Clean exposed unglazed masonry with stiff brush and clean water. If cleaning by water does not produce satisfactory results, apply cleaning agent to sample wall area of 20 square feet in location acceptable to Engineer. Do not proceed with cleaning until sample area is acceptable to Engineer.
- D. Follow manufacturer's recommendations for use of cleaning agents.
- E. Application:
  - 1. Thoroughly wet surface of masonry on which no efflorescence appears before using cleaning agent.
  - 2. Scrub with acceptable cleaning agent.
  - 3. Immediately rinse with clean water.
  - 4. Work small sections at a time.
  - 5. Work from top to bottom.
  - 6. Protect sash, metal lintels, and other materials, which may corrode when masonry is cleaned with acid solution.
  - 7. Remove efflorescence in accordance with brick manufacturer's recommendations.
- F. Leave Work area and surrounding surfaces clean and free of mortar spots, droppings, and broken masonry.

### 3.05 FIELD QUALITY CONTROL

- A. At least once a week while installation of masonry veneer is in progress, take mortar and grout samples for testing. Continue on that basis for duration of installation of masonry veneer at the discretion of Engineer.
- B. Take Samples in accordance with ASTM C270 and ASTM C476, as applicable.

### 3.06 PROTECTION

- A. Wall Covering: During erection, cover top of wall with strong waterproof membrane at end of each day or shutdown and as follows:
  - 1. Cover partially completed walls when Work is not in progress.
  - 2. Extend cover minimum of 24 inches down both sides.
  - 3. Hold cover securely in-place.

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- B. Protect sills, ledges, and offsets from mortar drippings or other damage during construction. Remove misplaced mortar or grout immediately. Protect face materials against staining. Protect the door jambs and corners from damage during construction.

**END OF SECTION**

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**SECTION 04 22 00  
CONCRETE UNIT MASONRY**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Concrete Institute (ACI): 530.1/ASCE 6/TMS 602, Building Code Requirements for Masonry Structures and Specifications for Masonry Structures and Related Commentaries.
  2. ASTM International (ASTM):
    - a. A82/A82M, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
    - b. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
    - c. C33, Standard Specification for Concrete Aggregates.
    - d. C90, Standard Specification for Loadbearing Concrete Masonry Units.
    - e. C140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
    - f. C144, Standard Specification for Aggregate for Masonry Mortar.
    - g. C150, Standard Specification for Portland Cement.
    - h. C207, Standard Specification for Hydrated Lime for Masonry Purposes.
    - i. C216, Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).
    - j. C270, Standard Specification for Mortar for Unit Masonry.
    - k. C404, Standard Specification for Aggregates for Masonry Grout.
    - l. C476, Standard Specification for Grout for Masonry.
    - m. C652, Standard Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale).
    - n. C744, Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.
    - o. C1314, Standard Test Method for Compressive Strength of Masonry Prisms.
    - p. E514, Standard Test Method for Water Penetration and Leakage through Masonry.
  3. Brick Institute of America (BIA).
  4. International Code Council (ICC):
    - a. International Building Code (IBC), Chapter 21.
    - b. ICC Evaluation Service (ICC-ES) Reports.
  5. National Concrete Masonry Association (NCMA).

## FORT THOMAS WTP ADVANCED TREATMENT

### 1.02 SUBMITTALS

#### A. Action Submittals:

1. Shop Drawings:
  - a. Information illustrating horizontal joint reinforcement and preformed control joint materials proposed.
  - b. Grout proportions.
  - c. Mortar proportions.
  - d. Letter of certification stating grout aggregates and mortar sand meet requirements of ASTM C33, including nonreactivity.
2. Samples:
  - a. One of each type of masonry unit to be used on Project.
  - b. Two each; textured, glazed, sound absorbing, and brick units for selection of color and texture.
  - c. Mortar colors for color selection.

#### B. Informational Submittals:

1. Method of placing grout.
2. Certified field test results within 5 days of performing specified tests.
3. Letter of certification from masonry unit manufacturer stating that units comply with IBC Table 2105.2.2.1.2.
4. Letter from water repellent admixture manufacturer verifying masonry unit manufacturer's proper use of product.
5. Certified test reports showing compliance with specified performance tests.
6. Statement of acknowledgement of Quality Assurance Plan in accordance with IBC Section 1705.3
7. Method and materials for removal of efflorescence.

### 1.03 QUALITY ASSURANCE

A. Masonry Unit Manufacturer: Qualified by manufacturer of water repellent admixture to use product.

#### B. Mockups:

1. Lay up Sample panel for each type of masonry at Site.
2. Dimensions: Minimum 4 feet high by 4 feet long.
3. May be part of permanent construction.
4. Approved panels shall serve as basis of color, texture, bond, quality of finished joints, and for acceptance of permanent construction.

## FORT THOMAS WTP ADVANCED TREATMENT

5. Demonstrate ability to keep insulation and grout isolated and in certain cells during any sequence of placement, and to demonstrate materials will be restricted to cells and bond beams intended to receive each material.
  6. Construction shall show areas required to receive mortar, including webs on each side of each cell to prevent insulation from entering cells to receive grout or to prevent grout from entering cells to receive insulation.
  7. Where bond beams are to be used, demonstrate proper placement of both insulation and grout to bond beam level, and proper placement of bond beam prior to placement of insulation and grout above bond beam level.
  8. Demonstrate proper use of running bond or stacked bond.
- C. Comply with the requirements and criteria of the NCMA, BIA, ASTM C90, ASTM C216, and ACI 530.1 for masonry finish and appearance, dimension tolerances, tolerances of construction, joint tolerances, and wall plumb tolerances.

### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection: Keep lime and other ingredients dry.

### 1.05 ENVIRONMENTAL REQUIREMENTS

- A. Temperature: Do not lay masonry when ambient temperature is below 32 degrees F on a rising temperature, or below 40 degrees F on a falling temperature, or when there is a probability of such conditions occurring within 48 hours, unless written approval of procedures for protection from freezing is obtained from Engineer.
- B. Moisture Protection: Protect masonry construction from loss of moisture during curing period of 7 days when ambient air temperature is 90 degrees F or greater and when relative humidity is less than 50 percent.

## PART 2 PRODUCTS

### 2.01 COMPRESSIVE STRENGTH OF MASONRY

- A. Minimum 28-Day Compressive Field Strength ( $f_m$ ) of Completed Assemblage: 1,500 psi.

## FORT THOMAS WTP ADVANCED TREATMENT

### 2.02 MASONRY UNITS

#### A. General:

1. Furnish or cut special shapes for corners, jambs, lintels, and other areas shown or required.
2. Special units shall match color and texture of standard units.
3. Where units are placed so end of unit is exposed, such as at a corner or intersection, exposed end of that block shall have surface to match color and texture of sides of other units.
4. Furnish sound, dry, clean units free of cracks, prior to placing in structure.
5. Vertical Cells to be Grouted: Capable of alignment sufficient to maintain clear, unobstructed continuous vertical cell dimensions in accordance with ACI 530.1, Table 7.
6. Masonry unit size and shape shall allow for all placement patterns to prevent materials, such as grout or poured insulation, from escaping from cell being filled to adjacent cells where material is not intended to be placed.

#### B. Concrete Masonry Units (CMU):

1. ASTM C90: Normal weight.
2. Nominal Size: 16 inches long by 8 inches high by thickness shown on Drawings.
3. Compressive Strength: 1,900 psi minimum, in accordance with ASTM C90, Table 2.
4. Color of Units: Natural.
5. Surface Texture on Exposed Surfaces: Smooth.
6. Surface Texture: Smooth on interior, concealed exterior, and surface 1 foot below finished grade.

### 2.03 MORTAR AND GROUT MATERIALS

A. Cement: ASTM C150, Type I, portland cement.

B. Lime: ASTM C207, Type S hydrated.

#### C. Aggregates:

1. Mortar: ASTM C144, sand.
2. Grout: ASTM C404.

D. Water: Fresh, clean, and potable.



## FORT THOMAS WTP ADVANCED TREATMENT

### E. Mortar Plasticizer Admixture:

1. May be used instead of lime.
2. Manufacturer and Product: American Colloid Co.; Easy/Spread Plasticizer.

### F. Grout Admixture:

1. Controlled expansion additive.
2. Manufacturer and Product: Sika Corporation, Lyndhurst, NJ; Grout Aid.

## 2.04 REINFORCEMENT

### A. Horizontal Joint Reinforcement:

1. Two parallel, ASTM A82/A82M, No. 9 wires, galvanized in accordance with ASTM A153/A153M, weld connected to No. 9 perpendicular cross wire at 16 inches, maximum, on center.
2. Reinforcement: Clean and free from loose rust, scale, and coatings that reduce bond.
3. Furnish special manufactured corner and wall intersection pieces.
4. Manufacturer: Dur-O-Wal, Inc., Aurora, IL.

### B. Deformed Bars: As specified in Section 03 21 00, Reinforcing Steel.

## 2.05 PREFORMED CONTROL JOINTS

### A. Solid rubber cross-shape extrusions as manufactured by:

1. Dur-O-Wal, Inc., Aurora, IL; Regular Rapid Control Joint.
2. Sonneborn-Contech Co., Oakland, CA; Sonneborn Control Joint.
3. Hohmann and Barnard, Inc; #RS-Standard.

## 2.06 MORTAR MIXES

### A. Minimum average mortar 28-day compressive strength 1,800 psi.

### B. Proportions:

1. In accordance with ASTM C270, Type S.
2. Mortar plasticizer admixture may be substituted for lime. Batch in accordance with ICC, ICBO, BOCA, or Standard Building Code Current Reports for specified mortar type and strength.

## FORT THOMAS WTP ADVANCED TREATMENT

### C. Mixing:

1. Machine mix in approved mixers.
2. Keep mixer drums clean and free of debris and dried mortar.
3. Mix by placing 1/2 water and 1/2 aggregate in operating mixer.
4. Add cement.
5. Add remaining aggregate and water and mix for at least 2 minutes.
6. Add lime and continue mixing as long as needed to secure a uniform mass, but no less than 3 minutes after addition of lime.
7. Time addition of admixture in accordance with manufacturer's instructions. Procedure used for adding it to mix shall provide good dispersion.
8. Follow manufacturer's instructions for mortar plasticizer admixture.
9. Review compatibility with other mortar admixture.

## 2.07 GROUT MIXES

### A. Proportions: Conform to ASTM C476 for coarse grout and as follows:

1. Compressive Strength: Minimum 2,000 psi at 28 days.
2. For Pouring:
  - a. Fluid consistency (suitable for pouring without segregation) meeting requirements of ASTM C476.
  - b. Conform to IBC Table 2103.10, except as noted.
3. For Pumping: Fluid consistency with minimum seven sacks of cement in each cubic yard.

### B. Mixing:

1. Onsite: Follow procedure specified in Article Mortar Production.
2. Transit-Mixed Grout: Meet requirements of ASTM C476.
3. Add approved grout expansion admixture in accordance with manufacturer's recommendations. Premix admixture with water and add resulting solution to grout mix and thoroughly mix. Do not exceed quantity of admixture recommended by manufacturer.

## PART 3 EXECUTION

### 3.01 GENERAL

- A. Protect masonry construction to prevent efflorescence. Provide measures to prevent moisture from entering incomplete walls.

4. As units are laid, remove excess mortar from grout space of cells to be filled.
5. Place mortar before initial setting of cement takes place. Do not retemper mortar that has started to set or is not used within one hour. Retempering of colored mortar is not allowed.
6. Remove mortar containing water repellent admixture from face of masonry, before it sets

B. Exposed Joints:

1. Tool joints exposed to view after final construction, unless otherwise noted or shown.
2. Cut joints flush and as mortar takes its initial set tool to provide a concave joint.
3. Perform tooling when mortar is partially set but still sufficiently plastic to bond.
4. Perform tooling with tool that compacts mortar, pressing excess mortar out rather than dragging it out.
5. Rake out joints that are not tight at time of tooling, point, and then tool.
6. Rake and tool joints at split-face surfaces, interior and exterior.

C. Concealed Joints: Strike flush with no further treatment required.

3.06 CONTROL JOINTS

A. Preformed Control Joints:

1. Omit mortar from vertical joints.
2. Place rubber control joint material as wall is built.
3. After wall is grouted, cured, and cleaned, install backing rod and sealant as specified in Section 07 92 00, Joint Sealants.
4. Place and tool sealant to match depth of typical joint.

3.07 REINFORCING

A. Foundation Dowels:

1. Size, number, and location of foundation dowels shall match vertical wall reinforcing, unless otherwise noted.
2. When foundation dowel does not line up as intended, with vertical core, do not slope more than 1 horizontal to 6 vertical to bring it into alignment.

B. Vertical Reinforcing:

1. Use deformed bars.

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2. Hold in position near the ends of bars by wire ties to dowels or by reinforcing positioners.
3. Lap reinforcing bars as shown, where spliced and wire tie together.
4. Minimum Bar Clearance: One bar diameter from masonry and from additional parallel bars in same grout space.
5. Hold in position at maximum intervals of 160 bar diameters by reinforcing positioners.

### C. Horizontal Reinforcing:

1. Use deformed bars.
2. Lay on webs of bond beam units and place as wall is built.
3. Lap reinforcing bars as shown, where spliced and wire tie together.
4. Minimum Bar Clearance: One bar diameter from masonry and from additional parallel bars in same grout space.
5. Terminate reinforcing bars 2 inches clear from control joints as shown.

### D. Horizontal Joint Reinforcement:

1. Use for stack bond.
2. Provide in addition to typical wall reinforcing steel.
3. Space maximum 16 inches apart, vertically.
4. Lap ends 6 inches minimum.
5. At control joints make reinforcement discontinuous.
6. Use manufactured corner and other wall intersection pieces.

## 3.08 MORTAR PRODUCTION

### A. General:

1. Mix ingredients 3 minutes to 5 minutes after all ingredients are introduced.
2. Provide volumetric control by using batching box or similar measuring device. Do not use shovel to introduce materials directly into batch.
3. Keep sand damp and loose.
4. Use cool mix water.

## 3.09 GROUTING

### A. General:

1. Do not mix, convey, or place with equipment constructed of aluminum.
2. Secure vertical and horizontal reinforcement, ties, bolts, anchors, and other required embedments in place; inspect and verify before placing grout.

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3. Grout beams over openings in one continuous operation.
4. Maintain vertical alignment in ACI 530.1, Table 7.
5. Place grout as soon as possible after mortar has set to reduce shrinkage cracking of vertical joints.
6. Vertical Reinforcement:
  - a. First wire tie to foundation dowels, then build wall around it.
  - b. Provide reinforcing positioners or approved cross bracing to secure top of steel in place.
  - c. Do not drop in vertical steel after block is laid, unless reinforcing positioners are provided in the course above previously grouted course.

### B. Grouting Requirements:

1. Slump: 8 inches to 11 inches.
2. Do not start grouting until wall has cured for 24 hours, minimum.
3. Solid Grouting Requirements: Solid grout all walls.
4. Partial Grouting Requirements:
  - a. Walls Not Requiring Solid Grouting: Fill cells containing reinforcing steel, anchor bolts, and other embedded items as shown with grout.
  - b. Construct cells to be filled to confine grout within cell.
  - c. Cover tops of unfilled vertical cells under a bond beam with metal lath to confine grout fill to bond beam section.
5. Form horizontal construction joints between pours by stopping grout pour 1-1/2 inches below a mortar joint, except at a bond beam; stop pour 1/2 inch below top of masonry unit.
6. Partial Grouting with Insulation Fill:
  - a. Where cells of masonry units are to receive masonry fill insulation in some cells and to receive grout in some cells, provide continuous mortar on block webs on each side of cells to be filled with grout to ensure insulation will not enter grout cells.
  - b. Where bond beams are required with masonry fill insulation and grout, limit pours to less than 6 feet in height.
7. Fully embed horizontal steel with grout in an uninterrupted pour.
8. Do not construct wall more than one course above top of grout pour prior to placing grout.
9. Vibration:
  - a. Use internal "pencil" type, low energy vibrator to thoroughly consolidate grout and reduce amount of air voids. Do not use concrete vibrators.
  - b. After waiting sufficient time to permit grout to become plastic, but before it has taken any set, reconsolidate grout.

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- c. Waiting period will vary depending upon weather conditions and block absorption rates, but under "normal" weather conditions with average masonry units the waiting period should be between 30 minutes to 60 minutes.
10. Cleanouts:
- a. Provide for grout pours over 5 feet in height.
  - b. Provide of sufficient size to permit cleaning of cell, positioning of reinforcing, and inspection at bottom of every vertical cell containing reinforcing.
  - c. Location: Concealed from view after final construction, unless otherwise approved by Engineer.
  - d. After wall has been inspected and approved and prior to grouting, cap cleanouts in a manner that will seal them from grout leakage and provide a flush finish.

### 3.10 WATER REPELLENT MASONRY SEALER

- A. Remove efflorescence prior to applying water repellents. Dispose of waste generated.
- B. Apply to weather exposed exterior concrete masonry walls.
- C. Repoint loose, cracked, or disintegrating mortar at least 7 days prior to application. Ensure joint sealants and caulking are fully cured and wall surfaces are clean, dry, and free of chemical cleaners, efflorescence, dirt, oils, mortar smears, and other surface contaminants.
- D. Follow manufacturer's recommendations for weather conditions during application.
- E. Test a 5-foot by 5-foot wall area to assure proper coverage, desired water repellency properties, and desired surface appearance when sealer is fully dried.
- F. Apply with spray, brush, or roller following manufacturer's recommendations, at a coverage rate of 50 square feet to 150 square feet per gallon, as determined by testing. Use two coat application where recommended by manufacturer.

### 3.11 FIELD QUALITY CONTROL

- A. Special Inspection of masonry in accordance with IBC Section 1704.5

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- B. Masonry shall be tested by: Independent testing agency, retained by Contractor and approved by Engineer in accordance with ASTM C1314, Method B, as modified by ACI 530.1/ASCE 6.
- C. Masonry test prisms, when required, shall be constructed onsite with same materials and workmanship to be used for Project.
- D. Provide adequate facilities for safe storage and proper curing of masonry prisms, mortar samples, and grout samples, as applicable, onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
- E. Masonry Testing:
  - 1. Prism Testing:
    - a. Method and frequency of sampling and testing in accordance with: IBC Section 2105.2.2.2.
    - b. Prior to start of construction, construct and test a set of three prisms.
    - c. During construction, construct and test an additional set of three prisms for each 5,000 square feet of wall area.
    - d. Prepare and submit test report for each set of prisms which includes name of testing lab and individual, dimensions, descriptions of materials, age of prism, maximum test load, net area, and compressive strength for each prism and for the set.
  - 2. Unit Strength Method:
    - a. Method and frequency for mortar, grout, and masonry unit sampling and testing in accordance with ACI 530.1/ASCE 6/TMS 602, Section 1.4.B IBC 2105.2.2.1. UBC Section 2105.3.4. Sample and test units in accordance with ASTM C140.
    - b. Provide masonry units for test samples required.
- F. Corrective Action:
  - 1. If compressive strength tests made prior to construction of permanent structure fail to meet Specifications, adjustments shall be made to mix designs for mortar, or grout, or both, as needed to produce specified strength. Masonry units shall also be tested to verify compliance to requirements of ASTM C90, Type 1.
  - 2. If strength tests performed on materials representative of in-place construction fail to meet Specifications, prisms or cores shall be cut from constructed walls in sufficient locations to adequately determine strength in accordance with ACI 530.1/ASCE 6/TMS 602, IBC 2105.3, UBC Section 2105.3.5.

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- G. Performance Test: Masonry using concrete masonry units and mortar with integral water repellent additives, and water repellent masonry sealer, shall achieve a Class E rating when evaluated in accordance with ASTM E514, with the test extended to 72 hours.

### 3.12 CLEANING

- A. Immediately after completion of grouting, clean masonry surfaces of excess mortar, grout spillage, scum, stains, dirt, and other foreign substances using clean water and fiber brushes.
- B. Clean walls not requiring painting or sealing so there are no visible stains.

### 3.13 PROTECTION OF INSTALLED WORK

- A. Do not allow grout and mortar stains to dry on face of exposed masonry.
- B. Protect tops of walls at all times. Cover tops of walls with waterproof paper when rain or snow is imminent and when the Work is discontinued.
- C. Adequately brace walls until walls and roof are completed.
- D. Provide sufficient bracing to protect walls against damage from elements, including wind and snow.
- E. Protect masonry against freezing for minimum 72 hours after being laid.
- F. Protect masonry from damage until final acceptance of the Work. Damaged units will not be accepted.

**END OF SECTION**



**SECTION 05 05 23  
WELDING**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Society of Mechanical Engineers (ASME):
    - a. BPVC SEC V, Nondestructive Examination.
    - b. BPVC SEC IX, Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators.
  2. American Society of Nondestructive Testing (ASNT): SNT-TC-1A, Personnel Qualification and Certification in Nondestructive Testing.
  3. ASTM International (ASTM): A370, Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
  4. American Welding Society (AWS):
    - a. A2.4, Standard Symbols for Welding, Brazing, and Nondestructive Examination.
    - b. A3.0, Standard Welding Terms and Definitions; Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting and Thermalspraying.
    - c. D1.1/D1.1M, Structural Welding Code - Steel.
    - d. D1.2/D1.2M, Structural Welding Code - Aluminum.
    - e. D1.3, Structural Welding Code - Sheet Steel.  
D1.4/D1.4M, Structural Welding Code - Reinforcing Steel.
    - f. D1.6/D1.6M, Structural Welding Code - Stainless Steel.
    - g. QC1, Standard for AWS Certification of Welding Inspectors.
  5. American Water Works Association (AWWA): C206, Field Welding of Steel Water Pipe.

1.02 DEFINITIONS

- A. CJP: Complete Joint Penetration.
- B. CWI: Certified Welding Inspector.
- C. MT: Magnetic Particle Testing.
- D. NDE: Nondestructive Examination.
- E. NDT: Nondestructive Testing.

## FORT THOMAS WTP ADVANCED TREATMENT

- F. PJP: Partial Joint Penetration.
- G. PQR: Procedure Qualification Record.
- H. PT: Liquid Penetrant Testing.
- I. RT: Radiographic Testing.
- J. UT: Ultrasonic Testing.
- K. VT: Visual Testing.
- L. WPQ: Welder/Welding Operator Performance Qualification.
- M. WPS: Welding Procedure Specification.

### 1.03 SUBMITTALS

- A. Shop Drawings:
  - 1. Shop and field WPSs and PQRs.
  - 2. NDT procedure specifications prepared in accordance with ASME BPVC SEC V.
  - 3. Welding Data (Shop and Field):
    - a. Show on Shop Drawings or a weld map complete information regarding base metal specification designation, location, type, size, and extent of welds with reference called out for WPS and NDE numbers in tails of combined welding and NDE symbols as indicated in AWS A2.4.
    - b. Distinguish between shop and field welds.
    - c. Indicate, by welding symbols or sketches, details of welded joints and preparation of base metal. Provide complete joint welding details showing bevels, groove angles, and root openings for welds.
    - d. For pipe fittings, provide a joint weld beveling diagram. Refer to AWS D1.1/D1.1M, Annex P Local Dihedral Angle that can be used to calculate bevels for weld joint details of intersecting pipes.
    - e. Welding and NDE symbols shall be in accordance with AWS A2.4.
    - f. Welding terms and definitions shall be in accordance with AWS A3.0.
    - g. Submit welding data together with shop drawings as a complete package.

## FORT THOMAS WTP ADVANCED TREATMENT

### B. Informational Submittals:

1. WPQs.
2. CWI credentials.
3. Testing agency personnel credentials.
4. CWI reports.
5. Welding Documentation: Submit on appropriate forms in referenced welding codes.

### 1.04 QUALIFICATIONS

- A. WPSs: In accordance with AWS D1.1/D1.1M (Annex N Forms) (field) and ASME BPVC SEC IX (shop).
- B. WPQs: In accordance with AWS D1.1/D1.1M (Annex N Forms) (field) and ASME BPVC SEC IX (shop).
- C. CWI: Certified in accordance with AWS QC1, and having prior experience with the welding codes specified. Alternate welding inspector qualifications require approval by the Engineer.
- D. Testing Agency: Personnel performing tests shall be NDT Level II certified in accordance with ASNT SNT-TC-1A.

### 1.05 SEQUENCING AND SCHEDULING

- A. Unless otherwise specified, all Submittals required in this section shall be submitted and approved prior to commencement of welding operations.

## PART 2 PRODUCTS

### 2.01 SOURCE QUALITY CONTROL

- A. CWI shall be present whenever shop welding is performed. CWI shall perform inspection, as necessary, prior to assembly, during assembly, during welding, and after welding. CWI shall perform inspections as required in AWS D1.1/D1.1M or referenced welding code and as follows:
  1. Verifying conformance of specified job material and proper storage.
  2. Monitoring conformance with approved WPS.
  3. Monitoring conformance of WPQ.
  4. Inspecting weld joint fit-up and performing in-process inspection.
  5. Providing 100 percent visual inspection of welds.
  6. Supervising nondestructive testing personnel and evaluating test results.
  7. Maintaining records and preparing report confirming results of inspection and testing comply with the Work.

**PART 3 EXECUTION**

**3.01 GENERAL**

- A. Welding and Fabrication by Welding: Conform to governing welding codes referenced in attached Welding and Nondestructive Testing Table.
- B. Welding procedure specifications for all pressure piping shall be qualified for notch toughness by limiting heat input; charpy testing of weld metal and heat-affected zone shall be done as a part of the welding procedure qualification. Full-size specimens shall be charpy tested in accordance with ASTM A370. The minimum average energy of the test coupons shall not be less than 25 foot-pounds.

**3.02 NONDESTRUCTIVE WELD TESTING REQUIREMENTS**

- A. Weld Inspection Criteria:
  - 1. Selection of welds to be tested unless 100 percent NDT is specified herein, shall be as agreed upon between Engineer and Contractor.
  - 2. Unless otherwise specified, perform NDT of welds at a frequency as shown below or in the attached table in accordance with the referenced welding codes as follows. Perform UT on CJP groove welds that cannot be readily radiographed. In case there is a conflict the higher frequency level of NDT shall apply:
    - a. CJP Butt Joint Welds: 10 percent random RT.
    - b. CJP Groove Welds: 10 percent random UT.
    - c. Fillet Welds and PJP Groove Welds: 10 percent random PT or MT.
    - d. All Welds: 100 percent VT.
  - 3. Weld Acceptance:
    - a. VT:
      - 1) Structural Pipe and Tubing: AWS D1.1/D1.1M, Paragraph 6.9, Visual Inspection, Tubular Connections.
      - 2) All Other Structural Steel: AWS D1.1/D1.1M, Paragraph 6.9, Visual Inspection, Statically Loaded Nontubular Connections.
      - 3) Stud Connections: AWS D1.1/D1.1M, Paragraph 7.8.1.
    - b. UT: Perform UT of CJP groove welds in accordance with AWS D1.1/D1.1M, Paragraph 6.13.3, Class R Indications.
    - c. RT: Perform RT of CJP butt joint welds in accordance with AWS D1.1/D1.1M, Paragraph 6.12.1.

## FORT THOMAS WTP ADVANCED TREATMENT

- d. PT or MT:
  - 1) Perform on fillet and PJP groove welds in accordance with AWS D1.1/D1.1M, Paragraph 6.10.
  - 2) Acceptance shall be in accordance with VT standards specified above.

### 3.03 FIELD QUALITY CONTROL

- A. The CWI shall be present whenever field welding is performed. The CWI shall perform inspection, as necessary, prior to assembly, during assembly, during welding, and after welding. CWI shall perform inspections as required in AWS D1.1/D1.1M or referenced welding code and as follows:
  - 1. Verifying conformance of specified job material and proper storage.
  - 2. Monitoring conformance with approved WPS.
  - 3. Monitoring conformance of WPQ.
  - 4. Inspecting weld joint fit-up and performing in-process inspection.
  - 5. Providing 100 percent visual inspection of all welds.
  - 6. Supervising nondestructive testing personnel and evaluating test results.
  - 7. Maintaining records and preparing report confirming results of inspection and testing comply with the Work.

### 3.04 WELD DEFECT REPAIR

- A. Repair and retest rejectable weld defects until sound weld metal has been deposited in accordance with appropriate welding codes.

### 3.05 SUPPLEMENTS

- A. The supplement listed below, following "End of Section," is a part of this Specification.
  - 1. Welding and Nondestructive Testing table.

**END OF SECTION**

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FORT THOMAS WTP ADVANCED TREATMENT

Welding and Nondestructive Testing						
Specification Section	Governing Welding Codes or Standards	Submit WPS	Submit WPQ	Onsite CWI Req'd	Submit Written NDT Procedure Specifications	NDT Requirements
05 12 00 Structural Steel Framing	AWS D1.1/D1.1M, Structural Welding Code - Steel	Yes	Yes	Yes	Yes	10% UT or RT of all groove-and-butt joint welds; 10% MT of all fillet welds; see Section 05 12 00
05 21 19 Open Web Steel Joists Framing	AWS D1.1/D1.1M, Structural Welding Code - Steel	Yes	Yes	Yes	Yes	100% VT; see Section 05 21 19
05 31 00 Steel Decking	AWS D1.1/D1.1M, Structural Welding Code - Steel or AWS D1.3, Structural Welding Code - Sheet Steel	Yes	Yes	Yes	Yes	100% VT; see Section 05 31 00
05 41 00 Structural Metal Stud Framing	AWS D1.1/D1.1M, Structural Welding Code - Steel or AWS D1.3, Structural Welding Code - Sheet Steel	Yes	Yes	Yes	Yes	100% VT; see Section 05 41 00
05 50 00 Metal Fabrications	AWS D1.1/D1.1M, Structural Welding Code - Steel or AWS D1.2/D1.2M, Structural Welding Code - Aluminum or AWS D1.6/D1.6M, Structural Welding Code - Stainless Steel	Yes	Yes	Yes	Yes	100% VT; see Section 05 50 00
05 52 00 Metal Railings	AWS D1.1/D1.1M, Structural Welding Code - Steel or AWS D1.2/D1.2M, Structural Welding Code - Aluminum	No	No	No	No	100% VT; see Section 05 52 00
05 53 00 Metal Gratings	AWS D1.1/D1.1M, Structural Welding Code - Steel or AWS D1.2/D1.2M, Structural Welding Code - Aluminum	No	No	No	No	100% VT; see Section 05 53 00
40 27 00 Process Piping - General	ASME BPV Code, Section IX; and AWS D1.1/D1.1M, Structural Welding Code - Steel AWWA C206	Yes	Yes	Yes	Yes	100% VT; see Section 40 27 00

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**SECTION 05 50 00  
METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. The Aluminum Association, Inc. (AA): The Aluminum Design Manual.
  2. American Galvanizers Association (AGA): Inspection of Products Hot-Dip Galvanized After Fabrication.
  3. American Institute of Steel Construction (AISC): S329, Allowable Stress Design Specification for Structural Joints using ASTM A325 or A490 Bolts.
  4. American Iron and Steel Institute (AISI): Stainless Steel Types.
  5. American Ladder Institute (ALI): A14.3, Ladders - Fixed - Safety Requirements.
  6. American National Standards Institute (ANSI).
  7. American Society of Mechanical Engineers (ASME): B1.1, Unified-inch Screw Threads (UN and UNR Thread Form).
  8. American Society of Safety Engineers (ASSE): A10.11, Safety Requirements for Personnel and Debris Nets.
  9. American Welding Society (AWS):
    - a. D1.1, Structural Welding Code - Steel.
    - b. D1.2, Structural Welding Code - Aluminum.
    - c. D1.6, Structural Welding Code - Stainless Steel.
  10. ASTM International (ASTM):
    - a. A36/A36M, Specification for Carbon Structural Steel.
    - b. A48, Specification for Gray Iron Castings.
    - c. A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
    - d. A108, Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality.
    - e. A123/A123M, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    - f. A143, Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
    - g. A153/A153M, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
    - h. A193/A193M, Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.

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- i. A194/A194M, Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both.
- j. A240/A240M, Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.
- k. A276, Specification for Stainless Steel Bars and Shapes.
- l. A278, Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650 Degree.
- m. A283/A283M, Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- n. A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile.
- o. A325, Specification for Structural Bolts, Steel, Heat Treated 120/105 ksi Minimum Tensile Strength.
- p. A380, Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
- q. A384, Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
- r. A385, Practice for Providing High-Quality Zinc Coatings (Hot-Dip).
- s. A489, Specification for Carbon Steel Lifting Eyes.
- t. A500, Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- u. A501, Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- v. A563, Specification for Carbon and Alloy Steel Nuts.
- w. A653, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- x. A780, Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- y. A786/A786M, Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
- z. A793, Specification for Rolled Floor Plate, Stainless Steel.
- aa. A967, Specification for Chemical Passivation Treatments for Stainless Steel Parts.
- bb. A992/A992M, Specification for Steel for Structural Shapes for Use in Building Framing
- cc. B209, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- dd. B308/B308M, Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.
- ee. B429, Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

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- ff. B632/B632M, Specification for Aluminum-Alloy Rolled Tread Plate.
  - gg. D1056, Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
  - hh. F436, Specification for Hardened Steel Washers.
  - ii. F468, Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.
  - jj. F593, Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
  - kk. F594, Specification for Stainless Steel Nuts.
  - ll. F844, Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
  - mm. F1554, Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- 11. International Code Council (ICC): Evaluation Reports for Concrete and Masonry Anchors.
  - 12. NSF International (NSF).
  - 13. Occupational Safety and Health Administration (OSHA):
    - a. 29 CFR 1910.27, Fixed Ladders.
    - b. 29 CFR 1926.105, Safety Nets.
    - c. 29 CFR 1926.502, Fall Protection Systems Criteria and Practices.
  - 14. Specialty Steel Industry of North America (SSINA):
    - a. Specifications for Stainless Steel.
    - b. Design Guidelines for the Selection and Use of Stainless Steel.
    - c. Stainless Steel Fabrication.
    - d. Stainless Steel Fasteners.

### 1.02 DEFINITIONS

- A. Corrosive Area: Containment area or area exposed to delivery, storage, transfer, or use of chemicals.
- B. Exterior Area: Location not protected from the weather by a building or other enclosed structure.
- C. Interior Dry Area: Location inside building or structure where floor is not subject to liquid spills or washdown, nor where wall or roof slab is common to a water-holding or earth-retaining structure.
- D. Interior Wet Area: Location inside building or structure where floor is sloped to floor drains or gutters and is subject to liquid spills or washdown, or where wall, floor, or roof slab is common to a water-holding or earth-retaining structure.

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- E. Submerged: Location at or below top of wall of open water-holding structure, such as a basin or channel, or wall, ceiling or floor surface inside a covered water-holding structure, or exterior belowgrade wall or roof surface of water-holding structure, open or covered.

### 1.03 SUBMITTALS

#### A. Action Submittals:

- 1. Shop Drawings:
  - a. Metal fabrications, including welding and fastener information.
  - b. Specific instructions for concrete anchor installation, including drilled hole size, preparation, placement, procedures, and instructions for safe handling of anchoring systems.
- 2. Samples: Color samples of abrasive stair nosings.

#### B. Informational Submittals:

- 1. Concrete and Masonry Drilled Anchors:
  - a. Manufacturer's product description and installation procedures.
  - b. Current test data or ICC Evaluation Report.
  - c. Adhesive Anchor Installer Certification.
- 2. U-Channel Concrete Inserts:
  - a. Manufacturer's product description.
  - b. Allowable load tables.
- 3. Ladders: Certification of load and fatigue tests.
- 4. Passivation method for stainless steel members.
- 5. Hot-Dip Galvanizing: Certificate of compliance signed by galvanizer, with description of material processed and ASTM standard used for coating.

### 1.04 QUALITY ASSURANCE

#### A. Qualifications:

- 1. Adhesive Anchor Installers: Trained and certified by manufacturer.
- 2. Galvanized Coating Applicator: Company specializing in hot-dip galvanizing after fabrication and following procedures of Quality Assurance Manual of the American Galvanizers Association.

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1.05 DELIVERY, STORAGE, AND HANDLING

- A. Insofar as practical, factory assemble items specified herein. Assemblies that due to necessity have to be shipped unassembled shall be packaged and tagged in manner that will protect materials from damage and will facilitate identification and field assembly.
- B. Package stainless steel items in a manner to provide protection from carbon impregnation.
- C. Protect painted coatings and hot-dip galvanized finishes from damage due to metal banding and rough handling. Use padded slings and straps.
- D. Store fabricated items in dry area, not in direct contact with ground.

1.06 SPECIAL GUARANTEE

- A. Manufacturer's extended guarantee or warranty, with Owner named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at option of Owner, removal and replacement of sidewalk doors and floor hatches found defective during a period of 5 years after date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work as specified in General Conditions.

1.07 EXTRA MATERIALS

- A. Furnish, tag, and box for shipment and storage the following extra materials:

Item	Quantity
Neoprene Gasket	Two for each location requiring neoprene gaskets.
Four-inch wide by 50-foot long neoprene gasket material	One roll for each location requiring neoprene gaskets.
Neoprene Gasket Adhesive	One (manufacturer's recommended) for each location requiring neoprene gaskets.

- B. Delivery: In accordance with Section 01 61 00, Common Product Requirements.

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**PART 2 PRODUCTS**

2.01 GENERAL

- A. For hot-dip galvanized steel that is exposed to view and does not receive paint, limit the combined phosphorus and silicon content to 0.04 percent. For steels that require a minimum of 0.15 percent silicon (such as plates over 1.5 inches thick for A36 steel), limit the maximum silicon content to 0.21 percent and the phosphorous content to 0.03 percent.
- B. Unless otherwise indicated, meet the following requirements:

<u>Item</u>	<u>ASTM Reference</u>
Channels, Angles, S-Shapes and Plate and Bar	W-Shapes, A992/A992M
Steel Pipe	A501 or A53/A53M, Type E or S, Grade B
Structural Steel Tubing	A500, Grade B
Stainless Steel:	
Bars and Angles	A276, AISI Type 316 (316L for welded connections)
Shapes	A276, AISI Type 304 (304L for welded connections)
Steel Plate, Sheet, and Strip	A240/A240M, AISI Type 316 (316L for welded connections)
Bolts, Threaded Rods, Anchor Bolts, and Anchor Studs	F593, AISI Type 316, Condition CW
Nuts	F594, AISI Type 316, Condition CW
Steel Bolts and Nuts:	
Carbon Steel	A307 bolts, with A563 nuts
High-Strength	A325, Type 1 bolts, with A563 nuts
Anchor Bolts and Rods	F1554, Grade 55, with weldability supplement S1.
Eyebolts	A489
Threaded Rods	A36/A36M
Flat Washers (Unhardened)	F844

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Item	ASTM Reference
Flat and Beveled Washers (Hardened)	F436
Thrust Ties for Steel Pipe:	
Threaded Rods	A193/A193M, Grade B7
Nuts	A194/A194M, Grade 2H
Plate	A283/A283M, Grade D
Welded Anchor Studs	A108, Grades C-1010 through C-1020
Aluminum Plates and Structural Shapes	B209 and B308/B308M, Alloy 6061-T6
Aluminum Bolts and Nuts	F468, Alloy 2024-T4
Cast Iron	A48, Class 35

- C. Bolts, Washers, and Nuts: Use stainless steel, hot-dip galvanized steel, zinc-plated steel, and aluminum material types as indicated in Fastener Schedule at end of this section.

2.02 ANCHOR BOLTS AND ANCHOR BOLT SLEEVES

A. Cast-In-Place Anchor Bolts:

1. Headed type, unless otherwise shown on Drawings.
2. Material type and protective coating as shown in Fastener Schedule at end of this section.

B. Anchor Bolt Sleeves:

1. Plastic:
  - a. Single unit construction with corrugated sleeve.
  - b. Top of sleeve shall be self-threading to provide adjustment of threaded anchor bolt projection.
  - c. Material: High density polyethylene.
  - d. Manufacturer: Sinco Products, Inc., Middletown, CT, (800) 243-6753.
2. Fabricated Steel: ASTM A36/A36M.

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### 2.03 CONCRETE AND MASONRY DRILLED ANCHORS

#### A. General:

1. AISI Type 316 stainless, hot-dip galvanized, or zinc-plated steel, as shown in Fastener Schedule at end of this section.
2. Current evaluation and acceptance reports by ICC or other similar code organization.
3. Acceptable for use in potable water structures by EPA and local health agencies or NSF.

#### B. Wedge Anchors:

1. Manufacturers and Products:
  - a. ITW Ramset/Red Head, Addison, IL; Trubolt Wedge Anchor.
  - b. Hilti, Inc., Tulsa, OK; Kwik-Bolt-3 (KB-3) Anchor.
  - c. Powers Fasteners, New Rochelle, NY; Power-Stud Anchor.
  - d. Simpson Strong-Tie Co., Inc., Pleasanton, CA; Wedge-All Anchor.
  - e. Wej-It Corp., Tulsa, OK; ANKRtite Wedge Anchor.
  - f. Adhesives Technology, Pompano Beach, FL; Kingpin Wedge Anchor.
  - g. Unitex, Kansas City, MO; Pro-Poxy 300 and Pro-Poxy 300 Fast Epoxy Adhesive Anchors.

#### C. Expansion Anchors:

1. Self-drilling anchors, snap-off or flush type, zinc-plated.
2. Nondrilling Anchors: Flush type for use with zinc-plated or stainless steel bolt, or stud type with projecting threaded stud.
3. Manufacturers and Products:
  - a. ITW Ramset/Red Head, Addison, IL; Multi-Set II Drop-In and Self Drill Anchor.
  - b. Hilti, Inc., Tulsa, OK; Hilti HDI Drop-In Anchor.
  - c. Powers Fasteners, New Rochelle, NY; Steel Drop-In Anchor.
  - d. Simpson Strong-Tie Co., Inc., Pleasanton, CA; Drop-In Anchor.

#### D. Undercut Anchors:

1. Manufacturers and Products:
  - a. USP Structural Connectors; DUC Undercut Anchor.
  - b. Hilti, Inc., Tulsa OK; HDA Undercut Anchor.



E. Sleeve Anchors:

1. Manufacturers and Products:
  - a. ITW Ramset/Red Head, Addison, IL; Dynabolt Hex Nut Sleeve Anchor.
  - b. Powers Fasteners, New Rochelle, NY; Hex Head Power-Bolt Anchor.
  - c. Simpson Strong-Tie Co., Inc., Pleasanton, CA; Sleeve-All Hex Head Anchor.
  - d. Wej-It Corp., Tulsa, OK; Wej-It Sleeve Anchor.
  - e. Hilti, Inc., Tulsa, OK; HSL-3 Heavy Duty Sleeve Anchor.

F. Adhesive Anchors:

1. Threaded Rod:
  - a. ASTM F593 stainless steel threaded rod, diameter as shown on Drawings.
  - b. Length as required, to provide minimum depth of embedment.
  - c. Clean and free of grease, oil, or other deleterious material.
  - d. For hollow-unit masonry, provide galvanized or stainless steel wire cloth screen tube to fit threaded rod.
2. Adhesive:
  - a. Two-component, designed to be used in adverse freeze/thaw environments, with gray color after mixing.
  - b. Cure Temperature, Pot Life, and Workability: Compatible for intended use and environmental conditions.
  - c. Nonsag, with selected viscosity base on installation temperature and overhead application where applicable.
3. Packaging and Storage:
  - a. Disposable, self-contained cartridge system capable of dispensing both components in the proper mixing ratio and fitting into a manually or pneumatically operated caulking gun.
  - b. Store adhesive cartridges on pallets or shelving in covered storage area, in accordance with manufacturer's written instructions.
  - c. Cartridge Markings: Include manufacturer's name, product name, material type, batch or serial number, and adhesive expiration date.
  - d. Dispose of cartridges if shelf life has expired.
4. Manufacturers and Products:
  - a. Adhesives Technology, Pompano Beach, FL; Ultrabond 1 Epoxy Anchor System.
  - b. Hilti, Inc., Tulsa, OK; HIT HY 150 Adhesive Anchor System, (use HIT HY 20 for hollow masonry).

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- c. ITW Ramset/Red Head, Addison, IL; C6 Adhesive Anchor System or A7 Adhesive Anchor System. (Use A7 Adhesive Anchor System for hollow masonry.)
- d. Simpson Strong-Tie Co., Inc., Pleasanton, CA; ET Epoxy-Tie Adhesive or Acrylic-Tie Adhesive. (Use Acrylic-Tie Adhesive for temperatures below 40 degrees F.)
- e. Unitex, Kansas City, MO; Pro-Poxy 300 Adhesive Anchors or Pro-Poxy 300 Fast Epoxy Adhesive Anchors.
- f. USP Structural Connectors CIA-Gel 7000 Epoxy Anchoring System.

### G. Adhesive Threaded Inserts:

- 1. Stainless steel, internally threaded insert.
- 2. Manufacturer and Product: Hilti, Inc., Tulsa, OK; HIS-R Insert with HIT HY 150 adhesive.

## 2.04 WELDED ANCHOR STUDS

### A. Headed anchor studs (HAS) or threaded anchor studs (TAS), as indicated on Drawings.

- 1. Carbon Steel: ASTM A108, Standard Quality Grades 1010 through 1020, inclusive either semikilled or killed aluminum or silicon dioxide, unless indicated otherwise.
- 2. Stainless Steel: ASTM F593, AISI Type 316, Condition CW, where indicated.

### B. Manufacturers:

- 1. Nelson Stud Welding, FabriSteel Co., Elyria, OH.
- 2. Stud Welding Associates, Inc., Elyria, OH.

## 2.05 PIPE SLEEVES

### A. As specified in Section 40 27 01, Process Piping Specialties

## 2.06 STEEL LINTELS AND SHELF ANGLES

- A. ASTM A36/A36M, hot-dip galvanize after fabrication in accordance with ASTM A123/A123M.

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### 2.07 EMBEDDED STEEL SUPPORT FRAMES FOR FLOOR PLATE AND GRATING

- A. Steel angle support frames to be embedded in concrete shall be stainless steel, ASTM A276, AISI Type 316, unless indicated otherwise.
- B. Welded anchors for stainless steel support frames shall also be stainless steel.

### 2.08 U-CHANNEL CONCRETE INSERTS

- A. Rolled ASTM A240/A240M, AISI Type 316 stainless steel; 0.105-inch thickness, 1-5/8-inch width by 1-3/8-inch depth, with stainless steel anchors at 10-inch maximum spacing, styrofoam fillers, and end caps.
- B. Nut and Bolt Hardware: Type 316 stainless steel, 5/8-inch minimum diameter, unless indicated otherwise. Manufacturer's standard to match insert.
- C. Manufacturers and Products:
  - 1. Power-Strut, Wayne, MI; PS 349 Series.
  - 2. B-Line Systems, Inc., Highland, IL; B32 Series.
  - 3. Halfen Anchoring Systems, Converse, TX; Channel Type 4141HTA.

### 2.09 ABRASIVE NOSING FOR STAIRS

- A. Unless otherwise shown on Drawings, furnish flush type abrasive nosings on stairs.
- B. Nosing Components:
  - 1. Homogeneous epoxy abrasive, with minimum 50 percent aluminum oxide content, formed and cured upon an extruded aluminum base.
  - 2. Epoxy abrasive shall extend over and form curved front edge of nosing.
  - 3. Base of Nosing: Extruded aluminum alloy, 6063-T5, heat-treated.
- C. Anchoring System: Double-set anchors consisting of two rows of integrally extruded anchors.
- D. Size: 3 inches wide by 1/4 to 3/8 inch thick by length as shown.
- E. Color: Selected by Engineer from manufacturer's standard color range.
- F. Manufacturers and Products:
  - 1. Wooster Products, Inc., Wooster, OH; Spectra Type WP3C.
  - 2. American Safety Tread Co., Inc., Helena, AL; Type FA-311D.

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### 2.10 FLOOR PLATE

#### A. Material:

1. Galvanized Steel: Carbon steel, ASTM A786/A786M, commercial grade, hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
2. Stainless Steel: ASTM A793, AISI Type 304.
3. Aluminum: ASTM B632/B632M, Alloy 6061-T6.

#### B. Minimum Thickness:

1. Steel: 1/4 inch, unless shown otherwise on Drawings.
2. Aluminum: 3/8 inch, unless shown otherwise on Drawings.

#### C. Surface shall be raised-lug pattern or diamond tread, unless shown otherwise on Drawings.

#### D. Slip-Resistant Surface:

1. Provide where indicated on Drawings.
2. Manufacturers and Products:
  - a. IKG/Borden, Clark, NJ; MEBAC 2.
  - b. W.S. Molnar Co., Detroit, MI; SLIPNOT Grade 2-Medium.

### 2.11 EXTRUDED FLOOR PLATE

#### A. Extruded Deck Plate:

1. Minimum Section Height: As shown on Drawings.
2. Minimum Section Width: 12 inches.
3. Accessories: Dovetail interlock strips. Anchor clamp fixtures. Toeboard, 1 inch raised lip.
4. Manufacturer and Product: Alcoa Building Products, Inc., Sidney, OH; Standard Diamondback.

#### B. Extruded Tread Plate:

1. Minimum Section Height: 0.360 inch, plus serrations.
2. Section Width: 12 inches.
3. Accessories: Edgebands, tongue-and-groove attachment.
4. Manufacturer and Product: Alcoa Building Products, Inc., Sidney, OH; Standard Diamondback.

2.12 SIDEWALK DOORS

- A. Load Capacity: 300 psf with maximum deflection of 1/150th of span. Provide H-20 highway loading capacity where indicated on Drawings.
- B. Component Fabrication:
  - 1. Access Door Leaf(s): 1/4-inch aluminum diamond pattern plate. Provide stainless steel safety chain and attachments for end of double-leaf door assembly when open.
  - 2. Channel Frame: 1/4-inch thick extruded aluminum trough frame with continuous anchor flange around perimeter. Weld 1-1/2-inch diameter drain coupling to frame trough at front right corner, unless indicated otherwise on Drawings.
- C. Door Hardware:
  - 1. Hinges: Heavy-duty brass or stainless steel with stainless steel pins through-bolted to cover plate with tamper-proof stainless steel bolts flush with top of cover and to outside leg of channel frame with stainless steel bolts and locknuts.
  - 2. Lifting Mechanism: Stainless steel compression lift springs enclosed in telescoping vertical housing or stainless steel torsion lift springs.
  - 3. Hold-Open Arm:
    - a. Locks automatically in open position.
    - b. Disengages with slight pull on vinyl grip with one hand.
    - c. Door can be easily closed with one hand by pulling forward and down on vinyl grip.
  - 4. Snap Lock:
    - a. Stainless steel snap lock mounted on bottom of door leaf with removable topside key wrench and inside fixed lever handle.
    - b. Threaded plug for flush outside surface with key wrench removed.
- D. Aluminum shall be mill finished with protective coating applied to surfaces to be in contact with concrete, as specified in Section 09 90 00, Painting and Coating.
- E. Sizes as shown on Drawings.
- F. Manufacturers and Products:
  - 1. Bilco Co., New Haven, JAL and JALD Series.
  - 2. Acceptable Manufacturers:
    - a. Nystrom Products Co., Minneapolis.
    - b. U.S.F. Fabrication, Hialeah.

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- c. ITT Flygt Corporation, Trumbull.
- d. Thompson Fabricating Co., Birmingham.
- e. Halliday Products, Orlando, FL.

### 2.13 FLOOR HATCHES

- A. Load Capacity: 300 psf with maximum deflection of 1/150th of span.
- B. Component Fabrication:
  1. Access Door Leaf(s): 1/4-inch thick aluminum diamond pattern plate. Provide stainless steel safety chain and attachments for end of double-leaf door assembly when open.
  2. Angle Frame: 1/4-inch thick extruded aluminum angle frame with concrete anchors and integral neoprene gasket strip.
- C. Door Hardware:
  1. Hinges: Heavy-duty brass or stainless steel with stainless steel pins, through-bolted to cover plate with tamper-proof stainless steel bolts flush with top of cover and to outside leg of channel frame with stainless steel bolts and locknuts.
  2. Lifting Mechanism: Stainless steel compression lift springs enclosed in telescoping vertical housing or stainless steel torsion lift springs.
  3. Hold-Open Arm:
    - a. Locks automatically in open position.
    - b. Disengages with slight pull on vinyl grip with one hand.
    - c. Door can be easily closed with one hand by pulling forward and down on vinyl grip.
  4. Snap Lock:
    - a. Stainless steel snap lock mounted on bottom of door leaf with removable topside key wrench and inside fixed lever handle.
    - b. Threaded plug for flush outside surface with key wrench removed.
  5. Sizes: As shown on drawings.
- D. Aluminum shall be mill finished with protective coating applied to surfaces to be in contact with concrete, as specified in Section 09 90 00, Painting and Coating.
- E. Manufacturers and Products:
  1. Bilco Co., New Haven, CT; K Series.
  2. Nystrom Products Co., Minneapolis, MN; FH Series.
  3. U.S.F. Fabrication, Hialeah, FL; A Series.
  4. ITT Flygt Corporation, Trumbull, CT; FLE Series.

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- 5. Thompson Fabricating Co., Birmingham, AL; TI Series.
- 6. Halliday Products, Orlando, FL; SS Series.

2.14 HINGED MANHOLE COVERS

- A. Slab type rectangular manhole frame and cover with flush, waterproof lift handles, and stainless steel butt hinges.
- B. ASTM A48, Class 35, cast iron, unpainted.
- C. Furnish where shown on the Drawings per the following table:

<b>Hinged Manhole Covers</b>			
<b>Mark</b>	<b>Duty</b>	<b>Size (inches)</b>	<b>Weight (pounds)</b>
HMC-1	Light	24 x 36	275
HMC-2	Light	30 x 30	290
HMC-3	Light	30 x 36	335
HMC-4	Light	30 x 48	450
HMC-5	Heavy	30 x 36	525
HMC-6	Heavy	36 x 36	700

- D. Manufacturers:
  - 1. Neenah Foundry Co., Neenah, WI.
  - 2. Flockhart Foundry Co., Newark, NJ.

2.15 LADDERS

- A. Fabricate ladders with rails, rungs, landings, and cages to meet applicable requirements of OSHA, CFR Part 1910.27, and ALI A14.3.
  - 1. Concentrated load of 250 pounds plus 30 percent impact on rungs.
  - 2. Maximum rung deflection of 1/360.
  - 3. Concentrated load of 250 pounds plus 30 percent impact between consecutive attachments.
  - 4. Self-closing gates at landings.
- B. Aluminum Pre-engineered Pipe Ladders:
  - 1. Rungs:
    - a. Aluminum extrusions of Alloy 6063-T6.

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- b. Nonslip grip surface, 1-inch wide flat top, and semicircular bottom with mill finish.
2. Side Rails: ASTM B429, Alloy 6063-T6, 1-1/2 inches, Schedule 40 pipe with anodized finish, AA M32-C22-A41.
3. Fasteners for Ladder Attachments and Cage Assembly: Stainless steel.
4. Welded, pop riveted, or glued construction is not acceptable.
5. Fabricate to longest length as practical but not to exceed 24 feet.
6. Furnish support attachments to side rails at 6 feet maximum spacing.
7. Manufacturer: Thompson Fabricating Co. Inc., Tarrant, AL.

### C. Ladder Safety Post:

1. Telescoping tubular, spring balanced and automatically locking in raised position, with release lever for unlocking.
2. Post: Aluminum.
3. Spring Mechanism: Stainless steel.
4. Furnish dissimilar metal protective coatings at connections.
5. Manufacturer and Product: Bilco Co., New Haven, CT; "Ladder Up" to fit ladder rungs.

### D. Fixed Rung Ladders:

1. Fabricate from 1 inch steel bar, Grade 60, ASTM A615/A615M.
2. Rungs shall have end lugs to prevent foot slipping off the sides.
3. Provide polypropylene encasement of rungs, ASTM D4101.
4. Rung width 16 inches from center to center of legs.
5. Embed in concrete wall 5 inches minimum.
6. Rung projection out from concrete wall 7 inches.
7. Each fixed rung ladder shall have fabricated stainless steel walk-through side rails mounted on top of landing at top of fixed ladder; rails shall be 42 inches high, 24 inches apart centered on the fixed ladder, and designed to comply with OSHA 1910.27.

## 2.16 GAC TANK LADDER SAFETY SYSTEM

### A. General:

1. Conforms to OSHA CFR Part 1910.27 and OSHA 29 CFR Part M for personal fall arrest system.
2. Belt and harness shall withstand minimum drop test of 250 pounds in 6-foot free fall.
3. All safety devices must be able to withstand without failure, a drop test consisting of a 500-pound weight dropping 18 inches.



## FORT THOMAS WTP ADVANCED TREATMENT

### B. Components and Accessories:

1. Portable Hoist System:
  - a. Welded aluminum hoist system with 450 pound minimum rated working load and variable offset mast.
  - b. Adjustable portable base assembly.
  - c. Quantity of two portable hoist systems required.
  - d. DBI Sala UCL Advanced Series; Hoist Model Number 8518040, or equal.
2. Hoist System Mast Sleeves:
  - a. Welded stainless steel sleeve, flush mount design with anchors for new concrete construction.
  - b. Compatible with portable hoist system mast.
  - c. Quantity of sixteen required (two at each GAC contactor tank).
  - d. DBI Sala Flush Mount Sleeve; Model 8510311, or equal.
  - e. Stainless steel cap required for each sleeve to be in place when sleeve not in use.
3. Winch:
  - a. Winch assembly with one speed and permanent mounted crank handle.
  - b. Stainless steel cable, 3/16 inch diameter, 150 feet of cable.
  - c. Quantity of two winches required.
  - d. DBI Sala UCL Advanced Digital 200 Series; Model 8518014, or equal.
4. Self Retracting Lifeline (SRL):
  - a. Sealed stainless steel and cast aluminum housing with self adjusting disc brake.
  - b. 3/16 inch galvanized steel wire rope, length 85 feet.
  - c. Self locking swivel snap hook.
  - d. Retrieval winch.
  - e. Quantity of two required.
  - f. DBI Sala SSRL; Model 3403502, or equal.

### C. Manufacturers and Products:

1. DBI Sala.
2. Miller Equipment
3. Or approved equal.

## 2.17 SAFETY CLIMB DEVICE

### A. General:

1. Conforms to OSHA CFR Part 1910.27 and OSHA 29 CFR Part M for personal fall arrest system.

## FORT THOMAS WTP ADVANCED TREATMENT

2. Belt and harness shall withstand minimum drop test of 250 pounds in 6-foot free fall.

### B. Components and Accessories:

1. Folding Davit and Base
  - a. Fixed stainless steel base provided and installed at each fixed ladder.
  - b. Portable davit with minimum 24-inch reach, 77-inch head clearance and 360 degree pivot; provide two per treatment plant.
2. Personal Fall Arrest System:
  - a. Self retracting lifeline (SRL) fall limiter with 400 pound minimum rating, 30 feet minimum working capacity length.
  - b. Personal harness, adjustable fit with front and back. D-rings in sizes M, L and XL.
  - c. Connecting device to attach SRL to personal harness, quick clip style.
  - d. Provide two personal fall arrest systems per treatment plant.

### C. Manufacturers and Products:

1. Miller Equipment, Franklin, PA personal fall arrest system.
2. MSA Folding Davit and Base.

## 2.18 MISCELLANEOUS FABRICATED UNITS

### A. Pressure Type Manhole Hatches:

1. Aluminum cover suitable for 15 psi with steel weld neck and cam locks.
2. Hot-dip galvanize manhole and extension sleeve in accordance with ASTM A123/A123M after welding.
3. Furnish a cam handle, bar, and six extra gaskets.
4. Manufacturer and Product: West Coast Engineered Products, Huntington Park, CA; West Coast No. 1520.

### B. T-Handled Operating Wrenches: Galvanized operating wrenches, 4-foot total length, No. A-2461 as manufactured by Mueller.

### C. Valve Operator Access Box: Cast iron, 8 inches by 4 inches, as manufactured by Zurn; No. ZN-1930-K.

### D. Wire Mesh Screen:

1. Fabricate frame of aluminum shapes and flat bar stock.
2. Wire Mesh: Woven of 14-gauge aluminum wire, three openings per inch, stretched taut over frame before bolts are tightened down.

## FORT THOMAS WTP ADVANCED TREATMENT

### 2.19 CASTINGS

- A. Meter Box Manhole: Nonslip surface and handle, as manufactured by Olympic Foundry Co.; 5823B.
- B. Floor Boxes:
  - 1. Cast iron, except as otherwise shown.
  - 2. Depth: Equal to slab thickness where installed.
  - 3. Diameter: As shown.
  - 4. Manufacturers and Products:
    - a. Neenah Foundry, Neenah, WI; R 7506.
    - b. Mueller, Decatur, IL; No. A-27010.
    - c. Olympic Foundry Co., Seattle, WA; No. 5680.

### 2.20 ACCESSORIES

- A. Antiseizing Lubricant for Stainless Steel Threaded Connections:
  - 1. Suitable for potable water supply.
  - 2. Resists washout.
  - 3. Manufacturers and Products:
    - a. Bostik, Middleton, MA; Neverseez.
    - b. Saf-T-Eze Div., STL Corp., Lombard, IL; Anti-Seize.
- B. Neoprene Gasket:
  - 1. ASTM D1056, 2C1, soft, closed-cell neoprene gasket material, unless otherwise shown on Drawings.
  - 2. Thickness: Minimum 1/4 inch.
  - 3. Furnish without skin coat.
  - 4. Manufacturer and Product: Rubatex Corporation, Bedford, VA; Rubatex No. R-411-N.

### 2.21 FABRICATION

- A. General:
  - 1. Finish exposed surfaces smooth, sharp, and to well-defined lines.
  - 2. Furnish necessary rabbets, lugs, and brackets so work can be assembled in neat, substantial manner.
  - 3. Conceal fastenings where practical; where exposed, flush countersink.
  - 4. Drill metalwork and countersink holes as required for attaching hardware or other materials.
  - 5. Grind cut edges smooth and straight. Round sharp edges to small uniform radius. Grind burrs, jagged edges, and surface defects smooth.

## FORT THOMAS WTP ADVANCED TREATMENT

6. Fit and assemble in largest practical sections for delivery to Site.
- B. Materials:
1. Use steel shapes, unless otherwise noted.
  2. Steel to be hot-dip galvanized: Limit silicon content to less than 0.04 percent or to between 0.15 and 0.25 percent.
  3. Fabricate aluminum in accordance with AA Specifications for Aluminum Structures – Allowable Stress Design.
- C. Welding:
1. Weld connections and grind exposed welds smooth. When required to be watertight, make welds continuous.
  2. Welded fabrications shall be free from twisting or distortion caused by improper welding techniques.
  3. Steel: Meet fabrication requirements of AWS D1.1, Section 5.
  4. Aluminum: Meet requirements of AWS D1.2.
  5. Stainless Steel: Meet requirements of AWS D1.6.
  6. Welded Anchor Studs: Prepare surface to be welded and weld with stud welding gun in accordance with AWS D1.1, Section 7, and manufacturer's instructions.
  7. Complete welding before applying finish.
- D. Painting:
1. Shop prime with rust-inhibitive primer as specified in Section 09 90 00, Painting and Coating, unless otherwise indicated.
  2. Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals, as specified in Section 09 90 00, Painting and Coating, unless indicated otherwise.
  3. Do not apply protective coating to galvanized steel anchor bolts or galvanized steel welded anchor studs, unless indicated otherwise.
- E. Galvanizing:
1. Fabricate steel to be galvanized in accordance with ASTM A143, ASTM A384, and ASTM A385. Avoid fabrication techniques that could cause distortion or embrittlement of the steel.
  2. Provide venting and drain holes for tubular members and fabricated assemblies in accordance with ASTM A385.
  3. Remove welding slag, splatter, burrs, grease, oil, paint, lacquer, and other deleterious material prior to delivery for galvanizing.

## FORT THOMAS WTP ADVANCED TREATMENT

4. Remove by blast cleaning or other methods surface contaminants and coatings not removable by normal chemical cleaning process in the galvanizing operation.
5. Hot-dip galvanize steel members, fabrications, and assemblies after fabrication in accordance with ASTM A123/A123M.
6. Hot-dip galvanize bolts, nuts, washers, and hardware components in accordance with ASTM A153/A153M. Oversize holes to allow for zinc alloy growth. Shop assemble bolts and nuts.
7. Galvanized steel sheets in accordance with ASTM A653.
8. Galvanize components of bolted assemblies separately before assembly. Galvanizing of tapped holes is not required.

- F. Watertight Seal: Where required or shown, furnish neoprene gasket of a type that is satisfactory for use in contact with sewage. Cover full bearing surfaces.
- G. Fitting: Where movement of fabrications is required or shown, cut, fit, and align items for smooth operation. Make corners square and opposite sides parallel.
- H. Accessories: Furnish as required for a complete installation. Fasten by welding or with stainless steel bolts or screws.

### 2.22 SOURCE QUALITY CONTROL

- A. Visually inspect all fabrication welds and correct any deficiencies.
1. Steel: AWS D1.1, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.
  2. Aluminum: AWS D1.2.
  3. Stainless Steel: AWS D1.6.
- B. Hot-Dip Galvanizing:
1. An independent testing agency, shall be retained by Contractor and approved by Engineer to inspect and test hot-dip galvanized fabricated items, except in accordance with ASTM A123/A153M and ASTM A153/A153M.

## PART 3 EXECUTION

### 3.01 INSTALLATION OF METAL FABRICATIONS

- A. General:
1. Install metal fabrications plumb or level, accurately fitted, free from distortion or defects.

## FORT THOMAS WTP ADVANCED TREATMENT

2. Install rigid, substantial, and neat in appearance.
  3. Install manufactured products in accordance with manufacturer's recommendations.
  4. Obtain Engineer approval prior to field cutting steel members or making adjustments not scheduled.
- B. Aluminum:
1. Do not remove mill markings from concealed surfaces.
  2. Remove inked or painted identification marks on exposed surfaces not otherwise coated after installed material has been inspected and approved.
  3. Fabrication, mechanical connections, and welded construction shall be in accordance with the AA Aluminum Design Manual.
- C. Pipe Sleeves:
1. Provide where pipes pass through concrete or masonry.
  2. Holes drilled with a rotary drill may be provided in lieu of sleeves in existing walls.
  3. Provide a center flange for water stoppage on sleeves in exterior or water-bearing walls.
  4. Provide a rubber caulking sealant or a modular mechanical unit to form a watertight seal in the annular space between pipes and sleeves.
- D. Steel Lintels and Shelf Angles: Provide as required for support of masonry and other construction not attached to structural steel framing, unless otherwise shown on Drawings.

### 3.02 CAST-IN-PLACE ANCHOR BOLTS

- A. Accurately locate and hold anchor bolts in place with templates at the time concrete is placed.
- B. Use anchor bolt sleeves for location adjustment and provide two nuts and one washer per bolt of same material as bolt.
- C. Minimum Bolt Size: 1/2-inch diameter by 12 inches long, unless otherwise shown.

### 3.03 CONCRETE AND MASONRY DRILLED ANCHORS

- A. Begin installation only after concrete or masonry to receive anchors has attained design strength.
- B. Install in accordance with manufacturer's instructions.

FORT THOMAS WTP ADVANCED TREATMENT

- C. Provide minimum embedment, edge distance, and spacing as follows, unless indicated otherwise by anchor manufacturer's instructions or shown otherwise on Drawings:

Anchor Type	Min. Embedment (bolt diameters)	Min. Edge Distance (bolt diameters)	Min. Spacing (bolt diameters)
Wedge	9	6	12
Expansion and Sleeve	4	6	12
Undercut	9	12	16
Adhesive	9	9	13.5

- D. Use only drill type and bit type and diameter recommended by anchor manufacturer. Clean hole of debris and dust with brush and compressed air.
- E. For undercut anchors, use special undercutting drill bit and rotary hammer drill and apply final torque as recommended by anchor manufacturer.
- F. When embedded steel or rebar is encountered in the drill path, slant drill to clear obstruction. If drill must be slanted more than 10 degrees to clear obstruction, notify Engineer for direction on how to proceed.
- G. Adhesive Anchors:
1. Do not install adhesive anchors when temperature of concrete is below 40 degrees F (25 degrees F for Simpson Strong-Tie Acrylic-Tie Adhesive) or above 100 degrees F.
  2. Remove any standing water from hole with oil-free compressed air. Inside surface of hole shall be dry where required by manufacturer's instructions.
  3. For hollow-unit masonry, install screen tube in accordance with manufacturer's instructions.
  4. Do not disturb anchor during recommended curing time.
  5. Do not exceed maximum torque as specified in manufacturer's instructions.
- H. Prestressed Concrete: Do not use drilled-in anchors in prestressed or post-tensioned concrete members without Engineer's prior approval unless specifically shown on Drawings.

## FORT THOMAS WTP ADVANCED TREATMENT

### 3.04 U-CHANNEL CONCRETE INSERTS

- A. Provide as indicated for pipe supports and where otherwise shown on Drawings.
- B. Except for interior dry areas, use plastic clips or similar dielectric material to isolate channel anchors from concrete reinforcing steel.

### 3.05 ABRASIVE NOSINGS

- A. Provide abrasive nosings on concrete steps and where shown.

### 3.06 ACCESS COVERS

- A. Install access covers, including sidewalk doors, floor hatches, and hinged manhole covers in accordance with manufacturer's instructions.
- B. Accurately position prior to placing concrete, such that covers are flush with floor surface.
- C. Protect from damage resulting from concrete placement. Thoroughly clean exposed surfaces of concrete spillage to obtain a clean, uniform appearance.

### 3.07 SAFETY CLIMB DEVICE SYSTEM

- A. Provide for each ladder where unbroken height between levels exceeds 20 feet, or at lesser height where indicated on Drawings.
- B. Install in accordance with manufacturer's instructions.
- C. Furnish additional accessories required to complete the system for each ladder.
- D. Furnish one harness for each ladder equipped with a safety climb device.
- E. Furnish pivot section at platforms, landings, and roofs.
- F. When installed to required height, fall prevention system shall be rigid and an integral part of the structure.

### 3.08 LADDER SAFETY POST

- A. Install on all ladders where safety climb device has not been installed.



3.09 ELECTROLYTIC PROTECTION

A. Aluminum and Galvanized Steel:

1. Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals, as specified in Section 09 90 00, Painting and Coating, unless indicated otherwise.
2. Do not apply protective coating to galvanized steel anchor bolts or galvanized steel welded anchor studs, unless indicated otherwise.
3. Allow coating to dry before installation of the material.
4. Protect coated surfaces during installation.
5. Should coating become marred, prepare and touch up in accordance with paint manufacturer's written instructions.

B. Titanium: Where titanium equipment is in contact with concrete or dissimilar metal, provide full-face neoprene insulation gasket, 3/32-inch minimum thickness and 70-durometer hardness.

C. Stainless Steel:

1. During handling and installation, take necessary precautions to prevent carbon impregnation of stainless steel members.
2. After installation, visually inspect stainless steel surfaces for evidence of iron rust, oil, paint, and other forms of contamination.
3. Remove contamination in accordance with requirements of ASTM A380 and ASTM A967.
4. Brushes used to remove foreign substances shall utilize only stainless steel or nonmetallic bristles.
5. After treatment, visually inspect surfaces for compliance.

3.10 PAINTING AND REPAIR OF GALVANIZED STEEL

A. Painted Galvanized Surfaces: Prepare as specified in Section 09 90 00, Painting and Coating.

B. Repair of Damaged Hot-Dip Galvanized Coating:

1. Conform to ASTM A780.
2. For minor repairs at abraded areas, use sprayed zinc conforming to ASTM A780.
3. For flame cut or welded areas, use zinc-based solder, or zinc sticks, conforming to ASTM A780.
4. Use magnetic gauge to determine that thickness is equal to or greater than the base galvanized coating.

3.11 FIELD QUALITY CONTROL

A. Welded Anchor Studs:

1. At start of each production period, Contractor shall perform the following test to determine proper generator, control unit, and stud welding gun settings, in accordance with AWS D1.1, Chapter 7:
  - a. Weld two test studs and visually inspect for full 360-degree flash.
  - b. Bend test studs 30 degrees from vertical for headed anchor studs (HAS). Torque test threaded anchor studs (TAS) studs per AWS D1.1, Section 7.6.6.2.
  - c. Test studs will be acceptable if there is no failure of welds.
  - d. If weld fails, repeat test until two consecutive test studs test to be satisfactory.
2. During production, if visual inspection reveals that weld does not exhibit full 360-degree flash or that stud has been repaired by welding, Contractor shall perform the following test in accordance with AWS D1.1, Chapter 7:
  - a. HAS studs, bend stud approximately 15 degrees from vertical, away from missing portion of flash. For TAS studs, torque test per AWS D1.1, Section 7.6.6.2.
  - b. Studs meeting this test without exhibiting cracks in weld will be considered acceptable and left in bent position.
  - c. Replace studs failing test.
3. Special inspection will be provided by Owner where indicated on Drawings.

B. Concrete and Masonry Drilled Anchors: Special inspection and testing will be provided by Owner where indicated on Drawings.

3.12 MANUFACTURER'S SERVICES

- A. Adhesive Anchors: Conduct site training of installation personnel for proper installation, handling, and storage of adhesive anchor system. Notify Engineer of time and place for sessions.

FORT THOMAS WTP ADVANCED TREATMENT

3.13 FASTENER SCHEDULE

A. Unless indicated otherwise on the Drawings, provide fasteners as follows:

Service Use and Location	Product	Remarks
1. Anchor Bolts Cast Into Concrete for Structural Steel, Metal Fabrications and Castings		
Interior Dry Areas	Hot-dip galvanized steel headed anchor bolts, unless indicated otherwise.	
Exterior and Interior Wet Areas	Stainless steel headed anchor bolts.	
Submerged and Corrosive Areas	Stainless steel headed anchor bolts with fusion bonded coating	See Section 09 90 00, Painting and Coating
2. Anchor Bolts Cast Into Concrete for Equipment Bases		
Interior Dry Areas	Stainless steel headed anchor bolts, unless otherwise specified with equipment	
Submerged, Exterior, Interior Wet, and Corrosive Areas	Stainless steel headed anchor bolts with fusion bonded coating, unless otherwise specified with equipment	See Section 09 90 00, Painting and Coating
3. Drilled Anchors for Metal Components to Cast-in-Place Concrete (e.g., Ladders, Handrail Posts, Electrical Panels, and Equipment)		
Interior Dry Areas	Zinc-plated or stainless steel wedge or expansion anchors	Use zinc-plated undercut anchors for overhead and ceiling installations.

FORT THOMAS WTP ADVANCED TREATMENT

Service Use and Location	Product	Remarks
Submerged, Exterior, Interior Wet, and Corrosive Areas	Adhesive stainless steel anchors	Use stainless steel undercut anchors for overhead and ceiling installations.
<b>4. Anchors in Grout-Filled Concrete Masonry Units</b>		
Exterior and Interior Wet and Dry Areas	Hot-dip galvanized steel headed anchor bolts, zinc-plated or stainless steel sleeve anchors, or stainless steel adhesive anchors	
<b>5. Anchors in Hollow Concrete Masonry Units</b>		
Exterior and Interior Wet and Dry Areas	Zinc-plated or stainless steel sleeve anchors, or stainless steel adhesive anchors with screen tube	
<b>6. Connections for Structural Steel Framing</b>		
Exterior and Interior Wet and Dry Areas	High-strength steel bolted connections	Use hot-dipped galvanized high-strength bolted connections for galvanized steel framing members
<b>7. Connections for Steel Fabrications and Wood Components</b>		
Exterior and Interior Wet and Dry Areas	Hot-dip galvanized carbon steel bolted connections	
<b>8. Connections of Aluminum Components</b>		
Submerged, Exterior and Interior Wet and Dry Areas	Stainless steel bolted connections, unless otherwise specified with equipment	

FORT THOMAS WTP ADVANCED TREATMENT

Service Use and Location	Product	Remarks
9. All Others		
Exterior and Interior Wet and Dry Areas	Stainless steel fasteners	

- B. Antiseizing Lubricant: Use on all stainless steel threads.
- C. Do not use adhesive anchors to support fire-resistive construction or where ambient temperature will exceed 120 degrees F.

**END OF SECTION**

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**SECTION 05 52 00  
METAL RAILINGS**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. Aluminum Association, Incorporated (AA): DAF45, Designation System for Aluminum Finishes.
  2. American Iron and Steel Institute (AISI).
  3. ASTM International (ASTM):
    - a. A36/A36M, Standard Specification for Carbon Structural Steel.
    - b. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
    - c. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    - d. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
    - e. A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.
    - f. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
    - g. A501, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
    - h. A554, Standard Specification for Welded Stainless Steel Mechanical Tubing.
    - i. E985, Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.
  4. International Code Council (ICC): International Building Code (IBC).
  5. Occupational Safety and Health Act (OSHA): 29 CFR 1910, Code of Federal Regulations.

**1.02 DEFINITIONS**

- A. Handrails: Synonymous with terms; i.e., guardrail system, railing system, ramp-rail system, and stair-rail system. Handrails are comprised of a framework of vertical, horizontal, or inclined members, grillwork or panels, accessories, or combination thereof.
- B. ICC Evaluation Services Report for concrete anchor manufacturers.

## FORT THOMAS WTP ADVANCED TREATMENT

- C. Special Inspection: As governed by the ICC IBC.
- D. Toeboards: Vertical barrier at floor level usually erected on handrails along exposed edges of floor or wall openings, platforms, ramps, or stairs to prevent miscellaneous items from falling through.

### 1.03 SUBMITTALS

#### A. Action Submittals:

- 1. Shop Drawings:
  - a. Indicate handrail profiles, sizes, connections, anchorage, size and type of fasteners, and accessories. Project-specific scale plans and elevations of handrails.
  - b. Manufacturer's literature and catalog data of handrail and components.
  - c. Design Data: Calculations or test data using design performance loads and include the following:
    - 1) Bending stress in, and deflection of, posts in accordance with ASTM E985.
    - 2) Stress in post base connection.
    - 3) Calculation of anchorage forces and comparison of these forces to ICC IBC recommendations regarding safe allowable design loads of anchorages.
    - 4) For concrete anchor spacings less than 12 anchor diameters and edge distances less than six anchor diameters, make reduction in allowable pullout and shear values. Provide independent laboratory inspection service for ICC Evaluation Services Report values with Special Inspection.
- 2. Samples:
  - a. Railing sections, 6 inches long showing different connections and proposed finish.
  - b. Each fitting including wall brackets, castings, toeboard fittings, and rail expansion joints.

#### B. Informational Submittals:

- 1. Manufacturer's assembly and installation instructions.
- 2. Special Inspection:
  - a. Manufacturer's instructions for Special Inspection of concrete anchors.
  - b. Special Inspection report in accordance with Article Tests and Inspections.



## FORT THOMAS WTP ADVANCED TREATMENT

3. Test Reports: Test data may supplement load calculations providing data covers the complete handrail system, including anchorage:
  - a. Test data for handrail and components showing load and deflection due to load, in enough detail to prove handrail is strong enough and satisfies national, state, local standards, regulations, code requirements, and OSHA 29 CFR 1910, using design loads specified. Include test data for the following:
    - 1) Railing and post connections.
    - 2) Railing wall connections.
    - 3) Post and base connections.
    - 4) Railing expansion joint connections.
    - 5) Railing gate assembly, including latch and gate stop. Both gate latch and stop to support required loads applied, independent of each other.
    - 6) Railing gate hinges.
    - 7) Railing picket panel clamps and connections.
  - b. Deflection Criteria: In accordance with ASTM E985 and design loads specified.
  - c. Aluminum Rail Piping: Test data showing yield strength of pipe as-delivered equals or exceeds values specified in this section.
  - d. Concrete Anchors: Calculations and test data for review prior to use, on anchors other than those specified.
4. Manufacturer's written recommendations describing procedures for maintaining handrails including cleaning materials, application methods, and precautions to be taken in the use of cleaning materials.
5. Manufacturer's Certificate of Proper Installation in accordance with Section 01 43 33, Manufacturers' Field Services.

### 1.04 QUALITY ASSURANCE

- A. Qualifications: Calculations required for design data stamped by a registered civil or structural engineer licensed in the state where the Project will be constructed.

### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Handrails adequately packaged and wrapped to prevent scratching and denting during shipment, storage, and installation. Maintain protective wrapping until railing is completely installed.
- B. Aluminum Handrails:
  1. Shop assemble into practical modules of lengths not exceeding 24 feet for shipment.
  2. Deliver toeboards loose for field assembly.

## FORT THOMAS WTP ADVANCED TREATMENT

3. Deliver clear anodized handrail pipe and posts with protective plastic wrap.

### 1.06 ENVIRONMENTAL REQUIREMENTS

- A. Thermal Movements: Allow for thermal movement resulting from the following maximum range in ambient temperature in design, fabrication, and installation of handrails to prevent buckling, opening up of joints, over stressing of components, connections and other detrimental effects. Base design calculation on actual surface temperatures of materials due to both solar heat gain and night time sky heat loss. Temperature change is difference between high or low temperature and installation temperature.
  1. Temperature Change Range: 70 degrees F, ambient; 100 degrees F, material surfaces.

## PART 2 PRODUCTS

### 2.01 DESIGN PERFORMANCE

- A. Structural Performance of Handrails: Design, test, fabricate, and install handrails to withstand the following structural loads without exceeding allowable design working stress or allowable deflection. Apply each load to produce maximum stress and deflection in each of the respective components comprising handrails.
  1. Top Rail of Handrails: Capable of withstanding the following load cases applied:
    - a. Concentrated load of 200 pounds applied at any point and in any direction in accordance with ICC IBC.
    - b. Uniform load of 50 pounds per lineal foot applied in any direction in accordance with ICC IBC.
    - c. Concentrated load need not be assumed to act concurrently with uniform loads in accordance with ICC IBC.
  2. In-Fill Area of Railing Systems:
    - a. Capable of withstanding a horizontally applied normal load of 50 pounds applied to 1 square foot at any point in the system including panels, intermediate rails, balusters, and openings and space between railings.
    - b. Horizontal concentrated load need not be assumed to act concurrently with loads on top rails of handrails.
  3. Mid-rails with corner returns to withstand a 300 pound concentrated vertical load applied at any point or direction without damage and loosening of pipe, fittings, or attachment hardware.

## FORT THOMAS WTP ADVANCED TREATMENT

4. Concrete Anchors for Handrail Wall Brackets: Anchors with a strength required by calculations with concrete strength assumed at 4,000 psi and in conformance with ICC IBC.
5. Concrete Anchors: In accordance with ICC IBC for size, length, embedment, spacing, and edge distance to match required loads shown in calculations.

### 2.02 ALUMINUM HANDRAILS

#### A. General:

1. Furnish pre-engineered and prefabricated two (2) rail and picket handrails.
2. Schedule of application:
  - a. Picket railing perimeter of the roof of the Fort Thomas GAC building
  - b. Two rail railing: all other locations
3. Pop rivets and glued railing construction not permitted.

#### B. Manufacturers:

1. Thompson Fabricating Co., Birmingham, AL.
2. Moultrie Manufacturing, Moultrie, GA; Wesrail II.
3. No "or-equal" or substitute products will be considered.

#### C. Rails, Posts, and Formed Elbows: Extruded Alloy 6105-T5 or 6061-T6, minimum tensile strength of 38,000 psi and minimum yield strength of 35,000 psi.

1. Miscellaneous Aluminum Parts: 6063-T6 or 6061-T6 extruded aluminum of adequate strength for all loads.
2. Post and Railing: Nominal 1-1/2-inch diameter.
  - a. Rails: 1.900-inch outside diameter by 0.145-inch wall thickness, Schedule 40.
  - b. Posts: 1.900-inch outside diameter by 0.200-inch wall thickness, Schedule 80.
  - c. Solid dowel interconnectors of 6105-T5 or 6061-T6 aluminum.

#### D. Fittings:

1. Handrail and Post Fittings: Extruded, machined bar stock, permanent mold castings, or die castings of sufficient strength to meet load requirements. Fittings shall match color of pipe in handrails. Sand cast parts not permitted.

## FORT THOMAS WTP ADVANCED TREATMENT

2. Concrete Top Mount Post Base:
  - a. Four holes in base for concrete anchors. For narrow walls or curbs, furnish two holes in base for concrete anchors with required edge distance.
  - b. Manufacturers and Products:
    - 1) Thompson Fabricating Co.; Part No. TBF-3.4 and Part No. TBF-3.2 for narrow walls and curbs.
    - 2) Moultrie Manufacturing Co.; Part No. WI14HB and WI12HB for narrow walls and curbs.
3. Concrete Side Mounted Handrail Bracket: Extruded aluminum, Alloy 6063-T6 with four holes for bolts or concrete anchors.
  - a. Manufacturers and Products:
    - 1) Thompson Fabricating Co.; Part No. TSM-1.5.
    - 2) Moultrie Manufacturing Co.; Part No. WIISMB.
4. Concrete Anchors for Securing Bases and Brackets to Concrete: Type 316 stainless steel 1/2-inch concrete anchors.
5. Handrail Connections for Metal Stairway Stringers:
  - a. Extruded aluminum bracket, Alloy 6063-T6.
  - b. Brackets bolts 1/2-inch diameter Type 316 stainless steel bolts.
  - c. Offset Adjustable Stair Fitting:
    - 1) Thompson Fabricating Co.; Part No. ASF of cast Al-mag.
    - 2) Moultrie Manufacturing Co.; Standard and custom elbow angles, Part No. W51XXX (numbers vary based on angle).
  - d. Additional Offset Adjustable Fitting for Picket Railing System: Thompson Fabricating Co.; Part No. APF of cast Al-mag.
  - e. Base Connection:
    - 1) Manufacturers and Products:
      - a) Thompson Fabricating Co.; Part Nos. SMB-2 or SMB-3, ASF, APF.
      - b) Moultrie Manufacturing Co.; Part No. WIISMBEXT.
6. Handrail Connections for Metal Beams:
  - a. Extruded aluminum bracket, Alloy 6063-T6.
  - b. Bracket bolts 1/2-inch diameter Type 316 stainless steel bolts.
  - c. Manufacturers and Products:
    - 1) Thompson Fabricating Co.; Part Nos. SMB-2 or SMB-3. Use Part No. TSM-1.5 if bracket is attached to flat side of channel.
    - 2) Moultrie Manufacturing Co.; Part No. WIISMBEXT. Use Part No. WIISMB if bracket is attached to flat side of channel.

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7. Handrail Wall Brackets: Adjustable wall fitting, with provision for three 3/8-inch Type 304 stainless steel bolts or concrete anchors.
  - a. Manufacturers and Products:
    - 1) Thompson Fabricating Co.; Part No. AWF cast Al-mag aluminum bracket.
    - 2) Moultrie Manufacturing Co.; Part No. W41100.
8. Miscellaneous Rail to Post Fittings:
  - a. Aluminum Tee Fittings:
    - 1) Manufacturers and Products:
      - a) Thompson Fabricating Co.; Part Nos. TF-1 and TX-1.
      - b) Moultrie Manufacturing Co.; Part Nos. WIIT40, WIIT40/05, WIIT80, and WIIT80/05.
  - b. Aluminum Ell Fittings:
    - 1) Manufacturers and Products:
      - a) Thompson Fabricating Co.; Part Nos. TE-1, TE-2, and TE-3.
      - b) Moultrie Manufacturing Co.; Part No. 51900.
  - c. Aluminum Splice Lock:
    - 1) Manufacturers and Products:
      - a) Thompson Fabricating Co.; Part No. SL-1.
      - b) Moultrie Manufacturing Co.; Part No. WIIS40.
  - d. Aluminum Expansion Joint Splice:
    - 1) Manufacturers and Products:
      - a) Thompson Fabricating Co.; Part No. ES-1.
      - b) Moultrie Manufacturing Co.; Part No. WI140, omit set screws on one side.
  - e. Formed Aluminum Wall Flange:
    - 1) Manufacturers and Products:
      - a) Thompson Fabricating Co.; Part No. CF-2.
      - b) Moultrie Manufacturing Co.; Part No. 41250.
9. Handrail Gate: 6063-T6, 6105-T5, or 6061-T6 extruded aluminum.
  - a. Hardware Manufacturers and Products:
    - 1) Julius Blum & Co., Inc., Carlstadt, NJ; No. 782/3 gate hinges with springs, and No. 784 gate latch and stop.
    - 2) CraneVeyor Corp., South El Monte, CA; No. C4370b gate hinges with spring, No. C4369 gate latch, and No. C4368 gate stop.
    - 3) Thompson Fabricating Co., Birmingham, AL.
    - 4) Moultrie Manufacturing Co., Moultrie, GA; Part No. W60006.
10. In-Fill Area Picket and Attachments:
  - a. 1/2-inch Schedule 40 aluminum pipe (picket); alloy 6105, 6063, or 6061.

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- b. Extruded aluminum 1-1/2-inch by 7/8-inch by 1/8-inch channel; alloy 6105, 6063, or 6061.
- c. Fittings for Offset Stair Railings:
  - 1) Cast Al-mag Adjustable Picket Fitting Manufacturer and Product: Thompson Fabricating Co.; Part No. APF.
  - 2) Cast Al-mag Adjustable Stair Fitting Manufacturer and Product: Thompson Fabricating Co.; Part No. ASF.
- d. Furnish neoprene plug for each end of the picket.
- 11. Toeboards and Accessories:
  - a. Material: Molded or extruded 6063 or 6061 aluminum.
  - b. Manufacturers:
    - 1) Thompson Fabricating Co.
    - 2) Moultrie Manufacturing Co.; Part No. WIHKP20.
- 12. Castings for Handrails:
  - a. Cast Al-mag with sufficient strength to meet load and test requirements.
  - b. Anodizable grade finish with excellent resistance to corrosion when subject to exposure of sodium chloride solution intermittent spray and immersion.
- E. Concrete Embedded Metal Anchorages: In accordance with Section 05 50 00, Metal Fabrications.
- F. Finishes:
  - 1. Handrail Pipe and Post: In accordance with AA DAF45, designation AA-M32-C22-A41.
  - 2. Cast Fittings and Toeboards: In accordance with AA DAF45, designation AA-M10-C22-A41.

### 2.03 ANCHOR BOLTS, FASTENERS, AND CONCRETE ANCHORS

- A. Locknuts, Washers, and Screws:
  - 1. Elastic Locknuts, Steel Flat Washers, RHMS Round Head Machine Screws: Type A 316 stainless steel.
  - 2. Flat Washers: Molded nylon.
  - 3. Manufacturer: McMaster-Carr Supply Co., Los Angeles, CA.
- B. Bolts and Nuts for Bolting Handrail to Metal Beams: ASTM A193/A193M and ASTM A194/A194M, Type A 316 stainless steel with minimum yield strength for bolts of 95,000 psi, unless otherwise shown.

C. Concrete Anchors:

1. Stainless steel Type 316.
2. Use ICC IBC approved values for size, length, embedment, spacing, and edge distance to match required loads shown in calculations.

D. Epoxy Anchors:

1. Heavy-duty 1/2-inch diameter, for exterior use only in accordance with Section 05 50 00, Metal Fabrications, as an alternative to mechanical concrete anchors.
2. Design and provide number required.
3. Do not use where fire or elevated temperatures above 110 degrees F exist.

2.04 FABRICATION OF ALUMINUM HANDRAILS

A. Shop Assembly:

1. Post Spacing: Maximum 6-foot horizontal spacing.
2. Railing Posts Bolted to Metal or Concrete:
  - a. In lieu of field cutting, provide approved fitting with sufficient post overlap, containing provisions for vertical adjustment.
  - b. Field fit-up is required.
3. Free of burrs, nicks, and sharp edges when fabrication is complete.
4. Welding is not permitted.

B. Shop/Factory Finishing:

1. Use same alloy for uniform appearance throughout fabrication for railings.
2. Handrail and Post Fittings: Match fittings with color of pipe in handrail.
3. Sand cast parts not permitted.

C. Tolerances:

1. Shop assemble rails, posts, and formed elbows with a close tolerance for tight fit.
2. Fit dowels tightly inside posts.

# FORT THOMAS WTP ADVANCED TREATMENT

## PART 3 EXECUTION

### 3.01 GENERAL

- A. Provide railing posts longer than needed and field cut to exact dimensions required in order to satisfy vertical variations on the actual structure. Install railing with a base that provides plus or minus 1/4-inch vertical adjustment inside base fitting. If adjustment is required in the field and exceeds plus or minus 1/4-inch, reduce post length not to exceed beyond bottom of lowest set-screw or bolt in base fitting.
- B. Field fabrication of aluminum railing systems not permitted.
- C. Modification to structure not permitted where handrail is attached.
- D. Mount handrails only on completed walls. Do not support handrails temporarily by means not satisfying structural performance requirements.

### 3.02 HANDRAIL INSTALLATION

- A. Assembly and Installation: Perform in accordance with manufacturer's written recommendations for installation.
- B. Protection from Entrapped Water:
  - 1. Make provisions in exterior and interior installations subject to high humidity to drain water from railing system.
  - 2. Posts mounted in concrete, bends, and elbows occurring at low points drill weep holes of 1/4-inch diameter at lowest possible elevations, one hole per post or rail. Drill hole in the plane of the rail.
- C. Expansion Joints:
  - 1. Maximum intervals of 54 feet on center and at structural joints.
  - 2. Slip joint with internal sleeve extending 2 inches beyond each side of joint. Provide 1/2-inch slip joint gap to allow for expansion.
  - 3. Fasten to one side using 3/8-inch diameter set-screw. Place set-screw at bottom of pipe.
  - 4. Locate joints within 12 inches of posts. Locate expansion joints in rails that span expansion joints in structural walls and floors supporting the posts.
- D. Setting Posts:
  - 1. Embedded:
    - a. Clean dust and foreign matter from sleeves or blockouts.



## FORT THOMAS WTP ADVANCED TREATMENT

- b. Moisten interior of hole and surrounding surface with clean water. Fill hole with nonshrink grout prior to installing post.
  - c. Brace railing until grout sets.
  - d. Posts installed outside and exposed to freezing temperatures, drill weep hole through post approximately 1/2 inch above level of grout inside post and in plane of rail to prevent entrapment and freezing of water inside post.
2. Surface Mounted:
    - a. Bolt post baseplate connectors firmly in place.
    - b. Shims, wedges, grout, and similar devices for handrail post alignment not permitted.
- E. Posts and Rails:
1. Set posts plumb and aligned to within 1/8 inch in 12 feet.
  2. Set rails horizontal or parallel to slope of steps to within 1/8 inch in 12 feet.
  3. Install posts and rails in same plane. Remove projections or irregularities and provide a smooth surface for sliding hands continuously along top rail. Use offset rail for use on stairs and platforms if post is attached to web of stringers or structural platform supports.
  4. Support 1-1/2-inch rails directly above stairway stringers with offset fittings.
- F. Handrail Wall Brackets:
1. Support wall rails on brackets spaced maximum 5 feet for aluminum as measured on the horizontal projection.
  2. Install wall anchor backplates on solid blocking in stud walls.
- G. Toeboard:
1. Provide at handrails, except where 4-inch or higher concrete curbs are installed or at gates.
  2. Accurately measure in field for correct length; after handrail post installation cut and secure to posts.
  3. Dimension between bottom of toeboard and walking surface not to exceed 1/4 inch.
  4. Aluminum Toeboards: Provide expansion and contraction connections between each post.
- H. Railing Gate: Install in accordance with manufacturer's installation instructions.

## FORT THOMAS WTP ADVANCED TREATMENT

### 3.03 FIELD FINISHING

- A. Corrosion Protection: Prevent galvanic action and other forms of corrosion caused from direct contact with concrete and dissimilar metals by coating metal surfaces as specified in Section 09 90 00, Painting and Coating.

### 3.04 TESTS AND INSPECTIONS

- A. Perform Special Inspection for anchors where ICC Evaluation Services Reports require them for anchor strength value used.
- B. Provide an independent test laboratory to perform Special Inspection.

### 3.05 CLEANING

- A. Wash railing system thoroughly using clean water and soap. Rinse with clean water.
- B. Do not use acid solution, steel wool, or other harsh abrasive.
- C. If stain remains after washing, restore in accordance with manufacturer's recommendations or replace stained handrails.

**END OF SECTION**

**SECTION 05 53 00  
METAL GRATINGS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO): Standard Specifications for Highway Bridges, 14th Edition.
  2. ASTM International (ASTM):
    - a. A36, Standard Specification for Structural Steel.
    - b. A123, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
    - c. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
    - d. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
    - e. A193, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
    - f. A194, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.
    - g. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
    - h. A525, Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
    - i. A569/A569M, Standard Specification for Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip Commercial Quality.
    - j. B221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
    - k. F844, Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.
  3. National Association of Architectural Metal Manufacturers (NAAMM):
    - a. MBG 531, Metal Bar Grating Manual.
    - b. MBG 532, Heavy-Duty Metal Bar Grating Manual.

# FORT THOMAS WTP ADVANCED TREATMENT

## 1.02 SUBMITTALS

### A. Action Submittals:

1. Shop Drawings:
  - a. Grating: Show dimensions, weight, and size, and location of connections to adjacent grating, supports, and other Work.
  - b. Grating Anchorage: Show structural calculations and details of anchorage to supports to prevent displacement from traffic impact.
  - c. Grating Supports: Show dimensions, weight, size, location, and anchorage to supporting structure.
  - d. Catalog information and catalog cuts.
  - e. Manufacturer's specifications, to include coatings.
2. Samples:
  - a. Two Samples of swaged aluminum grating approximately 4 by 8 inches, showing at least four crossbars each and four bearing bars each. One Sample will be retained at the Site to be used as a basis for acceptance or rejection of swaged grating installed.

### B. Informational Submittals:

1. Special handling and storage requirements.
2. Installation instructions.
3. Factory test reports.
4. Manufacturer's Certification of Compliance for specified products.
5. Written Test Report that swaged crossbars, if used on grating, meet the requirements of the specified test and additional requirements of these Specifications.

## 1.03 PREPARATION FOR SHIPMENT

- A. Insofar as is practical, factory assemble items provided.
- B. Package and clearly tag parts and assemblies that are of necessity shipped unassembled and protect the materials from damage, and facilitate identification and final assembly in the field.

## PART 2 PRODUCTS

### 2.01 FOOT TRAFFIC GRATING

#### A. Design:

1. Uniform Service Load: 100 psf minimum, unless otherwise shown.
2. Maximum Deflection: 1/4 inch, unless otherwise shown.

## FORT THOMAS WTP ADVANCED TREATMENT

3. Space bearing bars at 1-3/16 inch center-to-center.
4. Banding: 3/16 inch minimum.

### B. Material:

1. Aluminum Bar Type Grating:
  - a. Press-locked rectangular design, as manufactured by IKG/Borden, Clark, NJ; IKG/Borden Type B or Type F.
  - b. Swage locked aluminum grating, rectangular bar type, as manufactured by:
    - 1) IKG/Borden, Clark, NJ; IKG/Borden Type BS or Type FS.
    - 2) Seidelhuber Metal Products Inc., San Carlos CA; Type A-2.
    - 3) Ohio Gratings, Inc., Canton, OH; Aluminum Flush Top, Type 19SGF2.
    - 4) Klemp Corp., Chicago, IL; Type KRP.
  - c. Swage locked aluminum I-bar grating, as manufactured by:
    - 1) IKG/Borden, Clark, NJ; Type IF.
    - 2) Seidelhuber Metal Products, Inc., San Carlos, CA; Type 19SI2.
    - 3) Ohio Gratings, Inc., Canton, OH; Type 19 SGI 2.
    - 4) Klemp Corp., Chicago, IL; Type KIP.
2. Aluminum Plank Style Safety Grating Walkway:
  - a. Heavy-duty, with serrated openings.
  - b. Manufacturers and Products:
    - 1) USG Industries, Metal Products Div., Chicago, IL; Grip-Strut.
    - 2) IKG/Borden, Clark, NJ; IKG/Deck Span.
    - 3) Morton Manufacturing Co., Libertyville, IL; Open-Grip.
    - 4) Cressona Aluminum Co., Cressona, PA; Diamondback.
3. Stair Treads:
  - a. Material and Type: Same as grating material and grating type as furnished for connecting walkway or work surface.
  - b. Nosings: Integral ribbing and serrated edge on one long axis of tread or nonslip, abrasive on each tread along one long edge.
  - c. Carrier Plate or Angle: Furnish at each end for connection to stair stringers.
  - d. Manufacturers: Same as for grating.

### 2.02 HEAVY VEHICULAR TRAFFIC GRATING

#### A. Design:

1. Loading: AASHTO HS 20-44.
2. Banding: 1/4 inch.

## FORT THOMAS WTP ADVANCED TREATMENT

### B. Material:

1. Galvanized Steel Bar Type:
  - a. Heavy-duty, main bars spaced at 1-7/8 inch maximum center-to-center.
  - b. After Fabrication: ASTM A123, zinc coating.
  - c. Manufacturer and Product: 1KG/Borden, Clark, NJ; KG/Borden heavy-weld Type HWF or HWB or press-locked, rectangular crossbar, Type BJ or FJ.

## 2.03 ACCESSORIES

### A. Anchor Bolts and Nuts:

1. Carbon Steel: ASTM A307 or A36.
2. Stainless Steel: ASTM A193 and ASTM A194, Type 316.
3. Galvanized Steel Bolts and Nuts: ASTM A153, zinc coating for ASTM A307 or A36.

### B. Flat Washers (Unhardened): ASTM F844; use ASTM A153 for zinc coating.

### C. Removable Fastener Clips and Bolts:

1. Removable from above grating walkway surface.
2. Hat Bracket: Type 304 stainless steel.
3. Bolt: Type 316 stainless steel.
4. Cast iron, galvanized body.
5. Manufacturer and Product: Struct-Fast, Wellesley Hills, MA; Gratefast.

### D. Partially Removable Anchor:

1. Bolt: Threaded stud, Type 316 stainless steel.
  - a. Manufacturer: Nelson Stud Welding Co., Lorain, OH.
2. Hat Bracket: Type 304 stainless steel.
  - a. Manufacturer: STRUCT-FAST, Wellesley Hills, MA.

## 2.04 FABRICATION

### A. General:

1. Exposed Surfaces: Smooth finish and sharp, well-defined lines.
2. Furnish necessary rabbets, lugs, and brackets so work can be assembled in a neat, substantial manner.
3. Conceal fastenings where practical.
4. Drill metalwork and countersink holes as required for attaching hardware or other materials.

## FORT THOMAS WTP ADVANCED TREATMENT

5. Weld Connections: Not permitted on grating except at banding bars.

### B. Design:

1. Field measure areas to receive grating, verify dimensions of new fabricated supports, and fabricate to dimension required for specified clearances.
2. Section Length: Sufficient to prevent its falling down through clear opening when oriented in the span direction when one end is touching either the concrete or the vertical leg of grating support.
3. Minimum Bearing: NAAMM MBG 531.
4. Metal Crossbar Spacing: 2 inches maximum, unless otherwise shown or specified.
5. Crossbars: Flush with top of main bar and extend downward a minimum of 50 percent of the main bar depth.
  - a. Swaged Crossbars:
    - 1) Within 1/4 inch of top of grating with 1/2 inch minimum vertical dimension after swaging, and minimum before swaging dimension of 5/16 inch square.
    - 2) Crossbar Dimension After Swaging: Minimum 1/8 inch wider than the opening at minimum of two corners at each side of each square opening in main bar.
    - 3) Crossbars may be a special extruded shape so that after swaging the top will be flat, 3/16 inch wide and will be flush with the top surface of the bearing bars for a minimum of 5/8 inch at center between bearing bars.
    - 4) Flush crossbar meeting all of the above except that after swaging shall overlap one corner by a minimum of 1/8 inch. A Sample of one bearing bar and one crossbar shall be tested by holding the bearing bar and pulling on the crossbar. The crossbar to bearing bar shall sustain a minimum of 300 pounds without pullout of the bearing bar.
    - 5) Tightly fit main bars and crossbars allowing no differential movement.
6. Do not use weld type crossbars.
7. Banding: Same material as grating; NAAMM MBG 531 and NAAMM MBG 532.
8. Furnish stainless steel Type 316 threaded anchor studs, as fasteners for grating attachment to metal supports either not embedded or partially embedded in concrete, as manufactured by Nelson Studs Welding Co., Lorain, OH.

## FORT THOMAS WTP ADVANCED TREATMENT

### C. Supports:

1. Seat Angles and Beams:
  - a. Same material as rectangular bar grating.
  - b. Extruded aluminum frame with slot for recessed grating clips, as manufactured by Thompson Fabricating Co., for aluminum I-Bar type grating.
2. Coordinate dimensions and fabrication with grating to be supported.
3. Coordinate dimensions with increased depth due to serrations.
4. Welded Frames with Anchors: Continuously welded.

### D. Slip-Resistant Surface:

1. Rectangular Aluminum Bar Grating: As manufactured by:
  - a. IKG/Borden, Clark, NJ; EZ Weldslip-Resistant Coating.
  - b. Seidelhuber Metal Products, Inc., Hayward, CA; Safety Grit Non-Slip System.
  - c. Ohio Gratings, Inc., Canton, OH with "Slip-Not" Safety Surface manufactured by W.S. Molnar Co., Detroit, MI.
2. I-Bar grating aluminum shall incorporate a striated antiskid walking surface produced during the extrusion process, as manufactured by:
  - a. IKG/Borden, Clark, NJ.
  - b. Seidelhuber Metal Products, Inc., Hayward, CA.
  - c. Klemp Corp., Chicago, IL.
3. Extruded Plank Grating incorporating a rib pattern as part of the extrusion process and a crosswise serration to provide uni-directional slip resistance. Reference Federal Specification RGC-1602.
  - a. Cressona Aluminum, Cressona, PA; Diamondback.

### E. Aluminum:

1. ASTM B221 extruded shapes.
2. Fabricate as shown and in accordance with manufacturer's recommendations.
3. Grind smooth sheared edges exposed in the finished work.
4. Swage crossbars, if used, with equipment strong enough to deform crossbars.
5. Eliminate any loose crossbar intersections on swaged grating.

- F. Foot Traffic Grating: Any single grating section, individual plank, or plank assembly shall be not less than 1 foot 6 inches or greater than 3 feet 0 inch in width or weigh more than 150 pounds.



- G. Light Vehicular Traffic Grating: Any single grating section, individual plank, or plank assembly shall not be less than 1 foot 6 inches or greater than 3 feet 0 inch in width (except 3/8-inch thick bearing bar grating), or weigh more than 150 pounds.
- H. Heavy Vehicular Traffic Grating: Minimum width of grating sections shall be 2 feet 0 inch regardless of length and weight.

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Electrolytic Protection:
  - 1. Aluminum in contact with dissimilar metals, other than stainless steel, and embedded or in contact with masonry, grout, and concrete, protect surfaces as specified in Section 09 90 00, Painting and Coating.
  - 2. Allow paint to dry before installation of the material.

**3.02 INSTALLATION**

- A. Install supports such that grating sections have a solid bearing on both ends, and that rock and wobble grating movement does not occur under designed traffic loading.
- B. Install plumb or level as applicable.
- C. Install welded frames with anchors to straight plane without offsets.
- D. Anchor grating securely to supports using minimum of four fastener clips and bolts per grating section.
- E. Use stainless steel anchors and accessories with aluminum gratings.
- F. Completed installation shall be rigid and neat in appearance.
- G. Commercially Manufactured Products:
  - 1. Install in accordance with manufacturer's recommendations.
  - 2. Secure grating to support members with fasteners.
  - 3. Welding is not permitted.
  - 4. Fasteners: Field locate and install.
  - 5. Permit each grating section or plank style grating assembly to be easily removed and replaced.
- H. Protect painted surfaces during installation.

FORT THOMAS WTP ADVANCED TREATMENT

- I. Should coating become marred, prepare and touch up surface in accordance with paint manufacturer's instructions.

**END OF SECTION**

**SECTION 06 10 00  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Forest and Paper Association (AF&PA): National Design Specification for Wood Construction.
  2. American Hardboard Association (AHA): A135.4, Basic Hardboard.
  3. American Institute of Timber Construction (AITC): 112, Standard for Tongue-and-Groove Heavy Timber Roof Decking.
  4. American Lumber Standards Committee's Board of Review (ALSC).
  5. APA - The Engineered Wood Association (APA): PRP-108, Performance Standards and Qualification Policy for Structural-Use Panels.
  6. American Wood Preservers' Association (AWPA):
    - a. C2, Lumber, Timber, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes.
    - b. C9, Plywood—Preservative Treatment by Pressure Process.
    - c. C20, Structural Lumber—Fire-Retardant Treatment by Pressure Processes.
    - d. C27, Plywood—Fire-Retardant Treatment by Pressure Processes.
    - e. M4, Standard for the Care of Preservative-Treated Wood Products.
  7. ASTM International (ASTM):
    - a. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
    - b. A653/A653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
    - c. C1396/C1396M, Specification for Gypsum Board.
    - d. D226, Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
    - e. D3498, Standard Specification for Adhesives for Field-Gluing Plywood to Lumber Framing for Floor Systems.
    - f. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
    - g. F1667, Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
  8. Composite Panel Association (CPA): A208.1, Standard for Particleboard.

9. National Evaluation Service, Inc. (NER): 272, Power-Driven Staples and Nails for Use in All Types of Building Construction.
10. National Fire Protection Association (NFPA): 255, Standard Method of Test of Surface Burning Characteristics of Building Materials.
11. Southern Pine Inspection Bureau (SPIB): 1003, Grading Rules.
12. Underwriters' Laboratories, Inc. (UL): 723, Standard for Safety Test for Surface Burning Characteristics of Building Materials.
13. U.S. Department of Commerce—Product Standards (DOC):
  - a. PS 1, Construction and Industrial Plywood.
  - b. PS 2, Performance Standard for Wood-Based Structural-Use Panels.
  - c. PS 20, American Softwood Lumber Standard.
14. Western Wood Products Association (WWPA): G5, Western Lumber Grading Rules.

## 1.02 SUBMITTALS

### A. Action Submittals:

1. Product Data:
  - a. Underlayment.
  - b. Sheathing.
  - c. Metal framing anchors.
  - d. Construction adhesives.
  - e. Construction panel thickness where not shown.

### B. Informational Submittals:

1. Wood treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material.
2. Certificates:
  - a. Material certificates for dimensional lumber in compliance with allowable unit stresses. Show species and grade selected for each use as well as design values approved by the ALSC's Board of Review.
  - b. For each type of preservative treated wood product, include certification by treatment plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
  - c. For waterborne treated products include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to Site.
3. Material test reports from testing laboratory showing and interpreting test results in accordance with test methods UL 723, NFPA 255.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Immediately upon delivery to Site, place materials in area protected from weather. Do not store seasoned materials in wet or damp areas.
- B. Protect sheet materials from breaking corners and damaging surfaces while unloading.
- C. Store materials a minimum of 6 inches above ground on framework or blocking and cover with waterproof covering, providing for adequate air circulation and ventilation. Store sheet materials flat, not on edge.
- D. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.
- E. Store materials for which a maximum moisture content is specified in areas where humidity can be controlled.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Lumber Standards:
  - 1. Lumber manufactured in accordance with DOC PS 20 and with applicable grading rules and wood species certified by ALSC. Design values for wood members equal to those published in supplement to AF&PA's "National Design Specification for Wood Construction."
  - 2. Stamp or brand each unexposed piece of lumber with grade, species, and moisture content at time of mill surfacing.
  - 3. Furnish exposed lumber pieces with grade stamps applied to ends or back of each piece. If completely exposed, and permitted by local building jurisdiction, omit grade stamps entirely.
- B. Lumber sizes shown on Drawings are nominal, unless shown otherwise. Provide actual sizes as required by DOC PS 20 for use.
- C. Dressed lumber S4S, unless shown otherwise on Drawings.
- D. Moisture content of lumber not to exceed 19 percent, unless otherwise specified and marked "DRY".
- E. Each plywood panel identified with designated grade trademark of APA.

# FORT THOMAS WTP ADVANCED TREATMENT

## 2.02 LUMBER

A. Furnish lumber as follows, unless specified otherwise:

<u>Usage</u>	<u>Minimum Grade</u>
Plates, blocking, furring, braces, and nailers	Douglas Fir-Larch No. 2, Hemlock, Southern Pine Stud grade, nondense
Structural light framing, general framing, studs 2 to 4 inches thick by 2 to 4 inches wide	Douglas Fir-Larch No. 1, or Southern Pine No. 1
Posts and timbers	Douglas Fir-Larch Select Structural, Southern Pine Select Structural

## 2.03 CONSTRUCTION PANELS

A. Plywood Backing Panels: Mounting electrical, telephone and like equipment, provide fire-retardant treated plywood panels with grade designation, APA C-D Plugged Exposure 1, in thickness shown on Drawings, or, if not shown on Drawings, not less than 15/32 inch.

B. Plywood Wall Sheathing: APA rated sheathing:

1. Exposure Durability Classification: Exterior.
2. Span Rating: 48/0 for stud spacing of 16 inches or less, 3/4 inch thick.
3. Grade: Structural.

C. Particleboard and Oriented Strand Board:

1. General:
  - a. Manufacture and factory-mark each particleboard panel and oriented strand board panel to comply with CPA A208.1.
  - b. Construction Panel Standards: Comply with DOC PS 2 for particleboard panels and oriented strand board panels.
  - c. Trademark: Each construction panel factory-marked with APA trademark evidencing compliance with grade requirements.
2. Particleboard:
  - a. Underlayment: Grade M-1, factory marked with APA grade mark "Floor Underlayment."
  - b. Subflooring: Grade M-W (waferboard) or Grade 2-M-3.
  - c. Wall Sheathing: Grade M-1.
  - d. Roof Sheathing: Grade M-W (waferboard).
3. Oriented Strand Board: Use standard grade for all applications.

## FORT THOMAS WTP ADVANCED TREATMENT

### 2.04 PRESERVATIVE WOOD TREATMENT BY PRESSURE PROCESS

- A. General: Where lumber or plywood is indicated as preservative treated wood, in accordance with AWPA C2 (Lumber) and AWPA C9 (Plywood). Mark and grade each treated item in accordance with SPIB 1003 or WWPA G5.
  - 1. Kiln-dry after treatment to maximum moisture content of 19 percent.
  - 2. Treat wood in contact with roofing or flashing.
  - 3. Treat wood in contact with masonry or concrete.
  - 4. Treat wood less than 18 inches above grade.
- B. Aboveground Materials: Pressure treat items with waterborne preservatives to a minimum retention of 0.25 pcf. For interior uses, after treatment, kiln-dry lumber and plywood to maximum moisture content, respectively, of 19 percent and 15 percent. Treat the following items:
  - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
- C. Materials in Contact with Ground or Freshwater: Pressure treat with waterborne preservatives to a minimum retention of 0.40 pcf.
- D. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces to comply with AWPA M4. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

### 2.05 HARDWARE

- A. Conform to ASTM F1667.
- B. Nails:
  - 1. Conform to ASTM F1667.
  - 2. Steel common nails or alternatives listed in rough carpentry section of the general structural notes found on Drawings.
  - 3. Use hot-dipped zinc-coated nails wherever exposed.
  - 4. Use deformed shank nails for fastening underlayment.
- C. Staples: Conform to ASTM F1667, galvanized where exposed.
- D. Power Driven Fasteners: Conform to NER 272.

## FORT THOMAS WTP ADVANCED TREATMENT

- E. Bolts and Screws: Conform to ASTM A307, galvanized where exposed.
- F. Framing Anchors:
  - I. Manufacturers:
    - a. United Steel Products, Gibraltar Industries, Montgomery, MN.
    - b. KC Metal Products, San Jose, CA.
    - c. Simpson Strong-Tie Co., Pleasanton, CA.
    - d. Cleveland Steel Specialty Co., Bedford Heights, OH.
- G. Ply Clips: Extruded 6063-T6 aluminum alloy.
- H. Bar or Strap Anchors: ASTM A653/A653M, zinc-coated steel, 18 gauge minimum.

### 2.06 AIR BARRIER, AIR SEAL, DAMPROOF FLASHING

- A. As specified in Section 07 21 00, Thermal Insulation.

### 2.07 MISCELLANEOUS

- A. Construction Adhesives: Elastomeric glue conforming to ASTM D3498 for gluing subfloor to joists.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify surfaces to receive rough carpentry materials are prepared to exact grades and dimensions.

### 3.02 GENERAL

- A. Lay out, cut, fit, and install rough carpentry items. Anchor sufficiently to ensure rigidity and permanence.
- B. Install items accurate to dimension, true to line, level, and square unless shown otherwise on Drawings. Provide for installation and support of other Work.
- C. Discard units of material with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.
- D. Countersink nail heads on exposed carpentry work and fill holes.



## FORT THOMAS WTP ADVANCED TREATMENT

- E. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- F. Field cuts and holes in pressure-treated lumber shall be field treated with preservative in accordance with AWP A M4.
- G. Holes shall be 1/16 inch larger than nominal bolt diameter, except holes for cast-in-place anchor bolts shall be 3/16 inch larger than nominal bolt diameter. Tight holes requiring forcible driving of bolts shall be enlarged by reaming.
- H. Provide washers under bolt heads and nuts bearing on wood.

### 3.03 WALL SHEATHING

- A. Allow minimum 1/16 inch space at end joints and 1/8 inch at edge joints, doubling these spacings in wet or humid conditions.
- B. Unless noted otherwise on Drawings, minimum nailing shall be 6 inches on center along panel edges and 12 inches on center at intermediate supports.
- C. Place an air barrier horizontally over wall sheathing, weather lap edges, and ends.

### 3.04 PRESERVATIVE TREATED WOOD PRODUCTS

- A. Provide preservative treated wood for framing, blocking, furring, nailing strips built into exterior masonry walls, wood in contact with concrete or masonry and in conjunction with gravel stops, and built-up roofing.
- B. Apply two brush coats of same preservative used in original treatment to sawed or cut surfaces of treated lumber.

**END OF SECTION**

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**SECTION 06 20 00  
FINISH CARPENTRY**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Hardboard Association (AHA): A135.4, Basic Hardboard.
  2. APA-The Engineered Wood Association (APA): 303, Siding Manufacturing Specifications.
  3. Architectural Woodwork Institute (AWI): Architectural Woodwork Quality Standards.
  4. ASTM International (ASTM): A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  5. Builders Hardware Manufacturers Association (BHMA): 156.9, Cabinet Hardware.
  6. California Redwood Association (CRA): Redwood Lumber Grades and Uses.
  7. Composite Panel Association (CPA): A208.1, Particleboard.
  8. Federal Specifications (FS): A-A-1936, Adhesive, Contact, Neoprene Rubber.
  9. National Electrical Manufacturers' Association (NEMA): LD 3, High-Pressure Decorative Laminates.
  10. U.S. Department of Commerce, Voluntary Product Standards (DOC): PS 1, Structural Plywood.
  11. Western Wood Products Association (WWPA): G16, Standard Patterns.
  12. Woodwork Institute (WI): Manual of Millwork.

**1.02 SUBMITTALS**

- A. Action Submittals:
1. Shop Drawings for Cabinets, Casework, and Running Trim:
    - a. Show field measurements, construction details, dimensions, materials used, and finish.
      - 1) Use full-size or 1/4-scale drawings.
      - 2) Key Shop Drawings to Contract Drawings.

## FORT THOMAS WTP ADVANCED TREATMENT

### 1.03 QUALITY ASSURANCE

- A. Quality Standards: AWI Architectural Woodwork Quality Standards, unless detailed otherwise.
- B. Plywood Grades: DOC PS 1. Identify each plywood panel with appropriate grade trademark of APA-The Engineered Wood Association.
- C. Grade and Trademark: Identify each piece or bundle of lumber or other product with a recognized mark of the authority grading the product.

### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Defer material delivery to Site until installation or storage areas are complete or protected from wetness. Install materials or store in these areas immediately upon delivery and maintain relative humidity at 60 percent or less.
- B. Protect sheet materials from corner breaks and surface damage while unloading.

## PART 2 PRODUCTS

### 2.01 LUMBER

- A. Moisture Content: Kiln-dry lumber to an average moisture content range as follows:
  - 1. Exterior Work: 9 percent to 15 percent.
  - 2. Interior Work: 5 percent to 10 percent.
- B. Stepping: Hem-Fir, D Grade or APA Standard, Interior Grade plywood, 1-1/8 inches thick.

### 2.02 PLYWOOD

- A. Softwood Plywood: APA A-B Interior.
- B. Overlaid Plywood: EXT APA B-B with medium density overlay (MDO) on both faces, plain surface, no grooves.

### 2.03 PREFINISHED ALUMINUM FACED PANELS

- A. Face Sheet: Stucco textured 10-mil prefinished aluminum, waterproof adhesive bonded to core.

- B. Back Sheet: 1.5-mil aluminum foil, bonded to core with waterproof adhesive.
- C. Core: 5/16-inch-thick Structural C (plugged) exterior type plywood.
- D. Face Sheet: Factory coat face sheet with primer and minimum 1-mil dry film thickness acrylic coating.
  - 1. Provide additional coating to allow field touchup application for scratches.
- E. Moldings: Manufacturer's standard flush type for panel joints, edges, and corners; color to match panels.
- F. Size: Full wall height or 12 feet, whichever is less by 4 feet wide.
- G. Manufacturers and Products:
  - 1. Weyerhaeuser Co., Federal Way, WA; Panel 15.
  - 2. Laminators, Inc., Hatfield, PA; Omega-Ply 20.

#### 2.04 ANCILLARY MATERIALS

- A. Vent Screen: Galvanized hardware cloth, 1/4-inch square mesh.
- B. Adhesives:
  - 1. For Woodwork: Phenol-resin or resorcinol-resin.
  - 2. For Plastic Laminate: Contact cement; FS A-A-1936.
- C. Hardware: Furnish fasteners and miscellaneous hardware required for assembling and anchoring woodwork, including casework.
- D. Carpenter's Putty: Single-component, acrylic latex polymer, paintable, and nonsag.
- E. Metal Zee Flashing: Galvanized 0.0217-inch (26-gauge) steel sheet, ASTM A653/A653M, G90; bend for 1-inch minimum vertical concealed leg and 1/2-inch maximum exposed leg. Furnish 10-foot long pieces.

#### 2.05 INSTALLATION

- A. Lay out, cut, fit, and install finish carpentry items.
- B. Anchor securely to ensure rigidity, tight fit, permanence, and as noted on Drawings.

## FORT THOMAS WTP ADVANCED TREATMENT

- C. Install items accurate to dimension, true to line, level, and square unless otherwise shown.
- D. Install running trim in as long a length as practical.
  - 1. Miter corners of casings and moldings.
  - 2. Anchor securely using finishing nails.
  - 3. Counter set nails 1/16 inch for filling.
- E. Follow manufacturer's instructions for installation of hardware items.
- F. Make Work neat and secure, developing full strength of components and providing intended function.

### 2.06 ALUMINUM FACED PANEL INSTALLATION

- A. Lay out panels to minimize joints, unless otherwise shown.
- B. Install metal faced plywood panels over wood furring and stud framing with manufacturer's standard nail or screw fasteners with color matched head.
- C. Apply trim and molding according to manufacturer's instructions.
- D. Seal panel joints and perimeters with Type 1 sealant as specified in Section 07 92 00, Joint Sealants.
- E. Touch up scratches on panel faces with panel manufacturer-supplied paint to match scheduled color and in accordance with panel manufacturer's recommendations.

**END OF SECTION**