

**CITY OF KINGSTON
ARC LADD LANDING PARKING IMPROVEMENTS
1470 N KENTUCKY ST
KINGSTON, TN 37763
ARC PROJECT FY23 TN-20804**

**Project Manual Including Contract,
General Conditions, & Technical Specifications**

Prepared for

The City of Kingston

900 Waterford Place
Kingston, TN 37763
Contact: David Bolling
david.bolling@kingstontn.gov
865.376.2325

August 20, 2024



FOR INFORMATION CONCERNING THIS PROJECT CONTACT:

Aarron Gray, P.E.
2160 Lakeside Centre Way, Suite 201
Knoxville, TN 37922
Phone: 865.386.3172
Email: agray@ardurra.com

**SECTION 000110
TABLE OF CONTENTS**

GENERAL

Non applicable division and section references have been omitted.

Recipients of Bidding Documents must consult the Table of Contents to determine the full scope of the work involved and to ensure that all pages of the Project Manual and Drawings have been included.

Neither the Owner nor the Design Engineer will be responsible for bids submitted that are based on incomplete Bidding Documents.

PROCUREMENT AND CONTRACTING REQUIREMENTS		<u>No. of Pages</u>
00 01 01	Project Title Page	01
00 01 10	Table of Contents.....	02
00 01 14	Professional in Charge	01
00 11 13	Advertisement for Bids	01
00 11 19	Request for Bidder Information.....	01
00 21 13	Information for Bidders	04
00 41 00	Bid Form.....	03
00 43 13	Bid Bond.....	02
00 43 43	Davis-Bacon Wage Rate Certifications.....	01
00 45 19	Non-Collusion Affidavit.....	01
00 45 36	Equal Employment Opportunity Affidavit	01
00 45 36.10	Subcontractor’s Equal Employment Opportunity Affidavit	01
00 45 39	Female/Minority Business Enterprise Affidavit	01
00 45 47	Certificate of Owner’s Attorney.....	01
00 45 48	Illegal Immigrants Compliance Certificate	01
00 45 49	Iran Divestment Act	03
00 45 50	SAM Registration	01
00 45 51	Subcontractor Debarment, Suspension, Ineligibility & Exclusion.....	01
00 45 52	Affidavit Regarding Non-Boycott of Israel	01
00 45 53	Certification of Bidder Regarding Section 3 and Segregated Facilities.....	01
00 45 54	Certification of Subcontractor Regarding Section 3 and Segregated Facilities ...	01
00 45 55	Appalachian Regional Commission Interim Buy America Guidelines	05
00 46 00	Drug-Free Workplace Affidavit	01
00 51 00	Notice of Award	01
00 52 13	Agreement Form.....	02
00 55 00	Notice to Proceed	01
00 61 13.13	Performance Bond	03
00 61 13.16	Payment Bond.....	03
00 62 76	Application for Payment Form.....	03
00 63 63	Change Order Form	02
00 65 16	Certificate of Substantial Completion.....	01
00 72 13	Standard General Conditions of the Construction Contract.....	36
00 73 00	Supplemental General Conditions	33
00 76 00	Byrd Anti-Lobbying Amendment Certification	05
00 78 00	Certification of Bidder Regarding Use of Women/Minority Contractors	01

GENERAL REQUIREMENTS

01 11 00 Summary of Work 02
01 21 00 Allowances 01
01 32 16 Construction Progress Schedules..... 05
01 32 26 Weather Delays..... 02
01 33 00 Submittals and Substitutions 03
01 35 13 Special Project Procedures 03
01 40 00 Quality Requirements 02
01 42 19 Reference Standards..... 02
01 52 00 Construction Facilities and Temporary Controls 04
01 57 13 Temporary Erosion and Sediment Control 02
01 60 00 Material and Equipment 04
01 71 23 Field Engineering..... 01
01 74 00 Cleaning 02
01 77 00 Contract Closeout 03
01 78 39 Project Record Documents 02

DIVISION 26: ELECTRICAL

26 05 00 Common Work Results for Electrical 01
26 05 19 Low-Voltage Electrical Power Conductors and Cables 03
26 05 26 Grounding and Bonding for Electrical Systems..... 02
26 05 33 Raceway and Boxes for Electrical Systems 03
26 05 53 Identification for Electrical Systems 03
26 61 00 Lighting General Provisions 02

DIVISION 31: SITE WORK

31 11 00 Site Clearing 03
31 20 00 Earthwork (Unclassified)..... 06
31 23 33 Trenching, Backfilling, and Compacting..... 06
31 25 00 Erosion Prevention and Sediment Control 03

DIVISION 32: EXTERIOR IMPROVEMENTS

32 12 16 Asphalt Paving..... 08
32 13 13 Concrete Paving 05
32 16 00 Curbs and Gutters..... 05
32 17 23 Pavement Markings 04
32 92 19 Seeding..... 04

DIVISION 33: UTILITIES

33 11 00 Underground Water Utilities 05
33 11 10 Disinfection and Testing of Water Distribution System 10
33 12 16 Water Utility Distribution Valves 03
33 31 30 Low Pressure Sewer Mains and Laterals 03
33 40 00 Storm Drainage Utilities..... 08

END OF SECTION

SECTION 00 01 14
PROFESSIONAL IN RESPONSIBLE CHARGE

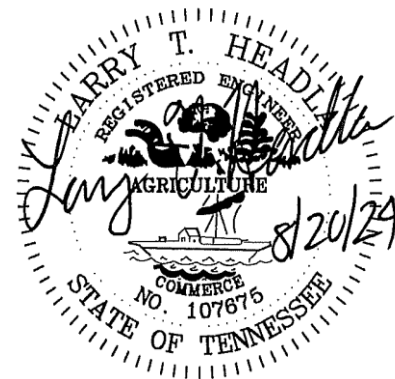
The following licensed professionals are responsible for the various portions of the project manual by which their seal is affixed:

-
- Division 00: Procurement and Contracting Requirements**
 - Division 01: General Requirements**
 - Division 31: Site Work**
 - Division 32: Exterior Improvements**
 - Division 33: Utilities**



Aaron M. Gray, PE

Division 26: Electrical



Larry T. Headla, PE

End of Section

ADVERTISEMENT FOR BIDS

Project No. ARC FY23 TN-20804

Owner: City of Kingston

Separate sealed bids for construction for City of Kingston ARC Ladd Landing Parking Improvements will be received by City of Kingston at the office of the City of Kingston located at 900 Waterford Place, Kingston, TN 37763 until 2:00 o'clock PM E.S.T. October 10, 2024, and then at said office publicly opened and read aloud. A pre-bid conference will be held at 900 Waterford Place, Kingston, TN 37763 at 2:00 PM on September 26, 2024.

The Information for Bidders, Form of Bid, Form of Contract, Plans, Specifications, and Forms of Bid Bond, Performance and Payment Bond, and other contract documents may be examined at the following:

1. Ardurra Group, Inc., 2160 Lakeside Centre Way, Suite 201 Knoxville, TN 37922
2. City of Kingston, 900 Waterford Place, Kingston, TN 37763
3. Knoxville Builders' Exchange, 301 Clark Street, Knoxville, TN 37921
4. McGraw-Hill Construction Dodge, www.dodgeprojectcenter.com, Customer Service 1-800-393-6343

Digital copies may be obtained at the office of Ardurra Group, Inc. located at 2160 Lakeside Centre Way, Suite 201, Knoxville, TN 37922 upon payment of \$0.00 for each set. Any unsuccessful bidder, upon returning each set promptly and in good condition, will be refunded his payment, and any non-bidder upon so returning such a set will be refunded \$0.00.

The owner reserves the right to waive any informalities or to reject any or all bids. Each bidder must deposit with his bid, security in the amount, form and subject to the conditions provided in the Information for Bidders.

All bidders must be licensed General Contractors as required by the Contractor's Licensing Act of 1994 of the General Assembly of the State of Tennessee, and qualified for the type of construction being bid upon.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract, Section 3, Segregated Facility, Section 109 and E.O. 11246.

The City of Kingston hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, or national origin in consideration for an award. The City of Kingston is an Equal Opportunity Employer. Any contract that uses federal funds to pay for construction work is a "federally assisted construction contract" and must include the equal opportunity clause found in 2 C.F.R. Part 200, unless otherwise stated in 41 C.F.R. Part 60. We encourage all small and minority owned firms and women's business enterprises to participate. No bidder may withdraw his bid within (60) days after the actual date of the opening thereof.

(Date)

SECTION 00 01 19
REQUEST FOR BIDDER INFORMATION

Questions regarding the project or the Bid Documents must be in writing as required by the Instruction to Bidders. Questions must be written on this form and sent by mail or email to the address listed below. Upon timely receipt, if appropriate, an Addendum will then be issued to all persons who have received Bid Documents from the Owner.

Ardurra Group, Inc.
2160 Lakeside Centre Way, Suite 201
Knoxville, Tennessee 37922
Attn: Aarron Gray, P.E.
Email: agray@ardurra.com

CITY OF KINGSTON
ARC LADD LANDING PARKING IMPROVEMENTS PROJECT

BID DATE: _____

From: _____

Company: _____

Date: _____

CLARIFICATION IS NEEDED FOR THE FOLLOWING ITEMS:
(List Specification Section, Paragraph, Drawing Number and/or Detail Number)

End of Section

INFORMATION FOR BIDDERS

1. Receipt and Opening of Bids

The _____ (herein called the "Owner), invites bids on the form attached hereto, all blanks of which must be appropriately filled in. Bids will be received by the Owner at the office of _____ until _____ o'clock A.M./P.M., C.S.T/E.S.T, _____, 20____, and then at said office publicly opened and read aloud. The envelopes containing the bids must be sealed, addressed to _____ at _____ and designated as bid for _____.

The Owner may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within 60 days after the actual date of the opening thereof.

2. Preparation of Bid:

Each bid must be submitted on the prescribed form and accompanied by Certification of Bidder Regarding Equal Employment Opportunity, Acknowledgment Regarding Bidder SAM Registration, Certification of Bidder Regarding Section 3 and Segregated Facilities, and Drug-Free Workplace Affidavit. All blank spaces for bid prices must be filled in, in ink or typewritten, in both words and figures, and the foregoing Certifications must be fully completed and executed when submitted.

Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, his/her address, the name of the project for which the bid is submitted, license number, expiration date thereof, and license classification of the contractors applying to bid for the prime contract, and for the electrical, plumbing, heating, ventilation, and air conditioning contracts, and all other information required by State law..

All bidders must be licensed General Contractors as required by the Contractor's Licensing Act of 1994 of the General Assembly of the State of Tennessee, and qualified for the type of construction being bid upon. Each bidder shall write on the outside of the envelope containing its bid: 1) its Contractor's license number; 2) that part of the classification applying to the bid. If this is not done, the bid will not be opened.

3. Subcontracts:

The bidder is specifically advised that any person, for, or other party to whom it is proposed to award a subcontract under this contract:

- a. Must be acceptable to the owner; and
- b. Must submit Certification by Proposed Subcontractor Regarding Equal Employment Opportunity, and Certification of Proposed Subcontractor Regarding Section 3 and Segregated Facilities. Approval of the proposed subcontract award cannot be given by the owner unless and until the proposed subcontractor has submitted the Certifications and/or other evidence showing that it has fully complied with any reporting requirements to which it is or was subject.

Although the bidder is not required to attach such Certifications by proposed subcontractors to his/her bid, the bidder is here advised of this requirement so that appropriate action can be taken to prevent subsequent delay in subcontract awards.

4. Telegraphic Modification:

Any bidder may modify his/her bid by telegraphic communication at any time prior to the scheduled closing time for receipt of bids provided such telegraphic communication is received by the Owner prior to the closing time, and, provided further, the Owner is satisfied that a written confirmation of the telegraphic modification over the signature of the bidder was mailed prior to the closing time. The telegraphic communication should not reveal the bid price but should provide the addition or subtraction or other modification so that the final prices or terms will not be known by the Owner until the sealed bid is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to the telegraphic modification.

5. Method of Bidding:

The Owner invites the following bid(s):

6. Qualification of Bidder:

The Owner may make such investigations as s/he deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the owner that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.

7. Bid Security:

Each bid must be accompanied by cash, certified check of the bidder, or a bid bond prepared on the form of bid bond attached thereto, duly executed by the bidder as principal and having as surety thereon a surety company approved by the Owner, in the amount of 5% of the bid. Such cash, checks or bid bonds will be returned to all except the three lowest bidders within three days after the opening of bids, and the remaining cash, checks or bid bonds will be returned promptly after the Owner and the accepted bidder have executed the contract, or, if no award has been made within 60 days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as he/she has not been notified of the acceptance of his/her bid.

8. Liquidated Damages for Failure to Enter into Contract:

The successful bidder, upon his/her failure to refusal to execute and deliver the contract and bonds required within 10 days after she/he has received notice of the acceptance of his/her bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his/her bid.

9. Time of Completion and Liquidated Damages:

Bidder must agree to commence work on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within _____ consecutive calendar days thereafter. Bidder must agree also to pay as liquidated damages, the sum of \$ 500.00 _____ for each consecutive calendar day thereafter as hereinafter provided in the Supplemental General Conditions.

10. Condition of Work:

Each bidder must inform him/herself fully of the conditions relating to the construction of the project and the employment of labor thereof. Failure to do so will not relieve a successful bidder of his/her obligation to furnish all material and labor necessary to carry out the provisions of his/her contract. Insofar as possible, the contractor, in carrying out the work, must employ such methods as will not cause any interruption of or interference with the work of any other contractor.

11. Addenda and Interpretations:

No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally.

Every request for such interpretation should be in writing addressed to

_____ at _____
and to be given consideration must be received at least five days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be mailed by certified mail with return receipt requested or emailed to all prospective bidders (at the respective addresses furnished for such purposes), not later than two days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his/her bid as submitted. All addenda so issued shall become part of the contract documents.

12. Security for Faithful Performance:

Simultaneously with his/her delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this contract and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract, as specified in the General Conditions included herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner.

13. Power of Attorney:

Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.

14. Notice of Special Conditions:

Attention is particularly called to those parts of the contract documents and specifications which deal with the following:

- a. Inspection and testing of materials.
- b. Insurance requirements.
- c. Wage rates.
- d. Stated allowances.

15. Laws and Regulations:

The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

16. Method of Award - Lowest Qualified Bidder:

After receiving bids and determining the amount of funds estimated by the OWNER as available to finance the contract, the OWNER will award the contract to the lowest responsible bidder. The lowest responsible bidder will be determined upon the basis of the lowest base bid or lowest base bid combined with alternates (additive or deductive). If the contract is to be awarded based on the lowest base bid with alternates, alternates will be accepted in the numerical order in which they are listed in the Form of Bid.

17. Obligation of Bidder:

At the time of the opening of bids each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the plans and contract documents (including all addenda). The failure or omission of any bidder to examine any form, instrument or document shall in no way relieve any bidder from any obligation in respect of his/her bid.

18. Safety Standards and Accident Prevention: With respect to all work performed under this contract, the Contractor shall:

- a. Comply with the safety standards provisions of applicable laws, building and construction codes and the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596), and the requirements of Title 29 of the Code of Federal Regulations, Section 1518 as published in the "Federal Register", Volume 36, No. 75, Saturday, April 17, 1971.
- b. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.
- c. Maintain at his/her office or other well known place at the job site, all articles necessary for giving first aid to the injured, and shall make standing arrangements for the immediate removal to a hospital or a doctor's care of persons (including employees), who may be injured on the job site. In no case shall employees be permitted to work at a job site before the employer has made a standing arrangement for removal of injured persons to a hospital or a doctor's care.

**DOCUMENT 004100
BID FORM**

Project: ARC Ladd Landing Parking Improvements Project
 1470 N Kentucky St
 Kingston, TN 37763

Bid Opening Date: October 10, 2024

The undersigned Bidder proposes and agrees, if this bid is accepted, to enter into an agreement with the Owner in the form included in the bidding documents to perform all work as specified or indicated in the contract documents for the prices and within the time indicated in this bid and in accordance with the other terms and conditions of these documents.

The Bidder accepts all terms and conditions contained in the contract documents, including the furnishing of a bid security as called for in the bidding information. The bid will remain subject to acceptance for a period of 60 days after the bid opening or for a longer period of time if agreeable to both parties in writing.

In submitting this bid, the Bidder represents the following as set forth in the Agreement:

- A. Bidder has examined and carefully studied the contract documents, other related data referenced in the documents, and the following addenda, receipt of which is hereby acknowledged:

Addendum No. _____ Addendum Date _____
Addendum No. _____ Addendum Date _____

- B. Bidder has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost(s), progress and the performance of the work;
- C. Bidder is familiar with and is satisfied as to all Federal, State and local laws and regulations that may affect cost(s), progress and the performance of work;
- D. Bidder has obtained and carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface features at or contiguous to the site including underground utilities.
- E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, exploration tests, studies and data concerning the conditions (surface and subsurface) at or contiguous to the Site which may affect cost, progress or performance of Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be used by the Bidder, including applying specific means, methods, techniques, sequences and procedures of construction expressly required by the contract documents to be used by the Bidder, and safety precautions and programs incident thereto;

- F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the determination of this bid for the performance of the work at the price(s) and within the times and in accordance with the other terms and conditions of the contract documents;
- G. Bidder is aware of the general nature of the work to be performed by the Owner and others at the site that relates to the work as indicated in Section 011100, Summary of Work;
- H. Bidder has correlated the information known to the Bidder, information and observations obtained from visits to the site, reports and drawings identified in the contract documents, and all additional examinations, investigations, explorations, tests, studies and data with the contract documents;
- I. Bidder has given the Engineer written notice of all conflicts, errors, ambiguities or discrepancies that the Bidder has discovered in the contract documents, and the written resolution thereof by the Engineer is acceptable to the Bidder;
- J. The contract documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and the Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over the Owner.

The Bidder acknowledges and accepts the Owner’s right to waive any and all bid requirements and formalities.

Bidder will complete the work in accordance with the contract documents for the following compensation:

PART 1: LUMP SUM PAY ITEM		
ITEM NO.	DESCRIPTION	LUMP SUM AMOUNT
1.0	Ladd Landing Parking Improvements: Lump sum item includes storm drainage; cleaning; excavation and grading; concrete and asphalt paving; gravel; utilities; sidewalks; retaining wall design and construction; walking trails; demolition; valves and accessories; pavement striping; testing/troubleshooting; warranties; and all other work as shown on the plans and specified herein.	\$
TOTAL LUMP SUM BID		\$

TOTAL BASE BID: \$ _____

(Use Words _____)

ALLOWANCES: The Bidder agrees to include Work of the following Allowance(s), as specified in Section 01 21 00 Allowances, for the additional unit price item(s) of the following amount(s) (In both words and figures. Figures prevail. Words clarify at Owner's discretion.):

ALLOWANCE No. 1: Additional Excavation (Unsuitable Rock) and Replacement Material

500 Cubic Yards (CY) @ _____/CY = _____ and _____/100ths Dollars
\$ _____

ALLOWANCE No. 2: Additional Excavation (Unsuitable Soil) and Replacement Material

1,000 Cubic Yards (CY) @ _____/CY = _____ and _____/100ths Dollars
\$ _____

TOTAL BASE BID PLUS ALLOWANCES: \$ _____

(Use Words _____)

All applicable taxes shall be included in Bid.

AWARD OF CONTRACT

It is the intent of the OWNER that the Contract will be awarded to the Bidder having proposed the lowest responsible bid within the amount of funds available to the OWNER. Deductive Alternatives and/or equipment substitutions may be used to reduce the cost to the extent necessary to come within the available funds. The Deductive Alternates, if used, are listed in order of priority.

Bidder agrees that the work will be complete and ready for final payment in accordance with the Agreement.

Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the work within the time specified in the Agreement. The terms used in this bid with the initial capital letters have the meanings indicated in the General Conditions and Supplementary Conditions.

Submitted on this _____ day of _____, 2024.

State of Tennessee Contractor License No. _____;

Classification _____; Expiration Date _____

Corporation Name: _____

State of Incorporation: _____

Type (Corporation, Partnership, Limited Liability Corporation): _____

By: _____

(Signature of Authorized Agent - Attach Evidence of Authority)

Name (Type or Print) _____ Title _____

(Corporate Seal, if applicable)

Attest _____

(Signature of Corporate Secretary, if applicable)

Business Address _____

Phone Number _____ Fax Number _____

Special Note: In the event of a joint Venture Submittal, each joint venturer must sign.

END OF SECTION

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____

_____ as Principal, and _____

as Surety, are hereby held and firmly bound unto _____

as owner in the penal sum of _____ for the

payment of which, well and truly to be made, we hereby jointly and severally bind

ourselves, our heirs, executors, administrators, successors and assigns.

Signed, this _____ day of _____, 20____.

The condition of the above obligation is such that whereas the Principal has submitted to _____ a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing for the

NOW, THEREFORE,

- (a) If said Bid shall be rejected, or in the alternate.
- (b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall remain in force and effect, it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The surety for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by an extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____ (L.S.)

Principal

Surety

SEAL

By: _____

WAGE RATE DETERMINATION

Appropriate Wage Rates shall be inserted here.

"General Decision Number: TN20240147 01/05/2024

Superseded General Decision Number: TN20230147

State: Tennessee

Construction Type: Highway

Counties: Tennessee Statewide.

HIGHWAY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<p>. Executive Order 14026 generally applies to the contract.</p> <p>. The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.</p>
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<p>. Executive Order 13658 generally applies to the contract.</p> <p>. The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.</p>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number Publication Date

0

01/05/2024

SUTN2016-001 07/13/2016

	Rates	Fringes
BRICKLAYER.....	\$ 14.26	**
CARPENTER.....	\$ 17.52	
CEMENT MASON/CONCRETE FINISHER...\$	15.55	**
ELECTRICIAN.....	\$ 24.08	
IRONWORKER		
Reinforcing.....	\$ 16.29	**
Structural.....	\$ 16.89	**
LABORER		
Common/Unskilled.....	\$ 13.11	**
Skilled		
Air Tool Operator,		
Asphalt Raker, Chain Saw		
Operator, Concrete Mixer		
(less than 1 yd),		
Concrete Rubber, Edger,		
Fence Erector, Form		
Setter (steel), Guard		
Rail Erector, Mechanic's		
Tender (tire changer or		
oiler), Mortar Mixer,		
Nozzleman or Gun Operator		
(gunite), Pipelayer,		
Sign Erector.....	\$ 15.27	**
PAINTER (INCLUDES SANDBLASTER)...\$	26.36	
POWER EQUIPMENT OPERATOR:		
GROUP 1		
Backhoe/Hydraulic		
Excavator (3/4 yd &		
over), Crane (less than		
20 Tons), End Loader (3		
yd & over), Motor Patrol		
(finish),Piledriver,		
Dragline.....	\$ 19.14	
GROUP 1A		
Drill Operator (Caisson)...\$	25.26	
Farm Tractor Operator		
(Power Broom).....	\$ 13.50	**
GROUP 2		
Backhoe/Hydraulic		
Excavator (less than 3/4		
yd), Bulldozer or Push		
Dozer, End Loader (less		
than 3 yd), Motor Patrol		
(rough), Tractor		
(crawler/ utility), Truck		
Driver (Heavy Duty, Off		
Road) Scraper, Shovel, or		
Trenching Machine.....	\$ 17.08	**
GROUP 3		

Asphalt Paver, Concrete
 Finishing Machine,
 Concrete Paver, Scale,
 Spreader (self-
 propelled), Concrete
 Grinder, Asphalt Milling
 Machine, Boring Machine
 (horizontal).....\$ 17.75

GROUP 4

Bobcat, Central Mining
 Plant, Concrete Pump,
 Concrete Saw, Curb
 Machine (automatic or
 manual), Dozer or Loader
 (stockpile), Drill
 (piling), Mulcher or
 Seeder, Rock Drill (truck
 mounted), Roller
 (asphalt), Roller
 (compaction self-
 propelled), Soil
 Stabilization Machine,
 Tractor (boom and hoist),
 Bituminous Distributor
 Machine, pump, Track
 Drill, Striping Machine....\$ 16.48 **
 Heavy Duty Mechanic.....\$ 20.33
 Light Duty Mechanic.....\$ 19.53
 Sweeping Machine (Vacuum)
 Operator.....\$ 15.56 **

GROUP 5

Crane (over 20 Tons).....\$ 20.44

TRUCK DRIVER

2 axles.....\$ 15.36 **
 3-4 axles.....\$ 14.86 **
 5 or more axles.....\$ 16.27 **

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

=====
 ** Workers in this classification may be entitled to a higher
 minimum wage under Executive Order 14026 (\$17.20) or 13658
 (\$12.90). Please see the Note at the top of the wage
 determination for more information. Please also note that the
 minimum wage requirements of Executive Order 14026 are not
 currently being enforced as to any contract or subcontract to
 which the states of Texas, Louisiana, or Mississippi, including
 their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave
 for Federal Contractors applies to all contracts subject to the
 Davis-Bacon Act for which the contract is awarded (and any
 solicitation was issued) on or after January 1, 2017. If this
 contract is covered by the EO, the contractor must provide
 employees with 1 hour of paid sick leave for every 30 hours
 they work, up to 56 hours of paid sick leave each year.
 Employees must be permitted to use paid sick leave for their
 own illness, injury or other health-related needs, including

preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

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

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

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

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

Union Average Rate Identifiers

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

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

Wage and Hour Administrator
U.S. Department of Labor

200 Constitution Avenue, N.W.
Washington, DC 20210

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

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

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

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

=====

END OF GENERAL DECISION"

SECTION 00 45 19
NON-COLLUSION AFFIDAVIT

I certify that I have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise take any action in restraint of free competitive bidding in connection with this proposal or contract.

Signature by the bidder in that space provided below shall in addition be considered, and shall have the same legal effect, as the bidder's signature on the certifications set forth on Proposal Sheet 2. The signature below must be sworn to before a person authorized by the laws of a State to administer oaths.

Company

By: _____
Title

Address

Address

STATE OF _____

COUNTY OF _____

On this the _____ day of _____, personally appeared before me _____ (name), to me personally known, who being duly sworn, did depose and say that he/she resides in _____ state of _____ and that he/she is the _____ of _____ described herein and which executed the above agreement and that he/she signed pursuant to proper authority and authorization.

END OF SECTION

CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven calendar days after bid opening. No contract shall be awarded unless such report is submitted.

Certification by Bidder

Bidder/Firm: _____

Address: _____

City: _____ State _____ Zip _____

- | | | | |
|---|-----|----|-----------|
| 1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause. | Yes | No | |
| 2. Compliance reports were required to be filed in connection with such contract or subcontract. | Yes | No | |
| 3. Bidder has filed all compliance reports due under applicable instructions, including SF-100. | Yes | No | None Req. |
| 4. Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended? | Yes | No | |

Bidder Name: _____

Title: _____

Signature: _____

Date: _____

CERTIFICATION BY PROPOSED SUBCONTRACTOR REGARDING EQUAL EMPLOYMENT OPPORTUNITY

NAME OF PRIME CONTRACTOR: _____

PROJECT NUMBER: _____

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the subcontractor has not filed a compliance report due under applicable instructions, such subcontractor shall be required to submit a compliance report before the owner approves the subcontract or permits work to begin under the subcontract.

SUBCONTRACTOR'S CERTIFICATION

Subcontractor Name: _____

Address: _____

City: _____ State _____ Zip _____

- | | | | |
|---|-----|----|-----------|
| 1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause. | Yes | No | |
| 2. Compliance reports were required to be filed in connection with such contract or subcontract. | Yes | No | |
| 3. Bidder has filed all compliance reports due under applicable instructions, including SF-100. | Yes | No | None Req. |
| 4. Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended? | Yes | No | |

Name: _____

Title: _____

Signature: _____

Date: _____

**CERTIFICATION OF BIDDER REGARDING USE OF
FEMALE/MINORITY SUBCONTRACTORS**

This certification is required for the contractor to demonstrate that when subcontractors are to be used on this project, an attempt will be made to utilize female/minority owned firms.

Documentation must be on file to show who has been contacted.

Certification by Bidder

Bidder/Firm: _____

Address: _____

City: _____ State _____ Zip _____

I, _____, certify that every attempt was made to utilize female/minority contractors on this project.

Bidder Name: _____

Title: _____

Signature: _____

Date: _____

CERTIFICATE OF OWNER'S ATTORNEY

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

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

Date: _____

**STATEMENT OF COMPLIANCE CERTIFICATE
ILLEGAL IMMIGRANT**

EACH CONTRACTOR BIDDING SHALL FILL IN AND SIGN THE FOLLOWING

Bidder Name: _____

Address: _____

City: _____ State _____ Zip _____

This is to certify that _____ have fully complied with all the requirements of T.C.A. § 12-3-309, stating:

- (1) No state governmental entity shall contract to acquire goods or services from any person who knowingly utilizes the services of illegal immigrants in the performance of a contract for goods or services entered into with a state governmental entity;
- (2) No person may contract to supply goods or services to a state governmental entity if that person knowingly utilizes the services of illegal immigrants in the performance of a contract to supply goods or services entered into with the state or a state entity.

All Bidders for construction services on this project shall be required to submit an affidavit (by executing this compliance document) as part of their bid, that attests that such Bidder shall comply with requirements of T.C.A. § 12-3-309.

Name: _____

Title: _____

Signature: _____

Date: _____

**IRAN DIVESTMENT
ACT**

In compliance with the Iran Divestment Act (State of Tennessee 2016, Public Chapter No. 817), which became effective on July 1, 2016, certification is required of all bidders on contracts over \$1,000.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party hereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to T.C.A. § 12-12-106.

I affirm, under the penalties of perjury, this statement to be true and correct.

Date

Signature of Bidder

Company

A bid shall not be considered for award nor shall award be made where the foregoing certification has been complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. The **City/County of _____** may award a bid to a bidder who cannot make the certification, on case-by-case basis, if:

1. The investment activities in Iran were made before July 1, 2016, the investment activities in Iran have not been expanded or reviewed on or after July 1, 2016, and the person has adopted, publicized, and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran; or
2. The **City/County of _____** makes a determination that the goods or services are necessary for the **City/County of _____** to perform its functions and that, absent such an exemption, the political subdivision will be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.



NOTICE

Tenn. Code Ann. § 12-12-106 requires the chief procurement officer to publish, using credible information freely available to the public, a list of persons it determines engage in investment activities in Iran, as described in § 12-12-105.

For these purposes, the State intends to use the attached list of “Entities determined to be non-responsive bidders/offerers pursuant to the New York State Iran Divestment Act of 2012.”

While inclusion on this list would make a person ineligible to contract with the state of Tennessee, if a person ceases its engagement in investment activities in Iran, it may be removed from the list.

If you feel as though you have been erroneously included on this list please contact the Central Procurement Office at CPO.Website@tn.gov.

List Date: May 4, 2022

Source: <https://www.ogs.ny.gov/iran-divestment-act-2012>

1. Ak Makina, Ltd.
2. Amona
3. Bank Markazi Iran (Central Bank of Iran)
4. Bank Mellat
5. Bank Melli Iran
6. Bank Saderat Iran
7. Bank Sepah
8. Bank Tejarat
9. China Precision Machinery Import- Export Corporation (CPMIEC)
10. ChinaOil (China National United Oil Corporation)
11. China National Offshore Oil Corporation (CNOOC)
12. China National Petroleum Corporation (CNPC)
13. Indian Oil Corporation
14. Kingdream PLC
15. Naftiran Intertrade Co. (NICO)
16. National Iranian Tanker Co. (NITC)
17. Oil and Natural Gas Corporation (ONGC)
18. Oil India, Ltd.
19. Persia International Bank
20. Petroleos de Venezuela (PDVSA Petróleo, SA)
21. PetroChina Co., Ltd.
22. Petronet LNG, Ltd.
23. Sameh Afzar Tajak Co. (SATCO)
24. Shandong FIN CNC Machine Co., Ltd.
25. Sinohydro Co., Ltd.
26. Sinopec Corp. (China Petroleum & Chemical Corporation)
27. SKS Ventures
28. SK Energy Co., Ltd.
29. Som Petrol AS
30. Unipet (China International United Petroleum & Chemicals Co., Ltd.)
31. Zhuhai Zhenrong Co.

ACKNOWLEDGEMENT REGARDING BIDDER SAM REGISTRATION

Pursuant to 2 CFR Parts 183 and 215 and the requirement of the U.S. Department of Housing and Urban Development (HUD), contractors procured directly by grantees, sub-grantees, and/or sub-recipients of HUD funds, including CDBG are required to have an active registration in the System of Award Management (SAM). This document shall be completed and submitted as part of the bid proposal.

1. By submitting this proposal, the prospective bidder acknowledges that it must have an active SAM UEI (Unique Entity ID) to be awarded this contract and that without an active SAM UEI the bidder's proposal may be disallowed.
2. By submitting this proposal, the prospective bidder certifies neither it, its principals nor affiliates, is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
3. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that an erroneous certification was rendered, in addition to other remedies available to the Federal Government, the Department or agency with which this transaction originated may pursue available remedies.
4. Further, the prospective bidder shall provide immediate written notice to the person to which this proposal is submitted if at any time the Participant learns that this certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. By submitting this proposal, it is agreed that should the proposed covered transaction be entered into, the prospective bidder will not knowingly enter into any lower-tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction unless authorized by the agency with which this transaction originated.
6. It is further agreed that by submitting this proposal, the prospective bidder will include Certification of Subcontractor Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion without modification, in all lower-tier covered transactions and in all solicitations for lower-tier covered transactions.

Provide the following information as detailed in the prospective bidder's SAM registration:

Entity Name: _____

Address: _____

City: _____ State: _____ Zip: _____

SAM Entity ID: _____ Expiration Date: _____

Active Exclusions: Yes No

CERTIFICATION OF SUBCONTRACTOR REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND EXCLUSION

Pursuant to 2 CFR Parts 183, 215, and 2424, and the requirement of the U.S. Department of Housing and Urban Development (HUD), subcontractors for projects that are funded in whole or in part by HUD funds must provide information concerning the entity's debarment, suspension, ineligibility or exclusion status. This document shall be completed and provided to the prime contractor.

1. By signing and submitting this proposal, the prospective lower-tier participant certifies that neither it, its principals nor affiliates, is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. Further, the Participant provides the certification set out below:
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that an erroneous certification was rendered, in addition to other remedies available to the Federal Government, the Department or agency with which this transaction originated may pursue available remedies.
3. Further, the Participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the Participant learns that this certification was erroneous when submitted or has become erroneously by reason of changed circumstances.
4. By submitting this document, it is agreed that should the proposed covered transaction be entered into, the Participant will not knowingly enter into any lower-tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction unless authorized by the agency with which this transaction originated.

The subcontracting entity may satisfy the requirement of this document via one of the two options below:

Option 1: SAM.gov Active Registration

Entity Name: _____

Address: _____

City: _____ State: _____ Zip: _____

SAM Entity ID: _____ Expiration Date: _____

Active Exclusions: Yes No

Option 2: Signed Certification

Entity Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Entity Representative: _____ Title: _____

Signature: _____

CERTIFICATION OF NON-BOYCOTT OF ISRAEL

The Bidder certifies that it is not currently engaged in, and will not for the duration of the contract engage in, a boycott of Israel as defined by Tenn. Code Ann. § 12-4-119. This provision shall not apply to contracts with a total value of less than two hundred fifty thousand dollars (\$250,000) or to contractors with less than ten (10) employees.

According to the law, a boycott of Israel means engaging in refusals to deal, terminating business activities, or other commercial actions that are intended to limit commercial relations with Israel, or companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel to do business, or persons or entities doing business in Israel, when such actions are taken:

- 1) In compliance with, or adherence to, calls for a boycott of Israel, or
- 2) In a manner that discriminates on the basis of nationality, national origin, religion, or other unreasonable basis, and is not based on a valid business reason. Tenn. Code Ann. § 12-4-119.

I certify this statement to be true and correct.

Bidder Name Printed

Date

Signature of Bidder

Company

**CERTIFICATION OF BIDDER REGARDING
SECTION 3 AND SEGREGATED FACILITIES**

NAME OF PRIME CONTRACTOR: _____

PROJECT NUMBER: _____

The undersigned hereby certifies that

- Section 3 provisions are included in the Contract.
- This grant project exceeds \$200,000 of CDBG assistance, and the contractor will comply with all Section 3 requirements detailed in the CDBG Manual, including:
 - reporting total labor hours worked,
 - reporting total labor hours worked by Section 3 workers,
 - reporting total labor hours worked by Targeted Section 3 workers,
 - Providing documentation of Section 3 worker status as required for all workers for the project under the covered contract.
- No segregated facilities will be maintained as required by Title VI of the Civil Rights Act of 1964.

Name & Title of Signer (Print or Type)

Signature

Date

**CERTIFICATION OF PROPOSED SUBCONTRACTOR
REGARDING SECTION 3 AND SEGREGATED FACILITIES**

NAME OF SUBCONTRACTOR: _____

PROJECT NUMBER: _____

The undersigned hereby certifies that

- Section 3 provisions are included in the Contract.
- If contract equals or exceeds \$200,000, the contractor will comply with all Section 3 requirements detailed in the CDBG Manual, including:
 - reporting total labor hours worked,
 - reporting total labor hours worked by Section 3 workers,
 - reporting total labor hours worked by Targeted Section 3 workers,
 - Providing documentation of Section 3 worker status as required for all workers for the project under the covered contract.
- No segregated facilities will be maintained as required by Title VI of the Civil Rights Act of 1964.
-

Name & Title of Signer (Print or Type)

Signature

Date

APPALACHIAN REGIONAL COMMISSION

Interim Implementation Guidance on the Application of the Buy America Preference in ARC Grants for Infrastructure

On May 5, 2022, ARC notified the implementation of the domestic content procurement preference (Buy America) provided in the Build America, Buy America Act, starting on May 14, 2022. The new requirement in ARC grants for infrastructure projects means that, 1-all of the iron and steel in the project is produced in the United States, 2-the manufactured products used in the project are produced in the United States, and 3- the construction materials used in the project are produced in the United States. This interim guidance describes the type of projects subject to the Buy America requirements and the process to request waivers.

I. Applicability:

This guidance applies to all ARC grants whether or not funded through Infrastructure Investment and Jobs Act, Pub. L. No. 117-58 (IIJA)—where funds are made available and used in the infrastructure portion of all grants involving infrastructure. It will also apply to subawards made with ARC grants.

The Buy America preference applies to an entire infrastructure project, even if it is funded by both Federal and non-Federal funds under one or more awards. The Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. It does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project, but are not an integral part of or permanently affixed to the structure.

II. Definitions:

1. **Construction materials** includes an article, material, or supply— other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives — that is or consists primarily of: non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall.
2. **Domestic content procurement preference-** The term “domestic content procurement preference” means all iron and steel used in the project are produced in the United States; the manufactured products used in the project are produced in the United States; or the construction materials used in the project are produced in the United States.

3. **Infrastructure-** The term infrastructure encompasses public infrastructure projects. Thus, the term “infrastructure” includes, at a minimum, the structures, facilities, and equipment for roads, highways, and bridges; public transportation; dams, ports, harbors, and other maritime facilities; intercity passenger and freight railroads; freight and intermodal facilities; airports; water systems, including drinking water and wastewater systems; electrical transmission facilities and systems; utilities; broadband infrastructure; and buildings and real property.

In determining whether a particular construction project constitutes “infrastructure” for purposes of the Buy America requirement, the ARC will consider whether the project will serve a public function, including whether the project is publicly owned and operated, privately operated on behalf of the public, or is a place of public accommodation, as opposed to a project that is privately owned and not open to the public. Projects with the former qualities have greater indicia of infrastructure, while projects with the latter quality have fewer. If ARC determines that no funds from a particular grant will be used for infrastructure, a Buy America preference does not apply to that grant award.

4. **Produced in the United States-** The term produced in the United States means-
 - (A) in the case of iron or steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;
 - (B) in the case of manufactured products, that (i) the manufactured product was manufactured in the United States; and (ii) the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and
 - (C) in the case of construction materials, that all manufacturing processes for the construction material occurred in the United States.
5. **Project-** The term project means construction, alteration, maintenance, or repair of infrastructure.

III. Waivers

ARC may waive the application of the Buy America preference in any case in which the Federal Co-Chair finds that—

- (1) applying the domestic content procurement preference would be inconsistent with the public interest (a “public interest waiver”);
- (2) types of iron, steel, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality (a “non-availability waiver”); or

(3) the inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25 percent (an “unreasonable cost waiver”).

A. Non-availability Waivers

In considering a request for a non-availability waiver, ARC will assess whether the recipient or subrecipient performed a thorough market research and adequately considered, where appropriate, qualifying alternate items, products, or materials.

B. Unreasonable Cost Waivers

In considering a request for an unreasonable cost waiver, ARC will examine whether the recipient or subrecipient has provided adequate documentation that no domestic alternatives are available within the cost parameter. An unreasonable cost waiver is available if the inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25 percent. The waiver justification must include, as applicable, a comparison of the cost of the domestic product to the cost of the foreign product or a comparison of the overall cost of the project with domestic products to the overall cost of the project with foreign-origin products. Publicly available cost comparison data may be provided in lieu of proprietary pricing information.

C. Public Interest Waivers

ARC may issue public interest waivers when it determines that its statutory mandate and policy goals cannot be achieved consistent with the Buy America requirements and the proposed waiver would not meet the requirements for a non-availability or unreasonable cost waiver. ARC may consider issuing general applicability public interest waivers in the interest of efficiency and to ease burdens for recipients or subrecipients.

IV. Process to Request a Waiver

ARC sponsored construction projects administered by a Federal Basic Agency will follow the policies and procedures of the Federal Agency for Buy American waivers. ARC sponsored construction projects administered by a Registered State Basic Agency that follows the policies and procedures of a Federal agency in administering an ARC grant will follow the policies and procedures for Buy America waivers as determined by said Federal agency. Whenever a construction project is co-funded by a Federal agency and ARC, the grantee and subgrantee will follow the processes and procedures for Buy America waivers of the Federal agency. In the event that two or more Federal agencies participate in funding an infrastructure project, the grantee or subgrantee will follow the policies and procedures for Buy America of the Federal agency with the highest contribution of funds to the project.

The following process will apply in those circumstances not covered in the previous paragraph. ARC grant recipients and subrecipients will submit their request for Buy America waivers in writing (email) to the ARC project coordinator and the administering agency point of contact. All waiver requests must include a detailed justification for the use of goods, products, or materials mined, produced, or manufactured outside the United States and a certification that there was a good faith effort to solicit bids for domestic products supported by terms included in requests for proposals, contracts, and nonproprietary communications with potential suppliers.

The request for a Buy America waiver must include, at a minimum and to the greatest extent practicable, the following information:

- Waiver type (non-availability, unreasonable cost, or public interest)
- Recipient name and Unique Entity Identifier (UEI)
- ARC program name (POWER, INSPIRE, BWI, DCI)
- ARC Grant Award Identification Number
- ARC and Federal financial assistance (if applicable) funding amount
- Total cost of infrastructure expenditures, including all Federal and non-Federal funds (to the extent known)
- Infrastructure project description and location
- List of iron or steel item(s), manufactured products, and construction material(s) proposed to be excepted from Buy America requirements, including name, cost, and country(ies) of origin (if known), and relevant Product and Service Code (PSC) and North American Industry Classification System (NAICS) code for each.
- A certification that the recipient made a good faith effort to solicit bids for domestic products supported by terms included in requests for proposals, contracts, and nonproprietary communications with the prime contractor.
- A statement of waiver justification, including a description of efforts made (e.g., market research, industry outreach), by the recipient, in an attempt to avoid the need for a waiver. Such a justification may cite, if applicable, the absence of any Buy America-compliant bids received in response to a solicitation.
- Anticipated impact if no waiver is issued.

ARC will consider request for waivers on a case-by-case basis. The grantee or subgrantee must promptly submit the request for a Buy America waiver upon having the documentation to support the request for the waiver and not less than 60 days prior to the expected day for starting construction.

In issuing a waiver on Buy America, ARC will consider the statutory provisions of the Build America, Buy America Act, the Appalachian Regional Development Act of 1965, as amended, the Guidance of the U.S. Office of Management and Budget (OMB), and its mission and policy goals described in its Strategic Fiscal Plan for Fiscal Years 2022-2026. ARC Buy America waiver determinations will be notified to the grantees or subgrantees by the ARC project coordinator in writing.

V. Buy America Guidance Updates

ARC would be updating this Buy America guidance, that is applicable to the infrastructure portion of all grants involving infrastructure, as new guidelines are issued by the OMB and the Made in America Office, including but not limited to the final standards on construction material.

DRUG-FREE WORKPLACE AFFIDAVIT

STATE OF _____

COUNTY OF _____

The undersigned, principal officer of _____, an employer of five (5) or more employees contracting with _____ government to provide construction services, hereby states under oath as follows:

- 1. The undersigned is a principal officer of _____ (hereinafter referred to as the "Company"), and is duly authorized to execute this Affidavit on behalf of the Company.
- 2. The Company submits this Affidavit pursuant to T.C.A. § 50-9-113, which requires each employer with no less than five (5) employees receiving pay who contracts with the state or any local government to provide construction services to submit an affidavit stating that such employer has a drug-free workplace program that complies with Title 50, Chapter 9, of the Tennessee Code Annotated.
- 3. The Company is in compliance with T.C.A. § 50-9-113.

Further affiant saith not.

Principal Officer

STATE OF _____

COUNTY OF _____

Before me personally appeared _____, with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who acknowledged that such person executed the foregoing affidavit for the purposes therein contained.

Witness my hand and seal at office this _____ day of _____, 20____.

Notary Public

My commission expires: _____

SECTION 005100

Notice of Award

Dated _____

Project: ARC Ladd Landing Parking Improvements	Owner: City of Kingston	Owner's Contract No.:
Contract:		Engineer's Project No.:
Bidder:		
Bidder's Address: (send Certified Mail, Return Receipt Requested)		

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

(Indicate total Work, alternates or sections or Work awarded.)

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

(Insert appropriate data if Unit Prices are used. Change language for Cost-Plus contracts.)

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

_____ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner [_____] fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01) [and Supplementary Conditions (Paragraph SC-5.01).]
3. Other conditions precedent:

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

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

Owner

By: _____
Authorized Signature

Title

Copy to Engineer

END OF SECTION

AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 20____, by and between _____, herein called "Owner", acting herein through its _____, and _____,

STRIKE OUT (a corporation) (a partnership)
INAPPLICABLE (an individual doing business as _____)
TERMS

of _____, County of _____, and State of _____, hereinafter called "Contractor".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction described as follows: hereinafter called "the project", for the sum of _____

_____ Dollars (\$_____) and all extra work in connection therewith, under the terms as stated in the General and Special Conditions of the Contract; and at this (its or their) own property cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the Proposal, the General Conditions, Supplemental General Conditions and Special Conditions of the Contract, the plans, which include all maps, plats, blue prints, and other drawings and printed or written explanatory matter thereof, the specifications and contract documents therefore as prepared by _____, herein entitled "the Architect/Engineer", and as enumerated in Paragraph 1 of the Supplemental General Conditions, all of which are made a part hereof and collectively evidence and constitute the contract.

The Contractor hereby agrees to commence work under this contract on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within _____ consecutive calendar days thereafter. The Contractor further agrees to pay, as liquidated damages, the sum of \$_____ for each consecutive calendar day thereafter as hereinafter provided in Paragraph 3 of the Supplemental General Conditions.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the contract, subject to additions and deductions, as provided in the General Conditions of the Contract, and to make payments on account thereof as provided in Paragraph 3, "Payments to Contractor", of the Supplemental General Conditions.

IN WITNESS WHEREOF, the parties to these presents have executed this contract in six (6) counterparts, each of which shall be deemed an original, in the year and day first above mentioned.

(Seal)
ATTEST: _____
(Owner)

(Secretary)

By: _____

(Witness)

(Title)

(Seal)

(Contractor)

(Secretary)

By: _____

(Witness)

(Title)

(Address, City, State, and Zip Code)

Notice to Proceed

Dated _____

Project: ARC Ladd Landing Parking Improvements	Owner: City of Kingston	Owner's Contract No.:
Contract:		Engineer's Project No.:

Contractor:

Contractor's Address: [send Certified Mail, Return Receipt Requested]

You are notified that the Contract Times under the above contract will commence to run on _____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is _____, and the date of readiness for final payment is _____ [(or) the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must [add other requirements]:

_____	Owner
_____	Given by:
_____	Authorized Signature
_____	Title
_____	Date

Copy to Engineer

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Contractor,
(Corporation, Partnership, Individual or Joint Venture)

and _____
(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____

_____ Dollars, \$(_____) in
lawful money of the United States, for the payment of which sum well and truly to be
made, we bind ourselves, successors, and assigns, jointly and severally, firmed by
these presents, this sum being in the amount of one hundred percent (100%) of the
contract amount.

THE CONDITION OF THIS OBLIGATION is such that whereas, the contractor has
entered into a certain contract with the OWNER, dated the _____ day of _____,
20____, a copy of which is hereto attached and made a part hereof for the construction
of :

NOW, THEREFORE, if the Contractor shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall full indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alternation or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts
(number)

each one of which shall be deemed an original, this the _____ day of _____, 20_____.

ATTEST:

(Contractor) Corporate Official

Contractor

(SEAL)

By: _____

Title: _____

Address: _____

Witness to Contractor

Address

ATTEST:

_____	_____
Witness to Surety	Surety
_____	By: _____
Address	Attorney-in-Fact
_____	_____
	Address

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

BOND is not valid unless accompanied by Power of Attorney.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located.

SECTION 006113.16
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter call Contractor,
(Corporation, Partnership, Individual or Joint Venture)

and

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____

_____ Dollars, \$(_____) in
lawful money of the United States, for the payment of which sum well and truly to be
made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these
presents, this sum being in the amount of one hundred percent (100%) of the contract
amount.

THE CONDITION OF THIS OBLIGATION is such that whereas, the contractor has
entered into a certain contract with the OWNER, dated the ____ day of _____,
20____, a copy of which is hereto attached and made a part hereto fore the
construction of:

NOW, THEREFORE, if the Contractor shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due to materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK whether by SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts
(number)

each one of which shall be deemed an original,

this the _____ day of _____, 20_____.

ATTEST:

(Contractor) Corporate Official

Contractor

(SEAL)

By: _____

Title: _____

Address: _____

Witness to Contractor

Address

ATTEST:

_____	_____
Witness to Surety	Surety
_____	By: _____
Address	Attorney-in-Fact
_____	_____
	Address

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

BOND is not valid unless accompanied by Power of Attorney.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located.

Contractor's Application For Payment No. _____

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer)
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

APPLICATION FOR PAYMENT

Change Order Summary

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

1. ORIGINAL CONTRACT PRICE	\$	
2. Net change by Change Orders	\$	
3. CURRENT CONTRACT PRICE (Line 1 ± 2).....	\$	
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	\$	
5. RETAINAGE:		
a. ____ % x \$ _____ Work Completed	\$	
b. ____ % x \$ _____ Stored Material	\$	
c. Total Retainage (Line 5a + Line 5b)	\$	
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c).....	\$	
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	\$	
8. AMOUNT DUE THIS APPLICATION	\$	
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)	\$	

CONTRACTOR'S CERTIFICATION

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

Payment of:	\$ _____	
	(Line 8 or other - attach explanation of other amount)	
is recommended by:	_____	_____
	(Engineer)	(Date)
Payment of:	\$ _____	
	(Line 8 or other - attach explanation of other amount)	
is approved by:	_____	_____
	(Owner)	(Date)

Stored Material Summary

Contractor's Application

For (contract):					Application Number:				
Application Period:					Application Date:				
A	B	C	D		E		F		G
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work		Materials Remaining in Storage (\$) (D + E - F)
			Date (Month/Year)	Amount (\$)	Amount (\$)	Subtotal	Date (Month/Year)	Amount (\$)	
		Totals							

Change Order No. _____

Date of Issuance: _____ Effective Date: _____

Project:	Owner:	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.:

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

Description:

Attachments: (List documents supporting change):

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price: \$ _____	Original Contract Times: <input type="checkbox"/> Working days <input type="checkbox"/> Calendar days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: \$ _____	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order: \$ _____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____ Engineer (Authorized Signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____
Approved by Funding Agency (if applicable): _____		Date: _____

Change Order Instructions

A. GENERAL INFORMATION

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

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

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

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

B. COMPLETING THE CHANGE ORDER FORM

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

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

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

END OF SECTION 006363

SECTION 006516
 CERTIFICATE OF SUBSTANTIAL COMPLETION

Project:	Owner:	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.:

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

- All Work under the Contract Documents:
 The following specified portions:

_____ Date of Substantial Completion

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

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

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

- Amended Responsibilities
 Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

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

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

 Executed by Engineer

 Date

 Accepted by Contractor

 Date

 Accepted by Owner

 Date

Community Development Block Grant Program GENERAL CONDITIONS

1. Contract and Contract Documents

The project to be constructed and pursuant to this contract will be financed with assistance from the Tennessee Community Development Block Grant Program and is subject to all applicable Federal laws and regulations.

The Plans, Specifications and Addenda, hereinafter enumerated in Paragraph 1 of the Supplemental General Conditions shall form part of this Contract and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth. The table of contents, titles, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect, limit or cast light on the interpretation of the provisions to which they refer.

TABLE OF CONTENTS OF GENERAL CONDITIONS

<u>Article Number</u>	<u>Title</u>	<u>Page</u>
1	DEFINITIONS	11
2	PRELIMINARY MATTERS	12
3	CONTRACT DOCUMENTS: INTENT, AMENDING AND REUSE	13
4	AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS	14
5	BONDS AND INSURANCE	15
6	CONTRACTOR'S RESPONSIBILITIES	19
7	OTHER WORK	24
8	OWNER'S RESPONSIBILITIES	22
9	ENGINEER'S STATUS DURING CONSTRUCTION	22
10	CHANGES IN THE WORK	25
11	CHANGE OF CONTRACT PRICE	25
12	CHANGE OF CONTRACT TIMES	30
13	TESTS AND INSPECTIONS; CORRECTION; REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK	30
14	PAYMENTS TO CONTRACTOR AND COMPLETION	32
15	SUSPENSION OF WORK AND TERMINATION	34
16	DISPUTE RESOLUTION	35
17	MISCELLANEOUS	35

1.	DEFINITIONS	53	3.6	Supplementing Contract Documents	56
1.1	Addendum	53	3.7	Reuse of Documents	57
1.2	Agreement	53	4.	AVAILABILITY OF LANDS; SUBSURFACE AND	
1.3	Application for Payment	53		PHYSICAL CONDITIONS; REFERENCE POINTS	57
1.4	Asbestos	53	4.1	Availability of Lands	57
1.5	Bid	53	4.2	Subsurface and Physical Conditions	57
1.6	Bidding Documents	53	4.2.1	Reports and Drawings	57
1.7	Bidding Requirements	53	4.2.2	Limited Reliance by CONTRACTOR	
1.8	Bonds	53		Authorized; Technical Data	57
1.9	Change Order	53	4.2.3	Notice of Differing Subsurface or	
1.10	Contract Documents	53		Physical Conditions	57
1.11	Contract Price	53	4.2.4	ENGINEER's Review	57
1.12	Contract Times	53	4.2.5	Possible Contract Documents Change	58
1.13	CONTRACTOR	53	4.2.6	Possible Price and Times Adjustments	58
1.14	defective	53	4.3	Physical Conditions--Underground	
1.15	Drawings	53		Facilities	58
1.16	Effective Date of the Agreement	53	4.3.1	Shown or Indicated	58
1.17	ENGINEER	53	4.3.2	Not Shown or Indicated	58
1.18	ENGINEER's Consultant	53	4.4	Reference Points	58
1.19	Field Order	53	4.5	Asbestos, PCB's, Petroleum, Hazardous	
1.20	General Requirements	53		Waste or Radioactive Material	59
1.21	Hazardous Waste	53	5.	BONDS AND INSURANCE	59
1.22	Laws and Regulations; Laws or		5.1-5.2	Performance, Payment and Other Bonds... 59	
	Regulations	53	5.3	Licensed Sureties and Insurers;	
1.23	Liens	54		Certificates of Insurance	59
1.24	Milestone	54	5.4	CONTRACTOR's Liability Insurance	60
1.25	Notice of Award	54	5.5	OWNER's Liability Insurance	60
1.26	Notice to Proceed	54	5.6	Property Insurance	60
1.27	OWNER	54	5.7	Boiler and Machinery or Additional	
1.28	Partial Utilization	54		Property Insurance	61
1.29	PCBs	54	5.8	Notice of Cancellation Provisions	61
1.30	Petroleum	54	5.9	CONTRACTOR's Responsibility for	
1.31	Project	54		Deductible Amounts	61
1.32	Radioactive Material	54	5.10	Other Special Insurance	61
1.33	Resident Project Representative	54	5.11	Waiver of Rights	61
1.34	Samples	54	5.12-5.13	Receipt and Application of Insurance	
1.35	Shop Drawings	54		Proceeds	61
1.36	Specifications	54	5.14	Acceptance of Bonds and Insurance;	
1.37	Subcontractor	54		Option to Replace	62
1.38	Substantial Completion	54	5.15	Partial Utilization--Property	
1.39	Supplementary Conditions	54		Insurance	62
1.40	Supplier	54	6.	CONTRACTOR'S RESPONSIBILITIES	62
1.41	Underground Facilities	54	6.1-6.2	Supervision and Superintendence	62
1.42	Unit Price Work	54	6.3-6.5	Labor, Materials and Equipment	62
1.43	Work	54	6.6	Progress Schedule	62
1.44	Work Change Directive	54	6.7	Substitutes and "Or-Equal" Items;	
1.45	Written Amendment	55		CONTRACTOR's Expense;	
2.	PRELIMINARY MATTERS	55		Substitute Construction	
2.1	Delivery of Bonds	55		Methods or Procedures;	
2.2	Copies of Documents	55		ENGINEER's Evaluation	63
2.3	Commencement of Contract Times;		6.8-6.11	Concerning Subcontractors, Suppliers	
	Notice to Proceed	55		and Others; Waiver of Rights	63
2.4	Starting the Work	55	6.12	Patent Fees and Royalties	64
2.5-2.7	Before Starting Construction;		6.13	Permits	64
	CONTRACTOR's Responsibility to Report:		6.14	Laws and Regulations	64
	Preliminary Schedules;		6.15	Taxes	64
	Delivery of Certificates of		6.16	Use of Premises	65
	Insurance	55	6.17	Site Cleanliness	65
2.8	Preconstruction Conference	55	6.18	Safe Structural Loading	65
2.9	Initially Acceptable Schedules	55	6.19	Record Documents	65
3.	CONTRACT DOCUMENTS: INTENT,		6.20	Safety and Protection	65
	AMENDING, REUSE	56	6.21	Safety Representative	65
3.1-3.2	Intent	56	6.22	Hazard Communication Programs	65
3.3	Reference to Standards and		6.23	Emergencies	65
	Specifications of Technical Societies;		6.24	Shop Drawings and Samples	66
	Reporting and Resolving		6.25	Submittal Procedures;	
	Discrepancies	56		CONTRACTOR's Review Prior to	
3.4	Intent of Certain Terms or Adjectives	56		Shop Drawing or Sample Submittal.....	66
3.5	Amending Contract Documents	56			

6.26	Shop Drawing & Sample Submittals Review by ENGINEER	66	12.4	Delays Beyond OWNER's and CONTRACTOR's Control	74
6.27	Responsibility for Variation From Contract Documents	66	13.	TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK	74
6.28	Related Work Performed Prior to ENGINEER's Review and Approval of Required Submittals	66	13.1	Notice of Defects	74
6.29	Continuing the Work	66	13.2	Access to the Work	74
6.30	CONTRACTOR's General Warranty and Guarantee	67	13.3	Tests and Inspections; Contractor's Cooperation	74
6.31-6.33	Indemnification	67	13.4	OWNER's Responsibilities: Independent Testing Laboratory	74
6.34	Survival of Obligations	67	13.5	CONTRACTOR'S Responsibilities.....	74
7.	OTHER WORK	67	13.6-13.7	Covering Work Prior to Inspection, Testing or Approval	74
7.1-7.3	Related Work at Site	67	13.8-13.9	Uncovering Work at ENGINEER's Request	74
7.4	Coordination.....	68	13.10	OWNER May Stop the Work	75
8.	OWNER'S RESPONSIBILITIES	68	13.11	Correction or Removal of Defective Work	75
8.1	Communications to Contractor	68	13.12	Correction Period.....	75
8.2	Replacement of ENGINEER	68	13.13	Acceptance of Defective Work	75
8.3	Furnish Data and Pay Promptly When Due	68	13.14	OWNER May Correct Defective Work	75
8.4	Lands and Easements; Reports and Tests	68	14.	PAYMENTS TO CONTRACTOR AND COMPLETION.....	76
8.5	Insurance	68	14.1	Schedule of Values	76
8.6	Change Orders	68	14.2	Application for Progress Payment.....	76
8.7	Inspections, Tests and Approvals	68	14.3	CONTRACTOR's Warranty of Title	76
8.8	Stop or Suspend Work; Terminate CONTRACTOR's Services	68	14.4-14.7	Review of Applications for Progress Payments	76
8.9	Limitations on OWNER's Responsibilities	68	14.8-14.9	Substantial Completion.....	77
8.10	Asbestos, PCB's, Petroleum, Hazardous Waste or Radioactive Material	68	14.10	Partial Utilization.....	77
8.11	Evidence of Financial Arrangements	68	14.11	Final Inspection	77
9.	ENGINEER'S STATUS DURING CONSTRUCTION	68	14.12	Final Application for Payment.....	78
9.1	OWNER's Representative	68	14.13-14.14	Final Payment and Acceptance.....	78
9.2	Visits to Site	68	14.15	Waiver of Claims.....	78
9.3	Project Representative	69	15.	SUSPENSION OF WORK AND TERMINATION.....	78
9.4	Clarifications and Interpretations	69	15.1	OWNER May Suspend Work	78
9.5	Authorized Variations in Work	69	15.2-15.4	OWNER May Terminate	78
9.6	Rejecting Defective Work	69	15.5	CONTRACTOR May Stop Work or Terminate.....	79
9.7-9.9	Shop Drawings, Change Orders and Payments	69	16.	DISPUTE RESOLUTION	79
9.10	Determinations for Unit Prices	69	17.	MISCELLANEOUS	79
9.11-9.12	Decisions on Disputes; ENGINEER as Initial Interpreter	69	17.1	Giving Notice	79
9.13	Limitations on ENGINEER's Authority and Responsibilities	70	17.2	Computation of Times	79
10.	CHANGES IN THE WORK	70	17.3	Notice of Claim.....	80
10.1	OWNER Ordered Change	70	17.4	Cumulative Remedies	80
10.2	Claim for Adjustment	70	17.5	Professional Fees and Court Costs Included	80
10.3	Work Not Required by Contract Documents	70			
10.4	Change Orders	70			
10.5	Notification of Surety	71			
11.	CHANGE OF CONTRACT PRICE	71			
11.1-11.3	Contract Price; Claim for Adjustment; Value of the Work	71			
11.4	Cost of the Work	71			
11.5	Exclusions to Cost of the Work	72			
11.6	CONTRACTOR's Fee	73			
11.7	Cost Records	73			
11.8	Cash Allowances	73			
11.9	Unit Price Work	73			
12.	CHANGE OF CONTRACT TIMES	73			
12.1	Claim for Adjustment	73			
12.2	Time of the Essence	74			
12.3	Delays Beyond CONTRACTOR's Control	74			

<i>Article or Paragraph Number</i>	<i>Article or Paragraph Number</i>
Acceptance of--	
Bonds and Insurance	5.14
defective Work	10.4.1, 13.13, 13.15
final payment	9.12,14.15
insurance	5.14
other Work, by CONTRACTOR	7.3
Substitutes and "Or-Equal" Items.....	6.7.1
Work by OWNER.....	2.5, 6.30, 6.34
Access to the--	
Lands, OWNER and CONTRACTOR	
responsibilities	4.1
site, related work	7.2
Work,	13.2, 13.14, 14.9
Acts or Omissions-- , Acts and Omissions--	
CONTRACTOR	6.9.1, 9.13.3
ENGINEER	6.20, 9.13.3
OWNER.....	6.20, 8.9
Addenda--definition of (also see	
definition of Specifications)	(1.6, 1.10, 6.19) 1.1
Additional Property Insurances	5.7
Adjustments	
Contract Price or Contract	
Times	1.5, 3.5, 4.1, 4.3.2, 4.5.2, 4.5.3, 9.4, 9.5, 10.2-10.4, 11, 12, 14.8, 15.1
progress schedule.....	6.6
Agreement--	
definition of	1.2
All risk Insurance, policy form	5.6.2
Allowances, Cash	11.8
Amending Contract Documents	3.5
Amendment, Written--	
in general	1.10, 1.45, 3.5, 5.10, 5.12, 6.6.2, 6.8.2, 6.19, 10.1, 10.4, 11.2, 12.1, 13.12.2, 14.7.2
Appeal,, OWNER or CONTRACTOR	
intent to	9.10, 9.11, 10.4, 16.2, 16.5
Application for Payment--	
definition of	1.3
ENGINEER's Responsibility	9.9
final payment	9.13.4, 9.13.5, 14.12-14.15
in general	2.8, 2.9, 5.6.4, 9.10, 15.5
progress payment	14.1, 14.7
review of	14.4-14.7
Arbitration (Optional).....	16.1-16.6
Asbestos--	
claims pursuant thereto	4.5.2, 4.5.3
CONTRACTOR authorized to stop Work	4.5.2
definition of	1.4
OWNER responsibility for.....	4.5.1, 8.10
possible price and times change	4.5.2
Authorized Variations in Work	3.6, 6.25, 6.27, 9.5
Availability of Lands.....	4.1, 8.4
Award, Notice of--defined.....	1.2.5
Before Starting Construction	2.5-2.8
Bid--definition of	1.5
(1.1, 1.10, 2.3, 3.3, 4.2.6.4, 6.13, 11.4.3, 11.9.1)	
Bidding Documents--definition of	1.6 (6.8.2)
Bidding Requirements--definitions of	1.7 (1.1, 4.2.6.2)
Bonds--	
acceptance of	5.14
additional bonds.....	10.5, 11.4.5.9
Cost of the Work.....	11.5.4
definition of	1.8
delivery of	2.1, 5.1
final application for payment	14.12-14.14
general	1.10, 5.1-5.3, 5.13, 9.13, 10.5, 14.7.6
performance, Payment and Other.....	5.1-5.2
Bonds and Insurance--in general	5
Builder's risk "all risk" policy form	5.6.2
Cancellation Provisions, Insurance.....	5.4.11, 5.8, 5.15
Cash Allowances	11.8
Certificate of Substantial Completion.....	1.38, 6.30.2.3,
Certificates of Inspection	9.13.4, 13.13.4.2
Certificates of Insurance	2.7, 5.3, 5.4.11, 5.4.13, 5.6.5, 5.8 5.14, 9.13.4, 14.12
Change in Contract Price--	
Cash Allowances	11.8
claim for price adjustment.....	4.1, 4.2.6, 4.5, 5.15, 6.8.2, 9.4, 9.5, 9.11, 10.2, 10.5, 11.2, 13.9, 13.13, 13.14, 15.1, 15.5
CONTRACTOR's fee.....	11.6
Cost of the Work	
general.....	11.4-11.7
Exclusions to	11.5
Cost Records	11.7
in general.....	1.19, 1.44, 9.11, 10.4.2, 10.4.3, 11
Lump Sum Pricing	11.3.2
Notification of Surety.....	10.5
Scope of	10.3-10.4
Testing and Inspection, Uncovering the Work	13.9
Unit Price Work	11.9
Value of Work.....	11.3
Change in Contract Times--	
Claim for times adjustment	4.1, 4.2.6, 4.5, 5.15, 6.8.2, 9.4, 9.5, 9.11, 10.2, 10.5, 12.1, 13.9, 13.13, 13.14, 14.7, 15.1, 15.5
Contractual time limits	12.2
Delays beyond CONTRACTOR's control.....	12.3
Delays beyond OWNER's and CONTRACTOR's	
control	12.4
Notification of surety.....	10.5
Scope of change	10.3-10.4
Change Orders--	
Acceptance of Defective Work.....	13.13
Amending Contract Documents	3.5
Cash Allowances.....	11.8
Change of Contract Price.....	11
Change of Contract Times.....	12
Changes in the Work	10
CONTRACTOR's fee.....	11.6
Cost of the Work	11.4-11.7
Cost Records	11.7
definition of.....	1.9
emergencies.....	6.23
ENGINEER's responsibility	9.8, 10.4, 11.2, 12.1
execution of	10.4
Indemnification	6.12, 6.16, 6.31, 6.33
Insurance, Bonds and	5.10, 5.13, 10.5
OWNER may terminate	15.2-15.4
OWNER's Responsibility	8.6, 10.4
Physical Conditions--	
Subsurface and,	4.2
Underground Facilities	4.3.2
Record Documents	6.19
Scope of Change	10.3-10.4
Substitutes	6.7.3, 6.8.2
Unit Price Work	11.9
value of Work, covered by	11.3
Changes in the Work	10
Notification of surety	10.5
OWNER's and CONTRACTOR's responsibilities	10.4
Right to an adjustment	10.2
Scope of change	10.3-10.4
Claims--	
against CONTRACTOR	6.16
against ENGINEER	6.32
against OWNER	6.32
Change of Contract Price	9.4, 11.2

*Article or Paragraph
Number*

Change of Contract Times	9.4,12.1	Reference to Standards and Specifications	
CONTRACTOR's	4, 7.1, 9.4, 9.5, 9.11, 10.2, 11.2, 11.9, 12.1, 14.8, 15.1, 15.5, 17.3	of Technical Societies	3.3
CONTRACTOR's Fee	11.6	Related Work	7.2
CONTRACTOR's liability	5.4, 6.12, 6.16, 6.31	Reporting and Resolving Discrepancies	2.5, 3.3
Cost of the Work	11.4, 11.5	Reuse of	3.7
Decisions on Disputes.....	9.11, 9.12	Supplementing	3.6
Dispute Resolution.....	16.1	Termination of ENGINEER's Employment	8.2
Dispute Resolution Agreement	16.1-16.6	Unit Price Work	11.9
ENGINEER as initial interpreter.....	9.11	variations	3.6, 6.23, 6.27
Lump Sum Pricing	11.3.2	Visits to Site, ENGINEER's	9.2
Notice of	17.3	Contract Price--	
OWNER's	9.4, 9.5, 9.11, 10.2, 11.2, 11.9, 12.1, 13.9, 13.13, 13.14, 17.3	adjustment of	3.5, 4.1, 9.4, 10.3, 11.2-11.3
OWNER's liability	5.5	Change of	11
OWNER may refuse to make payment	14.7	Decision on Disputes	9.11
Professional Fees and Court Costs Included	17.5	definition of	1.11
request for formal decision on	9.11	Contract Times--	
Substitute items	6.7.1.2	adjustment of	3.5, 4.1, 9.4, 10.3, 12
Time Extension	12.1	Change of	12.1-12.4
Time requirements	9.11, 12.1	Commencement of	2.3
Unit Price Work	11.9.3	definition of	1.12
Value of	11.3	CONTRACTOR--	
Waiver of--on Final Payment	14.14, 14.15	Acceptance of Insurance	5.14
Work Change Directive	10.2	Limited Reliance on Technical Data Authorized	4.2.2
written notice required	9.11, 11.2, 12.1	Communications	6.2, 6.9.2
Clarifications and Interpretations	3.6.3, 9.4, 9.11	Continue Work	6.29, 10.4
Clean Site	6.17	coordination and scheduling	6.9.2
Codes of Technical Society, Organization or		definition of	1.13
Association	3.3.3	May Stop Work or Terminate	15.5
Commencement of Contract Times	2.3	provide site access to others	7.2, 13.2
Communications--		Safety and Protection	4.3, 1.2, 6.16, 6.18, 6.21-6.23, 7.2, 13.2
general	6.2, 6.9.2, 8.1	Shop Drawing and Sample Review Prior to Submittal	6.25
Hazard Communication Programs	6.22	Stop Work requirements	4.5.2
Completion--		CONTRACTOR's--	
Final Application for Payment	14.12	Compensation	11.1-11.2
Final Inspection	14.11	Continuing Obligation	14.15
Final Payment and Acceptance	14.13-14.14	Defective Work	9.6, 13.10-13.14
Partial Utilization	14.10	Duty to correct defective Work	13.11
Substantial Completion	1.38, 14.8-14.9	Duty to Report--	
Waiver of Claims	14.15	Changes in the Work caused by	
Computation of Times	17.2.1-17.2.2	Emergency	6.23
Concerning Subcontractors,		Defects in Work of Others	7.3
Suppliers and Other	6.8-6.11	Differing conditions	4.2.3
Conferences--		Discrepancy in Documents	2.5, 3.3.2, 6.14.2
initially acceptable schedules	2.9	Underground Facilities not indicated	4.3.2
preconstruction	2.8	Emergencies	6.23
Conflict, Error, Ambiguity, Discrepancy--		Equipment and Machinery Rental, Cost	
CONTRACTOR to Report.....	2.5, 3.3.2	of the Work	11.4.5.3
Construction, before starting by CONTRACTOR.....	2.5-2.7	Fee--Cost-Plus	11.4.5.6, 11.5.1, 11.6
Construction Machinery, Equipment, Etc.....	6.4	General Warranty and Guarantee	6.30
Continuing the Work	6.29, 10.4	Hazard Communication Programs	6.22
Contract Documents--		Indemnification	6.12, 6.16, 6.31-6.33
Amending	3.5	Inspection of the Work	7.3, 13.4
Bonds	5.1	Labor, Materials and Equipment	6.3-6.5
Cash Allowances	11.8	Laws and Regulations, Compliance by	6.14.1
Change of Contract Price.....	11	Liability Insurance	5.4
Change of Contract Times	12	Notice of Intent to Appeal	9.10, 10.4
Changes in the Work	10.4-10.5	obligation to perform and complete the Work	6.30
check and verify	2.5	Patent Fees and Royalties, paid for by	6.12
Clarifications and Interpretations	3.2, 3.6, 9.4, 9.11	Performance and Other Bonds	5.1
definition of	1.10	Permits, obtained and paid for by	6.13
ENGINEER as initial interpreter of	9.11	Progress Schedule	2.6, 2.8, 2.9, 6.6, 6.29, 10.4, 15.2.1
ENGINEER as OWNER's representative	9.1	Request for formal decision on disputes	9.11
general	3	Responsibilities--	
Insurance	5.3	Changes in the Work	10.1
Intent	3.1-3.4	Concerning Subcontractors, Suppliers and Others.....	6.8-6.11
minor variations in the Work	3.6	Continuing the Work	6.29, 10.4
OWNER's responsibility to furnish data	8.3	CONTRACTOR's expense	6.7.1
OWNER's responsibility to make		CONTRACTOR's General Warranty and Guarantee	6.30
prompt payment	8.3, 14.4, 14.13	CONTRACTOR's review prior to Shop Drawing or	
precedence	3.1, 3.3.3	Sample Submittal	6.25
Record Documents	6.19	Coordination of Work	6.9.2
		Emergencies	6.23

ENGINEER's evaluation, Substitutes or "Or-Equal" Items	6.7.3	Records	11.7
For Acts and Omissions of Others	6.9.1-6.9.2, 9.13	Cost of the Work--	
for deductible amounts, insurance	5.9	Bonds and insurance, additional	11.4.5.9
general	6, 7.2, 7.3, 8.9	Cash Discounts	11.4.2
Hazardous Communication Programs	6.22	CONTRACTOR's Fee	11.6
Indemnification	6.31-6.33	Employee Expenses	11.4.5.1
Labor, Materials and Equipment	6.3-6.5	Exclusions to	11.5
Laws and Regulations	6.14	General	11.4-11.5
Liability Insurance	5.4	Home office and overhead expenses	11.5
Notice of variation from Contract Documents	6.27	Losses and damages	11.4.5.6
Patent Fees and Royalties	6.12	Materials and equipment	11.4.2
Permits	6.13	Minor expenses	11.4.5.8
Progress Schedule	6.6	Payroll costs on changes	11.4.1
Record Documents	6.19	performed by Subcontractors	11.4.3
related Work performed prior to ENGINEER's		Records	11.7
approval of required submittals	6.28	Rentals of construction equipment and machinery	11.4.5.3
safe structural loading	6.18	Royalty payments, permits and license fees	11.4.5.5
Safety and Protection	6.20, 7.2, 13.2	Site office and temporary facilities	11.4.5.2
Safety Representative	6.21	Special Consultants, CONTRACTOR's	11.4.4
Scheduling the Work	6.9.2	Supplemental	11.4.5
Shop Drawings and Samples	6.24	Taxes related to the Work	11.4.5.4
Shop Drawings and Samples Review		Tests and Inspection	13.4
by ENGINEER	6.26	Trade Discounts	11.4.2
Site Cleanliness	6.17	Utilities, fuel and sanitary facilities	11.4.5.7
Submittal Procedures	6.25	Work after regular hours	11.4.1
Substitute Construction Methods and		Covering Work	13.6-13.7
Procedures	6.7.2	Cumulative Remedies	17.4-17.5
Substitutes and "Or-Equal" Items	6.7.1	Cutting, fitting and patching	7.2
Superintendence	6.2	Data, to be furnished by OWNER	8.3
Supervision	6.1	Day--definition of	17.2.2
Survival of Obligations	6.34	Decisions on Disputes	9.11, 9.12
Taxes	6.15	defective--definition of	1.14
Tests and Inspections	13.5	defective Work--	
To Report	2.5	Acceptance of	10.4.1, 13.13
Use of Premises	6.16-6.18, 6.30, 2.4	Correction or Removal of	10.4.1, 13.11
Review Prior to Shop Drawing or Sample Submittal	6.25	Correction Period	13.12
Right to adjustment for changes in the Work	10.2	in general	13, 14.7, 14.11
right to claim	4, 7.1, 9.4, 9.5, 9.11, 10.2, 11.2, 11.9, 12.1,	Observation by ENGINEER	9.2
	13.9, 14.8, 15.1, 15.5, 17.3	OWNER May Stop Work	13.10
Safety and Protection	6.20-6.22, 7.2, 13.2	Prompt Notice of Defects	13.1
Safety Representative	6.21	Rejecting	9.6
Shop Drawings and Samples Submittals	6.24-6.28	Uncovering the Work	13.8
Special Consultants	11.4.4	Definitions	1
Substitute Construction Methods and Procedures	6.7	Delays	4.1, 6.29, 12-3-12.4
Substitutes and "Or-Equal" Items, Expense	6.7.1, 6.7.2	Delivery of Bonds	2.1
Subcontractors, Suppliers and Others	6.8-6.11	Delivery of certificates of insurance	2.7
Supervision and Superintendence	6.1, 6.2, 6.21	Determinations for Unit Prices	9.10
Taxes, Payment by	6.15	Differing Subsurface or	
Use of Premises	6.16-6.18	Physical Conditions	
Warranties and guarantees	6.30, 6.5	Notice of	4.2.3
Warranty of Title	14.3	ENGINEER's Review	4.2.4
Written Notice Required--		Possible Contract Documents Change	4.2.6
CONTRACTOR stop Work or terminate	15.5	Possible Price and Times Adjustments	4.2.6
Reports of Differing Subsurface and Physical		Discrepancies-Reporting and Resolving	2.5, 3.3.2, 6.14.2
Conditions	4.2.3	Dispute Resolution--	
Substantial Completion	14.8	Agreement	16.1-16.6
CONTRACTORS--other	7	Arbitration	16.1-16.5
Contractual Liability Insurance	5.4.10	general	16
Contractual Times Limits	12.2	Mediation	16.6
Coordination		Dispute Resolution Agreement	16.1-16.6
CONTRACTOR's responsibility	6.9.2	Disputes, Decisions by ENGINEER	9.11-9.12
Copies of Documents	2.2	Documents--	
Correction Period	13.12	Copies of	2.2
Correction, Removal or Acceptance of		Record	6.19
Defective Work		Reuse of	3.7
in general	10.4.1, 13.10-13.14	Drawings--definition of	1.15
Acceptance of Defective Work	13.13	Easements	4.1
Correction or Removal of Defective Work	6.30, 13.11	Effective date of Agreement--definition of	1.16
Correction Period	13.12	Emergencies	6.23
OWNER May Correct Defective Work	13.14	ENGINEER--	
OWNER May Stop Work	13.10	as initial interpreter on disputes	9.11-9.12
Cost--		definition of	1.17
of Tests and Inspections	13.4	Limitations on authority and	
		responsibilities	9.13

Replacement of	8.2	Special, required by ENGINEER	9.6
Resident Project Representative	9.3	Tests and Approval	8.7, 13.3-13.4
ENGINEER's Consultant--definition of	1.18	Insurance--	
ENGINEER's--		Acceptance of, by OWNER	5.14
authority and responsibility, limitations on	9.13	Additional, required by changes	
Authorized Variations in the Work	9.5	in the Work	11.4.5.9
Change Orders, responsibility for	9.7,10, 11, 12	Before starting the Work	2.7
Clarifications and Interpretations	3.6.3, 9.4	Bonds and--in general	5
Decisions on Disputes	9.11-9.12	Cancellation Provisions	5.8
defective Work, notice of	13.1	Certificates of	2.7, 5, 5.3, 5.4.11, 5.4.13, 5.6.5, 5.8, 5.14, 9.13.4, 14.12
Evaluation of Substitute Items	6.7.3	completed operations	5.4.13
Liability	6.32, 9.12	CONTRACTOR's Liability	5.4
Notice Work is Acceptable	14.13	CONTRACTOR's objection to coverage	5.14
Observations	6.30.2, 9.2	Contractual Liability	5.4.10
OWNER's Representative	9.1	deductible amounts, CONTRACTOR's	
Payments to the CONTRACTOR,		responsibility	5.9
Responsibility for	9.9, 14	Final Application for Payment	14.12
Recommendation of Payment	14.4, 14.13	Licensed Insurers	5.3
Responsibilities--		Notice requirements, material	
Limitations on	9.11-9.13	changes	5.8, 10.50
Review of Reports on Differing Subsurface		Option to Replace	5.14
and Physical Conditions	4.2.4	other special insurances	5.10
Shop Drawings and Samples, review		OWNER as fiduciary for insured	5.12-5.13
responsibility	6.26	OWNER's Liability	5.5
Status During Construction--		OWNER's Responsibility	8.5
authorized variations in the Work	9.5	Partial Utilization, Property Insurance	5.15
Clarifications and Interpretations	9.4	Property	5.6-5.10
Decisions on Disputes	9.11-9.12	Receipt and Application of Insurance Proceeds	5.12-5.13
Determination on Unit Price	9.10	Special Insurance	5.10
ENGINEER as Initial Interpreter	9.11-9.12	Waiver of Rights	5.11
ENGINEER's Responsibilities	9.1-9.12	Intent of Contract Documents	3.1-3.4
Limitations on ENGINEER's Authority and		Interpretations and Clarifications	3.6.3, 9.4
Responsibilities	9.13	Investigations of physical conditions	4.2
OWNER's Representative	9.1	Labor, Materials and Equipment	6.3-6.5
Project Representative	9.3	Lands--	
Rejecting Defective Work	9.6	and Easements	8.4
Shop Drawings, Change Orders and		Availability of	4.1, 8.4
Payments	9.7-9.9	Reports & Tests	8.4
Visits to Site	9.2	Laws and Regulations--Laws or Regulations--	
Unit Price Determinations	9.10	Bonds	5.1-5.2
Visits to Site	9.2	Changes in the Work	10.4
Written consent required	7.2, 9.1	Contract Documents	3.1
Equipment, Labor, Materials and	6.3-6.5	CONTRACTOR's Responsibilities	6.14
Equipment rental, Cost of the Work	11.4.5.3	Correction Period, defective Work	13.12
Equivalent Materials and Equipment	6.7	Cost of the Work, taxes	11.4.5.4
Errors or omissions	6.33	definition of	1.22
Evidence of Financial Arrangements	8.11	general	6.14
Explorations of physical conditions	4.2.1	Indemnification	6.31-6.33
Fee, CONTRACTOR's--Costs-Plus	11.6	Insurance	5.3
Field Order--		Precedence	3.1, 3.3.3
definition of	1.19	Reference to	3.3.1
issued by ENGINEER	3.6.1, 9.5	Safety and Protection	6.20, 13.2
Final Application for Payment	14.12	Subcontractors, Suppliers and Others	6.8-6.11
Final Inspection	14.11	Tests and Inspections	13.5
Final Payment--		Use of Premises	6.16
and Acceptance	14.13-14.14	Visits to Site	9.2
Prior to, for cash allowances	11.8	Liability Insurance--	
General Provisions	17.3-17.4	CONTRACTOR's	5.4
General Requirements--		OWNER's	5.5
definition of	1.20	Licensed Sureties and Insurers	5.3
principal references to	2.6, 6.4, 6.6-6.7, 6.24	Liens--	
Giving Notice	17.1	Application for Progress Payment	14.2
Guarantee of Work--by		Contractor's Warranty of Title	14.3
CONTRACTOR	6.30, 14.12	Final Application for Payment	14.12
Hazard Communication Programs	6.22	definition of	1.23
Hazardous Waste--		Waiver of Claims	14.15
definition of	1.21	Limitations on ENGINEER's authority and	
general	4.5	responsibilities	9.13
OWNER's responsibility for	8.10	Limited Reliance by CONTRACTOR Authorized	4.2.2
Indemnification	6.12, 6.16, 6.31-6.33	Maintenance and Operating Manuals--	
Initially Acceptable Schedules	2.9	Final Application for Payment	14.12
Inspection--		Manuals (of others)--	
Certificates of	9.13.4, 13.5, 14.12	Precedence	3.3.3.1
Final	14.11		

Reference to in Contract Documents	3.3.1	lands and easements	8.4
Materials and equipment--		prompt payment by	8.3
furnished by CONTRACTOR	6.3	replacement of ENGINEER	8.2
not incorporated in Work	14.2	reports and tests	8.4
Materials or equipment--equivalent	6.7	stop or suspend Work	8.8, 13.10, 15.1
Mediation (Optional)	16.7	terminate CONTRACTOR's services	8.8, 15.2
Milestones--definition of	1.24	separate representative at site	9.3
Miscellaneous--		independent testing	13.4
Computation of Times	17.2	use or occupancy of the Work	5.15, 14.10
Cumulative Remedies	17.4	written consent or approval required	9.1, 6.3, 11.4
Giving Notice	17.1	written notice required	7.1, 9.4, 9.11, 11.2, 11.9, 14.7, 15.4
Notice of Claim	17.3	PCBs--	
Professional Fees and Court Costs Included	17.5	definition of	1.29
Multi-prime contracts	7	general	4.5
Not Shown or Indicated	4.3.2	OWNER's responsibility for	8.10
Notice of--		Partial Utilization--	
Acceptability of Project	14.13	definition of	1.29
Award, definition of	1.25	general	6.30.2.4, 14.10
Claim	17.3	Property Insurance	5.15
Defects	13.1	Patent Fees and Royalties	6.12
Differing Subsurface or Physical Conditions	4.2.3	Payment Bonds	5.1-5.2
Giving	17.1	Payments, Recommendation of	14.4-14.7, 14.13
Tests and Inspections	13.3	Payments to CONTRACTOR and Completion--	
Variation, Shop Drawing and Sample	6.27	Application for Progress Payments	14.2
Notice to Proceed--		CONTRACTOR's Warranty of Title	14.3
definition of	1.26	Final Application for Payment	14.12
giving of	2.3	Final Inspection	14.11
Notification to Surety	10.5	Final Payment and Acceptance	14.13-14.14
Observations, by ENGINEER	6.30, 9.2	general	8.3, 14
Occupancy of the Work	5.15, 6.30.2.4, 14.10	Partial Utilization	14.10
Omissions or acts by CONTRACTOR	6.9, 9.13	Retainage	14.2
"Open peril" policy form, Insurance	5.6.2	Review of Applications for Progress	
Option to Replace	5.14	Payments	14.4-14.7
"Or Equal" Items	6.7	prompt payment	8.3
Other work	7	Schedule of Values	14.1
Overtime Work--prohibition of	6.3	Substantial Completion	14.8-14.9
OWNER--		Waiver of Claims	14.15
Acceptance of defective Work	13.13	when payments due	14.4, 14.13
appoint an ENGINEER	8.2	withholding payment	14.7
as fiduciary	5.12-5.13	Performance Bonds	5.1-5.2
Availability of Lands, responsibility	4.1	Permits	6.13
definition of	1.27	Petroleum--	
data, furnish	8.3	definition of	1.30
May Correct Defective Work	13.14	general	4.5
May refuse to make payment	14.7	OWNER's responsibility for	8.10
May Stop the Work	13.10	Physical Conditions--	
may suspend work,		Drawings of, in or relating to	4.2.1.2
terminate	8.3, 13.10, 15.1-15.4	ENGINEER's review	4.2.4
Payment, make prompt	8.3, 14.4, 14.13	existing structures	4.2.2
performance of other Work	7.1	general	4.2.1.2
permits and licenses, requirements	6.13	Subsurface and,	4.2
purchased insurance requirements	5.6-5.10	Underground Facilities	4.3
OWNER's--		Possible Contract Documents Change	4.2.5
Acceptance of the Work	6.30.2.5	Possible Price and Times Adjustments	4.2.6
Change Orders, obligation to		Reports and Drawings	4.2.1
execute	8.6, 10.4	Notice of Differing Subsurface or,	4.2.3
Communications	8.1	Subsurface and	4.2
Coordination of the Work	7.4	Subsurface Conditions	4.2.1.1
Disputes, request for decision	9.11	Technical Data, Limited Reliance by	
Inspections, tests and approvals	8.7, 13.4	CONTRACTOR Authorized	4.2.2
Liability Insurance	5.5	Underground Facilities--	
Notice of Defects	13.1	general	4.3
Representative-- During Construction,		Not Shown or Indicated	4.3.2
ENGINEER's Status	9.1	Protection of	4.3, 6.20
Responsibilities--		Shown or Indicated	4.3.1
Asbestos, PCB's, Petroleum, Hazardous		Technical Data	4.2.2
Waste on Radioactive Material	8.10	Preconstruction Conference	2.8
Change Orders	8.6	Preliminary Matters	2
Changes in the Work	10.1	Preliminary Schedules	2.6
communications	8.1	Premises, Use of	6.16-6.18
CONTRACTOR's responsibilities	8.9	Price, Change of Contract	11
evidence of financial arrangements	8.11	Price, Contract--definition of	1.11
inspections, tests and approvals	8.7	Progress Payment, Applications for	14.2
Insurance	8.5	Progress payment--retainage	14.2

Progress schedule, CONTRACTOR's2.6, 2.8, 2.9, 6.6,
6.29, 10.4, 15.2.1

Project--definition of 1.31

Project Representative--
ENGINEER's Status During Construction 9.3

Project Representative, Resident
--definition of 1.33

prompt payment by OWNER 8.3

Property Insurance
Additional5.7
general 5.6-5.10
Partial Utilization 5.15, 14.10.2
receipt and application of
proceeds5.12-5.13

Protection, Safety and 6.20-6.21, 13.2

Punch list 14.11

Radioactive Material--
definition 1.32
general4.5
OWNER's responsibility for 8.10

Recommendation of Payment14.4, 14.5, 14.13

Record Documents 6.19, 14.12

Records, procedures for maintaining2.8

Reference Points 4.4

Reference to Standards and Specifications
of Technical Societies 3.3

Regulations, Laws and (or) 6.14

Rejecting Defective Work 9.6

Related Work--
at Site7.1-7.3
Performed prior to Shop Drawings
and Samples submittals review 6.28

Remedies, cumulative 17.4, 17.5

Removal or Correction of
Defective Work 13.11

rental agreements, OWNER approval
required 11.4.5.3

replacement of ENGINEER, by OWNER 8.2

Reporting and Resolving Discrepancies2.5, 3.3.2, 6.14.2

Reports--
and Drawings4.2.1
and Tests, OWNER's responsibility 8.4

Resident Project Representative--
definition of 1.33
provision for9.3

Resident superintendent, CONTRACTOR's 6.2

Responsibilities--
CONTRACTOR's-in general6
ENGINEER's-in general9
Limitations on9.13
OWNER's-in general 8

Retainage 14.2

Reuse of Documents3.7

Review by CONTRACTOR: Shop Drawings
and Samples Prior to Submittal 6.25

Review of Applications for Progress
Payments 14.4-14.7

Right to an adjustment 10.2

Rights of Way4.1

Royalties, Patent Fees and 6.12

Safe Structural Loading 6.18

Safety--
and Protection4.3.2, 6.16, 6.18, 6.20-6.21, 7.2, 13.2
general6.20-6.23
Representative, CONTRACTOR's 6.21

Samples--
definition of 1.34
general6.24-6.28
Review by CONTRACTOR 6.25
Review by ENGINEER 6.26, 6.27
related Work 6.28
submittal of 6.24.2
submittal procedures 6.25
Schedule of progress2.6, 2.8-2.9, 6.6, 6.29, 10.4, 15.2.1

Schedule of Shop Drawing and Sample
Submittals2.6, 2.8-2.9, 6.24-6.28

Schedule of Values2.6, 2.8-2.9, 14.1

Schedules--
Adherence to15.2.1
Adjusting6.6
Change of Contract Times10.4
Initially Acceptable2.8-2.9
Preliminary2.6
Scope of Changes10.3-10.4

Subsurface Conditions4.2.1.1

Shop Drawings--
and Samples, general6.24-6.28
Change Orders & Applications for
Payments, and9.7-9.9
definition of1.35
ENGINEER's approval of3.6.2
ENGINEER's responsibility
for review9.7, 6.24-6.28
related Work6.28
review procedures2.8, 6.24-6.28
submittal required6.24.1
Submittal Procedures6.25
use to approve substitutions6.7.3

Shown or Indicated4.3.1

Site Access7.2, 13.2

Site Cleanliness6.17

Site, Visits to--
by ENGINEER9.2, 13.2
by others13.2

"Special causes of loss" policy form, insurance5.6.2

Specifications--
definition of1.36
of Technical Societies, reference to3.3.1
precedence3.3.3

Standards and Specifications of Technical
Societies3.3

Starting Construction, Before2.5-2.8

Starting the Work2.4

Stop or Suspend Work--
by CONTRACTOR15.5
by OWNER8.8, 13.10, 15.1

Storage of materials and equipment4.1, 7.2

Structural Loading, Safety6.18

Subcontractor--
Concerning6.8-6.11
definition of1.37
delays12.3
waiver of rights6.11

Subcontractors--in general6.8-6.11

Subcontracts--required provisions 5.11, 6.11, 11.4.3

Submittals--
Applications for Payment14.2
Maintenance and Operation Manuals 14.12
Procedures6.25
Progress Schedules2.6, 2.9
Samples6.24-6.28
Schedule of Values2.6, 14.1
Schedule of Shop Drawings and
Samples Submissions2.6, 2.8-2.9
Shop Drawings6.24-6.28

Substantial Completion--
certification of6.30.2.3, 14.8-14.9
definition of1.38

Substitute Construction Methods or Procedures6.7.2

Substitutes and "Or-Equal" Items6.7
CONTRACTOR's Expense6.7.1.3
ENGINEER's Evaluation6.7.3
"Or-Equal"6.7.1
Substitute Construction Methods of Procedures6.7.2
Substitute Items6.7.1.2

Subsurface and Physical Conditions--
Drawings of, in or relating to4.2.1.2
ENGINEER's Review4.2.4

general	4.2	Milestones	12
Limited Reliance by CONTRACTOR		Requirements--	
Authorized	4.2.2	appeals	16
Notice of Differing Subsurface or		clarifications, claims and	
Physical Conditions	4.2.3	disputes	9.11, 11.2, 12
Physical Conditions	4.2.1.2	commencement of contract times	2.3
Possible Contract Documents Change	4.2.5	preconstruction conference	2.8
Possible Price and Times Adjustments	4.2.6	schedules	2.6, 2.9, 6.6
Reports and Drawings	4.2.1	starting the Work	2.4
Subsurface and	4.2	Title, Warranty of	14.3
Subsurface Conditions at the Site	4.2.1.1	Uncovering Work	13.8-13.9
Technical Data	4.2.2	Underground Facilities, Physical Conditions--	
Supervision--		definition of	1.41
CONTRACTOR's responsibility	6.1	Not Shown or Indicated	4.3.2
OWNER shall not supervise	8.9	protection of	4.3, 6.20
ENGINEER shall not supervise	9.2, 9.13.2	Shown or Indicated	4.3.1
Superintendence	6.2	Unit Price Work--	
Superintendent, CONTRACTOR's resident	6.2	claims	11.9.3
Supplementary costs	11.4.5	definitions of	1.42
Supplementary Conditions--		general	11.9, 14.1, 14.5
definition of	1.39	Unit Prices--	
principal reference to	1.10, 1.18, 2.2, 2.7, 4.2, 4.3, 5.1	general	11.3.1
5.3, 5.4, 5.6-5.9, 5.11 6.8, 6.13, 7.4, 8.11, 9.3, 9.10		Determination for	9.10
Supplementing Contract Documents	3.6	Use of Premises	6.16, 6.18, 6.30.2.4
Supplier--		Utility owners	6.13, 6.20, 7.1-7.3, 13.2
definition of	1.40	Utilization, Partial	1.28, 5.15, 6.30, 2.4, 14.10
principal references to	3.7, 6.5, 6.8-6.11,	Value of the Work	11.3
6.20, 6.24, 9.13, 14.12		Values, Schedule of	2.6, 2.8-2.9, 14.1
Waiver of Rights	6.11	Variations in Work--Minor	
Surety--		Authorized	6.25, 6.27, 9.5
consent to final payment	14.12, 14.14	Visits of Site--by ENGINEER	9.2
ENGINEER has no duty to	9.13	Waiver of Claims--on Final	
Notification of	10.1, 10.5, 15.2	Payment	14.15
qualification of	5.1-5.3	Waiver of Rights by insured parties	5.11, 6.11
Survival of Obligations	6.34	Warranty and Guarantee, General--by	
Suspend Work, OWNER May	13.10, 15.1	CONTRACTOR	6.30
Suspension of Work and Termination--	15	Warranty of Title, CONTRACTOR's	14.3
CONTRACTOR May Stop Work or		Work--	
Terminate	15.5	Access to	13.2
OWNER May Suspend Work	15.1	by others	7
OWNER May Terminate	15.2-15.4	Changes in the	10
Taxes--Payment by CONTRACTOR	6.15	Continuing the,	6.29
Technical Data--		CONTRACTOR May Stop Work	
Limited Reliance by CONTRACTOR	4.2.2	or Terminate	15.5
Possible Price and Times Adjustments	4.2.6	Coordination of	7.4
Reports of Differing Subsurface and		Costs of the	11.4-11.5
Physical Conditions	4.2.3	definition of	1.43
Temporary construction facilities	4.1	neglected by CONTRACTOR	13.14
Termination--		other Work	7
by CONTRACTOR	15.5	OWNER May Stop Work	13.10
by OWNER	8.8, 15.1-15.4	OWNER May Suspend Work	13.10, 15.1
of ENGINEER's employment	8.2	Related, Work at Site	7.1-7.3
Suspension of Work-in general	15	Starting the	2.4
Terms and Adjectives	3.4	Stopping by CONTRACTOR	15.5
Tests and Inspections--		Stopping by OWNER	15.1-15.4
Access to the Work, by others	13.2	Variation and deviation authorized,	
CONTRACTOR's responsibilities	13.5	minor	3.6
cost of	13.4	Work Change Directive--	
covering Work prior to	13.6-13.7	claims pursuant to	10.2
Laws and Regulations (or)	13.5	definition of	1.44
Notice of Defects	13.1	principal references to	3.5.3, 10.1-10.2
OWNER May Stop Work	13.10	Written Amendment--	
OWNER's independent testing	13.4	definition of	1.45
special, required by ENGINEER	9.6	principal references to	1.10, 3.5, 5.10, 5.12, 6.6.2, 6.8.2,
timely notice required	13.4	6.19, 10.1, 10.4, 11.2, 12.1, 13.12.2, 14.7.2	
Uncovering the Work, at ENGINEER's		Written Clarifications and	
request	13.8-13.9	Interpretations	3.6.3, 9.4, 9.11
Times--		Written Notice Required--	
Adjusting	6.6	by CONTRACTOR	7.1, 9.10--9.11, 10.4, 11.2, 12.1
Change of Contract	12	by OWNER	9.10-9.11, 10.4, 11.2, 13.14
Adjusting	6.6		
Computation of	17.2		
Contract Times--definition of	1.12		
day	17.2		

GENERAL CONDITIONS

ARTICLE 1--DEFINITIONS

Wherever used in these General Conditions or in the other Contract

Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

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

1.2. *Agreement*--The written contract between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

1.3. *Application for Payment*--The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

1.4. *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.

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

1.6. *Bidding Documents*--The advertisement or invitation to Bid, instructions to bidders, the Bid form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

1.7. *Bidding Requirements*--The advertisement or invitation to Bid, instructions to bidders, and the Bid form.

1.8. *Bonds*--Performance and Payment bonds and other instruments of security.

1.9. *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.

1.10. *Contract Documents*--The Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders and ENGINEER's written interpretations and classifications issued pursuant to paragraphs 3.5, 3.6.1, and 3.6.3 on or after the Effective Date of the Agreement. Shop Drawing submittals approved pursuant to paragraphs 6.26 and 6.27 and the reports and drawings referred to in paragraphs 4.2.1.1 and 4.2.2.2 are not Contract Documents.

1.11. *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 11.9.1 in the case of Unit Price Work).

1.12. *Contract Times*--The numbers of days or the dates stated in the Agreement: (i) to achieve Substantial Completion, and (ii) to complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13.

1.13. *CONTRACTOR*--The person, firm or corporation with whom the OWNER has entered into the Agreement.

1.14. *defective*--An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.8 or 14.10).

1.15. *Drawings*--The drawings which show the scope, extent and character of the Work to be furnished and performed by CONTRACTOR and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents. Shop drawings are not Drawings as so defined.

1.16. *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.

1.17. *ENGINEER*--The person, firm or corporation named as such in the Agreement.

1.18. *ENGINEER's Consultant*--A person, firm, or corporation having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Conditions.

1.19. *Field Order*--A written order issued by ENGINEER which orders minor changes in the Work in accordance with paragraph 9.5 but which does not involve a change in the Contract Price or the Contract Times.

1.20. *General Requirements*--Sections of Division 1 of the Specifications.

1.21. *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.

1.22. *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.

1.23. *Liens*--Liens, charges, security interests or encumbrances upon real property or personal property.

1.24. *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.

1.25. *Notice of Award*--The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

1.26. *Notice to Proceed*--A written notice given by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

1.27. *OWNER*--The public body or authority, corporation, association, firm or person with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.

1.28. *Partial Utilization*--Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

1.29. *PCBs*--Polychlorinated biphenyls.

1.30. *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 Wastes and crude oils.

1.31. *Project*--The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

1.32. *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.

1.33. *Resident Project Representative*--The authorized representative of ENGINEER who may be assigned to the site or any part thereof.

1.34. *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.

1.35. *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.

1.36. *Specifications*--Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

1.37. *Subcontractor*--An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

1.38. *Substantial Completion*--The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

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

1.40. *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.

1.41. *Underground Facilities*--All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

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

1.43. *Work*--The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

1.44. *Work Change Directive*--A written directive 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 physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.23. A Work Change Directive will not change the Contract Price or the Contract Times, but is evidence that the parties expect that the change directed 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 as provided in paragraph 10.2.

1.45. *Written Amendment*--A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

ARTICLE 2--PRELIMINARY MATTERS

Delivery of Bonds:

2.1. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds

as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

2.2. OWNER shall furnish to CONTRACTOR up to ten copies (unless otherwise specified in the Supplementary Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

Commencement of Contract Times; Notice to Proceed:

2.3. 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 thirty 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.

Starting the Work:

2.4. CONTRACTOR shall start to perform the Work on the date when the Contract Times commence to run, but no Work shall be done at the site prior to the date on which the Contract Times commence to run.

Before Starting Construction:

2.5. Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon 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; however, 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.

2.6. Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1. 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;

2.6.2. a preliminary schedule for Shop Drawing and Sample submittals which will list each required submittal and the times for submitting, reviewing and processing such submittal;

2.6.3. a preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.7. 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 paragraphs 5.4, 5.6 and 5.7.

Preconstruction Conference:

2.8. Within twenty days after the Contract Times start to run, but before any Work at the site is started, a conference attended by 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 2.6, procedures for handling Shop Drawings and other submittals, processing Applications for Payment and maintaining required records.

Initially Acceptable Schedules:

2.9. Unless otherwise provided in the Contract Documents, at least ten 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 2.6. CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until the schedules are submitted to and acceptable to ENGINEER as provided below. The progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within any specified Milestones and the Contract Times, but such acceptance will neither impose on ENGINEER responsibility for the sequencing, scheduling or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefore. CONTRACTOR's schedule of Shop Drawing and Sample submissions will be acceptable to ENGINEER as providing a workable arrangement for reviewing and processing the required submittals. CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3--CONTRACT DOCUMENT: INTENT,
AMENDING, REUSE

Intent:

3.1. The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2. 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 Work, 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 furnished and performed whether or not specifically called for. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

3.3. Reference to Standards and Specifications of Technical Societies; Reporting and Resolving Discrepancies:

3.3.1. Reference to standards, specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest 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.

3.3.2. 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 such Law or Regulation applicable to the performance of the Work or of any such standard, specification, manual or code or of any instruction of any Supplier referred to in paragraph 6.5, CONTRACTOR shall report it to ENGINEER in writing at once, and, CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as authorized by paragraph 6.23) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.5 or 3.6; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

3.3.3. Except as otherwise specifically stated in the Contract Documents or as may be provided by amendment or supplement thereto issued by one of the methods indicated in paragraph 3.5 or 3.6, 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:

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

3.3.3.2. the provisions of any such 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).

No provision of any such standard, specification, manual, code or instruction shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to OWNER, ENGINEER or any of ENGINEER's Consultants, agents or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of paragraph 9.13 or any other provision of the Contract Documents.

3.4. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as approved" or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate, in general, the completed 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 shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.13 or any other provision of the Contract Documents.

Amending and Supplementing Contract Documents:

3.5. The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

3.5.1. a formal Written Amendment.

3.5.2. a Change Order (pursuant to paragraph 10.4), or

3.5.3. a Work Change Directive (pursuant to paragraph 10.1).

3.6. In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

3.6.1. a Field Order (pursuant to paragraph 9.5),

3.6.2. ENGINEER's approval of a Shop Drawing or Sample (pursuant to paragraphs 6.26 and 6.27), or

3.6.3. ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

Reuse of Documents:

3.7. CONTRACTOR, and any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of ENGINEER or ENGINEER's Consultant, and (ii) shall not reuse any of such Drawings, Specifications, other documents or copies on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaption by ENGINEER.

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

Availability of Lands:

4.1. OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of CONTRACTOR. Upon reasonable written request, OWNER shall furnish CONTRACTOR with a correct 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 lien against such lands in accordance with applicable Laws and Regulations. OWNER shall identify any encumbrances or restrictions not of general application but

specifically related to use of lands so furnished with which CONTRACTOR will have to comply in performing the Work. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR and OWNER are unable to agree on entitlement to or the amount or extent of any adjustments in the Contract Price or the Contract Times as a result of any delay in OWNER's furnishing these lands, rights-of-way or easements, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.2. *Subsurface and Physical Conditions:*

4.2.1. *Reports and Drawings:* Reference is made to the Supplementary Conditions for identification of:

4.2.1.1. *Subsurface Conditions:* Those reports of explorations and tests of subsurface conditions at or contiguous to the site that have been utilized by ENGINEER in preparing the Contract Documents; and

4.2.1.2. *Physical Conditions:* Those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) that have been utilized by ENGINEER in preparing the Contract Documents.

4.2.2. *Limited Reliance by CONTRACTOR Authorized: Technical Data:* 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, ENGINEER or any of ENGINEER's Consultants with respect to:

4.2.2.1. 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

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

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

4.2.3. *Notice of Differing Subsurface or Physical Conditions:* If CONTRACTOR believes that any subsurface or physical condition at or contiguous to the site that is uncovered or revealed either:

4.2.3.1. is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is materially inaccurate, or

4.2.3.2. is of such a nature as to require a change in the Contract Documents, or

4.2.3.3. differs materially from that shown or indicated in the Contract Documents, or

4.2.3.4. 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 conditions affected thereby or performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.23), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such conditions or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

4.2.4. *ENGINEER's Review:* ENGINEER will promptly review the pertinent conditions, 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.

4.2.5. *Possible Contract Documents Change:* If ENGINEER concludes that a change in the Contract Documents is required as a result of a condition that meets one or more of the categories in paragraph 4.2.3., a Work Change Directive or a Change Order will be issued as provided in Article 10 to reflect and document the consequences of such change.

4.2.6. *Possible Price and Times Adjustments:* An equitable adjustment in the Contract Price or in the Contract Times, or both, will be allowed to the extent that the existence of such uncovered or revealed condition causes an increase or decrease in CONTRACTOR's cost of, or time required for performance of, the Work; subject, however, to the following:

4.2.6.1. such condition must meet any one or more of the categories described in paragraphs 4.2.3.1 through 4.2.3.4, inclusive;

4.2.6.2. a change in the Contract Documents pursuant to paragraph 4.2.5 will not be an automatic authorization of nor a condition precedent to entitlement to any such adjustment;

4.2.6.3. 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 9.10 and 11.9; and

4.2.6.4. CONTRACTOR shall not be entitled to any adjustment in the Contract Price or Times if;

4.2.6.4.1. CONTRACTOR knew of the existence of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract Times by the submission of a bid or becoming bound under a negotiated contract; or

4.2.6.4.2. 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

4.2.6.4.3. CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.2.3.

If OWNER and CONTRACTOR are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in the Contract Price or Contract Times, a claim may be made therefore as provided in Articles 11 and 12. However, OWNER, ENGINEER and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses or damages sustained by CONTRACTOR on or in connection with any other project or anticipated project.

4.3. Physical Conditions--Underground Facilities:

4.3.1. *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 or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

4.3.1.1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and

4.3.1.2. The cost of all of the following will be included in the Contract Price and CONTRACTOR shall have full responsibility for: (i) reviewing and checking all such information and data, (ii) locating all Underground Facilities shown or indicated in the Contract Documents, (iii) coordination of the Work with the owners of such Underground Facilities during construction, and (iv) the safety and protection of all such Underground Facilities as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work.

4.3.2. *Not Shown or Indicated:* If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated 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 6.23), 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 of the Underground Facility. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued as provided in Article 10 to reflect and document such consequences. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated 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 the amount or length of any such adjustment in Contract Price or Contract Times, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. However, OWNER, ENGINEER and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses or damages incurred or sustained by CONTRACTOR on or in connection with any other project or anticipated project.

Reference Points:

4.4. 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 shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point 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 by professionally qualified personnel.

4.5. Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material:

4.5.1. OWNER shall be responsible for any Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material 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 and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the site. OWNER shall not be responsible for any such materials brought to the site by CONTRACTOR, Subcontractor, Suppliers or anyone else for whom CONTRACTOR is responsible.

4.5.2. CONTRACTOR shall immediately: (i) stop all Work in connection with such hazardous condition and in any area affected thereby (except in an emergency as required by paragraph 6.23), and (ii) notify OWNER and ENGINEER (and 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 hazardous condition or take corrective action, if any. CONTRACTOR shall not be required to resume Work in connection with such hazardous condition or in any such affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR special 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 the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of such Work stoppage or such special conditions under which Work is agreed by CONTRACTOR to be resumed, either party may make a claim therefore as provided in Articles 11 and 12.

4.5.3. If after receipt of such special 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 such portion of the Work that is in connection with such hazardous condition or in such affected area to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a claim therefore as provided in Articles 11 and 12. OWNER may have such deleted portion of the Work performed by OWNER's own forces or others in accordance with Article 7.

4.5.4. To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents, other consultants and subcontractors of each and any of them from and against all

claims, costs, losses and damages arising out of or resulting from such hazardous condition, provided that: (i) 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 there from, and (ii) nothing in this subparagraph 4.5.4 shall obligate OWNER to indemnify any person or entity from and against the consequences of that person's or entity's own negligence.

4.5.5. The provisions of paragraphs 4.2 and 4.3 are not intended to apply to Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site.

ARTICLE 5--BONDS AND INSURANCE

Performance, Payment and Other Bonds:

5.1. 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 CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, 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 Supplementary Conditions. 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 Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

5.2. If the surety on any Bond furnished by CONTRACTOR is declared a 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 5.1, CONTRACTOR shall within ten days thereafter substitute another Bond and surety, both of which must be acceptable to OWNER.

5.3. Licensed Sureties and Insurers; Certificates of Insurance:

5.3.1. 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.

5.3.2. 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 in accordance with paragraph 5.4. 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 in accordance with paragraphs 5.6 and 5.7 hereof.

CONTRACTOR's Liability Insurance:

5.4. CONTRACTOR shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for whose acts any of them may be liable:

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

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

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

5.4.4. claims for damages insured by customary personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (ii) by any other person for any other reason;

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

5.4.6. 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.

The policies of insurance so required by this paragraph 5.4 to be purchased and maintained shall:

5.4.7. with respect to insurance required by paragraphs 5.4.3. through 5.4.6 inclusive, include as additional insured (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insured, and include coverage for the respective officers and employees of all such additional insured;

5.4.8. include 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;

5.4.9. include completed operations insurance;

5.4.10. include contractual liability insurance covering CONTRACTOR's indemnity obligations under paragraphs 6.12, 6.16 and 6.31 through 6.33;

5.4.11. contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least thirty 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 5.3.2 will so provide);

5.4.12. 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 13.12; and

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

OWNER's Liability Insurance:

5.5. In addition to the insurance required to be provided by CONTRACTOR under paragraph 5.4, OWNER, at OWNER's option, may purchase and maintain at OWNER's expense OWNER's own liability insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

Property Insurance:

5.6. 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:

5.6.1. include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

5.6.2. 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 Work in transit and shall insure against at least the following perils 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 as may be specifically required by the Supplementary Conditions;

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

5.6.4. 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

5.6.5. be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR and ENGINEER with thirty days written notice to each other additional insured to whom a certificate of insurance has been issued.

5.7. 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, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

5.8. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty 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 5.11.

5.9. OWNER shall not be responsible for purchasing and maintaining any property insurance 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, Subcontractor 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.

5.10. If CONTRACTOR requests in writing that other special insurance be included in the property insurance policies provided under paragraphs 5.6 or 5.7, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. 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.

5.11. Waiver of Rights:

5.11.1. OWNER and CONTRACTOR intend that all policies purchased in accordance with paragraphs 5.6 and 5.7 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds in such policies and will provide primary coverage for all losses and damages caused by the perils 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, employees and agents for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds 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.

5.11.2. In addition, OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, ENGINEER'S Consultants and the officers, directors, employees and agents of any of them, for:

5.11.2.1. 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 peril, whether or not insured by OWNER; and

5.11.2.2. loss or damage to the completed Project or part thereof caused by, arising out of or resulting from fire or other insured peril covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization pursuant to paragraph 14.10, after substantial completion pursuant to paragraph 14.8 or after final payment pursuant to paragraph 14.13.

Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in this paragraph 5.11.2 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 any of CONTRACTOR, Subcontractors, ENGINEER, ENGINEER'S Consultants and the officers, directors, employees and agents of any of them.

Receipt and Application of Insurance Proceeds

5.12. Any insured loss under the policies of insurance required by paragraphs 5.6 and 5.7 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 5.13. 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 or Written Amendment.

5.13. 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 fifteen 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.

Acceptance of Bonds and Insurance; Option to Replace;

5.14. If either party (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 ten days after receipt of the certificates (or other evidence requested) required by paragraph 2.7. OWNER and

CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

Partial Utilization--Property Insurance:

5.15. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10; provided that no such use or occupancy shall commence before the insurers providing the property insurance 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 cancelled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6--CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1. 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, but CONTRACTOR shall not be responsible for the negligence of others 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. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

6.2. CONTRACTOR shall keep on the Work at all times during its progress 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 to the superintendent shall be as binding as if given to CONTRACTOR.

Labor, Materials and Equipment:

6.3. CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out and construct the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. Except as otherwise required for the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's written consent given after prior written notice to ENGINEER.

6.4. Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all 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 furnishing, performance, testing, start-up and completion of the Work.

6.5. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for 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 kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

Progress Schedule:

6.6. CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.9 as it may be adjusted from time to time as provided below:

6.6.1. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) proposed adjustments in the progress schedule that will not change the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

6.6.2. Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of paragraph 12.1. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

6.7. Substitutes and "Or-Equal" Items:

6.7.1. 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 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 accepted by ENGINEER under the following circumstances:

6.7.1.1. *"Or-Equal"*: 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 acceptance of proposed substitute items.

6.7.1.2. *Substitute Items*: If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under

subparagraph 6.7.1.1., it will be considered a proposed substitute item. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefore. The procedure for review by the ENGINEER will include the following as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall first make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use 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 work on the Project) to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute.

6.7.1.3. *CONTRACTOR's Expense*: All data to be provided by CONTRACTOR in support of any proposed "or-equal" or substitute item will be at CONTRACTOR's expense.

6.7.2. *Substitute Construction Methods or Procedures*: If a specific means, method, technique, sequence or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to 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 procedure for review by ENGINEER will be similar to that provided in subparagraph 6.7.1.2.

6.7.3. *Engineer's Evaluation*: ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.7.1.2 and 6.7.2. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance which will be evidenced by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute. ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in

evaluating substitutes proposed or submitted by CONTRACTOR pursuant to paragraphs 6.7.1.2 and 6.7.2 and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER accepts a substitute item so proposed or submitted by CONTRACTOR, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such proposed substitute item.

Concerning Subcontractors, Suppliers and Others:

6.8.1. CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

6.8.2. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers or other persons or organization (including those who are to furnish the principal items of materials or equipment) to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by OWNER and ENGINEER, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's or ENGINEER'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 person or organization so identified may be removed on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be adjusted by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject *defective* Work.

6.9.1. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person or organization any contractual relationship between OWNER and ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it 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 person or organization except as may otherwise be required by Laws and Regulations.

6.9.2. CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR. CONTRACTOR shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with the ENGINEER through CONTRACTOR.

6.10. 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.

6.11. 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 5.6 or 5.7, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER, ENGINEER's Consultants and all other additional insureds for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

Patent Fees and Royalties:

6.12. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product or device not specified in the Contract Documents.

Permits:

6.13. 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. CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

Laws and Regulations:

6.14.1. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and 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.

6.14.2. 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 caused by, arising out of or resulting there from; 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 or CONTRACTOR's obligations under paragraph 3.3.2.

Taxes:

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

Use of Premises:

6.16. CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the Work. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant and anyone directly or indirectly employed by any of them from and against all claims, costs, losses and damages arising out of or resulting from 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.

6.17. During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials. CONTRACTOR shall leave the site clean and ready for occupancy by OWNER at Substantial Completion of the Work. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

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

Record Documents:

6.19. CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Change Directives, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all

approved Samples and a counter part of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, Samples and Shop Drawings will be delivered to ENGINEER for OWNER.

Safety and Protection:

6.20. CONTRACTOR shall be 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:

6.20.1. all persons on the Work site or who may be affected by the Work;

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

6.20.3. 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.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for safety of persons or property or to protect them 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 utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant 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 person or organization directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

Safety Representative:

6.21. CONTRACTOR shall designate a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

Hazard Communication Program:

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

Emergencies:

6.23. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from OWNER or ENGINEER, 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. 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 to document the consequences of such action.

6.24. Shop Drawings and Samples:

6.24.1. CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawings and Sample submittals (see paragraph 2.9). All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The 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 materials and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.26.

6.24.2. CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with said accepted schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.26. The numbers of each Sample to be submitted will be as specified in the Specifications.

6.25. Submittal Procedures:

6.25.1. Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

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

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

6.25.1.3. all information relative to CONTRACTOR's sole responsibilities in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

CONTRACTOR 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.

6.25.2. Each submittal will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

6.25.3. At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawings or Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to ENGINEER for review and approval of each such variation.

6.26. ENGINEER will review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals accepted by ENGINEER as required by paragraph 2.9. ENGINEER's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed project as a functioning whole as indicated by the Contract Documents. ENGINEER's review and approval will not extend to means, methods, techniques, sequences or procedures of construction (except where 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. 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.

6.27. ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.25.1.

6.28. Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submissions accepted by ENGINEER as required by paragraph 2.9, 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.

Continuing the Work:

6.29. 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 15.5 or as OWNER and CONTRACTOR may otherwise agree in writing.

6.30. CONTRACTOR's General Warranty and Guarantee

6.30.1. CONTRACTOR warrants and guarantees to OWNER, ENGINEER and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be *defective*. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

6.30.1.1. abuse, modification or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors or Suppliers; or

6.30.1.2. normal wear and tear under normal usage.

6.30.2. 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:

6.30.2.1. observations by ENGINEER;

6.30.2.2. recommendation of any progress or final payment by ENGINEER;

6.30.2.3. the issuance of a certificate of Substantial Completion or any payment by OWNER to CONTRACTOR under the Contract Documents;

6.30.2.4. use or occupancy of the Work or any part thereof by OWNER;

6.30.2.5. any acceptance by OWNER or any failure to do so;

6.30.2.6. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13;

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

6.30.2.8. any correction of *defective* Work by OWNER.

Indemnification:

6.31. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents and other consultants 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) caused by, arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage: (i) 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 there from, and (ii) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of a person or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such person or entity.

6.32. In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors or employees by any employee (or the survivor or personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them

to perform or furnish any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.31 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 person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

6.33. The indemnification obligations of CONTRACTOR under paragraph 6.31 shall not extend to the liability of ENGINEER and ENGINEER's Consultants, officers, directors, employees or agents caused by the professional negligence errors or omissions of any of them.

Survival of Obligations:

6.34. All representatives, 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 and termination or completion of the Agreement.

ARTICLE 7--OTHER WORK

Related Work at Site:

7.1. OWNER may perform other work related to the Project at the site by OWNER's own forces, or let other direct contracts therefore which shall contain General Conditions similar to these, or have other work performed by utility owners. If the fact that such other work is to be performed was not noted in the Contract Documents, then: (i) written notice thereof will be given to CONTRACTOR prior to starting any such other work, and (ii) CONTRACTOR may make a claim therefore as provided in Articles 11 and 12 if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the amount or extent thereof.

7.2. CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (and OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly connect and coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and 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.

7.3. 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 so to report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent or nonapparent defects and deficiencies in such other work.

Coordination:

7.4. If OWNER contracts with others for the performance of other work on the Project at the site, the following will be set forth in Supplementary Conditions:

7.4.1. the person, firm or corporation who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified;

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

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

Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility in respect of such coordination.

ARTICLE 8--OWNER'S RESPONSIBILITIES

8.1. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer against whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.3. OWNER shall furnish the data required of OWNER under the Contract Documents promptly and shall make payments to CONTRACTOR promptly when they are due as provided in paragraphs 14.4 and 14.13.

8.4. OWNER's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER's identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and drawings of physical conditions in existing structures at or contiguous to the site that have been utilized by ENGINEER in preparing the Contract Documents.

8.5. OWNER's responsibilities in respect of purchasing and maintaining liability and property insurance are set forth in paragraphs 5.5 through 5.10.

8.6. OWNER is obligated to execute Change Orders as indicated in paragraph 10.4.

8.7. OWNER's responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

8.8. In connection with OWNER's right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with OWNER's right to terminate services of CONTRACTOR under certain circumstances.

8.9. 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 furnishing or performance of the Work. OWNER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

8.10. OWNER's responsibility in respect of undisclosed Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Materials uncovered or revealed at the site is set forth in paragraph 4.5.

8.11. 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

OWNER's Representative:

9.1. 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 shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site:

9.2. 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 will endeavor for the benefit of OWNER to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections 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 on-site observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against *defective* Work. ENGINEER's visits and on-site observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.13, and particularly, but without limitation, during or as a result of ENGINEER's on-site 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 furnishing or performance of the Work.

Project Representative:

9.3. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more continuous observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.13 and in the Supplementary Conditions. 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 person will be as provided in the Supplementary Conditions.

Clarifications and Interpretations:

9.4. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with the intent of and reasonably inferable from Contract Documents. Such written clarifications and interpretations will be binding on OWNER and CONTRACTOR. If OWNER or CONTRACTOR believes that a written clarification or interpretation justifies an adjustment in the Contract Price or the Contract Times and the parties are unable to agree to the amount or extent thereof, if any, OWNER or CONTRACTOR may make a written claim therefore as provided in Article 11 or Article 12.

Authorized Variations in Work:

9.5. 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 the Contract Times and the parties are unable to agree as to the amount or extent thereof, OWNER or CONTRACTOR may make a written claim therefore as provided in Article 11 or 12.

Rejecting Defective Work:

9.6. ENGINEER will have authority to disapprove or 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 13.9, whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7. In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraphs 6.24 through 6.28 inclusive.

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

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

Determinations for Unit Price:

9.10. 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 upon OWNER and CONTRACTOR, unless, within ten days after the date of any such decision, either OWNER or CONTRACTOR delivers to the other and to ENGINEER written notice of intention to appeal from ENGINEER's decision and: (i) an appeal from ENGINEER's decision is taken within the time limits and in accordance with the procedures set forth in Exhibit GC-A, "Dispute Resolution Agreement," entered into between OWNER and CONTRACTOR pursuant to Article 16, or (ii) if no such Dispute Resolution Agreement has been entered into, a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to ENGINEER's decision, unless otherwise agreed in writing by OWNER and CONTRACTOR. Such appeal will not be subject to the procedures of paragraph 9.11.

Decisions on Disputes:

9.11. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and Claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph. Written notice of each such claim, dispute or other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days after the start of such occurrence or event unless ENGINEER allows an additional period of time for the submission of additional or more accurate data in support of such claim, dispute or other matter. The opposing party shall submit any response to ENGINEER and the claimant within thirty days after receipt of the claimant's last submittal (unless ENGINEER allows additional time). ENGINEER will render a formal decision in writing within thirty days after receipt of the opposing party's submittal, if any, in accordance with this paragraph. ENGINEER's written decision on such claim, dispute or other matter will be final and binding upon OWNER and CONTRACTOR unless: (i) an appeal from ENGINEER's decision is taken within the time limits and in accordance with the procedures set forth in EXHIBIT GC-A, "Dispute Resolution Agreement," entered into between OWNER and CONTRACTOR pursuant to Article 16, or (ii) if no such Dispute Resolution Agreement has been entered into, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within thirty days after the date of such decision and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to such claim, dispute or other matter in accordance with applicable Laws and Regulations within sixty days of the date of such decision, unless otherwise agreed in writing by OWNER and CONTRACTOR.

9.12. When functioning as interpreter and judge under paragraphs 9.10 and 9.11, 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. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 or

9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter pursuant to Article 16.

9.13. Limitations on ENGINEER's Authority and Responsibilities:

9.13.1. 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 owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them.

9.13.2. 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 furnishing or performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.13.3. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

9.13.4. ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals and Other documentation required to be delivered by paragraph 14.12 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.

9.13.5. The limitations upon authority and responsibility set forth in this paragraph 9.13 shall also apply to ENGINEER's Consultants, Resident Project Representative and assistants.

ARTICLE 10--CHANGES IN THE WORK

10.1. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work. Such additions, deletions or revisions will be authorized by a Written Amendment, 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).

10.2. If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an adjustment in the Contract Price or an adjustment of the Contract Times that should be allowed as a result of a Work

Change Directive, a claim may be made therefore as provided in Article 11 or Article 12.

10.3. 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 and supplemented as provided in paragraphs 3.5 and 3.6 except in the case of any emergency as provided in paragraph 6.23 or in the case of uncovering Work as provided in paragraph 13.9.

10.4. OWNER and CONTRACTOR shall execute appropriate Change Orders recommended by ENGINEER (or Written Amendments) covering:

10.4.1. changes in the Work which are (i) ordered by OWNER pursuant to paragraph 10.1, (ii) required because of acceptance of *defective* Work under paragraph 13.13 or correcting *defective* Work under paragraph 13.14, or (iii) agreed to by the parties;

10.4.2. changes in the Contract Price or Contract Times which are agreed to by the parties; and

10.4.3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11;

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 6.29.

10.5. 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, and the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11--CHANGE OF CONTRACT PRICE

11.1. The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at CONTRACTOR's expense without change in the Contract Price.

11.2. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an adjustment in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after the start of such occurrence or event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the adjustment claimed covers all known amounts to which the claimant is entitled as a result of said occurrence or event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise

agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.

11.3. 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:

11.3.1. 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 paragraphs 11.9.1 through 11.9.3, inclusive);

11.3.2. 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 11.6.2);

11.3.3. 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 11.3.2, on the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 11.6).

Cost of the Work:

11.4. The term Cost of the Work means the sum of all costs necessarily incurred and paid by Contractor in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amount 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 11.5:

11.4.1. 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 after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by OWNER.

11.4.2. 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.

11.4.3. Payments made by CONTRACTOR to the Subcontractors for Work performed or furnished 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 accepted. 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 paragraphs 11.4, 11.5, 11.6 and 11.7. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4. 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.

11.4.5. Supplemental costs including the following:

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

11.4.5.2. 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.

11.4.5.3. 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, installation, dismantling and removal thereof--all 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.

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

11.4.5.5. 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.

11.4.5.6. 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 and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER in accordance with paragraph 5.9), provided they 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. If, however, any such loss or damage requires reconstruction and CONTRACTOR is

placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

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

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

11.4.5.9. Cost of premiums for additional Bonds and insurance required because of changes in the Work.

11.5. The term Cost of the Work shall not include any of the following:

11.5.1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general 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 a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1. or specifically covered by paragraph 11.4.4--all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

11.5.2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

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

11.5.4. Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by subparagraph 11.4.5.9 above).

11.5.5. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of *defective* Work, disposal of materials or equipment wrongly supplied and making good any damage to property.

Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

11.6. The CONTRACTOR's fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1. a mutually acceptable fixed fee

11.7. Whenever the cost of any Work is to be determined pursuant to paragraphs 11.4 and 11.5, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowance:

11.8. 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 furnished and performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

11.8.1. the 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

11.8.2. CONTRACTOR's cost for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the 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.

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.

11.9. Unit Price Work:

11.9.1. 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 established unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with paragraph 9.10.

11.9.2. 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.

11.9.3. OWNER or CONTRACTOR may make a claim for an adjustment in the Contract Price in accordance with Article 11 if:

11.9.3.1. 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

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

11.9.3.3. if 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 TIMES

12.1. The Contract Times (or Milestones) may only be changed by a Change Order or a Written Amendment. Any claim for an adjustment of the Contract Times (or Milestones) shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Times (or Milestones) shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Times (or Milestones) will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2. All time limits stated in the Contract Documents are of the essence of the Agreement.

12.3. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a claim is made therefore as provided in paragraph 12.1. 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. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.4. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall OWNER be liable to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii) delays beyond the control of both parties including but not limited to fires, floods,

epidemics, abnormal weather conditions, acts of God or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

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

13.1. *Notice of Defects:* Prompt notice of all *defective* Work of which OWNER or ENGINEER have actual knowledge will be given to CONTRACTOR. All *defective* Work may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2. OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of OWNER, independent testing laboratories and governmental agencies with jurisdiction interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

Tests and Inspections:

13.3. 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.

13.4. 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:

13.4.1. for inspections, tests or approvals covered by paragraph 13.5 below;

13.4.2. that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.9 below shall be paid as provided in said paragraph 13.9; and

13.4.3. as otherwise specifically provided in the Contract Documents.

13.5. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, pay all costs in connection therewith, and furnish ENGINEER the required certificates of inspection, or approval. CONTRACTOR shall also 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 of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work.

13.6. 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.

13.7. Uncovering Work as provided in paragraph 13.6 shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

Uncovering Work:

13.8. 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.

13.9. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, CONTRACTOR, at ENGINEER's request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is *defective*, CONTRACTOR shall pay all claims, costs, losses and damages caused by, arising out of or resulting from 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, and, if the parties are unable to agree as to the amount thereof, may make a claim therefore as provided in Article 11. If, however, such 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 Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12.

OWNER May Stop the Work:

13.10. If the Work is *defective*, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or 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 or any surety or other party.

Correction or Removal of Defective Work:

13.11. If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all *defective* Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with Work that is not *defective*. CONTRACTOR shall pay all claims, costs, losses and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.12. Correction Period:

13.12.1. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or 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*, CONTRACTOR shall promptly, without cost to

OWNER and in accordance with OWNER's written instructions: (i) correct such *defective* Work, or, if it has been rejected by OWNER, remove it from the site and replace it with Work that is not *defective*, and (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting there from. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the *defective* Work corrected or the rejected Work removed and replaced, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

13.12.2. 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 or by Written Amendment.

13.12.3. Where *defective* Work (and damage to other Work resulting there from) has been corrected, removed or replaced under this paragraph 13.12, 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.

Acceptance of Defective Work:

13.13. If, instead of requiring correction or removal and replacement of *defective* Work OWNER (and, prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall pay all claims, costs, losses and damages attributable to OWNER's evaluation of and determination to accept such *defective* Work (such costs to be approved by ENGINEER as to reasonableness). 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, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14. 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 13.11, 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 and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees, OWNER's other contractors and ENGINEER and ENGINEER's Consultants access to the site to enable OWNER to

exercise the rights and remedies under this paragraph. All claims, costs, losses and damages incurred or sustained by OWNER in exercising such rights and remedies 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, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. Such claims, costs, losses and damages will include but not be limited to all costs of repair or replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's *defective* Work. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

ARTICLE 14--PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

14.1. The schedule of values established as provided in paragraph 2.9 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.

Application for Progress Payment

14.2. At least twenty days before the date established 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 and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

CONTRACTOR's Warranty of Title:

14.3. 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.

Review of Applications for Progress Payment:

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

14.5.1. the Work has progressed to the point indicated.

14.5.2. 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 9.10, and to any other qualifications stated in the recommendation), and

14.5.3. 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.

However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that: (i) exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or (ii) 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.

14.6. ENGINEER's recommendation of any payment, including final payment, shall not mean that ENGINEER is 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 furnishing or performance of Work, or for any failure of CONTRACTOR to perform or furnish Work in accordance with the Contract Documents.

14.7. 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 referred to in paragraph 14.5. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.7.1. the Work is *defective*, or completed Work has been damaged requiring correction or replacement,

14.7.2. the Contract Price has been reduced by Written Amendment or Change Order,

14.7.3. OWNER has been required to correct *defective* Work or complete Work in accordance with paragraph 13.14, or

14.7.4. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.4 inclusive.

OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

14.7.5. claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work,

14.7.6. 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.

14.7.7. there are other items entitling OWNER to a set-off against the amount recommended, or

14.7.8. OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.7.1. through 14.7.3 or paragraphs 15.2.1 through 15.2.4 inclusive;

but OWNER must have CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and 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.

Substantial Completion:

14.8. 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. Within a reasonable time thereafter, 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 therefore. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and 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 fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefore. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER

and CONTRACTOR with respect to security, operation, safety, 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.

14.9. OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

Partial Utilization:

14.10. Use by OWNER at OWNER's option of any substantially completed part of the Work which: (i) has specifically been identified in the Contract Documents, or (ii) 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, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefore. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 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.

14.10.2. No occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.15 in respect of property insurance.

Final Inspection:

14.11. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will 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.

Final Application for Payment:

14.12. After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered in accordance with the Contract Documents all maintenance and operating instructions, schedules, guarantees, Bonds, certificates or other evidence of insurance required by paragraph 5.4, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.4.13, (ii) consent of the surety, if any, to final payment, and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu of such releases or waivers of Liens 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.

Final Payment and Acceptance:

14.13. 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 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 14.15. Otherwise, ENGINEER will return the Application 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.

14.14. 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 and recommendation of ENGINEER, and without terminating the Agreement, 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 5.1, 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.

Waiver of Claims:

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

14.15.1. 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 14.11, 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

14.15.2. a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

ARTICLE 15--SUSPENSION OF WORK AND TERMINATION

OWNER May Suspend Work:

15.1. At any time and without cause, OWNER may suspend the Work, or any portion thereof for a period of not more than ninety 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 allowed an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes an approved claim therefore as provided in Articles 11 and 12.

OWNER May Terminate:

15.2. Upon the occurrence of any one or more of the following events:

15.2.1. if CONTRACTOR persistently fails 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 2.9 as adjusted from time to time pursuant to paragraph 6.6);

15.2.2. if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.3. if CONTRACTOR disregards the authority of ENGINEER; or

15.2.4. if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if any,) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which Owner has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses and damages sustained by OWNER arising out of or resulting from 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, provided that when exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

15.3. Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.4. Upon seven day's written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Agreement. In such case, CONTRACTOR shall be paid (without duplication of any items);

15.4.1. for 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;

15.4.2. for 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;

15.4.3. for all claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers and others; and

15.4.4. for reasonable expenses directly attributable to termination.

CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

CONTRACTOR May Stop Work or Terminate:

15.5. If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application of Payment within thirty days after it is submitted or OWNER fails for thirty 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 and ENGINEER do not remedy such suspension or failure within that time, terminate the Agreement and recover from OWNER payment on the same terms as provided in paragraph 15.4. In lieu of terminating the Agreement and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within thirty days after it is submitted, or OWNER has failed for thirty days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may upon seven day's written notice to OWNER and ENGINEER stop the Work until payment of all such amount due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.5 are not intended to preclude CONTRACTOR from making claim under Articles 11 and 12 for an increase in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping Work as permitted by this paragraph.

ARTICLE 16--DISPUTE RESOLUTION

If and to the extent that OWNER and CONTRACTOR have agreed on the method and procedure for resolving disputes between them that may arise under this Agreement, such dispute resolution method and procedure, if any, shall be as set forth in Exhibit GC-A, "Dispute Resolution Agreement," to be attached hereto and made a part hereof. If no such agreement on the method and procedure for resolving such disputes has been reached, and subject to the provisions of paragraphs 9.10, 9.11, and 9.12, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

ARTICLE 17--MISCELLANEOUS

Giving Notice:

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

Computation of Times:

17.2.1. 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.

17.2.2. A calendar day of twenty-four hours measured from midnight to the next midnight will constitute a day.

Notice of Claim:

17.3. Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

Cumulative Remedies:

17.4. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.12, 6.16, 6.30, 6.31, 6.32, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER thereunder, 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, and 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.

Professional Fees and Court Costs Included:

17.5. Whenever reference is made to "claims, costs, losses and damages," it shall include in each case, but not be limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs.

[The remainder of this page was left blank intentionally.]

INDEX TO SUPPLEMENTAL GENERAL CONDITIONS

1. ENUMERATION OF PLANS, SPECIFICATIONS AND ADDENDA	38
2. STATED ALLOWANCES	38
3. PAYMENTS TO CONTRACTOR	39
4. FEDERAL LABOR STANDARDS PROVISIONS	42
5. SPECIAL HAZARDS	53
6. CONTRACTOR'S LIABILITY AND SUBCONTRACTORS LIABILITY	53
7. PHOTOGRAPHS OF PROJECT	53
8. SCHEDULE OF OCCUPATIONAL CLASSIFICATIONS AND MINIMUM WAGE RATES	53
9. BUILDER'S RISK INSURANCE	54
10. SPECIAL EQUAL OPPORTUNITY PROVISIONS	54
11. CERTIFICATION OF COMPLIANCE WITH AIR AND WATER ACTS	66
12. SPECIAL CONDITIONS PERTAINING TO HAZARDS, SAFETY AND ACCIDENT PREVENTION	67
13. FLOOD DISASTER PROTECTION	68
14. ACCESS TO RECORDS/MAINTENANCE OF RECORDS	68
15. CONFLICTS OF INTEREST	68
16. DRUG-FREE WORKPLACE	69
17. PROJECT SIGN	69
18. RETAINING WALL DESIGN	69

1. ENUMERATION OF PLANS, SPECIFICATIONS AND ADDENDA

Following are the Plans, Specifications and Addenda which form a part of this contract, as set forth in Paragraph 1 of the General Conditions, "Contract and Contract Documents":

Drawings:

Sheet No.	Description	Sheet No.	Description
C0.01	Cover Sheet and Index	C5.02	Off-Site Utility Plan
C0.02	Demolition Plan	C6.01	Road Profiles
C1.01	Layout and Paving Plan	C7.01	Details
C2.01	Grading Plan	C7.02	Details
C3.01	EPSC Plan – Stage 1	C7.03	Details
C3.02	EPSC Plan – Stage 2	C7.04	Details
C3.03	EPSC Plan – Stage 3	ES1.1	Electrical Site Plan
C4.01	Storm Drainage Plan	EP1.2	Photometric Site Plan
C5.01	Utility Plan		

Specifications:

Division	No. of Pages
Procurement and Contracting Requirements	131
General Requirements	38
Electrical	14
Site Work	29
Exterior Improvements	26
Utilities	29

Addenda:

No. _____ Date _____ No. _____ Date _____
 No. _____ Date _____ No. _____ Date _____

2. STATED ALLOWANCES: Pursuant to Article 11.8 of the General Conditions, the Contractor shall include the following cash allowances in his proposal.

- (a) For Additional Excavation (Unsuitable Rock) and Replacement \$ _____
- (b) For Additional Excavation (Unsuitable Soil) and Replacement \$ _____
- (c) For _____ \$ _____

3. A. Payments to Contractor

1. To insure the proper performance of this contract, the Owner shall retain five percent (5%) of the amount of each estimate until final completion and acceptance of all work covered by this contract: Provided that the Contractor shall submit his estimate not later than the first day of the month: Provided further that on completion and acceptance of each separate building, public work, or other division of the contract, on which the price is stated separately in the contract, payment may be made in full, including retained percentages thereon, less authorized deductions.
2. In preparing estimates the material delivered on the site and preparatory work done may be taken into consideration.
3. All material and work covered by partial payments made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work, or as a waiver of the right of the Owner to require the fulfillment of all of the terms of the contract.
4. Owner's Right to Withhold Certain Amounts and Make Application Thereof:
The Contractor agrees that he will indemnify and save the Owner harmless from all claims growing out of the lawful demands of subcontractors, laborers, workers, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in the furtherance of the performance of this contract. The Contractor shall, at the Owner's request, furnish satisfactory evidence that all obligations of the nature hereinabove designated have been paid, discharged, or waived. If the Contractor fails so to do, then the Owner may, after having served written notice on the said Contractor, either pay unpaid bills, of which the Owner has written notice, direct, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of this contract, but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the Contractor or his Surety. In paying any unpaid bills of the Contractor, the Owner shall be deemed the agent of the Contractor, and any payment so made by the Owner shall be considered as a payment made under the contract by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payments made in good faith.

B. Payments by Contractor

The Contractor shall pay (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which services are rendered, (b) for all materials, tools, and other expendable equipment to the extent of ninety percent (90%) of the cost thereof, not later than the 20th day of the calendar month following that in which such materials, tools, and equipment are delivered at the site of the project, and the balance of the cost thereof, not later than the 30th day following the completion of that part of the work in or on which such materials, tools, and equipment are incorporated or used, and (c) to each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors to the extent of each subcontractor's interest therein.

C. Time for Completion and Liquidated Damages

It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning and the time for completion as specified in the contract of the work to be done hereunder are ESSENTIAL CONDITIONS of this contract; and it is further mutually understood and agreed that the work embraced in this contract shall be commenced on a date to be specified in the "Notice to Proceed".

The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

If the said Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this contract, to pay to the Owner the amount specified in the contract, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the contract for completing the work.

The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodical estimates.

It is further agreed that time is of the essence of each and every portion of this contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this contract. Provided that the Contractor shall not be charged with liquidated damages or any excess cost when the Owner determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the Owner; Provided further that the Contractor shall not to be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

- (a) To any preference, priority or allocation order duly issued by the Government.
- (b) To unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather; and
- (c) To any delays of Subcontractors or suppliers occasioned by any of the causes specified in subsections (a) and (b) of this article:

Provided further that the Contractor shall, within ten (10) days from the beginning of such delay, unless the Owner shall grant a further period of time prior to the date of final settlement of the contract, notify the Owner, in writing, of the delay and notify the Contractor within a reasonable time of its decision in the matter.

D. Protection of Lives and Health

"The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of his prosecution of the work. The safety provisions of applicable laws and building and construction codes, in addition to specific safety and health regulations described by Chapter XIII, Bureau of Labor Standards, Department of Labor, Part 1518, Safety and Health Regulations for Construction, as outlined in the Federal Register, Volume 36, No. 75, Saturday, April 17, 1971. Title 29 - LABOR, shall be observed and the Contractor shall take or cause to be taken, such additional safety and health measures as the Contracting Authority may determine to be reasonably necessary."

E. Subcontracts

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

F. Interest of Member of or Delegate to Congress

No member of or Delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this contract or to any benefit that may arise there from, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

G. Other Prohibited Interests

No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part hereof. No officer, employee, architect, attorney, engineer or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

H. Use and Occupancy Prior to Acceptance by Owner

The Contractor agrees to the use and occupancy of a portion or unit of the project before formal acceptance by the Owner, provided the Owner:

- (a) Secures written consent of the Contractor except in the event, in the opinion of the Architect/Engineer, the Contractor is chargeable with unwarranted delay in final clean-up of punch list items or other contract requirements.
- (b) Secures endorsement from the insurance carrier and consent of the surety permitting occupancy of the building or use of the project during the remaining period of construction, or,
- (c) When the project consists of more than one building, and one of the buildings is occupied, secures permanent fire and extended coverage insurance, including a permit to complete construction. Consent of the surety must also be obtained.

I. Photographs of the Project

If required by the Owner, the Contractor shall furnish photographs of the project, in the quantities and as described in the Supplemental General Conditions.

J. Suspension of Work

Should the Owner be prevented or enjoined from proceeding with work either before or after the start of construction by reason of any litigation or other reason beyond the control of the Owner, the Contractor shall not be entitled to make or assert claim for damage by reason of said delay; but time for completion of the work will be extended to such reasonable time as the Owner may determine will compensate for time lost by such delay with such determination to be set forth in writing.

4. FEDERAL LABOR STANDARDS PROVISIONS

Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. 1. (i) Minimum Wages

All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less than often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(iv). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 FR Part 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

- (ii)(a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
 - (2) The classification is utilized in the area by the construction industry; and
 - (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.
- (b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)
- (c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representative, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)
- (d) The wage rate (including the fringe benefits where appropriate) determined pursuant to subparagraphs (1)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.
- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

- (iv) If the contractor does not make payments to a trustee or other third persons, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding

HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices and trainees, employed by the contractor or any subcontractor the full amount of wages required by the contract.

In the event of failure to pay any laborer or mechanic, including any apprentice or trainee, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make sure disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records.

Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1 (b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

- (ii)(a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR Part 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149).
- (b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
 - (1) That the payroll for the payroll period contains the information required to be maintained under 29 CFR Part 5.5(a)(3)(i) and that such information is correct and complete;

- (2) That each laborer or mechanic (including each apprentice and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;
 - (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- (c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph A.3.(ii)(b) of this section.
 - (d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.
- (iii) The contractor or subcontractor shall make the records required under paragraph A.3.(i) of this section available for inspection, copying, or transcription by authorized representative of HUD or its designee or the Department of Labor, and shall permit such representative to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR Part 5.12.
4. (i) Apprentices.

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

benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees.

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

(iii) Equal employment opportunity.

The utilization of apprentices, trainees and journeyman under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements.

The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract.

6. Subcontracts.

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

7. Contract termination; debarment.

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

8. Compliance with Davis-Bacon and Related Act Requirements.

All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards.

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

10. Certification of Eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part "Whoever, for the purpose of ...influencing in any way the action of such Administration ...makes, utters or publishes any statement, knowing the same to be false ...shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees.

No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act

As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

1. Overtime requirements.

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

2. Violation; liability for unpaid wages, liquidated damages.

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

3. Withholding for unpaid wages and liquidated damages.

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

4. Subcontracts.

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

C. Health and Safety

1. No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.
2. The contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 (formerly part 1518) and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat. 96).
3. The Contractor shall include the provisions of this Article in every subcontract so that such provisions will be binding on each subcontractor. The Contractor shall take such action with respect to any subcontract as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

5. SPECIAL HAZARDS

The Contractor's and his Subcontractor's Public Liability and Property Damage Insurance shall provide adequate protection against the following special hazards:

6. CONTRACTOR'S AND SUBCONTRACTOR'S PUBLIC LIABILITY, VEHICLE LIABILITY, AND PROPERTY DAMAGE INSURANCE

As required under Article 5 of the General Conditions, the Contractor's Public Liability Insurance and Vehicle Liability Insurance shall be in an amount not less than \$ 1,000,000 for injuries, including accidental death, to any one person, and subject to the same limit for each person, in an amount not less than \$ 1,000,000 on account of one accident, and Contractor's Property Damage Insurance in an amount not less than \$ 1,000,000 .

The Contractor shall either (1) require each of his subcontractors to procure and to maintain during the life of his subcontract, Subcontractor's Public Liability and Property Damage Insurance of this type and in the same amounts as specified in the preceding paragraph, or (2) insure the activities of his subcontractors in his own policy.

7. PHOTOGRAPHS OF PROJECT

As provided in Paragraph 3.1 of the Supplemental General Conditions, the Contractor will furnish photographs in the number, type, and stage as enumerated below:

8. SCHEDULE OF OCCUPATIONAL CLASSIFICATIONS AND MINIMUM HOURLY WAGE RATES AS REQUIRED UNDER PARAGRAPH 4.B OF THE SUPPLEMENTAL GENERAL CONDITIONS

Given on Pages _____, _____ and _____.

9. BUILDER'S RISK INSURANCE

As provided in the General Conditions, Article 5.6, the Contractor will/~~will not~~** maintain Builder's Risk Insurance (fire and extended coverage) on a 100 percent completed value basis on the insurable portions of the project for the benefit of the Owner, the Contractor, and all Subcontractors, as their interests may appear.

** ~~Strike out one.~~

10. SPECIAL EQUAL OPPORTUNITY PROVISIONS

A. Activities and Contracts Not Subject to Executive Order 11246, as Amended

(Applicable to Federally assisted construction contracts and related subcontracts \$10,000 and under.)

During the performance of this contract, the Contractor agrees as follows:

1. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants for employment are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.
2. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by Contracting Officer setting forth the provisions of this nondiscrimination clause. The Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
3. Contractors shall incorporate foregoing requirements in all subcontracts.

B. Executive Order 11246 (contracts/subcontracts above \$10,000)

1. Section 202 Equal Opportunity Clause

During the performance of this contract, the Contractor agrees as follows:

- a. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment, or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- b. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration without regard to race, color, religion, sex, or national origin.
- c. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding a notice to be provided by the Contract Compliance Officer advising the said labor union or workers' representatives of the Contractor's commitment under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- d. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- e. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Department of the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and others.
- f. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

g. The Contractor will include the provisions of the sentence immediately preceding paragraph a. and the provisions of paragraphs a. through g. in every subcontract or purchase order unless exempted by rules, regulations, orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Department may direct as a means of enforcing such provisions, including sanctions for non-compliance. Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Department, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.

2. Notice of Requirement for Affirmative Action to ensure Equal Employment Opportunity (Executive Order 11246).
 (Applicable to contracts/subcontracts exceeding \$10,000.)

- a. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
- b. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for minority participation	Goals for female participation
Insert Goals	Insert Goals
4.5%	6.9%

NOTE: THESE GOALS MUST BE PROVIDED. Also, list State Geographic Area to be covered on following page.

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or Federally assisted) performed in the covered area. If the Contractor performs construction work in a geographic area located outside of the covered area, it shall apply the goals established for such geographic area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its Federally involved and non-Federally involved construction.

The contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order, and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

- c. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.
 - d. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is City of Kingston
Roane County, Tennessee.
3. Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)
- a. As used in these specifications:
 - (1) "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - (2) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
 - (3) "Employer identification number" means the federal social security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941;
 - (4) "Minority" includes:
 - (a) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

- (b) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South America or other Spanish Culture or origin, regardless of race);
 - (c) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands);
 - (d) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
- b. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
- c. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

- d. The Contractor shall implement the specific affirmative action standards provided in paragraphs g.(1) through (16) of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing contracts in geographical areas where they do not have a Federal or Federally-assisted construction contract shall apply the minority and female goals established for the geographic area where the contract is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.
- e. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
- f. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
- g. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

- (1) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
- (2) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its union have employment opportunities available, and maintain a record of the organization's responses.
- (3) Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.
- (4) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- (5) Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under g.(2) above.

- (6) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company's EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
- (7) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- (8) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- (9) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date of the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- (10) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

- (11) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR part 60-3.
 - (12) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - (13) Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
 - (14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
 - (15) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
 - (16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
- h. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations g.(1) through (16). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under g.(1) through (16) of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation shall not be a defense for the Contractor's non-compliance.

- i. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
- j. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
- k. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
- l. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
- m. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph g. of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

- n. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company's EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee, the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number where assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and location at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractor shall not be required to maintain separate records.
- o. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

C. Certification of Nonsegregated Facilities (Over \$10,000)

By the submission of this bid, the bidder, offeror, applicant or subcontractor certifies that he/she does not maintain or provide for his/her employees any segregated facility at any of his/her establishments, and that he/she does not permit employees to perform their services at any location, under his/her control, where segregated facilities are maintained. He/She certifies further that he/she will not maintain or provide for employees any segregated facilities at any of his/her establishments, and he/she will not permit employees to perform their services at any location under his/her control where segregated facilities are maintained. The bidder, offeror, applicant or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause of this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, ***transportation and housing facilities provided for employees which are segregated on the basis of race, color, religion, or are in fact segregated on the basis of race, color, religion, or otherwise. He/She further agrees that (except where he/she has obtained identical certifications from proposed subcontractors for specific time periods) he/she will obtain identical certification from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause; that he/she will retain such certifications in his/her files; and that he/she will forward the following notice to such proposed subcontractors (except where proposed subcontractors have submitted identical certifications for specific time periods).

D. Civil Rights Act of 1964

Under Title VI of the Civil Rights Act of 1964, no person shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

E. Section 109 of the Housing and Community Development Act of 1974

No person in the United States shall on the grounds of race, color, national origin, or sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity funded in whole or in part with funds made available under this title.

F. "The Section 3 Clause"

1. The work to be performed under this contract is on a project assisted under a program providing direct Federal financial assistance from the Department of Housing and Urban Development and is subject to the requirements of section 3 of the Housing Urban Development Act of 1968, as amended, 12 U.S.C. 1701u. Section 3 requires that to the greatest extent feasible, opportunities for training and employment be given to lower income residents of the area of the Section 3 covered project, and contracts for work in connection with the project be awarded to business concerns which are located in, or owned in substantial part by persons residing in the area of the Section 3 covered project.
2. The parties to this contract will comply with the provisions of said Section 3 and the regulations issued pursuant thereto by the Secretary of Housing and Urban Development set forth in 24 Part CFR 135, and all applicable rules and orders of the Department issued thereunder prior to the execution of this contract. The parties to this contract certify and agree that they are under no contractual or other disability which would prevent them from complying with these requirements.
3. The contractor will send to each labor organization or representative of workers with which he has a collective bargaining agreement or other contract or understanding, if any, a notice advising the said labor organization or workers' representative of his commitments under this Section 3 clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment or training.
4. The contractor will include this Section 3 clause in every subcontract for work in connection with the project and will, at the direction of the applicant for or recipient of Federal Financial assistance, take appropriate action pursuant to the subcontract upon a finding that the subcontractor is in violation of regulations issued by the Secretary of Housing and Urban Development, 24 CFR Part 135. The contractor will not subcontract with any subcontractor where it has notice or knowledge that the latter has been found in violation of regulations under 24 CFR part 135 and will not let any subcontract unless the subcontractor has first provided it with a preliminary statement of ability to comply with the requirements of these regulations.

5. Compliance with the provisions of Section 3, the regulations set forth in 24 CFR Part 135, and all applicable rules and orders of the Department issued thereunder prior to the execution of the contract, shall be a condition of the Federal financial assistance provided to the project, binding upon the applicant or recipient, its contractors and subcontractors, its successors, and assigns to those sanctions specified by the grant or loan agreement or contract through which Federal assistance is provided, and to such sanctions as are specified by 24 CFR Part 135.

G. Age Discrimination Act of 1975

No person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under, any program or activity receiving Federal financial assistance.

H. Section 504 Handicapped

Non-Discrimination for Handicapped Workers

No otherwise qualified handicapped individual in the U.S., as defined in Section 7, Paragraph 6 of the Rehabilitation Act of 1973 shall, solely by reason of this handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.

11. **CERTIFICATION OF COMPLIANCE WITH AIR AND WATER ACTS**

(Applicable to Federally assisted construction contracts and related subcontracts exceeding \$100,000)

Compliance with Air and Water Acts

During the performance of this contract the contractor and all subcontractors shall comply with the requirements of the Clean Air Act, as amended, 42 USC 1857 et seq., the Federal Water Pollution Control Act, as amended, 33 USC 1251 et seq., and the regulations of the Environmental Protection Agency with respect thereto, at 40 CFR Part 15, as amended.

In addition to the foregoing requirements, all nonexempt contractors and subcontractors shall furnish to the Owner, the following:

1. A stipulation by the Contractor or subcontractors, that any facility to be utilized in the performance of any nonexempt contract or subcontract, is not listed on the List of Violating Facilities issued by the Environmental Protection Agency (EPA) pursuant to 40 CFR 15.20.

2. Agreement by the Contractor to comply with all the requirements of Section 114 of the Clean Air Act, as amended, (42 USC 1857c-8) and Section 308 of the Federal Water Pollution Control Act, as amended, (33 USC 1318) relating to inspection, monitoring, entry, reports and information, as well as all other requirements specified in said Section 114 and Section 308, and all regulations and guidelines issued thereunder.
3. A stipulation that as a condition for the award of the contract, prompt notice will be given of any notification received from the Director, Office of Federal Activities, EPA, indicating that a facility utilized, or to be utilized for the contract, is under consideration to be listed on the EPA List of Violating Facilities.
4. Agreement by the Contractor that he will include, or cause to be included, the criteria and requirements in paragraph (1) through (4) of this section in every nonexempt subcontract and requiring that the Contractor will take such action as the Government may direct as a means of enforcing such provisions.

12. SPECIAL CONDITIONS PERTAINING TO HAZARDS, SAFETY STANDARDS AND ACCIDENT PREVENTION

A. Lead-Based Paint Hazards

(Applicable to contracts for construction or rehabilitation of residential structures.)
The construction or rehabilitation of residential structures is subject to the HUD Lead-Based Paint regulations, 24 CFR Part 35. The Contractor and Subcontractors shall comply with the provisions for the elimination of lead-base paint hazards under sub-part B of said regulations. The Owner will be responsible for the inspections and certifications required under Section 35.14(f) thereof.

B. Use of Explosives (Modify as Required)

When the use of explosives is necessary for the prosecution of the work, the Contractor shall observe all local, state and Federal laws in purchasing and handling explosives. The Contractor shall take all necessary precaution to protect completed work, neighboring property, water lines, or other underground structures. Where there is danger to structures or property from blasting, the charges shall be reduced and the material shall be covered with suitable timber, steel or rope mats.

The Contractor shall notify all owners of public utility property of intention to use explosives at least eight hours before blasting is done, close to such property. Any supervision or direction of use of explosives by the engineer, does not in any way reduce the responsibility of the Contractor or his Surety for damages that may be caused by such use.

C. Danger Signals and Safety Devices (Modify as Required)

The Contractor shall make all necessary precautions to guard against damages to property and injury to persons. He shall put up and maintain in good condition, sufficient red or warning lights at night, suitable barricades and other devices necessary to protect the public. In case the Contractor fails or neglects to take such precautions, the Owner may have such lights and barricades installed and charge the cost of this work to the Contractor. Such action by the Owner does not relieve the Contractor of any liability incurred under these specifications or contract.

13. FLOOD DISASTER PROTECTION

This Contract is subject to the requirements of the Flood Disaster Protection Act of 1973 (P.L. 93-234). Nothing included as a part of this Contract is approved for acquisition or construction purposes as defined under Section 3(a) of said Act, for use in an area identified by the Secretary of HUD as having special flood hazards which is located in a community not then in compliance with the requirements for participation in the national flood insurance program pursuant to Section 201(d) of said Act; and the use of any assistance provided under this Contract for such acquisition or construction in such identified areas in communities then participating in the national flood insurance program shall be subject to the mandatory purchase of flood insurance requirements of Section 102(a) of said Act.

Any contract or agreement for the sale, lease, or other transfer of land acquired, cleared or improved with assistance provided under the Contract shall contain, if such land is located in an area identified by the Secretary as having special flood hazards and in which the sale of flood insurance has been made available under the National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 et seq., provisions obligating the transferee and its successors or assigns to obtain and maintain, during the ownership of such land, such flood insurance as required with respect to financial assistance for acquisition or construction purposes under Section 102(a) of the Flood Disaster Protection Act of 1973.

14. ACCESS TO RECORDS/MAINTENANCE OF RECORDS

The Contractor shall maintain accounts and records, including personnel, property, and financial records, adequate to identify and account for all costs pertaining to the contract and such other records as may be deemed necessary by the locality to assure proper accounting for all funds. These records will be available for audit purposes to the locality or the State or any other authorized representative, and will be retained for three years after contract completion unless permission to destroy them is granted by the locality. Moreover, the locality, State, or any authorized representative shall have access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purpose of making audit, examination, excerpts, and transcriptions.

15. CONFLICT OF INTEREST OF OFFICERS OR EMPLOYEES OF THE LOCAL JURISDICTION, MEMBERS OF THE LOCAL GOVERNING BODY, OR OTHER PUBLIC OFFICIALS

No officer or employee of the local jurisdiction or its designees or agents, no member of the governing body, and no other public official of the locality who exercises any function or responsibility with respect to this contract, during his/her tenure or for one year thereafter, shall have any interest, direct or indirect, in any contract or subcontract, or the proceeds thereof, for work to be performed. Further, the contractor shall cause to be incorporated in all subcontracts the language set forth in this paragraph prohibiting conflict of interest.

16. DRUG-FREE WORKPLACE

Under the provisions of Tennessee Code Annotate § 50-9-113 enacted by the General Assembly effective 2001, a) employers with five (5) or more employees who contract with either the state or a local government to provide construction services are required to submit an affidavit stating that they have a drug free workplace program that complies with Title 50, Chapter 9, in effect at the time of submission of a bid at least to the extent required of governmental entities. The statute, imposes other requirements on the contractor, but the grantee's responsibility is specifically limited in section (b) of the state as follows:

(b) A written affidavit by the principal officer of a covered employer provided to a local government at the time such bid or contract is submitted stating that the employer is in compliance with this section shall absolve the local government of all further responsibility under this section and any liability arising from the employer's compliance or failure of compliance with the provisions of this section.

17. PROJECT SIGN

If a project sign is erected, it must include the following:

Governor (*Name*)
 Department of Economic and Community Development
 Commissioner (*Name*)
 CDBG Grant (*Amount*)

18. RETAINING WALL DESIGN

Structure shall withstand design loads from soil pressure, surcharge loads from vehicles, and earthquake loads. The design shall conform to the International Building Code (IBC). The design shall include proper drainage systems to reduce hydrostatic pressure behind the wall. Materials shall withstand environmental conditions such as moisture and freeze-thaw cycles. Shop drawings must be submitted to the owner for review. Shop drawings must be signed and sealed by a professional engineer registered in the state where the project is located. The site retaining walls shall be either reinforced concrete, mechanically stabilized earth (MSE), or other approved equivalent.



STATE OF TENNESSEE

BYRD ANTI-LOBBYING AMENDMENT CERTIFICATION

Contractors who apply or bid for an award of \$100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352.

Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the awarding agency.

APPENDIX A, 44 C.F.R. PART 18 – CERTIFICATION REGARDING LOBBYING – REQUIRED FOR CONTRACTS OVER \$100,000 *Certification for Contracts, Grants, Loans, and Cooperative Agreements*

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

- No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

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

The Contractor certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap. 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

Signature of Authorized Representative	Date
Printed Name and Title	Phone Number / Email Address



STATE OF TENNESSEE
CERTIFICATION OF BIDDER REGARDING
USE OF WOMEN/MINORITY SUBCONTRACTORS
****Construction Projects Only****

This certification is required for the contractor to demonstrate that when subcontractors are to be used on this project, an attempt will be made to utilize women/minority owned firms.

Documentation must be on file to show who has been contacted.

- I certify that every attempt was made to utilize female/minority contractors on this project.
- I am unable to certify to the above statements. Explanation is attached.

Signature of Authorized Representative	Date
Printed Name	Phone Number
Email Address	Address

**SECTION 011100
SUMMARY OF WORK**

PART 1 GENERAL

1.01 TITLE OF WORK AND TYPE OF CONTRACT

- A. Title of Work: ARC Ladd Landing Parking Improvements.
- B. Type of Contract: Contract amount shall be based on lump sum bid.

1.02 RELATED REQUIREMENTS

- A. Section 00 52 13 - Agreement.
- B. Section 00 72 13 - General Conditions.
- C. Section 00 73 00 – Supplementary Conditions.
- D. Section 01 52 00 – Construction Facilities and Temporary Controls.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work of this Contract includes the installation/execution of the following:
 - Site improvements;
 - o Storm drainage
 - o Asphalt and concrete paving
 - o Sidewalks
 - o Retaining wall and design
 - o Walking trails
 - Demolition;
 - Excavation and grading;
 - Utilities (water and sewer);
 - EPSC
- B. The work shall include all related appurtenances as indicated in the design plans and specifications.

1.04 CONSTRUCTION SEQUENCE AND CONSTRAINTS

- A. Perform work in a manner that is least disruptive to the Owner’s operations. Refer to Section 01 52 00, Construction Facilities and Temporary Controls regarding temporary controls.
- B. Standard working hours shall be from 7:00 AM to 5:00 PM Monday through Friday, and no work shall be performed without the OWNER or OWNER’S representative on site. Any work required outside of these standard hours shall be submitted in writing as a request to the

Engineer documenting the work planned to be performed and the reason(s) for the overtime work.

- C. Contractor's employees and subcontractors shall be limited to the specific locations on the site where project work is to be performed. All other areas of the plant site are off limits.
- D. The Owner or the Owner's construction representative shall be on-site when work is occurring.

1.05 CONTRACTOR USE OF PREMISES

- A. Coordinate use of premises under direct supervision of the designated representative to the Owner.
- B. Assume full responsibility for protection and safekeeping of products and materials stored on the site under this Contract.
- C. Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- D. All materials removed during construction (such as existing sewer pipe, asphalt spoil material, etc.) shall be properly disposed by the Contractor.

PART 2 PRODUCTS

- A. Not Applicable

PART 3 EXECUTION

- A. Not Applicable

END OF SECTION

**SECTION 012100
ALLOWANCES**

PART 1 GENERAL

1.01 SUMMARY

- A. This Section specifies administration and procedural requirements governing handling and processing allowances. Allowances shall be used for any revisions, contingencies, etc. Use of allowances shall be authorized in writing by the Engineer and approved by the Owner.

PART 2 PRODUCTS

- A. Not applicable

PART 3 EXECUTION

3.01 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1 - Additional Excavation (Unsuitable Rock) and Replacement: Include in the bid for the project an allowance for 500 cubic yards of undercut of unsuitable rock below subgrade elevations and replacement of satisfactory materials as specified in Section 312000. The allowance shall include all materials, labor, and equipment necessary to remove and dispose of unsuitable materials and to place and compact the satisfactory materials as directed by the geotechnical engineer. The actual quantity shall be measured in the field by the geotechnical engineer. Payment shall be made at the contract unit price per cubic yard for the actual quantity utilized as directed by the geotechnical engineer.
- B. Allowance No. 2 - Additional Excavation (Unsuitable Soil) and Replacement: Include in the bid for the project an allowance for 1,000 cubic yards of undercut of unsuitable soil below subgrade elevations and replacement of satisfactory materials as specified in Section 312000. The allowance shall include all materials, labor, and equipment necessary to remove and dispose of unsuitable materials and to place and compact the satisfactory materials as directed by the geotechnical engineer. The actual quantity shall be measured in the field by the geotechnical engineer. Payment shall be made at the contract unit price per cubic yard for the actual quantity utilized as directed by the geotechnical engineer.
- C. In the event all or part of these allowances are not directed to be utilized by the Owner, then these amounts shall be credited to the Owner by Change Order.

SECTION 013216
CONSTRUCTION PROGRESS SCHEDULES

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Preliminary Progress Schedule: Submit at least 7 days prior to preconstruction conference.
2. Detailed Progress Schedule:
 - a. Submit initial Detailed Progress Schedule within **60** days after Effective Date of the Agreement.
 - b. Submit an Updated Progress Schedule at each update, in accordance with Section 1.03 Detailed Progress Schedule.
3. Submit with Each Progress Schedule Submission:
 - a. Contractor's certification that Progress Schedule submission is actual schedule being utilized for execution of the Work.
 - b. Progress Schedule: One legible copy.
 - c. Narrative Progress Report: Same number of copies as specified for Progress Schedule.
4. Prior to final payment, submit a final Updated Progress Schedule.

1.02 PRELIMINARY PROGRESS SCHEDULE

- A. In addition to basic requirements outlined in General Conditions, show a detailed schedule, beginning with Notice to Proceed, for minimum duration of 90 days, and a summary of balance of Project through Final Completion.
- B. Show activities including, but not limited to, the following:
 1. Notice to Proceed.
 2. Permits.
 3. Submittals, with review time. Contractor may use Schedule of Submittals specified in Section 013300, Submittals and Substitutions.
 4. Early procurement activities for long lead equipment and materials.
 5. Initial Site work.
 6. Earthwork.
 7. Specified Work sequences and construction constraints.
 8. Contract Milestone and Completion Dates.
 9. Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work.

10. System startup summary.
 11. Project close-out summary.
 12. Demobilization summary.
- C. Update Preliminary Progress Schedule monthly; as part of progress payment process. Failure to do so may result in the Owner withholding all or part of the monthly progress payment until the Preliminary Progress Schedule is updated in a manner acceptable to Engineer.
- D. Format: In accordance with Article 1.04, Progress Schedule—Bar Chart.

1.03 DETAILED PROGRESS SCHEDULE

- A. In addition to requirements of General Conditions, submit Detailed Progress Schedule beginning with Notice to Proceed and continuing through Final Completion.
- B. Show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by Contractor.
- C. When accepted by Engineer, Detailed Progress Schedule will replace Preliminary Progress Schedule and become Baseline Schedule. Subsequent revisions will be considered as Updated Progress Schedules.
- D. Format: In accordance with Article 1.04, Progress Schedule—Bar Chart.
- E. Update monthly to reflect actual progress and occurrences to date, including weather delays.

1.04 PROGRESS SCHEDULE—BAR CHART

- A. General: Comprehensive bar chart schedule, generally as outlined in Associated General Contractors of America (AGC) 580, "Construction Project Planning and Scheduling Guidelines." If a conflict occurs between the AGC publication and this Specification, this Specification shall govern.
- B. Format:
1. Unless otherwise approved, white paper, 11-inch by 17-inch sheet size.
 2. Title Block: Show name of project and Owner, date submitted, revision or update number, and name of scheduler.
 3. Identify horizontally, across the top of the schedule, the time frame by year, month, and day.
 4. Identify each activity with a unique number and a brief description of the Work associated with that activity.
 5. Legend: Describe standard and special symbols used.
- C. Contents: Identify, in chronological order, those activities reasonably required to complete the Work, including as applicable, but not limited to:

1. Obtaining permits, submittals for early product procurement, and long lead time items.
2. Mobilization and other preliminary activities.
3. Initial Site work.
4. Specified Work sequences, constraints, and Milestones, including Substantial Completion date(s).
5. Subcontract Work.
6. Major equipment design, fabrication, factory testing, and delivery dates.
7. Delivery dates for Owner-furnished products, as specified in Section 01010, Summary of Work.
8. Sitework.
9. Concrete Work.
10. Structural steel Work.
11. Architectural features Work.
12. Conveying systems Work.
13. Equipment Work.
14. Mechanical Work.
15. Electrical Work.
16. Instrumentation and control Work.
17. Interfaces with Owner-furnished equipment.
18. Other important Work for each major facility.
19. Equipment and system startup and test activities.
20. Project closeout and cleanup.
21. Demobilization.

1.05 PROGRESS OF THE WORK

- A. Updated Progress Schedule shall reflect:
 1. Progress of Work to within 5 working days prior to submission.
 2. Approved changes in Work scope and activities modified since submission.
 3. Delays in Submittals or resubmittals, deliveries, or Work.
 4. Adjusted or modified sequences of Work.
 5. Other identifiable changes.
 6. Revised projections of progress and completion.
 7. Report of changed logic.
- B. Produce detailed subschedules during Project, upon request of Owner or Engineer, to further define critical portions of the Work such as facility shutdowns.
- C. If Contractor fails to complete activity by its latest scheduled completion date and this Failure is anticipated to extend Contract Times (or Milestones), Contractor shall, within 7 days of such failure, submit a written statement as to how Contractor intends to correct nonperformance and return to acceptable current Progress Schedule. Actions by Contractor to complete the Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.

D. Owner may order Contractor to increase plant, equipment, labor force or working hours if Contractor fails to:

1. Complete a Milestone activity by its completion date.
2. Satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to Owner.

1.06 NARRATIVE PROGRESS REPORT

A. Format:

1. Organize same as Progress Schedule.
2. Identify, on a cover letter, reporting period, date submitted, and name of author of report.

B. Contents:

1. Number of days worked over the period, work force on hand, construction equipment on hand (including utility vehicles such as pickup trucks, maintenance vehicles, stake trucks).
2. General progress of Work, including a listing of activities started and completed over the reporting period, mobilization/demobilization of subcontractors, and major milestones achieved.
3. Contractor's plan for management of Site (e.g., lay down and staging areas, construction traffic), utilization of construction equipment, buildup of trade labor, and identification of potential Contract changes.
4. Identification of new activities and sequences as a result of executed Contract changes.
5. Documentation of weather conditions over the reporting period, and any resulting impacts to the work.
6. Description of actual or potential delays, including related causes, and the steps taken or anticipated to mitigate their impact.
7. Changes to activity logic.
8. Changes to the critical path.
9. Identification of, and accompanying reason for, any activities added or deleted since the last report.
10. Steps taken to recover the schedule from Contractor-caused delays.

1.07 SCHEDULE ACCEPTANCE

A. Engineer's acceptance will demonstrate agreement that:

1. Proposed schedule is accepted with respect to:
 - a. Contract Times, including Final Completion and all intermediate Milestones are within the specified times.
 - b. Specified Work sequences and constraints are shown as specified.

- c. Specified Owner-furnished Equipment or Material arrival dates, or range of dates, are included.
- d. Access restrictions are accurately reflected.
- e. Startup and testing times are as specified.
- f. Submittal review times are as specified.
- g. Startup testing duration is as specified and timing is acceptable.

2. In all other respects, Engineer's acceptance of Contractor's schedule indicates that, in Engineer's judgement, schedule represents reasonable plan for constructing Project in accordance with the Contract Documents. Engineer's review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless Contractor has explicitly called the nonconformance to Engineer's attention in submittal. Schedule remains Contractor's responsibility and Contractor retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct Project in accordance with the Contract Documents.

B. Unacceptable Preliminary Progress Schedule:

- 1. Make requested corrections; resubmit within 10 days.
- 2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process, during which time Contractor shall update schedule on a monthly basis to reflect actual progress and occurrences to date.

C. Unacceptable Detailed Progress Schedule:

- 1. Make requested corrections; resubmit within 10 days.
- 2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process.

D. Narrative Report: All changes to activity duration and sequences, including addition or deletion of activities subsequent to Engineer's acceptance of Baseline Progress Schedule, shall be delineated in Narrative Report current with proposed Updated Progress Schedule.

PART 2 PRODUCTS

A. Not Applicable

PART 3 EXECUTION

A. Not Applicable

END OF SECTION

**SECTION 013226
WEATHER DELAYS**

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Standards set for weather delays.
- B. Procedures for claim submittals.

1.02 RELATED REQUIREMENTS

- A. Document 00 72 13 – General Conditions, Article 12.

1.03 EXTENSION OF CONTRACT TIME

- A. If the basis exists for an extension of time in accordance with Article 12 of the General Conditions, then an extension of time on the basis of weather may be granted only for the number of weather delay days in excess of the number of weather days listed as the Standard Baseline for that month.

1.04.1 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE

- A. The Standard Baseline shall be regarded as the normal and anticipated number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is to be included in the work and not eligible for an extension of the contract time.
- B. The Standard Baseline is as follows:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
12	11	13	11	11	10	10	9	8	8	10	11

1.05 ADVERSE WEATHER AND WEATHER DELAY DAYS

- A. Adverse weather is defined as the occurrence of one or more of the following conditions which prevents only exterior construction activity or access to the site within a 24-hour period:
 - 1. Precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10”) liquid measure.
 - 2. Temperatures which do not rise above 32 degrees F by 10:00 AM.
 - 3. Standing snow in excess of one inch (1.00”).
- B. Adverse weather may include, if appropriate, “dry-out” or “mud” days when all of the following conditions are met:
 - 1. For rain above the Standard Baseline.

2. Only if there is a hindrance to site access or site work, such as excavation, backfill, and footings.
 3. At a rate no greater than 1 make-up day for each day or consecutive days of rain beyond the Standard Baseline that total 1.0 inch or more, liquid measure, unless specifically recommended otherwise by the Engineer.
- C. A weather delay day may be counted only if adverse weather prevents work on the project for 50 percent or more of the Contractor's scheduled work day, including a weekend day or holiday if the Contractor has scheduled construction activity that day.

1.06 DOCUMENTATION AND SUBMITTALS

- A. Maintain Daily Jobsite Work Log showing which and to what extent construction activities have been affected by weather on a monthly basis.
- B. Maintain a rain gauge, thermometer, and clock at the jobsite. Keep daily records of precipitation, temperature, and the time of each occurrence throughout the project.
- C. Use the Standard Baseline data provided in this section when documenting actual delays due to weather in excess of the average.
- D. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods, and submit in accordance with the procedures for claims established in Article 12 of the General Conditions.
- E. If an extension of the contract time is appropriate, it shall be implemented in accordance with the provisions of Article 12 of the General Conditions.
- F. No extra cost will be incurred by the Owner for any extra time increase to the Contract.

PART 2 PRODUCTS

- A. Not Applicable

PART 3 EXECUTION

- A. Not Applicable

**SECTION 013300
SUBMITTALS AND SUBSTITUTIONS**

PART 1 GENERAL

1.01 SUMMARY

A. Work Included

1. Wherever possible throughout the contract documents, the minimum acceptable quality of workmanship and materials has been defined by a manufacturer's name and catalogue number, reference to recognized industry and government standards, or description of required attributes and performance.
2. To ensure that the specified products are furnished and installed in accordance with the design intent, procedures have been established for advance submittal of design data and for their review by the Engineer.
3. Make all submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements.

B. Related Work Described Elsewhere

1. Individual requirements for submittals are described in other pertinent sections of these specifications.

1.02 SUBMITTALS

A. Identification of Submittals

1. General: Consecutively number all submittals.
2. Internal Identification: On at least the first page of each copy of each submittal, clearly indicate the submittal number in which the item was included.
3. Resubmittals: When material is resubmitted for any reason, transmit under a new letter of transmittal utilizing the original submittal number followed by an A, B, C, etc., depending on the number of resubmittals of the original submittal required.

B. Shop Drawings and Coordination of Drawings

1. Deliver or mail all submittals to:

Ardurra Group, Inc.
2160 Lakeside Centre Way, Suite 201
Knoxville, Tennessee 37922

Attention: Aarron Gray, P.E.
Email: agray@ardurra.com
Telephone: (865) 386-3172

2. Before issuance of Certificate of Payment for Final Payment, deliver to the Design Engineer:
 - a. Waivers of Lien
 - b. Affidavit of payment of debts and claims
 - c. Consent of surety company to final payment
 - d. Written guarantees and warranties
 - e. Marked-up record set of drawings showing every alteration or change from the original drawings and specifications
 - f. All certificates of compliance, as a condition of acceptance of the work.
3. Make submittals in strict accordance with the provisions of this section.

1.03 QUALITY ASSURANCE

A. Coordination of Submittals

1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted and verify that each item and the submittal for it conforms in all respects with the requirements of the bidding instruments.
2. Shop drawings and submittals shall bear the stamp of approval of the Contractor as evidence that this coordination has been performed.

1.04 SUBMITTAL SCHEDULE

A. Timing Of Submittals

1. General:
 - a. Make all submittals far enough in advance of scheduled dates for installation to provide all time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.
 - b. Submit shop drawings in accordance with the approved schedule of shop drawing submittals.

2. Engineer's Review Time: In scheduling, allow at least 20 calendar days for review by the Engineer following his receipt of the submittal.
3. Delays: Delays caused by tardiness in receipt of submittals will not be an acceptable basis for extension of the contract completion date.

1.05 SUBSTITUTIONS

A. Approval Required

1. The contract is based on the standards of quality established in the contract documents.
2. All products proposed for use, including those specified by required attributes and performance shall require approval by the Engineer before being incorporated into the work.
3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this work by the Engineer.

B. "Or Equal"

1. Where the phrase "or equal", "or approved equal", or "approved substitute" occurs in the contract documents do not assume that materials, equipment, or methods will be approved as equal unless the item has been specifically approved for this work by the Engineer.
2. The decision of the Engineer shall be final.
3. See pertinent portions of the contract documents for additional information relating to substitutions.
4. Where equipment, materials, or methods do not specify "or equal", "or approved equal", or "approved substitute", substitutions may be submitted by the Contractor in accordance with this section.

PART 2 PRODUCTS

- A. Not Applicable

PART 3 EXECUTION

- A. Not Applicable

END OF SECTION

**SECTION 013513
SPECIAL PROJECT PROCEDURES**

PART 1 GENERAL

1.01 ACCESS TO PROJECT

- A. The project shall be accessible at all times to representatives of the Tennessee Department of Environment and Conservation; Tennessee Department of Transportation; TVA; Town of Huntsville; and any other state, local, or federal regulatory agencies.

1.02 SMOKING AND FIRE PRECAUTIONS

- A. No smoking, fire, or use of any fire- or explosion-producing tools or equipment will be permitted on the properties of oil companies or other concerns prohibiting same on their premises or at any locations where such may endanger said premises or the current operations thereon.

1.03 MANUFACTURERS' QUALIFICATIONS

- A. The manufacturers of all materials and equipment used must be reputable and regularly engaged in the manufacture of the particular material or equipment for the use and service to which it will be subjected.

1.04 CONTRACTOR SHALL PAY FOR ALL LABORATORY INSPECTION SERVICE

- A. All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards. The laboratory or inspection agency shall be selected by the Contractor and approved by the Owner. Pay for all laboratory inspection services as a part of the Contract. Submit all material test reports to the Owner in triplicate.

1.05 COMPLIANCE WITH STATE AND LOCAL LAWS

- A. Comply with all applicable requirements of state and local laws and ordinances to the extent that such requirements do not conflict with federal laws or regulations.

1.06 PROTECTION OF PUBLIC AND PRIVATE PROPERTY

- A. Take special care in working areas to protect public and private property. The Contractor shall replace or repair at his own expense any damaged water pipes, power and communication lines, or other public utilities, roads, curbs, gutters, sidewalks, drain pipes, sewer drainage ditches, and all plantings, including grass or sod on the site of the work. Leave the site in original or better condition after all cleanup work has been done.

1.07 MARKERS

- A. Preserve all USGS, TVA, State of Tennessee, and private markers; do not remove or disturb any such markers without prior approval from the Owner. Any removal and replacement of such markers shall be at the expense of the Contractor.

1.08 PAVEMENT REPAIR AND/OR REPLACEMENT

- A. Not Applicable.

1.09 APPROVED CHEMICALS

- A. All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, must show approval of either EPA or USDA. The use of all such chemicals and the disposal of residues shall be in strict conformance with instructions.

1.10 DRAWINGS OF RECORD

- A. The Contractor shall provide and keep up-to-date a complete record set of record drawing prints, which shall be corrected daily to show every change, and the approved shop drawings. Keep this set of prints at the job site and use only as a record set. This shall not be construed as authorization for the Contractor to make changes in the approved layout without definite instructions in each case. The Contractor shall turn the set over to the Owner upon completion of the project.
- B. The drawings of record shall indicate the Contractor's name, address, phone number, the project manager's name, and the dates of the project.
- C. The final pay application will not be processed until sufficient drawings of record are provided by the Contractor.

1.11 PRESERVATION OF EXISTING VEGETATION

- A. Not Applicable

1.12 UTILITIES

- A. The Contractor is to contact the Owner of all underground utilities before beginning construction in the area. Carefully protect from damage all utilities in the vicinity of the work at all times. If it is necessary to repair, remove, and/or replace any such utility in order to complete the work properly, do so in compliance with the rules and regulations of the particular utility involved. Any such work shall be considered incidental to the construction or repairs of utility lines, and no additional payment will be allowed.

1.13 PRECONSTRUCTION SURVEY

- A. The Contractor shall video tape existing site prior to construction. Document existing damage to structures and slopes located along on project site. Preconstruction survey shall be considered incidental to the project, and no additional payment will be allowed.

1.14 PROTECTION OF LIVES AND HEALTH

- A. In accordance with generally accepted construction practices, the Contractor will be solely and completely responsible for conditions at the job site, including the safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.
- B. The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). The duty of the Design Engineer to conduct construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the construction site, nor to relieve the Contractor of his obligation to conduct comprehensive inspection of the work sufficient to ensure conformance with the intent of the contract documents.
- C. During construction, the Contractor shall construct, and at all times maintain, satisfactory and substantial temporary fencing, safety fencing, chain link fencing, solid fencing railing, barricades and/or steel plates as applicable, at all excavations, obstructions, or other hazards in streets, sidewalks and walkways. All such barriers shall have adequate painted or flagged markings and warning lights as necessary or required for safety.

1.15 WASTEWATER BYPASSING

- A. Not Applicable.

1.16 CONTRACT WORKING HOURS

- B. All work at the site shall be performed during regular working hours (7:00 a.m. to 5:00 p.m.) and the Contractor, including all their subcontractors, will not be permitted to work overtime on Saturday, Sunday or any legal holiday without the Owner's written consent given after prior notice to the Engineer.

1.17 FINAL GUARANTY/WARRANTY

- A. All work shall be and is guaranteed by the Contractor for a period of one (1) year from the date of final acceptance of all Work by the Owner. Within the warranty periods, the Contractor shall promptly, upon receipt of notice from the Owner, make repair or changes to materials, equipment, or workmanship that is inferior, defected, or not in accordance with the terms of the Contract. If the Contractor, after notice, fails within 10 days to proceed to comply with the terms of the warranty, the Owner may have the defects corrected and the Contractor and his surety shall be liable for all expenses incurred.

PART 2 PRODUCTS

- A. Not Applicable

PART 3 EXECUTION

- A. Not Applicable

END OF SECTION

SECTION 014000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. General Quality Control.

1. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.

B. Workmanship.

1. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
2. Perform work by persons qualified to produce workmanship of specified quality.
3. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

B. Manufacturers' Instructions.

1. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with contract documents, request clarification from Engineer before proceeding.

C. Manufacturers' Certificates.

1. When required by individual specifications section, submit manufacturers' certificate, in duplicate, that products meet or exceed specified requirements.

D. Manufacturers' Field Services.

1. When specified in respective specification sections, require supplier or manufacturer to provide qualified personnel to observe field conditions; conditions of surfaces and installation; quality of workmanship; start-up of equipment; test, adjust, and balance of equipment; and as applicable, to make appropriate recommendations.
2. A representative shall submit a written report to Owner listing observations and recommendations.

E. Testing Laboratory Services.

1. Owner shall employ and pay for services of an Independent Testing Laboratory to perform inspections, tests, and other services required by individual specification sections.
2. Services will be performed in accordance with requirements of governing authorities and with specified standards.
3. Reports will be submitted to Owner in duplicate giving observations and results of tests, indicating compliance or non-compliance with specified standards and with contract documents.
4. Contractor shall cooperate with testing laboratory personnel, furnish tools, samples of materials, design mix, equipment, storage, and assistance as requested.
 - a. Notify Owner and testing laboratory 24 hours prior to expected time for operations requiring testing services.
 - b. Make arrangements with testing laboratory and pay for additional samples and tests for Contractors' convenience.

PART 2 PRODUCTS

A. Not Applicable

PART 3 EXECUTION

A. Not Applicable

END OF SECTION

SECTION 014219
REFERENCE STANDARDS

PART 1 GENERAL

1.01 Meet the requirements and recommendations of all Standards, Institutes, Associations, etc., referred to throughout these documents and specifications as if they were fully reproduced herein. Unless otherwise noted, the latest editions shall apply.

1.02 ABBREVIATIONS

AAMA	Architectural Aluminum Manufacturers' Association
AASHTO	American Association of State Highway and Transportation Officials
ABMA	American Boiler Manufacturers' Association
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturers' Association
AGA	American Gas Association
AGC	Association of General Contractors
AGMA	American Gear Manufacturers' Association
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
ARI	Air Conditioning and Refrigeration Institute
ASA	American Standards Association
ASAE	American Society of Automotive Engineers
ASC	Association of Specialty Contractors
ASCII	American Standard Code for Information Interchange
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPB	American Wood Preservers Bureau
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BIA	Brick Institute of America
CMAA	Crane Manufacturer's Association of America
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards
CSI	Construction Specifications Institute
EPA	Environmental Protection Agency

#

FAA	Federal Aviation Administration
FGMA	Flat Glass Marketing Association
FM	Associated Factory Mutual Laboratories
FS	Federal Specifications
IEEE	Institute of Electrical and Electronic Engineers
IRI	Industrial Risk Insurors
ISA	Instrument Society of America
JIC	Joint Industrial Council
MBMA	Metal Building Manufacturers' Association
MMA	Monorail Manufacturers' Association
NAAMM	National Association of Architectural Metal Manufacturers
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NFPA	National Fire Protection Association or National Forest Products Association
NKCA	National Kitchen Cabinet Association
NPT	National Pipe Thread
NRCA	National Roofing Contractors' Association
NSF	National Sanitation Foundation
NSWMA	National Solid Waste Manufacturers' Association
NWMA	National Woodwork Manufacturing Association
OSHA	Occupational Safety and Health Administration
PPI	Plastics Pipe Institute
RIS	Redwood Inspection Service
SAE	Society of Automotive Engineers
SBCC	Standard Building Code Congress
SDI	Steel Deck Institute
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPII	Southern Pine Inspection Institute
SSBC	Southern Standard Building Code
SSPC	Steel Structures Painting Council
TCA	Tile Council of America
TDOT	Tennessee Department of Transportation
TIMA	Thermal Insulation Manufacturers' Association
UL	Underwriters' Laboratories
USG	United States Gypsum
WCLIB	West Coast Lumber Inspection Bureau
WWPA	Western Wood Products Association

PART 2 **PRODUCTS**
A. Not Applicable

PART 3 **EXECUTION**
A. Not Applicable

END OF SECTION

#

**SECTION 015200
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS**

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Sanitary Facilities
- B. Electricity, Lighting
- C. Water
- D. Barriers
- E. Security
- F. Temporary Controls
- G. Protection of Installed Work
- H. Water Control
- I. Cleaning During Construction
- J. Field Offices and Sheds
- K. Removal of Construction Facilities and Temporary Controls

1.02 RELATED REQUIREMENTS

- A. Section 01 11 00 - Summary of Work: Abandoned materials, storage, and Contractor's use of premises.
- B. Section 01 74 00 - Cleaning.
- C. Owner's facilities can not be used by any of the contractor's or subcontractor's employees.

1.03 SANITARY FACILITIES

- A. Provide and maintain required temporary facilities and enclosures for job personnel that:
 - 1. Are weather tight, clean, and sanitary.
 - 2. Are provided with either natural light and ventilation or artificial light and mechanical ventilation.
 - 3. Are provided with toilet tissue in a suitable holder.
 - 4. Comply with applicable legal and health requirements.

- B. Remove temporary toilet facilities when work is complete.

1.04 ELECTRICITY, LIGHTING

- A. Connect to existing service, provide branch wiring and distribution boxes located to allow service and lighting by means of construction-type power cords.
 - 1. Make arrangements for, pay deposits on, and install the poles, wiring, switches, outlets, and other electrical equipment necessary.
 - 2. Pay for current used during construction period.
- B. Provide lighting for construction operations.
- C. Existing and permanent lighting may be used during construction. Maintain lighting and make routine repairs. Replace all lamps of all light fixtures used during construction at final inspection and give used lamps to the Owner for stock.
- D. Remove temporary electrical equipment when construction is completed.

1.05 WATER

- A. Provide service required for construction operations. Extend branch piping with outlets located so that water is available by use of hoses. Connect to existing facilities; extend branch piping with outlets located so that water is available by use of hoses.
 - 1. Make arrangements for, pay deposits on, and install the piping and equipment necessary.
- B. Remove temporary water facilities when construction is completed. Water will be paid for by the Owner, for standard, reasonable, project-related use only.

1.06 BARRIERS

- A. Provide as required to prevent public entry to construction areas, to provide for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.
- C. Provide barriers adjacent to areas of excavation to protect against vehicular traffic.

1.07 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Coordinate with Owner's security program.

1.08 TEMPORARY CONTROLS

- A. Coordinate, schedule, and perform work to cause the least practical interference with the public, fire protection service, public utility service, and Owner's operations. Coordinate all connections, cut-ins, alterations, or other interruption with designated representative of the Owner or utility service. Notify the representative 48 hours in advance and cooperate with him in minimizing the interruptions.
- B. Comply with the local requirements of EPA, the health department, or other regulatory requirement for construction operations relating to noise, pest, rodent, dust, and pollution controls.

1.09 PROTECTION OF INSTALLED WORK

- A. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
- B. Prohibit traffic and storage on lawn and landscaped areas.

1.10 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide and operate pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.11 CLEANING DURING CONSTRUCTION

- A. Construction cleaning shall be as specified in Section 01 74 00.

1.12 FIELD OFFICES AND SHEDS

- A. Offices: The Contractor shall provide offices for himself, which shall:
 - 1. Be located in an area approved by the Owner.
 - 2. Consist of weather-tight buildings or trailers of adequate size.
 - 3. Be provided with lights, heat, cooling, and ventilation.
 - 4. Be provided with a means of being locked.
 - 5. Be maintained in a clean, neat and orderly manner, as determined by the Owner.

- B. Storage Sheds for Tools, Materials, and Equipment: Weather-tight, with heat and ventilation for Products requiring controlled conditions, with adequate space for organized storage and access, and lighting for inspection of stored materials.

1.13 REMOVAL OF CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

- A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations to a depth of 2 feet; grade site as indicated. Restore existing facilities used during construction to specified, or to original, condition.

1.14 PAYMENT

- A. No separate payment will be made for the materials, work, equipment, labor, etc., required herein for Construction Facilities and Temporary Controls. Include the costs thereof in the lump sum price on the Bid Form.

PART 2 PRODUCTS

- A. Not Applicable

PART 3 EXECUTION

- A. Not Applicable

END OF SECTION

**SECTION 015713
TEMPORARY EROSION AND SEDIMENT CONTROL**

PART 1 GENERAL

1.01 SUMMARY

- A. This work shall consist of erosion control on all cut and fill operations, excavation, backfill, or other construction activities within the limits of the construction site, within any temporary or permanent easements, and within any borrow site used during the period of construction. The protection of these sites shall continue throughout the construction period regardless of weather conditions.

- B. While formally identified as erosion control activities, this work encompasses that necessary to ensure that construction activities do not temporarily or permanently harm the waters of the State of Tennessee, nor properties of the Owner, nor adjoining owners.

- C. These activities, over which neither the Owner nor the Engineer has control during the bidding process, are related to the means and methods the Contractor uses to pursue the work and as such cannot be predicted in advance. For this reason, the Contractor must be solely responsible for conforming to related local, State, and Federal requirements.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials, installation, and maintenance of erosion and pollution control structures shall be in accordance with the Drawings and the "Tennessee Erosion and Sediment Control Handbook" (Tennessee Department of Environment and Conservation, latest edition).

PART 3 EXECUTION

3.01 GENERAL

- A. The temporary erosion and pollution control provisions shown on the drawings are considered the minimum necessary, with the final design, implementation, and maintenance being the responsibility of the Contractor.

- B. Install temporary sediment traps where appropriate. Construct and maintain in accordance with the requirements of Tennessee Erosion and Sediment Control Handbook. Muddy water collected in sediment traps shall be held until it is at least as clear as the upstream water before it is discharged to surface waters. Discharge

through a pipe or lined channel so that the discharge does not cause erosion and sedimentation.

- C. Install temporary diversion berms or diversion channels as necessary to divert storm water from running onto the disturbed areas and to divert runoff from disturbed areas to the temporary sediment traps.
- D. Apply temporary seeding whenever grading operations are temporarily halted for over 14 days and final grading of exposed surfaces is to be completed within one year. Apply temporary seeding to soil stockpiles.

END OF SECTION

**SECTION 016000
MATERIAL AND EQUIPMENT**

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Products.
- B. Transportation and Handling.
- C. Storage and Protection.
- D. Product Options.
- E. Products List.
- F. Substitutions.
- G. Systems Demonstration.

1.02 QUALITY ASSURANCE

- A. Approval Required
 - 1. The contract is based on the standards of quality established in the contract documents.
 - 2. All products proposed for use, including those specified by required attributes and performance, shall require approval by the Owner before being incorporated into the work.
 - 3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this work by the Owner.

1.03 PRODUCTS

- A. Products include material, equipment, and systems.
- B. Comply with specifications and referenced standards as minimum requirements.
- C. Components required to be supplied in quantity within a specification section shall be the same, and shall be interchangeable.

1.04 TRANSPORTATION AND HANDLING

- A. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.

- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.
- C. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

1.05 STORAGE AND PROTECTION

- A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions. Store mechanical and electrical equipment in a controlled environment as recommended by the manufacturer.
- B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
- C. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.
- D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged and are maintained under required conditions.

1.06 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards.
- B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not specifically named.

1.07 PRODUCTS LIST

- A. Under provisions of Section 01 33 00-Submittals and Substitutions, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

1.08 SUBSTITUTIONS

- A. During bidding period, the Owner will govern times for submitting requests for substitutions under requirements specified in this section.
- B. Concurrent with submission of product list, the Owner will consider requests from Contractor for substitutions. Subsequently, substitutions will be considered only when a product becomes unavailable due to no fault of Contractor. Confirmation of unavailable products must be in writing and certified by the manufacturer that the product is no longer available.
- C. Submit separate request for each substitution. Document each request with complete data substantiating compliance of proposed substitution with contract documents.
- D. Request for substitution constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
 - 2. Will provide the same warranty for substitution as for specified product.
 - 3. Will coordinate installation and make other changes which may be required for work to be complete in all respects.
 - 4. Waives claims for additional costs which may subsequently become apparent.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals. Separate written request must be submitted for any proposed substitutions or deviation from the contract documents.
- F. Owner will determine acceptability of proposed substitution, and the Engineer will notify Contractor of acceptance or rejection in writing within a reasonable time.
- G. Substitute products shall not be ordered or installed without written acceptance.
- H. Only one request for substitution will be considered for each product. When substitution is not accepted, provide specified product.
- I. Engineer will determine acceptability of substitutions.

1.09 SUBMITTAL PROCEDURES

- A. Engineer will review Contractor's requests for substitutions with reasonable promptness.
- B. During the bidding period, Engineer will record acceptable substitutions in Addenda.
- C. Upon proper submission, Engineer will notify Contractor, in writing, of decision to accept or reject requested substitution within 15 days.

- D. For accepted products, submit shop drawings, product data, and samples under provisions of Section 01 33 00 - Submittals and Substitutions.

1.10 SYSTEMS DEMONSTRATION

- A. Prior to final inspection, demonstrate operation of each system to the Owner.
- B. Instruct Owner's personnel in operation, adjustment, and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

PART 2 PRODUCTS

- A. Not Applicable

PART 3 EXECUTION

- A. Not Applicable

END OF SECTION

**SECTION 017123
FIELD ENGINEERING**

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Contractor shall provide field engineering services and establish grades, lines, and levels, by use of recognized survey practices.
- B. Control datum for survey is established by Owner-provided survey.

PART 2 PRODUCTS

- A. Not Applicable

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify locations of survey control points prior to starting work. Promptly notify Owner of any discrepancies discovered.

3.02 SURVEY REFERENCE POINTS

- A. Protect survey control points prior to starting site work; preserve permanent reference points during construction. Make no changes without prior written notice to Owner.
- B. Promptly report to Owner the loss or destruction of any reference point or relocation required because of changes in grades or other reasons. Replace dislocated survey control points based on original survey control.
- C. The Contractor shall preserve all USGS, TVA, State of Tennessee, and private markers; do not remove or disturb any such markers without prior approval from the Owner. Any removal and replacement of such markers shall be at the expense of the Contractor. The re-establishment of these markers shall be performed by a surveyor licensed by the State of Tennessee, with a letter indicating the completion of work.

3.03 STAKING

- A. The Contractor shall be responsible for staking the project and preparing cut sheets as needed.

3.04 TESTING

- B. Testing services required during construction will be provided by Owner.

END OF SECTION

**SECTION 017400
CLEANING**

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work Included: Throughout the construction period, maintain the site in a standard of cleanliness as described in this section.
 - 1. Site generated garbage will be cleaned and removed daily.
- B. Related Work Described Elsewhere: In addition to standards described in this section, comply with all requirements for cleaning up as described in other sections of these specifications.

1.02 QUALITY ASSURANCE

- A. Inspection: Conduct inspection daily, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. Codes and Standards: In addition to the standards described in this section, comply with all pertinent requirements of government agencies having jurisdiction.

PART 2 PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

- A. Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

PART 3 EXECUTION

3.01 PROGRESS CLEANING

- A. General:
 - 1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
 - 2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for the construction of this work.
 - 3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
 - 4. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the ecology.
- B. Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service all arrangements to meet the requirements of paragraph 3.01.A.1, above.
3. Maintain the site in a neat and orderly condition at all times.

3.02 FINAL CLEANING

- A. Definition: Except as otherwise specifically provided, "clean" (for the purpose of all paragraphs under paragraph 3.02) shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. General: Prior to the completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described under paragraph 3.01, above.
- C. Site: Unless otherwise specifically directed by the Owner, broom clean all paved areas on the site and all public paved areas directly adjacent to the site. Completely remove all resultant debris.
- D. Timing: Schedule final cleaning as approved by the Owner to accept a completely clean project.

END OF SECTION

**SECTION 017700
CONTRACT CLOSEOUT**

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Closeout Procedures
- B. Final Cleaning
- C. Project Record Documents
- D. Operation and Maintenance Data
- E. Warranties and Bonds
- F. Spare Parts and Maintenance Materials

1.02 RELATED REQUIREMENTS

- A. Document 00 72 13 - General Conditions: Fiscal provisions, legal submittals, and other administrative requirements.

1.03 CLOSEOUT PROCEDURES

- A. Comply with procedures stated in General Conditions of the contract and procedures specified in this section for issuance of Certificate of Final Completion.
- B. Owner will occupy designated portion of Project for the purpose of installation of Owner furnished equipment, or conduct of business, under provision stated in Certificate of Substantial Completion.
- C. When Contractor considers work has reached final completion, submit written certification that contract documents have been reviewed, work has been inspected, and that work is complete in accordance with contract documents and ready for Engineer observation.
- D. In addition to submittals required by the conditions of the contract, provide submittals required by governing authorities and submit a final statement of accounting, giving total adjusted Contract Sum, previous payments, and sum remaining due.
- E. Owner will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order.

1.04 FINAL COMPLETION

- A. The final inspection at the job site will be done by the Engineer once the following items are received from the General Contractor:
 - 1. A letter stating that a qualified person authorized by the General Contractor has fully reviewed the Contract Documents and inspected the work and that they both agree.
 - 2. A letter stating that the work is complete and in accordance with the Contract Documents and ready for final inspection.
 - 3. Work has been completed in accordance with Contract Documents and deficiencies listed with Certificate of Substantial Completion have been corrected.
 - 4. Equipment and systems have been tested, adjusted, and balanced and are fully operational.
 - 5. Operation of systems has been demonstrated to Owner's personnel.
 - 6. A letter stating that the Project Record Documents are complete and be provided to the Owner before final inspection.
 - 7. Work is complete and ready for final inspection.
- B. Should Engineer inspection find work incomplete, he will promptly notify Contractor in writing listing observed deficiencies.
- C. Contractor shall remedy deficiencies and send a second certification of final completion.
- D. When Engineer finds work is complete, he will consider closeout submittals.

1.05 CLOSEOUT SUBMITTALS

- A. Before issuance of Certificate of Payment for Final Payment, deliver to the Owner the following:
 - 1. Project Record Documents:
 - a. Store documents separate from those used for construction.
 - b. Keep documents current. Do not permanently conceal any work until required information has been recorded.
 - c. At contract closeout, submit documents with transmittal letter containing date, project title, Contractor's name and address, list of documents, and signature of Contractor.
 - 2. Closeout Documents - Volume One
 - a. Submit two sets bound in 8-1/2- by 11-inch locking three-ring side binder with durable plastic covers, minimum 1/2 inch larger than thickness of contents, of the following:
 - 1) Directory listing names, addresses, and telephone numbers of the Owner and Contractor.
 - 2) Directory listing names, addresses, and telephone numbers of subcontractors and suppliers.
 - 3) Contractor's letter that is notarized providing 1-year warranty.

- 4) Letter certifying that all materials used comply with the specifications.
- 5) Evidence of Payment and Release of Liens and Waivers of Lien in accordance with conditions of the Contract.
- 6) Consent of Surety to Final Payment.

3. Make submittals in strict accordance with the provisions of this section.

1.06 STATEMENT OF ADJUSTMENT OF ACCOUNTS

A. Submit final statement reflecting adjustments to Contract Sum indicating:

1. Original Contract Sum
2. Previous Change Orders
3. Changes Under Unit Prices
4. Deductions for Uncorrected Work
5. Deductions for Liquidated Damages
6. Other Adjustments to Contract Sum
7. Total Contract Sum as Adjusted
8. Previous Payments
9. Sum Remaining Due

B. Engineer will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by change orders.

1.07 APPLICATION FOR FINAL PAYMENT

A. Submit application for final payment in accordance with provisions of Conditions of the contract.

PART 2 PRODUCTS

A. Not Applicable

PART 3 EXECUTION

A. Not Applicable

END OF SECTION

SECTION 017839
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Maintenance of Record Documents and Samples.
- B. Submittal of Record Documents and Samples.

1.02 RELATED REQUIREMENTS

- A. Document 00 72 13 - General Conditions: Documents at the site.
- B. Section 01 33 00 - Submittals and Substitutions: Shop drawings, product data.
- C. Individual Specifications Sections: Manufacturer's certificates and certificates of inspection.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. In addition to requirements in General Conditions, maintain at the site for Owner one record copy of:
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Field test records.
 - 7. Inspection certificates.
 - 8. Manufacturer's certificates.
- B. Maintain Record Documents in a clean, dry, and legible condition. Do not use Record Documents for construction purposes.
- C. Keep Record Documents and samples available for inspection by Owner.

1.04 RECORDING

- A. Record information concurrently with construction progress. Do not conceal any work until required information is recorded by Contractor and verified by Engineer.
- B. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction, including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

2. Field changes of dimension and detail.
3. Changes made by modifications.
4. Details not on original contract drawings.
5. References to related shop drawings and modifications.

C. Specifications: Legibly mark each item to record actual construction, including:

1. Manufacturer, trade name, and catalog number of each product actually installed, particularly optional items and substitute items.
2. Changes made by addenda and modifications.

1.05 SUBMITTALS

A. At Contract closeout, deliver Record Documents and samples to Engineer.

B. Transmit with cover letter in duplicate, listing:

1. Date.
2. Project title and number.
3. Contractor's name, address, and telephone number.
4. Number and title of each Record Document.
5. Signature of Contractor or authorized representative.

PART 2 PRODUCTS

A. Not Applicable

PART 3 EXECUTION

A. Not Applicable

END OF SECTION

**SECTION 260500
COMMON WORK RESULTS FOR ELECTRICAL**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Electrical equipment coordination and installation.
 - 2. Common electrical installation requirements.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- D. Terminations for all electrical devices including but not limited to, safety and disconnect switches, circuit breakers, panelboards, motor controllers, wiring devices like receptacle outlets, hard wired electrical equipment etc. shall be rated to accept 75 Degree C rated conductors.

END OF SECTION

SECTION 260519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section includes:
 - 1. Building wires and cables rated 600 volts (V) and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.03 ACTION SUBMITTALS

- A. Product data: for each type of product.

1.04 INFORMATIONAL SUBMITTALS

- A. Qualification data: for testing agency.
- B. Field quality-control reports.

1.05 QUALITY ASSURANCE

- A. Testing agency qualifications: member-company of National Environmental Training Association (NETA) or a Nationally Recognized Testing Laboratory (NRTL).
 - 1. Testing agency's field supervisor: certified by NETA to supervise on-site testing.

PART 2 PRODUCTS

2.01 CONDUCTORS AND CABLES

- A. Basis-Of-Design product – subject to compliance with requirements, provide product by one of the following:
 - 1. Alcan Products Corporation; Alcan Cable Division.
 - 2. Alpha Wire.
 - 3. Belden Inc.
 - 4. Encore Wire Corporation.
 - 5. General Cable Technologies Corporation.
 - 6. Southwire Incorporated.
- B. Copper conductors: comply with NEMA WC 70/ICEA S-95-658.

- C. Conductor insulation: comply with National Electrical Manufacturers Association (NEMA) wire and cable (WC) 70/Insulated Cable Engineers Association (ICEA) S-95-658 for Type THHN-2-THWN-2 and Type SO.

2.02 CONNECTORS AND SPLICES

- A. Basis-Of-Design product – subject to compliance with requirements, provide product by one of the following:
 - 1. The AFC Cable Systems, Inc.
 - 2. Gardner Bender.
 - 3. Hubbell Power Systems, Inc.
 - 4. Ideal Industries, Inc.
 - 5. IlSCO; a branch of Bardes Corporation.
 - 6. The NSI Industries LLC.
 - 7. The O-Z/Gedney; a brand of the EGS Electrical Group.
 - 8. The 3M; Electrical Markets Division.
 - 9. Tyco Electronics.
- B. Description: factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.03 SYSTEM DESCRIPTION

- A. Electrical components, devices, and accessories: listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

PART 3 EXECUTION

3.01 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper for feeders smaller than No. 4 American Wire Gage (AWG). Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch circuits: copper. Solid for No. 10 and No. 12 AWG and smaller; stranded for No. 8 AWG and larger, except VFC cable, which shall be extra flexible stranded.

3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service entrance: Type THHN-2-THWN-2, single conductors in raceway
- B. Exposed feeders: Type THHN-2-THWN-2, single conductors in raceway
- C. Feeders concealed underground: Type THHN-2-THWN-2, single conductors in raceway.
- D. Branch circuits concealed underground: Type THHN-2-THWN-2, single conductors in raceway.

3.03 INSTALLATION OF CONDUCTORS AND CABLES

- A. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

3.04 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

3.05 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems".

3.06 FIELD QUALITY CONTROL

- A. Testing agency: engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's field service: engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- D. Test and inspection reports – prepare a written report to record the following:
 - 1. Procedures used.
 - 2. Results that comply with requirements.
 - 3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- E. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION

SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment, plus the following special applications:
 - 1. Underground distribution grounding.

1.03 SUBMITTALS

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

1.04 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 PRODUCTS

2.01 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

2.02 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.03 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad; 3/4 inch by 10 feet in diameter.

PART 3 EXECUTION

3.01 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all branch circuits.
- B. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounded conductor installed with branch-circuit conductors.

3.02 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

END OF SECTION

**SECTION 260533
RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.03 DEFINITIONS

- A. RNC: Rigid nonmetallic conduit (PVC)

1.04 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 PRODUCTS

2.01 NONMETALLIC CONDUIT AND TUBING

- A. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- B. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.

2.02 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. Description: Comply with SCTE 77.
 - 1. Color of Frame and Cover: Gray.
 - 2. Configuration: Units shall be designed for flush burial and have open bottom, unless otherwise indicated.
 - 3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
 - 4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 - 5. Cover Legend: Molded lettering as indicated for each service.
 - 6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

7. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

PART 3 EXECUTION

3.01 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
 1. Exposed Conduit: RNC, Type EPC-80-PVC, direct buried.
 2. Underground Conduit: RNC, Type EPC-80-PVC, direct buried.
- B. Minimum Raceway Size: 1/2-inch (16-mm) trade size.

3.02 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Complete raceway installation before starting conductor installation.
- C. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- D. Install no more than the equivalent of four 90-degree bends in any conduit .

3.03 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches (150 mm) in nominal diameter.
 2. Install backfill as specified in Division 31 Section "Earth Moving."
 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."

3.04 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
- C. Install handholes and boxes with bottom below the frost line, minimum 18" below grade.

3.05 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 260553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Identification for conductors.
 - 2. Underground-line warning tape.

1.03 SUBMITTALS

- A. Product Data: For each electrical identification product indicated.

1.04 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and IEEE C2.
- B. Comply with NFPA 70.

PART 2 PRODUCTS

2.01 UNDERGROUND-LINE WARNING TAPE

- A. Tape:
 - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - 2. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - 3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.
- B. Color and Printing:
 - 1. Comply with ANSI Z535.1 through ANSI Z535.5.
 - 2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
 - 3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- F. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- G. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.
- H. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches (400 mm) overall.
- I. Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.

3.02 IDENTIFICATION SCHEDULE

- A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
 - 1. Color-Coding for Phase Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
 - a. Color shall be factory applied.
 - b. Colors for 240/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and

in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

END OF SECTION

**SECTION 266100
GENERAL LIGHTING PROVISIONS**

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Fixtures
- B. Drivers

1.02 SUBMITTALS

- A. Submit shop drawings and product data in accordance with Section 260500.
- B. Submit shop drawings for luminaries showing pertinent physical characteristics and performance data.
- C. Provide a complete set of fixture information and include in O&M Manuals.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide fixtures as shown in the fixture schedule. Equals to be considered.

2.02 FIXTURES

All LED fixtures shall have the following characteristics:

- A. Minimum color rendering index (CRI) of 80
- B. L70 of 50,000 or greater with minimum 5 year warranty to support lifetime claim.
- C. Passive cooling only for LED fixtures with less than 2000 lumens
- D. Color Temperature within 4 SDCM or less (Standard Deviation Color Matching aka MacAdam Ellipse)
- E. Remote Phosphor LEDs only where consistency of color over the life of the LED is critical
- F. Driver lifetime of 50,000 hours or more, with minimum 5 year warranty to support lifetime claim
- G. All light engines and drivers must be field-replaceable
- H. Driver information must be available including brand, dimming options, and amperage rating

2.03 CONTROLS

- A. Time switches shall be Tork, Intermatic, or Paragon of types and quantity shown on Drawings.

PART 3 EXECUTION

3.01 GENERAL

- A. Furnish, locate, and install fixtures as indicated on Drawings.

3.02 INSTALLATION

- A. Receive, store, uncrate, and install light fixtures shown in schedule on drawings to be specified by others.
- B. Locate no splice or tap within an arm or stem. Wire shall be continuous from splice in pullbox or hand-hole to driver terminals.

END OF SECTION

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:

- 1.This work consists of clearing, grubbing, removing, and disposing of all debris and of all vegetation.
- 2.Removal of buildings and foundations not removed by others that are within designated construction areas, except for such objects that the Owner or Owner's Representative designates to remain.
- 3.The work shall also include preserving and protecting from injury or defacement all vegetation and objects designated to remain.
- 4.Topsoil excavation is not included.

- B. Related Sections:

- 1.Section 312000 – Earthwork
- 2.Section 312500 – Erosion Prevention and Sediment Control
- 3.Section 329219 – Seeding

1.3 DEFINITIONS

- A. Not Used.

1.4 SUBMITTALS

- A. Submittals shall be in electronic form (via email) and shall be stamped by the Contractor. Submit to the Owner or Owner's representative.

1.5 QUALITY ASSURANCE

- A. Perform work in compliance with applicable requirements of authorities having jurisdiction.

1.6 PROJECT CONDITIONS

- A. Contractor shall obtain all necessary permits from regulatory agencies including signing and

resubmitting Notices of Intent (NOI) and Stormwater Pollution Prevention Plans (SWPPP).

- B. Obtain any other necessary permits required to perform this work.

PART 2 - PRODUCTS

- B. Not Used.

PART 3 - EXECUTION

3.1 PROTECTION

- A. The Owner or Owner's Representative will designate all trees, shrubs, plants, and other items within the project area that are to remain. Paint required for cut or scarred surfaces of trees or shrubs selected for retention shall be an asphaltum base paint prepared especially for tree surgery and approved by the Engineer.
- B. Preserve from injury all trees and other vegetation that are not within designated areas of clearing and grubbing, unless marked for removal by the Owner or Owner's Representative.

3.2 CLEARING

- A. The project area shall be cleared of all dead trees, stumps, brush, hedges, weeds, logs and other objectionable material and vegetation. Remove tree stumps, boulders, and obstructions to a depth of 2 feet below subgrade. Scarify rock to a depth of 1 foot below subgrade.
- B. In areas where excavation is to be made and 5 feet beyond the excavation limits, all trees, stumps, roots, brush, hedge, heavy growth of vegetation, etc., shall be cleared and grubbed.
- C. In areas where embankments are to be constructed, all trees, stumps, roots, brush, hedge, heavy growth of vegetation, etc., shall be cleared and grubbed to a point 5 feet beyond slope intercepts. All depressions made below the ground surface shall be refilled with suitable material and compacted before the embankment is started. Unsatisfactory material such as brush, hedge, roots, stump, branches and logs of trees, heavy vegetation, etc. shall not be embedded or buried within the embankment.
- D. All slopes of cuts, embankments, ditches, channels, waterways and all structures, both old and new, shall be cleared and cleaned of all brush, hedges, weeds, heavy vegetation, obstruction, rubbish and other objectionable material or growth; and shall be maintained in a neat, serviceable and satisfactory condition until the project is accepted.
- E. Borrow pits and other material pits shall be cleared and grubbed of all trees, stumps, roots, brush, hedge, and other heavy growths of vegetation, and in addition shall be stripped of overburden laying above the material to be obtained. This work is to be completed before any excavation is made in the pit area.

- F. All clearing and grubbing shall be completed a satisfactory distance ahead of the construction operations before construction stakes are set.

3.3 CLEANUP AND PROTECTION

- A. Unless otherwise approved by the Owner or Owner's Representative, all materials and debris from the clearing and grubbing operation shall be burned, completely destroyed, or otherwise disposed of from the project limits by the Contractor in a satisfactory manner.
- B. The Contractor must obtain written permission from any property owner if private property is used for disposal, and furnish a copy to the Engineer. All Federal, State, local laws, regulations and ordinances related to burning or disposal shall be observed. If on-site disposal is approved by the Owner, coordinate the exact location of disposal with the Owner.

END OF SECTION 311000

SECTION 312000 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
3. Excavating and backfilling for buildings and structures.
4. Excavation, placing, and spreading of topsoil.
5. Excavation and grading of roadways, borrow pits, waterways, ditches, and other specified items, within the project limits.
6. Excavation of unsuitable material beneath embankment areas.
7. Excavating select material for specific use in the construction; trimming, shaping and dressing of all slopes; preparation of the subgrade for building slabs, walks, and pavements.
8. Disposing of all excavated materials. Constructing of embankments and the placing and compacting of approved material in the project area, finish grading.

- B. Related Sections:

1. Section 311000 – Site Clearing
2. Section 312333 – Trenching, Backfilling, and Compacting
3. Section 312500 – Erosion Prevention and Sediment Control
4. Section 329219 - Seeding

1.3 DEFINITIONS

- A. Backfill: Soil, aggregate, or controlled low-strength material used to fill an excavation.
- B. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- C. Excavation: Removal of material encountered above subgrade elevations and to the lines, grades, elevations, and dimensions indicated on the Plans. Excavation shall also consist of the legal and appropriate disposal of unsatisfactory materials. The classification of excavation shall be UNCLASSIFIED.

- D. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions.
1. Borrow Excavation: Consists of material required for the construction of embankments or other portions of the work, and shall be obtained from the approved sources outside project limits, unless otherwise designated in the Plans. This item shall consist of the satisfactory removal and placement of the approved material, outside that required to complete the work contained in the Contract Documents.
 2. Mass Rock Excavation: Consists of the removal and satisfactory disposal of non-degradable rock which, in place, rings under the hammer or which cannot be economically excavated by the proper use of a power shovel or without the use of explosives; and any boulder, slab or fragment of rock having a volume of 1/2 cubic yard or more.
 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at no additional cost to the Owner.
 4. Unclassified Excavation: Without regard to the materials encountered, all general excavation shall be unclassified. It shall be distinctly understood that any reference to rock, earth, or any other material on the Plans is not to be taken as an indication of classified excavation or the quantity of rock, earth, or any other material involved. Any material that is encountered within the limits of the required excavation that cannot be removed except by drilling and/or blasting, including rock, boulders, masonry, hard pan, chert, shale, street and sidewalk pavements and/or similar materials, shall be considered as unclassified excavation, and no separate payment will be made. No allowance or extra payments will be made by reason of variation in types of soil encountered or variations in moisture contents. Additional fill material required shall be furnished and included as a part of the work. The bidders must draw their own conclusions as to the conditions to be encountered.
- E. Fill: Satisfactory materials used to raise existing grades.
- F. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 1/2 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D 1586.
- G. Satisfactory Materials or Structural Soil Fill: ASTM D 2487 soil classification groups GW, GP, SW, SP, SM, ML, CL, CH, and SC or a combination of these group symbols and also include:
1. Soil materials that are clean, free of organics, debris, waste, frozen materials, vegetation and other deleterious material, containing no rock fragments or gravel larger than 4 inches in any dimension.
 2. Soil material with a standard Proctor maximum dry density of 90 pounds per cubic foot (pcf) or greater, a plasticity index (PI) of 35 percent or less, and a liquid limit (LL) of 55 percent or less.
 3. All material to be used as structural fill should be tested by the geotechnical engineer to confirm that it meets the project requirements before being placed.

- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- J. Undercutting: Removal and disposal of unsatisfactory material excavated below the subgrade in cut sections from areas which embankments are to be placed. The quantity of undercut material shall be quantified by the Geotechnical Engineer. Undercut areas shall be backfilled with satisfactory material.
- K. Unsatisfactory Materials: Materials which do not comply with the requirements for satisfactory materials are unsatisfactory and include:
 - 1. Man-made fills; trash; refuse; backfills from previous construction; and material classified as satisfactory materials which contains root and other organic matter or frozen material. The ITL shall be notified of any contaminated materials.
 - 2. Soils that are too soft, expansive soils having a plasticity index and a liquid limit not consistent with the requirements of satisfactory soils as defined herein.
 - 3. Soils classified as PT, OH, and OL.
- L. Topsoil: Natural, fertile, friable soil possessing characteristics of representative productive soils in the vicinity; obtained from naturally well-drained areas; shall not be excessively acid or alkaline nor contain toxic substances that may be harmful to plant growth. Topsoil shall be without admixture of subsoil and shall be cleaned and reasonably free from clay lumps, stones, stumps, roots, or similar substances 2 inches or more in diameter, debris, or other objects that are a hindrance to planting operations. Topsoil may include soils that have been stripped from the site and that have been stockpiled as specified elsewhere. If the quantity of topsoil on the job is inadequate, furnish enough additional topsoil to meet the requirements of the project specifications.
- M. Wet Soils: Soils that are too wet to use as backfill in their current state, but that meet the requirements of satisfactory soils. These soils are considered to be satisfactory soils. The Contractor shall be responsible to employ either mechanical or chemical methods to dry on-site soils so that the specified compaction can be achieved.

1.4 SUBMITTALS

- A. Submittals shall be in pdf format electronic form (e.g, via email) and shall be stamped by the Contractor. Submit to the Owner or Owner's representative.
- B. Report the results of all density tests to the Owner or Owner's Representative. Include location of test, date of test, note of re-test, test location, depth below finished grade, wet density, moisture content, dry density, percent compaction of test sample, maximum dry density used for comparison, and any other information specified.

- C. Provide as-built elevations of building subgrades and top of stone prior to pouring foundations or pads.

1.5 QUALITY ASSURANCE

- A. Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.
- B. Testing shall be the responsibility of the Contractor.
- C. Testing shall be performed by a qualified independent geotechnical testing and inspection laboratory to perform soil testing and inspection services for quality control testing during earthwork operations.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery, storage, and handling of materials shall be in accordance with the Contract Documents and the local, State, and Federal requirements.
- B. Transport off site materials to project using well-maintained and operating vehicles. Once on site, transporting vehicles shall stay on designated haul roads and shall at no time endanger improvements by rutting, overloading, or pumping.

1.7 FIELD CONDITIONS

- A. If available, data in subsurface investigation reports used for the basis of the design and are available to Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.
- B. Additional test borings and other exploratory operations may be performed by Contractor, at Contractor's option. However, no change in the contract price will be authorized for such additional exploration.
- C. Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active. Repair damaged utilities to satisfaction of utility owner.
- D. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.
- E. Contractor shall obtain all necessary permits from regulatory agencies including signing and resubmitting Notices of Intent (NOI) and Stormwater Pollution Prevention Plans (SWPPP).

- F. Do not bring explosives onto site or use in work without prior written permission from the Owner, Engineer, and authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted. Provide a pre-blast survey before beginning work.
- G. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required by authorities having jurisdiction.
- H. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- I. Perform excavation by hand within drip-line of large trees to remain. Protect root systems from damage or dry-out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.
- J. Protect improvements on adjoining properties and on the Owner's property. Do not disturb any improvements outside the work area defined on the Plans. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.

PART 2 - PRODUCTS

2.1 SOIL AND ROCK MATERIALS

- A. Fill and Backfill: Excavated and re-used material for subsoil fill as defined herein and as considered satisfactory soils.
- B. Imported or Borrow Fill Material: Satisfactory material that is provided from off-site borrow areas when sufficient satisfactory materials are not available from required excavations. Locations for imported or borrow material shall be approved by Owner.
- C. Dense Graded Aggregate Fill and Backfill: Dense graded aggregate used as fill below the building or pavement subgrade areas, particularly in areas where soft soil conditions are encountered and undercut near subgrade level. Crushed stone fill should be Type A, Class A, and Grading E in accordance with Section 903.05 of the Tennessee Department of Transportation specifications.
- D. Topsoil as specified herein.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, datum, elevations, and grades necessary for construction as shown on the Plans.

- B. Complete all necessary clearing and grubbing, removal of structures and obstructions, and installation of erosion and sediment controls prior to beginning excavations.
- C. Notify utility companies to remove or relocate public utilities that are in conflict with proposed improvements. Pothole utilities to confirm that there will be no interferences or reduction in cover beyond the required minimum.
- D. Protect plant life, lawns, fences, existing structures, sidewalks, paving, and curbs, unless otherwise noted on the drawings from excavating equipment and vehicular traffic.
- E. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by licensed land surveyor and replaced, as necessary, by same.
- F. Excavation within the limits of the project shall be performed to the lines and grades as indicated on the Plans. Excavations carried below the depths indicated, without specific directions, shall, except as otherwise specified, be refilled to the proper grade with satisfactory material as directed by the Engineer.

3.2 DEWATERING

- A. Provide dewatering systems as required for excavations, in general this includes:
 - 1. Design and provide dewatering system using accepted and professional methods consistent with current industry practice to eliminate water entering the excavation under hydrostatic head from the bottom or sides. Design system to prevent differential hydrostatic head, which would result in floating out soil particles in a manner, termed as a "quick" or "boiling" condition. System shall not be dependent solely upon sumps or pumping water from within the excavation where differential head would result in a quick condition, which would continue to worsen the integrity of the excavation's stability.
 - 2. Provide dewatering system of sufficient size and capacity to prevent ground and surface water flow into the excavation and to allow Work to be installed in a dry condition.
 - 3. Control, by acceptable means, all water regardless of source. Contractor shall be responsible for disposal of the water.
 - 4. Control groundwater in a manner that preserves strength of foundation soils, does not cause instability or raveling of excavation slopes, and does not result in damage to existing structures. Where necessary, lower water level in advance of excavation utilizing wells, wellpoints, jet educators, or similar positive methods. The water level as measured by piezometers shall be maintained a minimum of 3 feet below prevailing excavation level.
 - 5. Commence dewatering prior to any appearance of water in excavation and continue until Work is complete to the extent that no damage results from hydrostatic pressure, flotation, or other causes.
 - 6. Open pumping with sumps and ditches will be allowed provided it does not result in boils, loss of fines, softening of the ground, or instability of slopes.
 - 7. Install wells or wellpoints, if required, with suitable screens and filters so that continuous pumping of fines does not occur. Arrange discharge to facilitate collection of samples by the Owner. During normal pumping and upon development of wells, levels of fine sand

or silt in the discharge water shall not exceed 5 ppm. Install sand tester on discharge of each pump during testing to verify that levels are not exceeded.

8. Control grading around excavations to prevent surface water from flowing into excavation areas.
 9. No additional payment will be made for any supplemental measures to control seepage, groundwater, or artesian head.
- B. Designate and obtain the services of a qualified dewatering specialist to provide dewatering plan as may be necessary to complete the Work. Contractor shall be responsible for the accuracy of the Plans, design data, and operational records required. Contractor shall be responsible for the design, installation, operation, maintenance, and failure of any component of the system.
- C. Contractor shall be responsible for and shall repair any damage to work in place, other contractor's equipment, utilities, residences, highways, roads, railroads, private and municipal well systems, adjacent structures, natural resources, habitat, existing wells, and the excavation. Contractor responsibility shall also include, damage to the bottom due to heave and including but not limited to, removal and pumping out of the excavated area that may result from Contractor's negligence, inadequate or improper design and operation of the dewatering system, and any mechanical or electrical failure of the dewatering system.
- D. Remove subgrade materials rendered unsatisfactory by excessive wetting and replace with approved backfill material at no additional cost to the Owner.
- E. Maintaining Excavation in Dewatering Condition:
1. Dewatering shall be a continuous operation. Interruptions due to power outages or any other reason will not be permitted.
 2. Continuously maintain excavation in a dry condition with positive dewatering methods during preparation of subgrade, installation of pipe, and construction of structures until the critical period of construction or backfill is completed to prevent damage of subgrade support, piping, structure, side slopes, or adjacent facilities from flotation or other hydrostatic pressure imbalance.
 3. Provide standby equipment on site, installed, wired, and available for immediate operation if required to maintain dewatering on a continuous basis in the event any part of the system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, perform such work as may be required to restore damaged structures and foundation soils at no additional cost to Owner.
 4. System maintenance shall include but not be limited to 24-hour supervision by personnel skilled in the operation, maintenance, and replacement of system components and any other work required to maintain excavation in dewatered condition.
- F. Upon completion of the work, remove dewatering equipment from the site, including related temporary electrical service.
- G. Wells shall be removed or cut off a minimum of 3 feet below final ground surface, capped, and abandoned in accordance with regulations by agencies having jurisdiction. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area.

3.3 TOPSOIL EXCAVATION

- A. Strip topsoil within the limits of excavation to full depth or to a minimum depth of 6-inches. Stripping operations should extend a minimum of 5 feet beyond the limits of proposed pavement areas and 10 feet beyond building limits.
- B. Temporarily stockpile topsoil in storage piles. Confirm the location of the storage areas with the Owner. Construct storage piles to freely drain surface water. Cover storage piles as required to prevent windblown dust. Dispose of unsuitable topsoil as specified for waste material, unless otherwise specified by Owner. Remove excess topsoil from site unless specifically noted otherwise on the Plans.

3.4 GENERAL EXCAVATION

- A. When performing grading operations during periods of wet weather, provide adequate dewatering, drainage and ground water management to control moisture of soils.
- B. Excavate to the line and grade as shown on the Plans being careful not to over excavate beyond elevations needed for building subgrades. Excavation to subgrade is unclassified.
- C. Perform excavation using capable, well-maintained equipment and methods acceptable to Owner and local governing agencies.
- D. Remove from site, material encountered in grading operations that, in opinion of the Engineer is unsatisfactory material or undesirable for backfilling, subgrade, or foundation purposes. Dispose of in manner satisfactory to the Owner and local governing agencies. Backfill areas with layers of satisfactory material and compact as specified herein.
- E. Unsatisfactory excavated material shall be disposed of in manner and location that is acceptable to Owner and local governing agencies.
- F. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction including OSHA (29 CFR Part 1926) excavation trench safety standards. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- G. Shore and brace excavations where sloping is not possible either because of space restrictions or stability of material excavated. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition. Shoring and bracing design, installation, maintenance, and removal are the sole responsibility of the Contractor. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.
- H. A professional engineer that is licensed in the area where the work is being performed shall design the sheeting, shoring, and bracing system. However, the contractor is solely responsible for the safety of all employees, the effectiveness of the system, and any damages or injuries resulting from the lack or inadequacy of the system.

- I. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

3.5 SUBGRADE PREPARATION

- A. Areas exposed by excavation or stripping and on which subgrade preparations are to be performed shall be scarified to minimum depth of 8 inches and compacted as specified hereinafter. Extend proofrolling operations a minimum of 10 feet beyond proposed building lines.
- B. Subgrades shall be proofrolled to detect areas of insufficient compaction and soft pocket, or areas of excess yielding. Proof-rolling shall be accomplished by making minimum of 2 complete passes with fully loaded tandem axle dump truck with a minimum weight of 20 tons, or approved equal, in each of 2 perpendicular directions while under the supervision and direction of the Geotechnical Engineer. Limit vehicle speed to 3 mph. Areas of failure such as soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by the Geotechnical Engineer, shall be excavated and re-compacted as specified herein. Continual failure areas shall be stabilized in accordance with the requirements of the Geotechnical Engineer and at no additional cost to Owner. Authorized additional excavation and replacement material will be paid for according to Contract provisions.
- C. Subgrade exposed longer than 48 hours or on which precipitation has occurred shall be re-proofrolled. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities at no additional cost to the owner.

3.6 BACKFILLING

- A. Fill areas to contours and elevations shown on the Plans with satisfactory materials.
- B. Unless otherwise specified for rock fill, rock or stone less than 6-inches in largest dimension may be used in fill below structures, paving, and graded areas, up to 24 inches below surface of proposed subgrade or finish grade of graded areas when mixed with satisfactory material. Rock or stone less than 2 inches in largest dimension may be used in fill within the upper 24 inches of proposed subgrade or finish grade of graded areas when mixed with satisfactory material.
- C. Place backfill in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- D. Do not place backfill on surfaces that are muddy, frozen, or contain frost or ice.
- E. Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.

3.7 COMPACTION

- A. In excavated areas, scarify the upper 6 to 10 inches of the subgrade and compact.
- B. Compact each lift of structural soil fill or dense graded aggregate to at least 98 percent of the soil's maximum dry density per the standard Proctor method (ASTM D 698) and within the range of minus (-) 2 percent to plus (+) 2 percent of the optimum moisture content.
- C. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
- D. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
- E. Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.
- F. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing, or pulverizing, until moisture content is maintained to within the specified range of optimum.

3.8 MAINTENANCE OF SUBGRADE

- A. Verify finished subgrades to ensure proper elevation and conditions for construction above subgrade.
- B. Protect subgrade from excessive wheel loading during construction, including concrete trucks, dump trucks, and other construction equipment.
- C. Remove areas of finished subgrade found to have insufficient compaction density to depth necessary and replace in manner that will comply with compaction requirements by use of material equal to or better than that specified on the Plans. Surface of subgrade after compaction shall be firm, uniform, smooth, stable, and true to grade and cross section.
- D. Construct temporary ditches and perform such grading as necessary to maintain positive drainage away from subgrade at all times.
- E. Construction traffic patterns should be varied to prevent the degradation of previously stable subgrade.

3.9 FINISH GRADING

- A. Do not begin work until the earth is dry enough to be tillable. Inspect subgrades to see that they generally conform to the elevations, slopes, and standards as specified on the Plans and within these specifications, particularly with regard to the approximate depths required for the work.

After work is completed, inspect it to ensure that the finish grading complies with the design requirements and Plans.

- B. Subgrades shall be graded to within not more than 0.10' above or below the required elevations.
- C. Grassed or finish areas to receive topsoil shall be graded to within not more than 0.10' above or below the required elevations.
- D. Shape surface of areas under pavement and sidewalks to line, grade, and cross-section, with finish surface not more than 0.04' above or below the required subgrade elevation.
- E. Grade surface of fill under building slab smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 0.04' above or below the required final elevation.

3.10 PLACING AND SPREADING TOPSOIL

- A. Place topsoil uniformly over disturbed areas that do not receive other work. Obtain approval of the finish grading from the Engineer before starting to place topsoil.
- B. Scarify subgrade to a depth of 3 inches and place the topsoil to a depth of 6 inches when lightly rolled or, on rock, to a depth of 12 inches.
- C. Level the topsoil so that it slopes uniformly and has no water pockets. Carefully rake the topsoil by hand to remove all clods, roots, sticks, stones over 1 inch in diameter, and other foreign materials from the surface. Dispose of excess excavated materials and debris away from the site.

3.11 FIELD QUALITY CONTROL

- A. The Geotechnical Engineer shall test each lift of backfill to confirm that the contractors' compaction method is capable of achieving the project requirements before placing any subsequent lifts. Field density tests will be made with a minimum of one test for every 10,000 sq. ft. per lift and for every 5,000 sq. ft. per lift in building areas.
- B. The Contractor shall furnish a portion of the job office building at the site for the field technician in charge of making field density determinations. Both electrical current and water shall be provided by the Contractor at or near this designated area for the technician's use.
- C. Insufficiently compacted areas shall be scarified and loosened to the full depth of fill or otherwise reworked as necessary to re-compact to the specified density.

3.12 DISPOSAL, PROTECTION, AND CLEANUP

- A. Protect newly graded areas from traffic and erosion, and keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

- B. The Contractor is responsible for the stability of all embankments and cut slopes until final acceptance.
- C. Where subsequent construction operations or adverse weather disturbs completed compacted areas, scarify surface, re-shape, and compact to required density prior to further construction.
- D. Remove waste materials, including unacceptable excavated material, trash and debris, from the Owner's property and legally dispose of it.

END OF SECTION 312000

SECTION 312333 – TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:

1. Excavation of trenches for installation of utilities.
2. Backfilling trenches with bedding material as specified and filling trenches with suitable material to proposed subgrade.
3. Compacting backfill materials in acceptable manner.
4. Borings and casings under roads.

- B. Related Sections:

1. Section 311000 – Site Clearing
2. Section 312000 – Earthwork
3. Section 312500 – Erosion Prevention and Sediment Control
4. Section 329219 – Seeding
5. Section 331100 – Water Lines
6. Section 333100 – Sanitary Sewer (Gravity)
7. Section 333400 – Sanitary Sewer (Force Mains)
8. Section 334000 – Storm Sewer

1.3 DEFINITIONS

- A. Backfill or Fill: Refer to Section 312000 – Earthwork for definitions of satisfactory soils, structural soil fill, and unsatisfactory soils.
- B. Base Rock: Granular material upon which manhole bases and other structures are placed.
- C. Bedding Material: Class B granular material upon which pipes, conduits, cables, or duct banks are placed.
- D. Borrow or Imported Material: Suitable structural backfill material obtained by Contractor from source(s) offsite. Refer to Section 312000 – Earthwork.
- E. Excavation Classifications: The classification of TRENCH excavation work IS CONSIDERED UNCLASSIFIED unless defined otherwise by the Owner prior to bidding, pricing, and beginning work. Refer to Section 312000 – Earthwork for excavation classifications.

- F. Lift: Loose (uncompacted) layer of material.
- G. Prepared Trench Bottom: Graded trench bottom after excavation and installation of stabilization material, if required, but before installation of bedding material.
- H. Trench: The word “trench” shall mean excavations having vertical sides whose depths exceed its width, made for storm water drainage, sanitary sewer, water, gas pipes, electric power or lighting, communications, steam conduits, and related uses.
- I. Trench Excavation (unclassified) shall consist of the removal of all materials necessary for the construction of storm sewers, culvert pipes, other pipe lines and all drainage structures such as manholes, catch basins, junction boxes, head walls, wing walls and concrete collars.

1.4 SUBMITTALS

- A. Submittals shall be in pdf format electronic form (e.g, via email) and shall be stamped by the Contractor. Do not submit un-stamped shop drawings. Submit to the Owner or Owner’s representative.
- B. Report the results of all density tests to the Owner or Owner’s Representative. Include location of test, date of test, note of re-test, test location, depth below finished grade, wet density, moisture content, dry density, percent compaction of test sample, maximum dry density used for comparison, and any other information specified.

1.5 QUALITY ASSURANCE

- A. Protect benchmarks, property corners, and other survey monuments from damage or displacement. If marker needs to be removed it shall be referenced by a Registered Land Surveyor and replaced, as necessary, by same.
- B. Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.
- C. Trench design and safety for pipe and conduit construction is solely the responsibility of the contractor and shall conform to all applicable local, state, and OSHA regulations.
- D. Accurately record actual locations of subsurface utilities, structures, and obstructions installed or encountered.
- E. Testing shall be the responsibility of either the Contractor or the Owner. Do not bid, price, or begin work on this project until the ownership of this responsibility has been adequately identified and agreed upon by both parties.
- F. Testing shall be performed by a qualified independent geotechnical testing and inspection laboratory to perform soil testing and inspection services for quality control testing during earthwork operations.

- G. Do not bring explosives onto site or use in work without prior written permission from the Owner, Engineer, and authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted. Provide a pre-blast survey before beginning work.
- H. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required by authorities having jurisdiction.
- I. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- J. Perform excavation by hand within drip-line of large trees to remain. Protect root systems from damage or dry-out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.
- K. Protect improvements on adjoining properties and on the Owner's property. Do not disturb any improvements outside the work area defined on the Plans. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery, storage, and handling of materials shall be in accordance with the Contract Documents and the local, State, and Federal requirements.

1.7 PROJECT CONDITIONS

- A. If available, data in subsurface investigation reports used for the basis of the design are available to Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.
- B. Additional test borings and other exploratory operations may be performed by Contractor, at Contractor's option. However, no change in the contract price will be authorized for such additional exploration.
- C. Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active. Repair damaged utilities to satisfaction of utility owner.
- D. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

- E. Contractor shall obtain all necessary permits from regulatory agencies including signing and resubmitting Notices of Intent (NOI) and Stormwater Pollution Prevention Plans (SWPPP).

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Bedding Material (Class B): Bedding material shall be compacted granular material consisting of well-graded crushed stone or crushed gravel meeting the requirements of TDOT (latest edition), Section 903, Grading Size No. 57 or No. 67.
- B. Backfill Material (Open Areas): Material excavated from trenches or from other on-site sources or borrow (i.e., imported) material from off-site and as defined in Section 312000 – Earthwork as satisfactory soils. Backfill material shall not contain rock or stone with a maximum size greater than 2 inches.
- C. Backfill Material (Paved Areas): Backfill material for pipe under pavement or less than 5 feet from the outside edge of the pavement shall be as specified on the Plans. Based on the reviewing jurisdiction, backfill material shall be either:
 - 1. Mineral aggregate base crushed stone meeting the requirements of TDOT (latest edition), Subsection 903.05, Class A aggregate Grading D.
 - 2. Well-graded crushed stone or crushed gravel meeting the requirements of TDOT (latest edition), Section 903, Grading Size No. 57 or No. 67.
- D. Steel Casing Pipe: Comply with AWWA C200 minimum grade B, size, and wall thickness as indicated on Construction Plans.
- E. Topsoil: Topsoil as defined in Section 312000 – Earthwork.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility; colored as follows:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.
 - 3. Orange: Telephone and other communications.
 - 4. Blue: Water systems.
 - 5. Green: Sewer systems.
- B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches (150 mm) wide and 4 mils (0.1 mm) thick, continuously inscribed with a description of the utility,

with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches (750 mm) deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prior to the beginning of grading, all necessary clearing and grubbing, removal of structures and obstructions, and placement of erosion and sediment controls in that area shall have been completed.
- B. Contact local utility companies before excavation begins.
- C. Maintain in operating condition existing utilities, previously installed utilities, and drainage systems encountered in trenching excavation.
- D. Verify location, size, elevation, depth (by potholing or other approved methods), and other pertinent data required to make connections or to avoid interfering with existing utilities and drainage systems.
- E. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
- F. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
- G. Perform all work so as to cause the least possible inconvenience to the public. Construct temporary bridges or crossings when and where the Engineer deems necessary to maintain vehicular or pedestrian traffic.
- H. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- I. Locate excavation support and protection systems clear of permanent construction so that construction and finishing of other work is not impeded.

3.2 EXCAVATION FOR TRENCHES

- A. Excavation within the limits of the project shall be performed to the lines and grades as indicated on the Plans. Excavations carried below the depths indicated, without specific directions, shall, except as otherwise specified, be refilled to the proper grade with satisfactory material as directed by the Engineer.
- B. Open cut excavation with trenching machine or backhoe. Where machines other than ladder or wheel type trenching machines are used, do not use clods for backfill.
- C. Trench design and safety is solely the responsibility of the contractor. Trench excavation sidewalls shall be sloped, shored, sheeted, braced, or otherwise supported by means of sufficient strength to protect workmen in accordance with applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration (OSHA), and by local ordinances. Unless regulated otherwise, lateral travel distance to exit ladder or steps shall not be greater than 25-feet in trenches 4-feet or deeper. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- D. Unless the construction of lines by tunneling, jacking, or boring is called for by the Plans or specifically authorized by the Engineer, make excavation for pipelines in open cut and true to the lines and grades shown on the Plans or established by the Engineer on the ground. Any cut made in excess of the minimum trench width, formula outside diameter $4/3$ O.D. + 15" or the typical trench dimensions as shown on the Plans shall be at the expense of the Contractor and may be cause for the Engineer to require that stronger pipe and/or a higher class of bedding be used at no cost to the Owner.
- E. Locate and retain soil materials away from edge of excavations. In all cases where materials are deposited along open trenches, place them so that in the event of rain or surcharge loading from such deposits, no damage will result to the work and/or to adjacent property. Do not store within drip line of trees indicated to remain.
- F. Pipe trenches shall not be excavated more than 400 feet in advance of pipe laying and all work shall be performed to cause the least possible inconvenience to the public. Adequate temporary bridges or crossings shall be constructed and maintained where required to permit uninterrupted vehicular and pedestrian traffic.
- G. For work within public right-of-ways and during working hours, the maximum amount of exposed pipe trench shall be 50 feet of pipe or two pipe joints, whichever is shorter. During nonworking hours, use one of the following methods of trench protection:
 - 1. Steel plate, minimum $5/8$ inch thick, over entire trench or excavation overlapping each pavement edge by 1 foot minimum.
 - 2. Concrete barriers placed around entire trench or excavation.
 - 3. Backfill and compact entire trench or excavation.
 - 4. Cones, barrels, and illumination manned by flagmen.
- H. Trench Bottoms: Accurately excavate and shape trench bottoms to designated elevations, to provide uniform bearing and support for each section of pipe once bedding material is installed at every point along entire length, except where necessary to excavate for bell holes,

proper sealing of pipe joints, or other required connections.

1. For pipes 15 inches and smaller, excavate the bottom of the trench 4 inches below the bottom of pipe that is to be installed;
 2. For pipes 18 inches to 36 inches, excavate the bottom of the trench 6 inches below the bottom of pipe that is to be installed;
 3. For pipes 42 inches and larger, excavate the bottom of the trench 8 inches below the bottom of pipe that is to be installed;
 4. Where rock or other unyielding bearing material is encountered, excavate trenches 6 inches below required elevation and backfill with a 6-in. layer of TDOT no. 57 or No. 67 crushed stone prior to installation of pipe bedding;
 5. For bell and spigot pipe, excavate bell holes at proper intervals so that the barrel of the pipe will rest for its entire length upon the bottom of the trench. Bell holes shall be large enough to permit proper jointing of the pipe. Do not excavate bell holes more than 2 joints ahead of pipe laying;
 6. If wet or unstable soil is encountered, over excavate from trench bottom as necessary to provide suitable base for continuous and uniform bedding;
 7. Remove projecting stones and sharp objects along trench subgrade.
- I. Excavation for manholes, inlets, and other incidental structures may be performed with non-vertical banks except beneath pavements or adjoining existing improvements and shall not be greater in horizontal area than that required to allow a 2 foot clearance between the outer surface of the structure and the walls of the adjacent excavation or of the sheeting used to protect it. The bottom of the excavation shall be true to the required shape and elevation shown on the Plans. No earth backfilling will be permitted under manholes, inlets, headwalls, or similar structures. Should the Contractor excavate below the elevations shown or specified, he shall, at his own expense, fill the void with either concrete or granular material approved by the Engineer.
- J. Remove excavated materials not required or not suitable for backfill or embankments and legally waste off-site or on-site at Owner approved locations. Provide other suitable material at no additional cost to Owner.

3.3 SHEETING, SHORING, AND BRACING

- A. Where sloping is not possible either because of space restrictions or stability of material excavated, sufficiently sheet, shore, and brace the sides of excavations to prevent slides, cave-ins, settlement, or movement of the banks and to maintain the specified trench widths. Use solid sheets in wet, saturated, or flowing ground. All sheeting, shoring, and bracing shall have enough strength and rigidity to withstand the pressures exerted, to keep the walls of the excavation properly in place, and to protect all persons and property from injury or damage.
- B. A Professional Engineer shall design the sheeting, shoring, and bracing system. However, the contractor is solely responsible for the safety of all employees, the effectiveness of the system, and any damages or injuries resulting from the lack or inadequacy of the system. Sheeting, shoring, and bracing shall conform to all applicable local, state, and OSHA regulations.

Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

- C. Where excavations are made adjacent to existing buildings or structures or in paved streets or alleys, take particular care to sheet, shore, and brace the sides of the excavation so as to prevent any undermining of or settlement beneath such structures or pavement. Underpin adjacent structures in substantial compliance with Plans sealed by a Professional Engineer wherever necessary. Notify adjacent property owner of the excavation.
- D. Sheeting, shoring, or bracing materials shall not be left in place unless this is called for by the Plans, ordered by the Engineer, or deemed necessary or advisable for the safety or protection of the new or existing work or features. Remove these materials in such a manner that the new structure or any existing structures or property, whether public or private, will not be endangered or damaged and that cave-ins and slides are avoided.
- E. All holes and voids that remain due to the removal of sheeting, shoring, or bracing shall be filled and compacted as specified herein.
- F. A trench box may be used, which is a prefabricated movable trench shield composed of steel plates welded to a heavy steel frame. The trench box shall be designed to provide protection equal to or greater than that of an appropriate shoring system.

3.4 DEWATERING OF EXCAVATION

- A. Prevent surface water and subsurface or groundwater from flowing into excavations and re-route surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
- B. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
- C. Provide and keep in operation enough suitable pumping equipment whenever necessary. Give special attention to excavations for those structures that, prior to proper backfilling, are subject to flotation from hydrostatic uplift. Dewatering shall occur only in accordance with applicable Laws and Regulations, approved permits, and industry best management practices.

3.5 PIPE BEDDING

- A. Bedding shall be installed by placing bedding material from the trench bottom, for the entire trench width, up to the bottom of the pipe. The middle of the bedding, under the pipe invert, equal to 1/3 of the pipe O.D. should be loosely placed and accurately shaped to conform to the lower portion of the pipe barrel, with the remainder compacted to minimum standard proctor density. Backfill the haunches of the pipe in loose lifts not exceeding 6-inches and compact. Continue backfilling and compacting each lift vertically up to the spring line of the pipe.

- B. Do not place bedding material over porous, wet, frozen, or spongy subgrade surfaces.

3.6 BACKFILL AND FILL

- A. Do not backfill trenches until the pipe has been laid to line and grade and properly bedded, tests and inspections have been made, utility systems comply with and are accepted by applicable governing authorities, and backfilling is authorized by the Owner. Use care in backfilling to avoid damage or displacement of pipe or conduit systems.
- B. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces. Backfill evenly and simultaneously on both sides of the pipe up to the subgrade elevation.
- C. Under unpaved areas (i.e., open areas), backfill the trench as follows:
 - 1. For flexible pipe in unpaved areas, the initial backfill above the spring line shall be granular material as specified in Section 2.1 Materials. Place in loose lifts not exceeding 6-inches, compact, and extend to 12-inches above the top of the pipe. The final backfill shall be suitable excavated or borrow (i.e., imported) material as specified in Section 2.1 Materials. Place material in loose lifts not exceeding 6-inches, compact, and extend to the required subgrade elevation.
 - 2. For rigid (i.e., concrete) pipe in unpaved areas, backfill above the spring line with suitable excavated or borrow (i.e., imported) material as specified in Section 2.1 Materials. Place material in loose lifts not exceeding 6-inches, compact, and extend to the required subgrade elevation.
- D. Under paved areas, within 5 feet of pavement edge, and within 10 feet of a building pad backfill above the spring line with granular material as specified in Section 2.1 Materials. Place material in loose lifts not exceeding 6-inches, compact, and extend to the required subgrade elevation.
- E. Flowable Fill or Controlled Low Strength Material (CLSM): Where indicated on the Plans or as required to expedite trench backfill or to protect pipe, backfill with CLSM or flowable fill above pipe bedding. Do not allow dirt or foreign material to become mixed with concrete during placement. Allow sufficient time for concrete to reach initial set before additional backfill material is placed in the trench. Place in lifts as necessary to prevent uplift (flotation) of new and existing pipes.
- F. Concrete: Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and which are carried below the bottom of such footings, or which pass under wall footings. Place concrete to the level of the bottom of adjacent footing.
- G. Do not allow backfill to free fall into the trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over the top of pipe.
- H. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to required percentage of maximum density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or

contain frost or ice. Adjust moisture content as necessary to obtain specified compaction.

- I. Backfill to the subgrade elevations as determined from the Plans.

3.7 COMPACTION

- A. Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction.
- B. Mechanically compact each lift (e.g., vibratory sleds, jumping jacks) prior to placing succeeding lifts. Compaction of the haunch layer may require a small tamping mechanism to obtain the specified compaction in a confined area.
- C. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
- D. Maintain moisture content within the specified range of optimum of fill materials as specified in Section 312000 – Earthwork to attain required compaction density.
- E. Compact each lift of aggregate backfill to at least 98% of the standard Proctor maximum density (ASTM D 698). In open areas, compact each lift of soil backfill to at least 95% of the standard Proctor maximum density (ASTM D 698).
- F. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing, or pulverizing, until moisture content is maintained within the specified range of optimum.

3.8 PLACING AND SPREADING TOPSOIL

- A. Place topsoil uniformly over disturbed areas that do not receive other work. Obtain approval of the finish grading from the Owner before starting to place topsoil.
- B. Level the topsoil so that it slopes uniformly and has no water pockets. Carefully rake the topsoil by hand to remove all clods, roots, sticks, stones over 1 inch in diameter, and other foreign materials from the surface. Dispose of excess excavated materials and debris away from the site.

3.9 FIELD QUALITY CONTROL

- A. Beginning at a depth of 2 feet above the top of the pipe, provide a density test for each lift of compacted fill, at a maximum horizontal spacing of 200 feet, and at all proposed or existing street or pavement crossings. If necessary, excavate to the depth and size as required by the Engineer to allow compaction tests.
- B. The Contractor shall furnish a portion of the job office building at the site for the field

technician in charge of making field density determinations. Both electricity and water shall be provided by the Contractor at or near this designated area for the technician's use.

- C. Insufficiently backfilled or compacted areas shall be scarified and loosened to the full depth of fill or otherwise re-worked as necessary to re-compact to the specified density.

3.10 PROTECTION AND CLEANUP

- A. Protect newly graded areas from traffic and erosion, and keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Where subsequent construction operations or adverse weather disturbs completed compacted areas, scarify surface, re-shape, and compact to required density prior to further construction.
- C. Remove waste materials, including unacceptable excavated material, trash and debris, from the Owner's property and legally dispose of it.

END OF SECTION 312333

SECTION 312500 - EROSION PREVENTION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Plans and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Tennessee Erosion and Sediment Control Handbook (Tennessee Department of Environment and Conservation, latest edition) and the regulations, policies, etc. of the local jurisdiction regarding materials, installation, and maintenance of best management practices for erosion and sedimentation controls.
- C. The project Stormwater Pollution Prevention Plan (SWPPP).

1.2 SUMMARY

- A. Section includes:
 - 1. Erosion and sediment control for excavation, backfill, and/or other construction activities within the limits of the construction site, within any temporary or permanent easements, and within any borrow site.
 - 2. Work necessary to ensure that construction activities do not temporarily or permanently harm the waters of the State of Tennessee, nor properties of the Owner, nor adjoining owners.
- B. Related Sections:
 - 1. Section 311000 – Site Clearing
 - 2. Section 312000 – Earthwork
 - 3. Section 329219 – Seeding

1.3 DEFINITIONS

- A. Fines from Regulators: Any fines levied by the Federal, State, and/or local governments for non-conformance with their respective regulations related to erosion and pollution control shall be paid for by the Contractor.
- B. Duration of Maintenance: Protect the site throughout the construction period regardless of weather conditions until the time that permanent vegetation is established.
- C. Responsibility: These activities are related to the means and methods the Contractor uses to pursue the work and as such cannot be predicted in advance. For this reason, the Contractor is solely responsible for conforming to related local, State, and Federal requirements.

1.4 SUBMITTALS

- A. Submittals shall be in electronic form (via email) and shall be stamped by the Contractor. Submit to the Owner or Owner's representative.
- B. Submit shop drawings for material substitutions. Do not submit shop drawings for materials that are consistent with the plans. These submittals will be marked "Not Requested for Review" and returned.

1.5 QUALITY ASSURANCE

- A. Provide and maintain a quality control system that will provide reasonable assurance that materials and construction conform to the specified requirements.

1.6 DELIVERY, STORAGE, & HANDLING

- A. Delivery, storage, and handling of materials shall be in accordance with these specifications and the manufacturer's requirements.

1.7 PROJECT CONDITIONS

- A. Verify the locations of the existing underground utilities by contacting the utility owners and by potholing in the field.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials for erosion and pollution control shall be in accordance with the Plans and the "Tennessee Erosion and Sediment Control Handbook" (Tennessee Department of Environment and Conservation, latest edition) and the requirements. These include, but are not limited to:
 - 1. Silt Fencing
 - 2. Erosion Control Matting
 - 3. Storm Drain Inlet Protection
 - 4. Rip Rap
 - 5. Straw
 - 6. Temporary and Permanent Seeding

2.2 PHYSICAL CONTROLS

- A. Physical controls for erosion and pollution control shall be in accordance with the Plans and the "Tennessee Erosion and Sediment Control Handbook" (Tennessee Department of

Environment and Conservation, latest edition) and the requirements. These include, but are not limited to:

1. Sediment Traps / Ponds
2. Diversion Ditches

PART 3 - EXECUTION

3.1 GENERAL

- A. The temporary erosion and pollution control provisions shown on the Plans are considered the minimum necessary, with the final design, implementation, and maintenance being the responsibility of the Contractor.
- B. The Contractor shall prepare a Stormwater Pollution Prevention Plan (SWPPP) and submit or amend the project Notice of Intent (NOI) to include their project specific activities.
- C. Install temporary sediment traps where appropriate. Muddy water collected in sediment traps shall be held until it is at least as clear as the upstream water before it is discharged to surface waters. Discharge through a pipe or lined channel so that the discharge does not cause erosion and sedimentation.
- D. Install temporary diversion berms or diversion channels as necessary to divert storm water from running onto the disturbed areas and to divert runoff from disturbed areas to the temporary sediment traps.
- E. Apply temporary seeding whenever grading operations are temporarily halted for over 14 days and final grading of exposed surfaces is to be completed within one year. Apply temporary seeding to soil stockpiles.

3.2 FIELD QUALITY CONTROL

- A. Maintain erosion and sedimentation controls throughout the life of the project. Replace controls and/or add additional ones as needed to meet the requirements of the local, State, and Federal requirements.

3.3 CLEANUP AND PROTECTION

- A. Remove erosion and sedimentation control structures once the site has been permanently stabilized. Properly dispose of these materials off-site.
- B. Backfill, topsoil, seed, and straw areas disturbed as a result of the cleanup efforts.

END OF SECTION 312500

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Plans and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Standard specifications of the Tennessee Department of Transportation (TDOT). Even though the weather limitations, construction methods, and materials specifications contained in the TDOT Specifications may not be explicitly repeated in these specifications, they shall, wherever applicable to the work called for by this section, be considered as implied and therefore adhered to. However, the various subsections "Basis for Payment" contained in the TDOT specifications shall not be considered applicable.

1.2 SUMMARY

- A. Section includes installation of asphalt paving as follows:

- 1. Installation of aggregate base.
- 2. Installation of asphalt pavement.
- 3. Striping asphalt pavement.

- B. Related Sections:

- 1. Section 312000 – Earthwork
- 2. Section 321600 – Curbs and Gutters

1.3 SUBMITTALS

- A. Submittals shall be in electronic form (via email) and shall be stamped by the Contractor. Submit to the Owner or Owner's representative.
- B. Within 14 working days prior to the scheduled start of asphalt construction, submit the actual design mix to the Owner or Owner's representative for review and approval. Design mix submittal shall follow a format in accordance with the Marshall Method of Mix Design (AASHTO T 245) and as modified by TDOT. This information shall include the information as specified by TDOT and as a minimum the following:
 - 1. Type/name of mix.
 - 2. Gradation analysis.
 - 3. Grade of asphalt cement used and optimum asphalt content in percent.
 - 4. RAP size and gradation.
 - 5. Location of the plant.
 - 6. Mixing and compaction temperatures
 - 7. Direct references to TDOT specifications sections for each material.

- C. Submit certification that mix design conforms to specification requirements. Materials certificate shall be signed by materials producer and Contractor, certifying that materials and mix design conform to requirements specified herein.
- D. Laboratory reports of compaction tests and proof rolling of soil sub-grade.
- E. The Contractor shall certify in writing that asphalt pavement (i.e., base and asphalt courses) was placed in accordance with specification requirements. This certification shall include:
 - 1. Verification of the subgrade, mineral aggregate base, and pavement slopes, elevations, and surface smoothness.
 - 2. Results of the mineral aggregate base density tests, laboratory air void, Marshall stability, and flow results, coring locations, compacted thicknesses, asphalt density, and asphalt extraction and aggregate gradation results.

1.4 QUALITY ASSURANCE

- A. Provide and maintain a quality control system that will provide reasonable assurance that materials and construction conform to the specified requirements.
- B. An independent testing laboratory may be selected and paid by the Owner to perform construction testing of in-place asphalt courses for compliance with requirements of materials, thickness, compaction, and surface smoothness. This does not relieve the Contractor of any quality assurance responsibilities.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Asphalt delivery, storage, and handling shall be in accordance with the latest edition of the TDOT specifications.

1.6 PROJECT CONDITIONS

- A. Weather limitations for pavement to be properly placed, compacted, and finished shall be in accordance with the latest edition of the TDOT specifications, generally these are:
 - 1. For a compacted thickness of 1.5 in. or less the minimum placement air temperature or surface temperature (whichever is less) shall be: 45° F for unmodified mixes and 55° F for modified mixes. For compacted thicknesses greater than 1.5 in., 40° F for unmodified mixes and 50° F for modified mixes.
 - 2. Do not apply when base is wet, contains excess moisture, during rain, or when frozen.
- B. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

1.7 GUARANTEE

- A. Contractor shall guarantee in writing, the materials and workmanship for a period of two (2) years, beginning on the date of substantial completion or upon Owner’s possession, which ever comes later.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Mineral Aggregate Base: Type A Base, Grading D crushed stone (TDOT Specification Section 303);
- B. Bituminous Prime Coats: Emulsified asphalt or Grade AE-P (TDOT Specification Section 402);
- C. Tack Coat: Emulsified asphalt, SS-1, SS-1h, CSS-1, CSS-1h, TST-1p, CQS 1h (TDOT Specification Section 403);
- D. Bituminous Plant Mix Base (Hot Mix): Grading B or BM as directed by the Engineer (TDOT Specification Section 307);
 - 1. Asphalt Cement: Grading B and BM shall range between 4.2 to 6.2;
 - 2. Asphalt temperature: the mixing temperature for PG 64-22 is 290° F minimum and 350° F maximum. The compaction temperature for PG 64-22 is 280° F minimum and 310° F maximum.
 - 3. For Grading B (307B), the RAP maximum particle size is 1-½ in. For Grading BM (307BM) the RAP maximum particle size is ¾ in. The percent RAP (non-processed) is 0% and 25% (processed) for both mixes.
 - 4. The aggregate fractions shall be sized, graded, and combined in such proportions that the resulting composite blend will be met:

<i>Sieve Size</i>	<i>Total % Passing by Weight</i>	
	<i>Grading B</i>	<i>Grading BM</i>
2 in.	100	-
1-1/4 in.	95 – 100	-
1 in.	-	-
3/4 in.	70 – 85	85 - 100
5/8 in.	-	-
1/2 in.	-	-
3/8 in.	49 – 72	59 – 79
No. 4	34 – 51	42 – 61
No. 8	23 – 42	29 - 47
No. 30	11 – 22	13 – 27

No. 50	9 – 14	7 – 20
No. 100	4 – 10	4 – 10
No. 200	2.5 – 6.5	0 – 6.5

E. Asphaltic Concrete Surface (Hot Mix): Grading D or E as specified (TDOT Specification Section 411).

1. Asphalt cement content for both mixes shall range between 5.3 to 7.0;
2. Asphalt temperature: the mixing temperature for PG 64-22 is 290° F minimum and 350° F maximum. The compaction temperature for PG 64-22 is 280° F minimum and 310° F maximum.
3. RAP maximum particle size is ½ in. Percent of RAP (non-processed) is 0% for both mixes and percent RAP (processed) for Grade D is 15% (PG64-22, PG67-22) or 10% (PG 70-22, PG 76-22, PG 82-22) and for Grade E is 25%.
4. The aggregate fractions shall be sized, graded, and combined in such proportions that the resulting composite blend will be met:

Sieve Size	Total % Passing by Weight	
	Grading D	Grading E
3/4 in.	100	100
5/8 in.	100	100
1/2 in.	95 - 100	95 - 100
3/8 in.	80 - 93	80 - 93
No. 4	54 - 76	54 - 76
No. 8	35 - 57	35 - 57
No. 30	17 - 29	17 - 29
No. 50	10 - 18	10 - 18
No. 100	3 - 10	3 - 11
No. 200	0 - 6.5	0 - 8

F. Pavement Marking Paint: White and Yellow (TDOT Specification Section 716);

PART 3 - EXECUTION

3.1 SUBGRADE

- A. Before any base material is installed, prepare subgrade in accordance with the requirements of the Earthwork Section. The subgrade shall be constructed to the grades shown on the Plans, with an allowable working tolerance of plus or minus 0.1 ft.
- B. Protect and maintain subgrade until placement of the final surface is achieved.

- C. Establish grades and set grade stakes to the desired section. In establishing the grades, make due allowances for existing improvements, proper drainage, adjoining property rights, and good appearance.
- D. The joint between new and existing pavement shall be true and approximately at right angles to the centerline of the existing pavement. When a base course is compacted, cut back the surface course of the existing pavement a minimum of 1 foot beyond the limit of the joint between the old and new base course. Take special care to ensure good compaction of the new base course at the joint. Apply and compact the surface to conform to the existing pavement so that it will have no surface irregularity.

3.2 AGGREGATE BASE

- A. Install a mineral aggregate base of the type specified above in accordance with Section 303 of the TDOT Specifications. The maximum compacted thickness of any one layer shall not exceed 6 inches and the total thickness of the base shall be that indicated on the Plans.

3.3 PRIME COAT SURFACE PREPARATION

- A. Uniformly apply a bituminous prime coat of emulsified asphalt or Grade AE-P at a rate of 0.2 to 0.5 gal./s.y. Take care to prevent the bituminous material's splashing on exposed faces of curbs and gutters, walls, walks, trees, etc.; if such splashing does occur, remove it immediately. After the prime coat has been properly cured, apply an asphaltic concrete course to the thickness and width shown on the Plans.

3.4 ASPHALTIC CONCRETE PLACEMENT

- A. For all areas of more than 1,000 square yards, spread and strike off the asphalt binder course with a paver. Correct any irregularities in the surface of the pavement course directly behind the paver. Remove excess material forming high spots with a shovel or lute. Fill indented areas with hot mix, and smooth with a lute or the edge of a shovel being pulled over the surface. Casting of mix over such areas will not be permitted.
- B. If it is impractical to use a paver or spread box in areas of 1,000 square yards or less, the asphalt binder course may be spread and finished by hand. Carefully place by hand to avoid segregation of the mix. Broadcasting of the material will not be permitted. Remove any lumps that do not readily break down.
- C. Remove over-pavement of asphalt and stone from underneath landscape areas up to the limits that have been specified (refer to the curb detail) in order to provide a solid base for the concrete curb.
- D. If the asphaltic concrete surface course is to be placed directly on the mineral aggregate base, place a bituminous prime coat as described above. If, however, the surface course is to be placed on a binder course, then apply a bituminous tack coat of the sort specified above under

Materials at a rate of 0.05 to 0.10 gal./s.y. when directed by the Engineer. Take care to prevent the bituminous material's splashing on exposed faces of curbs, gutters, walls, walks, trees, etc.; if such splashing does occur, remove it immediately. After the prime or tack coat has been properly cured, apply the asphaltic concrete to the thickness and width shown on the Plans. Apply the surface course as described above for the binder course.

3.5 ROLLING AND COMPACTION

- A. After being spread, mixture shall be compacted by rolling as soon as it will bear the weight of rollers without undue displacement. Number, weight, types of rollers, and sequences of rolling operations shall be such that the required density and surface are consistently attained while the mixture is in workable condition.
- B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
- C. Breakdown Rolling: Perform breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling with hot material.
- D. Second Rolling: Follow breakdown rolling as soon as possible while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.
- E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.
- F. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot asphaltic concrete. Compact by rolling to maximum surface density and smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked. Any masked or marred finish surfaces shall be repaired or smoothed.

3.6 JOINTS

- A. Place each asphaltic paving layer as continuous as possible to keep the number of joints to a minimum. Create joints between old and new pavement, between successive days work, and where the mixture has become cold (less than 140 degrees F). Make these joints in such a manner as to create a continuous bond between the old and new pavement construction courses.
- B. Offset joint of successive courses by at least 6 inches.

- C. Transverse Joints: If placing of material is discontinued or if material in place becomes cold, make a joint running perpendicular to the direction traveled by the paver. Before placement continues, trim the edge of the previously placed pavement to a straight line perpendicular to the paver and cut back to expose an even vertical surface for the full thickness of the course. When placement continues, position the paver on the transverse joint so that sufficient hot mixture will be spread in order to create a joint after rolling that conforms to the required smoothness. If the temperature of the previously placed pavement material drops below 140 degrees F before paving is resumed, give the exposed vertical face a thin coat of liquid asphalt just before paving is continued.
- D. Longitudinal Joints: Coat longitudinal joints that are not completed before the previously laid mixture has cooled to a temperature below 140 degrees F, with liquid asphalt just before paving is continued.

3.7 TOLERANCES

- A. The finished surface of each asphalt course shall conform to the lines and grades shown on the Plans. No deviations, variations, or irregularities exceeding 1/4 inch in any direction when tested with a 12-foot straightedge will be permitted in the finished work, nor will any depressions that will not drain. Correct all such defects.
- B. The top surface of the base and binder courses shall be installed to the line, grade, and cross-section as shown on the Plans with a variance in elevation of no greater than plus or minus 0.10 ft.
- C. The top of the surface course shall be installed to the line, grade, and cross-section as shown on the Plans with a variance in elevation of no greater than plus or minus 0.04 ft.

3.8 FIELD QUALITY CONTROL

- A. The Contractor is responsible for the quality of construction and materials.
- B. Verify that the slope, elevations, and smoothness of the subgrade and mineral aggregate base conform to the requirements of the Plans and the specifications.
- C. Perform density tests on Type A mineral aggregate base at a minimum rate of 5 density tests per 90,000 sq. ft. The average density shall be not less than 100% of maximum density determined in accordance with AASHTO T 99, Method D with no individual test less than 97% of maximum density.
- D. Laboratory Air Void, Marshall Stability, and Flow: During production, mixture samples shall be taken at least four times for every 2000 tons or 8-hour day and compacted into specimens, using compactive blows (35, 50, or 75) equal to mix design per side with the Marshall hammer as described in AASHTO T 245. Temperature shall be equal to temperature at paving machine with reheating. After compaction, the laboratory air voids of each specimen shall be determined, as well as the Marshall stability and flow.

- E. Asphaltic pavement courses shall be randomly cored at minimum rate of 1 core per 20,000 sq. ft of paving, but not less than 3 cores. Asphaltic concrete pavement samples shall be tested for conformance with mix design. Cores shall be cut from areas representative of project. Coring holes shall be immediately filled by the Contractor with full-depth asphaltic concrete.
- F. Thickness Test: Measure thickness of each core sample taken. For each core, the thickness of the course (e.g., surface) or the combined courses (e.g., surface, binder, sub-base) shall meet or exceed the minimum indicated thickness.
- G. Density tests shall be conducted on each core sample taken in accordance with ASTM D1188 or D2726 as applicable. The average density shall not be less than 92% of the mixtures maximum theoretical specific gravity with no individual test less than 87%.
- H. Asphalt Extraction and Aggregate Gradation: Asphalt extraction and gradation of extracted aggregate testing shall be performed on a minimum of 2 cores in accordance with AASHTO TP 53 and ASTM D5444 respectively.
- I. Areas of deficient paving, including thickness, compaction, smoothness, ponding of water for longer more than 24 hours, and asphalt mixture shall be delineated, removed, and replaced in compliance with the specifications requirements unless corrected otherwise as directed and approved by the Owner or Owner's Representative.

3.9 CLEANING AND PROTECTION

- A. Remove any excess debris and trash.
- B. Prohibit access of vehicles onto any of the asphaltic courses for vehicles that exceed the design load for the current condition of the pavement.

END OF SECTION 321216

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Plans and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Standard specifications of the Tennessee Department of Transportation (TDOT) sections 501, 604, 702, and 905. Even though the weather limitations, construction methods, and materials specifications contained in the TDOT Specifications may not be explicitly repeated in these specifications, they shall, wherever applicable to the work called for by this section, be considered as implied and therefore adhered to. However, the various subsections "Basis for Payment" contained in the TDOT specifications shall not be considered applicable.
- C. ACI 301, Specifications for Structural Concrete for Buildings.

1.2 SUMMARY

- A. Section includes installation of curbs and gutters as follows:
 - 1. Furnishing all plant, labor, equipment, appliances, and materials and of performing all operations in connection with the construction of concrete pavements, sidewalks, concrete steps, and driveway ramps.
- B. Related Sections:
 - 1. Section 312000 – Earthwork
 - 2. Section 321600 – Curbs and Gutters
 - 3. Section 321616 – Asphalt Paving

1.3 SUBMITTALS

- A. Submittals shall be in electronic form (via email) and shall be stamped by the Contractor. Submit to the Owner or Owner's representative.

1.4 QUALITY ASSURANCE

- A. Provide and maintain a quality control system that will provide reasonable assurance that materials and construction conform to the specified requirements.
- B. An independent testing laboratory may be selected and paid by the Owner to perform construction testing of in-place asphalt courses for compliance with requirements of

materials, thickness, compaction, and surface smoothness. This does not relieve the Contractor of any quality assurance responsibilities.

- C. Materials, sampling, and testing shall meet the applicable requirements of the Concrete Sections, ACI, and the latest revision of TDOT Section 501, 604, 702, and 905.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Concrete delivery, storage, and handling shall be in accordance with the latest edition of TDOT specifications.

1.6 PROJECT CONDITIONS

- A. Weather limitations for pavement to be properly placed, compacted, and finished shall be in accordance with the latest edition of the TDOT specifications, generally these are:
- B. Do not place concrete when the ambient temperature is below 35 degrees F, nor when the concrete is, without special protections, likely to be subject to freezing temperatures before final setting has occurred. The temperature of the concrete when placed shall be not less than 50 degrees F, nor more than 90 degrees F. Heating of the mixing water and/or aggregates will not be permitted until the temperature of the concrete has decreased to 55 degrees F. Heated materials shall be free from ice, snow, and frozen lumps before entering the mixer. Methods and equipment for heating shall be subject to the Owner or Owner's Representative's approval. Provide suitable means for maintaining the concrete at a temperature of at least 40 degrees F for not less than 72 hours after placement. Any concrete damaged by freezing shall be removed and replaced at the expense of the Contractor.
- C. Do not apply when base is wet, contains excess moisture, during rain, or when frozen.
- D. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete: Concrete shall be $f'c = 4,000$ psi (unless otherwise shown on the Plans), as defined by ACI standards, air entrained. The applicable provisions of ACI 301, Specifications for Structural Concrete for Buildings, form a part of this specification. Concrete slump shall range from 0 to 3-in.
- B. Joint Filler: Joint Fillers: Resilient premolded bituminous impregnated fiberboard units complying with ASTM D994, D1751, D2628; FS HH-F-341, Type I; or approved equal.

- C. Joint Sealants: Conforming to ASTM D1190, non-priming, pourable, self-leveling polyurethane. Acceptable sealants are Sonneborn "Sonolastic Paving Joint Sealant", Sonneborn "Sonomeric CT 1 Sealant", Sonneborn "Sonomeric CT 2 Sealant", Mameco "Vulkem 245", or Woodmont Products "Chem-Caulk" or approved equal.

PART 3 EXECUTION

3.1 SUBGRADE AND FORMS

- A. Provide and operate a template for checking the contour of the subgrade. The template shall rest on the side forms and shall be provided with adjustable rods that project downward to the subgrade at 1 foot intervals. Adjust these rods to the required cross sections of the bottom of the slab when the template is supported at its sides.
- B. Forms shall be of metal or wood and subject to approval by the Engineer.
- C. Test the subgrade with respect to elevation and density prior to setting forms. Complete the subgrade to the plane of the typical sections shown on the drawings and to the lines and grades established by the drawings. Compact subgrades in accordance with the requirements in the Earthwork section.
- D. After preparing the subgrade as described above, set the forms. The subgrade under the forms shall be firm and cut true to grade so that each form section will, when placed, be firmly in contact for its entire length and base width. Stake the form into position so that the top, when tested by a 10 feet straightedge, conforms to the requirements specified for the surface of the concrete and so that the longitudinal axis of the upstanding leg does not vary more than 1/4 inch. Tightly lock form sections together.
- E. Finish the subgrade to the exact section of the bottom of the pavement shown on the drawings. Wet the subgrade down far enough in advance of the placing of the concrete to ensure that it is firm and moist. In cold weather, the subgrade shall be entirely free from frost when the concrete is deposited.
- F. Leave forms in place at least 24 hours after the concrete has been placed against them. Do not use crowbars or heavy tools against green concrete when removing the forms. Clean the forms well before re-oiling and reuse.

3.2 PLACING

- A. Concrete shall be in place within 45 minutes from the time all ingredients are charged in the mixing drum and before the concrete has obtained its initial set. Deposit concrete so that minimum handling will be necessary, and distribute it so that, when consolidated and finished, the slab thickness and surface grade required by the drawings will be obtained at all points. Place concrete rapidly and continuously between expansion joints. Use shovels for any necessary hand spreading. Consolidate the concrete adjacent to forms and joints with forks and spades.

- B. Do not place concrete when the ambient temperature is below 35 degrees F, nor when the concrete is, without special protections, likely to be subject to freezing temperatures before final setting has occurred. The temperature of the concrete when placed shall be not less than 50 degrees F, nor more than 90 degrees F. Heating of the mixing water and/or aggregates will not be permitted until the temperature of the concrete has decreased to 55 degrees F. Heated materials shall be free from ice, snow, and frozen lumps before entering the mixer. Methods and equipment for heating shall be subject to the A/E's approval. Provide suitable means for maintaining the concrete at a temperature of at least 40 degrees F for not less than 72 hours after placement. Any concrete damaged by freezing shall be removed and replaced at the expense of the Contractor.

3.3 FINISHING

- A. Immediately after placement, properly finish the concrete. The sequence of operations shall be as follows: hand finishing, longitudinal floating, straightedge finishing, and edging the joints.
- B. Provide an approved hand strike template, approved tamping template, and a longitudinal float for the hand finishing of pavement. The templates shall be at least 1.0 foot longer than the pavement width and at least 4 inches wide. The longitudinal float shall be 6 feet to 8 feet long. The float shall be rigid and substantially braced and provided with suitable handles to ensure smooth and effective manipulation. The bottom edges of the base of the float shall be rounded. Floats made of metal or a combination of wood and metal may be used.
- C. As soon as concrete is placed, strike off and screed to the appropriate cross section and to an elevation above grade which, when the concrete is consolidated and finished, will ensure that the surface of the pavement is at the exact elevation indicated on the drawings. Tamp the entire surface, and continue tamping until the required compaction and reduction of internal and surface voids are secured. Immediately after the final tamping of the surfaces, float the pavement longitudinally by hand. If contact with the pavement is not made at all points by the float, additional concrete shall be required and screeded, and the float operated until a satisfactory surface is obtained.
- D. After the longitudinal floating is complete, eliminate minor irregularities and score marks remaining in the pavement surface by removing surplus material or, if necessary, by adding and working in freshly mixed concrete with long handled floats and filling in open textured areas in the pavement surfaces. Make the final finish with straightedges 8 feet in length. A straightedge operated from the side of the pavement shall be equipped with a handle 3 feet longer than 1/2 of the pavement width. Place the straightedge at the centerline and pull uniformly to the edge. Do not advance the straightedge along the pavement in successive stages more than 1/2 its length. Immediately fill depressions with freshly mixed concrete, strike off, consolidate, and refinish. Remove projections above the required elevation while the concrete is still plastic and workable, doing so in a time sequence that will ensure the removal of all water and laitance from the surface. Continue the straightedge testing and refloating until the entire surface is free from observable departures from the straightedge, conforms to the required grade and contour, and will, when the concrete has hardened, conform with the surface requirements specified herein.

- E. After hand finishing has been completed but before the concrete has attained initial set, carefully finish the edges of slabs along forms and at joints with an edging tool of 1/2-inch radius to form a smooth, rounded surface. Clean corners or edges of slabs that have crumbled and any areas that lack enough mortar for proper finishing by removing loose fragments and soupy mortar, and then fill solidly and finish with a mixture of the correct proportions and appropriate consistency. Eliminate unnecessary tool marks, and leave edges smooth and true to line. After removing the forms, fill any damaged or honeycombed areas with mortar composed of one part cement and two parts sand.
- F. Form transverse and contraction joints in the finished pavement prior to initial set, spacing them as shown on the drawings. Contraction joints shall be 1/4-inch wide and 3/4-inch deep and shall be finished with an edging tool of 1/4-inch radius.
- G. Place transverse and premolded expansion joints 1/2-inch thick in such a way that the joint will be filled to within 1/2 inch of the surface of the walk. Place them to full depth and normal to the grade. Wherever concrete walks abut against transverse steps, other walks, or adjacent structures, provide expansion joints. Clean all concrete from the top of the premolded joints and edge the concrete as specified above.

3.4 PROTECTION AND CURING

- A. Protect and cure concrete with an approved curing compound applied according to the manufacturer's directions.

3.5 SURFACE TEST

- A. Remove any portion of the pavement that shows a variation or departure greater than 1/4-inch from the testing edge of a 10 feet straightedge, and replace or correct as directed by the Engineer.

END OF SECTION 321313

SECTION 321600 - CURBS AND GUTTERS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Plans and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Standard specifications of the Tennessee Department of Transportation (TDOT) sections 702. Even though the weather limitations, construction methods, and materials specifications contained in the TDOT Specifications may not be explicitly repeated in these specifications, they shall, wherever applicable to the work called for by this section, be considered as implied and therefore adhered to. However, the various subsections "Basis for Payment" contained in the TDOT specifications shall not be considered applicable.
- C. ACI 301, Specifications for Structural Concrete for Buildings.

1.2 SUMMARY

- A. Section includes installation of curbs and gutters as follows:
 - 1. Installation of post curbs, extruded curbs, gutters, or combined curb and gutters.
- B. Related Sections:
 - 1. Section 312000 – Earthwork
 - 2. Section 321313 – Concrete Paving.
 - 3. Section 321616 – Asphalt Paving.

1.3 SUBMITTALS

- A. Submittals shall be in electronic form (via email) and shall be stamped by the Contractor. Submit to the Owner or Owner's representative.
- B. Submit templates of the curb cross sections if alternates are proposed; these must be approved by the Owner or Owner's Representative prior to construction. Replace curbing that is installed without the Owner or Owner's Representative's approval.

1.4 QUALITY ASSURANCE

- A. Provide and maintain a quality control system that will provide reasonable assurance that materials and construction conform to the specified requirements.

- B. An independent testing laboratory may be selected and paid by the Owner to perform construction testing. This does not relieve the Contractor of any quality assurance responsibilities.
- C. Materials, sampling, and testing shall meet the applicable requirements of the Concrete Sections, ACI, and the latest revision of TDOT Section 501, 604, 702, and 905.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Concrete delivery, storage, and handling shall be in accordance with the latest edition TDOT specifications.

1.6 PROJECT CONDITIONS

- A. Weather limitations for pavement to be properly placed, compacted, and finished shall be in accordance with the latest edition of the TDOT specifications, generally these are:
- B. Do not place concrete when the ambient temperature is below 35 degrees F, nor when the concrete is, without special protections, likely to be subject to freezing temperatures before final setting has occurred. The temperature of the concrete when placed shall be not less than 50 degrees F, nor more than 90 degrees F. Heating of the mixing water and/or aggregates will not be permitted until the temperature of the concrete has decreased to 55 degrees F. Heated materials shall be free from ice, snow, and frozen lumps before entering the mixer. Methods and equipment for heating shall be subject to the Owner or Owner's Representative's approval. Provide suitable means for maintaining the concrete at a temperature of at least 40 degrees F for not less than 72 hours after placement. Any concrete damaged by freezing shall be removed and replaced at the expense of the Contractor.
- C. Do not apply when base is wet, contains excess moisture, during rain, or when frozen.
- D. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete: Concrete shall be $f'c = 4,000$ psi (unless otherwise shown on the Plans), as defined by ACI standards, air entrained. The applicable provisions of ACI 301, Specifications for Structural Concrete for Buildings, form a part of this specification. Concrete slump shall range from 0 to 3-in.
- B. Joint Filler: Joint Fillers: Resilient premolded bituminous impregnated fiberboard units complying with ASTM D994, D1751, D2628; FS HH-F-341, Type II, Class A or approved equal.

- C. Joint Sealants: Conforming to ASTM D1190, non-priming, pourable, self-leveling polyurethane. Acceptable sealants are Sonneborn "Sonolastic Paving Joint Sealant", Sonneborn "Sonomeric CT 1 Sealant", Sonneborn "Sonomeric CT 2 Sealant", Mameco "Vulken 245", or Woodmont Products "Chem-Caulk" or approved equal.

PART 3 - EXECUTION

3.1 SUBGRADE AND FORMS

- A. Provide and operate a template for checking the contour of the subgrade. The template shall rest on the side forms and shall be provided with adjustable rods that project downward to the subgrade at 1 foot intervals. Adjust these rods to the required cross sections of the bottom of the slab when the template is supported at its sides.
- B. Forms shall be of metal or wood and subject to approval by the Engineer.
- C. The Contractor may elect to use extruded machine curb or curb and gutter. The Owner reserves the right to approve the machine used, the contour and finish of the curb and gutter, and the design mix and the right to designate the spacings for expansion and contraction joints.
- D. Test the subgrade with respect to elevation and density prior to setting forms. Complete the subgrade to the plane of the typical sections shown on the drawings and to the lines and grades established by the drawings. Compact subgrades in accordance with the requirements in the Earthwork Section.
- E. After preparing the subgrade as described above, set the forms. The subgrade under the forms shall be firm and cut true to grade so that each form section will, when placed, be firmly in contact for its entire length and base width. Stake the form into position so that the top, when tested by a 10 feet straightedge, conforms to the requirements specified for the surface of the concrete and so that the longitudinal axis of the upstanding leg does not vary more than 1/4 inch. Tightly lock form sections together.
- F. Finish the subgrade to the exact section of the bottom of the pavement shown on the drawings. Wet the subgrade down far enough in advance of the placing of the concrete to ensure that it is firm and moist. In cold weather, the subgrade shall be entirely free from frost when the concrete is deposited.
- G. Leave forms in place at least 24 hours after the concrete has been placed against them. Do not use crowbars or heavy tools against green concrete when removing the forms. Clean the forms well before reoiling and reuse.

3.2 PLACING

- A. Concrete shall be in place within 45 minutes from the time all ingredients are charged in the mixing drum and before the concrete has obtained its initial set. Deposit concrete so that minimum handling will be necessary, and distribute it so that, when consolidated and finished, the slab thickness and surface grade required by the drawings will be obtained at all points. Place concrete rapidly and continuously between expansion joints. Use shovels for any necessary hand spreading. Consolidate the concrete adjacent to forms and joints with forks and spades.
- B. Construct concrete curb or combination concrete curb and gutter, where specified on the Plans, in uniform sections of length specified on the Plans.
- C. Form joints between sections either by steel templates, 1/8-inch in thickness, of length equal to width of curb and gutter, and with depth which will penetrate at least 2-inches below surface of curb and gutter; or with 3/4-inch thick performed expansion joint filler cut to exact cross section of curb and gutter; or by sawing to depth of at least 2-inches while concrete is between 4 and 24 hours old. If steel templates are used, they shall be left in place until concrete has set enough to hold it's shape, but shall be removed while forms are still in place.
- D. Longitudinal Construction Joints: Tie concrete curb or combination concrete curb and gutter, where specified on the Plans, to concrete pavement with 1/2-inch round deformed reinforcement bars of length and spacing shown on the Plans.
- E. Transverse Expansion Joints: Concrete curb, combination concrete curb and gutter, or concrete sidewalk shall have filler cut to exact cross section of curb, gutter, or sidewalk. Joints shall be similar to type of expansion joint used in adjacent pavement.
- F. Joint Fillers: Extend joint fillers full-width and depth of joint, and not less than 1/2-inch or more than 1-inch below finished surface where joint sealer is indicated. Furnish joint fillers in 1-piece lengths for full width being placed, wherever possible. Where more than 1 length is required, lace or clip joint filler sections together.
- G. Joint Sealants: Seal joints with approved exterior pavement joint sealants. Install in accordance with manufacturer's recommendations.

3.3 FINISHING

- A. Immediately after placement, properly finish the concrete. The sequence of operations shall be as follows: hand finishing, longitudinal floating, straightedge finishing, and edging the joints.
- B. Provide an approved hand strike template, approved tamping template, and a longitudinal float for the hand finishing of pavement. The templates shall be at least 1.0 foot longer than the pavement width and at least 4 inches wide. The longitudinal float shall be 6 feet to 8 feet long. The float shall be rigid and substantially braced and provided with suitable handles to ensure smooth and effective manipulation. The bottom edges of the base of the float shall be rounded. Floats made of metal or a combination of wood and metal may be used.

- C. As soon as concrete is placed, strike off and screed to the appropriate cross section and to an elevation above grade which, when the concrete is consolidated and finished, will ensure that the surface of the pavement is at the exact elevation indicated on the drawings. Tamp the entire surface, and continue tamping until the required compaction and reduction of internal and surface voids are secured.
- D. Form contraction joints in the finished concrete prior to initial set, spacing them as shown on the Plans. Unless otherwise noted, contraction joints shall be 1/4-inch wide at 10-ft. intervals.
- E. Form expansion joints in the finished concrete prior to initial set, spacing them as shown on the Plans. Unless noted otherwise, premolded expansion joints shall be 3/4-inch thick at 100-ft. maximum spacing between joints. Provide expansion joints at tangent points of circular curbs, between curbs and rigid objects, at locations where stresses may develop, and wherever concrete abuts against transverse steps, walks, or adjacent structures.
- F. Finish the edges of joints on ¼-in. radii. Clean all concrete from the top of the premolded joints.

3.4 PROTECTION AND CURING

- A. Cure concrete with an approved curing compound applied according to the manufacturer's directions and as specified in "water-curing" section of ACI 308.
- B. Protect the curbing until final acceptance. Repair sections that are damaged during this period by removing and reconstructing each 10-ft. section that has been damaged.
- C. Backfill the curb immediately after the concrete has set sufficiently and after the forms have been removed. Place material in layers not exceeding 4-in. in loose thickness, and compact until firm and stable. Completely fill to the top of the back of curb and eliminate ponding behind the curbs.

END OF SECTION 321600

SECTION 321723 – PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Plans and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Standard specifications of the Tennessee Department of Transportation (TDOT). Even though the weather limitations, construction methods, and materials specifications contained in the TDOT Specifications may not be explicitly repeated in these specifications, they shall, wherever applicable to the work called for by this section, be considered as implied and therefore adhered to. However, the various subsections "Basis for Payment" contained in the TDOT specifications shall not be considered applicable.
- C. American Association of State Highway and Transportation (AASHTO)
 - 1. AASHTO M248 – Ready Mixed White and Yellow Traffic Paints
- D. American Society for Testing and Materials (ASTM)
 - 1. ASTM D4414 – Standard Practice for Measurement of Wet Film Thickness by Notched Gauges.
- E. Federal Specifications (FS)
 - 1. FS A-A-2886 – Paint, Traffic, Solvent Based
 - 2. FS TT-P-1952 – Paint, Traffic and Airfield Marking, Waterborne

1.2 SUMMARY

- A. Section includes painting and marking of pavements, curbs, guard posts, and light pole bases.
- B. Related Sections:
 - 1. Section 321216 – Asphalt Paving
 - 2. Section 321212 – Concrete Paving
 - 3. Section 321600 – Curbs and Gutters

1.3 SUBMITTALS

- A. Submittals shall be in electronic form (via email) and shall be stamped by the Contractor. Submit to the Owner or Owner's representative.

1.4 QUALITY ASSURANCE

- A. Provide and maintain a quality control system that will provide reasonable assurance that materials and construction conform to the specified requirements.

- B. An independent testing laboratory may be selected and paid by the Owner to perform construction testing of in-place striping and markings for compliance with requirements of materials and thickness. This does not relieve the Contractor of any quality assurance responsibilities.
- C. Use trained and experienced personnel in applying the products and operating the equipment required for properly performed work.

1.5 PROJECT CONDITIONS

- A. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Paint shall be waterborne or solvent borne, colors as shown or specified herein. Pavement marking paints shall comply with applicable state and local laws enacted to ensure compliance with Federal Clean Air Standards. Paint materials shall conform to the restrictions of the local Air Pollution Control District.
- B. Waterborne Paint: Paints shall conform to FS TT-P-1952.
- C. Solvent Borne Paint: Paint shall conform to FS A-A-2883 or AASHTO M248. Paint shall be non-bleeding, quick-drying, and alkyd petroleum base paint suitable for traffic-bearing surface and be mixed in accordance with manufacturer's instructions before application for colors White, Yellow, Blue, and Red.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before any pavement markings are is applied, examine the work area and correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Sweep and clean surface to eliminate loose material and dust.
- B. Where existing pavement markings are indicated on Construction Drawings to be removed or would interfere with adhesion of new paint, a motorized abrasive device shall be used to

remove the markings. Equipment employed shall not damage existing paving or create surfaces hazardous to vehicle or pedestrian traffic. Within public rights-of-way, appropriate governing authority shall approve method of marking removal.

- C. New pavement surfaces shall be allowed to cure for not less than 30 days before application of marking materials.

3.3 CLEANING EXISTING PAVEMENT MARKINGS

- A. In general, markings shall not be placed over existing pavement marking patterns. Existing pavement markings, which are in good condition but interfere or conflict with the newly applied marking patterns, shall be removed. Deteriorated or obscured markings that are not misleading or confusing or do not interfere with the adhesion of the new marking material do not require removal. Whenever grinding, scraping, sandblasting or other operations are performed, the work shall be conducted in such a manner that the finished pavement surface is not damaged or left in a pattern that is misleading or confusing. When these operations are completed the pavement surface shall be blown off with compressed air to remove residue and debris resulting from the cleaning work.

3.4 APPLICATION

- A. Apply two coats of paint at manufacturer's recommended rate, without addition of thinner, with maximum of 100 square feet per gallon or as required to provide a minimum wet film thickness of 15 mils and dry film thickness of 7 ½ mils per coat. Paint shall be applied for a total dry film thickness of 15 mils. Apply with mechanical equipment to produce uniform straight edges. At sidewalk curbs and crosswalks, use straightedge to ensure uniform, clean, and straight stripe.
- B. Install pavement markings according to manufacturer's recommended procedures for the specified material.
- C. Following items shall be painted with colors noted below:
 1. Pedestrian Crosswalks: White
 2. Exterior Sidewalk Curbs, Light Pole Bases, Guard Posts: Yellow
 3. Fire Lanes: Red (or per local code)
 4. Lane Striping where separating traffic moving in opposite directions: Yellow
 5. Lane Striping where separating traffic moving in same direction: White
 6. ADA Symbols: Blue (or per local code)
 7. ADA parking space markings: Yellow
 8. Parking stall striping: White (unless otherwise noted on Construction Drawings)

3.5 FIELD QUALITY CONTROL

- A. Inspection: After the paint has thoroughly dried, visually inspect the entire application and touch up as required to provide clean, straight lines and surfaces throughout. The Contractor is responsible for the quality of construction and materials.
- B. Testing: Testing of wet film thickness shall be performed a minimum of two times on each parking row (including striped islands) and pedestrian crosswalks, and a minimum of one test on each lane/alignment striping. In addition to the test mentioned above, at least one test shall be performed after refilling paint striping machine, changing operators of striping machine, and changing paint types, brands, etc. The tests mentioned above shall be performed on each coat applied and in accordance with ASTM D4414.

3.6 CLEANING AND PROTECTION

- A. Remove any excess debris and trash. Waste materials shall be removed at the end of each workday. Upon completion of the work, all containers and debris shall be removed from the site. Paint spots upon adjacent surfaces shall be carefully removed by approved procedures that will not damage the surfaces and the entire job left clean and acceptable.
- B. Prohibit access of vehicles onto any of the pavement markings until paint has had sufficient time to dry. Refer to product manufacturer's recommendations and adjust minimum drying time according to weather and temperature conditions.

END OF SECTION 321723

SECTION 329219 - SEEDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:

1. Supplying and placing soil additives, seed, and mulch as specified on prepared ground in accordance with the Plans and these Specifications.
2. Sodding or seeding all non-construction areas that show signs of excessive erosion and all newly graded earthen areas that are not to be paved, stabilized unless otherwise indicated on the Plans or as directed by the Engineer.

- B. Related Sections:

1. Section 312000 - Earthwork

1.3 SUBMITTALS

- A. Submittals shall be in electronic form (via email) and shall be stamped by the Contractor. Submit to the Owner or Owner's representative.

1.4 QUALITY ASSURANCE

- A. Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.
- B. Do not disturb any areas outside the work area as defined on the Plans. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery, storage, and handling of materials shall be in accordance with the Contract Documents and the local, State, and Federal requirements.

1.6 PROJECT CONDITIONS

- A. Maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Grass Seed: Seed mixture shall be fresh, clean, new crop seed. Grass shall be of the previous year's crop and in no case shall the weed seed content exceed 0.25% by weight. The seed shall be furnished and delivered in the proportion specified below in new, clean, sealed, and properly marked containers. Seed shall comply with State and Federal seed laws. Seed that has become wet, moldy, or otherwise damaged will not be accepted. All Fescues shall contain Acromonium endophytes. Seed containing endophyte must be kept cool and dry at all times; do not stockpile in the sun. Seed mixture for general lawn conditions shall be as follows:

<u>Common Name</u>	<u>Proportion By Weight</u>	<u>Germination Minimum</u>	<u>Purity Minimum</u>
Tall Fescue	50%	85%	95%
Chewings Fescue	25%	85%	95%
Creeping Red Fescue	25%	85%	95%

1. Tall fescue shall be improved turf-type blends. Kentucky 31 tall fescue shall not be used.
2. Provide 3 varieties minimum for each Fescue species.
3. Seed may be mixed by an approved method on the site or may be mixed by a dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers that shall bear the dealer's guaranteed analysis. If the seed is mixed by a dealer, provide the dealer's guaranteed statement of the composition of the mix.

- B. Fertilizer: Use a slow-release starter fertilizer in standard containers that are clearly marked with name, weight, and guaranteed analysis of the contents and that ensure proper protection in transportation and handling; and in compliance with all local, state, and federal fertilizer laws.

- C. Lime: Use lime containing a minimum of 85% calcium carbonate and magnesium carbonate and shall be ground to such fineness that 40% will pass the No. 100 mesh sieve and 95% of which will pass through the No. 20 mesh sieve. Contractor shall be aware of loam borrow pH and the amount of lime needed to adjust pH to specifications in accordance with testing lab recommendations.

- D. Mulch: Stalks of rye, oats, wheat, or other approved grain crops properly cured prior to baling, air dried, and reasonably free of noxious weeds and weed seeds or other material detrimental to plant growth.

- E. Water: The Contractor shall be responsible to furnish their supply of water to the site at no additional cost. If possible, the Owner may furnish the Contractor upon request with an

adequate source and supply of water at no charge. However, if the Owner's water supply is not available or not functioning, the Contractor shall be responsible to furnish adequate supplies at their cost. All work injured or damaged due to the lack of water or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

- F. Matting: provide matting as shown on the Plans for slopes steeper than 3:1 or as otherwise specified on the Plans.

PART 3 - EXECUTION

3.1 GENERAL

- A. Before starting seeding operations on any area, final dressing and placing of topsoil shall have been completed in accordance with the applicable Specifications. Seed, fertilize, lime, and mulch within 30 days of attainment of finish grade.
- B. Apply temporary seeding whenever grading operations are temporarily halted for over 14 days and final grading of exposed surfaces is to be completed within one year. Also apply temporary seeding to soil stockpiles.

3.2 PREPARATION

- A. Each area to be seeded shall be scarified, disked, harrowed, raked or otherwise worked until it has been loosened and pulverized to a depth of not less than 2 inches and brought to the lines and grades indicated on the Plans or directed by the Engineer. This operation shall be performed only when the soil is in a tillable and workable condition.
- B. Apply fertilizer at the rate of 1 pound of nitrogen per 1,000 square feet, and lime at the rate of 50 pounds per 1,000 square feet, shall be uniformly incorporated in the soil for a depth of approximately 1 inch. Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with power sprayer equipment. Do not apply lime without a soil test.

3.3 SEEDING

- A. Seed shall be sown as soon as preparation of the seed bed has been completed. It shall be sown uniformly by means of a rotary seeder or other satisfactory means. Seed shall be sown at the rate of 8 pounds per 1,000 square feet.
- B. No seeding shall be done during windy weather or when the ground surface is frozen, wet or otherwise non-tillable.

- C. When seeding during February 1 through April 1 and October 1 through November 30, add an additional 3 pounds per 1000 square feet of annual rye grass. No seeding shall be performed during December and January unless otherwise permitted.

3.4 MULCHING

- A. When the mulching material is hay or straw, it shall be spread evenly over the seeded area at an approximate rate of 2 bales (100 pounds minimum) per 1,000 square feet for straw and 150 pounds per 1,000 square feet for hay immediately following the seeding operations. The Engineer depending on the texture and condition of the mulch material and the characteristics of the area seeded may vary this rate.

3.5 MAINTANENCE

- A. All seeded areas shall be cared for properly to the Owner or Owner's Representative's satisfaction until acceptance of the work. Areas, which have been previously seeded and mulched in accordance with this Section, but which, have been damaged or failed to successfully establish an acceptable stand of grasses shall be repaired as directed by the Owner or Owner's Representative. All material and labor required to repair seeded areas made necessary by negligence on a part of the Contractor will be furnished by the Contractor at no cost.
- B. If within 60 days of the planting less than 50% is successful, rework the ground, refertilize, reseed, and remulch.

3.6 CLEANUP AND PROTECTION

- A. After the completion of seeding, the area shall be cleaned of all rubbish, excess material, and any other items that will mar the appearance of the projects as in accordance with the General Specifications.

END OF SECTION 329219

SECTION 331100 –UNDERGROUND WATER UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Plans and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. NFPA 24, *Standard for the Installation of Private Service Fire Mains and Their Appurtenances*, shall be followed where applicable.
- C. American Water Works Association (AWWA) latest requirements and standards in accordance the materials specifications.

1.2 SUMMARY

- A. Section includes:
 - 1. The work covered by this section shall consist of the furnishing and installation of underground water lines.
 - 2. The Contractor shall be responsible for safely storing materials needed for the work until they have been incorporated into the completed project.
- B. Related Sections:
 - 1. Section 310000 – Earthwork
 - 2. Section 331216 – Water Utility Distribution Valves
 - 3. Section 331110 – Disinfection and Testing of Water Distribution System

1.3 DEFINITIONS

- A. The length of pipe as shown on the Plans is based on its in-place length as measured along the centerline with no deductions for appurtenances. Actual quantity of pipe may vary; supply and install the necessary quantity of pipe to construct the complete system.

1.4 SUBMITTALS

- A. Submittals shall be in electronic form (via email) and shall be stamped by the Contractor. Submit to the Owner or Owner’s representative.

- B. Submit shop drawings for material substitutions. Do not submit shop drawings for materials that are consistent with the plans. These submittals will be marked "Not Requested for Review" and returned.

1.5 QUALITY ASSURANCE

- A. Provide and maintain a quality control system that will provide reasonable assurance that materials and construction conform to the specified requirements.

1.6 DELIVERY, STORAGE, & HANDLING

- A. Delivery, storage, and handling shall be in accordance with these specifications and the manufacturer's requirements.
- B. All pipe, structures, and appurtenances shall be inspected and accepted by an approved commercial testing laboratory prior to delivery to the work site. Each joint and each structure shall be stenciled or otherwise marked with the laboratory's mark of acceptance. Furnish the Engineer with a certified copy (via email) of the laboratory's report of inspection, test, and acceptance on all pipe and appurtenances prior to its incorporation in the work.

1.7 PROJECT CONDITIONS

- A. Verify the locations of the existing underground utilities by contacting the utility owners and by potholing in the field.
- B. Notify the utility owners prior to beginning work.

PART 2 - PRODUCTS

2.1 PIPE MATERIALS

- A. All materials will be visually inspected by the Owner at the site for conformance to the specifications. At the Owner's discretion, the Contractor may be required to supply certified mill tests, samples, or other suitable form of verification that the material meets the required specifications.
- B. Ductile Iron Pipe (DIP, 4-inch and larger): DIP shall be made of good quality ductile iron in conformance with the latest revision of ANSI/AWWA C151/A21.51 Standard. The pipe shall be push-on joint with a minimum pressure class of 350 psi, cement-lined according to ANSI 21.4/AWWA C104, and coated inside and outside with an asphaltic coating. Fittings shall be mechanical joint fittings in accordance with AWWA C110 with a pressure rating of 350 psi.

Ductile iron pipe and fittings shall conform to the requirements of the Materials Specifications herein.

- C. PVC pipe (2 – 4 inch diameter) and fittings shall be NSF-Approved Class 200 or Class 250 as required by Owner in high pressure areas. The pipe shall be manufactured from Class 12454-B polyvinyl chloride plastic (PVC 1120) as defined by ASTM D1784, and in accordance with ASTM D2241 and the Materials Specifications herein.
- D. Copper pipe (2-inch diameter and smaller) shall be Type-K copper, annealed, and meeting ASTM B88, latest revision. Furnished in 20-foot straight laying lengths, and in conformance with the Materials Specifications herein.

PART 3 - EXECUTION

3.1 INSTALLATION OF UNDERGROUND WATER LINES

- A. All water lines greater than or equal to 4 inches in diameter shall be ductile iron pipe. Water lines 2 – 4 inches in diameter shall be PVC or alternate if approved by the Owner. Water lines 2-inches and smaller shall be copper pipe. Lines under roadway pavement or in bores and tunnels shall be copper pipe or DIP. Either copper pipe or PVC pipe may be used elsewhere.
- B. All 2-inch PVC pipe shall be installed with a 14-gauge copper wire which shall be tied into metallic mains and valve boxes.
- C. Water lines shall be installed as shown on the drawings. All fittings, valves, and hydrants shall be at the required locations, the spigots centered in the bells, and all valves and hydrant stem plumb.
- D. Timing and procedures of pipe installations, valve closings, temporary services, and interruption of services shall be approved by and coordinated with the Owner. The Owner may require that the work be performed during non-business hours if necessary to maintain services.
- E. Unless otherwise indicated by the drawings, all water lines shall have at least 36 inches of cover. Exceptions shall be approved by the Owner.
- F. Trench Width:
 - 1. Minimum Trench Width
 - a. Outside Diameter Less than 4-inches: trench 4-inches greater on each side of the pipe.
 - b. Outside Diameter 4-inches to 12-inches: trench 6-inches greater on each side of the pipe.

- c. Outside Diameter 12-inches to 24-inches: trench 8-inches greater on each side of the pipe.
 2. Maximum Trench Width shall not be greater than the minimum trench width plus 8-inches nor greater than the minimum width required in order to insert the smallest trench box appropriate for the pipe installation.
 3. Trench widths for larger sizes shall be approved by the Owner.
- G. The Contractor shall provide and use tools and facilities that are satisfactory to the Owner and that will allow the work to be done in a safe and convenient manner. All pipe, fittings, valves, and hydrants are to be unloaded from the trucks using suitable tools and equipment. A derrick, ropes, or other suitable tools or equipment shall be used to lower all pipe, fittings, valves, and hydrants into the trench one piece at a time. Each piece shall be lowered carefully so that neither it nor any protective coating or lining it may have will be damaged. Under no circumstances shall water line materials be dropped or dumped.
- H. Any pipes strung out along the route of the proposed lines before the actual installation of those lines is due to take place shall not be lowered into the trench until they have been swabbed to remove any mud, debris, etc., that may have accumulated within them. PVC pipe shall be strung out a maximum of one day ahead of pipe laying. All unnecessary material shall be removed from the bell and spigot end of each pipe. Before any pipe is laid, the outside of its spigot end and the inside of its bell shall be cleaned and left dry and oil-free.
- I. Every precaution shall be taken to keep foreign material from getting into the pipe while it is being installed. No debris, tools, clothing, or other materials shall be placed in the pipe during laying operations.
- J. After a length of pipe has been placed in the trench, the spigot end shall be centered in the bell of the adjacent pipe, and then inserted to the depth specified by the manufacturer.
- K. Bell holes shall be big enough so that there is ample room for the pipe joints to be properly made. Between bell holes, the bottom of the trench shall be carefully graded so that each pipe barrel will rest on a solid foundation for its entire length.
- L. Whenever pipe laying is not in progress, the open ends of the pipe shall be closed either with a watertight plug or by other means approved by the Owner.
- M. Pipe shall be cut so that valves, fittings, or closure pieces can be inserted in a neat and workmanlike manner and without any damage to the pipe. The manufacturer's recommendations shall be followed concerning how to cut and machine the ends of the pipe in order to leave a smooth end at right angles to the pipe's axis. For cast iron pipe, hydraulic cutters or a carborundum saw shall be used. A carborundum saw shall be used for ductile iron pipe. A handsaw or chisel shall be used for asbestos-cement and PVC pipe. The Owner may consider other methods for 12-inch diameter and larger pipe.

- N. Pipe shall be installed with the bell ends facing in the direction of laying unless otherwise directed by the Owner.
- O. Wherever pipe must be deflected from a straight line (in either the vertical or horizontal plane) in order to avoid obstructions, or plumb stems, or wherever long radius curves are permitted, the amount of deflection shall not exceed that necessary for the joint to be satisfactorily made, nor that recommended by the pipe manufacturer, and shall be approved by the Owner. Bend fittings shall only be used when the pipe deflections are inadequate, according to manufacturer's recommendations, or as directed by the Owner.
- P. Thrust blocks shall be installed wherever the water main changes direction (at tees and bends), at dead ends, or at any other point recommended by the manufacturer or required by the Owner. Thrust blocks shall be considered an integral part of the water line work. Where thrust blocking is inadequate or inappropriate, tie rods shall be installed.
- Q. No pipe shall be installed in water or when it is the Owner's opinion that trench conditions are unsuitable. If crushed stone is used to improve trench conditions or as backfill for bedding the pipe, its use is considered incidental to the project.
- R. Water lines shall be designed with a 10-foot horizontal separation from any existing or proposed sewer main. If this is not practical, the water main may be placed closer than 10 feet from a sewer main, provided it is laid in a separate trench and that the elevation of the top of the sewer is at least 18 inches below the bottom of the water main, or as directed by the Owner.
- S. Where a water main crosses over a sewer, the top of the sewer shall be at least 18 inches below the bottom of the water main. If the elevation of the lines cannot be adjusted to meet the 18-inch separation, then the water main shall be constructed with ductile iron pipe for a distance of 10 feet on either side of the sewer, with a full pipe section centered over the sewer, or as directed by the Owner.
- T. All pipe shall be jointed in the exact manner specified by the manufacturers of the pipe and jointing materials.
- U. All water distribution mains shall be flushed prior to inspection as specified below to assure complete removal of all debris and foreign material.
- V. On water lines to be abandoned, all water appurtenances shall be removed to a minimum depth of 6 inches below the proposed grade and backfilled in accordance with the Earthwork section.

END OF SECTION 331100

SECTION 331110- DISINFECTION AND TESTING OF WATER DISTRIBUTION SYSTEM

PART 1 – GENERAL

1.1 REFERENCES

A. American Water Works Association (AWWA):

1. B300, Hypochlorites
2. B301, Liquid Chlorine
3. C600, Installation of Ductile Iron Water Mains and Their Appurtenances
4. C605, Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.
5. C906 – Polyethylene (PE) Pressure Pipe and Fittings, 4 in. Through 65 in. (100 mm through 1,650 mm), for Waterworks.
6. C651, Disinfecting Water Mains
7. C655, Field Dechlorination

B. NSF International (NSF):

1. NSF/ANSI 61, Drinking Water System Components – Health Effects
2. NSF/ANSI 372, Drinking Water System Components – Lead Content

1.2 SUBMITTALS

A. Informational Submittals:

1. Plan describing and illustrating conformance to appropriate AWWA standards and this specification.
2. Procedures and plans for cleaning, disinfecting, and testing.
3. Type of disinfecting solution and method of preparation and application
4. Proposed locations where samples will be taken.
5. Method of disposal for highly chlorinated disinfecting water.

B. One (1) certified copy of disinfection test results shall be submitted.

C. Submittals shall be submitted as specified in Section 331100 – UNDERGROUND WATER UTILITIES, promptly and in accordance with approved schedule, in such a sequence that no delay to the Work, or to the work of other Contractors is caused.

D. Related Sections

1. Section 331100 – Underground Water Utilities
2. Section 331216 – Water Utility Distribution Valves

PART 2 – PRODUCTS

2.1 GENERAL

- A. Components and materials in contact with water for human consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the authority having jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
 - 1. Temporary or permanent use or reuse of components and materials without a traceable certification is prohibited.
- B. Contractor shall furnish all equipment including but not limited to; pumps, hoses, fittings, meters, gauges, and all chemicals to accomplish disinfection and testing.

2.2 WATER FOR DISINFECTION AND TESTING

- A. Owner will supply potable quality water. Contractor shall convey in disinfected pipelines or containers.
- B. Water shall be clean, uncontaminated, and potable.
- C. Contractor shall report quantity of water used for disinfection and testing (in gallons) to Owner in writing. Determine by metering or calculation of flow rate and time as directed by Owner. For informational purposes only, there will be no charge for water used specifically for disinfection and testing.

PART 3 – EXECUTION

3.1 HYDROSTATIC PRESSURE TEST – DUCTILE IRON or PVC

- A. Conduct Pressure test in accordance with AWWA C600 (DIP) or AWWA C605 (PVC).
- B. All testing shall be scheduled with the Owner and Owner's Representative (RPR) at least 48 hours in advance.
- C. Mains and services shall be pressure tested as a complete system or as directed by the Owner. Make approved necessary taps in piping prior to testing.
- D. All newly installed and backfilled pipe or any valved section thereof shall be subjected to a hydrostatic pressure test, conducted in the presence of the Owner or Owner's Resident Project Representative (RPR).

- E. Conduct Hydrostatic Pressure Test on buried piping after trench has been completely backfilled and compacted. Testing may be performed prior to placement of concrete or asphalt surface restoration as approved by Owner or RPR.
- F. Contractor shall install temporary thrust blocking and/or other restraint as necessary to prevent movement of pipe. Thrust blocking shall cure for 5 days prior to pressure tests. Restrained length calculations shall be prepared and stamped by a Professional Engineer, licensed in Tennessee.
- G. Remove or isolate appurtenant instruments or devices that could be damaged by pressure testing.
- H. Each valved section of pipe shall be slowly filled with water (0.25 feet per second based on full area of pipe). Expel air from piping system during filling. A test pressure equal to 1.5 times the normal working pressure (but not less than 200 psi and not greater than pressure rating of the pipe) shall be applied for a minimum of 2 hours (maximum of 4 hours). Test pressure shall be based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge. A pump shall be connected to the pipe in a manner satisfactory to the Owner.
- I. Minimum test pressure at the high point of each test segment must be equal to or greater than 1.25 times the working pressure at the high point elevation.
- J. The hydrostatic pressure test shall be conducted by measuring, through a calibrated meter, the amount of water, which enters the test section under 200 psi or normal working pressures (whichever is greater) for a period of at least 2 hours. No installation will be accepted until the hydrostatic testing leakage is zero. Should tests disclose leakage greater than the allowable amounts, the Contractor, at his expense, shall locate and repair defective joints until the leakage is within the specified tolerance.
- K. Cracked or defective pipes, fittings, valves, or hydrants discovered in consequence of this hydrostatic pressure test shall be replaced with sound material in the manner specified at no cost to the Owner. The test shall be repeated until the results are satisfactory to the Owner.
- L. Test results shall be recorded including date, name of Contractor, name and signature of Contractor's employee responsible for testing, name and signature of RPR, test pressure, and test duration. A recording chart shall be used to document the results of the test if requested by the Owner.

3.2 HYDROSTATIC PRESSURE TEST – HDPE

- A. All requirements of Paragraph 3.1 also apply to HDPE
- B. Hydrostatic pressure test shall be conducted following manufacturer and accepted industry recommendations.
- C. Monitored make-up water test shall consist of an initial expansion and test phase. During the initial expansion phase, the test section is pressurized to the test pressure and sufficient make-up water is added each hour for three hours to return to the test pressure.

- D. After the initial expansion phase, about four hours after pressurization, the test phase begins. The test phase lasts two hours and no make-up water should have to be added during this phase in order to achieve the required zero leakage.
- E. The total test time including initial pressurization, initial expansion and time at test pressure shall not exceed eight hours. If the pressure test is not completed within 8 hours, the test section shall be depressurized, and allowed to relax for at least 8 hours before reapplying the test pressure.

3.3 DISINFECTING WATER LINES (Reference AWWA C651 for further details)

- A. Disinfection and testing of the completed lines shall be done in accordance with AWWA C651 current edition and in a manner approved by the Tennessee Department of Environment and Conservation.
- B. Disinfect new pipelines that connect to existing pipelines up to point of connection.
- C. The basic disinfection procedure consists of the following steps:
 - 1. Inspecting all materials to be used to ensure the integrity of the materials.
 - 2. Preventing contaminating materials from entering the water main or components during storage, construction, or repair.
 - 3. Removing, by flushing or other means, those materials that may have entered the water main.
 - 4. Disinfecting any residual contamination that may remain and flushing the disinfected water from the main.
 - 5. Protecting the existing distribution system from backflow due to hydrostatic pressure test and disinfection procedures.
 - 6. Hydrostatic Pressure Test with potable water.
 - 7. Chlorinating and documenting that an adequate level of disinfectant contacted each pipe to provide disinfection. See AWWA C651 for methods and amounts of different types of disinfectant to achieve required levels of disinfectant.
 - 8. Flushing the chlorinated water from the main.
 - 9. Determining the bacteriological quality by laboratory test after disinfection.
 - 10. Final connecting of the approved new water main to the active distribution system.
- D. Chlorinate line with either calcium hypochlorite (tablets or granules), or continuous feed of chlorinated water as described in AWWA C651. Tables 1 through 3 show the chlorine doses required for each method (adapted from AWWA C651)

Table 1 Weight of calcium hypochlorite granules to be placed at beginning of main and at each 500-ft interval (adapted from AWWA C651)

Pipe Diameter (d)	Calcium Hypochlorite Granules
Inches	oz.
4	1.7
6	3.8
8	6.7
10	10.5
12	15.1
14 and larger	$D^2 \times 15.1$

Where D is the inside pipe diameter, in feet $D=d/12$

Table 2 Number of 5-g calcium hypochlorite tablets required for dose of 25 mg/L (adapted from AWWA C651)

Pipe Diameter Inches	Length of Pipe Section , ft				
	13 or less	18	20	30	40
	Number of 5-g Calcium Hypochlorite Tablets				
4	1	1	1	1	1
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

Table 3 Chlorine required to produce an initial 25-mg/L concentration in 100 ft of pipe by diameter (adapted from AWWA C651)

Pipe Diameter (inches)	100% Chlorine (lb)	1% Chlorine Solution (gal)
4	0.013	0.16
6	0.030	0.36
8	0.054	0.65
10	0.085	1.02
12	0.120	1.44
16	0.217	2.60

- E. Prior to chlorination by continuous feed method, the main shall be flushed as thoroughly as possible with the water pressure and outlets available. Flushing shall be done after the pressure tests are made. The flushing velocity in the main shall not be less than 3.0 ft/sec. Table 4 below (adapted from AWWA C651) shows the rates of flow required to produce a velocity of 3.0 ft/sec. After flushing, all valves shall be carefully inspected to see the entire operating mechanism is in good condition.

Table 4 Required flow and openings to flush pipelines at 3.0 ft/sec (40 psi residual pressure in main) adapted from AWWA C651

Pipe Diameter Inches	Flow Required Gpm	Size of Tap (inches)			Number of Hydrant Outlets	
		1	1.5	2	2 ½ inch	4 ½ inch
4	120	1			1	1
6	260		1		1	1
8	470		2		1	1
10	730		3	2	1	1
12	1,060			3	2	1
16	1,880			5	2	1

- F. After the applicable retention period per AWWA C651, the Contractor shall flush the heavily hyperchlorinated water from the line until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, but not less than 0.20 mg/l. The Contractor shall perform such flushing only at sites where there is adequate drainage and as approved by the Owner. The Owner shall document the start and end date, time, and chlorine concentration of the final flush.
1. Contractor shall report quantity of water used for disinfection and testing (in gallons) to Owner in writing. Determine by metering or calculation of flow rate and time as directed by Owner. For informational purposes only, there will be no charge for water used specifically for disinfection and testing.
- G. The Contractor shall use dechlorination and/or other treatment techniques if the treated water flushed from the line presents a hazard to the environment. Refer to ANSI/AWWA C655 Field Dechlorination for dechlorination procedures.
- H. Once a new water line has undergone final flushing but before it is placed into service, the Owner shall collect samples for bacteriological testing in accordance with AWWA C651 at a minimum from both ends of the main line and the ends of any branch lines connected to the main line. In the case of extremely long lines, additional samples will be collected at intervals of approximately 2500 feet or as determined by the Owner. Additional sampling may be required if the Owner determines sanitary conditions have not been maintained.
- I. Samples will be collected in sterile bottles containing sodium thiosulfate as specified by Standard Methods for the Examination of Water and Wastewater. A hose shall not be used to collect samples; as a last resort, fire hydrants may be used as sampling points. A corporation cock may

be installed in the main with a copper-tube gooseneck assembly. After samples have been collected, the gooseneck assembly may be removed and retained for future use.

- J. Samples will be taken as required by TDEC and AWWA C651. At a minimum, two sets of samples taken 24 hours apart or one set of samples taken 48 hours or longer after flushing will be collected by the Owner and tested for bacteriological quality by a state-certified laboratory. Each set of samples will consist of at least two samples representing water from both ends of the main line. If the initial disinfection fails to produce satisfactory samples, the Contractor at no cost to the Owner will repeat disinfection and flushing until the two consecutive sample sets taken 24 hours apart produce satisfactory results.

3.4 DISINFECTING PROCEDURE FOR WORK ON EXISTING LINES (Reference AWWA C651 for further details)

- A. The disinfection procedure for tie-ins on existing components is slightly different from that for new mains. Tie-ins made under pressure and where the components remain full will, in general, not require internal disinfection and sampling. Flushing and sampling is necessary when a tie-in requires the components to be dewatered and depressurized, as it presents the possibility of contamination being introduced into the system. The Owner shall provide guidance as needed to the Contractor to determine proper action in these situations.
- B. Disinfection procedure for work on existing lines shall be in accordance with AWWA C651 Sec. 4.11
- C. The general procedure for handling tie-ins is listed in the following steps:
 - 1. Inspecting all materials to be used to ensure the integrity of the materials.
 - 2. Preventing contaminating materials from entering the water main or components during storage and construction (trench treatment).
 - 3. Disinfecting, swabbing, and cleaning replacement components prior to installation.
 - 4. Removing, by flushing or other means, those materials that may have entered the water main or other components.
 - 5. Sampling to determine bacteriological quality by laboratory test after disinfection.
 - 6. Returning the replacement components back into service after bacteriological samples are taken. It is permissible to return tie-in sections to service as soon as samples are taken and before results are obtained.
 - 7. If necessary, removing the repaired components from service and repeating flushing and sampling until bacteriological samples are negative as directed by Owner.
- D. When an existing line is opened, the Contractor shall, as directed by the Owner, apply liquid hypochlorite to disinfect the exposed trench area around the tie-in. Dry granular or tablet hypochlorite shall be used for pools of standing water due to the more controlled release of

disinfectant. Application amount shall be sufficient to cause a faint chlorine odor and be reapplied as necessary to maintain sanitary conditions. These steps shall be repeated as necessary to minimize the possibility of contamination of the main, fittings, or other components.

E. The sampling procedure for a tie-in section, which has been dewatered and/or lost pressure is as follows:

1. The Owner shall take a single bacteriological sample from a point, which represents the water in the tie-in area. If the direction of flow is unknown, two samples, one from each side of the tie-in area shall be taken. The main and other components can then be returned to service as soon as samples are taken. It is not necessary to wait until sample results are available before putting the main back into service.
2. If the sample is positive for coliform, repeat sampling by the Owner shall include one sample from each side of the original sample point, as well as the point itself (total of three samples). The process shall be repeated until sampling results are negative. Additional flushing/disinfection may be required prior to taking the repeat samples.
3. Actions following positive sample results may vary according to regulatory requirements. The Contractor shall act at the direction of the Owner until satisfactory sampling results are obtained.

F. Tennessee Department of Environment and Conservation Public Water System (Rule 0400-45-01-17, 8, a):

1. General-Public water systems, construction Contractors, and engineers shall follow, and document sanitary practices used in inspecting, constructing or repairing water lines, finished water storage facilities, water treatment facilities, and wells. Public water systems, construction Contractors, and engineers shall follow the latest edition of the AWWA standards C-651, C-652, C-653, C-654, or equivalent methods provided the method has been approved in writing by the Department and is available during the inspection, construction, maintenance, or repair activity. In lieu of following AWWA standards or approved equivalent methods, public water systems, construction Contractors, and engineers may write their own disinfection standard operating procedures. Disinfection standard operating procedures shall be approved in writing by the Department and be available during the inspection, construction, maintenance, or repair activity.

The documentation shall include disinfection procedures used, bacteriological sample results, construction logs, and repair logs and may include photographs where appropriate. All wells, pipes, tanks, filters, filter media and other materials shall be properly disinfected prior to being placed in service. Any disinfectant used to disinfect shall be NSF approved or plain household bleach and used in a manner that assures sufficient contact time and concentration to inactivate any pathogens present. Bacteriological results including line repair records indicating adequacy of disinfection shall be maintained on file by the public water system for five years. Procedures to ensure that water containing excessive concentrations of disinfectant is not supplied to the

customers or discharged in such manner as to harm the environment shall be implemented.

All materials used for new or repaired water lines, storage facilities, water treatment facilities, and wells will be inspected prior to use for any evidence of gross contamination. Any contamination observed shall be removed and the materials protected during installation.

2. Bacteriological Sampling of New Facilities-Bacteriological samples will be collected and analyzed to verify the effectiveness of the disinfection practices prior to placing new facilities in service. Bacteriological samples for finished water storage facilities, water treatment facilities, and wells shall be collected as specified by AWWA standards C-652, C-653, and C-654.

Adequacy of disinfection of new lines shall be demonstrated by collecting two sets of microbiological samples 24 hours apart or collecting a single set of microbiological samples 48 hours or longer after flushing the highly chlorinated water from the lines. In either case microbiological samples in each set will be collected at approximately 2,500-foot intervals with samples near the beginning point, the end point, and at the end of each branch line, unless written approval of alternate sampling frequency and distance between sampling points has been obtained from the Department. If the newly constructed facility yields positive bacterial samples, the line shall be flushed, and re-sampled. If subsequent samples are positive, the line shall be re-disinfected, flushed and sampled again.

3. Bacteriological Sampling of Existing Facilities:
 - a. Finished water storage facilities, water treatment facilities, and wells that have been compromised and potential contamination is introduced during inspection or repair shall be disinfected, flushed, and sampled as specified by AWWA standards C-652, C-653, and C-654. Bacteriological samples shall be collected from a location representing the water contained in the compromised facility. The repaired facility may be returned to service prior to obtaining bacteriological results.
 - b. Drinking water mains where positive pressure has not been maintained during inspection or repair shall be disinfected and flushed prior to being placed back in service. Disinfection and flushing shall be in accordance with AWWA standard C-651 or other method approved in writing by the Department. Bacteriological samples shall be collected immediately after the repair is completed and from a location representing the water contained in the repaired main. The repaired main may be returned to service prior to obtaining bacteriological results. If the repaired main has been placed back into service and yields positive bacteriological samples, the main shall be flushed and re-sampled. One sample is to be collected at the original positive site, one sample is to be collected upstream of the repair and one sample is to be collected in the downstream area of the repair. Sampling shall continue until the water is coliform free.
 - c. If one-half or more of the bacteriological samples collected from the repaired facility are total coliform positive, the system shall notify the Department within 30 days that it has

reviewed its disinfection and sampling practices in an attempt to identify why the positive samples occurred and revise its disinfection and sampling plans accordingly.

- d. If any public water system collects a fecal coliform positive repeat sample or E-coli positive repeat sample or a total coliform positive repeat sample following an initial positive fecal coliform or E-coli sample collected from the repaired facility, the system shall notify the Department within 24 hours and issue a Tier 1 public notice using the language specified in Appendix B of Rule 0400-45-01-.19.
4. Inspectors, contractors, operators, public water systems or engineers that fail to document and follow adequate disinfection procedures, and fail to collect bacteriological samples during repairs, inspections or maintenance activities that potentially would compromise the microbial quality of the water shall issue a boil water advisory to the customers served by that portion of the public water system prior to returning the facility to service. The boil water advisory shall remain in effect until satisfactory microbial tests results and written approval from the Department are obtained.

END OF SECTION 331110

SECTION 331216 –WATER UTILITY DISTRIBUTION VALVES

PART 1 GENERAL

1.1 SUMMARY

- A. This section covers valves for the water pump stations and waterlines.

1.2 RELATED SECTIONS

- A. Section 331100 - Underground Water Utilities

PART 2 PRODUCTS

2.1 RESILIENT SEATED GATE VALVES

- A. Gate Valves shall be resilient seated, manufactured to meet or exceed the latest requirements of AWWA C509 and in accordance the materials specifications.
- B. Valves shall have an unobstructed waterway not less than the full nominal diameter of the valve.
- C. The valves shall be non-rising stem with the stem made of cast, forged, or rolled bronze. Two stem seals of the O-ring type shall be provided to prevent leakage around the stem.
- D. The stem nut, also made of bronze, may be independent of the gate or cast integrally with the gate. If the stem nut is cast integrally, the threads shall be straight and true with the axis of the stem to avoid binding during the opening or closing of the valve.
- E. The sealing mechanism shall consist of a cast iron gate having a vulcanized synthetic rubber coating or a rubber seat mechanically retained on the gate. The resilient sealing mechanism shall provide zero leakage at 200 psi working pressure when installed with the line flow in either direction.
- F. The valve body, bonnet, and bonnet cover shall be cast iron, ASTM A126, Class B or ductile iron per ASTM A536.
- G. All valves shall be in strict accordance with AWWA C509 by Clow, Mueller, American, Kennedy, McWane or other approved manufacturer.
- H. Buried valves shall have integrally cast mechanical joint ends in accordance with AWWA C111 and 2-inch square wrench nut operators. Mechanical accessories shall be supplied by the valve manufacturer. Exposed valves in structures shall have flanged ends and removable hand wheel operators. The direction of opening for either type of valve shall be counterclockwise as viewed from the top.

- I. All ferrous surfaces of the valve body, both inside and outside, shall be protected by a fusion-bonded epoxy coating.
- J. Markings shall be cast on the bonnet or body of each valve to identify the size, working pressure, year of manufacturer, and manufacturer of valve.

2.2 AIR VALVES

- A. Air valves shall be in accordance with the materials specifications and as shown on the standard details.
- B. Air valves shall be 1-inch size on pipelines 12 inches in diameter and smaller.
- C. Air valves shall be located at all high points on the pipeline or as directed by the Company.
- D. Air valves shall be installed in meter boxes.
- E. A tapping saddle shall be used on all air valve installations.

2.3 VALVE BOXES

- A. All valves not inside structures shall be provided with cast iron valve boxes and covers. Valve boxes shall be 2-piece or 3-piece screw type with round or oval bases and 5-1/4 inch shafts. Valve box covers shall be marked "sprinkler water" unless noted otherwise.
- B. Extension stems shall be provided for valves as shown on the drawings. Extension stems shall be fabricated from solid steel shafting not smaller in diameter than the stem of the valve. Stem couplings shall be both threaded and keyed to the coupled stems. Pipe couplings shall not be acceptable.
- C. Stems shall extend to within 12-inches of the surface of the ground unless noted otherwise on the drawings. Connect each stem to the valve operator. Pin all connections. Each extension stem shall be provided with stem guides that are adjustable in two directions. Stem guides shall be cast iron, bronze bushed, and mounted on cast iron brackets. Stem guide spacing shall not exceed 5 feet.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install each valve box on a firm base at the proper elevation only after the satisfactory completion of all pressure and leak testing. The valve box shall be installed so as not to transmit any shock or stress to the valve. Carefully backfill and tamp round the valve box so that the

valve box remains centered and plumb over the wrench nut of the valve. The bottom of the base section of the valve box shall be at or below the bottom of the operating nut on the valve.

- B. In its final position the top of the valve box cover shall be exactly flush with any paved surface and not more than 2 inches above any ground surface.
- C. Unless otherwise shown or noted, pour a 2-foot square or 2-foot diameter by 6-inch thick concrete pad around the top of all valve boxes that are not located in paved surfaces.

END OF SECTION 331216

SECTION 333130 – LOW PRESSURE SEWER MAINS AND LATERALS

PART 1 GENERAL

1.01 SUMMARY

- A. The work covered by this section shall consist of the furnishing and installation of low-pressure high-density polyethylene sewer mains and laterals.

1.02 RELATED SECTIONS

- A. Section 312000 – Earthwork

PART 2 PRODUCTS

2.01 GENERAL

- A. Product Delivery, Storage and handling shall be in strict accordance with the manufacturer's recommendations using the best available methods to prevent damage to materials and components.
- B. Contractor shall keep the interior of pipes free from dirt and foreign matter at all times.

2.02 PIPE AND FITTINGS

- A. Polyethylene pipe (HDPE) and fittings shall be made of High Density, Extra High Molecular Weight (EHMW) polyethylene with a standard thermoplastic material designation of PE3408.
- B. All pipe and fittings shall be Iron Pipe Size (IPS), manufactured in compliance with ASTM F714 and ASTM D3035. Pipe shall be SDR 11
- C. All fittings shall be molded. Fabricated fittings are not acceptable, unless approved in writing by OWNER. Butt fusion fittings shall comply with ASTM D3261 requirements.

PART 3 EXECUTION

3.01 INSTALLATION OF LOW PRESSURE SEWER MAIN AND LATERALS

- A. All pipe shall be joined in the exact manner specified by the manufacturer of the pipe and joining materials.

- B. Low-pressure sewer mains shall have at least 30 inches of cover and low-pressure sewer laterals shall have at least 24 inches of cover.
- C. Lower no pipes and fittings into the trench until they have been swabbed to remove any mud, debris, etc., that may have accumulated within them. After the pipe has been lowered, remove all unnecessary materials from it. Before any pipe is laid, brush and wipe clean the outside of its spigot end and the inside of its bell and ensure that the pipe is dry and oil-free.
- D. Take every precaution to keep foreign material from getting into the pipe while it is being placed in the line. If the crew laying the pipe cannot put it into the trench and in place without allowing earth to get inside it, then place a heavy, tightly woven canvas bag of suitable size over each end of the pipe and leave it there until it is time to connect that pipe to the one adjacent to it.
- E. Place no debris, tools, clothing, or other materials in the pipe during laying operations.
- F. The cutting of pipe so that fittings or closure pieces can be inserted shall be done in a neat and workmanlike manner and without any damage to the pipe. Follow the manufacturer's recommendations concerning how to cut and machine the ends of the pipe in order to leave a smooth end at right angles to the pipe's axis.
- G. Air valves shall be located at all high points on the pipeline or as directed by the Owner.
- H. CONTRACTOR shall provide and use tools and facilities that are satisfactory to OWNER and that will allow the work to be done in a safe and convenient manner. Suitable equipment shall be used to lower all pipe and fittings into the trench. Under no circumstances shall materials be dumped or dropped.

3.02 LEAKAGE TEST

- A. Low-pressure sewer mains and laterals shall be subjected to a pressure test with 100 psig of air after installation and backfilling have been completed. All testing shall be conducted in the presence of OWNER. The maximum pressure during testing shall be 150 psig.
- B. The CONTRACTOR shall furnish the pump, pipe, connections, gauges, and all necessary apparatus.
- C. Before applying the specified test pressure, all air shall be expelled from the pipe. If necessary, the CONTRACTOR shall make taps at the points of highest elevation before testing, and shall insert plugs after the test has been completed. The pressure shall be held constant for 2 hours and shall be continuously monitored during the test period using a chart recorder and temperature gage. Any pressure changes during the test period shall not be greater than that allowed by temperature changes recorded on the temperature gage. If the pressure falls below 100 psig during the test period, the test procedure shall start again. If significant pressure drops occur during the pressure test, CONTRACTOR shall locate and repair leaks on the main and laterals prior to retesting.

- D. Any cracked or defective pipes or fittings discovered in consequence of this leakage test shall be replaced with sound material in the manner specified at no cost to the OWNER. The test shall be repeated until the results are satisfactory to the OWNER.

3.03 CLEANUP

- A. All debris and construction materials shall be removed from the work site. Then the surface shall be graded and smoothed on both sides of the line. The entire area shall be left clean and in a condition satisfactory to the Owner. The Contractor shall keep cleanup operations as close to active pipe laying activities as practical.

END OF SECTION 333130

SECTION 334000 - STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

1. Storm drainage pipe work including furnishing and installation of pipes, joint materials, and couplings.
2. Storm drainage structures including furnishing and installation of manholes, catch basins, area drains, and other structures incidental to the construction of storm sewers.

B. Related Sections:

1. Section 310000 – Earthwork for excavation (defined as unclassified) for pipe trenches and structures and backfill.

1.3 DEFINITIONS

- A. The diameter of pipe culverts and storm drains shown on the project drawings and bid schedule are based on Manning's n-value of 0.013, pipes flowing full, and the slopes shown on the Plans and profiles. If alternative materials and types of pipe culverts and storm drains are used, alter the diameter of the pipe shown to accommodate the required flow.
- B. The length of pipe as shown on the Plans is based on its in place length as measured along the centerline with no deductions for storm structures. Actual quantity of pipe may vary; supply and install the necessary quantity of pipe to construct the complete system.

1.4 SUBMITTALS

- A. Submittals shall be in electronic form (via email) and shall be stamped by the Contractor. Submit to the Owner or Owner's representative.
- B. Submit shop drawings for material substitutions. Do not submit shop drawings for materials that are consistent with the plans. These submittals will be marked "Not Requested for Review" and returned.
- C. Results of the mandrel and deflection tests for each line of pipe.

1.5 QUALITY ASSURANCE

- A. Provide and maintain a quality control system that will provide reasonable assurance that materials and construction conform to the specified requirements.

1.6 DELIVERY, STORAGE, & HANDLING

- A. Delivery, storage, and handling shall be in accordance with these specifications and the manufacturer's requirements.
- B. All pipe, structures, and appurtenances shall be inspected and accepted by an approved commercial testing laboratory prior to delivery to the work site. Each joint and each structure shall be stenciled or otherwise marked with the laboratory's mark of acceptance. Furnish the Engineer with a certified copy (via email) of the laboratory's report of inspection, test, and acceptance on all pipe and appurtenances prior to its incorporation in the work.

1.7 PROJECT CONDITIONS

- A. Verify the locations of the existing underground utilities by contacting the utility owners and by potholing in the field.
- B. Notify the utility owners prior to beginning work.

PART 2 - PRODUCTS

2.1 SEWER PIPE MATERIALS

- A. Reinforced Concrete Pipe (RCP): All concrete pipe shall be Class III reinforced concrete pipe conforming to ASTM C76. Horizontal elliptical shall conform to C-507 Class HE-II, HE-III, or HE-IV as specified on the drawings.
- B. Corrugated Metal Pipe (CMP): Shall conform to the requirements of AASHTO M36 specifications for corrugated metal culvert pipe or AASHTO M 196 for aluminum coated steel pipe. Pipe diameters of 18-inches or smaller shall be 14-gauge minimum. Pipe diameters from 24-inch to 48-inch shall be 12-gauge minimum. Pipe diameters of 54-inch or greater shall be 10-gauge minimum.
- C. High Density Polyethylene (HDPE) Pipe: Pipe and appurtenances shall be high density polyethylene (HDPE) conforming to the requirements of ASTM F2306/F2306M-05. The pipe shall have a smooth interior and annular-corrugated exterior.

2.2 STORM PIPE ACCESSORIES

A. Joint Materials:

1. Cement Mortar Joints: Joints shall consist of a mixture of 1 part standard portland cement, 2 parts sand, and enough water to produce a uniform mixture of proper consistency and workability that will adhere to the pipe. The cement, sand, and water shall be in conformity with the applicable provisions of Section 03301, Concrete Work. Do not use mortar that has been mixed longer than 30 minutes for making pipe joints.
2. Asphaltic Joints: Jointing compounds shall be equivalent in quality and type to GK asphaltic jointing compound. The selection by the Contractor of an asphaltic jointing compound shall be approved by the Engineer prior to the purchase or use of same. Furnish the Engineer with complete technical and construction data on the jointing compound to be approved.
3. Rubber Gasket Joints: The bell and spigot and the tongue and groove of the pipe shall be specially manufactured and prepared for the use of the type of joint selected. The rubber gaskets shall be watertight (WT) and meet the requirements of ASTM C443, ASTM F2306, AASHTO M252, or AASHTO 294.
4. O-Ring Rubber Gasket Joints: Joints shall consist of a bell and spigot type joint with an O-ring rubber gasket that is watertight (WT) meeting the requirements of ASTM F477.

- B. Couplings: Couplings shall be of the same material and as the pipe and corrugated to match the corrugations. Couplings shall provide sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joints. Use bell and spigot, split collar, or screw-on collar couplings.

2.3 STRUCTURES AND APPURTENANCES

- A. Catch basins, manholes, and area drains shall be precast concrete as shown on the Plans or as otherwise directed by the Engineer. Precast concrete shall meet the applicable requirements of ASTM C478 with a minimum $f'c = 4,000$ psi.
- B. Brick: Grade SM, ASTM C32, or concrete brick conforming to the requirements of ASTM C55, Grade N-I.
- C. Grates, Frames, And Curb Castings: Conforming to the requirements of ASTM A-48, Class 30. Machining of contact surfaces will be required so that covers and grates rest securely on the frames.
- D. Ladder Bars: Shall be made of aluminum alloy conforming to Federal Specification QQ-A-200/8.
- E. Mortar: Shall be composed of one part Portland cement and 2 parts sand (volumetric measure). Mortar that has been mixed for more than 30 minutes which has been retempered or which has "set" shall not be used in the work.

- F. Headwalls and End Sections: Shall be precast concrete as shown on the Plans or as otherwise directed by the Engineer.

PART 3 - EXECUTION

3.1 PIPELINE CONSTRUCTION

- A. Carefully protect all existing sewers, water lines, gas lines, sidewalks, curbs, gutters, pavements, electric lines, or other utilities or structures in the vicinity of the work from damage at all times. Wherever it is necessary for the proper accomplishment of the work to repair, remove, and/or replace any utility or structure, do so in accordance with the provisions set forth in the General and Supplementary Conditions.
- B. Before constructing or placing joints, demonstrate to the Engineer, by completing at least one sample joint, that the methods employed conform to the specifications and will provide a watertight joint, and further that the workmen intended for use on this phase of the work are thoroughly familiar and experienced with the type of joint proposed.
- C. Before placing sewer pipe in position in the trench, carefully prepare the bottom and sides of the trench, and install any necessary bracing and sheeting as provided in the Earthwork section.
- D. Wherever necessary to provide a satisfactory bearing surface, place concrete cradles as shown on the drawings or as directed by the Engineer. Cradles shall be of concrete with $f'c = 4,000$ psi, as defined by ACI standards, and shall conform to the dimensions shown on the detailed Plans.
- E. Tightly stretch a mason's line or wire above the ground level, parallel to and directly above the axis of the pipe to be installed; this line is to be supported at intervals of no more than 50 feet on sewers being laid on a grade of 2% or more and not exceeding 25 feet for grades of less than 2%. Determine the exact line and grade for each section of pipe by measuring down from this line to the invert of the pipe in place. Accurately place each pipe to the exact line and grade called for on the drawings. Furnish all labor and materials necessary for erecting batter boards. The use of laser beams will be allowed.
- F. Do not allow water to run or stand in the trench while pipe laying is in progress, before the joint has completely set, or before the trench has been backfilled. Do not at any time open up more trench than the available pumping facilities are able to dewater.
- G. Correct trench bottoms found to be unsuitable for foundations after pipe laying operations have been started, and bring them to exact line and grade with compacted earth as necessary.
- H. Carefully inspect each piece of pipe and special fitting before it is placed, and lay no defective pipe in the trench. Pipe laying shall proceed upgrade, starting at the lower end of the grade and with the bells upgrade.

- I. Bell holes shall be large enough to allow ample room for the pipe joints to be properly made. Cut bell holes out not more than 10 joints ahead of the pipe laying. Carefully grade the bottom of the trench between bell holes so that each pipe barrel will rest on a solid foundation for its entire length. Lay each pipe joint so as to form a close concentric joint with adjoining pipe and to avoid sudden offsets or inequalities in the flow line.
- J. Jointing operations shall follow pipe laying very closely; failure to comply with this provision will result in the Engineer stopping all pipe laying operations until jointing operations catch up.
- K. After the joints have been completed, they shall be inspected, tested, and accepted by the Engineer before they can be covered. The pipe shall meet test requirements for watertightness; immediately repair any leaks or defects discovered at any time after completion of the work. Take up any pipe that has been disturbed after joints were formed; clean and remake the joints; and relay the pipe at the Contractor's expense. Carefully protect all pipe in place from damage until backfill operations are completed.
- L. Do not begin the backfilling of trenches until the pipe in place has been inspected and approved by the Engineer. Backfilling shall be performed in accordance with the requirements provided in the Earthwork section.
- M. As the work progresses, thoroughly clean the interior of all pipe in place. On small pipe, keep a swab or drag in the pipeline, and pull forward past each joint immediately after it has been made. After laying each line of pipe, carefully inspect it, and remove all earth, trash, rags, and other foreign matter from its interior.

3.2 JOINT CONSTRUCTION

- A. Cement Mortar Joints: Roll a gasket of jute or oakum thick enough to fill completely the annular space between the bell of one pipe and the spigot of another. This gasket shall be thoroughly saturated in a cement grout composed of neat portland cement and clean water mixed to the heaviest fluid consistency that will thoroughly impregnate gasket material to the Engineer's satisfaction. Then lay the gasket in the bell in the lower 1/3 of the circumference of the joint, and cover with mortar. Insert the spigot of the pipe, and carefully drive home; then insert a small amount of mortar into the annular space around the entire circumference of the pipe.
- B. Wrap the ends of the gasket around one pipe, and solidly ram into the joint with a caulking tool. The depth of caulking shall be such as will leave a space of approximately 1-1/2 inches in pipe 18 inches and less in diameter or of 2-1/4 inches in pipe 21 inches and larger in diameter, measured from the end of the bell. Drive the mortar previously placed ahead of the gasket. Then fill the joints with Portland cement mortar. This mortar must be placed by hand; take care to fill the joint completely entirely around the pipe by pushing the mortar in by hand, using a rubber glove with fingers and a wooden caulking tool. Bevel the joints off at an angle of 45 degrees with the outside of the pipe, and protect with a wetted strip of muslin placed completely around the joint.

- C. Make joints in tongue and groove pipe with cement mortar in the manner specified above for bell and spigot pipe, except that the gasket material shall be omitted and both the outside and inside surfaces of the joints shall be wiped smooth. When modified tongue and groove pipe is used, bevel the joints off at an angle of 45 degrees with the outside of the pipe, and protect with muslin as specified above for bell and spigot pipe.
- D. Asphaltic Joints: Install asphaltic joints in accordance with the manufacturer's recommendations and specifications in respect to heating, pouring, and joint construction. When asphaltic jointing compound is used, alternate joints may be poured before the 2 sections are lowered into the trench. In such cases, the joint must be allowed to set before placing and the bottom of the trench carefully graded to provide uniform bearing after the pipes are placed in final position.
- E. Rubber Joints: Rubber gaskets and the method of joint construction shall form a flexible watertight seal and shall be in strict compliance with the manufacturer's directions and requirements. Adequately lubricate the gaskets with special cement provided for this purpose. Pipe joints shall be adequately and thoroughly driven home or seated.
- F. O-Ring Rubber Gasket Joints: O-ring rubber gasket joints shall be placed on the spigot end at least two corrugations of the spigot must insert into the bell end.
- G. Couplings: Install couplings in accordance with the manufacturer's specifications. Split collar couplings shall engage at least two full corrugations on each pipe section and screw-on collars shall be in width at least one-half the nominal diameter of the pipe.

3.3 WYES AND TEES

- A. Install wyes and tee branches in the sewer line as shown on the drawings and/or at such other locations as may be designated by the Engineer. If such branches are not to be used immediately, close them with manufacturer approved stoppers.

3.4 CONNECTIONS

- A. Make connections to all existing sewer lines as shown on the Plans or as directed by the Engineer. Make connections either by removing a section of the sewer from the existing line and inserting in the space a wye branch of the proper size or by constructing a manhole, junction box, regulator chamber, or other structure as shown on the Plans.
- B. Make connections to existing manholes or inlets by cutting a hole in the wall of the existing structure, inserting a length of pipe into the hole, filling around the pipe with concrete or mortar, and troweling the inside and outside surfaces of the joint to a neat finish. Shape or reshape the bottoms of manholes as necessary to fit the invert of the sewer pipe.

3.5 PIPE PROTECTION

- A. Construction loads may exceed design loads. These heavy loads can cause damage if construction equipment crosses over the installed pipe before adequate fill has been placed or moves too close to the trench walls, creating unbalanced loadings. Provide additional protective fill or other appropriate protection at equipment crossings.
- B. If pipe sewer has less than 1-1/2 feet of cover when completed, provide concrete protection as shown on the drawings or required by the Engineer. Place the protection in accordance with the Plans.

3.6 INSTALLATION OF STRUCTURES AND APPURTENANCES

- A. Construct inlets to the sizes, shapes, and dimensions shown on the drawings or as directed by the Engineer to meet special conditions. Excavate for structures in accordance with the applicable provisions of the Earthwork section.
- B. Where inlets are to be constructed in existing pavements and/or curbs and gutters, cut such pavements and/or curbs and gutters to a neat line with an air hammer or other suitable equipment, removing no more pavement and/or curb and gutter than is essential.
- C. Protect inlet foundations from damage by water and/or other causes. Place no concrete until the trench has been freed from water and/or mud, and maintain the trench in a reasonably dry condition during the progress of construction on structures.
- D. When the foundation has been prepared and is approved by the Engineer, construct the bottom to the required line and grade. After the bottom has been allowed to set for a period of no less than 24 hours, construct the inlet thereon, taking care to form the pipe or pipes into the walls at the required elevations.
- E. Lay brick in common bond with joints staggered from course to course. All joints at the face of wall shall be no more than 1/2 inch thick and shall be trowel struck joints to provide a clean, smooth wall surface. Wet each brick thoroughly by immersing it in water immediately before placement; lay each brick separately in a full and close joint of mortar on its bed, sides, and/or ends in one operation by shoving the brick into the mortar. Make no joints by working mortar into the joints, by grouting, or by "slushing" after the brick is in place. Brick work shall be plumb and in conformance with the drawing dimensions.
- F. Whenever work is discontinued for any purpose, rack the unfinished brick masonry back into courses, and remove all mortar from exposed surfaces. When work is resumed, clean and thoroughly wet the exposed surfaces before adding any new work.
- G. Carefully protect fresh brickwork against damage from freezing and against movement from any cause. Remove and properly rebuild any work that, in the opinion of the Engineer has been damaged by any cause either before or after backfilling.
- H. Set all castings accurately to line and grade in full cement mortar beds on the brick masonry. Unless otherwise shown on the Plans and/or directed by the Engineer, set all grate frames no less than 1 inch below the normal grade of surrounding pavement and no less than 3 inches

below the normal surface of unpaved areas; then slope the surrounding area to the grates on an approximate slope of 12:1. Mount frame in grout, secured to the top cone section to the elevation as indicated on the Plans.

- I. After the masonry and frames have time to set, but in no case less than 24 hours, the space around the drainage structure shall be backfilled and compacted to the required grade and as specified in the Earthwork section.
- J. Install headwalls and/or end sections as shown on the Plans and in accordance with the manufacturer's specifications.

3.7 FIELD QUALITY CONTROL

- A. After backfilling and the embankment are complete and prior to placing the base, the contractor shall perform deflection and alignment tests on each line of pipe. For pipe diameters of less than 30-inches, deflection testing shall be performed using a 9-vane mandrel with a diameter that is 5% less than the nominal diameter of the pipe being tested. The mandrel vanes shall be equally spaced around the central core. At the Contractor's expense, replace any line of pipe through which the mandrel does not freely pass.
- B. For pipe diameters 30-inches or greater, deflection shall be tested as described above or may be checked by other means as approved by the Engineer. Pipe with a deflection of 5% or greater of the nominal pipe diameter or with undue misalignment shall be replaced at the contractor's expense.
- C. After backfill has been placed and compacted to a depth not less than one foot above top of pipe, a visual inspection shall be made by flashing a light between manholes. Any displacement or misalignment of invert shall be corrected.
- D. Install drainage structures and pipes to the line, grade, and cross-section as shown on the Plans and with finish elevation not more than 0.04' above or below the required elevation.

3.8 CLEANUP AND PROTECTION

- A. After completing each section of storm drainage line, remove all debris and construction materials and equipment from the site of the work, grade and smooth over the surface on both sides of the line, and leave the entire right-of-way in a clean, neat, and serviceable condition.
- B. The interior of catch basins, area drains, and manholes shall be cleaned of debris and excess material, the grating or cover placed, and all unused material, equipment, tools, and debris removed from the area.

END OF SECTION 334000