

TECHNICAL SPECIFICATIONS

CONTRACT FY2015-004

**MODIFICATIONS AND REPAINTING OF
ETTP K-1530 2.5 MG WATER STORAGE TANK**

Prepared For
CITY OF OAK RIDGE, TENNESSEE



Prepared By
CTI Engineers, Inc.
Practical Innovation, By Design[®]
Knoxville, Tennessee
Project No. K12003

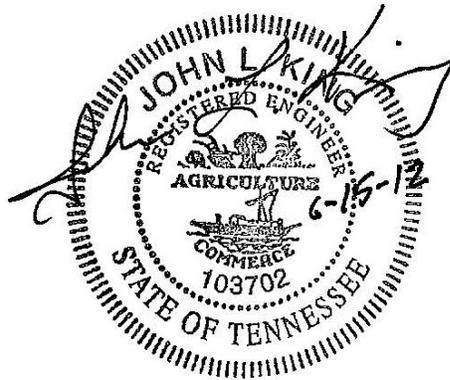
June 2012
(revised March 2014)

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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 Law.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By



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

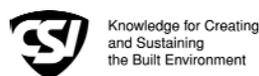
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These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Nos. C-520 or C-525 (2002 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the EJCDC Construction Documents, General and Instructions (No. C-001) (2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800) (2002 Edition).

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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

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

3. *Application for Payment*--The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

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

6. *Bidder*--The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*--A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*-- Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*--The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

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

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

17. *Drawings*--That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

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

20. *Field Order*--A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

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

22. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

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

26. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*--The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*--A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

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

30. *PCBs*--Polychlorinated biphenyls.

31. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*--A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

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

34. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

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

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

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Schedule of Submittals*--A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values*--A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

41. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *Site*--Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. *Specifications*--That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain

administrative requirements and procedural matters applicable thereto.

44. *Subcontractor*--An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

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

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

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

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

49. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. *Unit Price Work*--Work to be paid for on the basis of unit prices.

51. *Work*--The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive*--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times

but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

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

B. Intent of Certain Terms or Adjectives

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

C. Day

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

D. Defective

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

- a. does not conform to the Contract Documents, or
- b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or
- c. has been damaged prior to Engineer's - recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. Furnish, Install, Perform, Provide

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

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

ARTICLE 2 - PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

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

2.02 Copies of Documents

A. Owner shall furnish to Contractor up to 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

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

2.07 Initial Acceptance of Schedules

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

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

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

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

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

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

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

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

3.02 *Reference Standards*

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

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or

responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

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

B. Resolving Discrepancies

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

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

b. the provisions of any Laws or Regulations applicable to the performance of the Work

(unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;
2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or
3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or
2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

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

3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's

sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party..

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

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

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

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

4.02 *Subsurface and Physical Conditions*

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

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

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

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

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

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

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

4.03 *Differing Subsurface or Physical Conditions*

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

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

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

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

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

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

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

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

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

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

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

a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

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

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

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

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

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

a. reviewing and checking all such information and data,

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

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

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

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will

promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

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

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

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

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to

entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

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

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 current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

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

5.03 *Certificates of Insurance*

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

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

5.04 *Contractor's Liability Insurance*

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection

from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

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

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

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

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

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

b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

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

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

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

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

3. include completed operations insurance;

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

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

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

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

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

5.06 *Property Insurance*

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

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

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

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

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

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any

deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

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

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

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

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

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order .

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

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

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract

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

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

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

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

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

received from the superintendent shall be binding on Contractor.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

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

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. "*Or-Equal*" Items: If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

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

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

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

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

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

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

2. Substitute Items

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

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

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

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

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

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

3) will identify:

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

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

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

B. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. Engineer's Evaluation: Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

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

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

Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

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

6.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual

or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

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

6.08 *Permits*

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

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

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

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

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

C. Cleaning: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

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

6.12 *Record Documents*

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

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

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

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

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Draw-

ings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

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

6.17 *Shop Drawings and Samples*

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

1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

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

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

a. Submit number of Samples specified in the Specifications.

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

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

C. Submittal Procedures

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

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

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

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

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents

with respect to Contractor's review and approval of that submittal.

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

D. Engineer's Review

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

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures

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

6.18 Continuing the Work

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or

disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 Contractor's General Warranty and Guarantee

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

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

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

2. normal wear and tear under normal usage.

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

1. observations by Engineer;

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

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

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

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

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 Indemnification

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or

arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

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

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal

shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

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

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

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

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and
2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and

properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

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

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

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

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

3. the extent of such authority and responsibilities will be provided.

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

7.03 *Legal Relationships*

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

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

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

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

8.03 *Furnish Data*

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

8.04 *Pay When Due*

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

8.05 *Lands and Easements; Reports and Tests*

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

8.06 *Insurance*

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

8.07 *Change Orders*

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

8.08 *Inspections, Tests, and Approvals*

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

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements*

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

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

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

Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

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

9.03 *Project Representative*

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

9.04 *Authorized Variations in Work*

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

9.05 *Rejecting Defective Work*

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

9.06 *Shop Drawings, Change Orders and Payments*

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

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

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

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

9.07 *Determinations for Unit Price Work*

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

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

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show

partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

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

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

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

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

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

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall

promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

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

10.03 *Execution of Change Orders*

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

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

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

10.05 *Claims*

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

B. *Notice:* Written notice stating the general nature of each Claim, shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

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

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

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

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

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and

Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

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

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

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

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have

resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

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

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

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

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

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, 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 and 11.01.B.

C. Contractor's Fee: When all the Work is performed on the basis of cost-plus, Contractor's fee shall

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

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

11.02 Allowances

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

B. Cash Allowances

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance

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

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

11.03 Unit Price Work

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

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

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

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

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

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

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

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

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an

allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

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

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

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

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

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

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

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

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted

by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

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

13.01 *Notice of Defects*

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

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

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

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to

be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

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

13.05 *Owner May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
2. correct such defective Work; or
3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications .

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

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

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

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

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress

payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. Applications for Payments

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

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

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

B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

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

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

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

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

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

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

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent

inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

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

D. Reduction in Payment

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

- a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
- b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
- c. there are other items entitling Owner to a set-off against the amount recommended; or
- d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 Contractor's Warranty of Title

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

14.04 Substantial Completion

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, , Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial

Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

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

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals

that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. Application for Payment

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

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

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

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

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

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

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

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations

under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

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

14.08 *Final Completion Delayed*

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

14.09 *Waiver of Claims*

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

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance

with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

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

15.02 *Owner May Terminate for Cause*

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

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

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

3. Contractor's disregard of the authority of Engineer; or

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

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 their 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.

SECTION 00800

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General conditions of the Construction Contract (C-700, 2002 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

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

- I. SC-2.03 - Delete Paragraph 2.03.A in its entirety and insert the following in its place:
 - A. The Contract Times will commence to run upon receipt of the notice to proceed or upon a date specified in the notice to proceed.
- II. SC-4.02 - Add the following new paragraph immediately after Paragraph 4.02.A.2:
 3. Contractor shall only use the reports and drawings pertaining to the subsurface and physical conditions developed by geotechnical consultants for the intended use of design purpose only. These documents were not developed to quantify rock or a give a detailed investigation of all subsurface conditions.
- III. SC-4.06 – Delete Paragraph 4.06.G in its entirety.
- IV. SC-5.01 – Delete Section 5.01 in its entirety.
- V. SC-5.04 - Add the following new paragraph immediately after Paragraph 5.04.B:
 - C. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:
 1. Workers' Compensation and related coverages under paragraphs 5.04.A.1 and A.2 of the General Conditions:

a. State:	Statutory
b. Applicable Federal (e.g., Longshoreman's)	Statutory
c. Employer's Liability	\$1,000.000
 2. Contractor's General Liability under paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

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

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

- a. Bodily Injury:
 - (1) Each Person \$ 500,000
 - (2) Each Accident \$ 500,000
- b. Property Damage:
 - (1) Each Accident \$ 500,000
- c. Combined Single Limit of: \$1,000,000

4. The Contractual Liability coverage required by paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:

- a. Bodily Injury:
 - (1) Each Accident \$1,000,000
 - (2) Annual Aggregate \$1,000,000
- b. Property Damage:
 - (1) Each Accident \$1,000,000
 - (2) Annual Aggregate \$1,000,000

5. The Contractor shall furnish the Owner with a Certificate of Insurance naming Owner as an additional insured on all casualty policies.

VI. 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 upon the work at the Site in the amount of full replacement cost thereof. This insurance shall:

1. Include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER'S Consultants and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;
 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 and 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, 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; and
 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. The policies of insurance required to be purchased and maintained by CONTRACTOR in accordance with this paragraph SC-5.06 shall comply with the requirements of paragraph 5.06.C of the General Conditions.
- VII. SC-5.07 - Delete Paragraph 5.07 in its entirety.
- VIII. SC-6.08 - Add the following new paragraph immediately after Paragraph 6.08.A:
- B. Contractor shall abide by all conditions of permits obtained including any additional insurance requirements requested by the permitting agency(s).
- IX. SC-10.01 - Add the following new paragraph immediately after Paragraph 10.01.B:
- C. Changes in Scope of Work:
1. The Contract Documents outline a Scope of Work that reflects the intended size of the Project based on the best information available at the time of document preparation and Advertisement for Bids.

2. The actual Scope of Work may vary once actual field conditions are encountered and addressed as the Work progresses.
 3. The Owner reserves the right to increase up to ten (10%) percent or decrease up to twenty-five (25%) percent the Scope of Work without obligation to receive or to pay additional compensation from or to the Contractor beyond the contract unit prices, or to adjust the Contract Time as a penalty for the change in the Scope of Work.
 4. All terms, conditions, Unit Prices and Schedule of Values in the Contract for Work within the original Scope of Work shall apply to all Work and to determine the value of all Work added to or deleted from the original Scope of Work.
 5. Changes outside the stated limits for the revised Scope of Work shall be subject to applicable revisions of Article 10, 11, and 12 of Section 00700, General Conditions of the Construction Contract.
- X. SC-14.02 – Delete Paragraph 14.02.C.1 in its entirety and insert the following in its place:
- C. Payment Becomes Due
1. Thirty 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.
- XI. SC-16 - Delete Article 16 from General Conditions in its entirety.
- XII. T.C.A. 66-11-144, Portion of Contract Price Held in Escrow
- A. Whenever, in any contract for the improvement of real property, a certain amount or percentage of the contract price is held back by the owner or contractor, that retained amount shall be deposited in a separate escrow account with a third party giving proper security for the performance of the obligation of the owner or contractor.
 - B. As of the time of the deposit of the retained funds, such funds shall become the sole and separate property of the contractor, subcontractor, material man, or laborer to whom they are owed.
 - C. Upon satisfactory completion of the contract, to be evidenced by a written release by the owner or contractor, all funds accumulated in the escrow account together with any interest thereon shall be paid immediately to the contractor, subcontractor, material man, or laborer to whom such funds and interest are owed.
 - D. In the event the owner or contractor fails or refuses to execute the release provided for in subsection ©, then the contractor, subcontractor, material man, or laborer shall seek any remedy in a court of proper jurisdiction and the person holding the fund as escrow agent shall bear no liability for the nonpayment thereof to the contractor, subcontractor, material man, or laborer.

- E. In contracts to which the State of Tennessee or any department, board or agency thereof, including the University of Tennessee, is a party, interest shall be paid on such retained amounts at the same rate interest is paid on the funds of local governments participating in the local government investment pool established pursuant to § 9-4-704, for the contract period.
- F. The provisions of this section shall be applicable to the State of Tennessee, any department, board or agency thereof, including the University of Tennessee, and all counties and municipalities and all departments, boards or agencies thereof, including all school and education boards, and any other subdivision of the state.
- G. For all contracts for the improvement of real property where the contract amount equals or exceeds \$500,000.00 and the City of Oak Ridge, Tennessee has determined to retain a certain amount of percentage of the contract price, said retained amount will be deposited in a separate escrow account with TN Bank, 401 South Illinois Avenue, Oak Ridge, Tennessee 37830.
- H. Compliance with this section shall be mandatory, and may not be waived by contract.

XIII. Independent Contractors:

- A. The parties acknowledge that the relationship created under this Contract is that of independent contracting parties and this Contract does not create a general agency, joint venture, partnership, employment relationship, or franchise between the parties. Neither party shall represent itself to be an agent of the other, nor shall in execute any documents or make any commitments to any contractual or other obligations with third parties.

XIV. Anti-Discrimination

- A. The CONTRACTOR, in performing the work or furnishing the services covered by this Contract, shall not discriminate against any person because of race, creed, color, national origin, age, sex, sexual orientation, disability, religion or other legally protected status. The City of Oak Ridge encourages the utilization of minority and women-owned businesses in its contracting and subcontracting projects and the CONTRACTOR is encouraged to actively solicit the participation of these businesses. The CONTRACTOR shall inform all of its subcontractors and vendors providing work or services under this Contract of this requirement and shall ensure compliance therewith.

END OF SECTION

SECTION 00900

SUPPLEMENTAL SPECIAL CONDITIONS

I. PERMITS, LICENSES, EASEMENTS, AND REGULATIONS

A. GENERAL

1. Permits and licenses shall be obtained from the appropriate authorities having jurisdiction prior to beginning and Work on the project.
2. Contractor shall have copies of each specific permit and license at the job site prior to initiating construction of Work associated with the permit or license.
3. Copies of all permits and licenses obtained by the Contractor shall be supplied to the Owner prior to beginning any Work on the project.
4. Copies of permits and easements obtained by the Owner shall be supplied to the Contractor prior to beginning any Work on the project.
5. Contractor shall strictly adhere to all requirements, stipulations, and conditions of each permit, license and/or easement.
6. Contractor shall comply with all permits, regulations and ordinances governing employee safety and health, hazardous materials and environmental protection.
7. Any problem noted in compliance with the permits, license and/or easement, or any proposed amendments by the Contractor shall be reported to the Engineer in writing before initiating or continuing with the Work.

B. REGULATIONS AND ORDINANCES

1. Contractor shall strictly adhere to all regulations and ordinances governing Work included in the construction of this Project, employee safety and health, hazardous materials and environmental protection for all activities associated with the project.
2. The enclosed list of applicable regulations and ordinances is included for general reference and should not be considered complete until verified by the Contractor to assure strict compliance.
3. The regulations and ordinances governing the Project shall include, but not necessarily be limited to:
 - a. Tennessee Department of Environment and Conservation, Division of Water Supply;
 - b. Tennessee Department of Environment and Conservation, Division of Water Pollution Control, Wastewater and Stormwater Regulations;
 - c. Tennessee Department of Environment and Conservation, Division of Air Pollution Control, all Air Quality Regulations, with specific reference to all Sections dealing with lead based coatings removal, painting operations and to Chapter 1200-3/Chapters 1 - 26, with general attention to Chapter 8 – “Fugitive Dust”;
 - d. Tennessee Department of Environment and Conservation, Division of Solid Waste Management, all solid waste and hazardous materials regulations;
 - e. The Tennessee Valley Authority;
 - f. Tennessee Occupational Safety and Health Act, (TOSHA), Regulations;

- g. The U.S. Army Corps of Engineers; and
- h. The Resident County, City and/or Utility District for the Project, regulations and ordinances governing air quality, wastewater, stormwater and solid waste, employee safety and health, hazardous materials and environmental protection.

C. PERMITS AND EASEMENTS SECURED BY THE OWNER (Only permits specifically applicable to the project will be supplied)

- 1. Tennessee Department of Environment and Conservation – Water System Construction Permit;
- 2. Tennessee Department of Environment and Conservation – Wastewater System Construction Permit;
- 3. Tennessee Department of Environment and Conservation – Stormwater Construction Permit;
- 4. Tennessee Department of Environment and Conservation – Aquatic Resource Alteration Permit (ARAP)
- 5. U.S. Army Corps of Engineers – 404 Permit
- 6. Tennessee Valley Authority – 26A Permit
- 7. Resident County, City and/or Utility District Permits governing air pollution, potable water, wastewater, stormwater and erosion control, solid waste, and roadway – encroachment and crossings.
- 8. Tennessee Department of Transportation – Roadway Encroachment and Crossings;
- 9. Rail Road Right-of-way Encroachments and Crossings;
- 10. Boiler and Machinery Insurance and other such coverage as may be required to be maintained by the Owner.
- 11. Easements for Encroachments on Private Property; and
- 12. Other Permits and Easements specifically required and listed for this Project.

D. PERMITS AND LICENSES TO BE SECURED AND PAID FOR BY THE CONTRACTOR (Only Permits specifically applicable to the Project are required)

- 1. Tennessee Department of Commerce and Insurance Licenses for working as a Contractor in the State with applicable classifications(s) for the specific work task(s) associated with this Project;
- 2. Resident county, City and/or Utility District, Business and/or Contractors Licenses;
- 3. U.S. Government; State of Tennessee; Resident County, City and/or Utility District Permit to transport or dispose of solid waste;
- 4. State of Tennessee; Resident County, City and/or Utility District Permits and Licenses for Contractor's job site office, yard and utilities;
- 5. Easements and other Agreements between the contractor and other parties for use of property or utilities for the job site office, yard and other materials or equipment lay down or storage areas;
- 6. Labor Unions, all applicable agreements;
- 7. Tennessee Department of Transportation Permits and Licenses to transport materials and equipment to and from the job site(s); and
- 8. Any and all other permits and/or licenses required of the Contractor for the complete and successful construction of the Project.

END OF SECTION

DIVISION 01
GENERAL REQUIREMENTS

SECTION 01 1100

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

- A. The work described in these Contract Documents consists of furnishing, delivering, and installing all materials, equipment, and products for the demolition of an existing tank roof and support system, construction of a new aluminum geodesic dome, and repainting of the existing 2.5 MG water storage tank as specified herein.
- B. Furnish all materials, power, equipment, tools, labor, transportation, and other items necessary or convenient to the Contractor for the installation of the equipment, materials, and products specified or described in these Contract Documents and for the completion of all work to be performed by the Contractor as specified herein.

1.2 PROJECT COORDINATION

- A. The Contractor shall be responsible for project coordination, which includes but is not limited to the following:
 - 1. Work of employees and subcontractors under contract to him. Conduct work to ensure compliance with schedules.
 - 2. Submission of all invoices, progress schedules, progress reports, progress estimates, and other data needed in support of requests for payment.
 - 3. Product and equipment deliveries adequate to maintain the schedule of construction. Report noncompliance to Owner with a recommendation for remedy.
 - 4. Obtaining and use of all temporary structures, offices, storage sheds, and utilities.
 - 5. Obtaining any required building permits, special permits, and approvals from all authorities having jurisdiction.
 - 6. Testing laboratory activities associated with Contractor's scope of work.
 - 7. Check-out of systems and equipment and start-up operations.
 - 8. Work and operations between the Contractor and all trades in such a manner that no union labor dispute of jurisdiction arises regarding unloading, handling, installations, and connections to utilities and otherwise of the various items in the various trades.

1.3 SUBSTANTIAL COMPLETION

- A. The work will not be considered to be fully functional and usable by the Owner for its intended purposes and will not be considered substantially complete until the following items are completed and/or submitted.

1. The tank coatings are completed and cured, all tank interior surfaces and associated piping are disinfected and the tank is ready to be placed into service.
 2. Copies of specified inspection and test reports.
 3. Copies of written warranties on equipment and products in accordance with Contract requirements.
 4. Other information as specified in other sections is submitted.
- B. In addition to the above submissions, the work will not be considered to be fully functional and useful by the Owner for its intended purposes and will not be accepted as substantially complete until all of the following components and/or items have been completed:
1. Drainage.
 2. Signage and identification.
 3. The following items, unless waived in writing by the Owner due to inclement weather:
 - a. Finish grading.
 - b. Seeding and mulching.
 - c. Pavement replacement (if damaged).
 - d. Landscaping.

1.4 FINAL COMPLETION

- A. The work under these Contract Documents will not be considered for final acceptance as complete until all of the following items have been completed or submitted:
1. Any items not completed at the time of substantial completion, including all remaining punch list items.
 2. Final cleanup.
 3. Restoration of all disturbed or damaged properties.
 4. Executed project close-out documents included with the Contract.
 5. Record drawings.

END OF SECTION

SECTION 01 2200

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplemental Conditions or General Provisions and other Division 1 specification sections, apply to this section.

1.2 LUMP SUM PRICES

- A. Lump sum prices shall include all items of work shown on the Drawings, specified, or otherwise required or necessary for complete, working systems including work, services, fees, equipment or material not specifically listed, overhead, profit, and applicable taxes.

1.3 SCHEDULE OF VALUES

- A. A "Schedule of Values" is required to facilitate payment for partial completion of lump sum items as the project progresses.
- B. At a minimum, the schedule of values for the lump sum items of construction of the new aluminum geodesic dome and repainting the existing tank shall consist of the following:
 - 1. Aluminum Geodesic Dome
 - a. Design
 - b. Dome Fabrication and Delivery
 - c. Existing Tank Modifications
 - d. Installation
 - 2. Coatings
 - a. Interior
 - 1) Surface Preparation
 - 2) Painting
 - b. Exterior
 - 1) Surface Preparation
 - 2) Painting
- C. At a minimum, the schedule of values for the lump sum item of miscellaneous items shall consist of the following:
 - 1. Mobilization
 - 2. Site work
 - 3. Final cleanup and project closeout

PART 2 - PARTIAL PAYMENT

- A. Partial payment may be made for stored material on site, providing:
1. The material meets the specifications outlined elsewhere in these documents.
 2. The material is stored according to the recommendations of the Engineer and/or manufacturer.
 3. The Contractor submits copies of all shipping invoices for the stored materials delivered to the site.

PART 3 - MEASUREMENT AND PAYMENT

3.1 MEASUREMENT AND PAYMENT

- A. Measurement and payment for all items of work shown on the Drawings, specified, or otherwise required or necessary for complete, working systems shall be made at the lump sum prices listed in the Bid Schedule. No separate payment shall be made for items of work, services, fees, or equipment not specifically listed, but payment for those items shall be included in the payment for items listed.

END OF SECTION

SECTION 01 2976

APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Submit Applications for Payment to the Engineer.

1.2 RELATED DOCUMENTS

- A. Contract between Owner and Contractor.
- B. Progress Payments, Retainages and Final Payment.
- C. Section 01 7800, Project Closeout.

1.3 FORMAT AND INFORMATION REQUIRED

- A. Review preliminary application with resident project representative.
- B. Submit applications typed on forms acceptable to the Owner.
- C. Provide itemized data on application:
 - 1. Format, schedules, line items, unit prices, units completed by month and project-to-date, and values.
 - 2. Project photographs illustrating progress of work during the period.

1.4 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

A. Application Form

- 1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.
- 2. Fill in summary of dollar values to agree with respective totals indicated.
- 3. Execute certification with signature of a responsible officer.

B. Continuation Sheets

- 1. Fill in total list of all scheduled component items of work, with item number and scheduled dollar value for each item.
- 2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored. Round off values to nearest dollar, or as specified for the Bid Schedule.

3. List each Change Order executed prior to date of submission. List by Change Order number and description, as for an original component item of work.
4. To receive approval for payment on component material stored on site, submit copies of the original paid invoices with the application for payment along with the material location report (see Section 01 3200, Schedules and Reports).

1.5 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. Substantiating Data. When the Owner or the Engineer requires substantiating data, submit suitable information, with a cover letter identifying:
 1. Project.
 2. Application number and date.
 3. Detailed list of enclosures.
 4. For stored products:
 - a. Item number and identification as shown on application.
 - b. Description of specific material.
- B. Submit one copy of data and cover letter for each copy of application.

1.6 PREPARATION OF APPLICATION FOR FINAL PAYMENT

- A. Fill in application form as specified for progress payments.

1.7 SUBMITTAL PROCEDURE

- A. Submit Applications for Payment to the Engineer at the times stipulated in the Contract.
- B. Number: Five copies of each application.

1.8 PROCESSING OF PERIODIC APPLICATIONS FOR PAYMENT

- A. No applications for payment for work under this Contract will be processed until the Contractor's Preliminary Construction Schedule, Submittal Tabulation, and Schedule of Values are submitted in accordance with the requirements of Section 01 3200, Schedules and Reports.
- B. No further applications for payment will be processed after the due date of the Contractor's Construction Schedule and Submittal Schedule until both schedules are submitted in conformance with the requirements of Section 01 3200, Schedules and Reports.
- C. No applications will be processed for stored materials unless the application is accompanied with copies of original paid invoices and the Material Location Report specified in Section 01 3200, Schedules and Reports.
- D. No further applications for payment will be processed after the expiration of the Contract Time, including approved extensions thereof, until the date of Substantial Completion as described in these Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 3119

PROJECT MEETINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specifies administrative and procedural requirements for project meetings including but not limited to:
 - 1. Pre-Construction Conference.
 - 2. Coordination Meetings.
 - 3. Progress Meetings.
- B. Construction schedules are specified in another Division 1 section.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract and other Division 1 specification sections apply to this section.

1.3 PRE-CONSTRUCTION CONFERENCE

- A. Attend and participate in a pre-construction conference and organizational meeting at the project site or other convenient location no later than 15 days after execution of the Agreement and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees. The Owner, Engineer and their consultants, the contractor and its superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the work.
- C. Agenda. Discuss items of significance that could affect progress including such topics as:
 - 1. Tentative construction schedule.
 - 2. Critical work sequencing.
 - 3. Designation of responsible personnel.
 - 4. Procedures for processing field decisions and Change Orders.
 - 5. Procedures for processing Applications for Payment.
 - 6. Distribution of Contract Documents.
 - 7. Submittal of shop drawings, product data and samples.
 - 8. Preparation of record documents.
 - 9. Use of the premises.
 - 10. Office, work and storage areas.
 - 11. Equipment deliveries and priorities.
 - 12. Safety procedures.
 - 13. First aid.
 - 14. Security.
 - 15. Housekeeping.

16. Working hours.

1.4 COORDINATION MEETINGS

- A. Conduct project coordination meetings at regularly scheduled times as determined during the pre-construction conference or during progress meetings or on a as needed basis convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.5 PROGRESS MEETINGS

- A. Conduct progress meetings at the project site at regularly scheduled intervals but not less than monthly once onsite construction begins. Notify the Owner and Engineer of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
- B. Attendees. In addition to representatives of the Owner and Engineer, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.
- C. Agenda. Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the project.
 - 1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the contract time.
 - 2. Contractor's Submittal Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Submittal Schedule, whether on time or ahead or behind schedule. Determine how submittals behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the contract time.
 - 3. Review the present and future needs of each entity present, including such items as:
 - a. Interface requirements.
 - b. Time.
 - c. Sequences.
 - d. Deliveries.

- e. Off-site fabrication problems.
- f. Access.
- g. Site utilization.
- h. Temporary facilities and services.
- i. Hours of work.
- j. Hazards and risks.
- k. Housekeeping.
- l. Quality and work standards.
- m. Change Orders.
- n. Documentation of information for payment requests.

D. Reporting. No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

- 1. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01 3200

SCHEDULES AND REPORTS

PART 1 - GENERAL

1.1 SUMMARY

- A. General. This section specifies administrative and procedural requirements for schedules and reports required for proper performance of the work.
- B. Coordination. The Contractor shall closely coordinate scheduling and reporting of work by subcontractors.
- C. Schedules required include:
 - 1. Preliminary Schedule, including Submittals Tabulation.
 - 2. Contractor's Construction Schedule.
 - 3. Submittal Schedule.
 - 4. Schedule of Values.
- D. Reports required include:
 - 1. Daily Construction Reports.
 - 2. Material Location Reports.
 - 3. Field Correction Reports.
- E. Project meeting minutes are included in Section 01 3119, Project Meetings.
- F. Inspection and test reports are included in Section 01 4000, Quality Control Services.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract and other technical specification sections apply to this section.

1.3 PRELIMINARY SCHEDULE

- A. Bar Chart Schedule. Submit a preliminary horizontal bar chart type construction schedule within seven days of the date established for commencement of the work.
- B. Bar Chart Schedule. The Contractor for General Construction shall submit a preliminary horizontal bar chart type construction schedule, with a copy to each prime Contractor, within seven days of the date established for commencement of the work. Within five working days of this submittal, each other prime Contractor shall submit a matching preliminary horizontal bar chart schedule showing their construction operations sequenced and coordinated with general construction.
 - 1. Provide a separate time bar for each significant construction activity. Coordinate each element on the schedule with other construction activities. Schedule each construction activity in proper sequence. Provide a continuous vertical line to identify the first working day of each week.

2. Indicate completion of the work in advance of the date established for substantial completion.
3. If adjustments are necessary for sequencing and coordination of the work, the Contractor for general construction shall arrange a meeting with the other prime Contractors at the earliest possible date. At this meeting each prime Contractor shall negotiate reasonable adjustments to their schedules.

C. Submittal Tabulation. With the submittal of the preliminary construction schedule, include a tabulation by date of submittals required during the first 90 days of construction. List those submittals required to maintain orderly progress of the work, and those required early because of long lead time for manufacture or fabrication.

1. At the Contractor's option, submittal dates may be shown on the schedule, in lieu of being tabulated separately.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Bar Chart Schedule. Prepare a comprehensive, fully developed, horizontal bar chart type Contractor's construction schedule based on the preliminary construction schedule and on whatever updating and feedback was received since the start of the project.

B. Bar Chart Schedule. The Contractor for general construction shall secure time commitments for performing critical construction activities from each of the other prime Contractors and shall prepare a combined construction schedule for the entire project. The Schedule shall be a comprehensive, multi-sheet, integrated, fully developed horizontal bar chart type schedule (Microsoft Project 2003, or similar) based on the preliminary construction schedules and reflecting updating and feedback received since the start of the project.

1. Submit the schedule within 30 calendar days of the date established for commencement of the work, unless a longer time has been requested and approved.
2. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week.
 - a. If practical, use the same breakdown of units of the work as indicated in the "Schedule of Values."
3. For significant construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within the time bar. As work progresses, place a contrasting mark in each bar to indicate actual completion percentage.
4. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data clearly for the entire construction period.
 - a. Show the activities of each prime contract on a separate sheet.

- b. Prepare a simplified summary sheet indicating the combined construction activities of the prime contracts.
 5. Secure time commitments for performing critical elements of the work from parties involved. Coordinate each element on the schedule with other portions of the work; include minor elements involved in the overall sequence of the work. Show each construction activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the work. Show critical path activities or elements.
 6. Coordinate the Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests and other required schedules and reports.
 7. Indicate completion of the work in advance of the date established for substantial completion. Indicate substantial completion on the schedule to allow ample time for the Engineer's administrative procedures necessary for certification of substantial completion.
- C. Work Stages. Use crosshatched bars to indicate important stages of construction for each major portion of the work.
- D. Such stages include, but are not necessarily limited to:
1. Subcontract awards.
 2. Purchases.
 3. Mockups.
 4. Fabrication.
 5. Sample testing.
 6. Deliveries.
 7. Installation.
 8. Testing.
 9. Adjusting.
 10. Curing.
 11. Start-up and placement into final use and operation.
- E. Distribution. Following the Engineer's response to initial submittal of the Contractor's construction schedule, print and distribute copies to the Engineer, Owner, separate contractors, subcontractors, suppliers, fabricators, and other parties required to comply with scheduled dates.
1. Post copies of the schedule in the project meeting room and temporary field office.
 2. When revisions are made, distribute the updated schedule to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in performance of construction activities.
- F. Schedule Updating. Revise the schedule immediately after each meeting or other activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.5 SUBMITTAL SCHEDULE

- A. Prepare a complete submittal schedule concurrent with the development of the Contractor's construction schedule. Submit the schedule within 30 calendar days of the date established for commencement of the work, unless a longer period has been requested and approved.
1. Coordinate submittal schedule with the list of subcontracts, Schedule of Values, and the Contractor's construction schedule.
 2. Prepare the schedule in chronological order; include submittals listed on the tabulation of submittals required during the first 90 days of construction. Provide the following information on the schedule:
 - a. Schedule date for the first submittal.
 - b. Related section number.
 - c. Submittal category.
 - d. Name of subcontractor.
 - e. Description of the part of the work covered.
 - f. Scheduled date of the Engineer's final release or approval.
 3. Scheduled submittal dates shall be staggered.
 4. Items of a critical nature shall be prioritized and so noted.
 5. Scheduled final release or approval dates shall be coordinated with construction schedule.
- B. Distribution. Following the Engineer's response to initial submittal, print and distribute the schedule to the Engineer, Owner, separate Contractors, subcontractors, suppliers, fabricators, and other parties required to comply with submittal dates indicated.
1. Post copies in the project meeting room and temporary field office.
 2. When revisions are made, distribute the updated schedule to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned part of the work and are no longer involved in the performance of construction activities.
- C. Schedule Updating. Revise the schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.6 SCHEDULE OF VALUES

- A. Prepare and submit a schedule of values established in the Agreement within 15 days of the date established for commencement of the work.
1. Refer to Section 01 2200, Measurement and Payment, for a listing of categories of work where unit prices are required.

2. Refer to individual specification sections for portions of the work where the establishment of unit prices is required. Methods of measurement and pricing are specified in these sections.
- B. Prepare the schedule in tabular form, including the following items:
1. Name of the part of the work.
 2. Related specification section.
 3. Name of subcontractor assigned.
 4. Unit of measurement.
 5. Price per unit.
- C. Distribution. Distribute to the Owner, Engineer, and each party involved in performance of the portion of the work, where established unit prices could come into force and effect.
- D. Following review by the Owner and Engineer, revise the schedule of values to correct any elements which the Owner and Engineer find unacceptable. After revision, the schedule of values shall be submitted for further review.

1.7 REPORTS

- A. Daily Construction Reports. Prepare a daily construction report, recording the following information concerning events at the site; and submit duplicate copies to the Engineer at weekly intervals:
1. List of subcontractors at the site.
 2. List of separate contractors at the site.
 3. Approximate count of personnel at the site.
 4. High and low temperature, general weather conditions.
 5. Accidents (refer to accident reports).
 6. Meetings and significant decisions.
 7. Unusual events (refer to special reports).
 8. Stoppages, delays, shortages, losses.
 9. Meter readings and similar recordings.
 10. Emergency procedures.
 11. Orders and requests of governing authorities.
 12. Change Orders received, implemented.
 13. Services connected, disconnected.
 14. Equipment or system tests and start-ups.
 15. Partial completions, occupancies.
 16. Substantial completions authorized.
- B. Material Location Reports. At monthly intervals prepare a comprehensive list of materials delivered to and stored at the site. The list shall be cumulative, showing materials previously reported plus items recently delivered. Include with the list a statement of progress on and delivery dates for all materials or items of equipment being fabricated or stored away from the building site. Submit copies of the list to the Engineer at monthly intervals.
- C. Field Correction Report. When the need to take corrective action that requires a departure from the Contract Documents arises, prepare a detailed report including a

statement describing the problem and recommended changes. Indicate reasons the Contract Documents cannot be followed. Submit a copy to the Engineer immediately.

1.8 LOGS

- A. RFI Log. Maintain a tabular log of all Requests for Information (RFI). Number RFIs in a sequential manner. Note date of request and date of response for each. Update the RFI log monthly and distribute at the monthly progress meeting.
- B. Shop Drawing and Product Data Submittal Log. Maintain a tabular log of all shop drawing and product data submittals. Number submittals in a sequential manner. Note dates of initial submittal, first return, resubmittal, second or final return along with Engineer's action noted for each submittal. Update the shop drawing submittal log monthly and distribute at the monthly progress meeting.
- C. Change Order Request/Proposal Log. Maintain a tabular log of all change order requests/proposals. Number change order requests/proposals in a sequential manner. Note date of submittal, brief description of covered work, proposed price, requested number of days (if applicable), and status (denied/approved/pending). For those that are approved, indicate in which change order they are included. Update the log monthly and distribute at the monthly progress meeting.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PAYMENT

- A. No requests for payment for work under this Contract will be processed until the Contractor's Preliminary Construction Schedule, Submittals Tabulation, and Schedule of Values are submitted and found acceptable by the Owner and Engineer in conformance with the requirements of this section.
- B. No further requests for payment will be processed after the due date of the Contractor's Construction Schedule and Submittal Schedule until both schedules are submitted in conformance with the requirements of this section.
- C. If payment is being requested for stored materials, the material location report must be included with the request for payment.

END OF SECTION

SECTION 01 3233

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.1 SUMMARY

- A. General. This section specifies administrative and procedural requirements for construction photographs.
- B. Costs. Costs for photographs, album pages, and album shall be included in the lump sum bid price or unit prices contained for other items of work. No separate payment shall be allowed, with the exception of additional photographs, which is addressed elsewhere in this section.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including other technical specification sections, apply to this section.

1.3 SUBMITTALS

- A. Prints. Submit 3 prints of at least 4 views but not more than 8 views, directly to the Engineer with each monthly Application for Payment. The Engineer will distribute prints as follows:
 - 1. One print shall be retained in the project site field office of the Engineer's field representative and shall be available at all times for reference.
 - 2. One print to the Owner as the Owner's permanent record.
 - 3. One print shall be retained in the Engineer's files.
- B. Extra Prints. When requested by the Engineer, the photographer shall submit extra prints of photographs, with distribution directly to designated parties who will pay the costs for the extra prints directly to the photographer.
- C. Digitally Stored Photographs. Contractor shall provide digital photographs stored in standard format on standard CDs or diskettes.
- D. Photograph Albums. Provide 3-ring loose leaf, notebook type photo albums with the first Application for Payment. Albums shall be provided as required, if more than one volume of photographs is required to contain the photographs over the length of the construction contract. The front cover of each photo album shall contain the following:
 - 1. Project Name
 - 2. Owner's Name and Contract Number
 - 3. Engineer's Name and Project Number
 - 4. Volume Number
 - 5. Contractor's Name

- E. Album Pages. Album pages shall be punched for standard 3-ring binder. Allow 1-inch-wide margin on the left edge.

1.4 QUALITY ASSURANCE

- A. Engage an experienced photographer to take photographs during construction.
- B. Associated Services. Cooperate with the photographer's work. Provide reasonable auxiliary services as requested, including access to and use of temporary facilities including temporary lighting.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC COPIES

- A. Provide 4-by-6-inch smooth surface, glossy color prints on single-weight, commercial-grade stock, contained in a photo album page or provide two 4-by-6-inch color photos per page in word (.doc) or Adobe (.pdf) format. The photographs shall be taken with a digital camera capable of being programmed to show the date the photo was taken on the front of the photograph.
- B. Identification. Provide date on front of the photo per the previous paragraph. On the back of each print or beneath the photos in digital format provide an applied label with the following information:
 - 1. Name of the Project.
 - 2. Name and address of the photographer.
 - 3. Name of the Engineer.
 - 4. Name of the Contractor.
 - 5. Provide notation of vantage point marked for location and direction of shot on a key plan of the site.

PART 3 - EXECUTION

3.1 PHOTOGRAPHIC REQUIREMENTS

- A. Take at least 4 but no more than 8 color photographs in accordance with requirements indicated, to best show the status of construction and progress since taking the previous photographs.
 - 1. Frequency: Take photographs monthly, coinciding with the cutoff date associated with each Application for Payment.
 - 2. Vantage Points: The photographer shall select the vantage points for each shot each month to best show the status of construction and progress since the last photographs were taken.
 - 3. Description: A description of each photograph in album shall be noted below or to the side of the photograph.

END OF SECTION

SECTION 01 3323

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specifies administrative and procedural requirements for submittal of shop drawings, product data, and samples to verify that products, materials, and systems proposed for use comply with provisions of the Contract Documents.
- B. Shop drawings are required for all materials, products, and equipment furnished on this project, unless otherwise specified.
- C. Standard information prepared without specific reference to the project is not considered to be shop drawings.
- D. Coordination drawings are a special type of shop drawing that show the relationship and integration of different construction elements that require close and careful coordination during fabrication or during installation to fit in the restricted space provided or to function as intended.
- E. Product data include, but are not limited to, the following:
 - 1. Manufacturer's product specifications.
 - 2. Manufacturer's installation instructions.
 - 3. Standard color charts.
 - 4. Catalog cuts.
 - 5. Roughing-in diagrams and templates.
 - 6. Standard wiring diagrams.
 - 7. Printed performance curves.
 - 8. Operational range diagrams.
 - 9. Mill reports.
 - 10. Standard product operating and maintenance manuals.
- F. Samples include, but are not limited to, the following:
 - 1. Partial sections of manufactured or fabricated components.
 - 2. Small cuts or containers of materials.
 - 3. Complete units of repetitively used materials.
 - 4. Swatches showing color, texture, and pattern.
 - 5. Color range sets.
 - 6. Components used for independent inspection and testing.
- G. Administrative Submittals. Refer to other sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:
 - 1. Permits.
 - 2. Applications for payment.
 - 3. Performance and payment bonds.

4. Insurance certificates.
5. Listing of subcontractors.

H. Project Photographs. Submittal of project photographs is included under Section 01 3233, Construction Photographs.

I. Inspection and Test Reports. Submittal of inspection and test reports is included under Section 01 4000, Quality Control Services.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of Contract and other specification sections apply to this section.

1.3 CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the Contractor to check all drawings, data, and samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of the Drawings and data shall bear Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the Contract Documents.

B. The Contractor shall determine and verify:

1. Field measurements.
2. Field construction criteria.
3. Catalog numbers and similar data.
4. Conformance with Specifications.

C. Do not begin any of the work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been reviewed and accepted by the Engineer.

D. Submit to the Engineer all drawings and schedules sufficiently in advance of construction requirements to provide no less than 21 calendar days for checking and appropriate action from the time the Engineer receives them.

E. Stagger shop drawing submittals and indicate priority for critical delivery items on the shop drawing submittal schedule.

F. Submit four copies for the Engineer plus the number of copies the Contractor requires of descriptive or product data submittals to complement shop drawings (up to a maximum of eight copies). The Engineer will retain four sets. All blueprint shop drawings shall be submitted with one set of reproducible and only four sets of prints. The Engineer will review the blueprints and return to the Contractor the set of marked-up prints with appropriate review comments.

G. Contractor shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of the work prior to the review by Engineer of the necessary shop drawings.

1.4 ENGINEER'S REVIEW OF SHOP DRAWINGS

- A. The Engineer's review of drawings, data, and samples submitted by the Contractor is for general conformance with the design concept of the project and for general compliance with the information given in the Contract Documents. The Engineer's review and exception, if any, will not constitute an approval of dimensions, quantities, and details of the material, equipment, device, or item shown.
- B. The review of drawings and schedules shall not be construed:
 - 1. As permitting any departure from the Contract requirements;
 - 2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;
 - 3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.
- C. If the drawings or schedules as submitted describe variations and show a departure from the Contract requirements which the Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in contract price or time for performance, the Engineer may return the reviewed drawings without noting an exception.
- D. When reviewed by the Engineer, each of the shop drawings will be identified as having received such review, being so stamped and dated. Shop drawings stamped "REVISE AND RESUBMIT" and with required corrections shown will be returned to the Contractor for correction and resubmittal.
- E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing or on resubmitted shop drawings, to revisions other than the corrections requested by the Engineer on previous submissions. Make any corrections required by the Engineer.
- F. If the Contractor considers any correction indicated on the Drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.
- G. The Engineer will review a submittal/resubmittal a maximum of 3 times, after which the cost of review will be borne by the Contractor. The cost of engineering will be equal to the Engineer's charges to the Owner under the terms of the Engineer's agreement with the Owner.
- H. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.
- I. No partial submittals will be reviewed. Submittals not complete will be returned to the Contractor, and will be considered "Rejected" until resubmitted.

1.5 SUBMITTAL PROCEDURES

- A. Coordination. Coordinate preparation and processing of submittals with performance of the work. Transmit each submittal to the Engineer sufficiently in advance of scheduled performance of related construction activities to avoid delay.
1. Coordinate each submittal with other submittals and related activities that require sequential activity including:
 - a. Testing.
 - b. Purchasing.
 - c. Fabrication.
 - d. Delivery.
 2. Coordinate transmittal of different types of submittals for the same element of the work and different elements of related parts of the work so that processing will not be delayed by the Engineer's need to review submittals concurrently for coordination.
 - a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are forthcoming.
 - b. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Engineer sufficiently in advance of the work to permit processing.
- B. Submittal Preparation. Prepare and submit shop drawings in accordance with the following:
1. Attach a submittal cover sheet to each copy of a shop drawing. The submittal cover sheet shall contain the following information:
 - a. Project name and Owner's name.
 - b. Contractor's name and address.
 - c. Engineer's name and address.
 - d. Specification section and title.
 - e. Drawing reference number.
 - f. Submittal number.
 - g. Space to indicate the results of the Contractor's review.
 - h. Space to indicate any deviations from the Contract Documents or comments by the Contractor.
 - i. Space approximately 8 inches wide and 4 inches high for the Engineer to indicate the results of his review and any comments.
 2. Each shop drawing submittal shall be assigned a sequential number, beginning with the number 1. Resubmittals shall be identified by a letter suffix (i.e., 1A, 1B, etc.).
- C. Submittal Transmittal. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Engineer, and to other destinations, as indicated, by use of a transmittal form. Submittals received from sources other than the Contractor will be returned to the sender without action. A separate transmittal shall be used for each shop drawing submittal.

1.6 SHOP DRAWINGS

- A. The term "shop drawings," when used in the Contract Documents, shall be considered to mean Contractor's plans for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature, and performance and test data, shall be considered only as support to required shop drawings as defined above.
- B. Drawings and schedules shall be checked and coordinated with the work of all trades involved before they are submitted for review by the Engineer. Contractor shall indicate whether the shop drawing complies with or deviates from the requirement of the Contract Documents.
- C. If drawings show deviations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall clearly mark and describe such deviation in his letter of transmittal. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility for executing the Work in accordance with the Contract, even though such drawings have been reviewed.
- D. Data on materials and equipment include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.
- E. Installation List. When requested by the Engineer, manufacturers or equipment suppliers who propose to furnish equipment or products under Divisions 11, 15, and 26 shall submit an installation list to the Engineer along with the required shop drawings. The installation list shall include at least five installations where identical equipment has been installed and has been in operation for a period of at least 1 year.
- F. Color. Only the Engineer will utilize the color "red" in marking shop drawing submittals.
- G. Before final payment is made, the Contractor shall furnish to Engineer five sets of record drawings, all clearly revised, complete and up-to-date showing the permanent construction as actually made for all reinforcing and structural steel, miscellaneous metals, process and mechanical equipment, yard piping, electrical system and instrument system.

1.7 SAMPLES

- A. Furnish, for the approval of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until approved by the Engineer.

1.8 SPECIFIC SUBMITTAL REQUIREMENTS

- A. Submit coordination drawings where required for integration of different construction elements. Show construction sequences and relationships of separate components where necessary to avoid conflicts in utilization of the space available.
- B. Highlight, encircle, or otherwise indicate deviations from the Contract Documents on the shop drawings.
- C. Do not permit shop drawing copies without an appropriate final stamp or other marking indicating the action taken by the Engineer to be used in connection with construction.
- D. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit shop drawings on sheets at least 8½ by 11 inches but no larger than 30 by 40 inches.

1.9 PRODUCT DATA

- A. Collect product data into a single submittal for each element of construction or system. Mark each copy to show which choices and options are applicable to the Project.
- B. Where product data have been printed to include information on several similar products, some of which are not required for use on the project, or are not included in this submittal, mark copies to clearly indicate which information is applicable.
- C. Where product data must be specially prepared for required products, materials, or systems, because standard printed data are not suitable for use, submit as "shop drawings," not "product data."
- D. Include the following information in product data:
 - 1. Manufacturer's printed recommendations.
 - 2. Compliance with recognized trade association standards.
 - 3. Compliance with recognized testing agency standards.
 - 4. Application of testing agency labels and seals.
 - 5. Notation of dimensions verified by field measurement.
 - 6. Notation of coordination requirements.
- E. Submittals. Submit two copies of each required product data submittal; submit two additional copies where copies are required for maintenance manuals. The Engineer will retain one copy, and will return the other marked with the action taken and corrections or modifications required.
- F. Distribution. Furnish copies of final product data submittal to manufacturers, subcontractors, suppliers, fabricators, installers, governing authorities and others as required for performance of the construction activities. Show distribution on transmittal forms.
 - 1. Do not proceed with installation of materials, products and systems until a copy of product data applicable to the installation is in the installer's possession.
 - 2. Do not permit use of unmarked copies of project data in connection with construction.

1.10 ENGINEER'S ACTION

- A. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
1. Final Unrestricted Release: Where submittals are marked "NO EXCEPTIONS," that part of the work covered by the submittal may proceed, provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
 2. Final-But-Restricted Release: When submittals are marked "EXCEPTIONS AS NOTED," that part of the work covered by the submittal may proceed, provided it complies with both the Engineer's notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
 3. Returned for Resubmittal: When submittal is marked "REVISE AND RESUBMIT," do not proceed with that part of the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the Engineer's notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "REVISE AND RESUBMIT" to be used at the project site, or elsewhere where construction is in progress.
 4. Rejected: When submittal is marked "REJECTED," the materials, equipment, and/or methods identified in the submittal do not comply with the Contract requirements and shall not be incorporated into the work. No resubmittal of the same materials, equipment, and/or methods shall be made.
 5. Other Action: Where a submittal is primarily for information or record purposes, for special processing or other Contractor activity, the submittal will be returned, marked "Action Not Required."

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION

SECTION 01 4000

QUALITY CONTROL SERVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specifies administrative and procedural requirements for quality control services.
- B. Quality control services include inspections and tests and related actions including reports, performed by independent agencies, governing authorities, and the Contractor. They do not include contract enforcement or quality assurance activities performed by the Engineer.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract requirements.
 - 1. Specific quality control requirements for individual construction and painting activities are specified in the sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
 - 2. Inspections, tests, and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract requirements.
 - 3. Requirements for the Contractor to provide quality control services required by the authorities having jurisdiction are not limited by provisions of this section.

1.2 RELATED DOCUMENTS

- A. Drawings, technical specifications, and provisions of Contract apply to this section.

1.3 RESPONSIBILITIES

- A. Contractor Responsibilities. Provide inspections, tests, and similar quality control services, specified in individual specification sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the contract sum.
 - 1. Employ and pay an independent agency to perform specified quality control services.
 - 2. The Owner will engage and pay for the services of an independent agency to perform inspections and tests specified as the Owner's responsibility.

3. Retesting: The Contractor is responsible for retesting where results of required inspections, tests, or similar services prove unsatisfactory and do not indicate compliance with Contract requirements, regardless of whether the original test was the Contractor's responsibility.
 - a. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.
4. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
 - a. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
 - b. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
 - c. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
 - d. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
 - e. Security and protection of samples and test equipment at the project site.
- B. Owner Responsibilities. The Owner will employ and pay for the services of an independent agency, testing laboratory, or other qualified firm to perform services which are the Owner's responsibility.
- C. Duties of the Testing Agency. The independent testing agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual specification sections shall cooperate with the Engineer and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.
 1. The agency shall notify the Engineer and Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.
 2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract, or approve or accept any portion of the work.
 3. The agency shall not perform any duties of the Contractor.
- D. Coordination. The Contractor and each agency engaged to perform inspections, tests, and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.4 SUBMITTALS

- A. The independent testing agency shall submit to the Engineer, in duplicate, a certified written report of each inspection, test, or similar service.
 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
 2. Report Data: Written reports of each inspection, test, or similar service shall include, but not be limited to:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address, and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - f. Designation of the work and test method.
 - g. Identification of product and specification section.
 - h. Complete inspection or test data.
 - i. Test results and an interpretation of test results.
 - j. Ambient conditions at the time of sample-taking and/or testing.
 - k. Comments or professional opinion as to whether inspected or tested work complies with Contract requirements.
 - l. Name and signature of onsite or laboratory inspector.
 - m. Recommendations on retesting.

1.5 QUALITY ASSURANCE

- A. Qualification for Service Agencies. Engage inspection and testing service agencies, including independent testing laboratories, which are prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.
 1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state in which the project is located.
- B. The Engineer's Resident Project Representative (RPR) shall provide on-site observation on a full-time basis during tank erection and other site work and shall provide on-site observation on a part-time basis during painting operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General. Upon completion of inspection, testing, sample-taking, and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
- B. Protect construction exposed by or for quality control service activities, and protect repaired construction.
- C. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION

SECTION 01 4219

APPLICABLE CODES AND STANDARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. All materials, equipment, fabrication, and installation practices shall comply with the following applicable codes and standards, unless the Contractor's quality standards establish more stringent quality requirements or as specified in the technical specification.

1. Pressure Piping and Tubing

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
AWWA	American Water Works Association
NAPF	National Association of Piping Fabricators
NSF	NSF International

2. Materials

ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials

3. Painting and Surface Preparation

NACE	National Association of Corrosion Engineers
SSPC	SSPC: The Society for Protective Coatings

4. Electrical and Instrumentation

NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
UL	Underwriter's Laboratories

5. Aluminum Structures

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturers Association

6. Steel Structures

AISC	American Institute of Steel Construction
AWWA	American Water Works Association
SJI	Steel Joist Institute

7. Concrete Structures

ACI	American Concrete Institute
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8. Welding

ASME American Society of Mechanical Engineers
AWS American Welding Society

9. Safety

OSHA Occupational Safety and Health Act

10. General Building Construction

FM Factory Mutual Fire Insurance Corporation
IBC International Building Code by the International Code Council
NFPA National Fire Protection Association

11. Plumbing

NSF NSF International
SPC SBCC Standard Plumbing Code

In addition, all work shall comply with the applicable requirements of local codes, utilities, and other authorities having jurisdiction.

- B. All material and equipment, for which a UL Standard or an ASME requirement is established, shall be so approved and labeled or stamped. Label or stamp shall be conspicuous and not covered, painted, or otherwise obscured from visual inspection.

END OF SECTION

SECTION 01 7800

PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operating and maintenance manual submittal.
 - 4. Submittal of warranties.
 - 5. Final cleaning.
- B. Closeout requirements for specific construction activities are included in the appropriate technical specification sections.

1.2 RELATED DOCUMENTS

- A. Drawings, technical specifications, and general provisions of Contract apply to this section.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures. Before requesting inspection for certification of substantial completion, complete the following. List exceptions in the request.
 - 1. Advise Owner of pending insurance change-over requirements.
 - 2. Discontinue or change over and remove temporary facilities from the site, along with construction tools and similar elements.
 - 3. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedures. On receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfulfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
 - 1. The Engineer will repeat inspection when requested and assured that the work has been substantially completed.
 - 2. Results of the completed inspection will form the basis of requirements for substantial completion.

C. Reinspection Procedure. The Engineer will reinspect the work upon receipt of notice that the work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Engineer.

1. Upon completion of reinspection, the Engineer will prepare a certificate of final acceptance or advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
2. If necessary, reinspection will be repeated.

1.4 FINAL ACCEPTANCE

A. Preliminary Procedures. Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the contract sum.
3. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Engineer.
4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
5. Obtain and submit releases enabling the Owner unrestricted use of the work and access to services and utilities.
6. Submit record drawings, final project photographs, damage or settlement survey, and similar final record information.
7. Deliver any specified tools, extra stock, and similar items.
8. Make final change-over of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of change-over in security provisions.
9. Submit all project close out forms completed and executed.
10. Submit operation and maintenance data.
11. Submit project record drawings (mark-up of plans showing revisions during construction).
12. Submit a final liquidated damages settlement statement, if required.
13. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General. General cleaning during construction is required by the General Conditions.
- B. Cleaning. Employ experienced workers or professional cleaners for final cleaning. Clean all work areas to original condition or to satisfaction of Owner and Engineer.
 - 1. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
 - 2. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
- C. Removal of Protection. Remove temporary protection and facilities installed for protection of the work during construction.
- D. Compliance. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.
 - 1. Where extra materials of value remaining after completion of associated work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION

SECTION 01 7839

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specifies administrative and procedural requirements for project record documents.
- B. Project record documents required include:
 - 1. Marked-up copies of Contract Drawings.
 - 2. Marked-up copies of approved shop drawings.
 - 3. Newly prepared drawings.
 - 4. Marked-up copies of Specifications, Addenda, and Change Orders.
 - 5. Marked-up product data submittals.
 - 6. Construction photographs.
 - 7. Field records for variable and concealed conditions.
- C. Specific record copy requirements that expand requirements of this section are included in the individual sections.
- D. General project closeout requirements are included in Section 01 7800, Project Closeout.
- E. Maintenance of Documents and Samples. Store record documents and samples in the field office apart from Contract Documents used for construction. Do not permit project record documents to be used for construction purposes. Maintain record documents in good order, and in a clean, dry, legible condition. Make documents and samples available at all times for inspection by the Engineer.

1.2 RELATED DOCUMENTS

- A. Drawings, technical specifications, and general provisions of Contract apply to this section.

1.3 RECORD DRAWINGS

- A. Mark-up Procedure. During the construction period, maintain a set of blue- or black-line prints of Contract Drawings and shop drawings for project record document purposes.
 - 1. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:
 - a. Dimensional changes to the Drawings.
 - b. Revisions to details shown on the Drawings.
 - c. Depth of rock.

- d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Locations of concealed internal utilities.
 - i. Changes made by Change Order.
 - j. Details not on original Contract Drawings.
2. Mark completely and accurately record prints of Contract Drawings or shop drawings, whichever is most capable of showing actual physical conditions. Where shop drawings are marked, show cross-reference on Contract Drawings location.
 3. Mark record sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the work at the same location.
 4. Mark important additional information which was either shown schematically or omitted from original Drawings.
 5. Note construction change directive numbers, alternate numbers, Change Order numbers, and similar identification.
 6. Responsibility for Markup: Where feasible, the individual or entity who obtained record data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on record drawings.
 - a. Accurately record information in an understandable drawing technique.
 - b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.
 7. At time of final acceptance, submit record drawings to Engineer for Owner's records. Organize into sets, bind, and label sets for Owner's continued use.

1.4 RECORD SPECIFICATIONS

- A. Maintain one copy of the project Specifications, including addenda and modifications issued, for project record document purposes during the construction period.
 1. Mark the Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and modifications issued. Note related project record drawings information, where applicable. Give particular attention to substitutions, selection of product options, and information on concealed installations that would be difficult to identify or measure and record later.

1.5 RECORD PRODUCT DATA

- A. Maintain one copy of each product data submittal for project record document purposes during the construction period.

1. Mark project data to indicate the actual product installation where the installation varies substantially from that indicated in product data submitted. Include significant changes in the product delivered to the site, and changes in manufacturer's instructions and recommendations for installation.
2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
3. Note related Change Orders and mark-up of record drawings, where applicable.
4. Upon completion of mark-up, submit a complete set of record product data to the Engineer for the Owner's records.
5. Where record product data are required as part of maintenance manuals, submit marked-up product data as an insert in the manual, instead of submittal as record product data.

1.6 MISCELLANEOUS RECORD SUBMITTALS

- A. Refer to other specification sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to final acceptance, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Engineer for the Owner's records.
 1. Categories of requirements resulting in miscellaneous records include, but are not limited to the following:
 - a. Field records on excavations and foundations.
 - b. Field records on underground construction and similar work.
 - c. Survey showing locations and elevations of underground lines.
 - d. Invert elevations of drainage piping.
 - e. Surveys establishing foundation location and levels.
 - f. Inspections and certifications by governing authorities.
 - g. Leakage and pressure test.
 - h. Disinfection test results.
 - i. Final inspection and correction procedures.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 RECORDING

- A. Post changes and modifications to the documents as they occur. Do not wait until the end of the project. The Engineer will periodically review record documents to ensure compliance with this requirement.

END OF SECTION

DIVISION 02
EXISTING CONDITIONS

SECTION 02 4117.12

DEMOLITION OF EXISTING TANK ROOF

PART 1 - GENERAL

1.1 SUMMARY

- A. The work covered by this sections consists of furnishing all labor, equipment, materials, and means required to demolish the roof of the existing 96-foot diameter by 46-foot tall steel water tank and roof support system. Work to be performed includes dismantling and removing the existing roof and support system from site and disposal at an approved salvage yard in accordance with the requirements of these Specifications.

- B. Special Site Conditions
 - 1. The water tank is co-located with another water tank and both tanks are surrounded by security fencing. The tank site is accessible via a paved road and by passing through the ETP Water Treatment Plant site on Bear Creek Road (see Location Map in Appendix A).

 - 2. Conduct work activities in such a way as to prevent any contamination of the surrounding area. Minimize airborne dust and debris during all phases of work.

- C. Related Sections:
 - 1. Section 09 9714.10 Modifications and Repainting Steel Water Tank
 - 2. Section 13 3313 Aluminum Geodesic Dome

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Latest editions of publications at the time of bidding shall be used unless noted otherwise.

- A. Code of Federal Regulations (CFR) and Occupational Safety and Health Administration (OSHA)
 - 1. 29 CFR 1910 Occupational Safety and Health Standards
 - 2. 29 CFR 1910.134 Respiratory Protection
 - 3. 29 CFR 1910.1000 Subpart Z - Toxic and Hazardous Substances - 1500
 - 4. 29 CFR 1910.1020 Access to Employee Exposure and Medical Records
 - 5. 29 CFR 1910.1025 Lead
 - 6. 29 CFR 1910.1200 Hazard Communications
 - 7. 29 CFR 1926 Safety and Health Regulations for Construction
 - 8. 29 CFR 1926.62 Interim Final Standard on Lead Exposure in Construction
 - 9. 40 CFR 50 National Primary and Secondary Ambient Air Quality Standards

 - 10. 40 CFR 261 Identification and Listing of Hazardous Waste
 - 11. 40 CFR 268 Land Disposal Restrictions

1.3 SUBMITTALS

- A. Submit to the Engineer complete engineering data on all lead abatement procedures including worker safety protection and disposal methods.

1.4 PROJECT CONDITIONS

- A. All operations, procedures, safety precautions, and other work performed shall be done in strict conformance to these Specifications and OSHA requirements.
- B. Paint samples were tested in 2012 and test results confirm that interior and exterior coatings are not considered "lead containing." Paints that contain lead quantities in excess of the 0.06 percent (600 mg/kg) limit by the Consumer Product Safety Commission are considered "lead-containing" paint. A copy of the test results are available in Appendix D.

1.5 LAWS AND REGULATIONS

A. Confined Space Entry

1. If any confined space entry is required, provide Owner with certification, signed by an officer of the contracting company, that an OSHA compliant confined space entry program has been developed and implemented.
2. If any confined space entry is required, provide Owner with a copy of the Contractor's confined space entry program for this project.
3. Advise the Owner of any permit space hazard encountered.

B. Safety - General

1. Comply with all applicable health and safety requirements of OSHA. Any vents, holes, rigging attachments, or any other modification to the tank required to meet safety standards are the responsibility of the Contractor. Bear expense for minor modifications, consisting of temporary safety or rigging devices.
2. Carefully inspect all rigging attachments present on the tank prior to use. The Contractor assumes all responsibility for use of any existing or added attachments.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.1 PROTECTION

- A. Locate, identify, and protect utilities that remain.

- B. Protect plant growth and features designated to remain as permanent landscaping. Install temporary fencing prior to demolition. Permanent trimming of adjacent trees is authorized.
- C. Protect existing structures from damage or displacement. A crane shall be used to lower portions of the tank. No portions of the tank shall fall outside the existing fenced area.
- D. Provide adequate personnel dedicated for fire watch during dismantling operations.
- E. Collect and remove all paint debris resulting from demolition from ground surfaces both inside and outside the site.

3.2 COORDINATION

- A. Coordinate all activities with the Owner.

3.3 TANK REMOVAL AND DISPOSAL

- A. Remove steel tank roof, roof support system, etc.; and discard in certified salvage yard.
- B. Only painted material that has been tested to confirm the non-presence of lead containing paints or other hazardous elements may be disposed of as a waste material. All other painted material shall be disposed of as a scrap material meeting the requirements of 40 CFR 261.6 "Requirements for Recyclable Materials." All slag generated from the cutting or burning operations shall be collected by the Contractor on a daily basis and stored in containers meeting requirements of 49 CFR 178. Contractor shall conduct his operation to minimize the quantity of resultant slag. Contractor shall have TCLP testing per Appendix II of 40 CFR 261 performed to determine requirements for disposal. Disposal shall be arranged and paid for by Contractor.

3.4 OBSERVATION

- A. Observation of the work described above shall be conducted during progress of the work by the Owner or other representative of the Owner.
- B. Provide safe access to job site during all phases of demolition.

END OF SECTION

DIVISION 09
FINISHES

SECTION 09 9714.10

MODIFICATIONS AND REPAINTING STEEL WATER TANK

PART 1 - GENERAL

1.1 SUMMARY

- A. The work covered by this section consists of furnishing all labor, equipment, and materials required to modify, repair, and repaint the existing approximate 96-foot diameter by 46-foot tall (45-foot overflow), 2.5-million-gallon ETPP K-1530 steel water storage tank. Work to be performed shall include abrasive blast cleaning and painting of all interior and all exterior steel surfaces of the tank; exterior concrete surfaces; steel accessories including platforms, ladders, handrails, etc.; and providing all accessories in accordance with the requirements of these Specifications.
- B. Special Site Conditions
1. The water tank is co-located with another water tank and both tanks are surrounded by security fencing. The tank site is accessible via a paved road and by passing through the ETPP Water Treatment Plant (WTP) site located at 1549 Bear Creek Road (see Location Map in Appendix A).
 2. The paved access road from the WTP to the tank site and the property surrounding the tank site is on federal property. Obey all posted regulations and warnings. Do not allow dust, debris, or other trash onto federal property. Store all equipment, materials, etc. within the site fencing or at designated areas at the WTP.
- C. Related Sections:
1. Section 02 4117.12 Demolition of Existing Tank Roof
 2. Section 13 3313 Aluminum Geodesic Dome

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Latest editions of publications at the time of bidding shall be used unless noted otherwise.

- A. American Welding Society (AWS)
1. AWS D1.1 Structural Welding Code – Steel
- B. American Society for Testing and Materials (ASTM) Publications
1. ASTM D 16-08 Terminology Relating to Paint, Varnish, Lacquer, and Related Products
 2. ASTM D 4417-03 Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
 3. ASTM D 5402-06 Standard Practice for Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs

C. Code of Federal Regulations (CFR) and Occupational Safety and Health Administration (OSHA)

1. 20 CFR 1910 Occupational Safety and Health Standards - Respiratory Protection
2. 29 CFR 1910.1000 Subpart Z - Toxic and Hazardous Substances - 1500
3. 29 CFR 1910.1200 Hazard Communications
4. 29 CFR Part 1926 Safety and Health Regulations for Construction

D. SSPC: The Society for Protective Coatings (SSPC) and National Association of Corrosion Engineering (NACE) Publications or Standards

1. NACE RP0287-2002 Field Measurement of Surface Profile of Abrasive Blast-Cleaned Steel Surfaces Using a Replica Tape
2. NACE SP0188-2006 Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
3. SSPC-AB 1 Mineral and Slag Abrasives
4. SSPC-AB 2 Cleanliness of Recycled Ferrous Metallic Abrasives
5. SSPC-AB 3 Ferrous Metallic Abrasive
6. SSPC-Guide 6 Guide for Containing Surface Preparation Debris
7. SSPC-PA 1 Shop, Field, and Maintenance Painting of Steel
8. SSPC-PA 2 Measurement of Dry Coating Thickness with Magnetic Gages
9. SSPC-PA Guide 11 Protecting Edge, Crevices, and Irregular Steel Surfaces by Stripe Coating
10. SSPC-SP COM Surface Preparation Commentary for Steel and Concrete Substrates
11. SSPC-SP 1 Solvent Cleaning
12. SSPC-SP 6/NACE No. 3 Commercial Blast Cleaning
13. SSPC-SP 10/NACE No. 2 Near-White Metal Blast Cleaning
14. SSPC-SP 11 Power Tool Cleaning to Bare Metal
15. SSPC-VIS 1 Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs)

E. American Water Works Association (AWWA) Publications

1. AWWA C652-02 Disinfection of Water-Storage Facilities
2. AWWA D100-05 Welded Carbon Steel Tanks for Water Storage
3. AWWA D102-06 Coating Steel Water-Storage Tanks

F. National Sanitation Foundation (NSF)/American National Standards Institute (ANSI) Publications

1. NSF/ANSI Standard 61 Drinking Water System Components - Health Effects (NSF 61)

G. International Concrete Repair Institute (ICRI)

1. Guideline No. 310.2 Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays (formerly No. 03732) and Concrete Surface Profile (CSP) Chips

1.3 DEFINITIONS

- A. Definition of Painting Terms: ASTM D 16, unless otherwise specified.
- B. Dry Film Thickness (DFT): Thickness of a coat of cured paint measured in mils.
- C. Wet Film Thickness (WFT): Thickness of a coat of uncured paint as measured in mils by a notched gauge.
- D. Mil: One mil equals 0.001 inch (25.4 micrometers).
- E. Stain: Shadows, streaks, discolorations from paints, rust, etc. that have no volume, do not leave surface residue, and cannot be removed by dry or wet wiping.
- F. Non-conforming work: Work that does not meet contract conditions or specifications. Reports with missing or incorrect information and coating defects are examples of non-conforming work.

1.4 SUBMITTALS

- A. Provide complete shop drawings and engineering data to the Engineer in accordance with the requirements of Section 33 3323 - Shop Drawings, Product Data, and Samples and as follows:
 - 1. Environmental and worker protection plan.
 - 2. Abrasives, paints, and surface repair materials.
 - 3. Surface preparation methods proposed including containment or use of water rings, etc.
 - 4. Air filtration, forced air ventilation methods, artificial lighting, etc.
 - 5. Debris collection, storage, and disposal.
 - 6. List of inspection equipment and test kits to be used.
- B. Product data sheets for paints must contain the following information:
 - 1. Manufacturer's name
 - 2. Type of paint or other generic identification
 - 3. Manufacturer's product number
 - 4. Color (if any)
 - 5. Type of gloss
 - 6. Minimum flash point
 - 7. Percent solids by volume
 - 8. Recommended dry film thickness range per coat
 - 9. Theoretical coverage rates
 - 10. Instructions for mixing, thinning, or reducing (as applicable)
 - 11. Manufacturer's application recommendations and restrictions
 - 12. Safety and storage information
 - 13. Viscosity at ambient temperature
 - 14. Average dry times (dry to touch, dry to recoat) and pot life at ambient temperature
 - 15. Recommended thinner(s) and maximum thinning permissible
 - 16. Recommended primer (if applicable)

17. Application method (brush, roller, conventional or airless spray, etc.)
18. VOC level of coating
19. Instructions for mixing multiple component materials.

- C. Welder certificates for work involving modifications (i.e. sidewall opening for equipment access, etc.).

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery. Deliver coating materials in properly sealed and labeled containers bearing manufacturer's name and distinctive product name and number, batch number, color, date of manufacture, mixing and thinning instruction, and all safety requirements.
- B. Storage and Handling. Store and handle coating materials, solvents, cleaning agents, and abrasives in accordance with SSPC-PA 1 and the manufacturer's written instructions. Protect materials to prevent damage or contamination. Keep coating containers sealed until ready for use. Reject all damaged, leaking, or unlabeled containers. Do not use materials beyond coating manufacturer's shelf life limits.

1.6 LAWS AND REGULATIONS

A. Confined Space Entry

1. Provide Owner with certification, signed by an officer of the contracting company, that an OSHA-compliant confined space entry program has been developed and implemented.
2. Provide Owner with a copy of the Contractor's confined space entry program for this project.
3. Advise the Owner of any permit space hazard encountered.
4. Ensure that all manways and other tank openings remain open during interior cleaning, painting, and curing.

B. Volatile Organic Compounds (VOC)

1. VOC ratings in pounds per gallon or grams per liter for coatings specified are believed to be in compliance with requirements set forth by the air pollution control agency governing the project work area.
2. Do not thin coatings in excess of the paint manufacturer's recommendations.

- C. Potable Water. Interior tank coatings specified herein are believed to be in compliance with NSF/ANSI standards for potable water. Notify Owner and Engineer if information is found to the contrary.

D. Safety - General

1. Comply with all applicable health and safety requirements of OSHA, SSPC-PA Guide 3, and the paint and abrasive manufacturers. Any vents, holes, rigging attachments, or any other modification to the tank required to meet safety standards are the responsibility of the Contractor.

2. Carefully inspect all rigging attachments present on the tank prior to use. The Contractor assumes all responsibility for use of any existing or added attachments.

E. Dust Control and Contaminant

1. Conduct all activities in such a way to minimize dust at the site. Adhere to state and local air quality requirements. Protect work areas from excessive dust and airborne contaminants during coating application and curing.
2. Dust from abrasive blast cleaning operations shall not leave the project site.
3. Full or partial containment of exterior surface preparation shall comply with the SSPC-Guide 6, Class 2A where open abrasive blast cleaning is used.
4. Provide dust collection during interior and exterior open abrasive blast cleaning.
5. Approved methods of exterior surface preparation to control dust:
 - a. Vacuum blast cleaning with recyclable steel grit.
 - b. Wet abrasive blasting.
 - c. Dry abrasive blast cleaning with water ring.
 - d. Dry abrasive blast cleaning with mini (partial) containment.
 - e. Dry abrasive blast cleaning with full containment.
 - f. Other alternative methods require pre-bid approval.
6. Bear all costs for disposal of spent debris. Submit documentation to the Engineer at the project completion.

1.7 PROJECT/SITE CONDITIONS

- A. All surface preparation and painting operations, procedures, safety precautions, and other work shall be in strict conformance to requirements of these Specifications, AWWA, SSPC, OSHA, and the paint and abrasive manufacturers.
- B. Paint samples were tested in 2012 and test results confirm that interior and exterior coatings are not considered "lead-containing." Paints that contain lead quantities in excess of the 0.06 percent (600 mg/kg) limit by the Consumer Product Safety Commission are considered "lead-containing" paint. However, the Contractor should take samples to satisfy his concerns and notify the Engineer immediately if conflicting results become apparent. A copy of the test results is available in Appendix D.
- C. Field Measurements. Where possible, check actual locations on tank to which metal fabrications must fit by accurate field measurements before fabrication; show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay of work.
 1. Where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with fabrication of products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

1.8 WARRANTY

- A. Provide a warranty against defective materials and workmanship for a period of one year after acceptance of work.
- B. Repair/restore in accordance with this specification any visible coating deterioration or other defects that occur within the one year after acceptance of work.

PART 2 - PRODUCTS

2.1 MATERIALS AND COATINGS

- A. Abrasives. Use abrasives conforming to SSPC-AB 1, Type II Class B, and/or SSPC-AB 2, Class 1, grit or grit/shot combination and sized to produce required angular surface (anchor) profile for the selected coating system.

- B. Interior Paint System. NSF-approved interior paint systems and approved dry film thickness (DFT) for each coat shall be as follows:

1.	Tnemec	Field Primer	Series 94-H ₂ O Hydro-Zinc at 2.5 to 3.5 mils
		Intermediate	Series 20 Pota-Pox at 3.0 to 6.0 mils
		Finish	Series N140 Pota-Pox Plus at 6.0 to 8.0 mils

2.	Sherwin Williams	Primer	Corothane I Galvapak at 2.0 to 4.0 mils
		Intermediate	Macropoxy 646 PW at 3.0 to 6.0 mils
		Finish	Macropoxy 646 PW at 6.0 to 8.0 mils

- C. Exterior Paint System. Approved exterior paint systems and approved DFT for each coat shall be as follows:

1.	Tnemec	Field Primer	Series N69 Hi-Build Epoxoline II at 4.0 to 6.0 mils
		Intermediate	Series N69 Hi-Build Epoxoline II at 4.0 to 6.0 mils
		Finish	Series 1075 Endura-Shield II at 2.0 to 5.0 mils

2.	Sherwin Williams	Primer	Macropoxy 646 PW at 4.0 to 6.0 mils
		Intermediate	Macropoxy 646 PW at 4.0 to 6.0 mils
		Finish	Acrolon 218 HS Acrylic Polyurethane at 2.0 to 4.0 mils

- D. Sealer/Surfacer.

- 1. Tnemec Series 215 Surfacing Epoxy
- 2. Sherwin Williams Steel - Seam FT910

- E. Mortar, Concrete Coating, and Sealant.

- 1. SikaTop 122 PLUS two-component, polymer-modified, cementitious, trowel-grade mortar, or approved equal.

2. Two coats Tnemec Series 156 Enviro-Crete at 6.0 to 9.0 mils per coat, or approved equal.
 3. Sikaflex-1a one part polyurethane, elastomeric sealant/adhesive and/or Sikaflex-2c NS two-component, non-sag, polyurethane elastomeric sealant, or approved equals, and closed cell backer rod to seal between foundation and bottom angle.
- F. Chloride (Salt) Removal, Degreasing, and Flash Rust Prevention
1. HoldTight Solutions, LLC - HoldTight®102 or approved equal.
- G. Container Labeling. The manufacturer of the painting materials for each distinctive product shall provide product information printed on the container label and an accompanying instruction sheet. See Item 1.4, B.
- H. Metal Fabrications and Accessories:
1. Platform and Ladder: Provide new A-36 steel components for new upper level, off-setting platform and ladder modifications. Platform, hand rails, and ladder step-off to match existing lower level platform. Provide toe boards on new and existing platforms. Provide new fiberglass grating on new and existing platforms. Grating shall be yellow in color, 1-1/2 inch height, grit surfaced, pultruded, I-bar type by McNichols, or approved equal. Provide manufacturer recommended stainless steel, bolted fasteners to secure grating to platform angles.
 2. Ladder Shield: Provide a new lockable, heavy gage, aluminum Ladder Gate Climb Prevention Shield. The shield shall be provided with adequate hinges and stainless steel or rust-resistant, hot-dip galvanized heavy-gauge steel mounting hardware. Provide shield by North Safety Products, or approved equal.
 - a. Climbing Fall Prevention System: Provide interior ladder with a stainless steel, cable type climbing fall prevention system. Provide two complete safety harness sets with additional 6-foot lanyards for each tank site. Provide two cable grips with system.
 3. Platform Gates: Provide two new self-closing Laddergard Safety Swing Gates as manufactured by Wildeck, Inc., or approved equal, at platform openings.
 4. Manway Openings: Provide new stainless steel bolts and cadmium plated nuts and new rubber or rubber over fiber FDA/NSF approved gasket material.
 5. Drain and Drain Vault: Provide new fiberglass grating on drain vault. Grating shall be equipped with stainless steel hinges and locking hasp for field opening. Provide new stainless steel screen and flap valve on drain discharge piping.
 6. Other: Wind girder and geodesic dome supports as required by dome manufacturer.

PART 3 - EXECUTION

3.1 GENERAL

- A. Perform surface preparation and application of coating materials and installation of metal fabrications and accessories as specified herein and in accordance with the approved safety plan.

3.2 SURFACES NOT TO BE PAINTED

- A. Protect surrounding areas, surfaces, and appurtenances not scheduled to be coated from damage during surface preparation and application of coatings. Such surfaces and appurtenances include galvanized, aluminum or stainless steel items such as geodesic dome, vents, screens, climbing fall prevention systems, ladder gates, etc. Protect the concrete foundation from coatings applied to steel surfaces.
- B. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

3.3 ABRASIVE AND PAINTING DEBRIS

- A. Provide necessary measures and equipment to collect and store blasting and painting debris. Schedule and conduct blasting in such a manner as to avoid blasting dust from contaminating freshly painted surfaces.

3.4 ENVIRONMENTAL CONDITIONS

- A. Conduct blasting and coating operations only when the following conditions are met:
 - 1. Atmospheric and Surface Temperatures: Prepare surface and apply and cure coatings within air and surface temperature range in accordance with coating manufacturer's instructions
 - 2. Surface Temperature: Minimum of 5 °F above dewpoint.
 - 3. Relative Humidity: Prepare surfaces and apply and cure coatings within relative humidity range in accordance with coating manufacturer's instructions.
 - 4. Precipitation: Do not prepare surfaces or apply coatings in rain, snow, fog, or mist.
 - 5. Wind: Do not spray coatings if wind velocity is above coating manufacturer's limit.
 - 6. Visible Emissions. Assessment as to adequate containment and control of dust emissions shall be in accordance with SSPC-Guide 6, Method A – Visible Emissions. Visible emissions shall not exceed Level 2.
 - 7. Interior Illumination: Tank interiors (immediate working areas) and containment areas shall be illuminated by natural and/or artificial lighting.

- a. Illumination for QC/QA observation or inspections shall be a least 30 foot candles (325 LUX).
- b. Illumination for cleaning and painting, including the work platforms, access, and entry ways shall be at least 20 foot candles (215 LUX).
- c. All artificial lighting shall be explosion proof.

3.5 SURFACE PREPARATION

A. Repair of Metal Surfaces

1. Abrasive blast clean and reseal with epoxy sealer/surfacer areas which are inaccessible to painting.
2. Remove all new and existing weld splatter prior to coatings application.
3. Round all outside corners and sharp metal edges to a 1/16- to 1/8-inch radius prior to coatings application. A sharp edge is any edge less than 1/16-inch radius. Chamfering metal edges to two 135° edges in lieu of one 90° edge as shown in SSPC-PA Guide 11, 3.1 and Figure 2, is acceptable.
4. Fill pits, irregular corrosion passages, etc. whose depths are greater than 1/32-inch but less than 50% of the plate thickness with epoxy sealer/surfacer. Finish smooth with steel surface.
5. Fill pits and seams, etc. whose depths are 50% or greater of the plate thickness by welding. Grind smooth all weld repairs.

B. Cleaning and Surface Preparation

1. Interior Steel Surfaces:

- a. Completely clean by pressure washing (1,400 to 1,800 psi) all interior surfaces.
- b. Abrasive blast all interior surfaces and accessories to be coated in accordance with SSPC-SP10/NACE No. 2.
- c. Provide a 2.0- to 3.5-mil angular surface profile.
- d. Repairs (includes Holidays):
 - 1) Abrasive blast to SSPC-SP 10 or power tool clean with bristle blaster to SSPC-SP 11 (includes required profile).
 - 2) Feather edges of adjacent intact coating.
- e. Overlapping and Transitions:
 - 1) Feather edges of adjacent intact coating.

2. Exterior Steel Surfaces:

- a. Abrasive blast and clean all exterior surfaces in accordance with SSPC-SP 10/NACE No. 2. Includes underside of bottom angle.
- b. Provide a 2.0- to 3.5-mil angular surface profile.
- c. Repairs:
 - 1) Abrasive blast to SSPC-SP 10 or power tool clean with bristle blaster to SSPC-SP 11 (includes required profile).
 - 2) Feather edges of adjacent intact coating.
- d. Overlapping and Transitions:

1) Feather edges of adjacent intact coating.

3. Painted Surfaces:

- a. Clean painted surfaces by removing dirt, dust, overspray, dry-fall, contaminants, etc. between coats.
- b. Blow down surfaces to remove dust; sand or scrape to remove overspray and/or dry-fall; and pressure wash, wipe (wet or dry); scrub, and/or solvent clean to remove contaminants.

4. Concrete Surfaces:

- a. Prepare surfaces to be coated and in contact with sealant per product manufacturer's recommendations.
- b. Remove existing sealant, coatings, etc. from foundation and from between foundation and bottom edge of tank (chime).
- c. Pressure wash and abrasive blast concrete surfaces.
- d. Achieve CSP as defined in ICRI Guideline No. 310.2 and using CSP chips.

3.6 MIXING, APPLICATION, AND CURING OF COATINGS

- A. General: Mix and apply coating systems in accordance with SSPC-PA 1, except as modified by the manufacturer's recommendations or this specification. Apply primers as soon as possible after blast cleaning steel surfaces, in no case exceeding 8 hours. If any visible degradation or contamination occurs before priming, regardless of the time period, restore the surface to the specified condition before priming. Apply additional coatings after area to be painted is completely cleaned to remove all contaminants such as dust or paint overspray. All finish colors will be selected by the Owner or Engineer.
- B. Mixing: Mix coatings per are SSPC-PA 1, 5.4, except "5.4.2.1 Manual Mixing," (manual hand mixing is not permitted) or per manufacturer's recommendations. Manufacturer's recommendations take priority. Where partial kits are mixed, provide method of accurate measurement.
- C. Striping: Brush stripe all bolts, edges, crevices, and other irregular surfaces, and all interior seams, welds, pitted surfaces, etc. as described in SSPC-PA 1, 6.6 and 7.2, and SSPC-PA Guide 11, 4.2.2, before or after applying full prime coat to all surfaces. Acceptable to spray on stripe coat and immediately work onto/into surfaces by brush.
- D. Interior Coating System: Apply each coat at the thickness specified in Section 2.1. The total DFT range for the three-coat system shall be 11.0 to 18.0 mils after 5 days drying time (at 70°F). All coats shall be applied by airless spray as described in SSPC-PA 1, 7.4 and 7.6, except for striping.
- E. Holidays and Other Coating Repairs: Apply each coat at the thickness specified in Section 2.1 and in accordance with Section 3.6, D. Brush application of spot repairs is acceptable. However, additional applications by brush may be required to achieve specified coating thickness(es).
- F. Exterior Coating System: Apply each coat at the thickness specified in Section 2.1. The total DFT range for the three-coat system shall be 10.0 to 17.0 mils after 5 days

drying time (at 70°F). All coats shall be applied by airless spray as described in SSPC-PA 1, 7.4 and 7.6, or roller as described in SSPC-PA 1, 7.3. However, each coat shall be applied by one method to ensure uniform appearance. NOTE: Reapply existing valve information onto side of tank in same locations. Use stencils to provide neat appearance. Color shall be black and coating shall be urethane.

- G. Recoating: Follow the manufacturer's or paint specification requirements for recoating times between each coat of each coating system. Clean painted surfaces to remove visible dirt, dust, overspray, dry-fall, grease, oil, or other contaminants before recoating.
- H. Ventilation: Provide ventilation during curing of interior coating system in accordance with AWWA D102-06, Section A.7.5. Forced air ventilation shall be maintained for a minimum of seven (7) days following interior coating application.
- I. Final Curing of Coating Systems
 - 1. Cure completed interior epoxy coating system a minimum of 10 days at an atmospheric temperature of 60°F or higher before filling tank with water.
 - 2. Cure completed exterior epoxy/polyurethane coating system a minimum of 4 days at an atmospheric temperature of 60°F or higher before filling tank with water.
- J. Finished Surfaces: Provide finished surfaces that are free from such paint defects as skips, runs, sags, pinholes, brush marks, overspray, dry fall, inclusions (i.e. abrasives, grit, etc.), and variations in color or texture.
- K. Protection of Coating System: Wear clean, soft-soled shoes and protective shoe covers on floor or roof surfaces after initial coating and after application of finish coat to prevent damage to the coating.
- L. Mortar, Foundation Coating and Sealant:
 - 1. Replace missing and/or damaged grout from between foundation and chime with approved mortar per manufacturer's recommendations.
 - 2. Apply two coats of concrete coating to all concrete surfaces except between grout/mortar and chime per manufacturer's recommendations.
 - 3. Install backer rod and sealant between grout/mortar and chime per manufacturer's recommendations.

3.7 TESTING

- A. Ambient Conditions: Prior to, during, and following abrasive blasting and/or paint application, measure ambient conditions to confirm that all conditions are within specified limits. Measure following conditions:
 - 1. Air temperature and relative humidity in the vicinity where work is conducted (i.e. tank interior when work is on inside of tank).

2. Surface temperature.
 3. Paint temperature (to be measured in container after mixing of components).
- B. Illumination: Measure lighting conditions with light meter.
- C. Surface Preparation:
1. Prior to blast cleaning:
 - a. Verify abrasives are free of chlorides prior to use.
 - b. Verify surface to be blast cleaned is free of contaminants.
 - c. Interior Only. Verify surfaces are free of chlorides especially in areas of corrosion.
 - d. Verify appropriate blast nozzle pressure using needle gauge.
 2. After abrasive blast cleaning and prior to paint application::
 - a. Verify surface to be painted is free of contaminants.
 - b. Interior Only. Verify surfaces are free of chlorides especially in areas of corrosion.
 - c. Verify surface profile depth using surface profile tape in accordance with ASTM D 4417 – Method C and NACE RP0287, Section 4, 4.1 through 4.8.
 - d. Verify degree of blast cleaning using SSPC-VIS 1.
- D. Wet Film Thickness (WFT): Measure WFT with notched gauge that provides measurements in mils. Provide a minimum of one WFT measurement for each 100 square feet of surface painted.
- E. Dry Film Thickness (DFT): Measure DFT in accordance with SSPC-PA 2 using magnetic or non-magnetic gauge that will measure the DFT within an accuracy of ± 0.25 mil. Apply additional coat of paint in order to attain the minimum DFT specified for each coating layer type. Remove excess paint that exceeds the maximum DFT of each coating layer type by sanding.
- F. Chloride Testing: Test interior surfaces and abrasives for chloride contamination.
1. Test interior surfaces using Chlor*Test kit, or Engineer approved alternative method or kit, in accordance with manufacturer's instructions.
 - a. Perform a minimum of 2 tests on sidewalls and 1 test on floor after initial pressure washing.
 - b. Perform a minimum of 2 tests on first 1000 sq. ft. of sidewall and 1 test on first 1000 sq. ft. of floor after initial abrasive blast cleaning.
 - c. If unacceptable test results are encountered, perform chloride remediation (pressure washing with HoldTight®102, or approved equal, solution) and retesting.
 - d. Acceptable test results are those less than $2 \mu\text{g}/\text{cm}^2$.
 2. Test abrasives using Chlor*Test "A" kit, or Engineer approved alternative method or kit, in accordance with manufacturer's instructions.
 - a. Perform a minimum of 2 tests per abrasive size/type per shipment received.

- b. Do not use abrasives where test results are greater than $2 \mu\text{g}/\text{cm}^2$.
- G. Holiday Testing: Holiday test all interior painted immersion surfaces and accessories with a wet-sponge low-voltage holiday detector in accordance with NACE SP0188 after the paint has cured for a minimum of 5 days. Wetting solution shall contain low-sudsing photographic wetting agent. Clean surfaces prior to testing. Mark holiday locations for repair and repair as specified in Sections 3.5, B. and 3.6, E. Retest after repaired coating has cured.
- H. Solvent Rub Test: After seven (7) days of curing with forced air ventilation, verify that the interior coating system has cured by use of ASTM D 5402. Visual detection of coating pick-up by the solvent-soaked cloth shall constitute test failure.

3.8 PREPARATION AND INSTALLATION, GENERAL

- A. Coordinate and furnish metal fabrications, setting drawings, diagrams, templates, instructions, and directions for installation of metal fabrications and accessories including supports and miscellaneous items. Coordinate delivery of such items to the project site.
- B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction.
- C. Cutting, Fitting, and Placement: Perform cutting, drilling, fitting and welding required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- D. Fit exposed connections accurately together to form hairline joints. Weld or bolt, as indicated, connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- E. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, methods used in correcting welding work, and the use of materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. If the Contractor elects to remove a section of the shell to allow easier work access, the following provisions are required:
 - 1. Opening cannot be closer than 3 inches from the floor.
 - 2. Weld replacement of the removed section shall meet original structural ability. Grind/bevel plates to allow proper welding on one face and arc-gouge weld on the opposite face.
 - 3. Proper 100 percent radiograph of completed weld.
 - 4. Properly repair any imperfections.
- F. Metal Fabrications and Accessories

1. Platform and Ladder Modifications
 - a. Construct new off-setting, step-off platform at top of sidewall.
 - b. Extend intermediate and top rails above new dome roof.
 - c. Modify cage and extend existing ladder 42 inches above platform floor to allow access from ladder to platform.
2. Ladder Shield: Install new ladder shield at base of existing exterior ladder.
3. Climbing Fall Prevention Systems: Install new cable system on interior ladder.
4. Platform Gates: Install new platform gates per manufacturer's instructions after coatings have properly cured.
5. Drain and Drain Vault: Install new grating on vault and new stainless screen and flap valve on drain piping.
6. Cathodic Protection System: Remove existing cathodic protection system including wiring, connections, conduit, housing, etc
7. Overflow Weir Box: Lower existing weir box one (1) foot by removing weir box from sidewall, removing 1 foot section of overflow piping, and reinstalling weir box.

3.9 QUALITY CONTROL AND QUALITY ASSURANCE

A. Engineer or other representative of the Owner.

1. Provide quality assurance through observation, testing and/or inspection of work described above on a part-time or as-needed basis. Contractor to provide all equipment necessary to conduct testing. Provide access to the Engineer or his representative to conduct observation and testing during progress of the work, including scaffolding, ladders, etc., as required to access all areas of work. Coordinate with Engineer so observation and testing may be conducted in a timely and efficient manner.

B. Applicator's Field Quality Control

1. Required applicator testing, inspections and documentation:
 - a. Verify coatings and other materials are as specified.
 - b. Verify environmental conditions including illumination are as specified.
 - c. Verify existing surface is contaminant free prior to abrasive blast cleaning. Includes testing for chlorides.
 - d. Verify surface preparation, surface cleanliness (includes previously painted surfaces); coating mixing and applications are as specified.
 - e. Verify DFT of each coat and total DFT of each coating system is as specified using wet film and dry film gauges. DFT's shall be measured in accordance with SSPC-PA 2.
 - f. Coating Defects:
 - 1) Check coatings for film characteristics or defects that could adversely affect performance of coating systems.

- 2) Check exterior finish for film characteristics or defects that adversely affect appearance.
 - 3) Check for holidays on steel immersion surfaces using a low-voltage holiday detector.
 - 4) Check proper cure of interior coating by solvent rub test.
- g. Reports:
- 1) Prepare inspection reports daily using reports as provided in Appendix B or in a format approved by the Engineer.
 - a) Required report information: abrasive type/size, nozzle size and pressure, paint name/type, thinner used, batch numbers, thickness applied (wet film and dry film thickness) and areas to which it was applied; environmental conditions including temperature, dewpoint, relative humidity and wind conditions; surface conditions including degree of cleanliness (SP-10, etc.), temperature, surface profile, and other information pertinent to documenting proper cleaning and paint application.
 - 2) Record and report nonconforming (defects/deficiencies) work not corrected that day.
 - 3) Submit written reports describing inspection made and actions taken to correct current and/or previously noted nonconforming work.
 - 4) Maintain copies of completed reports on-site for review by Engineer.
 - 5) Submit copies of reports to Engineer weekly.
- h. Rework Log:
- 1) Maintain a rework log containing non-conforming/defective work not corrected each day (see g., 2) above).
 - a) Required log information: date of defective work, description of defective work, specific information regarding date and inspection report number, and date defective work is corrected.
 - 2) Maintain copy of log on-site for review by Engineer.
 - 3) Submit copy of latest edition of log to Engineer weekly.

2. Coating Manufacturer's Field Services: Coating Manufacturer's representative shall provide technical assistance and guidance for surface preparation, application, and repair of coating systems.

C. A final field review of the interior and exterior cleaning and coating systems shall be conducted by representatives of the Contractor, Coating Manufacturer, Engineer, and Owner prior to final acceptance of the job. The Contractor shall correct any work found defective and not in conformance with these Specifications.

3.10 DISINFECTION

A. Upon completion of cleaning, painting, inspection, and testing, disinfect all interior surfaces, appurtenances, and piping in accordance with AWWA C652: Chlorination Method 2 or Method 3. Perform sampling and testing in accordance with AWWA C652.

B. The tank shall not be placed into service until disinfection has been completed and approved by the Engineer. Initial bacteriological sampling and testing of the tank contents and the incoming water shall be performed by the Owner. Should initial treatment fail to result in acceptable water, the Contractor shall repeat the chlorination procedure until satisfactory results are obtained. Additional sampling and testing shall be in accordance with AWWA C652. Work pertaining to effective disinfection of the

tank and appurtenances shall be the responsibility of the Contractor except that water required to fill the tank one time will be furnished by the Owner on an as-available basis and from a source determined by the Owner. Where the tank is drained and refilled due to unacceptable test results, the Contractor shall pay for the water.

3.11 WARRANTY INSPECTION

- A. Prior to one year after substantial completion, inspect the interior and exterior surfaces for rusting of steel and deterioration of the coating systems, such as by erosion, blistering, cracking, peeling, and discoloration. Inspection shall include representatives of the Contractor, Paint Manufacturer, Engineer, and Owner. The Owner shall remove the tank from service and drain the tank. The Contractor shall remove any standing water and sediments from the tank interior and provide required equipment for tank access for inspection purposes. The Contractor shall be responsible for disinfection of the tank interior following inspection and/or after approved repairs, except that water required will be furnished by the Owner.
- B. Repair any failed coatings and/or rust areas in accordance with Parts 2 and 3. Furnish warranty for repaired areas in accordance with Part 1.
- C. After inspection and any repairs, disinfect the tank in accordance with Part 3.10.

END OF SECTION

DIVISION 13
SPECIAL CONSTRUCTION

SECTION 13 3313

ALUMINUM GEODESIC DOME

PART 1 - GENERAL

1.1 SUMMARY

- A. The work covered by this section consists of furnishing an aluminum geodesic dome to be constructed on an existing approximately 96-foot diameter by 46-foot tall steel tank. Work to be performed includes design, labor, materials, delivery, and installation of the dome in accordance with this section.
- B. Special Site Conditions
 - 1. The water tank is co-located with another water tank and both tanks are surrounded by security fencing. The tank site is accessible via a paved road and by passing through the ETP Water Treatment Plant site at 1549 Bear Creek Road (see Location Map in Appendix A).
 - 2. The new girder shall be installed prior to or during removal of the existing steel roof.
- C. Related Sections:
 - 1. Section 02 4177.12 Demolition of Existing Tank Roof
 - 2. Section 09 9714.10 Modifications and Repainting Steel Water Tank

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. Latest editions of publications at the time of bidding shall be used unless otherwise noted.

- A. American Welding Society (AWS)
 - 1. AWS D1.2/D1.2M Structural Welding Code - Aluminum
- B. Aluminum Association (AA)
 - 1. AA ADM 2010 Aluminum Design Manual; Specifications and Guidelines for Aluminum Structures
 - 2. AA ASD-2006 Aluminum Standards and Data
- C. American Society for Testing and Materials (ASTM) Publications
 - 1. ASTM C509-06 Standard Specifications for Elastomeric Cellular Preformed Gasket and Sealing Material
 - 2. ASTM C920-08 Standard Specification for Elastomeric Joint Sealants
 - 3. ASTM C1115-06 Standard Specification for Dense Elastomeric Silicone Rubber Gaskets
 - 4. ASTM F468-03 Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use

- 5. ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- D. Code of Federal Regulations (CFR) and Occupational Safety and Health Administration (OSHA)
 - 1. 29 CFR Part 1926 Safety and Health Regulations for Construction
- E. American Water Works Association (AWWA) Publications
 - 1. AWWA D100-11 Welded Carbon Steel Tanks for Water Storage
 - 2. AWWA D108-10 Aluminum Dome Roofs for Water Storage Facilities
- F. Federal Specifications
 - 1. Federal Specification TT-S-00230C
 - 2. Federal Specification A-A-59588 – Rubber Silicone
- G. National Sanitation Foundation (NSF)/American National Standards Institute (ANSI) Publications
 - 1. NSF/ANSI Standard 61 Drinking Water System Components – Health Effects (NSF 61)

1.3 SUBMITTALS

- A. Provide complete shop drawings and engineering data to the Engineer in accordance with the requirements of Section 33 3323 - Shop Drawings, Product Data, and Samples and as follows:
 - 1. Prints or drawings showing dimensions, sizes, thickness, gauges, materials, materials lists, finishes, joint attachment and erection procedures.
 - 2. A complete set of design calculations for the dome and steel structural support connections to existing tank (including girder).
 - 3. Drawings and calculations shall be sealed by a registered professional engineer.
 - 4. Certification that the specified material alloys, sizes and quantities have been furnished shall be submitted upon completion of the project.

1.4 QUALITY ASSURANCE

- A. The dome manufacturer must have designed and manufactured at least four (4) domes of the same type and similar size as the unit specified herein. These domes must be in satisfactory use for a period not less than five (5) years.
- B. The dome manufacturer must be ISO 9001 certified
- C. The Contractor and/or his subcontractor must have installed at least one (1) dome of the same type and similar size as the unit specified herein.
- D. Contractor shall coordinate installation with dome manufacturer.
- E. Contractor shall use skilled workmen familiar with this type of installation.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery. Deliver various components and materials per manufacturer's recommendations.
- B. Storage and Handling. Store and handle materials per manufacturer's recommendations. Reject all damaged components and materials.

1.6 PROJECT/SITE CONDITIONS

- A. Contractor shall coordinate work between different trades. Schedule work as to not interfere with or damage work by others. All work shall be in strict conformance to requirements of these Specifications, OSHA, and the dome manufacturer.
- B. Field Measurements. Contractor shall confirm all existing dimensions and provide manufacturer with accurate field measurements prior to design and fabrication. Show recorded measurements on final shop drawings.
 - 1. Where field measurements cannot be made without delaying the work, guarantee dimensions and proceed with fabrication of products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

1.7 WARRANTY

- A. Provide a warranty against defective materials and workmanship for a period of one year after acceptance of work.
- B. Repair/restore in accordance with this specification any defects that occur within the one year after acceptance of work.

PART 2 - PRODUCTS

2.1 DESCRIPTION

- A. The dome roof shall conform to AWWA D108 and to the dimensions of the existing tank. It shall be clear-span and self-supporting from the peripheral structure with primary horizontal forces contained by an integral aluminum tension ring (unless otherwise specified). Vertical loads from the dome to the tank shall be in-line with the tank wall. The transfer of horizontal loads to the tank shall be minimized by means of low friction slide supports. The frame shall consist of aluminum structural members with the joints arrayed on the surface of a sphere. The arrangement of members shall result in a pattern of triangular spaces. These spaces shall be closed with light gauge aluminum panels. The members shall be joined by means of bolting their flanges to aluminum gusset plates.
- B. All metal components of the aluminum dome structure shall be aluminum or 300 series stainless steel. No galvanized, aluminized, painted, or plated steel shall be used anywhere in the dome above the mounting bracket base plates. Dissimilar materials in the supporting structure shall be isolated from the aluminum dome by means of a compatible elastomeric gasket.
- C. The entire structure shall be designed as a watertight system under all design load and temperature conditions.

- D. The aluminum closure panels shall be attached by either of two processes:
1. Continuously along their edges to the structural members by means of batten bars which engage the panels in an interlocking joint. The batten bar shall also secure an elastomeric weatherseal gasket that shall form a continuous watertight seal along the panel edges.
 2. Overlapping panels atop a double web I-beam and secured in place by a batten bar. The batten bar shall also secure a weather strip seal over the panel overlaps that shall form a continuous watertight seal.
- E. Connection forces shall be transferred through gusset plates connected to the top and bottom flanges of the beam struts. The connections shall be designed as moment connections; a minimum of four bolts shall be used to connect the gusset plate to each strut flange.
- F. The structural analysis shall be performed using stiffness analysis models. The structural computer models shall include the effect of geometry irregularities such as dormer openings and perimeter support members. Full provisions shall be made to allow for thermal expansion range of ± 120 F.
- G. Fasteners shall be designed with a factor of safety of 2.34 on ultimate strength and 1.65 on yield strength.
- H. Accessories: The dome shall be equipped with the following.
1. Access Hatch. Minimum 24-inch by 24-inch square with minimum 4-inch high curb and 2-inch turn down on hatch cover. Cover shall be hinged and lockable.
 2. Vent. Center, or near center, standard screened vent. Vent screen shall be minimum 24 mesh, non-corrosion insect screen. Vent diameter shall be minimum 24-inch. The vent cap shall have a vertical overhang to prevent the entrance of windborne debris and wind-driven precipitation. NOTE: Where accepted design does not leave an opening between the tank and dome, a pressure-vacuum vent shall be provided. A pressure-vacuum vent shall be a Safe Tank Vent by Advance Tank Construction Company, or approved equal.
 3. Skirt Screen. Dome to tank transition shall be protected by minimum 24 mesh, non-corrosion insect screen. Screen shall be secured to both the dome skirt and the tank (or wind girder). NOTE: Where accepted design does not leave an opening between the tank and dome, a skirt screen is not required.

2.2 MATERIALS

- A. Materials provided to meet these specifications shall be new and comply with all requirements of this section. All aluminum alloys, properties, and tolerances shall be as defined by AA ASD.
1. Bolts and Fasteners – All fasteners shall be 7075-T73 aluminum or austenitic stainless steel. Aluminum and austenitic stainless steel fasteners shall meet ASTM F468 and ASTM F593 requirements, respectively. NOTE: Only stainless steel fasteners shall be used to attach aluminum to carbon steel, and then only when electrical isolation is provided between non-compatible metals.

2. Panels and Plates – Panel and plate materials shall be 3003-H16, 3105-H154, 6061-T6, 5052-H32 or 5052-H36; mill finish. Tension ring gussets shall be 0.375 inch minimum thickness. Panels shall be 0.05” minimum thickness.
3. Structural Frame – All structural frame members including the tension ring and miscellaneous shapes shall be 6061-T6 or 6005A-T6. Frame members shall be a minimum of 4 ½ inches deep.
4. Design of the tension ring shall be based on the net cross section of the members and shall not include top flange protrusions used for panel attachment, bolt holes, or outstanding legs that are not connected through the joints.
5. Gaskets - All gaskets shall be ozone resistant Silicone or Neoprene only. If Neoprene gaskets are utilized they must be shielded from exposure to ultraviolet light. The gaskets must have a ¼” minimum thickness.
 - a. Silicone gasket material shall meet Fed. Spec. A-A-59588 and ASTM C1115.
 - b. Neoprene gasket material shall meet ASTM C509.
6. Sealant - All sealants shall be silicone and resistant to ozone and ultraviolet light and conform to ASTM C920.
7. Support Bearings - Bearings at the supports shall conform to AASHTO Division 2, Section 25. Acceptable bearing surfaces for sliding bearing are Teflon to stainless steel only. In order to avoid damage to the Teflon and to reduce the coefficient of bearing friction, Teflon shall not bear on aluminum surfaces.

2.3 DESIGN

- A. The entire dome structure shall be designed to sustain the loads specified herein. In no case shall the dome be designed for any loads less than those specified herein, or by the local building code.
- B. Design Loads:
 1. Dead Load – The dead load shall be defined as the weight of the structure and all components permanently attached to and supported by the structure.
 2. Live Load – A minimum of 15 lb/ft² per AWWA D100, 3.1.3.2.
 3. Snow Load – A minimum of 25 lb/ft² on the horizontal projection of surface having a slope of 30°, or less, with the horizontal per AWWA D100, 3.1.3.1.
 4. Unbalanced Live Load – Reduce the live load by 50% over one-half the dome per AWWA D108, 5.3.1.
 5. Wind Load – The minimum wind load shall be the load resulting from a wind velocity of 100 mph.
 6. Load Combinations – Per AWWA D108, 5.3.4.
 7. Temperature - The load combinations (above) shall be considered for a temperature change of 100 °F below the installation temperature and 100 °F above the installation temperature and a range of - 40 °F to +160 °F shall be used for design of connection between the roof and tank rim to allow for thermal expansion.

8. Panel Design Load – The following additional loads shall not act simultaneously with other design loads or with each other.
 - a. Two 250-lb loads concentrated on two separate 1-ft² areas of any panel OR
 - b. A 60-psf uniform load distributed over the total panel area.

C. Allowable Loads and Stresses:

1. Allowable dome shell buckling loads shall be determined in accordance with the following formula:

$$w = \frac{2258x10^6 \sqrt{I_x A}}{(SF)R^2 L}$$

Where:

w = allowable load (pressure), [psf]

I_x = moment of inertia of strut about the strong axis [in⁴].

A = cross sectional area of strut [in²].

R = spherical radius of dome [in].

L = average member length [in].

SF = safety factor (1.65).

- a. The allowable buckling pressure shall be compared to the maximum intensities of symmetrical and nonsymmetrical load conditions.
 - b. In lieu of the above formula, non-linear analysis modeling may also be performed to verify that the stiffness is adequate to prevent snap-through buckling for all load cases include live, snow and wind loads. To account for modeling variations and/or user assumptions in the analysis, a minimum safety factor of 1.95 shall be used.
2. Aluminum Structural Member. For structural members under axial forces and bending moments due to load eccentricity or lateral loads, the combined member stresses shall be determined by adding the stress component due to axial loads to the stress components due to bending in both the major and minor axes.
 3. Aluminum Panels. Aluminum panels shall be designed to support the loads specified above without exceeding the allowable stresses specified in AA ADM. Panel attachment fasteners shall not penetrate both the panel and the flange of the structural member.
 4. Bolts and Fasteners. The allowable stresses for bolts and fasteners shall be in accordance with AWWA D108, 5.5, Table 1, Bolts and Fasteners. For bolts and fasteners not listed in Table 1, the allowable stresses shall be in accordance with AA ADM-105. Hole diameters used for fasteners shall not exceed 1/16 in. plus the diameter of the fastener used.

2.4 MANUFACTURERS

- A. Acceptable manufacturers are CST Industries, Inc.; HMT, Inc.; or pre-bid approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All field work shall be executed by skilled workmen with a supervisor experienced in the erection of domes whom shall remain on-site for the duration of dome erection. The dome shall be erected plumb, level, and in proper alignment. The dome manufacturer shall provide a comprehensive installation manual that shall be used as a guide in the erecting of the dome.
- B. Field re-fabrication of structural components or panels will not be accepted.
 - 1. Forcing of the structure to achieve fit-up during construction is expressly forbidden and not acceptable.
 - 2. Cutting or reshaping components is not acceptable.
 - 3. Field welding of aluminum is not acceptable.
- C. All sealant joints shall be tooled slightly concave after sealant is installed. Care shall be taken to keep sealant confined to joint area, and any outside of the joint shall be removed so that the panels will be free from misplaced sealant. All gasket materials shall be continuous; splices will not be allowed. All sealants shall be placed only in a manner as recommended by the sealant manufacturer.

3.2 WARRANTY

- A. The contractor shall warrant for a period of one (1) year from the date of final erection that the work described herein shall be free from defective materials and workmanship. The contractor shall replace or repair any faulty workmanship or defective material as noted during an 11-month inspection or as determined during the 1-year warranty.

END OF SECTION

DIVISION 32
EXTERIOR IMPROVEMENTS

SECTION 32 9219

SEEDING

PART 1 - GENERAL

1.1 SUMMARY

- A. The work covered by this section consists of furnishing all labor, equipment, and material required to place topsoil, seed, commercial fertilizer, agricultural limestone, and mulch material, including seedbed preparation, harrowing, compacting, and other placement operations on graded earthen areas as described herein and/or shown on the Drawings. In general, seeding operations shall be conducted on all newly graded earthen areas not covered by structures, pavement, or sidewalks; all cleared or grubbed areas which are to remain as finish grade surfaces; and on all existing turf areas which are disturbed by construction operations and which are to remain as finish grade surfaces. Areas disturbed by borrow activities shall also be seeded according to these Specifications.

- B. Temporary Seeding and Erosion Control
 - 1. This practice is applicable on areas subject to erosion for up to 12 months or until establishment of finished grade or permanent vegetative cover. Temporary vegetative measures shall be coordinated with permanent measures to assure economical and effective stabilization.

 - 2. Temporary seeding shall be applied to exposed soil surfaces which are not to be fine-graded for periods from 30 days to one year. Such areas include denuded areas, soil stockpiles, dikes, dams, sides of sediment basins, temporary roadbanks, backfilled and rough graded utility line trenches, and disturbed areas along utility lines, etc.

 - 3. Temporary seeding shall be in accordance with the temporary seeding schedule and shall meet the same requirements for seed bed preparation and mulching with the exception that lime and fertilizer need not be applied unless the soil is very low fertility and low pH.

1.2 QUALITY ASSURANCE

- A. Prior to seeding operations, furnish to the Engineer labels or certified laboratory reports from an accredited commercial seed laboratory or a state seed laboratory showing the analysis and germination of the seed to be furnished. Acceptance of the seed test reports shall not relieve the Contractor of any responsibility or liability for furnishing seed meeting the requirements of this section.

- B. Prior to topsoil operations, obtain representative samples and furnish soil test certificates including textural, pH, and organic ignition analysis from the State University Agricultural Extension Services or other certified testing laboratory.

PART 2 - PRODUCTS

2.1 TOPSOIL

- A. Place a minimum of 4 inches of topsoil over all graded earthen areas and over any other areas to be seeded. Sources of topsoil shall be approved by the Engineer prior to disturbance.
- B. Topsoil shall be a friable loam containing a large amount of humus and shall be original surface soil of good, rich, uniform quality, free from any material such as hard clods, stiff clay, hardpan, partially disintegrated stone, pebbles larger than 1/2 inch in diameter, lime, cement, bricks, ashes, cinders, slag, concrete, bitumen or its residue, boards, sticks, chips, or other undesirable material harmful or unnecessary to plant growth. Topsoil shall be reasonably free from perennial weeds and perennial weed seeds, and shall not contain objectionable plant material, toxic amounts of either acid or alkaline elements, or vegetable debris undesirable or harmful to plant life.
- C. Topsoil shall be natural topsoil without admixture of subsoil material, and shall be classifiable as loam, silt loam, clay loam, sandy loam, or a combination thereof. The pH shall range from 5.5 to 7.0. Topsoil shall contain not less than 5 percent nor more than 20 percent, by weight, of organic matter as determined by loss on ignition of samples oven-dried to 65°C.

2.2 SEED

- A. Deliver seed in new bag or bags that are sound and labeled in accordance with the U.S. Department of Agriculture Federal Seed Act.
- B. All seed shall be from the last crop available at time of purchase and shall not be moldy, wet, or otherwise damaged in transit or storage.
- C. Seed shall bear the grower's analysis testing to 98 percent for purity and minimum 85 percent for germination. At the discretion of the Engineer, samples of seed may be taken for check against the grower's analysis.
- D. Species, rate of seeding, fertilization, and other requirements are shown in the Seeding Requirements Table.

2.3 FERTILIZER AND LIMING MATERIALS

- A. Fertilizer and liming materials shall comply with applicable state, local, and federal laws concerned with their production and use.

TEMPORARY SEEDING REQUIREMENTS TABLE					
			Rates per 1,000 Square Feet		
Area	Sowing Season	Species	Seed	Fertilizer*	Limestone**
All Areas	4/15 to 8/15	Sudangrass (Sorghum Sudanese)	1.5 lbs.	10 lbs. 10-20-20	100 lbs.
	8/16 to 4/14	Annual Ryegrass (Lolium Temulentum)	1 lb.	10 lbs. 10-20-20	100 lbs.

*Fertilizer is not required on fertile soils. Apply on very low fertility soil.
**Apply limestone on highly acidic soils (pH 5.5 and lower).

PERMANENT SEEDING REQUIREMENTS TABLE					
			Rates per 1,000 Square Feet		
Area	Sowing Season	Species	Seed	Fertilizer	Limestone
Flat to rolling terrain with slopes less than 3:1	3/1 to 6/1	Kentucky 31 Fescue Ladino White Clover*	4 lbs. 1/4 lb.	30 lbs. 6-12-12	100 lbs.
	8/1 to 11/1	Kentucky 31 Fescue Ladino White Clover* Annual Ryegrass	4 lbs. 1/4 lb. 2 lbs.	30 lbs. 6-12-12	100 lbs.
Embankments with slopes greater than 3:1	3/1 to 6/1	Hulled Sericea Lespedeza* Kentucky 31 Fescue Weeping Lovegrass	1 lb. 3 lbs. 1/4 lb.	30 lbs. 6-12-12	100 lbs.
	8/1 to 11/1	Unhulled Sericea Lespedeza* Kentucky 31 Fescue Annual Ryegrass	1 lb. 3 lbs. 2 lbs.	30 lbs. 6-12-12	100 lbs.

*Requires inoculation.

- B. Commercial fertilizer shall be a ready-mixed material and shall be equivalent to the grade or grades specified in the Seeding Requirements Table. Container bags shall be labeled with the name and address of the manufacturer, brand name, net weight, and chemical composition.
- C. Agricultural limestone shall be a pulverized limestone with a calcium carbonate content not less than 85 percent by weight. Agricultural limestone shall be crushed so that at least 85 percent of the material will pass a No. 10 mesh screen and 50 percent will pass a No. 40 mesh screen.

2.4 MULCH MATERIAL

- A. All mulch materials shall be air-dried and reasonably free of noxious weeds and weed seeds or other materials detrimental to plant growth.
- B. Mulch shall be composed of wood fiber, straw, or stalks, as specified herein. Mulch shall be suitable for spreading with standard mulch-blowing equipment.
- C. Wood fiber mulch shall be as manufactured by Conwed Corporation, or equal.
- D. Straw mulch shall be partially decomposed stalks of wheat, rye, oats, or other approved grain crops.

- E. Stalks shall be the partially decomposed, shredded residue of corn, cane, sorghum, or other approved standing field crops.

2.5 MULCH BINDER

- A. Mulch on slopes exceeding a 3 to 1 ratio shall be held in place by the use of an approved erosion control fabric, such as Curlex I as manufactured by American Excelsior Company, or approved equal. Fabric shall consist of strips of biodegradable paper interwoven with yarn that is subject to degradation by ultraviolet light.

2.6 INOCULANTS FOR LEGUMES

- A. All leguminous seed shall be inoculated prior to seeding with a standard culture of nitrogen-fixing bacteria that is adapted to the particular seed involved.

2.7 WATER

- A. Water shall be clean, clear, and free from any objectionable or harmful chemical qualities or organisms and shall be furnished by the Contractor.

PART 3 - EXECUTION

3.1 SECURING AND PLACING TOPSOIL

- A. Topsoil shall be secured from areas where topsoil has not been previously removed, either by erosion or mechanical methods. Topsoil shall not be removed to a depth in excess of the depth approved by the Engineer.
- B. The area or areas from which topsoil is secured shall possess such uniformity of soil depth, color, texture, drainage, and other characteristics as to offer assurance that when removed the product will be homogeneous in nature and will conform to the requirements of these Specifications.
- C. All areas from which topsoil is to be secured shall be cleaned of all sticks, boards, stones, lime, cement, ashes, cinders, slag, concrete, bitumen or its residue, and any other refuse which will hinder or prevent growth.
- D. When securing topsoil from a designated pit or elsewhere, should strata or seams of material occur which do not come under the requirements for topsoil, such material shall be removed from the topsoil or if required by the Engineer, the pit shall be abandoned.
- E. Before placing or depositing topsoil upon any area, all improvements within the area shall be completed, unless otherwise approved by the Engineer.
- F. The areas in which topsoil is to be placed or incorporated shall be prepared before securing topsoil for use.

3.2 SEEDBED PREPARATION

- A. Before fertilizing and seeding, the topsoil surfaces shall be trimmed and worked to true line free from unsightly variations, bumps, ridges, and depressions, and all detrimental material, roots, and stones larger than 3 inches in any dimension shall be removed from the soil.
- B. Not earlier than 24 hours before the seed is to be sown, the soil surface to be seeded shall be thoroughly cultivated to a depth of not less than 2 inches with a weighted disc, tiller, pulvimixer, or other equipment, until the surface is smooth and in a condition acceptable to the Engineer.
- C. If the prepared surface becomes eroded as a result of rain or for any other reason, or becomes crusted before the seed is sown, the surface shall again be placed in a condition suitable for seeding.
- D. Ground preparation operations shall be performed only when the ground is in a tillable and workable condition, as determined by the Engineer.

3.3 FERTILIZATION AND LIMING

- A. Following seedbed preparation, fertilizer shall be applied to all areas to be seeded so as to achieve the application rates shown in the Seeding Requirements Table.
- B. Fertilizer shall be spread evenly over the seedbed and shall be lightly harrowed, raked, or otherwise incorporated into the soil for a depth of 1/2 inch.
- C. Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with power sprayer equipment. The seed shall not remain in water containing fertilizer for more than 30 minutes when a hydraulic seeder is used.
- D. Agricultural limestone shall be thoroughly mixed into the soil according to the rates in the Seeding Requirements Table. The specified rate of application of limestone may be reduced by the Engineer if pH tests indicate this to be desirable. It is the responsibility of the Contractor to obtain such tests and submit the results to the Engineer for adjustment in rates.

3.4 SEEDING

- A. Seed of the specified group shall be sown as soon as preparation of the seedbed has been completed. No seed shall be sown during high winds, nor until the surface is suitable for working and is in a proper condition. Seeding shall be performed during the dates shown in the Seeding Requirements Table unless otherwise approved by the Engineer. Seed mixtures may be sown together, provided they are kept in a thoroughly mixed condition during the seeding operation.
- B. Seeds shall be uniformly sown by any approved mechanical method to suit the slope and size of the areas to be seeded, preferably with a broadcast type seeder, windmill hand seeder, or approved mechanical power-drawn seed drills. Hydroseeding and hydromulching may be used on steep embankments, provided full coverage is obtained. Care shall be taken to adjust the seeder to the proper rate before seeding operations are started and to maintain the adjustment during seeding. Seed in hoppers shall be agitated to prevent segregation of the various seeds in a seeding mixture.

- C. Immediately after sowing, the seeds shall be covered and compacted to a depth of 1/8 to 3/8 inch by a cultipacker or suitable roller.
- D. Leguminous seeds shall be inoculated prior to seeding with an approved and compatible nitrogen-fixing inoculant in accordance with the manufacturer's mixing instructions.

3.5 MULCHING

- A. All seeded areas shall be uniformly mulched in a continuous blanket immediately after seeding. The mulch shall be applied so as to permit some sunlight to penetrate and air to circulate, and at the same time shade the ground, reduce erosion, and conserve soil moisture. Approximately 25 percent of the ground shall be visible through the mulch blanket.
- B. One of the following mulches shall be spread evenly over the seeded areas at the following application rates:
 - 1. Wood Fiber 1,400 lbs/acre
 - 2. Straw 4,000 lbs/acre
 - 3. Stalks 4,000 lbs/acre

These rates may be adjusted at the discretion of the Engineer at no additional cost to the Owner, depending on the texture and condition of the mulch material and the characteristics of the seeded area.

- C. Mulch on slopes greater than a 3 to 1 ratio shall be held in place by the use of an approved erosion control fabric. Fabric shall be installed immediately after seeding and fertilizing area (mulch shall not be used under fabric).
- D. Erosion control fabric shall be installed and applied in accordance with the manufacturer's recommendations. Any fabric which becomes torn, broken loose from securing staples, or undermined shall be immediately and satisfactorily repaired. Areas where seed is washed out before germination shall be fertilized, reseeded, and restored. Any required restoration work shall be performed without additional compensation.

3.6 WATERING

- A. Maintain the proper moisture content of the soil to ensure adequate plant growth until a satisfactory stand is obtained. If necessary, watering shall be performed to maintain an adequate water content in the soil.
- B. Watering shall be accomplished by hoses, tank truck, or sprinklers in such a way to prevent erosion, excessive runoff, and overwatered spots.

3.7 MAINTENANCE

- A. Upon completion of seeding operations, the Contractor shall clear the area of all equipment, debris, and excess material, and the premises shall be left in a neat and orderly condition.
- B. Maintain all seeded areas without additional payment until final acceptance of the work by the Owner. Regrading, refertilizing, reliming, reseeding, or remulching shall be done at Contractor's expense. Seeding work shall be repeated on defective areas until a satisfactory uniform stand is achieved. Damage resulting from erosion, gullies, washouts, or other causes shall be repaired by filling with topsoil, compacting, and repeating the seeding work.

END OF SECTION

DIVISION 33
UTILITIES

SECTION 33 1300

DISINFECTION OF POTABLE WATER LINES AND WATER STORAGE TANKS

PART 1 - GENERAL

1.1 SUMMARY

- A. The work covered by this section includes furnishing all labor, equipment, materials, and chemicals required to disinfect all potable water lines and water storage tanks in accordance with the procedures specified herein.
- B. Disinfect all piping and connections thereto, all distribution system piping and storage tank and any surfaces that shall be in contact with potable water, upon completion of the construction and installation of equipment.
- C. No portion of new work shall be placed in service until disinfection has been completed and approved by the Engineer. Should the initial treatment fail to result in acceptable water, the chlorination procedure shall be repeated until satisfactory results are obtained.

1.2 STANDARDS

- A. Procedures for disinfecting potable water lines, unless otherwise modified herein, shall conform to the requirements of AWWA C651.
- B. Procedures for disinfecting water storage facilities, unless otherwise modified herein, shall conform to the requirements of AWWA C652.

PART 2 - PRODUCTS

2.1 DISINFECTION AGENT

- A. The disinfection agent shall be free chlorine or chlorine compound. The method of application and type of disinfecting agent shall both be acceptable to the Engineer.

PART 3 - EXECUTION

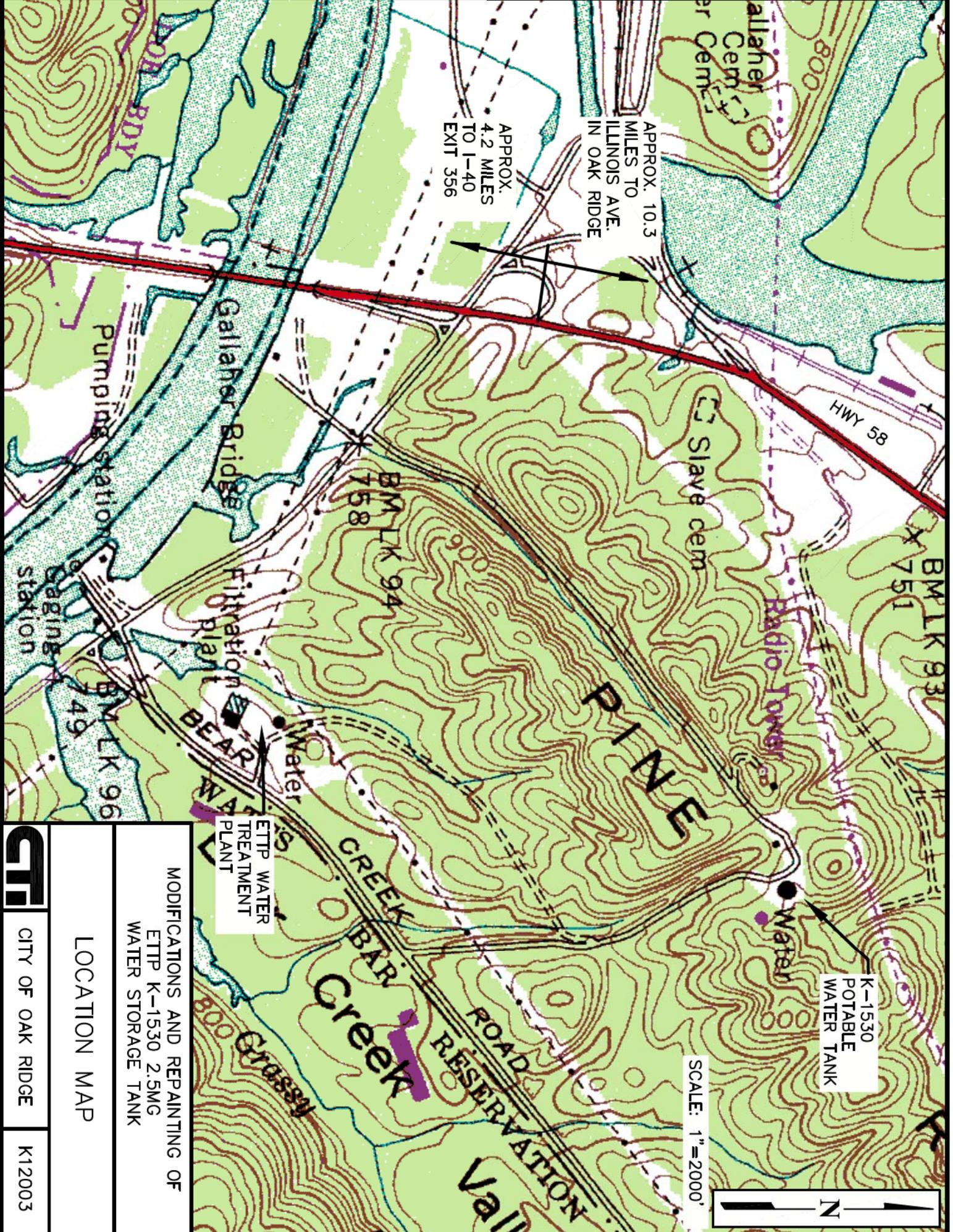
3.1 DISINFECTION PROCEDURE

- A. Disinfection of potable water lines shall be accomplished by one of the three following methods:
 - 1. Tablet Method. During construction, 5 gram calcium hypochlorite tablets shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch and at 500-foot intervals. The number of tablets required shall be such to provide an average chlorine dose of 25 mg/l for a period of not less than 24 hours.

2. Continuous-Feed Method. After construction and preliminary flushing, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 25 mg/l free chlorine. At the end of not less than 24 hours, the treated water in all portions of the main shall have a residual of not less than 10 mg/l free chlorine.
 3. Slug Method. Place calcium hypochlorite granules in the main during construction, as required by the tablet method. Completely fill the main to eliminate all air pockets and flush the main at 2.5 feet/second to remove particulates. Slowly flow through the main a slug of water dosed with chlorine to a concentration of 100 mg/l. Flow shall be slow enough to ensure that all parts of the main and its appurtenances will be exposed to the highly chlorinated water for a period of not less than 3 hours. If at any time the free chlorine measured in the slug drops below 50 mg/l, the flow shall be stopped and chlorine shall be applied as the flow is resumed to restore the free chlorine in the slug to not less than 100 mg/l.
 4. Following the applicable detention periods, the heavily chlorinated water shall be flushed until the chlorine concentration is acceptable for domestic use. Federal, state, and local regulatory agencies must be contacted to determine provisions for the disposal of heavily chlorinated water.
- B. Prior to disinfection, all surfaces shall be thoroughly flushed with clear water. Disinfection of water storage facilities shall be accomplished by the following AWWA standard method:
1. Chlorination Method No. 3. Water and chlorine shall be added to the storage facility in amounts such that initially the solution will contain 50 mg/l available chlorine and will fill approximately 5 percent of the total storage volume. This solution shall be held in the storage facility for a period of not less than 6 hours. The storage facility shall then be filled to the overflow level by flowing potable water into the highly chlorinated water. It shall be held full for a period of not less than 24 hours. The actual volume of the 50 mg/l chlorine solution shall be such that, after the solution is mixed with filling water and the storage facility is held full for 24 hours, there will be a free chlorine residual of not less than 2 mg/l.
- C. Following these procedures, two bacteriological tests shall be taken and the results of the tests be negative before the facility is put into service. If either of the samples is positive, the disinfection procedure must be repeated.
- D. In the process of chlorinating newly constructed units and newly installed pipe, all valves or other appurtenances shall be operated at least five times while the units and pipelines are filled with the chlorinating agent.

END OF SECTION

APPENDIX A
LOCATION MAP



CTI

CITY OF OAK RIDGE

K12003

MODIFICATIONS AND REPAINTING OF
 ETPP K-1530 2.5MG
 WATER STORAGE TANK

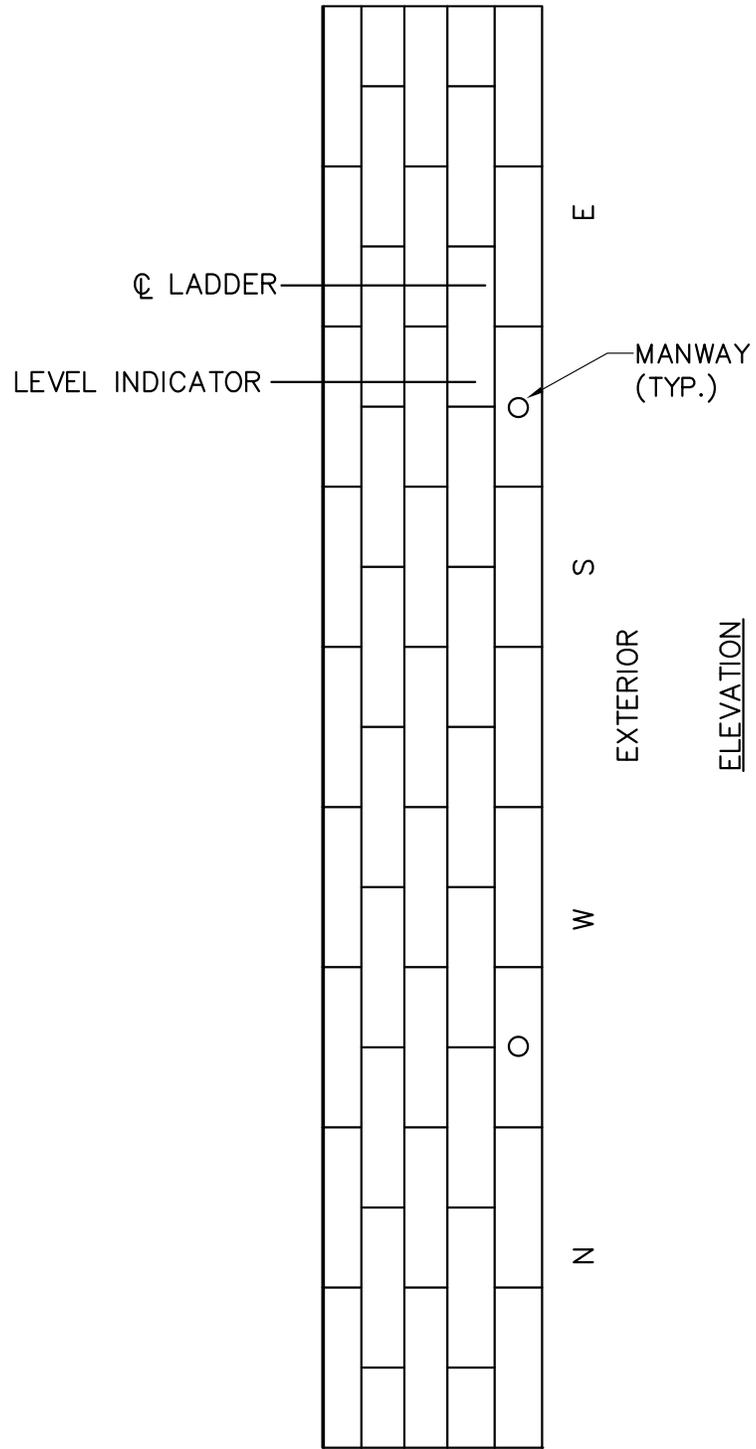
LOCATION MAP

APPENDIX B
CONTRACTOR'S DAILY REPORT(S)

REPORT NO. _____

DATE: _____

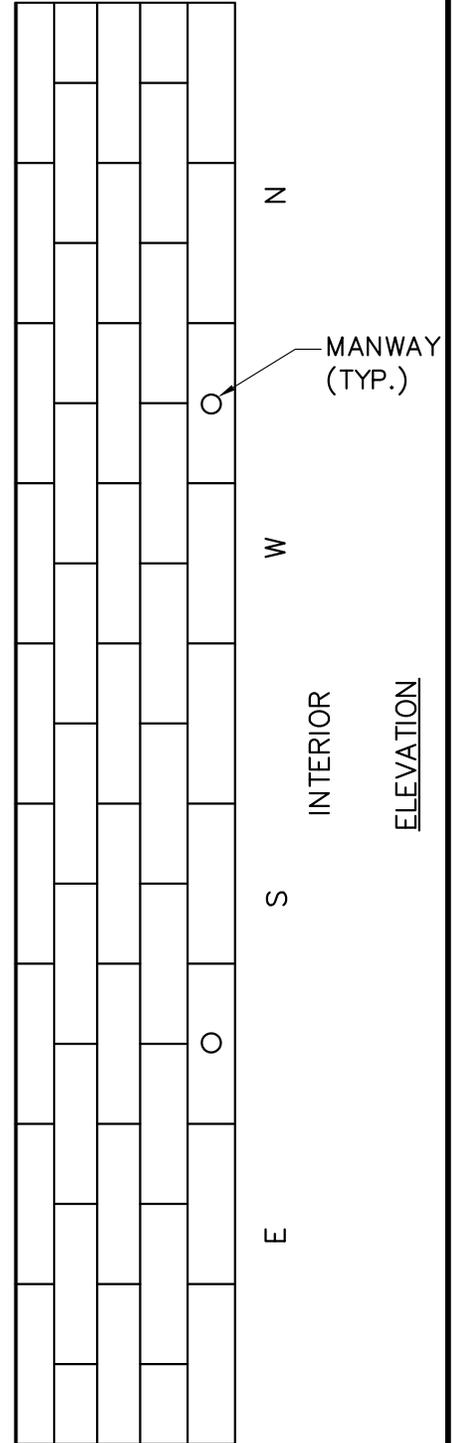
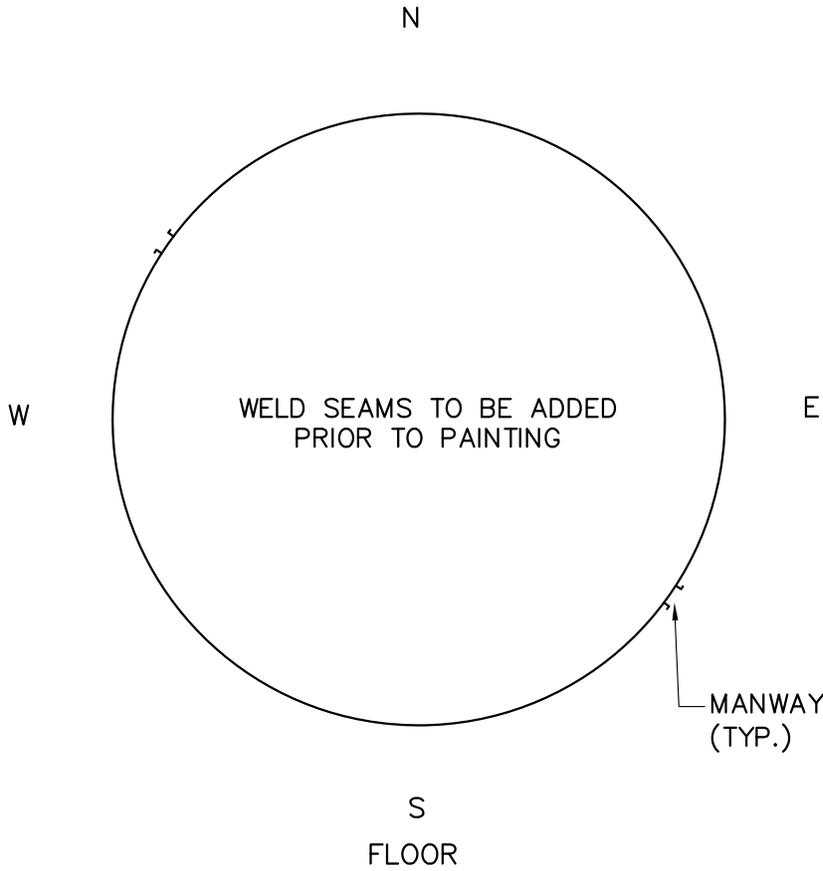
M:\CTI\ID\0\327000-327999\327024\K-1530 - TANK PAINTING (ID_327024).DWG, Exterior, 06/14/2012, 09:00 AM



M:\CT\ND\0\327000-327999\327024\K-1530 - TANK PAINTING (ID 327024).DWG - Interior_06/14/2012_08:59 AM

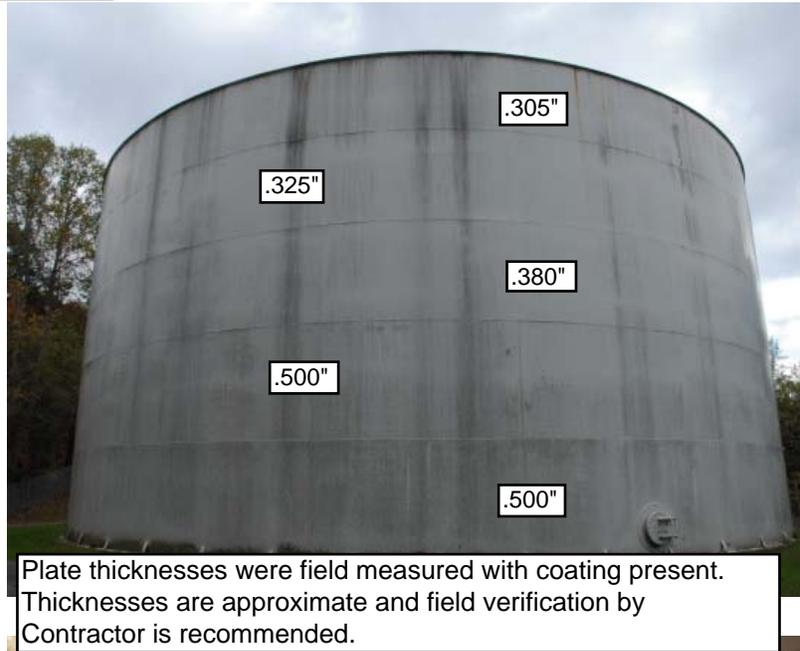
REPORT NO. _____

DATE: _____



APPENDIX C
EXISTING ETPP K-1530 TANK

ETTP K-1530 Tank



APPENDIX D
LABORATORY RESULTS



Environmental Hazards Services, L.L.C.
 7469 Whitepine Rd
 Richmond, VA 23237
 Telephone: 800.347.4010

Lead Paint Chip Analysis Report

Report Number: 12-03-01743

Client: CTI Engineers Inc.
 112 Durwood Rd., Ste. A
 Knoxville, TN 37922

Received Date: 03/14/2012
 Analyzed Date: 03/15/2012
 Reported Date: 03/16/2012

Project/Test Address: COR ETPP K-1530 Tank (K12003-01:01); Oak Ridge, TN
 Collection Date: 03/13/2012

Client Number:
 44-6753

Laboratory Results

Fax Number:
 865-246-2755

Lab Sample Number	Client Sample Number	Collection Location	Pb (ug/g) ppm	% Pb by Wt.	Narrative ID
12-03-01743-001	K-1530 INT		<50	<0.0050	L04
12-03-01743-002	K-1530 EXT		510	0.051	

Environmental Hazards Services, L.L.C

Client Number: 44-6753

Report Number: 12-03-01743

Project/Test Address: COR ETPP K-1530 Tank (K12003-01:01); Oak Ridge,
TN

Lab Sample Number	Client Sample Number	Collection Location	Pb (ug/g) ppm	% Pb by Wt.	Narrative ID
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Sample Narratives:

L04: Sample contains substantial amounts of substrate which may affect the calculated results with units of ppm and % by weight.

Method: EPA SW846 7000B

Reviewed By Authorized Signatory:



Deborah Britt
QA/QC Clerk

The HUD lead guidelines for lead paint chips are 0.50% by Weight, 5000 ppm, or 1.0 mg/cm². The Reporting Limit (RL) is 10.0 ug Total Pb. Paint chip area and results are calculated based on area measurements determined by the client. All internal quality control requirements associated with this batch were met, unless otherwise noted.

The condition of the samples analyzed was acceptable upon receipt per laboratory protocol unless otherwise noted on this report. Results represent the analysis of samples submitted by the client. Sample location, description, area, etc., was provided by the client. Results reported above in mg/cm³ are calculated based on area supplied by client. This report shall not be reproduced except in full, without the written consent of the Environmental Hazards Service, L.L.C. California Certification #2319 NY ELAP #11714.

LEGEND	Pb= lead	ug = microgram	ppm = parts per million
	ug/g = micrograms per gram	Wt. = weight	



EHS
Laboratories

Environmental Hazards Services, LLC
www.leadlab.com 7469 Whitepine Rd
(800) 347-4010 Richmond, VA
(804) 275-4907 (fax) 23237

Lead Chain-of-Custody

12-03-01743



Due Date:
03/19/2012
(Monday)
AE



City/State/Zip: Knoxville, TN 37922

Address: 112 Durwood Road, Suite A
City/State/Zip: Knoxville, TN 37922

Acct. Number: 44-6753

E-mail: jking@ctiengr.com

City/State (Required): Oak Ridge, TN

City/State (Required):

Purchase Order Number

Certification Number

* Do wipe samples submitted meet ASTM E1792 requirements? Yes No

Turn Around Time (TAT)
 1-Day 3-Day
 Same Day (Must Call Ahead)
 Weekend (Must Call Ahead)
If no TAT is specified, samples will be processed and charged as 3-Day TAT.

Sample Type
Single Dust Wipe = DW Soil = S
Paint Chip = PC Air = A
Composite Soil = CS

Abbreviations
FR = Family Room
LR = Living Room
DN = Den
DR = Dining Room
J = 1st Fl
F = Front
R = Rear
LT = Left
RT = Right
B = 2nd Fl
0 = Basement
KT = Kitchen
BA = Bath
BR = Bedroom

Surface Type for Dust Wipe
FL = Floor
CP = Carpet
SL = Window Sill
WW = Window Well

No.	Sample Type	Date Collected	Client Sample ID	Collection Location (LR, KT, L, TRBR, R, TRBR, etc.)	Surface Type	Area Length X Width in inches (Provide paint chip area only if requesting mg/cm2)	Paint Chip		Air		Comments
							#	%	Flow Rate (L/min)	Total Time (minutes)	
1	PC	3/13/12	K-1530 INT			X					
2	PC	3/13/12	K-1530 EXT			X					
3						X					
4						X					
5						X					
6						X					
7						X					
8						X					
9						X					
10						X					

Released by: Jonathan Gonzalez
Received by: Asha Eaddy

Date/Time: 3-13-12 1:34 PM
Date/Time: 3/14/12