PROJECT MANUAL

CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

LOWER BRUSH CREEK 42" INTERCEPTOR SEWER
CONTRACT 1

TDEC WASTEWATER PROJECT NO. 17.0413R
JOHNSON CITY ITB# 6441

SEPTEMBER 2020

BID SET

(BID DEADLINE 10/20/2020 @ 2PM ET)
OFFICE OF THE DIRECTOR OF PURCHASING OF THE CITY OF JOHNSON CITY
209 WATER STREET
JOHNSON CITY, TN 37601

PREPARED BY:

HAZEN AND SAWYER, P.C.
545 MAINSTREAM DRIVE
SUITE 320
NASHVILLE, TENNESSEE 37228
(615) 783-1515

Hazen Project # 50079-001

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Lower Brush Creek 42” Interceptor Sewer - Contract 1

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INVITATION TO BID

City of Johnson City

ITB No. 6441

Lower Brush Creek 42" Interceptor Sewer – Contract 1
City of Johnson City, Tennessee

The City of Johnson City is accepting bids for Lower Brush Creek 42" Interceptor Sewer – Contract 1 project. The project includes providing all construction supervision, labor, materials, tools, and test equipment necessary for the installation of approximately 13,425 LF of 42" gravity sewer pipe in open trench with appurtenances and 70 LF of 60" steel casing installed by auger bore. The Project is located adjacent to Watauga Road and Woodlyn Road.

Sealed bids will be received until **2:00 P.M. local time, Tuesday October 20, 2020 at the Office of the Director of Purchasing of the City of Johnson City at 209 Water Street**. All bids shall be publicly opened and read aloud at 2:00 P.M. the same day at the Office of the Director of Purchasing. Any bids received after the scheduled opening will not be considered.

Sealed bids to be mailed should be addressed as follows:

Office of the Director of Purchasing
City of Johnson City, City Services Complex
P.O. Box 2150/209 Water Street
Johnson City, TN 37604/37601

Digital copies of the Bidding Documents are available for purchase for $50.00 **from Hazen and Sawyer, 545 Mainstream Drive, Suite 320 Nashville, TN 37228, (615) 783-1515, mlawrence@hazenandsawyer.com.**

Purchase of bid documents will be non-refundable. No partial sets will be available. **NOTE the entire bid book must be returned with bid response**.

Copies of the Project Manual, including the Drawings, Specifications, and other Contract Documents may also be examined at the following locations:

1. Office of the Director of Purchasing, 209 Water Street, Johnson City, TN,37601
2. Associated General Contractors, 249 Neal Drive, Blountville, Tennessee 37617, (423) 323-7121,
3. Knoxville Builder's Exchange, 300 Clark Street, Knoxville, Tennessee 37921, (865) 525-0443,
4. Nashville Minority Business Center, 1919 Charlotte Ave, Suite 310 Nashville, Tennessee 37203, (615) 255-0432
5. Nashville Builder's Exchange, 2322 Winford Avenue, Nashville, Tennessee 37211, (615) 690-7200

Advertise Date:
September 20, 2020

A **Non-mandatory Pre-bid Conference** is scheduled at **2:00 PM local time on Tuesday, October 6, 2020** to discuss issues related to bidding the project.

Bids may be held for a period not to exceed sixty (60) days from the date of the bid opening for the purpose of reviewing the bids and investigating the qualifications of bidders prior to awarding of the contract. No bidder may withdraw their bid within sixty (60) days after the actual opening of the bid thereof.

DAVIS-BACON ACT and AMERICAN IRON AND STEEL REQUIREMENTS

This project is being funded by a State Revolving Fund loan on or after 2014 EPA Fiscal Year. The loan recipient must be in compliance with all applicable Davis-Bacon Act and American Iron and Steel requirements.

DISADVANTAGED BUSINESS ENTERPRISES (DBE) REQUIREMENTS

Any contract or contracts awarded by the Owner through this invitation for bids will be funded by a State Revolving Fund (SRF) loan from the State of Tennessee. State and Federal funds will be involved in this project, and, as a result, Bidders must comply with the SRF Loan Program's Disadvantaged Business Enterprises (DBE) requirements including contacting a minimum of 10 qualified DBE sub-contractors, professional service providers, vendors, and/or suppliers by certified mail to solicit bids. The apparent successful Bidder must submit to the Owner copies of the certified letters and return receipts prior to contract award. Neither the State of Tennessee nor any of its departments, agencies, or employees is or will be a party to this Invitation for Bids or any resulting contract(s) awarded by the Owner.

SPECIAL NOTICE TO DISADVANTAGED BUSINESS ENTERPRISES (DBE) FIRMS

All qualified Disadvantaged Business Enterprises (DBE) firms desiring to bid as a General Contractor, sub-contractor, professional service provider, supplier, or equipment vendor are encouraged to contact Ms. Marilyn Robinson at the Nashville Minority Business Center office listed above to review bidding/contract documents. Qualified Disadvantaged Business Enterprises (DBE) firms may also contact Hazen and Sawyer, 545 Mainstream Drive, Suite 320 Nashville, TN 37228, (615) 783-1515, in order to obtain a list of prospective bidding General Contractors or to obtain copies of bidding/contract documents.

All bidders must be licensed contractors as required by the Contractors Licensing Act of 1994, as amended (TCA Title 62, Chapter 6), and all requirements therein.

No bid will be opened unless the outside of the sealed envelope contains the Bid Envelope Form with the following information: (1) name of bidder, (2) contact person, and (3) telephone number. If engineering, surveying, materials testing, or other technical service providers are to be used by the CONTRACTOR, each company must be listed on the outside of the sealed bid envelope, regardless of the dollar value of work to be done by them.

Each bid shall be accompanied by a certified check or bid bond in the amount equal to five percent (5%) of the amount bid. This check or bid bond is required as a guarantee that, if the bid is accepted, a contract will be entered into and the performance thereof duly secured by an approved performance bond.

The successful bidder will be required to furnish an acceptable Performance Bond and a Payment Bond in the amount of one hundred percent (100%) of the contract price, each bond. 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 of Tennessee.

The project herein described is to be substantially completed within **540 calendar days** from the date of the Notice to Proceed with final completion 30 days thereafter as indicated in the contract. Liquidated damages for delay of completion of contract work will be assessed at $1,600 per Calendar Day.

The City of Johnson City reserves the right to waive any informality in or to reject any or all bids, and to accept the bid deemed favorable to the interest of the City of Johnson City.

The City of Johnson City is an equal opportunity affirmative action employer, drug-free workplace with policies of non-discrimination on the basis of race, sex, religion, color, national or ethnic origin, age, disability or military service.

The City of Johnson City in accordance with Title VI of the Civil Rights Act of 1964,78 Stat. 252, 42 U.S.C. 2000d to 2004d-4 and Title 49, Code of Federal Regulations, Department of Transportation, subtitle A, Office of the Secretary, Part 21, nondiscrimination in federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises 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 or national origin in consideration for an award.

BID DELIVERY

Information normally available in person at the Purchasing Department can be obtained through other methods.

Bids can be hand delivered or mailed to: Johnson City Purchasing Department; 209 Water Street; Johnson City, Tennessee 37601
Or:
Johnson City Purchasing Department; PO Box 2150; Johnson City, Tennessee 37605

BID OPENING – WEB CONFERENCE

COVID-19 UPDATE:
Solicitations will be opened publicly via a web conference only (public attendance not permitted). Information normally available in person can be obtained through other methods. Please contact us by phone or email for specific requests.

Join Zoom Meeting – ***Bid Opening***
ITB# 6441 LOWER BRUSH CREEK 42" INTERCEPTOR SEWER CONTRACT #1 PROJECT - WEB BID OPENING
Meeting ID: 846 382 6097
Passcode: Purch123

If you do not have access to a webcam, or you have no audio with your system, you may call this number to join: (646) 518-9805. Any issues accessing the zoom web meeting please call 423.975.2715 for assistance.

A **NON-MANDATORY** pre-bid conference will be held via Zoom video conference on **October 6, 2020,** local time **2:00 PM.** The conference will be held via Zoom only. Login information is as follows:

Join Zoom Meeting – ***Pre-Bid Conference***
ITB# 6441 - LOWER BRUSH CREEK 42" INTERCEPTOR SEWER - CONTRACT #1 OPTIONAL WEB PRE-BID
Meeting ID: 846 382 6097
Passcode: Purch123

If you do not have access to a webcam, or you have no audio with your system, you may call this number to join: (646) 518-9805. Any issues accessing the zoom web meeting please call 423.975.2715 for assistance.

From the
Office of the Director of
Purchasing City of Johnson City
City Services Complex
209 Water Street
Johnson City, TN
37601

ACKNOWLEDGEMENT OF REQUIREMENTS FOR BIDS, REQUESTS FOR PROPOSALS, AND CONTRACTS BETWEEN THE CITY OF JOHNSON CITY AND OTHER PARTIES AND THE REQUIREMENTS OF IRAN DIVESTMENT ACT

Name of Solicitation: _____

Solicitation Number: ITB# 6441

Name of Bidder/Proposer: _____

The Undersigned hereby acknowledges that the Bidder/Proposer has carefully reviewed the Requirements For Bids, Requests for Proposals, and Contracts between the City of Johnson City and Other Parties and the requirements of the Iran Divestment Act (Sealed Solicitations General Terms & Conditions #20), and understands that these documents are considered part of the Contract Documents and all Bids/Proposals shall be conditioned by the document.

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

Name of & Title of Signer (Print or Type): _____

_____

Signature: _____

Date: _____

Revised January 2020

COMPLETE AND RETURN WITH SOLICITATION PACKAGE

CITY OF JOHNSON CITY, TENNESSEE
http://www.johnsoncitytn.org/purchasing
SEALED SOLICITATION
GENERAL TERMS AND CONDITIONS

Read Carefully – if applicable or unless specifically noted otherwise in the solicitation documents

1. ACCEPTANCE, REJECTION AND POSTPONEMENT
Issuance of a bid/rfp/rfq does not commit the City to make an award. The City reserves the right to postpone or reject any or all bids/rfps/rfqs, to waive informalities and to accept the bid/rfp/rfq judged to be in the best interest of the City.

2. ADDENDA
Addenda will be issued to all known interested parties and posted on the City's website (listed above). All addenda issued shall become part of the solicitation documents. It is the vendor's responsibility to determine and acknowledge all addenda issued for a solicitation. No addendum will be issued less than two (2) working days prior to the solicitation opening as per TCA, Title 12, Chapter 4, Part 1, as amended

3. AWARD
An award, if made, shall be to the lowest responsible, responsive bidder(s) or best solicitation meeting quality and performance standards as described in the solicitation documents and whose bid/rfp is determined to be in the best interest of the City. The City also reserves the right to award this product/service based on other contracts in-place (state or cooperative contracts), as may be in our best interest.

4. AWARD PERIOD
The City shall have 60 days to issue a contract. Any contract past that period must be mutually agreed upon by both parties.

5. BID TABULATIONS/RFP/RFQ RESPONSES
Bid tabulations and RFP/RFQ respondent's lists will be posted and available the next business day on our above website. Click on "awarded/opened solicitations".

6. BRAND NAMES
By referencing a product or service name as "or approved equal", the City intends to establish a minimum level of quality by which alternate offers can be judged. If an alternate is offered, the vendor must include complete descriptive literature and specifications that clearly describe the item and how it differs from the referenced item. Vendor reference to literature previously submitted will not satisfy this provision. Unless specified otherwise, it is understood that the referenced product will be furnished. The City alone will determine whether an alternate is equivalent and meets the standards of quality and performance for the City's use. A sample or demonstration may be required at the expense of the vendor.

7. CONDITION STANDARDS
It is understood and agreed that any item offered or shipped as a result of this solicitation shall be new and unused and the manufacturer's latest model unless otherwise called for in the solicitation.

8. CONSTRUCTION DOCUMENTS
If a fee is required for bid documents then only those bidders of record with the issuing office are eligible to bid.

9. DEFAULT
In case of contractor default or failure to provide material or service according to the solicitation, the City may cancel this contract and acquire from another source and may recover any excess cost by (1) invoice; (2) deduction from an unpaid balance due; (3) collection against the bid and/or performance bond; or (4) a combination of the aforementioned remedies or other remedies provided by law. All costs associated with default will be borne by the contractor. The City reserves the right to remove a company in default from the active vendor list for a time period to be determined by the Director of Purchasing.

10. DELIVERY
Delivery/completion schedule must be clearly identified and realistically stated, as this may be a determining factor in the award.

11. DISCOUNT AND PAYMENT
Payment terms are Net 30 following receipt of the material or service and a correct invoice unless otherwise stated in the solicitation document. Discounts for prompt payment will not be considered in the bid evaluation for award. Partial payment will be allowed only if addressed in the solicitation.

12. EQUAL OPPORTUNITY
It is the policy of the City of Johnson City to ensure compliance with Title VI of the Civil Rights Act of 1964; 49 CFR, Part 21; related statutes and regulations to that end that no person shall be excluded from participation in or be denied benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance or any other funding source on the grounds of race, color, sex, national origin, or ancestry. By virtue of submitting a response to this solicitation, vendors agree to comply with the same non-discrimination policy.

13. EVALUATION
Bids/RFPs/RFQs will be evaluated according to the criteria set forth in the document with the degree of importance determined by the City.

14. EXAMINATION OF BIDS/RFPS/RFQS
Bids and associated documents may be examined at the opening. Only the name of the respondent is read aloud for RFPS/RFQS. All solicitations are closed for review and inspection during the evaluation period, prior to award.

15. FOB (FREE-ON-BOARD) POINT
All prices quoted shall be FOB destination, freight prepaid and allowed unless otherwise stated in the solicitation document. The seller pays and bears the freight charges and owns the goods while they are in transit. Title passes at the designated City location.

16. INDEMNIFICATION
The vendor shall guarantee and certify by submitting a response to this solicitation that if successful, they shall indemnify and defend the City against any and all claims or legal actions arising as a result of their performance of the contract, whether or not such claims relate to damages or alleged damages sustained by physical injury to contractors personnel, subcontractors, city employees or other persons, or against any lawsuits arising from alleged or actual patent infringements, and shall hold the City, its various departments, employees, and any and all persons or entities acting on its behalf harmless from the same.

17. INSPECTION
All supplies or materials purchased as a result of this solicitation are subject to inspection and rejection by the City. Rejected materials will be returned at the vendor's expense.

18. INSURANCE
The contractor shall maintain, at their expense, such insurance as required by the solicitation. Such insurance shall protect the City for claims of damages which may arise during operations under this contract whether such operations be by the Contractor or by any subcontractor or anyone directly or indirectly employed by either of them. Any required insurances shall be maintained for the term of the contract and beyond the term of the contract when so required in the solicitation.

19. IRAN DIVESTMENT ACT
Pursuant to the Iran Divestment Act Tenn. Code Ann. § 12-12-106 requires the State of Tennessee Chief Procurement Officer to publish, using creditable information freely available to the public, a list of persons it determines engage in investment activities in Iran, as described in § 12-12-105. Inclusion on this list makes a person ineligible to contract with the City of Johnson City; if a person ceases its engagement in investment activities in Iran, it may be removed from the list. The State of Tennessee list is available here: http://tennessee.gov/generalservices/article/Public-Information-library

20. LICENSES, FEES, PERMITS
The contractor is responsible for furnishing the proper licenses, fees, and permits required by law to do business with the City of Johnson City in completion of the project. All work shall be done in accordance with the latest building codes, state and federal laws relative to the contract.

21. MULTIPLE ITEM BIDS

The City will determine the successful bidder(s) either on the basis of the individual line items or the total of all items. ALL OR NONE bids must be clearly identified on the bid form and will be considered only if in the City's best interest.

22. NON-COLLUSION AGREEMENT

By submitting this solicitation, the agent representing all officers, partners, owners, representatives, employees or interested parties of the vendor's firm certifies to the best of his/her knowledge and belief this bid/proposal to the City of Johnson City, Tennessee has not been prepared in collusion with any other seller, proprietor, or manufacturer of similar products or services. The agent also certifies that the prices, terms and conditions of said bid/proposal have been arrived at independently and have not been communicated by the submitter, nor by any of the aforementioned firm associate to any other seller, proprietor, or manufacturer of similar products or services and will not be communicated prior to the official opening of said solicitation. The agent further states that no official or employee of the City of Johnson City has promised any personal, financial or other beneficial interest, either directly or indirectly, in order to influence award of this solicitation.

23. PARTS AND SERVICE

The successful vendor must be able to provide adequate parts and service for all items awarded. Service location and ability to perform may be a consideration in the award.

24. PENALTIES

Vendors may be removed from our active vendor system for any of the following:

- Failure to respond to three consecutive solicitations
- Failure to meet delivery requirements
- Failure to furnish items as a result of a solicitation
- Failure to provide service or material as a result of the award
- Offers of gratuities or favors to any City employee

25. PRE-BID MEETING ATTENDANCE

If attendance is mandatory then only those firms whose names are listed on the pre-bid attendance roster are eligible to submit a solicitation.

26. PRICING

All pricing must appear in the spaces provided on the city's form (if applicable) and be in ink or typed. Changes or corrections by the bidder/proposer must be initialed in ink by the person signing. No corrections may be made in pencil. Unit prices will prevail in case of an extension error. The City will correct math computation errors (unit price & totals). No bid may be altered or amended after bid opening time. Obvious mistakes will be given special consideration upon receipt of written request and full disclosure or evidence regarding pricing error.

27. PROPRIETARY/CONFIDENTIAL INFORMATION

Vendors are hereby notified that all information submitted as part of, or in support of, bids/proposals will be available for public inspection after award, in compliance with Tennessee Statutes unless the vendor additionally identifies a specific area or scope of data or other materials to be protected and details the reasons protection is necessary.

28. PROTEST PROCEDURE

Any protest to the award of a contract by the City of Johnson City shall be submitted in writing to the Director of Purchasing with a copy to the City Manager and delivered not later than seven (7) calendar days from the date of the city's award decision. Such protest must include a protest bond in the amount of $350 (cashier's check payable to the City of Johnson City or Cash) submitted to the Purchasing Director before the City will consider the protest. This protest bond will serve as a guarantee by the protester of the validity and accuracy of the protest. If the protest is denied by the City Manager the bond will be retained to cover costs associated with the protest.

29. QUESTIONS

Questions must be received by the City at least four (4) working days prior to the scheduled opening. No oral interpretations or instructions given by any city employee or any other person shall apply. Changes relative to any solicitation will be in writing, in the form of an addendum.

30. SAFETY STANDARDS

All manufactured items and fabricated assemblies shall comply with applicable requirements of OSHA/TOSHA and any related standards thereto.

31. SAMPLES

Samples will be furnished at no charge to the City. They will remain in the Purchasing Department for testing and evaluation until an award is made. Vendors are responsible for picking up their samples within two (2) weeks after the award. Samples not collected after that time shall become the property of the City. Samples from the successful vendor will be held until delivery is received and accepted as being equal to the sample.

32. SEALED SOLICITATION OPENINGS

Bids will be read aloud at the specified date and time as stated in the document. RFP's/RFQ'S respondent names will be read aloud. All openings are public meetings. Bidders/proposers and interested persons are invited to attend. The City reserves the right to postpone any solicitation opening under circumstances warranting such action, including but not limited to instances when the City receives fewer than two responses.

33. SIGNATURE ON BIDS

When submitting a bid, other than electronically, the bid form must contain the full name and address of the company and be signed in Ink by a person authorized to bind that company to a contract. Submission of an electronic solicitation constitutes acceptance of all terms and conditions. Unsigned paper bids will not be considered, read or tabulated. They may not be signed during or after the bid opening, even if a representative is present.

34. SUBMITTAL OF SEALED BIDS/RFPS/RFQS

Any forms furnished by the city must be completed and returned as specified in the solicitation, otherwise response will be considered as non-responsive. TELEPHONE, FACSIMILE OR E-MAIL RESPONSES WILL NOT BE ACCEPTED. Electronic receipt of bids/proposals is acceptable for those **eligible for online submittal** at: https://vrapp.vendorregistry.com/Vendor/Register/Index/johnson-city-tn-vendor-registration. **Paper submittals shall be sealed in an envelope.** No solicitation received after closing time shall be considered. The official time for paper submittals will be that of the date and time clock in the Purchasing Department. For electronic bids the official time is that posted on the website. Late submittals will not be accepted. The City of Johnson City shall not be responsible for technical difficulties experienced by vendors trying to register or submit their bid/rfp response electronically less than one hour prior to the bid/rfp opening time. If not offering a solicitation response, the vendor is encouraged to complete the "Statement of Decline" form and return prior to the opening.

35. TAXES

The City is exempt from Federal excise tax, State, and city sales tax. Contractors are not exempt from the use tax on materials and supplies used in the production of an item or in the performance of a repair or construction contract. Tax exemption certificates will be furnished upon request.

36. TERM OF CONTRACT

Unless otherwise stated, the City reserves the right to purchase like items at the same contract price for a period of one year from the award date subject to agreement of both parties. The City may cancel any contract for cause, or non-appropriation of funds, following written notification of intent.

37. WARRANTY

Unless otherwise specified by the City, all items shall be guaranteed for a minimum period of one (1) year against defects in material and workmanship.

REQUIREMENTS FOR BIDS, REQUESTS FOR PROPOSALS, AND CONTRACTS
BETWEEN THE CITY OF JOHNSON CITY
AND OTHER PARTIES

The City of Johnson City has established the following requirements for use in all bids and contracts between the City and any other person or entity. The following list is mandatory and modifies any bid, contract, or request for proposal, or conditions applicable to, signed by, or let by the City, notwithstanding anything contained in any particular conditions, contract, request for proposal, or bid to the contrary.

In general, the following provisions apply to all such contracts, bids, requests for proposals, contracts requiring bids, and bids containing contracts:

1. The City of Johnson City shall not answer to any contracting party for the furnishing of public records to a person requesting such in accordance with Tennessee law.

2. The City, while it may designate in writing a representative on a particular project, shall only be bound by a majority vote of the Board of Commissioners or by the limited authority delegated to the City Manager pursuant to City Ordinance. No personal representative of the City assigned to a particular project may bind it in excess of the dollar amounts granted to the City Manager by Ordinance, and no personal representative assigned to a particular project may bind the City for an amount equal to or less than the dollar amounts granted to the City Manager by Ordinance without the City Manager's approval.

3. The City shall not in any event waive or limit any claims for damages including but not limited to consequential damages in any contract for any reason or purpose.

4. No decision of an architect, engineer, or personal representative of the City shall be final and binding on the City, unless the City so agrees in any dispute with any

party including but not limited to an architect, a contractor, a subcontractor, an engineer, etc. If the City agrees to be bound pertaining to a dispute, then the monetary limits contained in the City's ordinances regarding the authority of the City Manager shall prevail, and any amounts exceeding the authority of the City Manager shall be referred to the Board of Commissioners for their consideration.

5. The City shall not participate in any mediation or arbitration regarding any agreement to which it is a party, and all matters left unresolved between the City and any other party, person, or entity shall be resolved in a court of competent jurisdiction in either Washington County, Tennessee, or in Federal District Court in Greeneville, Tennessee.

6. No party or other entity shall file a lien of any nature whatsoever against City property, real, personal, or mixed, no matter where that property is located. Should a party or entity contracting with the City or acting as a subcontractor or subsubcontractor file a lien against any property, real, personal, or mixed, owned by the City, then that party or entity shall take immediate steps at its own cost and expense to remove said lien, or the City shall take such steps as it deems necessary and hold the other party or entity liable for any costs and attorneys' fees associated with the lifting of said lien.

7. The City shall exercise its sole discretion before agreeing to any assignments of any contracts or subcontracts regarding any project in which the City is involved. No contract with the City shall be assignable without the City's sole, discretionary, absolute consent.

8. The City shall not be required to supply any information regarding its title to any property in which it has an interest for any purposes regarding the filing of liens.

9. The City shall not waive any claims it has in the making of final payment in any project in which it is involved. The City shall have the right to terminate any agreement to which this document is attached at any time in its sole discretion with or

without cause. In the event the City terminates with or without cause any agreement to which this document is attached, then in such event the City shall be liable only for the actual work and costs that have accrued at or before the date of the City's termination. In no event shall the City be liable for lost profits, consequential damages or incidental damages in the event it terminates a contract with or without cause.

10. Except to the extent allowed by law, the City shall not indemnify and hold harmless any other party, entity, person, their agents, employees, or anyone else in the world for any reason whatsoever.

11. The City shall not waive the rights of subrogation of its insurers or itself for any purpose whatsoever, and the City shall not cause any such endorsements to be placed on any policies to which it is a party.

12. Unless the City elects otherwise, the City shall not provide any "builders' risk" or an "all-risk" or equivalent policy for any reason whatsoever for any project in which the City has an interest, and the contractor or other such party shall assume this responsibility. That builder's risk policy provided by the contractor or other such interested party shall name the City as an additional insured. The City shall not provide boiler and machinery insurance, but shall require such insurance as applicable, depending on the parameters of whatever project is involved. The cost of boiler and machinery insurance shall be borne by the appropriate contractor, subcontractor, or other interested party. The City shall not insure the interests of any other person or entity, nor shall the City add any other person or entity as an additional insured to any of its policies.

13. The City shall not waive any rights regarding the loss of use of the City's property.

14. As to acts or failures to act or any causes of action by any party to a contract, whether that party be the architect, owner, contractor, City, etc., a cause of action shall accrue according to Tennessee law. No contract provision shall shorten the

statutes of limitations, statutes of repose, or the accrual of any causes of action which the City might have against another party or entity. No contract provision shall waive any warranties, express or implied, nor shall any contract limit the standard of care for any particular service or undertaking to that of the locality where those services or undertakings are performed.

15. Any interest to be paid by the City of Johnson City for late payments shall be at the rate of interest at which the City pays on its most recently issued bonds.

16. The City reserves to itself the right to approve the use of any tests, including but not limited to any borings, test pits, geotechnical work, environmental tests, and the like in its own sole discretion. All design professionals, consultants, subcontractors, or the like shall be duly licensed in the State of Tennessee, if licensure in the State of Tennessee is required for the work to be performed by such design professional, consultants, or subcontractors.

17. Notwithstanding any applicable choice of law or conflict of law provisions or decisions, the law of the State of Tennessee shall govern all contracts to which this document is attached.

18. The City of Johnson City shall not provide any legal advice, legal services, surveys, or procure the same for any other party.

19. Upon payment for services as rendered, all design documents and all instruments of service created by design professionals, including but not limited to architects, landscape architects, engineers, etc., shall become the property of the City of Johnson City, Tennessee. The City of Johnson City shall be allowed to use all design documents and instruments of service, including but not limited to bid drawings, shop drawings, reports, specifications, cost estimates, schematic designs, construction designs, and the like for future additions or alterations to the current project or for use in other projects. Any use of the aforementioned designs and construction documents shall be at

the City's sole risk and without liability to the design professional. The design professional's name and seal will be removed from all such design documents prior to the City's use thereof.

20. The City, as the owner of real property that is the subject of or in any way connected to any bid, request for proposal, or contract, hereby grants to the successful bidder/proposer/contractor the general management of the real property during the time that work is being performed, and the City agrees to transfer information specified in OSHA regulations at 29 CFR §1926.1203(h)(1), so that TOSHA/OSHA shall treat the successful bidder/proposer/contractor as the host employer when working in confined spaces. This paragraph applies only to those areas where the successful bidder/proposer/contractor has access to and performs work within confined spaces as defined in federal OSHA regulations. The successful bidder shall comply with all federal OSHA and state TOSHA regulations, including those regarding confined spaces.

September, 2017

BIDDER'S INSTRUCTIONS
LOWER BRUSH CREEK 42" INTERCEPTOR – Contract 1
ITB# 6441

September 2020

LICENSES, FEES, PERMITS
The Contractor is responsible for furnishing the proper licenses, fees, and permits required by law to do business in the City of Johnson City in completion of the requirements stated herein. All work shall be done in accordance with the latest building codes, state and federal laws relative to this project.

INSURANCE
The attached Insurance Checklist (which includes a section for the Insurance agent to fill-out) and General Contract Form shall be completed and returned with the bid package. Successful vendor shall provide certificate of insurance, as specified, prior to contract release by Purchasing.

MEASURE AND PAYMENT
Lump sum payment shall be NET 45 days following receipt of approved invoice.

RETAINAGE ESCROW
State Law (TCA § 66-34-104) requires a separate escrow account for retainage withheld on construction contracts and sub-contracts of $500,000 or greater. The attached Retainage Escrow Account Agreement shall be executed by the successful contractor.

DRUG FREE WORKPLACE
All bidders must execute the enclosed Drug Free Workplace Affidavit to verify compliance with TCA 50-9-113 and return same with bid response. Failure to comply with this requirement will declare that bid non-responsive.

SECTION I – PURPOSE OF THE DRUG & ALCOHOL TESTING PROGRAM
The City of Johnson City recognizes its responsibility to provide safe and efficient operations for our employees, our citizens and the general public. Our commitment to provide safe and efficient operations is shown by the implementation of programs and procedures which ensure compliance with appropriate safety measures, as well as the letter and intent of all applicable laws and regulations. There is sufficient evidence to conclude that the use of illegal drug/alcohol; drug/alcohol dependence and drug/alcohol abuse seriously impairs an employee's performance and general physical and mental health. The illegal possession and use of drugs, alcohol and/or narcotics by employees of the City is a crime in this jurisdiction and is clearly unacceptable. Therefore, the City of Johnson City has adopted this written policy to ensure an employee's fitness for duty as a condition of employment; to ensure the drug tests and alcohol tests are conducted on safety-sensitive positions in the categories of: pre-employment, random testing, suspicion testing, and return-to-duty testing.
To comply with TCA Title 50 Chapter 9 Part 1, all bidders and/or those proposing to do service with the City must have a testing program of the same or better than the requirements of the City of Johnson City.

STATE CONTRACTORS LICENSE
Bidder must be a licensed contractor in the State of Tennessee, as required by the Contractor's Licensing Act of 1994, State of Tennessee. The attached "Contractors Envelope Form" must be completed and attached to the outermost bid submittal envelope. A copy of Bidder's State Contractor's License shall be included with bid package.

BIDDER'S ELIGIBILITY
Bids will be accepted from Bidder's of Record only (obtained bidding documents through the City's Architect, Hazen and Sawyer Engineering). **Bidder must include a copy of STATE CONTRACTOR'S LICENSE with bid submittal.**

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SECTION 00300a

INSTRUCTIONS TO BIDDERS

ITB # 6441

1. DEFINED TERMS

Terms used in these Instructions to Bidders which are defined in the Standard General Conditions of the Construction Contract, EJCDC C-700 (2007 edition) shall have the meanings assigned to them in the General Conditions as modified, changed, added to or deleted by the Supplementary Conditions, Section 00800.

2. QUALIFICATIONS OF BIDDERS

To demonstrate his qualifications for the Project, each Bidder shall submit with his Proposal satisfactory proof of his qualifications to perform in a satisfactory manner and within the time specified in the Proposal, all of the work covered by the Contract Documents. Bidder shall submit, among other items, information and evidence with respect to the following:

2.1 That he has a well-trained and competent organization which has done work of similar character and value;

2.2 That he will have available to do the work at the proper time or times, adequate equipment and facilities listing such equipment and facilities in such detail that they can be quickly and accurately checked;

2.3 That he has ample repair parts and supplies to maintain all equipment and facilities properly and with a minimum of delay;

2.4 If the Bidder is a corporation, the names of all corporate officers and the name of the executive who will give his personal attention to the work;

2.5 Detailed financial information relating to the resources of the Bidder.

2.6 The Contractor shall self-perform work amounting to at least fifty percent (50%) of the Contract, using **his own personnel and equipment (owned or rented)** without written approval of the Owner prior to submitting bids. No portion of the Contract shall be sublet, assigned, or otherwise disposed of without with the expressed written consent of the Owner. **If the Contractor fails to demonstrate to the Owner in its Bid submittal information that he has the ability to perform the specified percentage of the Work with his own personnel and equipment, his Bid may be considered non-responsive.** The Contractor shall submit with its Bid, data supporting its ability to comply with this requirement on the Bid Qualification Form.

2.8 Each Bidder agrees to waive any claim it has or may have against the Owner, the Architect/Engineer, and their respective employees, arising out of or in connection with the administration, evaluation, or recommendation of any Bid.

Forms for submitting data and information relating to the financial responsibility of the Bidder are attached to the Proposal form and Bidders are requested to use such forms for the purpose intended. All information will be kept strictly confidential and used in determining whether the Bidder is qualified to do work set forth in the Contract Documents.

3. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

3.1 Before submitting his Bid, each Bidder must:

3.1.1 examine the Contract Documents thoroughly;

3.1.2 visit the site to familiarize himself with local conditions that may in any manner affect performance of the work;

3.1.3 familiarize himself with federal, state, and local laws, ordinances, rules and regulations affecting performance of the work;

3.1.4 carefully correlate his observations with the requirements of the Contract Documents; and

3.1.5 notify Engineer of all conflicts, errors, or discrepancies in the Contract Documents.

3.1.6 Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees that receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

3.1.7 Contractor shall make every effort to install and maintain Erosion and Sediment Control BMPs to minimize siltation and erosion during construction.

3.2 Reference is made to Section 01010 - Summary Of Work of the Specifications for the identification of those surveys and investigation reports of subsurface or latent physical conditions at the site or otherwise affecting performance of the work which have been relied upon by Engineer in preparing the Drawings and Specifications. Subsurface data are offered in good faith solely for the purpose of placing the Bidder in receipt of all information available to Owner and Engineer and in no event is to be considered part of the Contract Documents. Before submitting his Bid, each Bidder will, at his own expense, make such additional

surveys and investigations as he may deem necessary to determine his Bid Price for performance of the work within the terms of the Contract Documents.

The geotechnical report is included for information only in the Appendix. The Contractor shall be responsible for any damage (including damage to any underground utility) as a result of additional subsurface investigations.

3.3 The submission of a Bid will constitute an incontrovertible representation by the Bidder that he has complied with every requirement of this Article 3.

4. INTERPRETATION

4.1 All questions about the meaning or intent of the Contract Documents shall be submitted in writing to Hazen and Sawyer P.C. at 545 Mainstream Dr, Suite 320, Nashville, TN 37228, Attn: Michael Orr, PE. (615) 783-1515, morr@hazenandsawyer.com
Replies will be issued by Addenda, e-mailed, mailed, or delivered to all parties recorded by the Engineer as having received the bidding documents. Questions received less than **ninety-six (96) hours prior** to the date for opening of Bids will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

4.2 Addenda, when issued, will be on file at the offices of the Owner and Engineer at least twenty-four (24) hours before Bids are opened. **It shall be the Bidder's responsibility to make inquiry as to the Addenda issued.** All such Addenda shall become part of the Contract Documents and all Bidders shall be bound by such Addenda, whether or not received by the Bidders.

5. BID SECURITY

Each Bid must be accompanied by a Bid security which shall not be less than five (5%) percent of the Bid amount. The required security must be in the form of cash, a certified or bank cashier's check on some bank or trust company insured by the Federal Deposit Insurance Corporation made payable to Owner, or a Bid Bond issued by a surety licensed to conduct business in the state where the Project is located. The Bid security of the successful Bidder will be retained until he has executed the Contract and furnished the required Contract security, whereupon it will be returned; if he fails to execute and deliver the Contract and furnish the required Contract security within fifteen (15) calendar days of the Notice to Award, Owner may annul the Notice of Award and the Bid security of the Bidder will be forfeited. The Bid security of any other Bidder whom Owner believes to have a reasonable chance of receiving the Award may be retained by Owner until the earlier of (1) the seventh day after the executed Contract is delivered by the Owner to Contractor and the required Contract security is furnished or (2) the sixty-first day after Bid opening. Bid security of other Bidders will be returned within ten (10) days of the Bid opening.

6. CONTRACT TIME

The number of days for completion of the work (the Contract Time) is set forth in the Contract. The Contractor shall commence work on the date specified in the Notice to Proceed, and he shall complete the work within the stipulated Contract time.

7. SUBCONTRACTORS

7.2 The apparent low Bidder and any other Bidder so requested shall within thirty (30) days after the Bid opening submit to the Owner an experience statement with pertinent information as to similar projects and other evidence of qualifications for each identified Subcontractor, person or organization who will furnish labor or materials including the names of equipment manufacturers. If Owner or Engineer after due investigation has reasonable objection to any proposed Subcontractor, other person or organization, he may before giving the Notice of Award request the apparent low Bidder to submit an acceptable substitute without an increase in his Bid Price. Any Subcontractor, other person or organization so listed and to whom the Owner or Engineer does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to the Owner and Engineer. This does not remove responsibilities for said Subcontractor, supplier, etc., to comply with the Contract Specifications.

7.3 Contractor shall not be required to employ any Subcontractor, other person or organization against whom he has reasonable objection.

8. PROPOSAL FORM

8.1 Proposals shall be submitted on the Proposal Form furnished with the Contract Documents.

8.2 All blank spaces for Bid prices in the Proposal shall be properly completed in ink in both words and numerals. In case of conflict between the Price in words and its equivalent shown in numerals, the words will take precedence. PROPOSALS SHALL NOT BE CONDITIONAL, LIMITED OR RESTRICTED IN ANY WAY. No zero bids will be allowed.

8.3 Bids by corporations must be executed in the corporate name by the president or vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

8.4 Bids by partnership must be executed in the partnership name and signed by a partner, his title must appear under his signature and the official address of the partnership must be shown below the signature. The Owner reserves the right to request submission of partnership documents to determine the authority of the partner to execute the instrument.

8.5 All names must be printed in ink below the signature.

8.6 The Bid shall contain an acknowledgement of receipt of all Addenda (the numbers of which shall be filled in on the Proposal form).

8.7 Enter Contractor's license number where called for in the Proposal.

9. SUBMISSION OF PROPOSALS

9.1 Proposals shall be submitted at the time and place indicated in the Notice to Bidders and shall be included in an opaque sealed envelope, marked with the Project title and name and address of the Bidder. Contractor's license number and accompanied by the Bid security and other required documents. No Proposal will be considered unless filed on or before the time and at the place designated in the Notice to Bidders. Proposals received after the time set for their receipt will be returned unopened.

9.2 Proposals sent by mail should be registered mail. The sealed Proposal, marked as indicated above, should be enclosed in an additional sealed envelope similarly marked and addressed to:

Office of the Director of Purchasing
City of Johnson City, City Services Complex
209 Water Street
Johnson City, TN 37601

Mark envelope per Section 00430, State Contractors Licensing Information Bid Envelope Form. Proposals sent by mail and arriving after the time for opening of Bids shall not be considered as valid Bids. In such instances, the Bidder shall have no claim against the Owner.

9.3 THE FOLLOWING FORMS AND DOCUMENTATION SHALL BE COMPLETELY FILLED OUT AND SUBMITTED WITH THE BIDS:

1) Entire Bid Book
2) Acknowledgement of Requirements for Bids
3) Contractor Bid Envelope
4) Insurance Checklist
5) Legal Status of Bidder
6) Bidder’s Affidavit
7) Bid Schedule
8) Bid Qualification Form
9) Authentication of Bid and Statement of Non-Collusion and Non-Conflict of Interest
10) Equal Employment Agreement
11) Bid Bond or other security

Failure to submit all of the above forms with the Proposal shall be just cause for rejection of the Proposal by the Owner.

10. MODIFICATION AND WITHDRAWAL OF PROPOSALS

10.1 Written or telegraphic modifications of Proposals may be accepted if received in accordance with the requirements for the submission of Proposals as provided in Article 9 above. Bidders are cautioned that if in the opinion of the Owner or the Engineer such modifications are not explicit, or are in any sense subject to misinterpretation, then the Proposal so amended or modified will be subject to rejection.

10.2 Any Bidder upon his properly notarized written request will be given permission to withdraw his Proposal prior to the time scheduled for the opening of Bids. At the time of opening of the Proposals, when such Proposal is included, it will be returned to the Bidder unread. Negligence on the part of the Bidder in preparing his Proposal confers no right for the withdrawal of the Proposal after it has been opened.

11. OPENING OF BIDS

11.1 Proposals will be received and Bids publicly opened and read at the time(s) and place indicated in the Notice to Bidders.

12. BIDS TO REMAIN OPEN

12.1 All Bids shall remain open for sixty (60) days after the day of the Bid opening, but Owner may, in his sole discretion, release any Bid and return the Bid security prior to that date.

13. AWARD OF CONTRACT

13.1 Owner reserves the right to reject any and all Bids and waive any and all informalities, and the right to disregard all nonconforming or conditional Bids or counter Proposals.

13.2 In evaluating Bids, Owner shall consider the qualifications of the Bidders, whether or not the Bids comply with the prescribed requirements, and alternates and installed prices as requested in the Proposal forms. The Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the work as to which the identity of Subcontractors and other persons and organizations must be submitted, as required by Article 7. The Owner may conduct such investigations as deemed necessary to establish the responsibility, qualifications, and financial ability of the Bidders, proposed Subcontractors and other persons and organizations to do the work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time. Owner reserves the right to reject the Bid of any Bidder who does not pass any such evaluation to Owner's satisfaction.

13.3 If a Contract is to be awarded, it will be awarded to the lowest responsible Bidder whose qualification evaluation by City’s Engineer indicates to the Owner that the Award will be in the best interest of the Project.

13.4 The Owner will give the apparent successful Bidder a Notice of Award within sixty (60) days after the day of the Bid opening. The successful Bidder shall execute and return to the Engineer the Contract within fifteen (15) calendar days of the date of Notice of Award of Contract.

13.5 In addition, the successful Bidder, within the period stipulated in Paragraph 13.4, shall procure, execute and deliver to the Owner and maintain, at his own cost and expense, a 100%Performance Bond and a 100% Payment Bond as specified in the Supplementary Conditions.

13.6 Failure or refusal of the Bidder whose Proposal is accepted to execute the Contract as hereinbefore provided shall constitute a breach by such Bidder of the Contract created by the acceptance of the Proposal, and in such event, the Owner at his option, may determine that such Bidder has abandoned the Contract. Thereupon such Bidder's Proposal and the acceptance thereof shall be null and void. It is understood by the Bidder, in the event of the annulment of the Award, that the amount of the cash, certified check, or Bid Bond, submitted with the Proposal shall be forfeited to the use of the Owner, not as a penalty, but as liquidated damages.

14. MEETINGS

14.1 Pre-bid Meeting

A **NON-MANDATORY** pre-bid conference will be held on October 6, 2020 at 2PM via Zoom conference to discuss the requirements of the Contract Documents. Zoom video conference login information is as follows.

Join Zoom Meeting
ITB# 6441 - LOWER BRUSH CREEK 42" INTERCEPTOR SEWER - CONTRACT #1 OPTIONAL WEB PRE-BID

Meeting ID: 846 382 6097
Passcode: Purch123

If you do not have access to a webcam, or you have no audio with your system, you may call this number to join: (646) 518-9805. Any issues accessing the zoom web meeting please call 423.975.2715 for assistance.

- END OF SECTION -

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Disadvantaged Business Enterprise (DBE) Requirements for State Revolving Fund Loans Awarded after May 27, 2008

GUIDANCE DOCUMENT

Items included in the Guidance Document:

- **General Contract Administration Provisions Table**
- **Six Good Faith Efforts, Purpose and Definitions Table**
- **List of DBE Forms for Loans Awarded After May 27, 2008**

GENERAL CONTRACT ADMINISTRATION PROVISIONS—www.epa.gov			
Requirement	**Circumstance**	**Responsible Party:**	**Submitted To:**
A **Loan Recipient** must be notified in writing by its **Prime Contractor** prior to any termination of a **DBE Subcontractor** for convenience by the **Prime Contractor**.	Termination of a **DBE Subcontractor** for convenience by the **Prime Contractor**	**Prime Contractor**	**Loan Recipient**
A **Loan Recipient** must require its **Prime Contractor** to pay its **Subcontractor** for satisfactory performance no more than 30 days from the **Prime Contractor's** receipt of payment from the **Loan Recipient**.	**DBE Subcontractor's** satisfactory performance	**Loan Recipient** **Prime Contractor**	**DBE Subcontractor**
If a **DBE Subcontractor** fails to complete work under the subcontract for any reason, the **Loan Recipient** must require the **Prime Contractor** to employ the **Six Good Faith Efforts** (see Table below) if soliciting a replacement **Subcontractor**.	**DBE Subcontractor** fails to complete work under the subcontract for any reason and will be replaced	**Loan Recipient** **Prime Contractor**	**SRF Loan Program**
A **Loan Recipient** must require its **Prime Contractor** to employ the **Six Good Faith Efforts** (see Table below) even if the **Prime Contractor** has achieved its fair share objectives.	Employment of the **Six Good Faith Efforts**	**Loan Recipient** **Prime Contractor**	**SRF Loan Program**
Inclusion, completion, and/or transmittal of required **DBE Forms** as instructed below: **Loan Recipient Requirements** **Bidder Requirements** **DBE Participation/Certification Summary** **Advertisement for Bids and Publisher's Affidavit** 10 Certified Letters and Return Receipts to certified **DBEs** **Good Faith Letter** **Prime Contractor's Notice Letter** for EPA Form 6100-2 **EPA Form 6100-2** **EPA Form 6100-3** **EPA Form 6100-4**	---	**Loan Recipient** **Prime Contractor** **DBE Subcontractor**	See instructions below and on Forms

SIX GOOD FAITH EFFORTS—www.epa.gov	
PURPOSE	The Good Faith Efforts are required methods employed by all EPA financial assistance agreement recipients to ensure that all disadvantaged business enterprises (DBEs) have the opportunity to compete for procurements funded by EPA financial assistance dollars.
Definitions	
EFFORT 1	Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.
EFFORT 2	Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
EFFORT 3	Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.
EFFORT 4	Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
EFFORT 5	Use the services and assistance of the Small Business Administration (SBA) and the Minority Business Development Agency of the Department of Commerce.
EFFORT 6	If the **Prime Contractor** awards subcontracts, require the **Prime Contractor** to take the steps in the Good Faith Efforts 1 through 5 (above) and in the General Contract Administration Provisions (above).

Disadvantaged Business Enterprise (DBE) Requirements
for
State Revolving Fund Loans Awarded after May 27, 2008

GUIDANCE DOCUMENT

DBE FORMS FOR SRF LOANS AWARDED AFTER MAY 27, 2008—www.epa.gov				
Form	**Requirement**	**Provided By:**	**Completed By:**	**Submitted To:**
List of certified **DBE** contractors, subcontractors, supplies vendors, equipment vendors, and service providers	Keep list with project files/information for duration of project	**SRF Loan Program**	---	---
Loan Recipient's Requirements regarding DBEs	Include this information sheet in the Information for Bidders section of bid documents	**SRF Loan Program**	---	To be included in the contract specifications book
Bidder's Requirements regarding DBEs	Include this information sheet in the Information for Bidders section of bid documents	**SRF Loan Program**	---	To be included in the contract specifications book
Loan Recipient's Certification and Summary of **DBE** Participation	To be completed and submitted with the Authority-to-Award/ Bid Package. The SRF Loan Program must be notified of any changes, additions, or deletions to the contract during construction.	**SRF Loan Program**	**Loan Recipient**	**SRF Loan Program**
Advertisement for Bids and **Publisher's Affidavit**	**DBE** solicitation information must be included in the actual advertisement for bids. A Publisher's Affidavit (signed, original, notarized certification of publication) denoting the actual published date of the advertisement will be submitted to the SRF Loan Program as part of the Authority-to-Award/Bid Package documents.	An example advertise-ment with appropriate **DBE** language is supplied to the Loan Recipient by the **SRF Loan Program**	**Loan Recipient**	A copy of the actual advertisement and a Publisher's Affidavit will be submitted to the **SRF Loan Program** as part of the Authority-to-Award/Bid Package documents
10 Certified Letters and **Return Receipts** to potential certified DBE subcontractors, supplies vendors, service providers, and/or equipment vendors	These certified letters and copies of the corresponding return mail receipts are submitted with the completed **Loan Recipient's DBE Participation and Certification Summary Form.**	**Prime Contractor and/or Loan Recipient**	**Loan Recipient**	SRF Loan Program as part of the Authority-to-Award/Bid Package documents
Good Faith Letter	If **no DBE** participation is obtained for the contract, the "Good Faith" letter must be written.	Form letter provided by the **SRF Loan Program**	**Loan Recipient**	**SRF Loan Program**

Disadvantaged Business Enterprise (DBE) Requirements
for
State Revolving Fund Loans Awarded after May 27, 2008

GUIDANCE DOCUMENT

DBE FORMS FOR SRF LOANS AWARDED AFTER MAY 27, 2008—www.epa.gov				
Form	**Requirement**	**Provided By:**	**Completed By:**	**Submitted To:**
Prime Contractor's Notice Letter for EPA Form 6100-2	The **Prime Contractor** must submit the Notice Letter to verify that Form 6100-2 was supplied to all **DBE Subcontractors** participating in the contract.	**SRF Loan Program**	**Prime Contractor**	**Loan Recipient** for inclusion in the Authority-to-Award / Bid / Proposal package
EPA Form **6100-2**	**Loan Recipient** required to have **Prime Contractors** provide form to **DBE Subcontractors** This form gives a **DBE Subcontractor** the opportunity to describe the work the **DBE Subcontractor** received from the **Prime Contractor**, how much the **DBE Subcontractor** was paid, and any other concerns the **DBE Subcontractor** might have.	**Loan Recipient** **Prime Contractors**	**DBE Subcontractors**	**EPA DBE Coordinator** at the conclusion of **DBE Subcontractor** participation in the project (Address on Form)
EPA Form **6100-3**	**Loan Recipient** required to have **Prime Contractors** provide form to **DBE Subcontractors** This form captures an intended **Subcontractor's** description of work to be performed for the **Prime Contractor** and the price of the work submitted to the **Prime Contractor**.	**Loan Recipient**	**Prime Contractors** **DBE Subcontractors**	**Loan Recipient** for inclusion in the Authority-to-Award / Bid / Proposal package
EPA Form **6100-4**	**Loan Recipient** required to have **Prime Contractors** complete the form This form captures the **Prime Contractor's** intended use of an identified **DBE Subcontractor** and the estimated dollar amount of the subcontract.	**Loan Recipient**	**Prime Contractors**	**Loan Recipient** for inclusion in the Authority-to-Award / Bid / Proposal package

STATE REVOLVING FUND LOAN PROGRAM

Loan Recipient's Requirements for Solicitation and Documentation of Disadvantaged Business Enterprises (DBE) Participation on State Revolving Fund (SRF) Projects

A goal-oriented system has been established to promote **Disadvantaged Business Enterprises (DBE)** participation by providing construction services, professional services, supplies, and/or equipment on SRF Loan-funded water and wastewater projects. It is the Loan Recipient's responsibility to ensure that Bidders make a good faith effort during the bidding phase to solicit for subcontractor participation by **DBE** subcontractors, service professionals, suppliers, and/or equipment vendors on all SRF-funded projects.

DEFINITIONS

DBE - Minority Business Enterprise (MBE): A qualified socially and economically disadvantaged minority-owned business certified by any State or Federal agency, such as the Tennessee Department of Transportation, U.S. EPA's Office of Small and Disadvantaged Business Utilization, or the U.S. Small Business Administration.

DBE - Women's Business Enterprise (WBE): A qualified independent business at least 51% owned by a woman or women and certified by any State or Federal agency such as the Tennessee Department of Transportation, U.S. EPA's Office of Small and Disadvantaged Business Utilization, or the U.S. Small Business Administration.

Fair-Share Goals: The MBE fair-share goal is 2.6% for construction and 5.2% for supplies, services, and equipment. The WBE fair share goal is 2.6% for construction and 5.2% for supplies, services, and equipment.

INSTRUCTIONS TO LOAN RECIPIENTS

Pre-Bid Requirements

Loan Recipients must include the SRF Loan Program's "Bidder's Requirements for Solicitation and Documentation of **DBE** Participation on SRF-Funded Projects" information sheet in the Information for Bidders section of bid documents. Loan Recipients must also ensure that Bidders take the following affirmative steps that constitute a good-faith effort to secure **DBE** participation:

- Include certified **DBEs** on solicitation lists whenever they are potential sources,
- Divide construction contracts into subcontracts, when economically feasible, to encourage maximum participation by **DBEs**,
- Establish delivery schedules, where requirements of the work permit, that encourage participation by **DBEs**,
- Use the services and assistance of the Office of Minority Business Enterprises of the U.S. Department of Commerce, or the U.S. EPA's Office of Small and Disadvantaged Business Utilization. For assistance or information, Bidders may be referred to:

Tennessee Department of Transportation
Small Business Development
505 Deaderick Street, Suite 1800
Nashville, TN 37243-0347
(615) 741-3681
http://www.tdot.state.tn.us/construction/DBE%20list/dbe_list.pdf

Mr. W. Clinton Smith, District Director
U.S. Small Business Administration
50 Vantage Way, Suite 201
Nashville, TN 37228
(615) 736-5881
http://pro-net.sba.gov/

Ms. Jeanette L. Brown, Director
U.S. Environmental Protection Agency
Office of Small and Disadvantaged Business Utilization
1200 Pennsylvania Avenue, N.W. (1230A)
Washington, D.C. 20460
(202) 564-4100 http://www.epa.gov/osdbu/

POST-BID REQUIREMENTS

Whether or not DBE participation was obtained, the Loan Recipient must complete the **"Loan Recipient's Certification and Summary"** form for every contract detailing whether or not **DBE** participation of subcontractors, professional service providers, suppliers, and/or equipment vendors was obtained. The **"Loan Recipient's Certification and Summary"** form must be submitted to the Administrative Section of the SRF Loan Program prior to the award of any construction contract(s) along with the newspaper **advertisement**, a **Publisher's Affidavit**, and **return receipts** and copies of the **certified letters** that were mailed to a minimum of 10 qualified **DBEs**.

STATE REVOLVING FUND LOAN PROGRAM

Loan Recipient's Requirements for Solicitation and Documentation
of
Disadvantaged Business Enterprises (DBE) Participation
on State Revolving Fund (SRF) Projects

If DBE participation was obtained, the **"Loan Recipient's Certification and Summary"** form must clearly indicate whether **DBE** participation was obtained from either a subcontractor, professional service provider, supplier, and/or equipment vendor participation; identify the **DBE** firm(s) to be used; and certify that the **DBE** firm(s) is a certified **DBE**. In addition to the **"Loan Recipient's Certification and Summary"** form, the Loan Recipient must include in the submittal to the SRF Loan Program, copies of the **Prime Contractor's Notice Letter for EPA Form 6100-2**, **EPA Form 6100-3**, and **EPA Form 6100-4**.

If no DBE participation was obtained, the Loan Recipient must submit a separate letter documenting that a "**good-faith effort**" was made to secure **DBE** participation. This letter is submitted along with the above-mentioned **"Loan Recipient's Certification and Summary"** form, newspaper **advertisement**, **Publisher's Affidavit**, **return receipts,** and copies of the **certified letters.** The SRF Loan Program provides a template to the Loan Recipient for this letter.

This documentation is the only form of documentation that will be accepted by the SRF Loan Program. Failure to provide the required documentation may result in a delay of the SRF Loan Program's approval of the Authority-to-Award/Bid Package, thereby delaying the award of the construction contract(s).

The Loan Recipient should direct all inquiries regarding the SRF Loan Program's requirements for **DBE** solicitation and documentation to Dr. Bagher Sami at (615) 532-0501, bagher.sami@tn.gov, or the following address:

Dr. Bagher Sami, Manager
Administrative and Financial Section
Tennessee State Revolving Fund Loan Program
WRS - Tennessee Tower, 12th Floor
312 Rosa L. Parks Avenue
Nashville, TN 37243

STATE REVOLVING FUND LOAN PROGRAM

Loan Recipient's Good Faith Effort Letter for DBE Participation

(Insert on Loan Recipient's Letterhead)

(Date)

Dr. Bagher Sami, Manager
Administrative and Financial Sections
State Revolving Fund Loan Program
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 12th Floor
Nashville, TN 37243

RE: Good Faith Effort – Disadvantaged Business Enterprises (DBE) Participation
City/County/UD/Authority (??? County), Tennessee
Loan No. SRF/CWA/CGA/DWF/DWA/DGA 20??-???
Contract No. ????, Contract Description

Dear Dr. Sami:

This letter is to inform you that the City/County/UD/Authority did, in good faith, encourage Disadvantaged Business Enterprises (DBE) to participate in the above referenced project by placing a special notice to Disadvantaged Business Enterprises (DBE) firms in both the invitation to bid and the public advertisement for bids. The City/County/UD/Authority, through the consulting engineer, (A/E Consulting Firm), sent a copy of the invitation to bid and a set of contract documents to the Office of Minority Business Enterprises. The City/County/UD/Authority also sent certified letters, return receipts requested, to a minimum of ten (10) DBE potential subcontractors, professional service providers, suppliers, and equipment vendors requesting DBE participation through their office, A/E, or their contractor. The consulting engineer on this project is (Name), (Firm).

We have not received any DBE participation; we believe we have done a good faith effort.

If you have any questions, please don't hesitate to contact us.

Sincerely,

(Authorized Representative Name)
(Authorized Representative Title)

cc: (A/E Consultant Name and Firm)

STATE REVOLVING FUND LOAN PROGRAM

Loan Recipient's Certification and Summary
of
Disadvantaged Business Enterprises (DBE) Participation

SRF Loan Recipient: _____ SRF Loan No. _____

INSTRUCTIONS TO SRF LOAN RECIPIENTS

The SRF Loan Recipient's Authorized Representative must clearly indicate the Contractor's **Disadvantaged Business Enterprises (DBE)** participation results by placing a check in the appropriate box below. The remainder of the form must be completed if **DBE (Minority Business Enterprise-MBE or Women's Business Enterprise –WBE)** participation was obtained. The form must be signed and dated and returned to Dr. Bagher Sami of the Administrative Section of the SRF Loan Program.

The **completed Form** must be accompanied by **copies of the certified letters** sent from the selected Bidder to a minimum of 10 qualified DBE potential subcontractors, supplies vendor, services provider, and/or equipment vendors, and **copies of the corresponding return mail receipts**.

The SRF Loan Program must be notified of any changes, additions, or deletions to the contract during construction.

☐ **No, Disadvantaged Business Enterprises (DBE) participation was not obtained for this SRF-funded project.** I certify that a good-faith effort was made to solicit **DBE** participation in accordance with the four affirmative steps outlined in the SRF Loan Program's Requirements for Solicitation and Documentation of **DBE** Participation on SRF-Funded Projects. A letter documenting that a good–faith effort was made to secure **DBE** participation has been provided to the SRF Loan Program.

OR

☐ **Yes, Disadvantaged Business Enterprises (DBE) participation was obtained for this SRF-funded project.** I certify that the **DBE** firms participating in this SRF-funded project are qualified in accordance with the SRF Loan Program's Requirements for Solicitation and Documentation of **DBE** Participation on SRF-Funded Projects. Below is a listing of firms to be utilized and the amounts of their respective participation.

1. **DBE type (circle one): Subcontractor, Supplies Vendor, Service Provider, Equipment Vendor**
DBE Name: _____
Address: _____
Subcontract Amount: $ _____ **MBE** ___ **WBE** ___ **% of Contract $:** _____ **%**

2. **DBE type (circle one): Subcontractor, Supplies Vendor, Service Provider, Equipment Vendor**
DBE Name: _____
Address: _____
Subcontract Amount: $ _____ **MBE** ___ **WBE** ___ **% of Contract $:** _____ **%**

3. **DBE type (circle one): Subcontractor, Supplies Vendor, Service Provider, Equipment Vendor**
DBE Name: _____
Address: _____
Subcontract Amount: $ _____ **MBE** ___ **WBE** ___ **% of Contract $:** _____ **%**

4. **DBE type (circle one): Subcontractor, Supplies Vendor, Service Provider, Equipment Vendor**
DBE Name: _____
Address: _____
Subcontract Amount: $ _____ **MBE** ___ **WBE** ___ **% of Contract $:** _____ **%**

PARTICIPATION SUMMARY

Total SRF Loan Amount: $ _____ **Total Construction Contract Amount: $** _____

Total MBE Participation: $ _____ **Total WBE Participation: $** _____

_____ _____
Signature and Title of SRF Loan Recipient's Authorized Representative Date

STATE REVOLVING FUND LOAN PROGRAM

Bidder's Requirements for Solicitation and Documentation of Disadvantaged Business Enterprises (DBE) Participation

A goal-oriented system has been established to promote **Disadvantaged Business Enterprises (DBE)** participation by providing construction services, professional services, supplies, and/or equipment on SRF Loan-funded water and wastewater projects. It is the Bidder's responsibility to make a good faith effort to secure participation by **DBE** subcontractors, professional service providers, suppliers, and/or equipment vendors.

DEFINITIONS

DBE - Minority Business Enterprise (MBE): A qualified socially and economically disadvantaged minority-owned business certified by any State or Federal agency, such as the Tennessee Department of Transportation, U.S. EPA's Office of Small and Disadvantaged Business Utilization, or the U.S. Small Business Administration.

DBE - Women's Business Enterprise (WBE): A qualified independent business at least 51% owned by a woman or women and certified by any State or Federal agency such as the Tennessee Department of Transportation, U.S. EPA's Office of Small and Disadvantaged Business Utilization, or the U.S. Small Business Administration.

Fair-Share Goals: The MBE fair-share goal is 2.6% for construction and 5.2% for supplies, services, and equipment. The WBE fair share goal is 2.6% for construction and 5.2% for supplies, services, and equipment.

INSTRUCTIONS TO BIDDERS

Pre-Bid Requirements

All Bidders must send letters by certified mail with return receipt requested to a minimum of 10 certified **DBE** subcontractors, professional service providers, suppliers, and/or equipment vendors to solicit their subcontract participation in the work. Lists of certified **DBE** firms may be obtained from various State and Federal agencies, including the following:

Tennessee Department of Transportation
Small Business Development
505 Deaderick Street, Suite 1800
Nashville, TN 37243-0347
(615) 741-3681
http://www.tdot.state.tn.us/dbedirectinternet/Vendor.aspx

Mr. W. Clinton Smith, District Director
U.S. Small Business Administration
50 Vantage Way, Suite 201
Nashville, TN 37228
(615) 736-5881
http://pro-net.sba.gov/

U.S. Environmental Protection Agency
Office of Small and Disadvantaged Business Utilization
1200 Pennsylvania Avenue, N.W. (1230A)
Washington, D.C. 20460
(202) 564-4100
http://www.epa.gov/osdbu/

Post-Bid Requirements

Whether or not DBE participation was obtained, the successful Bidder (Prime Contractor) must maintain supporting documents such as certification lists, solicitation documents, letters of intent, contracts, etc., for the duration of the project.

If DBE participation was obtained, the apparent successful Bidder must identify to the Loan Recipient all **DBE** firms to be utilized on the contract and the respective **DBE** type--subcontractors, supplies vendors, service providers, and/or equipment vendors (see "Loan Recipient's Certification and Summary" form)**.** Copies of the State's or Federal agency's **DBE** certification list(s) identifying that the **DBE** firms are certified minority or women's business enterprises must be provided to the Loan Recipient. In addition, copies of the **Prime Contractor's Notice Letter for EPA Form 6100-2**, **EPA Form 6100-3** (to be co-completed by the Prime Contractor and each DBE subcontractor**)**, and **EPA Form 6100-4** must also be provided to the Loan Recipient prior to tentative loan award. The Prime Contractor must provide **EPA Form 6100-2** to each **DBE** utilized on the contract.

If no DBE participation was obtained by the apparent successful Bidder, it remains the responsibility of the Prime Contractor to provide documentation to the Loan Recipient, prior to contract award, that a good faith effort was made to obtain **DBE** participation. Copies of the **certified letters** sent to a minimum of 10 qualified **DBE** potential subcontractors, supplies vendors, service providers, and/or equipment vendors and the corresponding **return mail receipts** are the only documentation of a good-faith effort that will be acceptable to the Loan Recipient.

*Failure to provide the required certified letters, return receipts, State or Federal agency **DBE** certification list(s), **Prime Contractor's Notice Letter for EPA Form 6100-2**, **EPA Form 6100-3**, and **EPA Form 6100-4** to the Loan Recipient may delay the contract award until the required documentation has been provided to and accepted by the Loan Recipient.*

STATE REVOLVING FUND LOAN PROGRAM

Contractor Receipt Letter – Form 6100-2

(Please Insert on Contractor Letterhead)

(Date)

Ms. Andrea Fenwick, Manager
Administrative and Financial Sections
State Revolving Fund Loan Program
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 12th Floor
Nashville, TN 37243

RE: Receipt and Distribution of EPA Form 6100-2
Disadvantaged Business Enterprise (DBE) Participation
(City/County/UD/Authority) (??? County), Tennessee
Loan No. SRF/CWA/CGA/DWF/DWA/DGA 20??-???
(Contract Name and/or Number)

Dear Ms. Fenwick:

This letter is to inform you the EPA Form 6100-2 was received from the (City/County/UD/Authority) and was then given to all DBE Subcontractors as required who are going to provide either construction, services, supplies, or equipment for this project.

If you have any questions concerning this notification, please contact us at (Phone No., e-mail, etc.).

Sincerely,

(Contractors Authorized Representative)
(Title)

cc: (Consulting Engineer for the contract)
(City/County/UD/Authority's Authorized Representative)

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Participation Form

An EPA Financial Assistance Agreement Recipient must require its prime contractors to provide this form to its DBE subcontractors. This form gives a DBE[1] subcontractor[2] the opportunity to describe work received and/or report any concerns regarding the EPA-funded project (e.g., in areas such as termination by prime contractor, late payments, etc.). The DBE subcontractor can, as an option, complete and submit this form to the EPA DBE Coordinator at any time during the project period of performance.

Subcontractor Name	Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.	Email Address	
Prime Contractor Name	Issuing/Funding Entity:	

Contract Item Number	Description of Work Received from the Prime Contractor Involving Construction, Services , Equipment or Supplies	Amount Received by Prime Contractor

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

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

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Participation Form

Please use the space below to report any concerns regarding the above EPA-funded project:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Subcontractor Signature	Print Name
Title	**Date**

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

This form is intended to capture the DBE[1] subcontractor's[2] description of work to be performed and the price of the work submitted to the prime contractor. An EPA Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractors bid or proposal package.

Subcontractor Name	Project Name	
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.	Email Address	
Prime Contractor Name	Issuing/Funding Entity:	

Contract Item Number	Description of Work Submitted to the Prime Contractor Involving Construction, Services , Equipment or Supplies	Price of Work Submitted to the Prime Contractor

DBE Certified By: ___ DOT ___ SBA ___ Other: _____	Meets/ exceeds EPA certification standards? ___ YES ___ NO ___ Unknown

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

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

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Performance Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	**Date**

Subcontractor Signature	Print Name
Title	**Date**

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form

This form is intended to capture the prime contractor's actual and/or anticipated use of identified certified DBE[1] subcontractors[2] and the estimated dollar amount of each subcontract. An EPA Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

Prime Contractor Name		Project Name
Bid/ Proposal No.	Assistance Agreement ID No. (if known)	Point of Contact
Address		
Telephone No.		Email Address
Issuing/Funding Entity:		

I have identified potential DBE certified subcontractors	___ YES	___ NO
If yes, please complete the table below. If no, please explain:		

Subcontractor Name/ Company Name	**Company Address/ Phone/ Email**	**Est. Dollar Amt**	**Currently DBE Certified?**

Continue on back if needed

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

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

United States Environmental Protection Agency

OMB Control No: 2090-0030
Approved: 8/13/2013
Approval Expires: 8/31/2015

Disadvantaged Business Enterprise (DBE) Program
DBE Subcontractor Utilization Form

I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware of that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

Prime Contractor Signature	Print Name
Title	**Date**

Certified Disadvantaged Business Enterprises (DBE) List

Using Governor's Diversity Business Office and State DOT and CCR DBE Directories to Find Certified WBEs and MBEs

Here are the links:

https://tn.diversitysoftware.com/FrontEnd/VendorSearchPublic.asp?TN=tn&XID=1215

www.osdbu.dot.gov/DBEProgram/StateDOTDBESites.cfm

CCR can be used to search for SBA SDBs. Since the SBA SDB certification is considered acceptable under the EPA DBE Program, firms found using the following search criteria can count toward EPA MBE/WBE fair share objectives.

Access the CCR search page at www.bpn.gov/CCRSearch/Search.aspx

http://www.epa.gov/osbp/dbe_team.htm

SECTION 00410 – BID FORM
Lower Brush Creek 42" Interceptor Contract - 1
ITB # 6441

1.01 GENERAL

Place: **Johnson City, Tennessee** Date: _____

The following Bid Form shall be followed exactly in submitting a Bid for this Work.

This Bid Form Submitted by _____
(Name and Address of Bidder)
(Hereinafter called "Bidder"), organized and existing under the laws of the State of _____, doing

business as _____
"a corporation," "a partnership", or an "individual" as applicable

To: City of Johnson City (Hereinafter called "Owner")
Purchasing
209 Water Street
Johnson City, TN 37601
(423) 975-2715 http://www.johnsoncitytn.com/purchasing/bids

The Bidder, in compliance with your Advertisement for Bids for the **Lower Brush Creek 42" Interceptor – Contract 1,** Johnson City, Tennessee, having examined the Contract Documents including the Plans and Specifications with related documents, having examined the site for proposed Work, and being familiar with all of the conditions and any and all addendums surrounding the construction of the proposed Project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, and supplies, and to construct the Project in accordance with the Contract Documents, within the time set forth therein, and at the unit prices stated hereinafter. These prices are to cover all expenses incurred in performing the Work required under the Contract Documents, of which this Bid is a part.

The Bidder hereby agrees to commence Work under this Contract on a date to be specified in a written "Notice to Proceed" by the Owner and to substantially complete the Project within **Five Hundred and Forty (540)** consecutive calendar days as indicated in the contract. Bidder further agrees to pay liquidated damages, the sum of One Thousand six hundred Dollars and Zero cents ($1600.00) for each consecutive day thereafter.

The Bidder hereby acknowledges receipt of the following addenda:

Addendum No. ____ Date _____; Addendum No. ____ Date _____

Addendum No. ____ Date _____; Addendum No. ____ Date _____

Addendum No**.** ____ Date _____; Addendum No. ____ Date _____

Insert above the number and the date of any Addendum issued and received. If none has been issued and received, the word "NONE" should be inserted.

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1.02 LEGAL STATUS OF BIDDER

Bidder_____

Date_____

*A. A corporation duly organized and doing business under the laws of the State of

_____, for whom

_____, bearing the official

title of _____, whose signature

is affixed to this Bid is duly authorized to execute contracts.

*B. A Partnership, all of the members of which, with addresses are: (Designate general partners as such)

_____

_____

_____

_____

_____

*C. An individual, whose signature is affixed to this Bid. (Print name)

_____

_____

_____

* The Bidder shall fill out the appropriate form and strike out the other two.

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1.03 BIDDERS AFFIDAVIT

Comes the Affiant, _____, and after being first duly sworn, states under penalty of perjury as follows:

A. His/her name is _____ and he/she is the individual submitting the Bid or is the authorized representative of _____, the entity submitting the Bid (hereinafter referred to as "Bidder").

B. Bidder will pay all taxes and fees, which are owed to **City of Johnson City** at the time the Bid is submitted, prior to award of the Agreement and will maintain a "current" status in regard to those taxes and fees during the life of the Agreement.

C. Bidder will obtain a local business license, if applicable, prior to award of the Agreement.

D. Bidder has authorized the **City of Johnson City** to verify the above-mentioned information with the Division of Revenue and to disclose to the Board that taxes and/or fees are delinquent or that a business license has not been obtained.

E. Bidder has not knowingly violated any provision of the campaign finance laws of the State of Tennessee within the past five (5) years and the award of an Agreement to the Bidder will not violate any provision of the campaign finance laws of **Tennessee**.

F. Bidder acknowledges that "knowingly" for purposes of this Affidavit means, with respect to conduct or to circumstances described by a statute or ordinance defining an offense, that a person is aware or should have been aware that his/her conduct is of that nature or that the circumstance exists.

Further, Affiant sayeth naught.

_____
Affiant Signature

STATE OF _____

COUNTY OF _____

The foregoing instrument was subscribed, sworn to and acknowledged before me by

_____ on this the _____ day of _____, 20___ .

My Commission expires: _____

_____
NOTARY PUBLIC, STATE AT LARGE

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1.04 BID SCHEDULE

Item	Description	Unit	Qty	Unit Price	Item Price
1	Mobilization and General Conditions (max. 3% of Bid)	LS	1	$	$
2	Clearing and Grubbing	LF	15,100	$	$
3	42" Interceptor Sewer Pipe, Material:_____	LF	13,355	$	$
4	Trenchless Installation of 70 LF of 42" Interceptor Sewer Pipe via Bore and Jack, Material:_____, R/J Carrier, 70 LF of 60” steel casing, Watauga Rd crossing	LS	1	$	$
5	8" SDR 35 PVC	LF	1,518	$	$
6	4” SDR 35 PVC Sewer Lateral	LF	193	$	$
7	Creek Crossing #1: Sta. 12+25	LS	1	$	$
8	7'ϕ Manhole Base w/48” Riser Transition	EA	34	$	$
9	8'ϕ Manhole Base w/48” Riser Transition	EA	8	$	$
10	4'ϕ Manhole Base	EA	5	$	$
11	4'ϕ Manhole Riser, Including Eccentric Cone and Grade Rings to finished grade	VF	325	$	$
12	Anti-Seep Collar Upstream of each MH	EA	47	$	$
13	Manhole “Standard” Frame and Cover	EA	38	$	$
14	Manhole “Water-Tight” Frame and Cover	EA	9	$	$
15	Removal of Existing 30” Sewer Pipe during installation of new 42” Interceptor	LF	6,400	$	$
16	Removal of Existing Manholes during installation of new 42” Interceptor	EA	16	$	$
17	Abandon Exist Manholes (and adjacent Sewer Pipe) In-Place	EA	24	$	$
18	Temporary Connection and Removal of existing 30” sewer to New Manhole 1-7	LS	1	$	$
19	Connection of Existing 4” Sewer Service to New Manhole via outside drop connection	EA	2	$	$
20	Connection of Existing 6” Sewer Service to New Manhole via outside drop connection	EA	2	$	$
21	Connection of Existing 8” Sewer to New Manhole via outside drop connection	EA	5	$	$
22	Connection of Existing 10” Sewer to New Manhole 1-4	LS	1	$	$
23	Connection of Existing 24” discharge pipe from WTP to the New Manhole 1-30 via outside drop connection	LS	1	$	$
24	Connection of New 42” Trunk Sewer to Existing Manhole/Stubout at Sta. 0+00	LS	1	$	$
25	Connection of Existing Sewer Services to New 42” Interceptor Sewer w/Tap and Cleanout at Easement	EA	10	$	$
26	Connection of Existing Sewer Services to New 8” Sewer Mains w/8”X6” Tee and a Cleanout at Easement	EA	4	$	$

27	Concrete Cap for 42” Interceptor Sewer, Detail 0222128	LF	500	$	$
28	6" DI Waterline, includes fittings, connection to existing 4" waterline, and thrust restraints	LF	480	$	$
29	6" Gate Valve	EA	1	$	$
30	Waterline Blowoff Assembly per Detail D06	EA	1	$	$
31	3/4" Water Service, includes tap and service line from watermain to meters	EA	5	$	$
32	Sewer Flow Control and Bypass Pumping for the Project	A	1	$ 565,800	$ 565,800
33	Diesel Fuel used in Bypass Pumps.	A	1	$ 482,600	$ 482,600
34	Undercut Pipe Trench Subgrade and Refill with Crushed Stone, #57, as directed by Engineer	CY	2,000	$	$
35	Asphalt Surface, TDOT 411-01.11, Grading "E", PG64-22	TN	225	$	$
36	Asphalt Binder, TDOT 307-01.07, Grading "BM", PG64-22	TN	480	$	$
37	Aggregate Base, TDOT 303-01.01	TN	250		
38	Misc. Concrete, if directed by Owner/Engineer	CY	75	$	$
39	Flowable Fill per Detail 0222118A	CY	150	$	$
40	NPDES Compliance, Erosion Prevention and Sediment Control	LS	1	$	$
41	Temporary Seeding and Mulching	LF	16,000	$	$
42	Permanent Seeding and Mulching	LF	16,000	$	$
43	Misc. Stone, if directed by Owner/Engineer	TN	350	$	$
44	Misc. Rip Rap for ditch or slope stabilization, if directed by Owner/Engineer	TN	1,000	$	$
45	Misc. Slope Stabilization Matting, if directed by Owner/Engineer	SF	18,000	$	$
46	Traffic Control Plan and Implementation	LS	1	$	$
47	Alignment Stakeout and Monthly Progress Survey	MN	18	$	$
48	Final Site Cleanup and Closeout Documents	LS	1	$	$
49	Field Office, Equipment, and Services for RPR	MN	18	$	$
50	Trench Plug: Flowable Fill barrier at 50’ stream blasting buffer	EA	10	$	$
51	Geotextile Separator Fabric for pipe envelope, where directed by Engineer	LF	1,000	$	$
52	6” Service lateral replacement, where directed by Engineer	LF	200	$	$
53	Forcemain connection to MH 1-19	LS	1	$	$
54	Gravel Road Repair, where directed by Engineer	SY	2,500	$	$
55	Asphalt Pavement repair matching existing thickness, where directed by Engineer	TN	75	$	$
56	Concrete Pavement repair matching existing thickness, where directed by Engineer	CY	100	$	$
			SUBTOTAL	**$**	

	Project Contingency Allowance, if directed by Owner/Engineer	A	1	$ 300,000	$ 300,000
			TOTAL	**$**	

TOTAL BID AMOUNT (*in words*):

_____

_____**Dollars ($ _____)**
(numerals)

The Bidder agrees to perform all the Work described in the Specifications and shown on the Plans for the proceeding lump sum and/or unit prices, if applicable, which shall include the furnishing of all labor, materials, supplies, equipment and/or vehicle usage, services, all items of cost, overhead, taxes (federal, state, local), and profit for the Contractor and any Subcontractor involved, within the time set forth herein. If unit prices are applicable, Bidder must make the extensions and additions showing the total amount of Bid. In all cases of discrepancies or math errors, the amount written in for the unit price of an item shall govern.

If a discrepancy between the unit price and the item total exists, the unit price prevails except:

> If the unit price is illegible, omitted, or the same as the item total, item total prevails and the unit price is the quotient of the item total and the quantity.

If the unit price and the item total are illegible or are omitted, the bid may be determined nonresponsive. If a lump sum total price is illegible or is omitted, the bid may be determined nonresponsive.

For a unit price based bid, the sum of the item totals is the bid amount the Owner uses for bid comparison.

The Owner's decision on the bid amount is final.

Respectfully Submitted,

FIRM: _____

ADDRESS: _____

CITY/STATE/ZIP: _____

DATE: _____

BY: _____
(must be original signature)

TITLE: _____

PHONE: _____ FAX: _____
(area code, number & extension)

EMAIL ADDRESS: _____

OFFICIAL ADDRESS AND PHONE:

_____

_____

_____ (Seal if Bid is by Corporation)

By signing this form you agree to all of the terms and associated forms.

Bid must be signed to be considered valid.

1.05 BID QUALIFICATION FORM

a. Bidder shall complete Section 00411 BID QUALIFICATION FORM and attach it to the bid form.

1.06 AUTHENTICATION OF BID AND STATEMENT OF NON-COLLUSION AND NON-CONFLICT OF INTEREST

I hereby swear (or affirm) under the penalty for false swearing:

A. That I am the Bidder (if the Bidder is an individual), a partner of the Bidder (if the Bidder is a partnership), or an officer or employee of the Bidding corporation having authority to sign on its behalf (if the Bidder is a corporation);

B. That the attached Bid has been arrived at by the Bidder independently, and has been submitted without collusion with, and without any agreement, understanding or planned common course of action, with any other contractor, vendor of materials, supplies, equipment or services described in the Advertisement for Bid, designed to limit independent bidding or competition;

C. That the contents of the Bid or Bids have not been communicated by the Bidder or its employees or agents to any person not an employee or agent of the Bidder or its surety on any bond furnished, with the Bid or Bids, and will not be communicated to any such person, prior to the official opening of the Bid or Bids;

D. That the Bidder is legally entitled to enter into the contracts with the City of Johnson City, and is not in violation of any prohibited conflict of interest;

E. (Applicable to corporation only) That as a foreign corporation, we are registered with the Secretary of State of Tennessee, and authorized to do business in the State_____ , OR, that as a domestic corporation, we are in good standing with the Secretary of State of Tennessee_____. [Check the statement applicable.]

F. This offer is for sixty (60) calendar days from the date this Bid is opened. In submitting the above, it is expressly agreed that, upon proper acceptance by the Owner of any or all items Bid above, an Agreement shall thereby be created with respect to the items accepted.

G. That I have fully informed myself regarding the accuracy of the statements made in this statement.

H. That I certify that Subcontractors have not and will not be awarded to any firm(s) that have been debarred from noncompliance with the Federal Labor Standards, Title VI of the Civil Rights Act of 1964 As Amended, Executive Order 11246 As Amended or any other Federal Law.

_____

Company Date Representative

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1.07 EQUAL OPPORTUNITY AGREEMENT

The Law

* Title VII of the Civil Rights Act of 1964 (amended 1972) states that it is unlawful for an employer to discriminate in employment because of race, color, religion, sex, age (40-70 years) or national origin.

* Executive Order No. 11246 on Nondiscrimination under Federal contract prohibits employment discrimination by contractor and subcontractor doing business with the Federal Government or recipients of Federal funds. This order was later amended by Executive Order No. 11375 to prohibit discrimination on the basis of sex.

* Section 503 of the Rehabilitation Act of 1973 States:

  The Contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap.

* Section 2012 of the Vietnam Era Veterans Readjustment Act of 1973 requires Affirmative Action on behalf of disabled veterans and veterans of the Vietnam Era by contractors having Federal Contracts.

* Section 206 (A) of Executive Order 12086, Consolidation of Contract Compliance Functions for Equal Employment Opportunity, states:

  The Secretary of Labor may investigate the employment practices of any Government contractor or sub-contractor to determine whether or not the contractual provisions specified in Section 202 of this order have been violated.

City of Johnson City practices Equal Opportunity in recruiting, hiring and promoting. It is the Government's intent to affirmatively provide employment opportunities for those individuals who have previously not been allowed to enter into the mainstream of society. Because of its importance to the local Government, this policy carries the full endorsement of the Mayor, Commissioners, Directors, and all supervisory personnel. In following this commitment to Equal Employment Opportunity and because the Government is the benefactor of the Federal funds, it is both against the Urban County Government policy and illegal for the Government to let contracts to companies which knowingly or unknowingly practice discrimination in their employment practices. Violation of the above mentioned ordinances may cause an Agreement to be canceled and the contractor may be declared ineligible for future consideration.

Please sign this statement in the appropriate space acknowledging that you have read and understand the provisions contained herein. Return this document as part of your application packet.

Bidders

I/We agree to comply with the Civil Rights Laws listed above that govern employment rights of minorities, women, Vietnam veterans, handicapped, and aged persons.

Signature	Name of Business

The Entity (regardless of whether construction Contractor, non-construction Contractor or supplier) agrees to provide equal opportunity in employment for all qualified persons, to prohibit discrimination in employment because of race, color, creed, national origin, sex or age, and to promote equal employment through a positive, continuing program from itself and each of its sub-contracting agents. This program of equal employment opportunity shall apply to every aspect of its employment policies and practices.

1.08 BID BOND

Bond Number: _____

KNOW ALL MEN BY THESE PRESENTS, that we _____

as principal (the "Principal") and _____

hereinto called Surety, are held and firmly bound unto

City of Johnson City
601 E. Main St.
Johnson City, TN 37601

as obligee (the "Obligee"), in the penal sum of _____ dollars for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for

_____

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal within the period specified therein, or, if no period be specified, within ninety (90) days after opening, and the Principal shall enter into a contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or contract documents, or in the event of the failure of the Principal to enter into such contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference in money not to exceed the penal sum hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void; otherwise to remain in full force and effect. In no event shall the liability hereunder exceed the penal sum thereof.

PROVIDED AND SUBJECT TO THE CONDITION PRECEDENT, that any claim by Obligee under this bond must be submitted in writing by registered mail, to the attention of the Surety Law Department at the address above, within 120 days of the date of this bond. Any suit under this bond must be instituted before the expiration of one (1) year from the date of this bond. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall apply.

DATED as of this _____ day of _____, 20_____.

WITNESS / ATTEST:

_____

Principal (Secretary) Principal

By:_____(seal)
Name:
Title:

_____

Surety (Secretary) Surety

By:_____(seal)
Name:
Title:

POWER OF ATTORNEY

(Attach to Bid Bond)

END OF SECTION

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SECTION 00411 – BID QUALIFICATION FORM

All Bidders shall complete and submit this form with their bid:

1. In order to qualify to submit a bid on this project the Prime General Contractor must meet the following qualification requirement.

    a. Contractor must have completed at least three (3) separate large diameter "**gravity sewer**" projects in which 36-inch diameter or larger pipe was installed.

    b. Each of these three (3) required projects shall consist of 5,000 linear feet or more of 36-inch gravity sewer pipe.

    c. Provide information for each project requested above in item 5 below.

2. Provide the names of supervisory staff that will be assigned for the duration of this project:

	Position	**Name**	**# Yrs. Experience**	**# Yrs. With Bidder**
a.	Project Manager			
b.	Project Superintendent			

3. List the three largest projects currently under contract and contact information for each.

	Project	**Est. Completion Date**	**Engineer/Owner**	**Telephone**
a.				
b.				
c.				

4. List primary subcontractors proposed for this project and approximate percentage of bid amount for each.

	Subcontractor	**Work**	**% of Contract**
a.			
b.			
c.			

5. Provide a minimum of three references for work completed by Bidder similar in nature and scope to the proposed project as requested in item 1 above. Attach additional sheet(s) if necessary.

	Project Description	Date Completed	Completed on Schedule Yes/No (days late?)	Liguidated Damages Yes/No	Under/Over Budget Yes/No (%)	Change Orders Issued/ Requested	Engineer & Owner Contact	Telephone & Email	Litigation (Y/N)
a.									
b.									
c.									

DRUG FREE WORKPLACE

All vendors with five (5) or more employees must execute the attached Drug Free Workplace Affidavit to verify compliance with TCA 50-9-113 and return same with response. Failure to comply with this requirement will declare that submittal non-responsive.

City Of Johnson City, Tennessee - Policy No. HR-131
SECTION I – PURPOSE OF THE DRUG & ALCOHOL TESTING PROGRAM
The City of Johnson City recognizes its responsibility to provide safe and efficient operations for our employees, our citizens and the general public. Our commitment to provide safe and efficient operations is shown by the implementation of programs and procedures which ensure compliance with appropriate safety measures, as well as the letter and intent of all applicable laws and regulations. There is sufficient evidence to conclude that the use of illegal drug/alcohol; drug/alcohol dependence and drug/alcohol abuse seriously impairs an employee's performance and general physical and mental health. The illegal possession and use of drugs, alcohol and/or narcotics by employees of the City is a crime in this jurisdiction and is clearly unacceptable. Therefore, the City of Johnson City has adopted this written policy to ensure an employee's fitness for duty as a condition of employment; to ensure the drug tests and alcohol tests are conducted on safety-sensitive positions in the categories of: pre-employment, random testing, suspicion testing, and return-to-duty testing.

To comply with TCA Title 50 Chapter 9 Part 1, all bidders and/or proposers of service to the City must have a testing program of the same or better than the requirements of the City of Johnson City.

DRUG-FREE WORKPLACE AFFIDAVIT

State of _____

County of _____

I, _____, being duly sworn, depose, and say that:

1) I am a principal officer of _____, the firm that has submitted the attached or enclosed bid or proposal, my title being _____ of the firm; and

2) I have personal knowledge of the policies of the above-named firm with respect to the maintenance of a drug-free workplace; and

3) I certify that all provisions and requirements of the Tennessee Drug-Free Workplace Program, as established by Tennessee Code Annotated §§ 50-9-113 have been met and implemented.

(Signed) _____

(Title) _____

Subscribed and sworn to before me this _____ day of _____, _____.

_____

_____
Title

My Commission expires _____

Complete and return with response package

STATEMENT OF SOLICITATION DECLINE
City of Johnson City, Tennessee

NOTE: If you do not intend to respond to this solicitation, please complete and return this form on or before the stated deadline to Purchasing Department, P. O. Box 2150, Johnson City, TN 37605 or via e-mail: purchasing@johnsoncitytn.org

We value your feedback and ask that you complete the following:

Solicitation No.: # _____
Solicitation Name: _____

We, the undersigned, decline to submit on the above solicitation for the following reason(s):

_____ **Insufficient time to adequately prepare a response**

_____ **Our company does not offer this product or service. Remove us from the vendor list**

_____ **Our schedule will not permit us to perform in a timely manner**

_____ **We are unable to meet bond requirements**

_____ **We are unable to meet insurance requirements**

_____ **We are unable to offer comparable product or service**

_____ **We are unable to meet specifications (explain below)**

_____
_____
_____
_____

We understand that if this statement is not completed and returned, our company may be deleted from the City's solicitation list for this commodity or service.

Company Name: _____
Address: _____
_____
Signature: _____
Telephone: _____
E-mail: _____
Date: _____

Revised April 2020

STATE CONTRACTORS LICENSING INFORMATION
BID ENVELOPE FORM

THIS FORM MUST BE FIRMLY ATTACHED TO THE OUTSIDE OF THE ENVELOPE CONTAINING THE BID. NO BID WILL BE CONSIDERED IF THIS FORM IS INCOMPLETE OR NOT ATTACHED TO THE OUTSIDE OF THE BID ENVELOPE. IF TOTAL BID IS LESS THAN $25,000- ATTACH AND SPECIFY ON THIS FORM

PART 1
ALL BIDDERS MUST COMPLETE

TO:	City of Johnson City, Tennessee **ITB # 6441**
DUE DATE & TIME:	**October 20, 2020 at 2:00 P.M ET**
LOCATION:	OFFICE OF PURCHASING DIRECTOR, 209 WATER STREET JOHNSON CITY, TN 37601
NAME OF BIDDER:	
ADDRESS OF BIDDER:	
FEDERAL ID # OF BIDDER:	
LICENSE NO.:	#
LICENSE CLASSIFICATION OF BIDDER:	
EXPIRATION DATE:	
MONETARY LIMITS:	

PART 2
BIDDER MUST COMPLETE THIS SECTION IF BELOW IS $25,000+ OR $100,000+ MASONRY

(1) ELECTRICAL	(2)PLUMBING	(3)HVAC	(4)GEOTHERMAL	(5)MASONRY
A) Name of licensed **Electrical contractor**:	A) Name of licensed **Plumbing contractor**:	A) Name of licensed **HVAC contractor:**	A) Name of licensed **Geothermal contractor**:	A) Name of licensed **Masonry contractor**:
B) License #:	B) License #:	B) License #:	B) License #:	B) License #:
C) License Classification and Limits:	C) License Classification and Limits:	C) License Classification and Limits:	C) License Classification and Limits:	C) License Classification and Limits:
D) License expiration date:	D) License expiration date:	D) License expiration date:	D) License expiration date:	D) License expiration date:

00440

GENERAL CONTRACT FORM

The General Contract Form is included in every solicitation requiring insurance. The general requirements of the contract form are supplemented by items checked on the **Insurance Checklist that identify specific requirements for the bid or project**.

INSURANCE

Review this section carefully with your insurance agent or broker prior to submitting a bid or proposal. See Insurance Checklist (part of the Bid Forms) for specific coverage applicable to this contract. The term "Contract" as used in this section shall mean the Agreement covering the work that is entered into between the City of Johnson City, Tennessee and the Contractor.

1. General Insurance Requirements:

1.1 The Contractor shall not start work under this contract until the Contractor has obtained at its own expense all of the insurance called for hereunder and such insurance has been approved by the City; nor shall the Contractor allow any subcontractor to start work on any subcontract until all insurance required of the subcontractor has been so obtained and approved by the Contractor. Approval of insurance required of the Contractor will be granted only after submission to the Director of Purchasing of original, signed Certificate(s) of Insurance, General Contract Form, and Insurance Checklist or, alternately, at the City's request, certified copies of the required insurance policies.

1.2 No acceptance and/or approval of any insurance by the City shall be construed as relieving or excusing the Contractor, or the surety, or its bond, from any liability or obligation imposed upon either or both of them by the provisions of the Contract Documents.

1.3 The City of Johnson City (including its elected and appointed officials, agents, and employees) is to be named as an additional insured under all coverage except Worker's Compensation, Automobile Liability, and Professional Liability and the Certificate of Insurance or the certified policy, if requested, must so state. Coverage afforded under this paragraph shall be primary and non-contributory as respects the City, its elected and appointed officials, agents and employees. The following definition of the term "City" applies to all policies issued under the contract:

> "The City of Johnson City, Tennessee together with all of its various departments, bureaus, and agencies, as well as any affiliated or subsidiary board, committee, or authority, including but not limited to the City of Johnson City, Dept. of Education (A.K.A "Johnson City Schools")."

1.4 The contractor shall provide insurance as specified in the Insurance Checklist contained in this document. In the event that Contractor obtains insurance coverage that is broader than the minimum required by this Agreement, this Agreement shall be deemed to require the broader coverage, including but not limited to any greater limits and any excess or umbrella coverages.

1.5 The Contractor covenants to save, defend, hold harmless and indemnify the City of Johnson City, Tennessee together with its various departments, elected or appointed officials, employees, officers, counsel, agents, and any and all other persons or entities acting on behalf of the same (collectively the City) from and against any and all claims of any sort based upon any theory of liability whatsoever, for any and all harm, loss, damage, injury, cost (including court cost and attorney fees) charges, or other liability of any nature whatsoever, however caused, resulting from or arising out of or in any way connected with the contractors performance or non-performance of the terms of the contract documents or its obligations under the contract based upon any theory of liability whatsoever, including claims brought by third persons, and further covenants to discharge all of the aforesaid persons and entities and forever hold them harmless from the same. The foregoing obligation to indemnify and defend shall continue in full force and effect after the aforesaid contractor completes all of the work required under the contract, until such time as the applicable statutes of limitation or repose have expired.

1.6 The Contractor shall be responsible for the work performed under the Contract Documents and every part thereof, and for all materials, tools, equipment, appliances, and property of any description used in connection with the work. The Contractor assumes all risks for direct and indirect damage or injury to the property or persons used or employed on or in connection with the work contracted for, and of all damage or injury to any person or property wherever located, resulting from any action, omission, commission or operation under the Contract, or in connection in any way whatsoever with the contracted work, until final acceptance of the work by the City.

1.7 Insurance coverage required in these specifications shall be in force throughout the Contract Term. If the Contractor fails to provide acceptable evidence of current insurance within ten days of written notice at any time during the Contract Term, the City shall have absolute right to terminate the Contract without any further obligation to the Contractor and the Contractor shall be liable to the City for the entire additional cost of procuring performance by another vendor and the cost of performing the incomplete portion of the Contract at time of termination. **Contractor** is required to provide the City with notice of cancellation, non-renewal, or material change in coverage at least thirty (30) days prior to cancellation, non-renewal, or material change in coverage."

1.8 Contractual and other liability insurance provided under this Contract shall not contain a supervision, inspection or engineering services exclusion that would preclude the City from supervising or inspecting the project as to the end result. The Contractor shall assume all on-the-job responsibilities as to the control of persons directly employed by it and of the subcontractors and any persons employed by the subcontractor.

1.9 Nothing contained in the specifications shall be construed as creating any contractual relationship between any subcontractor and the City. The Contractor shall be as fully responsible to the City for acts and omissions of the subcontractors and of persons employed by them as it is for acts and omissions of persons directly employed by the Contractor.

1.10 Precaution shall be exercised by the Contractor at all times for the protection of persons (including employees) and property. All existing structures, utilities, roads, services, trees and shrubbery shall be protected against damage or interruption of service at all times by the

Contractor and its subcontractors during the term of the Contract, and the Contractor shall be held responsible for any damage to property occurring by reason of its operation on the property.

1.11 If a Contractor can not meet the insurance requirements contained in a bid, proposal, or project description, alternate insurance coverage may be considered. Written requests for consideration of alternate coverage must be received by the Director of Purchasing at least ten working days prior to the date set for receipt of bids or proposals. If the City denies the request for alternate coverage, the specified coverage will be required to be submitted. If the City permits alternate coverage, an amendment to the Insurance Requirement will be prepared and distributed prior to the time and date set for receipt of bids or proposals.

1.12 All required insurance coverage must be acquired from insurers authorized to do business in the State of Tennessee, and acceptable to the City. The insurers must also have policyholders' rating of "B++" or better, and a financial size of "Class V" or better in the latest edition of Best's Insurance Reports, unless the City grants specific approval for an exception in the same manner as described in 1.11 above.

1.13 The City may consider deductible amounts as part of its review of financial stability. The Contractor shall assume all deductibles.

2. Contractor's Insurance – Occurrence Basis:

2.1 The Contractor shall purchase the following insurance coverage, including the terms, provisions and limits shown in the Checklist:

- **Commercial General Liability** – The Commercial General Liability policy shall include any or all of the following as indicated on the Checklist:

    i. General aggregate limit is to apply per project;

    ii. Premises/Operations;

    iii. Action of Independent Contractors;

    iv. Contractual Liability including protection for the Contractor from claims arising out of liability assumed under this contract;

    v. Personal Injury Liability including coverage for offenses related to employment;

    vi. Explosion, Collapse, or Underground (XCU) hazards.

- **Business Automobile Liability** including coverage for any owned, hired, or non-owned motor vehicles, Uninsured Motorists insurance, and Automobile Contractual Liability.

- **Worker's Compensation** – statutory benefits as required by the State of Tennessee, or other laws as required by labor union agreements, including standard Other States coverage; Employers' Liability coverage.

- **Builder's Risk Insurance**
  - The Contractor shall purchase and maintain Builder's Risk Insurance with a limit equal to the initial contract amount and any amendments to the contract that affect the project cost on a replacement cost basis. Insurance shall be maintained until final payment under the contract has been made or until no person or entity other than the City has an insurable interest in the covered property, whichever is earlier. The Builder's Risk Insurance shall include the City, Contractor, subcontractors and sub-subcontractors as named insured.
  - Insurance shall be on an all-risks policy form including the perils of fire, extended coverage, theft, vandalism, malicious mischief, collapse, and earthquake. Coverage is to apply for demolition occasioned by enforcement of any applicable legal requirements and Architect's fees. Coverage for the peril of flood shall not be required unless otherwise provided in the Contract Documents.
  - The Contractor shall be responsible for payment of any deductibles applicable to the coverage.
  - Unless otherwise provided in the contract documents, the Builder's Risk Insurance shall cover materials to be incorporated into the project, which are stored off the site.
  - The Contractor shall purchase and maintain Boiler and Machinery insurance if required by the contract documents or by law with a limit satisfactory to the City. The City shall be included as a named insured.
  - The City and Contractor waive all rights against each other and any of their subcontractors, sub-subcontractors, agents, employees, and consultants for damages caused by perils covered by this Builder's Risk Insurance or other property insurance applicable to the project. The policies shall provide such waivers of subrogation by endorsement or otherwise.
  - Any loss under Builder's Risk Insurance shall be payable to the City as fiduciary for the insured as their interests may appear, subject to any mortgagee clause. The Contractor shall pay subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require subcontractors to make payments to their sub-subcontractors in similar manner.
  - The City, as fiduciary, shall have the right to adjust and settle a loss with insurers.
  - The insurance company providing the Builder's Risk coverage shall grant permission for the City to partially occupy or use the premises under construction prior to final acceptance.

3. Commercial General or other Liability Insurance – Claims-made Basis:

If Commercial General or other liability insurance purchased by the Contractor has been issued on a claims-made basis, the Contractor must comply with the following additional conditions. The limits of liability and the extensions to be included as described in the Checklist remain the same. The Contractor must either:

i. Agree to provide certificates of insurance evidencing the above coverage for a period of three years for Professional Liability; two years for CGL and other Liability, after final payment for the contract. Such certificates shall evidence a retroactive date, no later than the beginning of the Contractors or subcontractors' work under this contract, or

ii. Purchase an extended (minimum three years for Professional Liability; two years for CGL and other Liability) reporting period endorsement for the policy or policies in force during the term of this contract and evidence the purchase of this extended reporting period endorsement by means of a certificate of insurance or a copy of the endorsement itself.

4. Alternative Coverage (Self Insurance)

Notwithstanding any of the above, the Contractor may satisfy its obligations under this section by means of self-insurance for all or any part of the insurance required, provided that the alternative coverage is acceptable to the City.

5. Limits of Liability Coverage

Specific limits of liability coverage on the Insurance Checklist may be adjusted according to project risk if the adjustment is deemed appropriate and the amended amount is approved by the City Manager.

6. Verification of Compliance

I have read this General Contract Form and agree to all the terms and conditions contained therein.

Contractor's Name: _____

EIN or SSN: _____

Authorized Representative (Printed): _____

Authorized Representative (Signature): _____

Title: _____

Date: _____

This form and the Insurance Checklist must be completed and returned with Certificate of Insurance, as specified, prior to contract award.

00450

INSURANCE CHECKLIST

(Lower Brush Creek Sewer Interceptor Project)

REQUIRED COVERAGE (marked by "x") **MINIMUM LIMITS**

X	1.	Worker's Compensation **(proprietor/partners/executive officers exclusion not allowed)** . . . . . Statutory limits of Tennessee and Employer's Liability . . . . . $100,000/accident, $100,000/disease, $500,000/disease policy limit
X	2.	Commercial General Liability **(including Premises/Operations)** . . . . . $1,000,000 CSL BI/PD each occurrence, $1 Million annual aggregate
X	3.	Automobile Liability & Owned/Hired/Non-Owned Vehicles **. . . . . $500,000** BI/PD each accident, Uninsured Motorist
X	4.	Independent Contractors . . . . . $1,000,000 CSL BI/PD each occurrence, $1 Million annual aggregate
X	5.	Products/Completed Operations . . . . . $1,000,000 CSL BI/PD each occurrence, $1 Million annual aggregate
X	6.	Contractual Liability . . . . . $1,000,000 CSL BI/PD each occurrence, $1 Million annual aggregate
X	7.	Personal and Advertising Injury Liability . . . . . $1,000,000 each offense, $1 Million annual aggregate
X	8.	Umbrella Liability . . . . . $5 Million Bodily Injury, Property Damage and Personal Injury
X	9.	Per Project Aggregate
	10.	Professional Liability
	a.	Architects and Engineers . . . . . $1 Million per occurrence/claim
	b.	Asbestos Removal Liability . . . . . .$2 Million per occurrence/claim
	c.	Medical Malpractice . . . . . $1 Million per occurrence/claim
	d.	Medical Professional Liability . . . . . $1 Million per occurrence/claim
	11.	Miscellaneous E & O . . . . . $1 Million per occurrence/claim
	12.	Motor Carrier Act End. (MCS-90) . . . . . $1 Million BI/PD each accident, Uninsured Motorist
	13.	Motor Cargo Insurance
	14.	Garage Liability . . . . . $1 Million Bodily Injury, Property Damage per occurrence
	15.	Garagekeepers Liability . . . . . $500,000 Comprehensive, $500,000 Collision
	16.	Inland Marine-Bailee's Insurance . . . . . $_____
	17.	Moving and Rigging Floater . . . . . Endorsement to CGL
	18.	Dishonesty Bond . . . . . $_____
X	19.	Builder's Risk/Installation Floater . . . . . .Provide coverage in the full amount of contract
X	20.	XCU Coverage . . . . . Endorsement to CGL
X	21.	Carrier Rating shall be Best's Rating of A or better or its equivalent.
X	22.	Notice of cancellation, non-renewal or material change in coverage shall be provided to City at least **30 days** prior to action. Worker's Compensation and/or non-payment of premium - notification may be **10 days** prior to action.
X	23.	The City of Johnson City shall be named as Additional Insured on all policies except Worker's Compensation and Professional Liability. ***Per Acord 25 (2009/01), policies must be endorsed to incl. on-going & completed operations; must submit copy of endorsement(s).*** (Cert. Holder: City of Johnson City, Attn: Purchasing, P.O. Box 2150, Johnson City, TN 37605. Email: purchasing@johnsoncitytn.org.)
X	24.	Certificate of Insurance shall show project number or other contract identifier used by the City.
X	25.	OTHER INSURANCE REQUIRED: **___Contractor's Pollution Liability - $1,000,000_per occurrence_____**

INSURANCE AGENT'S STATEMENT:

I have reviewed the above requirements with the bidder named below. The bidder has coverage with this agency for all of the areas marked with the exception of the following numbers:

_____ _____ _____ _____ _____ _____ **Comments:** _____

Is Professional Liability excluded under General Liability? Yes_____ No_____
Is Contractual Liability excluded under Comm. General Liability? Yes_____ No_____
Is Independent Contractors excluded under Comm. General Liability? Yes_____ No_____

Carrier ratings: Insurer A_____; Insurer B_____; Insurer C_____; Insurer D_____

AGENCY NAME: _____ AUTHORIZED SIGNATURE: _____

Date: _____

CONTRACTOR'S STATEMENT:

I have reviewed the above requirements with my insurance agent(s) and, if awarded a contract, will provide all coverages marked.

CONTRACTOR'S NAME: _____ AUTHORIZED SIGNATURE: _____

Date: _____

RFP/Bid Number: _____

Bid or Project Name: _____

This form and the General Contract Form must be signed and returned with the bid package (if applicable). The Certificate of Insurance must be provided to Purchasing prior to contract award.

NONCOLLUSION AFFIDAVIT OF CONTRACTOR

State of _____
County of _____

_____, being first duly sworn, deposed and days that: (1) He is_____of _____ _____, the Contractor that submitted the attached Proposal;

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

(3) Such Proposal was genuine and not a collusive or sham Proposal;

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

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

Signed: _____

_____
Title

Subcribed and sworn to before me
this_____day of_____, 20___

_____

_____
Title

My commission expires _____

SECTION 00500
C O N T R A C T

This Contract, made and entered into on this the _____day of _____20_____, by and between City of Johnson City, with situs in Washington County, Tennessee, hereinafter referred to as the Owner, party of the first part, and_____, hereinafter referred to as the Contractor, party of the second part.

W I T N E S S E T H:

WHEREAS, the Owner has taken all steps required by law for the construction of certain improvements, to-wit:

Lower Brush Creek 42" Interceptor – Contract 1

ITB Bid # 6441

all in a proper and workman like manner as set forth herein; and has advertised, requested and received bids, as required by law, which bids, being sealed, were opened on the **_____;** and the Owner, by its Board, rejected all other bids or proposals, and accepted the proposal or bid of the Contractor herein, all of which is set forth in the minutes of said meeting, to which reference is here made.

NOW, THEREFORE, in consideration of the promises, and for the further considerations hereinafter mentioned, this contract is hereby mutually understood and agreed to by and between the parties hereto for themselves, their personal representatives, successors and/or assigns.

SECTION 1. SCOPE OF THE CONTRACT. The second party shall furnish all the materials and will perform all the work as provided by the following enumerated plans, specifications and documents, which are attached hereto and made a part hereof, as it is fully copied and contained herein:

1. Bids Wanted as published in the "**Johnson City Press**" on _____.
2. Specifications on file in the office of the City of Johnson City Engineering Department and previously sent to the Contractor.

The party of the second part shall defend, indemnify and save harmless the Owner from any and all claims and suits for injury to person or property arising out of the performance of this Contract, caused by the acts or omissions of the Contractor, its agents, employees or sub-Contractors, excepting bodily injury or property damage caused by the sole negligence of the Owner, its agents or employees.

SECTION 2. TIME OF COMPLETION. The work to be performed under this Contract shall be commenced within **14** calendar days after Notice to Proceed and will be substantially completed within **540** calendar days with final completion 30 days thereafter. Liquidated damages for delay of substantial completion of contract work will be assessed at $1,600 per Calendar Day

SECTION 3. THE CONTRACT PRICE. The Owner shall pay, in current fund, the Contractor for the performance of this Contract on the basis of the unit price cost per unit, as set forth in SECTION 1 above, and as set out and stipulated in the bid or proposal of said Contract, and the total cost of

_____ is an estimated total cost, based upon the number of units required for the completion of this improvement and in the event there is any variation in the units actually required in the performance of this Contract, and the estimate made above, then the unit price shall in all things control, so that the total estimated cost is subject to being increased in the event the units required for this improvement are greater than that estimated, and is subject to being decreased in the event said units are less than that estimated; which said payment, based upon the unit costs mentioned above, shall be full compensation for all materials and supplies furnished, and all labor done by the Contractor under and pursuant to this Agreement, and said sum shall also pay for all losses or damages of the Contractor arising out of the nature of the work, and for any and all expenses incurred in consequence of the work under this Contract, and for the well and faithful performance of said Contract.

SECTION 4. METHOD OF PAYMENT.

A. PARTIAL PAYMENTS. The first party shall make partial payments to the second party on the basis of a duly certified and approved estimate for the work satisfactorily executed and in place during the preceding calendar month, less five percent (5%) of such estimate, which five percent (5%) is to be retained by the first party until all work has been performed strictly in accordance with this agreement and until such work has been accepted by the first party. Estimates may at any time be withheld or reduced if, in the opinion of the Owner, the work is not proceeding in accordance with the provision of the Contract. Ordinarily, estimates by the Contractor will be made at the end of each calendar month, and partial payments within forty-five (45) days thereafter.

B. FINAL PAYMENT. The Contractor shall, within 30 days after completion of this Contract, prepare a statement of the total cost of the work done hereunder, and the Owner shall pay the entire sum so found to be due hereunder, after deducting here from all previous payments and all amounts to be kept and all amounts to be retained under the provisions of this Contract. All prior partial payments and estimates shall be subject to correction in the statement of "Total Cost".

The Contractor obligates and binds himself for the payment of all bills incurred for the purchase of materials, equipment, tools, supplies and labor necessary for the construction of any and all of the improvements, and before final payment shall be due and payable, and as an express condition precedent thereto, the Contractor shall furnish the Owner satisfactory evidence showing that all bills for labor and material have been paid in full.

SECTION 5. BOND. The Contractor obligates and binds himself, his successors and assigns, to pay all bills incurred for the purchase of materials, tools, supplies and labor necessary for the full performance of this Contract, and covenants to and with the Owner, to execute on behalf of the Owner, surety bonds made a part hereof, which shall at all times during the life of this Contract guarantee the full and faithful performance of all the terms, conditions and covenants of this Contract together with the full and final payment and satisfaction of all obligations and bills incurred by the Contractor.

Bonds shall be written by an agent representing some reputable insurance and bonding

company authorized to do business in the State of Tennessee subject to approval by the Owner's Attorney.

SECTION 6. INSURANCE. The Contractor aforesaid shall at all times keep in full force and effect, during the life of this Contract, Worker's Compensation Insurance in accordance with Title 50, Tennessee Code Annotated and all Amendatory Acts thereto, covering all of the employees during the progress of said construction work, and to furnish the Owner satisfactory evidence that he has in full force and effect such insurance on all of his employees used in the execution and carrying out the work under this Contract. Also, the Contractor shall have comprehensive general public liability insurance in amounts acceptable to the Owner. The Contractor will furnish comprehensive automobile liability insurance and furnish the Owner with certificates of insurance or policies and maintain the insurance in such form as shall be satisfactory to the Owner. The Contractor shall obtain and maintain Owners liability insurance specifically naming Owner as the insured to defend, indemnify and save harmless the Owner from any and all claims and suits for injury to persons, including death, or property damage arising out of the performance of the Contract caused in any way by the acts or omissions of the Contractor or the Contractor's agents, employees, or sub-Contractors during or in connection with the Contract work, excepting bodily injury or death or property damage caused by the sole negligence of the Owner, its agents or employees.

SECTION 7. SAFEGUARDS. The Contractor shall at all times during the progress and execution of said work to be done under the terms of this Contract, furnish and maintain all necessary signals and signs, safeguards and warning in, near and upon the place where said work is being done, so as to protect and prevent the public from being injured in any way or manner by reason of the construction of said improvements or work done in connection with and under the terms and provisions of this Contract.

IN WITNESS whereof the parties by their authorized agents have executed this contract.

CONTRACTOR	CITY OF JOHNSON CITY
BY:_____	BY:_____
ATTEST:	ATTEST:
_____	_____

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SECTION 00510

NOTICE OF AWARD

Dated _____, 20__

TO: _____
(Bidder)

ADDRESS:_____

CONTRACT FOR: **LOWER BRUSH CREEK 42" INTERCEPTOR – CONTRACT 1**

OWNER'S CONTRACT NUMBER: ITB - # _6441_____

You are hereby notified that your Bid dated _____for the above Contract has been considered. You are the apparent Successful Bidder and have been awarded a contract for the referenced project.

The Contract Price of Your contract is _____ Dollars ($_____).

Four (4) copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

You must comply with the following conditions precedent within fifteen (15) days of the date of this Notice of Award, that is by _____ .

1. You must deliver to the OWNER four (4) fully executed counterparts of the Agreement including all the Contract Documents (except drawings).

2. You must deliver with the executed the Agreement the Contract Security (Bonds) as specified in the Instructions to Bidders (Article 13), General Conditions (paragraph 5.01) and Supplementary Conditions (Article 5).

3. (List other conditions precedents).

_____

Failure to comply with these conditions within the time specified will entitle OWNER to consider your bid in default, to annul this Notice of Award and to declare your Bid Security forfeited. Within ten days after you comply with the above conditions, OWNER will return to you one (1) fully executed counterpart of the Contract Documents.

By: City of Johnson City_____

(OWNER)

_____
(AUTHORIZED SIGNATURE)

_____
(TITLE)

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Section 00511 - Escrow Agreement

THIS AGREEMENT is entered into this ____ day of _____, _____ by and between City of Johnson City, Tennessee, a Tennessee Municipal Corporation ("Owner"), _____ ("Contractor") and First Horizon Bank ("Bank") as escrow agent.

WITNESSETH:

WHEREAS, Owner and Contractor entered into a construction contract in the amount of $_____ (the "Contract"). The Contract provides that five percent (5.00%) of the progress payments made under the Contract will be withheld as retainage ("Retainage") from the total of progress payments made by Owner to Contractor; and

WHEREAS, pursuant to T.C.A. 66-34-104 (the "Statute"), the amount withheld as Retainage is to be deposited in a separate escrow account maintained with a third party; and

WHEREAS, Owner and Contractor desire that all Retainage withheld under the Contract, be deposited in an interest bearing escrow account pursuant to and in compliance with the Statute; and

WHEREAS, Bank has agreed to accept the Retainage and cause it to be placed in an interest bearing escrow account and to act as escrow agent for said account.

NOW, THEREFORE, in consideration of the premises and mutual covenants and promises hereinafter set forth, it is agreed, as follows:

1. This contract incorporates all of the recitals set forth above.
2. In accordance with the requirements of the Statute, Owner shall deposit, and the Bank shall hold in an interest bearing escrow account, Account No. _____ ("Escrow Account") all retainage held pursuant to the Contract. The total Contract amount is $_____.
3. All Retainage withheld from payments to Contractor by Owner under the Contract, from this date forward, shall be deposited in said Escrow Account.
4. The Bank, as escrow agent, shall hold and maintain the Retainage in the Escrow Account until the Bank is presented with a release signed by Owner and Contractor, authorizing the disbursement of all or a portion of the funds held on deposit in the Escrow Account, plus any accrued interest, provided that notwithstanding this Section 3, the Bank may comply with the final order of any court of applicable jurisdiction which affects the payment of all or any portion of the funds in the Escrow Account. The account will use Contractor's tax identification number, and Contractor will furnish the Escrow Agent with a W-9 form for this purpose.
5. To the extent allowed by Tennessee Law, in the event of any dispute regarding this Agreement, or in the event that any of the parties hereto do not agree as to the disposition of the funds in the Escrow Account, parties hereto agree that the Bank shall be released of any further obligation under this Agreement by tendering the funds maintained in the Escrow Account into a court of competent jurisdiction in an action in the nature of an interpleader, and the Bank shall have the right to recover its reasonable attorney fees and costs from Owner and Contractor, each of whom shall be jointly and severally liable therefore.

6. To the extent allowed by Tennessee law, the parties hereto agree to indemnify and hold Bank harmless from any loss, damages, or liabilities of any kind whatsoever, whether foreseen or unforeseen, whether direct or indirect arising out of or in connection with this Agreement, the Escrow Account and the funds contained therein, or the performance of the Bank's obligations hereunder, except liability resulting from Bank's gross negligence or willful misconduct. The Bank may rely upon the signatures of any correspondence from either or both of Owner and/or Contractor as being the authentic signatures of the Owner of Contractor or, if the Owner or Contractor are not natural persons, of person duly authorized to act on behalf of the Owner or Contractor.
7. The Bank shall not be bound by any modification, amendment, termination, cancellations, rescission or supersession of this Escrow Agreement unless the same shall be in writing and signed by all of the parties hereto and hereunder are effected thereby, unless it shall be given prior written consent thereto.
8. To the extent allowed by Tennessee Law, the Owner and Contractor agree, jointly and severally, to reimburse the Bank for any costs, damages, expenses or claims, including attorney's fees, which the Bank may incur or sustain as a result of or arising out of the Escrow Agreement or Bank's duties relating thereto (except for Bank's willful misconduct or negligence); and the Bank is hereby given a lien upon, and security interest in, the property deposited in the Escrow Account, to secure Bank's rights to payments or reimbursement.
9. Lender shall receive no fee in connection with its rendering of services as escrow agent pursuant to the terms of the Escrow Agreement.
10. This Escrow Agreement may be executed in three or more counterparts, each of which will be deemed to be an original agreement, but all of which will constitute one and the same document. A counterpart executed by a party and transmitted by facsimile to the other parties will have the same effect as delivery of the original counterpart.
11. This Agreement shall be construed in accordance with the Laws of the State of Tennessee without regard to its conflict of law principles.

ENTERED INTO as of the date first above written.

CONTRACTOR

_____

By:_____

Title:_____

City of Johnson City

By:_____

Title:_____

First Horizon Bank

By:_____

Title:_____

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned,_____, the duly authorized and legal representative of **The City of Johnson City** (OWNER), do hereby certify as follows:

I have examined the attached contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements 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 names 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.

Signed_____
Attorney

Date_____

SITE CERTIFICATION
CWSRF

I certify that the applicant, the City of Johnson City, has acquired or has entered into condemnation proceedings for all real property including easements and rights-of-way that are or will be required for the construction, (erection, extension, modification, addition) operation and maintenance of the entire wastewater treatment works project number 17.0413.

I certify that any deeds or documents required to be recorded in order to protect the title of the owner and the interest of the City of Johnson City have been duly recorded and filed for record wherever necessary.

I further certify that real property including easements required for the entire wastewater treatment works project was acquired in accordance with the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and EPA's regulation 40 CFR Part 4.

Dated this 20th day of June, 2019.

Applicants' Authorized Representative
Mayor Jenny Brock

PRINTED Mayor

K. Erickson Herrin
Attorney 6-24-2019

SECTION 00550

NOTICE TO PROCEED

Dated _____, 20__

TO: _____
(Bidder)

ADDRESS:

_____

_____

CONTRACT FOR: **LOWER BRUSH CREEK 42" INTERCEPTOR CONTRACT 1**

OWNER'S CONTRACT NUMBER: ITB - #__6441_____

You are hereby notified that the Contract Times under the above contract will commence to run on _____, 20__. By that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 3 of the Agreement the dates of Substantial Completion and completion and readiness for final payment are _____, 20__ and _____, 20__.

Before you may start any Work at the site, paragraph 2.01 of the General Conditions provides that you must deliver certificates of insurance which you are required to purchase and maintain in accordance with the Contract Documents.

Also before you may start any Work at the site, you must:

_____

_____

By: _City of Johnson City_____
(OWNER)

_____
(AUTHORIZED SIGNATURE)

_____
(TITLE)

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

ACEC
American Council of Engineering Companies

The Associated General Contractors of America
Skill Responsibility Integrity

ASCE American Society of Civil Engineers

National Society of Professional Engineers
Professional Engineers in Private Practice

AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by

CONSTRUCTION SPECIFICATIONS INSTITUTE

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

21. *General Requirements*—Sections of Division 1 of the Specifications.

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

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

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

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

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

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

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

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

30. *PCBs*—Polychlorinated biphenyls.

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

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

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

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

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

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

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

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

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

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

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

42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

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

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

45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.

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

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

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

49. *Unit Price Work*—Work to be paid for on the basis of unit prices.

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

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

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

B. *Intent of Certain Terms or Adjectives:*

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

C. *Day:*

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

D. *Defective:*

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

a. does not conform to the Contract Documents; or

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

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

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

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

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

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

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

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

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

2.02 *Copies of Documents*

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

2.03 *Commencement of Contract Times; Notice to Proceed*

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

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

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

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

2. a preliminary Schedule of Submittals; and

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

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

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

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

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

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

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

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

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

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

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

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

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

3.02 *Reference Standards*

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

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

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

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

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

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

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

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

   b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

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

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

1. A Field Order;

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

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or

2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

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

3.06 *Electronic Data*

A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

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

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

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

4.01 *Availability of Lands*

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

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

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

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

4.02 *Subsurface and Physical Conditions*

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

1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

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

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

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

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

4.03 *Differing Subsurface or Physical Conditions*

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

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

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

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

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

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

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

C. *Possible Price and Times Adjustments:*

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

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

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

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

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

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

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

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

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

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

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

   a. reviewing and checking all such information and data;

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

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

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

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

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

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.

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

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

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

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

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

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

permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

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

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

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

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

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

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

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

5.02 *Licensed Sureties and Insurers*

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

5.03 *Certificates of Insurance*

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

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

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

D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.

E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

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

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

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

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

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

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

   b. by any other person for any other reason;

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

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

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

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners,

employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

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

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

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

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

6. include completed operations coverage:

    a. Such insurance shall remain in effect for two years after final payment.

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

5.05 *Owner's Liability Insurance*

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

5.06 *Property Insurance*

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

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of

them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

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

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

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

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

6. include testing and startup; and

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

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

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

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

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

5.07 *Waiver of Rights*

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

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

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

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

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

5.08 *Receipt and Application of Insurance Proceeds*

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

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

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

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

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

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

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

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

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

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

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

6.03 *Services, Materials, and Equipment*

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

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

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

6.04 *Progress Schedule*

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

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

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

6.05 *Substitutes and "Or-Equals"*

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

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

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

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

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

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

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

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

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

2. *Substitute Items:*

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

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

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

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

      1) shall certify that the proposed substitute item will:

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

         b) be similar in substance to that specified, and

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

      2) will state:

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

         b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

         c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

      3) will identify:

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

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

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

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

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

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

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

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

6.06 *Concerning Subcontractors, Suppliers, and Others*

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

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

entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

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

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

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

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

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

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

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

6.07 *Patent Fees and Royalties*

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

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

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

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

6.08 *Permits*

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

6.09 *Laws and Regulations*

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

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

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner

and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

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

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

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

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

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

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

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

6.12 *Record Documents*

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

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

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

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

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

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

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

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

any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

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

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

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

6.17 *Shop Drawings and Samples*

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

1. *Shop Drawings:*

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

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

2. *Samples:*

a. Submit number of Samples specified in the Specifications.

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

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

C. *Submittal Procedures:*

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

a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

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

c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

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

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

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

D. *Engineer's Review:*

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

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the

Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

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

E. *Resubmittal Procedures:*

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

6.18 *Continuing the Work*

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

6.19 *Contractor's General Warranty and Guarantee*

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

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

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

2. normal wear and tear under normal usage.

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

1. observations by Engineer;

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

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

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

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

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

7. any correction of defective Work by Owner.

6.20 *Indemnification*

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

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

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

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

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

6.21 *Delegation of Professional Design Services*

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

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

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

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

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

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

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

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

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

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

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

7.02 *Coordination*

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

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

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

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

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

7.03 *Legal Relationships*

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

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

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

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

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

8.03 *Furnish Data*

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

8.04 *Pay When Due*

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

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and

tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

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

8.07 *Change Orders*

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

8.08 *Inspections, Tests, and Approvals*

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

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements*

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

8.12 *Compliance with Safety Program*

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

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

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

9.02 *Visits to Site*

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

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

9.03 *Project Representative*

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

9.04 *Authorized Variations in Work*

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

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract

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

9.06 *Shop Drawings, Change Orders and Payments*

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

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

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

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

9.07 *Determinations for Unit Price Work*

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

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

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

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

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

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

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

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

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

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

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

9.10 *Compliance with Safety Program*

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

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

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

10.02 *Unauthorized Changes in the Work*

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

10.03 *Execution of Change Orders*

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

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

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

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

10.04 *Notification to Surety*

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

10.05 *Claims*

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

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the

start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

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

1. deny the Claim in whole or in part;

2. approve the Claim; or

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

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

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

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

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

11.01 *Cost of the Work*

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

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel

employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

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

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

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

5. Supplemental costs including the following:

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

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

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

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

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

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

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

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

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

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

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

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

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

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

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

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

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

11.02 *Allowances*

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

B. *Cash Allowances:*

1. Contractor agrees that:

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

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

C. *Contingency Allowance:*

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

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

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to

the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

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

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

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

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

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

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

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

12.01 *Change of Contract Price*

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

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

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

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

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

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

1. a mutually acceptable fixed fee; or

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

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

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

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

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

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

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

12.02 *Change of Contract Times*

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

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

12.03 *Delays*

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

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

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

D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

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

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

13.01 *Notice of Defects*

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

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

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

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

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

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

3. as otherwise specifically provided in the Contract Documents.

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

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

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

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

13.04 *Uncovering Work*

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

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

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

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

13.05 *Owner May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

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

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

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be

defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

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

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

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

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

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

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

13.08 *Acceptance of Defective Work*

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

appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

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

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

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

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

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

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

14.02 *Progress Payments*

A. *Applications for Payments:*

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

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

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

B. *Review of Applications:*

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

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

   a. the Work has progressed to the point indicated;

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

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

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

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

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

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

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

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

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

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

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

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

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

    b. the Contract Price has been reduced by Change Orders;

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

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

C. *Payment Becomes Due:*

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

D. *Reduction in Payment:*

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

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

   b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

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

   d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

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

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

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

14.04 *Substantial Completion*

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

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

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

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

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

14.05 *Partial Utilization*

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

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

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

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

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

14.06 *Final Inspection*

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

14.07 *Final Payment*

A. *Application for Payment:*

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

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

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

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

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

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

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for

which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

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

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

C. *Payment Becomes Due:*

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

14.08 *Final Completion Delayed*

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

14.09 *Waiver of Claims*

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

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06,

from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

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

15.02 *Owner May Terminate for Cause*

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

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

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

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

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

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

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

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

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

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

15.03 *Owner May Terminate For Convenience*

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

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

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

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

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

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

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

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

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

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

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

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

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

SECTION 00800

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC C-700) (2007 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

1.01.A.12 Replace in its entirety with the following:

"12. Contract Documents—The Contract Documents establish the rights and obligations of the parties and include 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 clarifications issued on or after the Effective Date of the Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents. Only printed or Hardcopies of the items listed in this paragraph are Contract Documents. Files in electronic format of text, data, graphics, and the like that may be furnished by Owner to Contractor are not Contract Documents."

1.01.A.44 First sentence, change: "in the opinion of the Engineer", to "in the opinion of Engineer and Owner".

1.02 Terminology

1.02.E and replace with the following:

1.02.E The words "furnish", "furnish and install", "install", and "provide" or words with similar meaning shall be interpreted, unless otherwise specifically stated, to mean "furnish and install complete in place and ready for service".

Add the following:

1.02.G The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract (EJCDC C-700, 2002 Edition) have the meanings assigned to them in the General Conditions.

ARTICLE 2 - PRELIMINARY MATTERS

Add the following:

2.00 Execution of Agreement:

2.00.A At least four counterparts of the Agreement will be executed and delivered by the Contractor to the OWNER within fifteen (15) days of the Notice of Award and receipt of Contract Documents by the Contractor for execution; and OWNER will execute and deliver one counterpart to Contractor within ten (10) days of receipt of the executed Agreement from Contractor.

2.01 Delivery of Bonds and Evidence of Insurance

2.01.B Replace “Before any Work at the Site is started, Contractor and Owner shall each deliver to the other” with “When Contractor delivers the executed counterparts of the Agreement to the Owner, Contractor shall deliver to the Owner”, and replace “and Owner respectively are” with “is”.

2.03 Commencement of Contract Times; Notice To Proceed:

2.03.A Delete in its entirety and substitute the following:

2.03.A The Contract Time will commence to run on the day indicated in the Notice to Proceed; but in no event will the Contract Time commence to run later than the ninetieth day after the day of Bid opening or the thirtieth day after the effective date of the Agreement. By mutual consent of the parties to the Contract, these time limits may be changed.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING AND REUSE

3.01 Intent:

Add the following:

3.01.D It is the intent of the Specification and Contract Documents to obtain an operable Project. Equipment, components, systems, etc., therein shall be made operable by the Contractor.

3.01.E The Contract Drawings may be supplemented from time to time with additional Drawings by the Engineer as may be required to illustrate the work or, as the work progresses, with additional Drawings, by the Contractor, subject to the

approval of the Engineer. Supplementary Drawings, when issued by the Engineer or by the Contractor, after approval by the Engineer, shall be furnished in sufficient quantity to all those who, in the opinion of the Engineer, are affected by such Drawings.

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

4.02 Subsurface and Physical Conditions:

4.02.A Delete: "the Supplementary Conditions", and substitute "Section 01010 - SUMMARY OF WORK".

4.02.B Second sentence, delete: "Supplementary Conditions" and substitute "Specifications and Contract Drawings".

4.04 Underground Facilities:

Add the following:

4.04.B.3 The 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.

4.06 Hazardous Environmental Condition at Site

4.06.A First sentence, delete "Supplementary Conditions" and substitute "Section 01010 – SUMMARY OF WORK."

4.06.B Second sentence, delete "Supplementary Conditions: and substitute "Specifications and Contract Drawings."

ARTICLE 5 - BONDS AND INSURANCE

Delete Article 5 in its entirety and substitute the following

5.01 Performance, Payment, Other Bonds

5.01.A Concurrent with execution of the Agreement and within fifteen (15) days of the Notice of Award, the successful Contractor shall procure, execute and deliver to the OWNER and maintain, at his own cost and expense, the following bonds, in the forms attached, of a surety company approved by the State of Tennessee as a Surety:

5.01.B Performance Bond - in an amount not less than 100% of the total amount payable to the Contractor by the terms of the Contract as security for the faithful performance of the work. Bond must be valid until one year after the date of issuance of the Certificate of Substantial Completion.

5.01.C Payment Bond - in an amount not less than 100% of the total amount payable to the Contractor by the terms of the Contract as security for the payment of all persons performing labor and furnishing material in connection with the work. Bond must be valid until one (1) year after date of issuance of the Certificate of Substantial Completion.

5.01.D All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

5.01.E If the Surety on any Bond furnished by the Contractor is declared bankrupt or becomes insolvent or its right to do business in the State of Tennessee is revoked, the Contractor shall within five (5) days thereafter substitute another Bond or Surety, both of which shall be acceptable to the OWNER.

5.02 Insurance Requirements

5.02.A Wherever in this Article the terms "The Insured" and OWNER occurs with respect to coverage in a policy, it shall mean the OWNER and its agent and agencies, all municipalities where work is being performed under the Contract, the Engineer, and any other parties specifically designated herein, who shall be named as additional insured in each policy issued, except the Worker's Compensation and Employer's Liability policy. The insurance policies required herein shall not contain any Third Party Beneficiary Exclusion.

5.02.B The OWNER and the Engineer shall be named as an additional insured on all policies except Professional Liability and Worker's Compensation and Employer's Liability; and it is required that coverage be placed with **"A"** or better or its equivalent rated insurance companies acceptable to the OWNER. Statement should read **City of Johnson City** and **Hazen and Sawyer** shall be added as an additional insured as evidenced by an endorsement attached to this certificate." The endorsement must be written on ISO Form CG20-10 and 20-37. Blanket coverage for general liability in lieu of being named as an additional insured is acceptable. Failure to maintain the required insurance in force may be cause for contract termination. In the event that the Contractor fails to maintain and keep in force the insurance herein required, the OWNER has the right to cancel and terminate the contract without notice.

5.02.C The Contractor shall not commence work under the Contract until he has obtained all insurance required under this Article and such insurance has been approved by the OWNER, nor shall the Contractor allow any Subcontractor to commence work on his Subcontract until all similar insurance required of the Subcontractor has been so obtained and approved.

5.02.D Provision of some types of insurance by a Subcontractor may be waived, at the option of the OWNER, where it is deemed that adequate coverage is provided by the Contractor's insurance.

5.02.E Subcontractors must, in all cases, provide Workers' Compensation and Employer's Liability Insurance and Motor Vehicle Liability Insurance.

5.02.F An authorized representative of the insurance company(ies) shall certify that all of the required insurance coverages and amounts specified hereinafter are provided by the submitted policies. The certification shall be signed by the authorized representatives of the insurance company(ies) and notarized. The authorized representative of the insurance company(ies) shall specifically indicate with the submittal which of the policies submitted fulfills which specific coverage and amounts specified under Article 5.03 of the Supplementary Conditions. The certification statement and correlation shall be furnished and included with the insurance certificates.

5.02.G One (1) copy of each such insurance policy and certificates indicating each type of coverage mentioned, and the correlation between the insurance furnished and that required, shall be filed with each of the Insured.

5.02.H All policies relating to this Contract shall be so written that each of The Insured shall be notified by the carrier of cancellation or change at least thirty (30) days prior to the effective date of such cancellation or change. Renewal certificates covering the renewal of all policies expiring during the life of the Contract shall be filed with each of The Insured not less than sixty (60) days before the expiration of such policies.

5.02.I The insurance carrier shall notify each of The Insured of the filing of any claims within thirty (30) days of the filing of such claim.

5.03 Contractors Liability Insurance

5.03.A The Contractor shall, at his own cost, take out and maintain during the life of this Contract, such Bodily Injury and Property Damage Insurance as will protect him, The Insured, and any Subcontractor performing work covered by this Contract from claims of any character for property damage or bodily injury, including death, and demands, suits, actions, recoveries and judgments against The Insured therefor, for which The Insured shall be or may become liable; which may arise from operations under this Contract whether such operations be by himself or by a Subcontractor or by anyone directly or indirectly employed by either of them, and as will also cover the contingent liability of the Insured, if any, which may arise from said operations under this Contract. The Contractor may elect to require his Subcontractors to provide their own insurance coverage in lieu of covering them under his own policy(ies). In that event, the Contractor shall certify to the OWNER, in writing, that all of his Subcontractor's are insured to the coverage and amounts specified herein. The Contractor shall maintain copies of all Subcontractors' insurance certificates at the project site. The amounts of such insurance shall be as follows and shall apply per project:

5.03.B <u>The following types of insurance shall be provided</u>:

1. <u>Workers' Compensation and Employer's Liability Insurance</u>. The Contractor shall take out and maintain during the life of this Contract, Workers' Compensation and Employer's Liability Insurance for all of his employees, employees employed at the site, and in case any work is sublet, the Contractor shall require the Subcontractor similarly to provide

Workers' Compensation and Employer's Liability Insurance for all employees of the latter unless such employees are covered by the protection afforded by the Contractor, in amounts p*er* Section 00450 Insurance Checklist.

2. Commercial General Liability.

   a. Contractor's Bodily Injury Insurance - Liability for Contractor's Bodily Injury Insurance shall be in the amounts specified.
   b. Contractor's Property Damage Insurance - Liability for Contractor's Property Damage Insurance shall be in the amounts specified.
   c. OWNER'S and Contractor's Protective Bodily Injury Insurance - Liability for OWNER'S and Contractor's Protective Bodily Injury Insurance shall be $2,000,000 per occurrence and $2,000,000 aggregate.

3. Automobile Liability Insurance:

   a. Bodily Injury Insurance covering the operation of all motor vehicles owned by the Contractor, or used by the Contractor in the prosecution of the work under the Contract, shall be in the amounts specified in Section 00450 Insurance Checklist.

4. Independent Contractors:
   a. In the amounts specified in Section 00450 Insurance Checklist.

5. Products/Completed Operations
   a. In the amounts specified in Section 00450 Insurance Checklist.

6. Contractual Liability
   a. In the amounts specified in Section 00450 Insurance Checklist.

7. Personal and Advertising Injury Liability
   a. In the amounts specified in Section 00450 Insurance Checklist.

8. Umbrella Liability
   a. Umbrella Liability Insurance shall be provided that provides additional coverage for all protection provided under the Contractor’s Commercial General Liability insurance.
   b. In the amounts specified in Section 00450 Insurance Checklist.

9. Builder’s Risk/Installation Floater
   a. Provide coverage in the full amount of contract

10. XCU Coverage
    a. Endorsement to CGL

11. OWNER'S and Contractor's Protective Property Damage Insurance Liability for OWNER'S and Contractor's Protective Property Damage Insurance shall be $2,000,000 per occurrence and $2,000,000 aggregate.

12. Pollution Liability
    a. In the amounts specified in Section 00450 Insurance Checklist.

13. Special Hazards Insurance. Bodily injury and property damage insurance shall be in the amount of $1,000,000 each offense, $1,000,000 annual aggregate when bodily injury and property damage results from the following special hazards:

    a. Blasting and explosion;

    b. Collapse of or structural injury to any structure due to the Contractor's operations;

    c. Damage to underground structures, pipes or conduits.

10. OWNER'S Fire and Extended Coverage Insurance - Builder's Risk (fire and extended coverage, including vandalism and malicious mischief) insurance for the life of the Contract upon all work in place, or materials at the site, or both, shall be in the amount of$1,000,000 each offense, $1,000,000 annual aggregate. The Contractor shall submit to the OWNER documentation as to the cost of this insurance coverage prior to obtaining policy. The OWNER may, if deemed to be in his best interest, obtain this coverage separately and receive a credit from the Contractor for the insurance cost.

11. Completed Operations Hazards Insurance - Completed operations hazards insurance is to be provided for all the named insured in the greater of the amount of $1,000,000 each offense, $6,000,000 annual aggregate. The intent of this Section is to provide coverage to all of the named insureds, for the period of the applicable statute of limitation, for any and all claims which may arise from operations under this Contract.

5.03.C If any of the property and casualty insurance requirements are not complied with at their renewal dates, payments to the Contractor will be withheld until these requirements have been met, or at the option of the OWNER, the OWNER may pay the renewal premiums and withhold such payments from any monies due to the Contractor.

5.03.D In the event that claims in excess of the insured amounts provided herein are filed by reason of any operations under the Contract, the amount of excess of such claims, or any portion thereof, may be withheld from payment due or to become due the Contractor until such time as the Contractor shall furnish such additional security covering such claims as may be determined by the OWNER.

5.03.E All policies and certificates of insurance of the Contractor shall contain the following clauses:

1. Insurers shall have no right of recovery or subrogation against the OWNER and its agents and agencies and the Engineer, it being the intention of the parties that the insurance policies so effected shall protect both parties and be primary coverage for any and all losses covered by the above described insurance.

2. The clause "other insurance provisions" in a policy in which the OWNER and its agents and agencies and the Engineer is named as an insured, shall not apply to these parties.

3. The insurance companies issuing the policy or policies shall have no recourse against the OWNER and its agents and agencies and the Engineer, for the payment of any premiums or for assessments under any form of policy.

4. Any and all deductibles in the above described insurance policies shall be assumed by and be for the amount of, and at the sole risk of the Contractor.

5.04 Indemnification Agreement:

5.04.A Indemnification - To the fullest extent permitted by law, Contractor shall indemnify and hold harmless OWNER and Engineer and their agents, Subconsultants and employees from and against all claims, damages, losses and expenses including but not limited to attorneys' fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury or to destruction of tangible property (other than Work itself) including the loss of use resulting therefrom (b) is caused in whole or in part by either (1) any negligent act or omission of Contractor, any Subcontractor, anyone directly or indirectly employed by any of them may be liable regardless of whether or not a party indemnified hereunder is partially negligent or (2) arises out of operation of law as a consequence of any act or omission of the Contractor, and Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether any of them has been negligent; provided however that no party shall be entitled to indemnification with respect to such party's own negligence. This provision is intended to indemnify to the fullest extent permitted by law both OWNER and Engineer independently of the negligence of the other and thus the OWNER'S negligence shall not preclude indemnification by Contractor of the Engineer, and Engineer's negligence shall not preclude indemnification by Contractor of OWNER.

5.06 Property Insurance:

5.06 A.7 Amend as follows: Be maintained in effect and remains primary until final payment is made unless otherwise agreed to in writing by OWNER,

CONTRACTOR, and ENGINEER with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.06 Concerning Subcontractors, Suppliers and Others:

6.06.B First sentence, delete: "If the Supplementary Conditions", and substitute "The Instructions to Bidders". The seventh line, delete: "Supplementary Conditions", and substitute "Instructions to Bidders".

6.06.G Delete in its entirety and substitute the following:

6.06.G All work performed for Contractor by a Subcontractor shall be pursuant to an appropriate agreement between the Contractor and Subcontractor. The Subcontractor shall not commence work until the Contractor has obtained all insurance as required by Paragraphs 5.02 through 5.03 inclusive.

6.07 Patent Fees and Royalties:

6.07 Delete 6.07.A, 6.07.B, and 6.07.C in their entirety and substitute the following:

6.07.A Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work of any invention, design, process, products or device which is the subject of patent rights or copyrights held by others. Contractor shall indemnify and hold harmless OWNER and Engineer and anyone directly or indirectly employed by either of them from and against all claims, damages, losses and expenses, including attorney's fees, arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work or furnished by him in fulfillment of the requirements of this Contract. In the event of any claim or action by law on account of such patents or fees, it is agreed that the OWNER may retain out of the monies which are or which may become due the Contractor under this Contract, a sum of money sufficient to protect itself against loss, and to retain the same until said claims are paid or are satisfactorily adjusted.

6.08 Permits: City and County road right-of-way

6.08.A Third sentence of paragraph delete, "or if there are no Bids.....to the Work.", and substitute "and the Contractor shall pay all charges of utility owners for connections to the Work."

6.09 Laws and Regulations:

6.09.B Delete 6.09.B in its entirety and substitute the following:

6.09.B If Contractor observes that the Specifications or Drawings are at variance with any Laws or Regulations, he shall give Engineer prompt written notice thereof. If Contractor performs any Work knowing it to be contrary to such Laws or

Regulations, and without such notice to Engineer, he shall bear all costs arising therefrom. The Contractor shall, at all times, observe and comply with and shall cause all his agents and employees and all his Subcontractors to observe and comply with all such existing Laws or Regulations, and shall protect and indemnify the OWNER and the Engineer and the municipalities in which work is being performed, and their officers and agents against any claim, civil penalty, fine or liability arising from or based on the violation of any such Law or Regulation, whether by himself or his employees or any of his Subcontractors.

6.13 Safety and Protection:

6.13.B First sentence, after "CONTRACTOR" add the following:

", subject to provisions 6.09.B,"

6.19 Contractor's General Warranty and Guarantee:

6.19.A After the first sentence of Section 6.19.A add the following:

"All materials or equipment delivered to the site shall be accompanied by certificates, signed by an authorized officer of the supplier, and notarized guaranteeing that the materials or equipment conform to specification requirements. Such certificates shall be immediately turned over to the Engineer. Materials or equipment delivered to the site without such certificates will be subject to rejection."

6.20 Indemnification:

6.20.A First sentence, after "…claims, costs" add the following:

", civil penalties, fines,"

6.20.C Add the following:

6.20.C.3 Nothing in the Contract Documents shall create or give to third parties any claim or right of action against the Contractor, the OWNER or the Engineer beyond such as may legally exist irrespective of the Contract.

ARTICLE 7 - OTHER WORK AT THE SITE

7.02 Coordination:

Delete in its entirety.

7.03 Legal Relationships

7.03.B Delete “Owner and”.

7.03.C Delete “Owner and”.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.02 Replacement of Engineer

8.02.A Delete in its entirety.

8.06 Insurance

8.06.A Delete in its entirety.

8.11 Evidence of Financial Arrangements

8.11.A Delete in its entirety.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 OWNER'S Representative:

9.01.A Delete in its entirety and substitute the following:

9.01.A Engineer will be the OWNER'S representative during the construction period, and his instructions shall be carried into effect promptly and efficiently.

9.02 Visits to the Site:

9.02.A Delete in its entirety.

9.03 Project Representative:

Add the following:

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

9.03.C The Resident Project Representative shall conduct on-site observations of the work in progress to confirm that the work is proceeding in accordance with the Contract Documents. He will verify that tests, equipment and systems start-ups and operating and maintenance instructions are conducted as required by the Contract Documents. He will have the authority to disapprove or reject defective work in accordance with Article 13.

9.09 Limitations on Engineer's Authority and Responsibilities:

Add the following:

9.09.F Except upon written instructions of the Engineer, the Resident Project Representative:

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

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

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

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

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

ARTICLE 11 – COST OF THE WORK; CASH ALLOWANCES, UNIT PRICE WORK

11.01 Cost of the Work:

11.01.A.1 Last sentence, following "…in Paragraph 11.01.B," insert the following:

"or claims for extra cost shall be considered based on an escalation of labor costs throughout the period the Contract,"

11.01.A.2 Add the following at the end of the paragraph:

"No claims for extra cost shall be considered based on an escalation of material costs throughout the period of the Contract."

11.01.A.3 Delete second sentence "If required ... be acceptable."

11.01.A.4 Delete in its entirety.

11.01.A.5.a Delete in its entirety.

11.01.A.5.c Add the following before last sentence of paragraph:

"These rates shall include all fuel, lubricants, insurance, etc. Equipment rental charges shall not exceed the prorated monthly rental rates listed in the current edition of the 'Compilation' of Rental Rates for Construction Equipment" as published by the Associated Equipment Distributors. Charges per hour shall be determined by dividing the monthly rates by 176."

11.01.A.5.f Delete in its entirety.

11.01.A.5.g Delete in its entirety.

11.01.A.5.h Delete in its entirety.

11.03 Unit Price Work

11.03.D.1 Delete "materially and significantly", and insert "by more than plus or minus twenty percent (20%)".

ARTICLE 12 – CHANGE OF CONTRACT PRICE OF CONTRACT TIMES

12.03 Delays

12.03.A Add the following sentence at the end of paragraph: Delays as a result of epidemics and pandemics shall be considered delays beyond the control of the Contractor.

12.03.B Delete in its entirety and substitute the following:

12.03.B Delays beyond the control of the Contractor, as provided in paragraph 12.03.A, shall not entitle the Contractor to obtain additional project overhead costs unless such delays extend the Project as described below:

1. beyond the original Contract Times,

2. beyond the Contract Times for which the overhead costs have been previously approved, or

3. beyond Contract Times that are extended as a result of delays described in 12.03.C.

For the purpose of this paragraph, overhead costs shall be the supplemental costs defined in 11.01.A.5, paragraphs a,b,c,g,h and i. The Contractor's bid shall include all overhead costs as necessary to be on the Project for the original Contract Times.

12.03.C Add the following after the last sentence:

Delays described in this Paragraph 12.03.C shall be determined as follows:

1. Contractor shall obtain weather history for the most recent five (5) years (minimum) preceding the Bid date. Weather history shall be obtained from the National Oceanic & Atmospheric Administration (NOAA) or other source approved by the Engineer. Historical weather shall be based on data from the weather reporting station closest to the project site.

2. For delays associated with an abnormal amount of rain, the Contractor shall use the weather history to calculate an average number of days that rainfall exceeded 0.1-inches for the period (month, quarter, year, etc.) in question. The average value calculated shall be rounded up to the next full day. The Contractor will be awarded a time extension equal to the number of days, above the calculated average, that the period in question experienced rainfall in excess of 0.1- inches. A Contract Time extension will not be awarded for rain amounts less than 0.1-inches.

3. For daily rain amounts in excess of 1-inch the Contractor shall be awarded one day beyond the number of days calculated as described above. The added day shall be a recovery period for the Contractor to perform site maintenance, to dewater the site and to restore erosion control facilities before resuming work.

4. For delays associated with other abnormal weather events, the weather history shall be used to calculate an average number of days for the type of weather considered to be the cause of a delay. (Calculation of the average number of days shall be as described above.) The Contractor will be awarded a time extension equal to the number of days beyond the calculated average for the period in question. Where the Contractor can demonstrate that the abnormal weather event has impaired his ability to perform work, beyond the day of the abnormal event, a recovery day, or days, to perform site maintenance as necessary to restore the site to a workable condition may be awarded. The recovery days may be awarded if requested in writing by the Contractor and approved by the Engineer. Written requests for recovery days shall include a description of work activities performed during the recovery days.

5. Documentation for rain days must be included in the monthly pay applications for review. Request for delays due to rain not documented in the monthly pay applications will not be allowed.

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

13.03 Tests and Inspections:

13.03.B Delete in its entirety and substitute the following:

13.03.B OWNER shall employ and pay for inspections and testing services specifically noted as such in the Contract as paid by OWNER. All others required to complete the project shall be the responsibility of the Contractor.

13.03.C Delete in its entirety and substitute the following:

13.03.C If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any Work to be specifically inspected, tested, or approved by some public body, Contractor shall assume full

responsibility therefore, pay all costs in connection therewith and furnish Engineer the required certificates of inspection, testing or approval.

Add the following:

13.03.G The OWNER reserves the right to independently perform at its own expense, laboratory tests on random samples of material or performance tests on equipment delivered to the site. These tests if made will be conducted in accordance with the appropriate referenced standards or Specification requirements. The entire shipment represented by a given sample, samples or piece of equipment may be rejected on the basis of the failure of samples or pieces of equipment to meet specified test requirements. All rejected materials or equipment shall be removed from the site, whether stored or installed in the Work, and the required replacement shall be made, all at no additional cost to the OWNER.

13.05 OWNER May Stop the Work:

13.05.A First sentence, after “...conform to the Contract Documents”, insert "or if the Work interferes with the operation of the existing facility".

13.06 Correction or Removal of Defective Work:

Add the following:

13.06.C At any time during the progress of the Work and up to the date of final acceptance, the Engineer shall have the right to reject any work which does not conform to the requirements of the Contract Documents, even though such work has been previously inspected and paid for. Any omissions or failure on the part of the Engineer to disapprove or reject any Work or materials at the time of inspection shall not be construed as an acceptance of any defective work or materials.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Schedule of Values:

Add the following:

14.01.B The Contractor shall submit for the Engineer's approval, a complete breakdown of all Lump Sum Items in the Proposal. This breakdown, modified as directed by the Engineer, will be used as a basis for preparing estimates and establishing progress payments.

14.01.C A Lump Sum Payment consistent with criteria set forth in the 01025 Measurement and Payment shall be made as described.

14.02 Progress Payments:

14.02.A.3 Delete in its entirety and replace with the following:

14.02.A.3 Progress payment request shall include a percentage of the total amount of the Contract which has been completed from the start-up of the Project to and including the last day of the preceding month, or other mutually agreed upon day of the month accompanied by such data and supporting evidence as OWNER or Engineer may require.

Add the following:

14.02.A.4 Forms to be used shall be prepared by the Contractor and submitted to the Engineer for approval.

14.02.A.5 At the option of the OWNER, partial payment up to the estimated value, less retainage, may be allowed for any materials and equipment not incorporated in the Work, pursuant to the following conditions:

a. Major equipment items stored off site shall be stored in a bonded warehouse and properly maintained during storage.

b. Equipment or materials stored on the site shall be properly stored, protected and maintained.

c. For any partial payment the Contractor shall submit, with his monthly progress payment from each material or equipment manufacturer, bills or invoices indicating actual material cost.

d. Contractor shall submit evidence that he has paid for materials or equipment stored and for which the Engineer has authorized partial payment and previous progress payments, prior to submission of the next monthly payment request.

14.02.A.6 The OWNER will retain five percent (5%) of the amount of each such estimate until Work covered by the Contract is Substantially Complete. After Substantial Completion of the original Contract has been completed as evidenced by approved Partial Payment Requests exclusive of stored materials and in the opinion of the OWNER, satisfactory progress is being made, the OWNER may adjust future partial payments so that 0 percent (0%) of the amount of each such estimate is retained until Work covered by the Contract has reached Final Completion.

14.02.A.7 If the OWNER determines it is appropriate to reduce retainage, the method used for such adjustment shall be to fix retainage at five percent (5%) of the original Contract amount (when the work is 50% complete) and to pay all subsequent Partial Payment Requests to the full approved amount. The intent of such an adjustment is to gradually reduce retainage to 0 percent (0%) of the original Contract amount when the work is one hundred percent (100%) complete.

14.02.B.1 Review of Applications:

First sentence, delete "10 days", insert "30 days".

14.02.C.1 Payment Becomes Dues:

First sentence, delete “Ten days” and insert “Thirty Days”.

14.02.D.3 Delete “as provided in the Agreement” and replace with “equal to the federal funds rate as established from time to time by the Federal Open Market Committee of the United States Federal Reserve.”

14.04 Substantial Completion:

14.04 Delete paragraphs A, B, C and D in their entirety and substitute the following:

14.04.A Contractor may, in writing to OWNER and Engineer, certify that the entire Project is substantially complete 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 Project to determine the status of completion. If Engineer and OWNER do not consider the Project substantially complete, Engineer will notify Contractor in writing giving his reasons therefor. If Engineer and OWNER consider the Project substantially complete, Engineer will prepare and deliver to OWNER a tentative certificate of Substantial Completion and the responsibilities between OWNER and Contractor for maintenance, heat and utilities. There shall be attached to the certificate a tentative list of items to be completed or corrected before Substantial Completion, and the certificate shall fix the time within which such items shall be completed or corrected, said time to be within Contract Time.

14.05 Partial Utilization:

14.05.A Delete in its entirety and substitute the following:

14.05.A Prior to Substantial Completion of the Project, OWNER may request Contractor in writing to permit him to use a specified part of the Project which he believes he may use without significant interference with construction of the other parts of the Project. If Contractor agrees, he will certify to OWNER and Engineer that said part of the Project is substantially complete and request the Engineer to issue a certificate of Substantial Completion for that part of the Project. Within a reasonable time thereafter, OWNER, Contractor and Engineer shall make an inspection of that part of the Project to determine its status of completion. If Engineer and OWNER do not consider that it is substantially complete, Engineer will notify Contractor in writing giving his reasons therefor. If Engineer and OWNER consider that part of the Project to be substantially complete, Engineer will execute and deliver to OWNER and Contractor a certificate to that effect, fixing the date of Substantial Completion as to that part of the Project, attaching thereto a tentative list of items to be completed or corrected before Substantial Completion of the entire Project and fixing the responsibility between OWNER and Contractor for Maintenance, heat, and utilities as to that part of the Project.

OWNER shall have the right to exclude Contractor from any part of the Project which Engineer has so certified to be substantially complete, but OWNER shall allow Contractor reasonable access to complete items on the tentative list.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 Owner May Suspend Work

Add the following:

15.01.B Should the OWNER suspend Work due to repeated unsafe Work conducted by the CONTRACTOR which is confirmed by subsequent inspection by OSHA, the CONTRACTOR shall not be allowed any adjustment in Contract Price or extension of Contract Time attributed to this delay.

15.02 Owner May Terminate for Cause

15.02.A.2 Add the following to the end of first sentence after "jurisdiction":

"(including those governing employee safety)"

15.02.D Delete in its entirety.

Add the following:

15.05 Assignment of Contract:

15.05.A Contractor shall not assign, transfer, convey or otherwise dispose of the Contract, or of his legal right, title, or interest in or to the same or to any part thereof, without the prior written consent of the OWNER. Contractor shall not assign by power of attorney or otherwise any monies due him and payable under this Contract without the prior written consent of the OWNER. Such consent, if given, will in no way relieve the Contractor from any of the obligations of this Contract. OWNER shall not be bound to abide by or observe the requirements of any such assignment.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 Methods and Procedures

16.01.A Replace the first sentence with the following:

"If required by applicable laws and regulations, and not specifically excluded elsewhere, either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding."

ARTICLE 17 - MISCELLANEOUS

17.01 Giving Notice:

Add the following:

17.01.B No oral statement of any person whomsoever shall in any manner or degree modify or otherwise affect the terms of this Contract. Any notice to the Contractor, from OWNER and Engineer, relative to any part of this Contract shall be in writing.

Add the following:

ARTICLE 18 - LIQUIDATED DAMAGES FOR FAILURE TO COMPLETE WORK ON TIME

18.01 Liquidated Damages

18.01.A If the Contractor shall fail to complete the Work within the Contract Time, or extension of time granted by the OWNER in accordance with Article 12, then the Contractor will pay to the OWNER the amount for liquidated damages as specified in the Contract for each calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents.

18.01.B The Contractor shall not be charged with liquidated damages or any excess cost when delay in completion of the Work is due to the following and the Contractor has promptly given written notice of such delay to the OWNER or Engineer:

18.01.C To any preference, priority or allocation order duly issued by the OWNER.

18.01.D To unforeseeable causes 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 abnormal and unforeseeable weather; and

18.01.E To any delays of Subcontractors occasioned by any of the causes specified in Paragraphs 18.01.C and 18.01.D of this Article.

ARTICLE 19 – SANITARY SEWER OVERFLOW

19.01.A The Contractor is responsible for providing adequate sewer bypass pumping and 24/7 management of the sewer bypass pumping system during construction activities performed under the contract. In anticipation of excessive rain events, Contractor shall connect new sanitary sewer pipe to existing sanitary sewer pipe and temporarily decommission the sewer bypass system. Any reportable sanitary sewer overflow (SSO) event caused as a direct result of the Contractor's activities during the project will result in a non-disputable damage amount of $10,000.00 per occurrence paid to the Owner.

END OF SECTION

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CHANGE ORDER

No. _____

DATE OF ISSUANCE _____ EFFECTIVE DATE

OWNER City of Johnson City, Tennessee

CONTRACTOR

Contract:

Project:

OWNER's Contract No. _____ ENGINEER's Contract No. JCT603

ENGINEER

You are directed to make the following changes in the Contract Documents.

Description:

Reason for Change Order:

Attachments: (List documents supporting change)

CHANGE IN CONTRACT PRICE:	**CHANGE IN CONTRACT TIMES:**
Original Contract Price $	Original Contract Times: Substantial Completion: Ready for final payment: (days or dates)
Net Increase (Decrease) from previous Change Orders No.__ to No. $	Net changes from previous Change Orders No._____ to No._____: Substantial Completion: Ready for final payment: (days)
Contract Price prior to this Change Order $	Contract Times prior to this Change Order Substantial Completion: Ready for final payment: (days or dates)
Net Increase (decrease) of this Change Order $	Net Increase (decrease) of this Change Order Substantial Completion: Ready for final payment: (days)
Contract Price with all approved Change Orders $	Contract Times prior to this Change Order Substantial Completion: Ready for final payment: (days or dates)

RECOMMENDED:	APPROVED:	ACCEPTED:
BY:	BY:	BY:
ENGINEER (Authorized Signature)	OWNER (Authorized Signature)	CONTRACTOR (Authorized Signature)
DATE:	DATE:	DATE:

Field Order

No. _____

Date of Issuance: _____ Effective Date: _____

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

Attention:
You are hereby directed to promptly execute this Field Order issued in accordance with General Conditions Paragraph 9.04.A, for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Engineer immediately and before proceeding with this Work.

Reference: _____ _____
(Specification Section(s)) (Drawing(s) / Detail(s))

Description: _____

Attachments: _____

	Engineer:
Receipt Acknowledged by Contractor:	Date:

Copy to Owner

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.

By:	Date:

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)

Approved by: _____ _____
Funding Agency (if applicable) (Date)

Progress Estimate

Contractor's Application

For (contract):	Application Number:
Application Period:	Application Date:

A		B	Work Completed		E	F		G
Item			C	D		Total Completed and Stored to Date (C + D + E)	% (F) B	Balance to Finish (B - F)
Specification Section No.	Description	Scheduled Value	From Previous Application (C + D)	This Period	Materials Presently Stored (not in C or D)			
	Totals							

Progress Estimate

Contractor's Application

For (contract):	Application Number:
Application Period:	Application Date:

A				B	C	D	E	F		G
Item		Bid Quantity	Unit Price	Bid Value	Estimated Quantity Installed	Value	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F) B	Balance to Finish (B - F)
Bid Item No.	Description									
	Totals									

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							

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Work Change Directive No.

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

Contractor is directed to proceed promptly with the following change(s):

Description:

Attachments: *[List documents supporting change]*

Purpose for Work Change Directive:

Directive to proceed promptly with the Work described herein, prior to agreeing to changes on Contract Price and Contract Time, is issued due to: *[check one or both of the following]*

☐ Non-agreement on pricing of proposed change.

☐ Necessity to proceed for schedule or other Project reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price $ [increase] [decrease].

Contract Time days [increase] [decrease].

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price

☐ Cost of the Work ☐ Other

RECOMMENDED:	AUTHORIZED BY:	RECEIVED:
By:	By:	By:
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title:	Title:	Title:
Date:	Date:	Date:

Approved by Funding Agency (if applicable)

By: Date:

Title:

CERTIFICATION BY PROPOSED PRIME OR SUBCONTRACTOR REGARDING EQUAL EMPLOYMENT OPPORTUNITY

_____

Name of Prime Contractor **Project Number**

INSTRUCTIONS

This certification is required pursuant to Executive Order 11246, Part II, Section 203 (b), 30 F.R. 12319-25). 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 indicated that the prime or subcontractor has not filed a compliance report due under applicable instruction, such contractor shall be required to submit a compliance report.

CONTRACTOR'S CERTIFICATION

Contractor's Name: _____

Address: _____

_____

_____

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 □

   If yes, state what reports were filed and with what agency.

   _____

3. Bidder has filed all compliance reports due under applicable instructions, including SF-100. Yes □ No □

4. If answer to Item 3 is NO, please explain in detail on reverse side of this certification.

Certification - The information above is true and complete to the best of my knowledge and belief. (A willfully false statement is punishable by law-U.S. Code, Title 18, Section 1001.)

_____

Name and title of signer (Please type)

_____ _____

Signature **Date**

U.S. Environmental Protection Agency

CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILTITY MATTERS

The prospective participant certifies to the best of its knowledge and belief that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

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

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

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

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

_____

Typed Name & Title of Authorized Representative

_____

Signature of Authorized Representative Date

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

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Tenn. Code Ann. § 66-34-103

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Tennessee Code Annotated Title 66 Property Chapter 34 Prompt Pay Act Part 1 General Provisions

66-34-103. Withholding of retainage -- Violations -- Penalties.

(a) All construction contracts on any project in this state, both public and private, may provide for the withholding of retainage; provided, however, that the retainage amount may not exceed five percent (5%) of the amount of the contract.

(b) The owner, whether public or private, shall release and pay all retainages for work completed pursuant to the terms of any contract to the prime contractor within ninety (90) days after completion of the work or within ninety (90) days after substantial completion of the project for work completed, whichever occurs first. As used in this subsection (b), work completed shall be construed to mean the completion of the scope of the work and all terms and conditions covered by the contract under which the retainage is being held. The prime contractor shall pay all retainages due any subcontractor within ten (10) days after receipt of the retainages from the owner. Any subcontractor receiving the retainage from the prime contractor shall pay to any subsubcontractor or material supplier all retainages due the subsubcontractor or material supplier within ten (10) days after receipt of the retainages.

(c) Any default in the making of the payments shall be subject to those remedies provided in this part.

(d) In the event that an owner or prime contractor withholds retainage that is for the use and benefit of the prime contractor or its subcontractors pursuant to § 66-34-104(a) and (b), neither the prime contractor nor any of its subcontractors shall be required to deposit additional retained funds into an escrow account in accordance with § 66-34-104(a) and (b).

(e)

(1) It is an offense for a person, firm or corporation to fail to comply with subsection (a) or (b) or § 66-34-104(a).

(2)

(A) A violation of this subsection (e) is a Class A misdemeanor, subject to a fine only of three thousand dollars ($3,000).

(B) Each day a person, firm or corporation fails to comply with subsection (a) or (b) or § 66-34-104(a) is a separate violation of this subsection (e).

(C) Until the violation of this subsection (e) is remediated by compliance, the punishment for each violation shall be consecutive to all other such violations.

(3) In addition to the fine imposed pursuant to subdivisions (e)(2)(A) and (B), the court shall order restitution be made to the owner of the retained funds. In determining the appropriate amount of restitution, the formula stated in § 40-35-304 shall be used.

History

Acts 2007, ch. 201, § 3; 2008, ch. 804, § 3; 2012, ch. 609, § 1.

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Date and Time: Aug 24, 2018 01:08:56 p.m. EDT

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Tenn. Code Ann. § 66-34-104

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Tennessee Code Annotated Title 66 Property Chapter 34 Prompt Pay Act Part 1 General Provisions

66-34-104. Retention of portion of contract price in escrow -- Applicability -- Mandatory compliance.

(a) Whenever, in any contract for the improvement of real property, a certain amount or percentage of the contract price is retained, that retained amount shall be deposited in a separate, interest-bearing, escrow account with a third party which must be established upon the withholding of any retainage.

(b) As of the time of the withholding of the retained funds, the funds shall become the sole and separate property of the prime contractor or remote contractor to whom they are owed, subject to the rights of the person withholding the retainage in the event the prime contractor or remote contractor otherwise entitled to the funds defaults on or does not complete its contract.

(c) In the event that the party withholding the retained funds fails to deposit the funds into an escrow account as provided herein, such party shall be responsible for paying the owner of the retained funds an additional three hundred dollar ($300) penalty per day for each and every day that such retained funds are not deposited into such escrow account.

(d) The party with the responsibility for depositing the retained amount in a separate, interest-bearing, escrow account with a third party shall have the affirmative duty to provide written notice that it has complied with the requirements of this section to any prime contractor upon withholding the amount of retained funds from each and every application for payment, including:

(1) Identification of the name of the financial institution with whom the escrow account has been established;

(2) Account number; and

(3) Amount of retained funds that are deposited in the escrow account with the third party.

(e) Upon satisfactory completion of the contract, to be evidenced by a written release by the owner or prime contractor owing the retainage, all funds accumulated in the escrow account together with all interest on the account shall be paid immediately to the prime contractor or remote contractor to whom the funds and interest are owed.

(f) In the event the owner or prime contractor, as applicable, fails or refuses to execute the release provided for in subsection (c), then the prime contractor or remote contractor, as applicable, may seek any remedy in a court of proper jurisdiction and the person holding the fund as escrow agent shall bear no liability for the nonpayment of the fund to the prime contractor or remote contractor; provided, however, that all claims, demands, disputes, controversies, and differences that may arise between the owner, prime contractor or prime contractors, and remote contractor or remote contractors regarding the funds may be, upon written agreement of all parties concerned, settled by arbitration conducted pursuant to the Tennessee Uniform Arbitration Act, compiled in title 4, chapter 5, part 3, or the Federal Arbitration Act (9 U.S.C. § 1, et seq.), as may be applicable.

(g) In contracts to which the state or any department, board or agency of the state, including the University of Tennessee, is a party, interest shall be paid on the retained amounts at the same rate interest is paid on the funds of local governments participating in the local government investment pool established pursuant to § 9-4-704, for the contract period.

(h) This section shall be applicable to the state, any department, board or agency of the state, including the University of Tennessee, and all counties and municipalities and all departments, boards or agencies of the counties and municipalities, including all school and education boards, and any other subdivision of the state.

(i) This section shall be applicable to all prime contracts and all subcontracts thereunder for the improvement of real property when the contract amount of such prime contract is five hundred thousand dollars ($500,000) or greater, notwithstanding the amount of such subcontracts.

(j) Compliance with this section shall be mandatory, and may not be waived by contract.

(k) Failure to deposit the retained funds into an escrow account as provided herein, within seven (7) days' receipt of written notice regarding such failure, is a Class A misdemeanor.

History

Acts 1975, ch. 345, §§ 1-4; T.C.A., §§ 64-1148 -- 64-1151; Acts 1985, ch. 340, §§ 1, 2; 1986, ch. 551, § 9; 2007, ch. 189, § 43; 2007, ch. 201, §§ 1, 2; T.C.A. § 66-11-144; Acts 2008, ch. 804, §§ 1, 2; 2010, ch. 875, §§ 1, 2; 2012, ch. 609, §§ 2-5.

TENNESSEE CODE ANNOTATED

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Tennessee Code Annotated Title 66 Property Chapter 34 Prompt Pay Act Part 2 Owner/Contractor Payment

66-34-203. Withholding of payment or retainage by owner.

Nothing in this chapter shall prevent the owner from reasonably withholding payment or a portion of a payment to the contractor; provided, that such withholding is in accordance with the written contract between the owner and the contractor. The owner may also withhold a reasonable amount of retainage as specified in the written contract between the owner and the contractor; provided, however, that the retainage amount may not exceed five percent (5%) of the amount of the contract.

History

Acts 1991, ch. 45, § 1; 2007, ch. 201, § 4.

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EMPLOYEE RIGHTS
UNDER THE DAVIS-BACON ACT

FOR LABORERS AND MECHANICS EMPLOYED ON FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION PROJECTS

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

PREVAILING WAGES — You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this Notice for the work you perform.

OVERTIME — You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.

ENFORCEMENT — Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Davis-Bacon contract clauses allow contract termination and debarment of contractors from future federal contracts for up to three years. A contractor who falsifies certified payroll records or induces wage kickbacks may be subject to civil or criminal prosecution, fines and/or imprisonment.

APPRENTICES — Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.

PROPER PAY — If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

or contact the U.S. Department of Labor's Wage and Hour Division.

For additional information:

1-866-4-USWAGE

(1-866-487-9243) TTY: 1-877-889-5627

WWW.WAGEHOUR.DOL.GOV

U.S. Department of Labor | Employment Standards Administration | Wage and Hour Division

WH 1321(Revised April 2009)

DERECHOS DEL EMPLEADO
BAJO LA LEY DAVIS-BACON

PARA OBREROS Y MECÁNICOS EMPLEADOS EN PROYECTOS DE CONSTRUCCIÓN FEDERAL O CON ASISTENCIA FEDERAL

LA SECCIÓN DE HORAS Y SUELDOS DEL DEPARTAMENTO DE TRABAJO DE EEUU

SALARIOS PREVALECIENTES
No se le puede pagar menos de la tasa de pago indicada en la Decisión de Salarios Davis-Bacon fijada con este Aviso para el trabajo que Ud. desempeña.

SOBRETIEMPO
Se le ha de pagar no menos de tiempo y medio de su tasa básica de pago por todas las horas trabajadas en exceso de 40 en una semana laboral. Existen pocas excepciones.

CUMPLIMIENTO
Se pueden retener pagos por contratos para asegurarse que los obreros reciban los salarios y el pago de sobretiempo debidos, y se podría aplicar daños y perjuicios si no se cumple con las exigencias del pago de sobretiempo. Las cláusulas contractuales de Davis-Bacon permiten la terminación y exclusión de contratistas para efectuar futuros contratos federales hasta tres años. El contratista que falsifique los registros certificados de las nóminas de pago o induzca devoluciones de salarios puede ser sujeto a procesamiento civil o criminal, multas y/o encarcelamiento.

APRENDICES
Las tasas de aprendices sólo se aplican a aprendices correctamente inscritos bajo programas federales o estatales aprobados.

PAGO APROPIADO
Si Ud. no recibe el pago apropiado, o precisa de información adicional sobre los salarios aplicables, póngase en contacto con el Contratista Oficial que aparece abajo:

o póngase en contacto con la Sección de Horas y Sueldos del Departamento de Trabajo de EEUU.

Para obtener información adicional:

1-866-4-USWAGE

(1-866-487-9243) TTY: 1-877-889-5627

WWW.WAGEHOUR.DOL.GOV

U.S. Department of Labor | Employment Standards Administration | Wage and Hour Division

WH 1321 SPA (Revised April 2009)

"General Decision Number: TN20200143 01/03/2020

Superseded General Decision Number: TN20190143

State: Tennessee

Construction Type: Heavy
Including Water and Sewer Line Construction

Counties: Carter and Washington Counties in Tennessee.

HEAVY CONSTRUCTION PROJECTS (including sewer/water construction).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.80 for calendar year 2020 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, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.80 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 calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020

* ELEC0934-005 06/01/2019

	Rates	Fringes
ELECTRICIAN	$ 22.04	16.75%+8.26

ENGI0917-022 05/01/2017

	Rates	Fringes
Operating Engineers:		
Bulldozer and Crane	$ 28.26	10.10
Forklift	$ 25.97	10.10

SUTN2009-142 12/02/2009

	Rates	Fringes
LABORER: Common or General	$ 8.98	0.00
LABORER: Flagger	$ 8.73	0.00
LABORER: Pipelayer	$ 11.69	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 17.15	0.00
OPERATOR: Loader	$ 13.50	0.00
TRUCK DRIVER: Dump Truck	$ 10.76	0.00

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

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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 www.dol.gov/whd/govcontracts.

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

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

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

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

Union Average Rate Identifiers

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

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the

Branch of Construction Wage Determinations. Write to:

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

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

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

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

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

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

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

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END OF GENERAL DECISION
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Project Wage Rate Sheet

U.S. Department of Housing and Urban Development
Office of Labor Relations

PROJECT NAME:	**WAGE DECISION NUMBER/MODIFICATION NUMBER:**
PROJECT NUMBER:	**PROJECT COUNTY:**

WORK CLASSIFICATION	**BASIC HOURLY RATE (BHR)**	**FRINGE BENEFITS**	**TOTAL HOURLY WAGE RATE**	**LABORERS FRINGE BENEFITS:**		**$**
				GROUP #	**BHR**	**TOTAL WAGE**
Bricklayers			**$**			
Carpenters			**$**			**$**
Cement Masons			**$**			**$**
Drywall Hangers			**$**			**$**
Electricians			**$**			**$**
Iron Workers			**$**			**$**
Painters			**$**	**OPERATORS FRINGE BENEFITS:**		**$**
				GROUP #	**BHR**	**TOTAL WAGE**
Plumbers			**$**			
Roofers			**$**			**$**
Sheet Metal Workers			**$**			**$**
Soft Floor Layers			**$**			**$**
Tapers			**$**			**$**
Tile Setters			**$**	**TRUCK DRIVERS FRINGE BENEFITS:**		**$**
				GROUP #	**BHR**	**TOTAL WAGE**
OTHER CLASSIFICATIONS						
			$			**$**
			$			**$**
			$			**$**

ADDITIONAL CLASSIFICATIONS (HUD Form 4230-A)

WORK CLASSIFICATION	**BASIC HOURLY RATE**	**FRINGE BENEFITS**	**TOTAL HOURLY WAGE RATE**	**DATE OF HUD SUBMISSION TO DOL**	**DATE OF DOL APPROVAL**
			$		
			$		
			$		
			$		

STATE REVOLVING FUND LOAN PROGRAM

Bidder's Requirements

Davis-Bacon Act Wage Determination

The Loan Recipient must ensure the bidder is in compliance with the Davis-Bacon Act as outlined below. Additionally, ten (10) days prior to the scheduled bid opening date, the wage rates need to be checked to ensure they have not changed.

The Davis-Bacon Act as amended, requires that each contract over $2,000 to which the United States or the District of Columbia is a party for the construction, alteration, or repair of public buildings or public works shall contain a clause setting forth the minimum wages to be paid to various classes of laborers and mechanics employed under the contract. Under the provisions of the Act, contractors or their subcontractors are to pay workers employed directly upon the site of the work no less than the locally prevailing wages and fringe benefits paid on projects of a similar character. The Davis-Bacon Act directs the Secretary of Labor to determine such local prevailing wage rates.

The **wage determination** (including any additional **classifications** and **wage rates** conformed) **and** a Davis-Bacon poster (WH-1321) **must be posted on the work site at all times** by the contractor and its subcontractors in a prominent and accessible place where it can be easily seen. The WH-1321 poster **may be obtained at no charge** from offices of the Wage and Hour Division.

With each **pay estimate** submitted, the contractors **must submit** a certification stating that workers have been paid the current prevailing wage rates for each classification according to the Davis-Bacon wage rate schedule currently in effect for this project.

Wage Determinations

A "wage determination" is the listing of wage rates and fringe benefit rates for each classification of laborers and mechanics which the Administrator of the Wage and Hour Division of the U.S. Department of Labor has determined to be prevailing in a given area for a particular type of construction (e.g., building, heavy, highway, or residential).

Extensions of Wage Determinations

When a general wage determination has not been awarded within 90 days after bid opening, the head of the contracting/assisting agency may request an extension of the 90 day period from the Wage and Hour Administrator. When, due to unavoidable circumstances, a project wage determination expires before award but after bid opening, the head of the contracting/assisting agency may request an extension of the expiration date of the project wage determination in the bid specifications instead of issuing a new wage determination.

Extension requests should be supported by a written finding including a brief statement of the factual support, that extension of the expiration date of the determination is necessary and proper in the public interest to prevent injustice or undue hardship or to avoid serious impairment in the conduct of Government business.

The Administrator of the Wage and Hour Division of the U.S. Department of Labor will either grant or deny the request for an extension after consideration of all the circumstances, including an examination to determine if the previously issued rates remain prevailing. If a request for the extension of a project wage determination is denied, a new wage determination will be issued to replace an expired project wage determination.

Additional information concerning the Davis-Bacon Act and current wage rate determinations can be obtained at the following sites: www.gpo.gov/davisbacon/referencemat.html and www.wdol.gov/ .

Wage Rate Requirements Under FY 2010 Appropriations

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2010 appropriation , the following clauses:

(1) Minimum wages.

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

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

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

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

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

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

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

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

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

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

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the

contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

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

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

(3) Payrolls and basic records.

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

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

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

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

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or

indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

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

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

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

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

(4) Apprentices and trainees--

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

apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency

recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

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

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

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for

the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

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

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

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

(10) Certification of eligibility.

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

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

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

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

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such

laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

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

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

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

(b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Subrecipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Subrecipient shall insert in any such contract a clause providing hat the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

STATE REVOLVING FUND LOAN PROGRAM

Loan Recipient's Requirements

Davis-Bacon Act Wage Determination

The Loan Recipient must ensure the bidder is in compliance with the Davis-Bacon Act as outlined below. Additionally, ten (10) days prior to the scheduled bid opening date, the wage rates need to be checked to ensure they have not changed.

The Davis-Bacon Act as amended, requires that each contract over $2,000 to which the United States or the District of Columbia is a party for the construction, alteration, or repair of public buildings or public works shall contain a clause setting forth the minimum wages to be paid to various classes of laborers and mechanics employed under the contract. Under the provisions of the Act, contractors or their subcontractors are to pay workers employed directly upon the site of the work no less than the locally prevailing wages and fringe benefits paid on projects of a similar character. The Davis-Bacon Act directs the Secretary of Labor to determine such local prevailing wage rates.

The specifications must incorporate a clause stating that the current Davis-Bacon wage rate is required **(**with the Davis-Bacon links and information).

The Bid Advertisement **must include** a clause that the **Davis-Bacon wage rates** are a requirement. (Refer to the ADVERTISEMENT FOR BIDS EXAMPLE – DBE, ARRA)

If modifications to the existing **wage rates** occur **ten (10) days** prior to the Bid Opening Date, the Loan Recipient **must** incorporate the proper **wage rates** into the plans and specifications by Addendum. All Bidders **must** be informed that this addendum **must** be incorporated into the plans and specifications that they have received.

However, if these modifications occur **less than ten (10) days** prior to the Bid Opening Date, these modifications **shall be effective unless** the agency **finds** that there is not a reasonable time still available before the Bid Opening to notify bidders of the modifications. (A report of this **finding** shall be inserted in the contract file.)

The **wage determination** (including any additional **classifications** and **wage rates** conformed) **and** a Davis-Bacon poster (WH-1321) **must be posted on the work site at all times** by the contractor and its subcontractors in a prominent and accessible place where it can be easily seen. The WH-1321 poster **may be obtained at no charge** from offices of the Wage and Hour Division.

With each **pay estimate** submitted, the contractors **must** certify that workers have been paid the current prevailing wage rates for each classification according to the Davis-Bacon wage rate schedule currently in effect for this project.

The loan recipients **must keep a file** in which all documentation **must be filed** for the current classifications and wage rates (under the Davis-Bacon Act) for the construction of their projects. This file must be kept for three (3) years after the project is completed and **will** be subject to audit by the State of Tennessee and the Environmental Protection Agency (EPA).

Wage Determinations

A "wage determination" is the listing of wage rates and fringe benefit rates for each classification of laborers and mechanics which the Administrator of the Wage and Hour Division of the U.S. Department of Labor has determined to be prevailing in a given area for a particular type of construction (e.g., building, heavy, highway, or residential).

Extensions of Wage Determinations

When a general wage determination has not been awarded within 90 days after bid opening, the head of the contracting/assisting agency may request an extension of the 90 day period from the Wage and Hour Administrator. When, due to unavoidable circumstances, a project wage determination expires before award but after bid opening, the head of the contracting/assisting agency may request an extension of the expiration date of the project wage determination in the bid specifications instead of issuing a new wage determination.

Extension requests should be supported by a written finding including a brief statement of the factual support, that extension of the expiration date of the determination is necessary and proper in the public interest to prevent injustice or undue hardship or to avoid serious impairment in the conduct of Government business.

The Administrator of the Wage and Hour Division of the U.S. Department of Labor will either grant or deny the request for an extension after consideration of all the circumstances, including an examination to determine if the previously issued rates remain prevailing. If a request for the extension of a project wage determination is denied, a new wage determination will be issued to replace an expired project wage determination.

Additional information concerning the Davis-Bacon Act and current wage rate determinations can be obtained at the following sites: www.gpo.gov/davisbacon/referencemat.html and www.wdol.gov/ .

Wage Rate Requirements Under FY 2010 Appropriations

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2010 appropriation , the following clauses:

(1) Minimum wages.

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

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in §

5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

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

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

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

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

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

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

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

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

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the

contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

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

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

(3) Payrolls and basic records.

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

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

the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA , the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

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

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

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

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

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

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

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

(4) Apprentices and trainees--

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or

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

apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

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

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

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for

the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

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

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

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

(10) Certification of eligibility.

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

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

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

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

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such

laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

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

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

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

(b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Subrecipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Subrecipient shall insert in any such contract a clause providing hat the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

STATE REVOLVING FUND LOAN PROGRAM

Loan Recipient's and Contractor's Guidance

FY2010 and After

Tracking and Reporting

For tracking and reporting purposes, the **Loan Recipient** is responsible for the following:

- Ensuring that the Contractor is in compliance with the Davis Bacon provisions of ARRA
- The loan recipients **must keep a file** in which all documentation **must be stored** for the current classifications and wage rates (under the Davis-Bacon Act) for the construction of their projects. This file must be kept for three (3) years after the project is completed and **will** be subject to audit by the State of Tennessee and the Environmental Protection Agency (EPA).
- Any additional tracking and reporting requirements from EPA

For tracking and reporting purposes, the **Contractor** is responsible for the following:

- Achieving and maintaining compliance with the Davis Bacon provisions of ARRA
- Submitting with each **pay estimate** a certification stating that workers have been paid the current prevailing wage rates for each classification according to the Davis-Bacon wage rate schedule currently in effect for this project
- Any additional tracking and reporting requirements from EPA

Please contact Dr. Bagher Sami, Administrative Section Manager for the SRF Loan Program, at 615-532-0501 or bagher.sami@tn.gov to obtain details.

Appendix 5: Sample Certifications

The following information is provided as a sample letter of **step** certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxxx
2. Xxxx
3. Xxxx

Such process took place at the following location:

_____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

The following information is provided as a sample letter of certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxxx
2. Xxxx
3. Xxxx

Such process took place at the following location:

_____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

Appendix 4: Sample Construction Contract Language

ALL CONTRACTS MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE AIS REQUIREMENT. THIS IS AN EXAMPLE OF WHAT COULD BE INCLUDED IN ALL CONTRACTS IN PROJECTS THAT USE SRF FUNDS. EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THIS CLAUSE WITH RESPECT TO STATE OR LOCAL LAW:

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

Appendix 1: Information Checklist for Waiver Request

The purpose of this checklist is to help ensure that all appropriate and necessary information is submitted to EPA. EPA recommends that States review this checklist carefully and provide all appropriate information to EPA. This checklist is for informational purposes only and does not need to be included as part of a waiver application.

Items	✓	Notes
General • Waiver request includes the following information: — Description of the foreign and domestic construction materials — Unit of measure — Quantity — Price — Time of delivery or availability — Location of the construction project — Name and address of the proposed supplier — A detailed justification for the use of foreign construction materials • Waiver request was submitted according to the instructions in the memorandum • Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in requests for proposals, contracts, and communications with the prime contractor		
Cost Waiver Requests • Waiver request includes the following information: — Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and steel products — Relevant excerpts from the bid documents used by the contractors to complete the comparison — Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the process for identifying suppliers and a list of contacted suppliers		
Availability Waiver Requests • Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of the materials for which the waiver is requested: — Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery date for construction materials — Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process for identifying suppliers and a list of contacted suppliers. — Project schedule — Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction materials • Waiver request includes a statement from the prime contractor and/or supplier confirming the non-availability of the domestic construction materials for which the waiver is sought • Has the State received other waiver requests for the materials described in this waiver request, for comparable projects?		

Implementation

The Act states:

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

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

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

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

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

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

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

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

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds for carrying out

the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

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

The following questions and answers provide guidance for implementing and complying with the AIS requirements:

Project Coverage

1) What classes of projects are covered by the AIS requirement?

All treatment works projects funded by a CWSRF assistance agreement, and all public water system projects funded by a DWSRF assistance agreement, from the date of enactment through the end of Federal Fiscal Year 2014, are covered. The AIS requirements apply to the entirety of the project, no matter when construction begins or ends. Additionally, the AIS requirements apply to all parts of the project, no matter the source of funding.

2) Does the AIS requirement apply to nonpoint source projects or national estuary projects?

No. Congress did not include an AIS requirement for nonpoint source and national estuary projects unless the project can also be classified as a 'treatment works' as defined by section 212 of the Clean Water Act.

3) Are any projects for the construction, alteration, maintenance, or repair of a public water system or treatment works excluded from the AIS requirement?

Any project, whether a treatment works project or a public water system project, for which engineering plans and specifications were approved by the responsible state agency prior to January 17, 2014, is excluded from the AIS requirements.

4) What if the project does not have approved engineering plans and specifications but has signed an assistance agreement with a CWSRF or DWSRF program prior to January 17, 2014?

The AIS requirements do not apply to any project for which an assistance agreement was signed prior to January 17, 2014.

5) What if the project does not have approved engineering plans and specifications, but bids were advertised prior to January 17, 2014 and an assistance agreement was signed after January 17, 2014?

If the project does not require approved engineering plans and specifications, the bid advertisement date will count in lieu of the approval date for purposes of the exemption in section 436(f).

6) What if the assistance agreement that was signed prior to January 17, 2014, only funded a part of the overall project, where the remainder of the project will be funded later with another SRF loan?

If the original assistance agreement funded any construction of the project, the date of the original assistance agreement counts for purposes of the exemption. If the original assistance agreement was only for planning and design, the date of that assistance agreement will count for purposes of the exemption only if there is a written commitment or expectation on the part of the assistance recipient to fund the remainder of the project with SRF funds.

7) What if the assistance agreement that was signed prior to January 17, 2014, funded the first phase of a multi-phase project, where the remaining phases will be funded by SRF assistance in the future?

In such a case, the phases of the project will be considered a single project if all construction necessary to complete the building or work, regardless of the number of contracts or assistance agreements involved, are closely related in purpose, time and place. However, there are many situations in which major construction activities are clearly undertaken in phases that are distinct in purpose, time, or place. In the case of distinct phases, projects with engineering plans and specifications approval or assistance agreements signed prior to January 17, 2014 would be excluded from AIS requirements while those approved/signed on January 17, 2014, or later would be covered by the AIS requirements.

8) What if a project has split funding from a non-SRF source?

Many States intend to fund projects with "split" funding, from the SRF program and from State or other programs. Based on the Act language in section 436, which requires that American iron and steel products be used in any project for the construction, alteration, maintenance, or repair of a public water system or treatment works receiving SRF funding between and including January 17, 2014 and September 30, 2014, any project that is funded in whole or in part with such funds must comply with the AIS requirement. A "project" consists of all construction necessary to complete the building or work regardless of the number of contracts or assistance agreements involved so long as all contracts and assistance agreements awarded are closely related in purpose, time and place. This precludes the intentional splitting of SRF projects into separate and smaller contracts or assistance agreements to avoid AIS coverage on some portion of a larger

project, particularly where the activities are integrally and proximately related to the whole. However, there are many situations in which major construction activities are clearly undertaken in separate phases that are distinct in purpose, time, or place, in which case, separate contracts or assistance agreement for SRF and State or other funding would carry separate requirements.

9) What about refinancing?

If a project began construction, financed from a non-SRF source, prior to January 17, 2014, but is refinanced through an SRF assistance agreement executed on or after January 17, 2014 and prior to October 1, 2014, AIS requirements will apply to all construction that occurs on or after January 17, 2014, through completion of construction, unless, as is likely, engineering plans and specifications were approved by a responsible state agency prior to January 17, 2014. There is no retroactive application of the AIS requirements where a refinancing occurs for a project that has completed construction prior to January 17, 2014.

10) Do the AIS requirements apply to any other EPA programs, besides the SRF program, such as the Tribal Set-aside grants or grants to the Territories and DC?

No, the AIS requirement only applies to funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12)

Covered Iron and Steel Products

11) What is an iron or steel product?

For purposes of the CWSRF and DWSRF projects that must comply with the AIS requirement, an iron or steel product is one of the following made primarily of iron or steel that is permanently incorporated into the public water system or treatment works:

Lined or unlined pipes or fittings;
Manhole Covers;
Municipal Castings (defined in more detail below);
Hydrants;
Tanks;
Flanges;
Pipe clamps and restraints;
Valves;
Structural steel (defined in more detail below);
Reinforced precast concrete; and
Construction materials (defined in more detail below).

12) What does the term 'primarily iron or steel' mean?

'Primarily iron or steel' places constraints on the list of products above. For one of the listed products to be considered subject to the AIS requirements, it must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

13) Can you provide an example of how to perform a cost determination?

For example, the iron portion of a fire hydrant would likely be the bonnet, body and shoe, and the cost then would include the pouring and casting to create those components. The other material costs would include non-iron and steel internal workings of the fire hydrant (i.e., stem, coupling, valve, seals, etc). However, the assembly of the internal workings into the hydrant body would not be included in this cost calculation. If one of the listed products is not made primarily of iron or steel, United States (US) provenance is not required. An exception to this definition is reinforced precast concrete, which is addressed in a later question.

14) If a product is composed of more than 50% iron or steel, but is not listed in the above list of items, must the item be produced in the US? Alternatively, must the iron or steel in such a product be produced in the US?

The answer to both question is no. Only items on the above list must be produced in the US. Additionally, the iron or steel in a non-listed item can be sourced from outside the US.

15) What is the definition of steel?

Steel means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel and other specialty steels.

16) What does 'produced in the United States' mean?

Production in the United States of the iron or steel products used in the project requires that all manufacturing processes, including application of coatings, must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the

material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.

17) Are the raw materials used in the production of iron or steel required to come from US sources?

No. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-US sources.

18) If an above listed item is primarily made of iron or steel, but is only at the construction site temporarily, must such an item be produced in the US?

No. Only the above listed products made primarily of iron or steel, permanently incorporated into the project must be produced in the US. For example trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

19) What is the definition of 'municipal castings'?

Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:

Access Hatches;
Ballast Screen;
Benches (Iron or Steel);
Bollards;
Cast Bases;
Cast Iron Hinged Hatches, Square and Rectangular;
Cast Iron Riser Rings;
Catch Basin Inlet;
Cleanout/Monument Boxes;
Construction Covers and Frames;
Curb and Corner Guards;
Curb Openings;
Detectable Warning Plates;
Downspout Shoes (Boot, Inlet);
Drainage Grates, Frames and Curb Inlets;
Inlets;
Junction Boxes;
Lampposts;
Manhole Covers, Rings and Frames, Risers;

Meter Boxes;
Service Boxes;
Steel Hinged Hatches, Square and Rectangular;
Steel Riser Rings;
Trash receptacles;
Tree Grates;
Tree Guards;
Trench Grates; and
Valve Boxes, Covers and Risers.

20) What is 'structural steel'?

Structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zees. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

21) What is a 'construction material' for purposes of the AIS requirement?

Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, and stationary screens.

22) What is not considered a 'construction material' for purposes of the AIS requirement?

Mechanical and electrical components, equipment and systems are not considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system.

The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials: pumps, motors, gear reducers, drives (including variable frequency drives (VFDs)), electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators), mixers, gates, motorized screens (such as traveling screens), blowers/aeration equipment, compressors, meters, sensors, controls and switches, supervisory control and

data acquisition (SCADA), membrane bioreactor systems, membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters, heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, analytical instrumentation, and dewatering equipment.

23) If the iron or steel is produced in the US, may other steps in the manufacturing process take place outside of the US, such as assembly?

No. Production in the US of the iron or steel used in a listed product requires that all manufacturing processes must take place in the United States, except metallurgical processes involving refinement of steel additives.

24) What processes must occur in the US to be compliant with the AIS requirement for reinforced precast concrete?

While reinforced precast concrete may not be at least 50% iron or steel, in this particular case, the reinforcing bar and wire must be produced in the US and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin.

If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the US.

Compliance

25) How should an assistance recipient document compliance with the AIS requirement?

In order to ensure compliance with the AIS requirement, specific AIS contract language must be included in each contract, starting with the assistance agreement, all the way down to the purchase agreements. Sample language for assistance agreements and contracts can be found in Appendix 3 and 4.

EPA recommends the use of a step certification process, similar to one used by the Federal Highway Administration. The step certification process is a method to ensure that producers adhere to the AIS requirement and assistance recipients can verify that products comply with the AIS requirement. The process also establishes accountability and better enables States to take enforcement actions against violators.

Step certification creates a paper trail which documents the location of the manufacturing process involved with the production of steel and iron materials. A step certification is a process under which each handler (supplier, fabricator, manufacturer,

processor, etc) of the iron and steel products certifies that their step in the process was domestically performed. Each time a step in the manufacturing process takes place, the manufacturer delivers its work along with a certification of its origin. A certification can be quite simple. Typically, it includes the name of the manufacturer, the location of the manufacturing facility where the product or process took place (not its headquarters), a description of the product or item being delivered, and a signature by a manufacturer's responsible party. Attached, as Appendix 5, are sample certifications. These certifications should be collected and maintained by assistance recipients.

Alternatively, the final manufacturer that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification asserting that all manufacturing processes occurred in the US. While this type of certification may be acceptable, it may not provide the same degree of assurance. Additional documentation may be needed if the certification is lacking important information. Step certification is the best practice.

26) How should a State ensure assistance recipients are complying with the AIS requirement?

In order to ensure compliance with the AIS requirement, States SRF programs must include specific AIS contract language in the assistance agreement. Sample language for assistance agreements can be found in Appendix 3.

States should also, as a best practice, conduct site visits of projects during construction and review documentation demonstrating proof of compliance which the assistance recipient has gathered.

27) What happens if a State or EPA finds a non-compliant iron and/or steel product permanently incorporated in the project?

If a potentially non-compliant product is identified, the State should notify the assistance recipient of the apparent unauthorized use of the non-domestic component, including a proposed corrective action, and should be given the opportunity to reply. If unauthorized use is confirmed, the State can take one or more of the following actions: request a waiver where appropriate; require the removal of the non-domestic item; or withhold payment for all or part of the project. Only EPA can issue waivers to authorize the use of a non-domestic item. EPA may use remedies available to it under the Clean Water Act, the Safe Drinking Water Act, and 40 CFR part 31 grant regulations, in the event of a violation of a grant term and condition.

It is recommended that the State work collaboratively with EPA to determine the appropriate corrective action, especially in cases where the State is the one who identifies the item in noncompliance or there is a disagreement with the assistance recipient.

If fraud, waste, abuse, or any violation of the law is suspected, the Office of Inspector General (OIG) should be contacted immediately. The OIG can be reached at 1-

888-546-8740 or OIG_Hotline@epa.gov. More information can be found at this website: http://www.epa.gov/oig/hotline.htm.

28) How do international trade agreements affect the implementation of the AIS requirements?

The AIS provision applies in a manner consistent with United States obligations under international agreements. Typically, these obligations only apply to direct procurement by the entities that are signatories to such agreements. In general, SRF assistance recipients are not signatories to such agreements, so these agreements have no impact on this AIS provision. In the few instances where such an agreement applies to a municipality, that municipality is under the obligation to determine its applicability and requirements and document the actions taken to comply for the State.

Waiver Process

The statute permits EPA to issue waivers for a case or category of cases where EPA finds (1) that applying these requirements would be inconsistent with the public interest; (2) iron and steel products are not produced in the US in sufficient and reasonably available quantities and of a satisfactory quality; or (3) inclusion of iron and steel products produced in the US will increase the cost of the overall project by more than 25 percent.

In order to implement the AIS requirements, EPA has developed an approach to allow for effective and efficient implementation of the waiver process to allow projects to proceed in a timely manner. The framework described below will allow States, on behalf of the assistance recipients, to apply for waivers of the AIS requirement directly to EPA Headquarters. Only waiver requests received from states will be considered. Pursuant to the Act, EPA has the responsibility to make findings as to the issuance of waivers to the AIS requirements.

Definitions

The following terms are critical to the interpretation and implementation of the AIS requirements and apply to the process described in this memorandum:

Reasonably Available Quantity: The quantity of iron or steel products is available or will be available at the time needed and place needed, and in the proper form or specification as specified in the project plans and design.

Satisfactory Quality: The quality of iron or steel products, as specified in the project plans and designs.

Assistance Recipient: A borrower or grantee that receives funding from a State CWSRF or DWSRF program.

Step-By-Step Waiver Process

Application by Assistance Recipient

Each local entity that receives SRF water infrastructure financial assistance is required by section 436 of the Act to use American made iron and steel products in the construction of its project. However, the recipient may request a waiver. Until a waiver is granted by EPA, the AIS requirement stands, except as noted above with respect to municipalities covered by international agreements.

The waiver process begins with the SRF assistance recipient. In order to fulfill the AIS requirement, the assistance recipient must in good faith design the project (where applicable) and solicit bids for construction with American made iron and steel products. It is essential that the assistance recipient include the AIS terms in any request for proposals or solicitations for bids, and in all contracts (see Appendix 3 for sample construction contract language). The assistance recipient may receive a waiver at any point before, during, or after the bid process, if one or more of three conditions is met:

1. Applying the American Iron and Steel requirements of the Act would be inconsistent with the public interest;
2. Iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
3. Inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Proper and sufficient documentation must be provided by the assistance recipient. A checklist detailing the types of information required for a waiver to be processed is attached as Appendix 1.

Additionally, it is strongly encouraged that assistance recipients hold pre-bid conferences with potential bidders. A pre-bid conference can help to identify iron and steel products needed to complete the project as described in the plans and specifications that may not be available from domestic sources. It may also identify the need to seek a waiver prior to bid, and can help inform the recipient on compliance options.

In order to apply for a project waiver, the assistance recipient should email the request in the form of a Word document (.doc) to the State SRF program. It is strongly recommended that the State designate a single person for all AIS communications. The State SRF designee will review the application for the waiver and determine whether the necessary information has been included. Once the waiver application is complete, the State designee will forward the application to either of two email addresses. For CWSRF waiver requests, please send the application to: cwsrfwaiver@epa.gov. For DWSRF waiver requests, please send the application to: dwsrfwaiver@epa.gov.

Evaluation by EPA

After receiving an application for waiver of the AIS requirements, EPA Headquarters will publish the request on its website for 15 days and receive informal comment. EPA Headquarters will then use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.

In the event that EPA finds that adequate documentation and justification has been submitted, the Administrator may grant a waiver to the assistance recipient. EPA will notify the State designee that a waiver request has been approved or denied as soon as such a decision has been made. Granting such a waiver is a three-step process:

1. Posting – After receiving an application for a waiver, EPA is required to publish the application and all material submitted with the application on EPA's website for 15 days. During that period, the public will have the opportunity to review the request and provide informal comment to EPA. The website can be found at: http://water.epa.gov/grants_funding/aisrequirement.cfm

2. Evaluation – After receiving an application for waiver of the AIS requirements, EPA Headquarters will use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.

3. Signature of waiver approval by the Administrator or another agency official with delegated authority – As soon as the waiver is signed and dated, EPA will notify the State SRF program, and post the signed waiver on our website. The assistance recipient should keep a copy of the signed waiver in its project files.

Public Interest Waivers

EPA has the authority to issue public interest waivers. Evaluation of a public interest waiver request may be more complicated than that of other waiver requests so they may take more time than other waiver requests for a decision to be made. An example of a public interest waiver that might be issued could be for a community that has standardized on a particular type or manufacturer of a valve because of its performance to meet their specifications. Switching to an alternative valve may require staff to be trained on the new equipment and additional spare parts would need to be purchased and stocked, existing valves may need to be unnecessarily replaced, and portions of the system may need to be redesigned. Therefore, requiring the community to install an alternative valve would be inconsistent with public interest.

EPA also has the authority to issue a public interest waiver that covers categories of products that might apply to all projects.

EPA reserves the right to issue national waivers that may apply to particular classes of assistance recipients, particular classes of projects, or particular categories of iron or steel products. EPA may develop national or (US geographic) regional categorical waivers through the identification of similar circumstances in the detailed justifications presented to EPA in a waiver request or requests. EPA may issue a national waiver based on policy decisions regarding the public's interest or a determination that a particular item is not produced domestically in reasonably available quantities or of a sufficient quality. In such cases, EPA may determine it is necessary to issue a national waiver.

If you have any questions concerning the contents of this memorandum, you may contact us, or have your staff contact Jordan Dorfman, Attorney-Advisor, State Revolving Fund Branch, Municipal Support Division, at dorfman.jordan@epa.gov or (202) 564-0614 or Kiri Anderer, Environmental Engineer, Infrastructure Branch, Drinking Water Protection Division, at anderer.kirsten@epa.gov or (202) 564-3134.

Attachments

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Water Resources
William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243
1-888-891-8332 (TDEC)

Notice of Intent (NOI) for General NPDES Permit for Stormwater Discharges from Construction Activities (TNR100000)

Site or Project Name:		**Existing NPDES Tracking Number: TNR**
Street Address or Location:		Start date:
		Estimated end date:
Site Activity Description:		Latitude (dd.dddd):
		Longitude (dd.dddd):
County(ies):	MS4 Jurisdiction:	Acres Disturbed:
		Total Acres:
Does a topographic map show dotted or solid blue lines ☐ and/or wetlands ☐ on or adjacent to the construction site? If wetlands are located on-site and may be impacted, attach wetlands delineation report. If an Aquatic Resource Alteration Permit has been obtained for this site, what is the permit number? ARAP permit No.:		
Receiving waters:		
Attach the SWPPP with the NOI ☐ SWPPP Attached		Attach a site location map ☐ Map Attached

Site Owner/Developer Entity (*Primary Permittee*)**:** (person, company, or legal entity that has operational or design control over construction plans and specifications):			
Site Owner/Developer Signatory (V.P. level/higher - signs certification below): (individual responsible for site):		Signatory's Title or Position (V.P. level/higher - signs certification below):	
Mailing Address:		City: State:	Zip:
Phone: ( )	Fax: ( )	E-mail:	

Optional Contact:		Title or Position:	
Mailing Address:		City: State:	Zip:
Phone: ( )	Fax: ( )	E-mail:	

Owner or Developer Certification (must be signed by president, vice-president or equivalent, or ranking elected official) (Primary Permittee)

I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Owner or Developer Name; (print or type)	Signature:	Date:

Contractor(s) Certification (must be signed by president, vice-president or equivalent, or ranking elected official) (Secondary Permittee)

I certify under penalty of law that I have reviewed this document, any attachments, and the SWPPP referenced above. Based on my inquiry of the construction site owner/developer identified above and/or my inquiry of the person directly responsible for assembling this NOI and SWPPP, I believe the information submitted is accurate. I am aware that this NOI, if approved, makes the above-described construction activity subject to NPDES permit number TNR100000, and that certain of my activities on-site are thereby regulated.

Contractor company name (print or type):			
Contractor signatory (print/type): (V.P. level or higher)		Signature:	Date:
Mailing Address:		City: State:	Zip:
Phone: ( )	Fax: ( )	E-mail:	

Other Contractor company name (print or type):			
Other Contractor signatory (print/type): (V.P. level or higher)		Signature:	Date:
Mailing Address:		City: State:	Zip:
Phone: ( )	Fax: ( )	E-mail:	

OFFICIAL STATE USE ONLY

Received Date:	Reviewer:	Field Office:	Permit Number **TNR**	Exceptional TN Water:
Fee(s):	T & E Aquatic Flora and Fauna:		Impaired Receiving Stream:	Notice of Coverage Date:

Notice of Intent (NOI) for General NPDES Permit for Stormwater Discharges from Construction Activities (TNR100000)

Purpose of this form A completed notice of intent (NOI) must be submitted to obtain coverage under the Tennessee General NPDES Permit for Discharges of Stormwater Associated with Construction Activity (permit). **Requesting coverage under this permit means that an applicant has obtained and examined a copy of this permit, and thereby acknowledges applicant's claim of ability to be in compliance with permit terms and conditions.** This permit is required for stormwater discharge(s) from construction activities including clearing, grading, filling and excavating (including borrow pits) of one or more acres of land. This form should be submitted at least 30 days prior to the commencement of land disturbing activities, or no later than 48 hours prior to when a new operator assumes operational control over site specifications or commences work at the site.

Permit fee (see table below) must accompany the NOI and is based on total acreage to be disturbed by an entire project, including any associated construction support activities (e.g. equipment staging yards, material storage areas, excavated material disposal areas, borrow or waste sites). There is no fee for sites less than 1 acre.

Acres Disturbed	= or > 150 acres	= or > 50 < 150 acres	= or > 5 < 50 acres	= or > 1 < 5 acres
Fee	$7,500	$4,000	$1,000	$250

Who must submit the NOI form? Per Section 2 of the permit, all site operators must submit an NOI form. "Operator" for the purpose of this permit and in the context of stormwater associated with construction activity means any person associated with a construction project who meets either or both of the following two criteria: (1) The person has operational or design control over construction plans and specifications, including the ability to make modifications to those plans and specifications. This person is typically the owner or developer of the project or a portion of the project (e.g. subsequent builder), or the person that is the current land owner of the construction site. This person is considered the primary permittee; or (2) The person has day-to-day operational control of those activities at a project which are necessary to ensure compliance with a SWPPP for the site or other permit conditions. This person is typically a contractor or a commercial builder who is hired by the primary permittee, and is considered a secondary permittee.

Owners, developers and all contractors that meet the definition of the operator in subsection 2.2 of the permit shall apply for permit coverage on the same NOI, insofar as possible. After permit coverage has been granted to the primary permittee, any subsequent NOI submittals must include the site's previously assigned permit tracking number and the project name. The comprehensive site-specific SWPPP shall be prepared in accordance with the requirements of part 3 of the permit and must be submitted with the NOI unless the NOI being submitted is to only add a contractor (secondary permittee) to an existing coverage.

Notice of Coverage The division will review the NOI for completeness and accuracy and prepare a notice of coverage (NOC). Stormwater discharge from the construction site is authorized as of the effective date of the NOC.

Complete the form Type or print clearly, using ink and not markers or pencil. Answer each item or enter "NA," for not applicable, if a particular item does not fit the circumstances or characteristics of your construction site or activity. If you need additional space, attach a separate piece of paper to the NOI form. **The NOI will be considered incomplete without a permit fee, a map, and the SWPPP.**

Describe and locate the project Use the legal or official name of the construction site. If a construction site lacks street name or route number, give the most accurate geographic information available to describe the location (reference to adjacent highways, roads and structures; e.g. intersection of state highways 70 and 100). Latitude and longitude (expressed in decimal degrees) of the center of the site can be located on USGS quadrangle maps. The quadrangle maps can be obtained at the USGS World Wide Web site: http://www.usgs.gov/; latitude and longitude information can be found at numerous other web sites. Attach a copy of a portion of a 7.5 minute quad map, showing location of site, with boundaries at least one mile outside the site boundaries. Provide estimated starting date of clearing activities and completion date of the project, and an estimate of the number of acres of the site on which soil will be disturbed, including borrow areas, fill areas, stockpiles and the total acres. For linear projects, give location at each end of the construction area.

MS4 Jurisdiction: If this construction site is located within a Municipal Separate Storm Sewer System (MS4), please list name of MS4. A current list of MS4s in Tennessee may be found at http://www.tn.gov/environment/wpc/stormh2o/docs/MS4s_Jan2012.pdf

Give name of the receiving waters Trace the route of stormwater runoff from the construction site and determine the name of the river(s), stream(s), creek(s), wetland(s), lake(s) or any other water course(s) into which the stormwater runoff drains. Note that the receiving water course may or may not be located on the construction site. If the first water body receiving construction site runoff is unnamed ("unnamed tributary"), determine the name of the water body that the unnamed tributary enters.

ARAP permit may be required **If your work will disturb or cause alterations of a stream or wetland, you must obtain an appropriate Aquatic Resource Alteration Permit (ARAP).** If you have a question about the ARAP program or permits, contact your local Environmental Field Office (EFO).

Submitting the form and obtaining more information Note that this form must be signed by the company President, Vice-President, or a ranking elected official in the case of a municipality, for details see subpart 2.5. For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC). Submit the completed NOI form (keep a copy for your records) to the appropriate EFO for the county(ies) where the construction activity is located, addressed to **Attention: Stormwater NOI Processing**.

EFO	**Street Address**	**Zip Code**	**EFO**	**Street Address**	**Zip Code**
Memphis	8383 Wolf Lake Drive, Bartlett	38133-4119	Cookeville	1221 South Willow Ave.	38506
Jackson	1625 Hollywood Drive	38305-4316	Chattanooga	540 McCallie Avenue STE 550	37402-2013
Nashville	711 R S Gass Boulevard	37243	Knoxville	3711 Middlebrook Pike	37921
Columbia	1421 Hampshire Pike	38401	Johnson City	2305 Silverdale Road	37601

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION (TDEC)
Division of Water Resources
William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 11th Floor, Nashville, Tennessee 37243
1-888-891-TDEC (8332)

Notice of Termination (NOT) for General NPDES Permit for Stormwater Discharges from Construction Activities (CGP)

This form is required to be submitted when requesting termination of coverage from the CGP. The purpose of this form is to notify the TDEC that either all stormwater discharges associated with construction activity from the portion of the identified facility where you, as an operator, have ceased or have been eliminated; or you are no longer an operator at the construction site. Submission of this form shall in no way relieve the permittee of permit obligations required prior to submission of this form. Please submit this form to the local WPC Environmental Field Office (EFO) address (see table below). For more information, contact your local EFO at the toll-free number 1-888-891-8332 (TDEC).

Type or print clearly, using ink.

Site or Project Name:	**NPDES Tracking Number: TNR**
Street Address or Location:	County(ies):

Name of Permittee Requesting Termination of Coverage:			
Permittee Contact Name:	Title or Position:		
Mailing Address:	City:	State:	Zip:
Phone: ( )	E-mail:		

Check the reason(s) for termination of permit coverage:

☐	Stormwater discharge associated with construction activity is no longer occurring and the permitted area has a uniform 70% permanent vegetative cover OR has equivalent measures such as rip rap or geotextiles, in areas not covered with impervious surfaces.
☐	You are no longer the operator at the construction site (i.e., termination of site-wide, primary or secondary permittee coverage).

Certification and Signature: (must be signed by president, vice-president or equivalent ranking elected official)

I certify under penalty of law that either: (a) all stormwater discharges associated with construction activity from the portion of the identified facility where I was an operator have ceased or have been eliminated or (b) I am no longer an operator at the construction site. I understand that by submitting this notice of termination, I am no longer authorized to discharge stormwater associated with construction activity under this general permit, and that discharging pollutants in stormwater associated with construction activity to waters of the United States is unlawful under the Clean Water Act where the discharge is not authorized by a NPDES permit. I also understand that the submittal of this notice of termination does not release an operator from liability for any violations of this permit or the Clean Water Act.

For the purposes of this certification, elimination of stormwater discharges associated with construction activity means that all stormwater discharges associated with construction activities from the identified site that are authorized by a NPDES general permit have been eliminated from the portion of the construction site where the operator had control. Specifically, this means that all disturbed soils at the portion of the construction site where the operator had control have been finally stabilized, the temporary erosion and sediment control measures have been removed, and/or subsequent operators have obtained permit coverage for the site or portions of the site where the operator had control.

I certify under penalty of law that this document and all attachments were prepared by me, or under my direction or supervision. The submitted information is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. As specified in Tennessee Code Annotated Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

Permittee name (print or type):	Signature:	Date:

EFO	**Street Address**	**Zip Code**	**EFO**	**Street Address**	**Zip Code**
Memphis	8383 Wolf Lake Drive, Bartlett, TN	38133	Cookeville	1221 South Willow Ave.	38506
Jackson	1625 Hollywood Drive	38305	Chattanooga	540 McCallie Avenue STE 550	37402
Nashville	711 R S Gass Boulevard	37243	Knoxville	3711 Middlebrook Pike	37921
Columbia	1421 Hampshire Pike	38401	Johnson City	2305 Silverdale Road	37601

00840 Performance Bond

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

City of Johnson City
209 Water Street
Johnson City, Tennessee 37601

CONSTRUCTION CONTRACT

Effective Date of the Agreement:
Amount:
Description *(name and location)*: **Lower Brush Creek 42" Interceptor – Contract 1**

BOND

Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after Owner terminates for cause in accordance with General Conditions Paragraph 15.02.

4. Failure on the part of the Owner to comply with the notice requirement in General Conditions Paragraph 15.02 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

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

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

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

5.1.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

6.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

6.2 additional legal, design professional, and delay costs resulting from the Contractor's Default; and

6.3 liquidated damages caused by delayed performance or non-performance of the Contractor.

7. The Surety's liability is limited to the amount of this Bond.

8. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

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

10. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

11. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

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

13. Definitions

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

13.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

13.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

13.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

13.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

This document was prepared in part from material (EJCDC C-610 Performance Bond) which is copyrighted as indicated below:

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:
City of Johnson City
209 Water Street
Johnson City, Tennessee 37601

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*: **Lower Brush Creek 42" Interceptor Contract 1**

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

   5.1 Claimants who do not have a direct contract with the Contractor,

      5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

      5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

   5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

   7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

   7.2 Pay or arrange for payment of any undisputed amounts.

   7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

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

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

11. The Surety hereby waives notice of any change, including changes of time, to the Construction

Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

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

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default**: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

This document was prepared in part from material (EJCDC C-615 Payment Bond) which is copyrighted as indicated below:

NOTICE

THIS ENTITY IS A RECIPIENT OF STATE AND FEDERAL FUNDS. IF YOU HAVE KNOWLEDGE OF ANY ACTIVITY WHICH YOU CONSIDER TO BE ILLEGAL, IMPROPER, OR WASTEFUL, PLEASE CALL THE STATE COMPTROLLER'S TOLL-FREE HOTLINE:

1-800-232-5454

SECTION 01010

SUMMARY OF WORK

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Work to be done under these Contracts and in accordance with these Specifications consists of furnishing all equipment, superintendence, labor, skill, material and all other items necessary for the demolition and construction of the:

Lower Brush Creek 42" Interceptor – Contract 1

The Contractor shall perform all work required for such construction in accordance with the Contract Documents and subject to the terms and conditions of the Contract, complete and ready for use.

B. The principal features of the Work to be performed under these Contracts includes:

Includes, but is not limited to, furnishing and installing facilities as described under **ITB # 6441 – Lower Brush Creek 42" Interceptor – Contract 1** (refer to Drawings and Project Manual for additional details and requirements):

- Erosion Prevention and Sediment Control during and after construction and site restoration;
- Related and necessary bypass pumping;
- Excavation, backfill, and compaction as required. Coordination with the Owner and Engineer regarding the transport and storage and/or disposal of excavated materials;
- Procure and install 42" sewer pipe, manholes, cleanouts etc., in accordance with approved shop drawings, plans, specifications, manufacturers recommendations, applicable codes and regulations;
- Install riprap for slope stabilization and outlet protection in locations noted on the Drawings;
- Demolish existing manholes as shown on Drawings;
- Cap and abandoned sewer at locations shown on Drawings;
- Facilitate and coordinate all necessary inspections and commissioning;
- Restoration surrounding utilities and disturbed surfaces (pavement, ground, etc.) to pre-construction condition per the specifications;
- Re-establish disturbed area of site for drainage to preconstruction condition or better, add topsoil to pasture lands to promote successful growing conditions as shown on the Drawings;
- Direct the work, participate in progress meetings in person and supply an updated construction schedule, report progress and issues in a timely manner and cooperate with Owner and Engineer and their representatives;

C. The foregoing description(s) shall not be construed as a complete description of all work required.

1.02 CONTRACTOR QUALIFICATIONS

A. Refer to Section 00411 Bid Qualification Form

1.03 CONTRACT DOCUMENTS

B. The Work to be done is shown on the set of Drawings entitled **Lower Brush Creek 42" Interceptor – Contract 1** and dated **September 2020.** The numbers and titles of all Drawings appear on the index sheet of the Drawings, (Cover Page). All drawings so enumerated shall be considered an integral part of the Contract Documents as defined herein.

B. Certain Document Sections refer to Divisions of the Contract Specifications. Sections are each individually numbered portions of the Specifications (numerically) such as 02050, 02276, 15390, etc. The term Division is used as a convenience term meaning all Sections within a numerical grouping. Division 15 would thus include Sections 15000 through 15390.

1.04 GENERAL ARRANGEMENT

A. Drawings indicate the extent and general arrangement of the work. If any departures from the Drawings are deemed necessary by the Contractor to accommodate the materials and equipment he proposes to furnish, details of such departures and reasons therefore shall be submitted as soon as practicable to the Engineer for approval. No such departures shall be made without the prior written approval of the Engineer. Approved changes shall be made without additional cost to the Owner for this work or related work under other Contracts of the Project.

B. The specific equipment proposed for use by the Contractor on the project may require changes, in structures, auxiliary equipment, piping, electrical, mechanical, controls or other work to provide a complete satisfactory operating installation. The Contractor shall submit to the Engineer, for approval, all necessary Drawings and details showing such changes to verify conformance with the overall project structural and architectural requirements and overall project operating performance. The Bid Price shall include all costs in connection with the preparation of new drawings and details and all changes to construction work to accommodate the proposed equipment, including increases in the costs of other Contracts.

1.05 CONSTRUCTION PERMITS, EASEMENTS AND ENCROACHMENTS

A. The Contractor shall maintain all copies of the contract easements while in the field.

B. The Owner shall obtain or cause to be obtained all permanent and temporary construction easements as shown on the Drawings. The Owner shall further obtain or cause to be

obtained a right-of-way encroachment agreement from TDOT. The Contractor shall verify that these agreements have been obtained and shall comply with the conditions set forth in each agreement.

C. The Contractor shall obtain, keep current and pay all fees for any necessary construction permits from those authorities, agencies, or municipalities having jurisdiction over land areas, utilities, or structures which are located within the Contract limits and which will be occupied, encountered, used, or temporarily interrupted by the Contractor's operations unless otherwise stated. Record copies of all permits shall be furnished to the Engineer.

D. When construction permits are accompanied by regulations or requirements issued by a particular authority, agency or municipality, it shall be the Contractor's responsibility to familiarize himself and comply with such regulations or requirements as they apply to his operations on this Project.

E. The Contractor shall confine his construction operations within the limits of public rights-of-way or easements shown on the drawings. Storage of equipment and materials, or erection of sheds or trailers outside these limits, if such areas are property of the Owner, shall be used only with the Owner's approval. Storage of materials or equipment on private property outside the designated easements will not be permitted unless the Contractor secures written approval from the property owner. This agreement shall clearly define the terms and conditions of the approval including any rents or payments as requested by the property owner and a statement holding the City of Johnson City harmless. Copies of these agreements shall be provided to the Owner/Engineer if requested.

F. Contractor responsible for all fees and costed associated with removal, protection, or temporary relocation of BrightRidge existing utilities for the purpose of construction the work required by these contract documents.

1.06 ADDITIONAL ENGINEERING SERVICES

A. In the event that the Engineer is required to provide additional engineering services as a result of substitution of materials or equipment which are not "or equal" by the Contractor, or changes by the Contractor in dimension, weight, power requirements, etc., of the equipment and accessories furnished, or if the Engineer is required to examine and evaluate any changes proposed by the Contractor for the convenience of the Contractor, then the Engineer's charges in connection with such additional services shall be charged to the Contractor by the Owner.

B. In the event that the Engineer is required to provide additional engineering services as a result of Contractor's errors, omissions, or failure to conform to the requirements of the Contract Documents, or if the Engineer is required to examine and evaluate any changes proposed by the Contractor solely for the convenience of the Contractor, then the Engineer's charges in connection with such additional services shall be charged to the Contractor by the Owner.

1.07 ADDITIONAL OWNER'S EXPENSES

A. In the event the Work of this Contract is not completed within the time set forth in the Contract or within the time to which such completion may have been extended in accordance with the Contract Documents, the additional engineering or inspection charges incurred by the Owner may be charged to the Contractor and deducted from the monies due him. Extra work or supplemental Contract work added to the original Contract, as well as extenuating circumstances beyond the control of the Contractor, will be given due consideration by the Owner before assessing engineering and inspection charges against the Contractor.

B. Unless otherwise specifically permitted, the normal time of work under this Contract is limited to 8 hours per day, Monday through Friday. Work beyond these hours will result in additional expense to the Owner. Any expenses and/or damages, including the cost of the Engineer's on site personnel, arising from the Contractor's operations beyond the hours and days specified above shall be borne by the Contractor.

C. Charges assessed to the Contractor for additional engineering and inspection costs will be determined based on actual hours charged to the job by the Engineer. Daily rates will depend on the number and classifications of employees involved, but in no case shall such charges exceed **$880** per day per field personnel and **$1800** per day per engineering personnel, based on an eight-hour workday.

D. Charges for additional Owner's expenses shall be in addition to any liquidated damages assessed in accordance with the Contract.

E. Per Supplementary Conditions 19.01A, The Contractor shall be held responsible for reportable sanitary sewer overflow events that are caused by the Contractor's activities.

1.08 TIME OF WORK

A. The normal time of work for this Contract is limited to 40 hours per week and shall generally be between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday. The Contractor may elect to work beyond these hours or on weekends provided that all costs incurred by the Owner for additional engineering shall be borne by the Contractor.

1. The Owner shall deduct the cost of additional engineering costs from monies due the Contractor.

B. If it shall become imperative to perform work at night, the Owner and Engineer shall be informed a reasonable time in advance of the beginning of such work. Temporary lighting and all other necessary facilities for performing and inspecting the work shall be provided and maintained by the Contractor.

C. Unless otherwise specifically permitted, all work that would be subject to damage shall be stopped during inclement, stormy or freezing weather. Only such work as will not suffer

injury to workmanship or materials will be permitted. Contractor shall carefully protect his work against damage or injury from the weather, and when work is permitted during freezing weather, he shall provide and maintain approved facilities for heating the materials and for protecting the finished work.

D. Unless otherwise approved, contractor shall not work during city holidays.

1.09 SUBSURFACE DATA

A. Subsurface data are offered in good faith solely for placing the Bidder in receipt of all information available to the Owner and Engineer and in no event is to be considered as part of the Contract Documents.

B. The Bidder must interpret such subsurface data according to his own judgment and acknowledge that he is not relying upon the same as accurately describing the subsurface conditions, which may be found to exist.

1. The test boring logs present factual information of the subsurface conditions at the specific test boring location only. The Bidder should not consider, or conclude, that the subsurface conditions will be consistent between test boring locations.

C. The Bidder further acknowledges that he assumes all risks contingent upon the nature of the sub-surface conditions to be actually encountered by him in performing the work covered by the Contract, even though such actual conditions may result in the Bidder performing more or less work than he originally anticipated.

D. The Bidder is further advised that the Owner has made sub-surface investigations and a report has been prepared, in connection with this project for the Engineer, a copy of which is available upon request, but is not considered a part of design Engineer's sealed and signed project documents.

E. In making this data available, the Owner makes no guarantee, either expressed or implied, as to their accuracy or to the accuracy of any interpretation thereof.

1.10 SURVEYS AND LAYOUT

A. All work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings or as directed by the Engineer. Elevation of existing ground and appurtenances are believed to be reasonably correct but are not guaranteed to be absolute and therefore are presented only as an approximation. Any error or apparent discrepancy in the data shown or omissions of data required for accurately accomplishing the stake out survey shall be referred immediately to the Engineer for interpretation or correction.

B. All survey work for construction control purposes shall be made by the Contractor at his expense. The Contractor shall provide a Tennessee Licensed Surveyor as Chief of Party,

competently qualified men, all necessary instruments, stakes, and other material to perform the work.

C. Contractor shall establish all baselines for the location of the principal component parts of the work together with a suitable number of bench marks and batter boards adjacent to the work. Based upon the information provided by the Contract Drawings, the Contractor shall develop and make all detail surveys necessary for construction, including slope stakes, batter boards, stakes for all working points, lines and elevations.

D. Contractor shall have the responsibility to carefully preserve the bench marks, reference points and stakes, and in the case of destruction thereof by the Contractor or resulting from his negligence, the Contractor shall be charged with the expense and damage resulting therefrom and shall be responsible for any mistakes that may be caused by the unnecessary loss or disturbance of such bench marks, reference points and stakes.

E. Existing or new control points, property markers and monuments that will be or are destroyed during the normal causes of construction shall be reestablished by the Contractor and all reference ties recorded therefore shall be furnished to the Engineer. All computations necessary to establish the exact position of the work shall be made and preserved by the Contractor.

F. The Engineer may check all or any portion of the work and the Contractor shall afford all necessary assistance to the Engineer in carrying out such checks. Any necessary corrections to the work shall be immediately made by the Contractor. Such checking by the Engineer shall not relieve the Contractor of any responsibilities for the accuracy or completeness of his work.

G. At completion of the work, the Contractor shall furnish Record Drawings indicating the final layout of all structures, roads, all structures, existing bench marks, etc. The Record Drawings shall indicate all critical elevations of piping, structures, finish grades, etc.

1.11 FIRE PROTECTION

A. Contractor shall take all necessary precautions to prevent fires at or adjacent to the work, buildings, etc., and shall provide adequate facilities for extinguishing fires which do occur. Burning, if permitted in Division 2, shall be limited to areas approved by the Engineer and Owner and properly controlled by the Contractor.

B. When fire or explosion hazards are created in the vicinity of the work as a result of the locations of fuel tanks, or similar hazardous utilities or devices, the Contractor shall immediately alert the local Fire Marshal, the Engineer, and the Owner of such tank or device. The Contractor shall exercise all safety precautions and shall comply with all instructions issued by the Fire Marshal and shall cooperate with the Owner of the tank or device to prevent the occurrence of fire or explosion.

1.12 CHEMICALS

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

1.13 FIRST AID FACILITIES AND ACCIDENTS

A. First Aid Facilities

1. The Contractor shall provide at the site such equipment and facilities as are necessary to supply first aid to any of his personnel who may be injured in connection with the work.

B. Accidents

1. The Contractor shall promptly report, in writing, to the Engineer and Owner all accidents whatsoever out of, or in connection with, the performance of the work, whether on or adjacent to the site, which cause death, personal injury or property damage, giving full details and statements of witnesses.

2. If death, serious injuries, or serious damages are caused, the accident shall be reported immediately by telephone or messenger to both the Owner and the Engineer.

3. If any claim is made by anyone against the Contractor or a Subcontractor on account of any accidents, the Contractor shall promptly report the facts, in writing, to the Engineer and Owner, giving full details of the claim.

1.14 ULTIMATE DISPOSITION OF CLAIMS BY ONE CONTRACTOR ARISING FROM ALLEGED DAMAGE BY ANOTHER CONTRACTOR

A. During the progress of the work, other Contractors may be engaged in performing other work or may be awarded other Contracts for additional work on this project. In that event, the Contractor shall coordinate the work to be done hereunder with the work of such other Contractors and the Contractor shall fully cooperate with such other Contractors and carefully fit its own work to that provided under other Contracts as may be directed by the Engineer. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other Contractor.

B. If the Engineer shall determine that the Contractor is failing to coordinate his work with the work of the other Contractors as the Engineer directed, then the Owner shall have the right to withhold any payments otherwise due hereunder until the Contractor completely complies with the Engineer's directions.

C. If the Contractor notifies the Engineer in writing that another Contractor is failing to coordinate his work with the work of this Contract as directed, the Engineer will promptly investigate the charge. If the Engineer finds it to be true, he will promptly issue such directions to the other Contractor with respect thereto as the situation may require. The

Owner, the Engineer, nor any of their agents shall not, however, be liable for any damages suffered by the Contractor by reason of the other Contractor's failure to promptly comply with the directions so issued by the Engineer, or by reason of another Contractor's default in performance, it being understood that the Owner does not guarantee the responsibility or continued efficiency of any Contractor.

D. The Contractor shall indemnify and hold the Owner and the Engineer harmless from any and all claims of judgments for damages and from costs and expenses to which the Owner may be subjected or which it may suffer or incur by reason of the Contractor's failure to comply with the Engineer's directions promptly.

E. Should the Contractor sustain any damage through any act or omission of any other Contractor having a Contract with the Owner for the performance of work upon the site or of work which may be necessary to be performed for the proper execution of the work to be performed hereunder, or through any act or omission of a Subcontractor of such Contract, the Contractor shall have no claim against the Owner or the Engineer for such damage, but shall have a right to recover such damage from the other Contractor under the provision similar to the following provisions which have been or will be inserted in the Contracts with such other Contractors.

F. Should any other Contractor having or who shall hereafter have a Contract with the Owner for the performance of work upon the site sustain any damage through any act or omission of the Contractor hereunder or through any act or omission of any Subcontractor of the Contractor, the Contractor agrees to reimburse such other Contractor for all such damages and to defend at his own expense any suit based upon such claim and if any judgment or claims against the Owner shall be allowed, the Contractor shall pay or satisfy such judgment or claim and pay all costs and expenses in connection therewith and shall indemnify and hold the Owner harmless from all such claims.

G. The Owner's right to indemnification hereunder shall in no way be diminished, waived or discharged, by its recourse to assessment of liquidated damages as provided in the Contract, or by the exercise of any other remedy provided for by Contract Documents or by law.

1.15 BLASTING AND EXPLOSIVES

A. When blasting is utilized at the site of the work, it shall conform to the requirements specified in Section 02202 – Excavation by Blasting.

1.16 LIMITS OF WORK AREA

A. The Contractor shall confine his construction operations within the Contract limits shown on the Drawings and recorded easements. Storage of equipment and materials, or erection and use of sheds outside of the Contract limits, if such areas are the property of the Owner, shall be used only with the Owner's approval. Such storage or temporary structures, even within the Contract's limits, shall be confined to the Owner's property and shall not be placed on

properties designated as easements or rights-of-way unless specifically permitted elsewhere in the Contract Documents.

1.17 WEATHER CONDITIONS

A. No work shall be done when the weather is unsuitable. The Contractor shall take necessary precautions (in the event of impending storms) to protect all work, materials, or equipment from damage or deterioration due to floods, driving rain, or wind, and snow storms. The Owner reserves the right, through the opinion of the Engineer, to order that additional protection measures over and beyond those proposed by the Contractor, be taken to safeguard all components of the Project. The Contractor shall not claim any compensation for such precautionary measures so ordered, nor claim any compensation from the Owner for damage to the work from weather elements.

C. The mixing and placing of concrete or pavement courses, the laying of masonry, and installation of sewers and water mains shall be stopped during rainstorms, if ordered by the Engineer; and all freshly placed work shall be protected by canvas or other suitable covering in such manner as to prevent running water from coming in contact with it. Sufficient coverings shall be provided and kept ready at hand for this purpose. The limitations and requirements for mixing and placing concrete, or laying of masonry, in cold weather shall be as described elsewhere in these Specifications.

1.18 PERIODIC CLEANUP: BASIC SITE RESTORATION

A. During construction, the Contractor shall regularly remove from the site of the work all accumulated debris and surplus materials of any kind which result from his operations. Unused equipment and tools shall be stored at the Contractor's yard or base of operations for the Project.

B. When the work involves installation of sewers, drains, water mains, manholes, underground structures, or other disturbance of existing features in or across streets, rights-of-way, easements, or private property, the Contractor shall (as the work progresses) promptly backfill, compact, grade, and otherwise restore the disturbed area to the basic condition which will permit resumption of pedestrian or vehicular traffic and any other critical activity or functions consistent with the original use of the land. The requirements for temporary paving of streets, walks, and driveways are specified elsewhere. Unsightly mounds of earth, large stones, boulders, and debris shall be removed so that the site presents a neat appearance.

C. The Contractor shall perform the cleanup work on a regular basis and as frequently as ordered by the Engineer. Basic site restoration in a particular area shall be accomplished immediately following the installation or completion of the required facilities in that area. Furthermore, such work shall also be accomplished, when ordered by the Engineer, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.

F. Upon failure of the Contractor to perform periodic cleanup and basic restoration of the site to the Engineer's satisfaction, the Owner may, upon five (5) days prior written notice to the Contractor, without prejudice to any other rights or remedies of the Owner, cause such work

for which the Contractor is responsible to be accomplished to the extent deemed necessary by the Engineer, and all costs resulting therefrom shall be charged to the Contractor and deducted from the amounts of money that may be due him.

1.19 USE OF FACILITIES BEFORE COMPLETION

A. The Owner reserves the right to use any portion of the constructed facilities before final completion of the whole work to be done under this Contract. However, only those portions of the facilities which have been completed to the Engineer's satisfaction, as evidenced by his issuing a Certificate of Substantial Completion covering that part of the work, shall be placed in service.

B. It shall be the Owner's responsibility to prevent premature connections to or use of any portion of the installed facilities by private or public parties, persons or groups of persons, before the Engineer issues his Certificate of Substantial Completion covering that portion of the work to be placed in service.

D. Consistent with the approved progress schedule, the Contractor shall cooperate with the Owner, his agents, and the Engineer to accelerate completion of those facilities, or portions thereof, which have been designated for early use by the Owner.

1.20 CONSTRUCTION VIDEO

A. The Contractor shall video the entire project site including all concrete and asphalt pavements, curb and gutter, fencing to remain, structures to be demolished, and existing structures that are to be modified. The original video image shall be turned over to the Engineer prior to beginning construction activities. The video shall be provided as an Audio

B. Video mpg files shall be provided on DVD+R/DVD-ROM or flash drive compatible media only. The video shall clearly identify existing site and structural conditions prior to construction.

C. Prior to acceptance of any section of gravity sewer line, the contractor shall provide post construction CCTV and sonar of the internal pipeline.

PART 2 – PRODUCTS
(NOT USED)

PART 3 – EXECUTION
(NOT USED)

- END OF SECTION –

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Bid Form lists each item of the Project for which payment will be made. No payment will be made for any items other than those listed in the Bid Form

B. Required items of work and incidentals necessary for the satisfactory completion of the work which are not specifically listed in the Bid Form, and which are not specified in this Section, shall be considered incidental to the work. All costs thereof shall be considered as included in the lump sum or unit prices bid for the various Bid items. The Contractor shall prepare the Bid accordingly.

   a. It is the Contractor's responsibility to identify and acquire a project laydown area. A copy of property lease agreements shall be submitted to the Owner/Engineer to keep on file.

C. Contractor shall provide prices for the items listed herein to cover the material, complete installation, incidentals, testing, and Contractor's overhead and profit for each item.

D. The quantities shown for extra work unit price pay items listed in the Bid Form represent estimates made solely for the purpose of comparison of Bids. Owner makes no guarantee that actual required quantities will agree with those included in the Bid Form. The Owner reserves the right to increase or decrease any quantity or to eliminate any quantity as Owner may deem necessary. Contractor will not be entitled to any adjustment in the unit bid price as a result of any change in an estimated quantity and agrees to accept the unit bid prices as complete and total compensation for any additions caused by changes or alterations in the Work ordered by the Owner.

1.02 PAYMENT ITEM DESCRIPTIONS

A. Bid Form Line Items
   1. Item No. 1 - Mobilization and General Conditions
      a. The total price for mobilization shall not exceed three percent (3%) of the Contract Price.

      b. Payment shall be made at the price shown in the Schedule of Values for mobilization, specifically, all costs related to establishing construction offices (if applicable) for the Contractor and its subcontractors, the Construction Manager; communications; other temporary utilities that the Contractor, and subcontractors may require; and the transportation of construction equipment to the site to be used in performing the Work. Payment shall include compensation for all construction permits to be obtained by the Contractor, project signs, security measures, access road(s) installation for temporary facilities, and the site preparation required for

temporary facilities and utilities. The mobilization payment shall be issued for completion of the work and submission of submittals as provided below.

c. When the Construction Manager accepts the Contractor's Completion of the Work for construction permits, project signs, security measures, access road(s) installation for temporary facilities, and the site preparation required for temporary facilities and utilities, fifty percent (50%) of the mobilization cost shall be paid.

d. When the Construction Manager receives and approves the Contractor's Submittal Schedule, Construction Progress Schedule, and all required Material Submittals, forty-five percent (45%) of the mobilization cost shall be paid.

e. When the Construction Manager accepts the Contractor's site demobilization and restoration, separate from retainage, five percent (5%) of the mobilization cost shall be paid.

2. Item No. 2 – Clearing and Grubbing
   a. This unit price item includes furnishing all materials, equipment, labor, and incidentals required to remove and dispose of trees, roots, stumps, other vegetation and other non-vegetative debris, brush, bushes, trash, and ground cover to limits of construction as indicated on Plans.
   b. The entire width and length of the permanent easements are to be cleared and grubbed within the Limits of Construction for installation of piping. In temporary easements, only those trees and shrubs shall be removed which are in actual interference with excavation or grading work under this Contract.
   c. Trees shall be chipped onsite and distributed across disturbed areas.
   d. Payment for work under this item will be on a linear foot basis along the alignment of the sewer installed, Station to Station.

3. Item No. 3 – 42" Interceptor Sewer Pipe,
   a. Payment shall be made per the actual number of linear feet for all 42" diameter interceptor sewer pipe that is installed from open cutting excavation, installing pipe, trench dewatering, bedding, exterior V-Bio wrap for ductile iron and securely taped, and backfill per burial depth as indicated. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

4. Item No. 4 – Trenchless Installation for 42" Interceptor Sewer Pipe, R/J Carrier, <u>Watauga Rd crossing.</u>
   a. Payment shall be for providing and installing Steel Encasement Pipe or Tunnel Liner Plate as shown in the drawings to be installed via boring and jacking or hand mined. Contractor is responsible for all the work, materials, and labor needed for a complete installation. Payment for 70 LF of RJ 42" carrier pipe shall be included in this line item. Payment shall be made when casing/tunnel and carrier is determined by the Engineer/Owner to be in the correct location and elevation.
   b. Payment for work under this item will be on a lump sum basis.

5. Item No. 5 – 8” SDR 35 PVC
   a. Payment shall be made per the actual number of linear feet for all SDR 35 PVC sewer that is installed from open cutting, excavation, and installing pipe bedding, and backfill.

   b. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

6. Item No. 6 - 4” SDR 35 PVC Sewer Lateral
   a. Payment shall be made per the actual number of linear feet for all SDR 35 PVC sewer that is installed from open cut excavation, installing pipe bedding, and backfill.

   b. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

7. Item No. 7 – Creek Crossing #1: Sta. 12+25
   a. A lump sum payment shall be made for work required for an open-cut type sewer pipe installation crossing the steam as shown.

   b. Contractor shall be responsible for all aspects of the excavated crossing, including but not limited to scheduling, staging, and coordinating work activities per TDEC creek crossing guidelines. This item includes furnishing all materials, concrete encasement, equipment, labor and incidentals required to provide and install (and remove where applicable) all permanent or temporary items for pipe installation.

   c. Payment for the pipe installed shall be under Item No. 3.

8. Item No. 8 – Standard 7'ϕ Manhole Base w/Transition
   a. Payment shall be made per the actual number of manholes bases of this type installed.

   b. Base shall include full diameter riser to attain a clear height above the bench of 6’, minimum.

   c. Payment includes all excavation, dewatering, bedding, backfill, compaction, flexible pipe connections, joint gaskets, polypropylene steps, formed inverts, necessary for each manhole installed.

   d. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

9. Item No. 9 – Standard 8'ϕ Manhole Base w/Transition
   a. Payment shall be made per the actual number of manholes bases of this type installed.

   b. Base shall include full diameter riser to attain a clear height above the bench of 6', minimum.

   c. Payment includes all excavation, dewatering, bedding, backfill, compaction, flexible pipe connections, joint gaskets, polypropylene steps, formed inverts, necessary for each manhole installed.

   d. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

10. Item No. 10 – Standard 4'ϕ Manhole Base
   a. Payment shall be made per the actual number of manholes bases of this type installed.

   b. Payment includes all excavation, dewatering, bedding, backfill, compaction, flexible pipe connections, joint gaskets, polypropylene steps, formed inverts, necessary for each manhole installed.

   c. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

11. Item No. 11 - 4'ϕ Manhole Riser, stacked out to finished grade
   a. Payment shall be made per the actual number of vertical feet of manhole risers installed.

   b. Payment shall include all excavation, dewatering, bedding, backfill, compaction, Eccentric Cone and Grade Rings, flexible pipe connections, joint gaskets, and polypropylene steps necessary for each manhole riser installed.

   c. Vertical feet of grade rings shall be incidental to the riser installation.

   d. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

12. Item No. 12 - Anti-Seep Collar Upstream of each MH
   a. Payment shall be made per the actual number of Anti-Seep Collars installed upstream of each new manhole.

   b. Payment shall be for all offsite clay testing, excavation, hauling, placement up to finished grade, dewatering, and compaction.

   c. Payment shall be for all concrete testing, excavation, hauling, placement to within 24-inches of finished grade, dewatering, and compaction.

d. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

13. Item No. 13 - Manhole “Standard” Frame and Cover
    a. Payment shall be made for each standard manhole frame and cover installed on new or existing manholes.

    b. Payment shall include material and installation costs for all new manhole frames and covers, leveling and grade rings, waterproof adhesive, and all appurtenances necessary for a watertight installation.

14. Item No. 14 - Manhole “Water-Tight” Frame and Cover
    a. Payment shall be made for each water-tight manhole frame and cover installed on new or existing manholes.

    b. Payment shall include material and installation costs for all new manhole frames and covers, leveling and grade rings required on the cone, waterproof adhesive, anti-seize bolt compound, and all appurtenances necessary for a water-tight installation.

15. Item No. 15 – Removal of Existing 30” Sewer Pipe
    a. Payment shall be made per the actual number of linear feet of 30” trunk sewer that is removed for the purpose of installing new 42” sewer pipe within the same alignment.

    b. Removal of any additional piping within this project other than listed above shall be considered incidental to the overall project and no additional payment shall be made.

    c. Contractor shall completely remove existing abandoned sewer pipe where indicated or in conflict, regardless of type encountered while excavating for new pipe and dispose of it offsite at a location permitted to receive such material.

16. Item No. 16 – Removal of Existing Manholes
    a. Payment shall be made per the actual number of each manhole that is removed for the purpose of installing new 42” sewer pipe or new manhole within the same alignment.

    b. Contractor shall completely remove existing manhole, regardless of type encountered while excavating and dispose of it offsite at a location permitted to receive such material.

17. Item No. 17 – Abandoning of Existing Manholes (and adjacent Sewer Pipe) In-Place
    a. Payment shall be made per the actual number of each manhole that is abandoned in place.

    b. Contractor shall abandon each manhole that will be taken out of service and no longer needed in the system.

c. A complete abandonment shall consist of removing the top cone sections of the manhole, blocking off all inlets and outlets according to plan details, and blocking off connecting pipe at the point of intersection with the new sewer alignment.

18. Item No. 18 - Temporary Connection and Removal of existing 30” sewer to New Manhole 1-7

    a. Payment shall be made for the temporary connection of the existing 30” interceptor sewer to the new MH 1-7 while the new upstream 42” interceptor is being completed.

    b. When construction is complete the riser(s) affected by the 30” connection will be removed and replaced, and the MH stacked out accordingly.

19. Item No. 19 – Connection of Existing 4” Sewer Service to New Manhole via outside drop connection
    a. Payment shall be made per the actual number of each 4” sewer service that is connected to a new manhole.

    b. Work shall include all material and installation costs for all appurtenances, boots, coring, equipment, concrete, and labor necessary to provide a water-tight connection.

20. Item No. 20 – Connection of Existing 6” Sewer Service to New Manhole via outside drop connection
    a. Payment shall be made per the actual number of each 6” sewer service that is connected to a new manhole.

    b. Work shall include all material and installation costs for all appurtenances, boots, coring, equipment, concrete, and labor necessary to provide a water-tight connection.

21. Item No. 21 – Connection of Existing 8” Sewer Service to New Manhole via outside drop connection
    a. Payment shall be made per the actual number of each 8” sewer service that is connected to a new manhole.

    b. Work shall include all material and installation costs for all appurtenances, boots, coring, equipment, concrete, and labor necessary to provide a water-tight connection.

22. Item No. 22 – Connection of Existing 10” Sewer Service to New Manhole 1-4
    a. Payment shall be made per the actual number of each 10” sewer service that is connected to a new manhole.

    b. Work shall include all material and installation costs for all appurtenances, boots, coring, equipment, and labor necessary to provide a water-tight connection.

23. Item No. 23 – Connection of Existing 24” discharge pipe from WTP to New Manhole 1-30 via outside drop connection
    a. Payment shall be made as a Lump Sum or percentage thereof for connecting the 24” WTP discharge pipe the new manhole.

    b. Work shall include all material and installation costs for all appurtenances, boots, coring, equipment, and labor necessary to provide a water-tight drop connection.

24. Item No. 24 - Connection of New 42” Trunk Sewer to Existing Manhole/Stubout at Sta. 0+00
    a. Payment shall be made as a Lump Sum or percentage thereof for connecting the new 42” trunk sewer to the recently installed at Sta. 0+00.

    b. Contractor shall locate the 42” pipe left stubbed out of the manhole and adjust it’s slope accordingly to match the drawings.

    c. Work shall include all material and installation costs for all appurtenances, boots, coring, connection sleeves, equipment, and labor necessary to provide a water-tight connection.

25. Item No. 25 – Connection of Existing Sewer Services to New 42” Interceptor Sewer w/Inserta Tee and Cleanout at Easement.
    a. Payment shall be made per each sewer service connected directly to the new 42” trunk sewer.

    b. Work shall include all material and installation costs for all appurtenances, boots, coring, saddle, tapping, equipment, pipe, and labor necessary to provide a water-tight connection.

26. Item No. 26 - Connection of Existing Sewer Services to New 8” Sewer Mains w/8”x6” Tee and a Cleanout at Easement
    a. Payment shall be made per each sewer service connected to a new 8” sewer main.

    b. Work shall include all material and installation costs for all appurtenances, equipment, pipe, fittings, clean out, and labor necessary to provide a water-tight connection.

27. Item No. 27 – Concrete Cap for 42” Pipe, Detail 0222128
    a. Payment shall be made per the actual number of linear feet of concrete cap installed along the 42” Interceptor Sewer.

    b. The Concrete Cap shall be constructed per Detail 0222128 where indicated on the drawings.

28. Item No. 28 - 6” DI Waterline, includes fittings, thrust restraint, and connection to existing 4” waterline.
    a. Payment shall be made per the actual number of linear feet for 6” waterline that is installed from open cut excavation.

b. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

29. Item No. 29 – 6” Gate Valve
    a. Payment shall be made per each 6” gate valve installed and include valve box.

    b. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

30. Item No. 30 - Waterline Blowoff Assembly per Detail
    a. Payment shall be made per each blow off assembly installed.

    b. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

31. Item No. 31 - 3/4” Water Service, Includes tap and service line from 6” watermain to meter
    a. Payment shall be made per each water service installed and placed in service.

    b. Contractor shall provide, install, and test all materials needed for a complete and functional installation.

    c. City will provide and install water meter.

32. Item No. 32 - Sewer Flow Control and Bypass Pumping for the Project
    a. This line item is an allowance for reimbursement of invoices from the bypass pumping system vendor.

    b. Direct Reimbursement for bypass pumping equipment rental, delivery, setup, testing, and pickup. Amount paid will be directly taken from bypass equipment Supplier’s monthly invoices. Operation of system by vendor shall not be reimbursable under this pay item.

    a. Contractor shall be responsible for fueling and maintenance required to keep the pumps in ready operation during bypass periods. No additional payment will be made for system operation.

33. Item No. 33 – Diesel Fuel used in Bypass Pumps
    a. This line item is an allowance for diesel fuel used in bypass pumping activities.

    b. Payment shall be based on Engine Hours, Average RPM, and Average $/gallon diesel price (with appropriate supporting calculations and fuel delivery invoices with site address listed).

34. Item No. 34 - Undercut Pipe Trench Subgrade and Refill with Crushed Stone, #57, as directed by Engineer

a. Measurement of crushed stone refill made for the construction of sewer lines shall be computed from the formula: "trench depth" x "trench width" x "trench length" = allowable volume for payment expressed in cubic yards.

b. "Trench depth" for refill shall equal the vertical centerline depth from a point 6 inches below the pipe installed to the bottom of the trench ordered by the Engineer below the aforesaid limit. "Trench length" shall equal the actual horizontal measurement along the center line of the trench.

c. Where use of crushed stone refill is directed by the Engineer, it shall be paid per cubic yard of refill placed. Gravel refill placed at the discretion of the Contractor and not at the direction of the Engineer will not be paid for. The crushed stone bedding, six (6) inches below the pipe and gravel backfilling to twelve (12) inches above the pipe shall not be measured for payment under this unit of work, but shall be merged in the unit prices for other units of work of this Contract; and no separate payment shall be allowed therefore.

d. No payment will be made for Contractor opening trench and allowing good subgrade to fail.

35. Item No. 35 - Asphalt Surface, TDOT 411-01.11, Grading "E", PG64-22
    a. Payment shall be made per each ton of asphalt surface installed per the depth indicated in the plans. Associated work will be considered incidental and no additional payment will be made.

    b. Work shall include initial saw cutting of trench excavation limits and additional saw cutting of broken edges prior to binder and/or surface pavement installation.

    c. No asphalt surface shall be installed until the base has been approved by the Engineer or it will be considered noncompliant and no payment shall be granted.

    d. No additional payment shall be made for removal of waste material associated with the pipe installation or paving preparation.

36. Item No. 36 - Asphalt Binder, TDOT 307-01.07, Grading "BM", PG64-22
    a. Payment shall be made only per each ton of asphalt binder installed per the depth indicated in the plans. Associated work will be considered incidental and no additional payment will be made.

    b. No asphalt binder shall be installed until the base has been approved by the Engineer or it will be considered noncompliant and no payment shall be granted.

    c. No additional payment shall be made for removal of waste material associated with the pipe installation or paving preparation.

37. Item No. 37 - Aggregate Base, TDOT 303-01.01
    a. Payment shall be made for the full compensation of installing granular aggregate base including all labor, materials, tools, equipment, supervision, other accessories, or incidentals necessary to perform and successfully complete the Work. It shall also

include all costs associated with such work, including but not limited to, forming, reinforcing steel, miscellaneous earthwork, and cleanup.

b. Payment shall be based for the total tons of aggregate base installed as shown on the Drawing Details and described in the Specifications.

c. Wasted aggregate not used in trench for asphalt repair will not be paid for.

38. Item No. 38 – Misc. Concrete Pavement
    a. Payment shall be made for the full compensation of installing concrete paving including all labor, materials, tools, equipment, supervision, other accessories, or incidentals necessary to perform and successfully complete the Work. It shall also include all costs associated with such work, including but not limited to, forming, reinforcing steel, miscellaneous earthwork, and cleanup.

    b. Payment shall be based for the total cubic yardage of concrete as a complete pavement system as shown on the Drawing Details and described in the Specifications.

39. Item No. 39 - Flowable Fill per Detail 0222118A
    a. Payment shall be made for the full compensation of installing flowable as directed including all labor, materials, tools, equipment, supervision, other accessories, or incidentals necessary to perform and successfully complete the Work.

    c. Payment shall be based for the total cubic yardage of flowable fill installed.

40. Item No. 40 - NPDES Compliance, Erosion Prevention and Sediment Control
    a. Payment shall be made on a lump sum basis for installing, maintaining, replacing damaged BMPs, and removal of EPSC items required prior to and during construction.

    b. BMP items include but are not limited to Silt Fence, Construction Entrances, Erosion eels, Rock check dams, and Street Sweeping per the Project SWPPP.

    c. A lump sum payment shall be made for NPDES Compliance. A percentage of the lump sum shall be paid each month for the duration of the project as the work is being completed until all specified work is done and the site is stabilized and erosion prevention BMPs have been removed.

41. Item No. 41 - Temporary Seeding, Fertilizer, & Straw Mulch
    a. Payment for temporary seeding, fertilizer, and straw mulch shall be made per linear foot of pipe installed.

    b. Payment shall be made based on the centerline length of pipe installed in the trench. It is the Contractors responsibility to insure the seed germinates after the first installation. Subsequent applications due to lack of germination shall not receive additional payment.

42. Item No. 42 - Permanent Seeding, Fertilizer, & Straw Mulch
    a. Payment for permanent seeding, fertilizer, and straw mulch shall be made per length foot of pipe installed.

    b. Payment shall include work required to ready the ground for seeding which includes final grading, removal of deleterious material, addition of top soil, and removal of stones via specialty mechanical device.

    c. Payment shall be made only once per disturbed area. It is the Contractors responsibility to insure the seed germinates after the first installation by watering on a regular basis. Subsequent applications due to lack of germination shall not receive additional payment.

    d. A percentage of the lump sum shall be paid while work persist until item is complete and the site is stabilized.

43. Item No. 43 - Miscellaneous Stone, if directed by Owner/Engineer
    a. Payment shall be made per each ton of stone installed. Associated work will be considered incidental and no additional payment will be made.

    b. No additional payment for stone used for Contractor construction roads or laydown areas will be made. These uses and those similar shall be incorporated into other bid items.

44. Item No. 44 – Misc. Rip Rap for ditch or slope stabilization, if directed by Owner/Engineer
    a. Payment shall be made per each ton of Rip Rap installed. Associated work will be considered incidental and no additional payment will be made.

45. Item No. 45 – Miscellaneous Slope Stabilization Matting, if directed by Owner/Engineer
    a. Payment shall be made per square yard of slope stabilization matting installed.

    b. Matting shall be stapled accordingly to insure all areas are laying on top soil and the outside edges of area matted shall be trenched in so no matting edge is visible.

    c. Associated work will be considered incidental and no additional payment will be made.

46. Item No. 46 – Traffic Control Plan and Implementation
    a. Payment shall be made by lump sum for a completed traffic control plan and implementation.

    b. The Contractor shall prepare, submit for approval, and implement a Traffic Control Plan based on the Contractor's anticipated work schedule in coordination with local school bus routes, City and County, and local and state agencies.

c. Work shall include necessary signage (fixed or programmable), flagmen, cones, barriers, temporary stripping, etc. to safely route vehicular or pedestrian traffic through and around construction area.

d. Work shall also include repainting of existing pavement markings and removal, storage, and replacement of existing signage.

e. A percentage of the lump sum shall be paid as the work is being completed until all specified work is done and signage has been removed from the work area.

47. Item No. 47 – Alignment Stakeout and Monthly Progress Survey
    a. Monthly cost for survey work, collecting and processing field data for staking out the alignments, and monthly asbuilt updates.

    b. An asbuilt manhole (inverts and top of casting) and alignment survey (invert of each pipe joint) shall be required to accompany each monthly pay request. Monthly production shall not be approved for payment unless the Owner/Engineer are in agreement with the elevations presented match the plans.

    c. No additional payment shall be made for adjusting manhole or pipe placement, elevation, or pipe slope to comply with the approved plans.

48. Item No. 48 - Final Site Cleanup and Closeout Documents
    a. The lump sum payment shall be full compensation for the completion of the work. The Contractor shall remove all rubbish from and about the site of the work, and all temporary structures, construction signs, tools, scaffolding, materials, supplies and equipment which he or any of his Subcontractors may have used in the performance of the work. Contractor shall broom clean paved surfaces and rake clean other surfaces of grounds.

    b. As construction of the project enters the final stages of completion, the Contractor shall, in concert with accomplishing the construction requirements set forth in the Contract Documents, provide the following items as they apply to the contract.

        I. Contractor's Certification Of Completion Of Work
        II. Affidavit of Release of Liens
        III. Affidavit of Payment of Debts and Claims
        IV. Consent of Surety to Final Payment

49. Item No. 49 – Field Office, Equipment, and Services for RPR
    a. Payment shall be made on a monthly basis for the duration of construction for providing a fully equipped field office for Engineer’s RPR.
    b. Requirements shall be per specification 01521 Field Office, Equipment, and Services.

50. Item No. 50 – Trench Plug: Flowable Fill barrier at 50’ stream blasting buffer
    a. Payment shall be made for each Trench Plug installed according to the plans or where directed by Engineer.

b. Work shall include all excavation, shoring, formwork, flowable fill, labor, and equipment for a completed and acceptable trench plug.

51. Item No. 51 – Geotextile Separator Fabric for pipe envelope, where directed by Engineer
    a. Payment shall be made for each linear foot along the pipeline of geotextile separator fabric installed according to the plans or where directed by Engineer.

52. Item No. 52 – 6" Service Lateral replacement, where directed by Engineer
    a. Payment shall be made for each linear foot service lateral replaced according to the plans or where directed by Engineer.

53. Item No. 53 – Forcemain connection to MH 1-19
    a. A lump sum payment shall be made for connecting the existing sewer forcemain to the indicated manhole per the detail.

54. Item No. 54 – Gravel Road Repair, where directed by Engineer
    a. Payment shall be made for each square yard of gravel road repair, or where directed by Engineer.
    b. Aggregate shall be a minimum of 6" depth of crusher run.
    c. Aggregate shall be smoothed with grader and vibratory roller compacted in place.

55. Item No. 55 – Asphalt Pavement repair matching existing thickness, where directed by Engineer
    a. Payment shall be made for each ton of asphalt repair,
    b. Depth shall match adjacent asphalt layer(s).
    c. Asphalt shall be smoothed with grader and wet roller compacted in place.

56. Item No. 56 – Concrete Pavement repair matching existing thickness, where directed by Engineer
    a. Payment shall be made for each cubic yard of concrete pavement repair, including reinforcing steel,
    b. Depth shall match adjacent thickness.
    c. Concrete shall be finished to match adjacent finish.

B. Project Contingency Allowance, if directed by Owner/Engineer

    a. Documentation
        I. Submit to the Owner the value of the work to be performed.

        II. Furnish an itemized breakdown of the quantities and prices used in computing the value of the work on the approved Project Field Order or Change Order Form.

    b. No consideration for time or money will be given to the Contractor if work is performed prior to written approval from the Owner.

    c. In calculating the value of the work, labor, materials, and rental charges shall be paid in accordance with the General Conditions.

1.03 EARTHWORK

A. Earth Excavation

1. No separate payment shall be made for earth excavation. The cost of such work and all costs incidental thereto shall be included in the price bid for the item to which the work pertains.

2. No separate payment will be made for providing shoring: sheeting, bracing, timbering, etc.

B. Rock Excavation

1. No separate payment shall be made for rock excavation. All excavation shall be considered unclassified. The cost of such work and all costs incidental thereto shall be included in the price bid for the item to which the work pertains.

2. No separate payment will be made for providing shoring: sheeting, bracing, timbering, etc.

3. Blasting within 50-feet of any existing stream as indicated on the drawings shall be completed per the term in the Individual ARAP.

4. Blasting safety, design, placement, means, and methods, shall be the sole responsibility of the Contractor. The Owner/Engineer shall not be responsible for any damage caused by blasting by the Contractor or those hired by the Contractor.

a. Damage caused by blasting must be repaired by the Contractor at no expense to the owner.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION –

SECTION 01035

MODIFICATION PROCEDURES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Work includes all labor, materials, equipment and appliances required for the complete execution of additions, modifications and alterations to existing buildings and structures as shown on the Drawings and specified under the various Sections of the Contract Specifications and as required by conditions at the site.

B. The Contractor shall have examined all work to be performed to the existing buildings and familiarize himself with the nature and extent to which the existing buildings will be damaged, items removed or rearranged due to the work under his Contract and that of other Contracts.

1. Cutting and patching shall conform to the requirements of the General Conditions, Supplemental Conditions, and as specified herein.

2. Patching work shall be performed with similar materials and in the same manner as adjoining work. Joining between old and new work shall be perfect and practically invisible. All due caution shall be taken to obtain a bond between old and new work.

C. Major portions of the work are indicated on the Drawings and the accompanying Specifications thereto. All work must be complete in all respects and executed with high quality workmanship.

1.02 SITE

A. Site Visit

1. Prior to submission of Bids, the Contractor shall have visited the site and thoroughly acquainted himself with the exact nature of the work indicated on the Drawings and the Specifications requirements. Failure to comply with the aforementioned requirements shall not constitute a basis for claims for additional compensation.

B. Measurements

1. Prior to ordering any materials or doing any work, the Contractor shall verify all measurements, dimensions and other conditions as may be necessary or required in connection with his work. The Contractor shall be responsible for the correctness of same.

1.03 MATERIALS

A. All materials to perform and complete the work shall be new.

1.04 SHORING, UNDERPINNING AND BRACING

A. When necessary and required, the Contractor shall provide underpinning and temporary shoring and bracings, all in accordance with code requirements, and as approved by the Engineer.

B. Shoring and bracing shall be of such form and so installed as to safely support the work and interfere as little as possible with the progress of the work. Suitable means shall be provided to adjust any settlement in the shoring supports. Temporary shoring shall consist of sound timbers or rolled shapes of required dimensions which shall be removed after necessity for same ceases to exist. All work removed or damaged through installation of temporary shoring or through improper shoring shall be replaced or repaired after the shoring is removed, at no additional cost to the Owner.

1.05 WORK PREPARATION AND TEMPORARY ACCESS

A. The Contractor, before commencing work, shall prepare and submit for approval a progress schedule in accordance with the requirements of Section 01300 - Submittals, in order to coordinate the work of all trades and to insure completion on or before the completion date. The Owner and the Engineer reserve the right to revise or modify such schedules as required to expedite each phase of work and to coordinate such work with the partial use of the building for purposes as directed.

1.06 WEATHER PROTECTION

A. Where exterior walls or roofs are being altered, or disturbed for any adjacent alteration, the Contractor shall provide temporary weather protection in those areas to keep interior of buildings absolutely dry and unaffected by the weather. The Contractor will be held responsible for any damage caused by improper protection against weather.

B. Where existing exterior walls or roofs are disturbed due to alterations, disturbances shall be kept to a minimum and walls or roofs shall be repaired and patched in such a manner that the buildings will be absolutely watertight and meet the conditions of the existing roofing flashing and waterproofing bonds and guarantees.

1.07 CUTTING, PATCHING, REPAIRING, AND REFINISHING

A. The Contractor shall be responsible for cutting all openings in walls, floors and ceilings (indicated to remain) to accommodate alteration work under his Contract in accordance with the requirements of the General Conditions, Supplemental Conditions, and as hereinafter specified. Rough patching and all finish patching shall be by the Contractor.

1. Where new openings are to occur in existing exterior and interior concrete and masonry bearing walls and structural concrete floor, the Contractor will be required to notify the Owner and Engineer in writing and shall obtain approval prior to cutting operations. The Engineer will determine whether such openings affect the structural stability or load bearing capacities of walls and floors.

2. All holes and openings to be cut in existing walls, floors and ceilings of any nature shall be geometrically correct and no larger than necessary to accommodate the new work.

3. No cutting of finished or structural work may be done without the approval of the Engineer.

B. Major demolition and removal work such as demolition of buildings and structures, complete or nearly complete removal of floors, walls and ceilings indicated on the Drawings, shall be performed by the Contractor. The Contractor shall also be responsible for all finish patching operations of holes and openings in existing floors, walls, ceilings and roofs to accommodate the alteration work under the Plumbing, HVAC and Electrical Sections as well as that required for the Contractor's work hereinafter specified.

C. Each Contractor and/or his Subcontractors shall provide sleeves, forms and inserts for installation by the General Contractor as specified in Section 01010, Summary of Work.

1.09 EXISTING EQUIPMENT AND FURNISHINGS

A. All unsalvageable equipment shall become the property of the Contractor in accordance with the requirements of Section 01540, Demolition and Removal of Existing Structures and Equipment, and shall be removed away from the site. Equipment to be retained, or relocated, shall be as shown on the Drawings or as specified.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

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SECTION 01040

COORDINATION

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall allow the Owner or his agents, and other project Contractors or their agents, to enter upon the work for the purpose of constructing, operating, maintaining, removing, repairing, altering, or replacing such pipes, sewers, conduits, manholes, wires, poles, or other structures and appliances which may be required to be installed at or in the work. The Contractor shall cooperate with all aforesaid parties and shall allow reasonable provisions for the prosecution of any other work by the Owner, or others, to be done in connection with his work, or in connection with normal use of the facilities.

B. Each Contractor shall cooperate fully with the Owner, the Engineer, and all other Contractors employed on the work, to effect proper coordination and progress to complete the project on schedule and in proper sequence. Insofar as possible, decisions of all kinds required from the Engineer shall be anticipated by the Contractor to provide ample time for inspection, or the preparation of instructions.

C. Each Contractor shall assume full responsibility for the correlation of all parts of his work with that of other Contractors. Each Contractor's superintendent shall correlate all work with other Contractors in the laying out of work. Each Contractor shall lay out his own work in accordance with the Drawings, Specifications, and instructions of latest issue and with due regard to the work of other Contractors.

D. Periodic coordinating conferences shall be held per Section 01200, Project Meetings, of these Contract Documents.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION –

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SECTION 01070

ABBREVIATIONS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The following is a partial list of typical abbreviations which may be used in the Specifications, and the organizations to which they refer:

AASHTO	-	American Association of State Highway and Transportation Officials
ACI	-	American Concrete Institute
ACIFS	-	American Cast Iron Flange Standards
AFBMA	-	Anti-Friction Bearing Manufacturer's Association
AGA	-	American Gas Association
AGMA	-	American Gear Manufacturers Association
AIA	-	American Institute of Architects
AISC	-	American Institute of Steel Construction
AISI	-	American Iron and Steel Institute
ANSI	-	American National Standard Institute
API	-	American Petroleum Institute
ASCE	-	American Society of Civil Engineers
ASHRAE	-	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society for Testing and Materials
AWS	-	American Welding Society
AWWA-	American Water Works Association	
CEMA	-	Conveyor Equipment Manufacturer's Association
CRSI	-	Concrete Reinforcing Steel Institute
DIPRA	-	Ductile Iron Pipe Research Association
Fed Spec	-	Federal Specifications
IEEE	-	Institute of Electrical and Electronic Engineers
IPCEA	-	Insulated Power Cable Engineers Association
ISO	-	Insurance Services Offices
NBS	-	National Bureau of Standards
TDOT	-	Tennessee Department of Transportation
NEC	-	National Electric Code
NEMA	-	National Electrical Manufacturers Association
OSHA	-	Occupational Safety and Health Act
PCI	-	Precast Concrete Institute
UL	-	Underwriters Laboratories, Inc.
USGS	-	United States Geological Survey

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01090

REFERENCE STANDARDS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Wherever reference is made to any published standards, codes, or standard specifications, it shall mean the latest standard code, specification, or tentative specification of the technical society, organization, or body referred to, which is in effect at the date of invitation for Bids.

B. All materials, products, and procedures used or incorporated in the work shall be in strict conformance with applicable codes, regulations, specifications, and standards.

C. A partial listing of codes, regulations, specifications, and standards includes the following:

Air Conditioning and Refrigeration Institute (ARI)

Air Diffusion Council (ADC)

Air Moving and Conditioning Association (AMCA)

The Aluminum Association (AA)

American Architectural Manufacturers Association (AAMA)

American Concrete Institute (ACI)

American Gear Manufacturers Association (AGMA)

American Hot Dip Galvanizers Association (AHDGA)

American Institute of Steel Construction, Inc. (AISC)

American Iron and Steel Institute (AISI)

American National Standards Institute (ANSI)

American Society of Civil Engineers (ASCE)

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)

American Society of Mechanical Engineers (ASME)

American Society for Testing and Materials (ASTM)

American Standards Association (ASA)

American Water Works Association (AWWA)

American Welding Society (AWS)

American Wood-Preserver's Association (AWPA)

Anti-Friction Bearing Manufacturers Association (AFBMA)

Building Officials and Code Administrators (BOCA)

Conveyor Equipment Manufacturers Association (CEMA)

Consumer Product Safety Commission (CPSC)

Factory Mutual (FM)

Federal Specifications

Instrument Society of America (ISA)

Institute of Electrical and Electronics Engineers (IEEE)

National and Local Fire Codes

Lightning Protection Institute (LPI)

National Electrical Code (NEC)

National Electrical Manufacturer's Association (NEMA)

National Electrical Safety Code (NESC)

National Electrical Testing Association (NETA)

National Fire Protection Association (NFiPA)

Regulations and Standards of the Occupational Safety and Health Act (OSHA)

Southern Building Code Congress International, Inc. (SBCCI)

Sheet Metal & Air Conditioning Contractors National Association (SMACCNA)

Standard Building Code

Standard Mechanical Code

Standard Plumbing Code

Uniform Building Code (UBC)

Underwriters Laboratories Inc. (UL)

D. Contractor shall, when required, furnish evidence satisfactory to the Engineer that materials and methods are in accordance with such standards where so specified.

E. In the event any questions arise as to the application of these standards or codes, copies shall be supplied on-site by the Contractor.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

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SECTION 01200

PROJECT MEETINGS

PART 1 -- GENERAL

1.01 PRE-BID MEETING

A. A non-mandatory pre-bid meeting will be held at the time and place to be designated in the Instructions to Bidders.

B. The Engineer will be available to discuss the project and answer pertinent questions. No oral interpretation will be made as to the meaning of the Documents. Interpretation, if deemed necessary by the Engineer, will be in the form of an Addendum to the Contract Documents.

1.02 PRECONSTRUCTION MEETING

A. A preconstruction meeting will be held after Award of Contract, but prior to starting work at the site.

B. Attendance:

1. Owner

2. Engineer

3. Contractor

4. Major subcontractors

5. Safety representative

6. Representatives of governmental or other regulatory agencies.

C. Minimum Agenda:

1. Tentative construction schedule

2. Critical work sequencing

3. Designation of responsible personnel

4. Processing of Field Decisions and Change Orders

5. Adequacy of distribution of Contract Documents

6. Submittal of Shop Drawings and samples

7. Procedures for maintaining record documents

8. Use of site and Owner's requirements

9. Major equipment deliveries and priorities

10. Safety and first aid procedures

11. Security procedures

12. Housekeeping procedures

13. Processing of Partial Payment Requests

14. General regard for community relations

1.03 PROGRESS MEETING

A. Progress meetings will be held monthly at a location provided by the Owner during the performance of the work of this Contract. Additional meetings may be called as progress of work dictates.

B. Engineer will preside at meetings and record minutes of proceedings and decisions. Engineer will distribute copies of minutes to participants.

C. Attendance:

1. Engineer

2. Contractor

3. Subcontractors, only with Engineer's approval or request, as pertinent to the agenda

D. Minimum Agenda:

1. Review and approve minutes of previous meetings.

2. Review progress of Work since last meeting.

3. Review proposed 30-60 day construction schedule.

4. Note and identify problems which impede planned progress.

5. Develop corrective measures and procedures to regain planned schedule.

6. Revise construction schedule as indicated and plan progress during next work period.

7. Maintaining of quality and work standards.

8. Complete other current business.

9. Schedule next progress meeting.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

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SECTION 01300

SUBMITTALS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Progress Schedule

1. Within thirty (30) days after issuance of the Notice to Proceed, the Contractor shall prepare and submit electronic copies of his proposed progress schedule to the Engineer for review and approval.

2. If so required, the schedule shall be revised until it is approved by the Engineer.

3. Schedule shall be updated monthly, depicting progress to the last day of the month and five (5) copies submitted to the Engineer not later than the fifth day of the month, and prior to the application for progress payment. Failure to provide monthly schedule updates will be grounds for the Engineer or Owner to withhold progress payment approval.

4. Schedule shall be prepared in the form of a horizontal bar chart showing in detail the proposed sequence of the work and identifying construction activities for each structure and for each portion of work.

5. Schedule shall be time scaled, identifying the first day of each week. The Schedule shall be provided with estimated dates for Early Start, Early Finish, Late Start and Late Finish. The work shall be scheduled to complete the Project within the Contract time. The Late Finish date shall equal the Contract Completion Date.

6. Schedule shall show duration (number of days) and float for each activity. Float shall be defined as the measure of leeway in starting or completing a scheduled activity without adversely affecting the project completion date established by the Contract Documents.

7. Updated schedule shall show all changes since the previous submittal.

8. All revisions to the schedule must have the prior approval of the Engineer.

B. Equipment and Material Orders Schedule

1. Contractor shall prepare and submit five (5) copies of his schedule of principal items of equipment and materials to be purchased to the Engineer for review and approval.

2. If so required, the schedule shall be revised until it is approved by the Engineer.

3. Schedule shall be updated monthly and electronically submitted to the Engineer not later than the fifth day of every month with the application for progress payment.

4. The updated schedule shall be based on the Progress Schedule developed under the requirements of Paragraph 1.01(A) of this Section.

5. Schedule shall be in tabular form with appropriate spaces to insert the following information for principal items of equipment and materials:

    a. Dates on which Shop Drawings are requested and received from the manufacturer.

    b. Dates on which certification is received from the manufacturer and transmitted to the Engineer.

    c. Dates on which Shop Drawings are submitted to the Engineer and returned by the Engineer for revision.

    d. Dates on which Shop Drawings are revised by manufacturer and resubmitted to the Engineer.

    e. Date on which Shop Drawings are returned by Engineer annotated either "Furnish as Submitted" or "Furnish as Corrected".

    f. Date on which accepted Shop Drawings are transmitted to manufacturer.

    g. Date of manufacturer's scheduled delivery.

    h. Date on which delivery is actually made.

C. Working Drawings

1. Within thirty (30) days after the Notice to Proceed, each prime Contractor shall prepare and submit electronic copies of his preliminary schedule of Working Drawing submittals to the Engineer for review and approval. If so required, the schedule shall be revised until it is approved by the Engineer.

2. Working Drawings include, but are not limited to, Shop Drawings, layout drawings in plan and elevation, installation drawings, elementary wiring diagrams, interconnecting wiring diagrams, manufacturer's data, etc. Contractor shall be responsible for securing all of the information, details, dimensions, Drawings, etc., necessary to prepare the Working Drawings required and necessary under this Contract and to fulfill all other requirements of his Contract. Contractor shall secure such information, details, Drawings, etc., from all possible sources including the Drawings, Working Drawings prepared by subcontractors, Engineers, suppliers, etc.

3. Working Drawings shall accurately and clearly present the following:

    a. All working and installation dimensions.

b. Arrangement and sectional views.

c. Units of equipment in the proposed positions for installation, details of required attachments and connections, and dimensioned locations between units and in relation to the structures.

d. Necessary details and information for making connections between the various trades including, but not limited to, power supplies and interconnecting wiring between units, accessories, appurtenances, etc.

4. In the event that the Engineer is required to provide additional engineering services as a result of a substitution of materials or equipment by the Contractor, the additional services will be provided in accordance with Section 01010 - Summary of Work, and will be covered in supplementary or revised Drawings which will be issued to the Contractor. All changes indicated that are necessary to accommodate the equipment and appurtenances shall be incorporated into the Working Drawings submitted to the Engineer.

5. Working Drawings shall conform to recognized drafting standards and be neat, legible and drawn to a large enough scale to show in detail the required information.

6. The Drawings are used for engineering and general arrangement purposes only and are not to be used for Working Drawings.

7. Shop Drawings

a. Contractor shall submit for review by the Engineer Shop Drawings for all fabricated work and for all manufactured items required to be furnished by the Contract Documents.

b. Structural and all other layout Drawings prepared specifically for the Project shall have a plan scale of not less than 1/4-inch = 1 foot.

c. Where manufacturer's publications in the form of catalogs, brochures, illustrations or other data sheets are submitted in lieu of prepared Shop Drawings, such submittals shall specifically indicate the item for which approval is requested. Identification of items shall be made in ink, and submittals showing only general information are not acceptable.

8. Layout and Installation Drawings

a. Contractor shall prepare and submit for review by the Engineer layout and installation drawings for all pipes, valves, fittings, sewers, drains, heating and ventilation ducts, all electrical, heating, ventilating and other conduits, plumbing lines, electrical cable trays, lighting fixture layouts, and circuiting, instrumentation, interconnection wiring diagrams, communications, power supply, alarm circuits, etc., under this Contract. The final dimensions, elevation, location, etc., of pipe, valves, fittings, sewers, ducts, conduits, electrical cable trays, equipment, etc., may depend upon the dimensions of equipment and valves to be furnished by the Contractor.

b. Layout and installation drawings are required for both interior and exterior piping, valves, fittings, sewers, drains, heating and ventilation ducts, conduits, plumbing lines, electrical cable trays, etc.

c. Layout and installation Drawings shall show connections to structures, equipment, sleeves, valves, fittings, etc.

d. Drawings shall show the location and type of all supports, hangers, foundations, etc., and the required clearances to operate valves, equipment, etc.

e. The Drawings for pipes, ducts, conduits, etc., shall show all 3-inch and larger electrical conduits and pressure piping, electrical cable trays, heating and ventilation ducts or pipes, structure, manholes or any other feature within four (4) feet (measured as the clear dimension) from the pipe duct, conduit, etc., for which the profile is drawn.

9. Contractor Responsibilities

a. All submittals from subcontractors, manufacturers or suppliers shall be sent directly to the Contractor for checking. Contractor shall thoroughly check all Drawings for accuracy and conformance to the intent of the Contract Documents. Drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors, manufacturers, or suppliers by the Contractor for correction before submitting them to the Engineer.

b. All submittals shall be bound, dated, properly labeled and consecutively numbered. Information on the label shall indicate Specification Section, Drawing number, subcontractor's, manufacturer's or supplier's name and the name or type of item the submittal covers. Each part of a submittal shall be marked and tabulated.

c. Working Drawings shall be submitted as a single complete package including all associated drawings relating to a complete assembly of the various parts necessary for a complete unit or system.

d. Shop Drawings shall be submitted as a single complete package for any operating system and shall include all items of equipment and any mechanical units involved or necessary for the functioning of such system. Where applicable, the submittal shall include elementary wiring diagrams showing circuit functioning and necessary interconnection wiring diagrams for construction.

e. ALL SUBMITTALS SHALL BE THOROUGHLY CHECKED BY THE CONTRACTOR FOR ACCURACY AND CONFORMANCE TO THE INTENT OF THE CONTRACT DOCUMENTS BEFORE BEING SUBMITTED TO THE ENGINEER AND SHALL BEAR THE CONTRACTOR'S STAMP OF APPROVAL CERTIFYING THAT THEY HAVE BEEN SO CHECKED. SUBMITTALS WITHOUT THE CONTRACTOR'S STAMP OF APPROVAL

WILL NOT BE REVIEWED BY THE ENGINEER AND WILL BE RETURNED TO THE CONTRACTOR.

f. If the submittals contain any departures from the Contract Documents, specific mention thereof shall be made in the Contractor's letter of transmittal. Otherwise, the review of such submittals shall not constitute approval of the departure.

g. No materials or equipment shall be ordered, fabricated, shipped or any work performed until the Engineer returns to the Contractor the submittals, herein required, annotated "Furnish as Submitted", "Furnish as Corrected", or “Furnish as Corrected – Confirm.” If a submittal is returned “Furnish as Corrected – Confirm” the portions of work covered by the submittal that require confirmation by the Engineer shall not be ordered, fabricated, shipped, or any work performed until those portions are approved in a subsequent submittal either "Furnish as Submitted" or "Furnish as Corrected".

h. Where errors, deviations, and/or omissions are discovered at a later date in any of the submittals, the Engineer's prior review of the submittals does not relieve the Contractor of the responsibility for correcting all errors, deviations, and/or omissions.

10. Procedure for Review

a. Submittals shall be transmitted in sufficient time to allow the Engineer at least fifteen (15) working days for review and processing.

b. Contractor shall transmit electronic copies of all technical data or drawing to be reviewed.

c. Submittal shall be accompanied by a letter of transmittal containing date, project title, Contractor's name, number and titles of submittals, a list of relevant specification sections, notification of departures from any Contract requirement, and any other pertinent data to facilitate review.

d. Submittals will be annotated by the Engineer in one of the following ways:

"Furnish as Submitted" (FAS) - no exceptions are taken

"Furnish as Corrected" (FAC) - minor corrections are noted and shall be made.

“Furnish as Corrected – Confirm” (FACC) - some corrections are noted and a partial resubmittal or additional information are required as specifically requested.

"Revise and Resubmit" (R&R) - major corrections are noted and a full resubmittal is required.

"For Information Only – Not Reviewed" (FIO) – submittal was received and was distributed for record purposes without review.

e. If a submittal is satisfactory to the Engineer in full or in part, the Engineer will annotate the submittal "Furnish as Submitted", "Furnish as Corrected", or "Furnish as Corrected – Confirm", and return to the Contractor. If reproducible transparencies are submitted, the Engineer will retain the copies and return the reproducible transparencies to the Contractor. In the case of "Furnish as Corrected – Confirm" a partial resubmittal or additional information are required as specifically requested.

f. If a full resubmittal is required, the Engineer will annotate the submittal "Revise and Resubmit" and transmit to the Contractor for appropriate action.

g. Contractor shall continue to resubmit submittals in part if they are returned "Furnish as Corrected – Confirm" or in full if they are returned "Revise and Resubmit" as required by the Engineer until submittals are acceptable to the Engineer. It is understood by the Contractor that Owner may charge the Contractor the Engineer's charges for review in the event a submittal is not approved (either "Furnish as Submitted" or "Furnish as Corrected") by the third submittal for a system or piece of equipment. These charges shall be for all costs associated with engineering review, meetings with the Contractor or manufacturer, etc., commencing with the fourth submittal of a system or type of equipment submitted for a particular Specification Section.

h. Acceptance of a Working Drawing by the Engineer will constitute acceptance of the subject matter for which the Drawing was submitted and not for any other structure, material, equipment or appurtenances indicated or shown.

11. Engineer's Review

a. Engineer's review of the Contractor's submittals shall in no way relieve the Contractor of any of his responsibilities under the Contract. An acceptance of a submittal shall be interpreted to mean that the Engineer has no specific objections to the submitted material, subject to conformance with the Contract Drawings and Specifications.

b. Engineer's review will be confined to general arrangement and compliance with the Contract Drawings and Specifications only, and will not be for the purpose of checking dimensions, weights, clearances, fittings, tolerances, interferences, coordination of trades, etc.

12. Record Working Drawings

a. Contractor shall maintain current record drawings onsite for the Engineer's review. Record drawings shall be updated monthly at a minimum.

b. Prior to final payment, the Contractor shall furnish the Engineer one complete set of all accepted Working Drawings, including Shop Drawings, for equipment, piping, electrical work, heating system, ventilating system, air conditioning system, instrumentation system, plumbing system, structural, interconnection wiring diagrams, etc.

c. Working Drawings furnished shall be corrected to include any departures from previously accepted Drawings.

D. Certified Shop Test Reports

1. Each piece of equipment for which pressure, head, capacity, rating, efficiency, performance, function or special requirements are specified or implied shall be tested in the shop of the manufacturer in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents and applicable test codes and standards. Contractor shall keep the Engineer advised of the scheduling of shop tests so that the Engineer may arrange for the witnessing or inspection at the proper time and place.

2. The Contractor shall secure from the manufacturers electronic copies of the actual test data, the interpreted results and a complete description of the testing facilities and testing setup, all accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company and notarized. These reports shall be forwarded to the Engineer for review.

3. In the event any equipment fails to meet the test requirements, the manufacturer shall make all necessary changes, adjustments or replacements and the tests shall be repeated, at no additional cost to the Owner or Engineer, until the equipment test requirements are acceptable to the Engineer.

4. No equipment shall be shipped to the Project until the Engineer notifies the Contractor, in writing, that the shop test reports are acceptable.

E. Samples

1. Contractor shall furnish for review all samples as required by the Contract Documents or requested by the Engineer.

2. Samples shall be of sufficient size or quantity to clearly illustrate the quality, type, range of color, finish or texture and shall be properly labeled to show the nature of the material, trade name of manufacturer and location of the work where the material represented by the sample will be used.

3. Samples shall be checked by the Contractor for conformance to the Contract Documents before being submitted to the Engineer and shall bear the Contractor's stamp of approval certifying that they have been so checked. Transportation charges on samples submitted to the Engineer shall be prepaid by the Contractor.

4. Engineer's review will be for compliance with the Contract Documents and his comments will be transmitted to the Contractor with reasonable promptness.

5. Accepted samples will establish the standards by which the completed work will be judged.

F. Construction Photographs

1. The General Contractor shall engage a competent photographer to take photographs at the locations and at such stages of the construction as directed by the Engineer.

2. Provide the equivalent of 36 different exposures per month for the duration of the Contract time. When directed by the Engineer, frequency of photographs may be increased to weekly sessions provided that the equivalent number of exposures is not exceeded. Engineer may waive requirements for photographs during inactive construction periods in favor of increased photographs during active construction sequences.

3. Submittal Requirements

a. One set of digital files of each photograph required by Section 1.01(F), with the date, shall be submitted to the Engineer with each request for payment.

G. Field Test Reports

1. Contractor shall furnish for review all test reports as required by the Contract Documents or requested by the Engineer.

2. Test reports shall be checked by the Contractor for conformance to the Contract Documents before being submitted to the Engineer and shall bear the Contractor's stamp of approval certifying that they have been so checked. Transportation charges on samples submitted to the Engineer shall be prepaid by the Contractor.

3. Engineer's review will be for compliance with the Contract Documents and his comments will be transmitted to the Contractor with reasonable promptness.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01320
CONSTRUCTION PROGRESS SCHEDULE

PART 1 – GENERAL

1.01 SUMMARY

A. Contractor shall prepare and submit Progress Schedules and related documents in accordance with the General Conditions, as may be modified by the Supplementary Conditions, and this Section, unless otherwise accepted by Engineer.

1. Maintain and update Progress Schedules and related documents.

2. Progress Schedule shall be a Critical Path Method (CPM) Progress Schedule.

B. Engineer's acceptance of the Progress Schedule or related documents, and comments or opinions concerning activities in the Progress Schedule and related documents shall not control independent judgment of Contractor concerning means, methods, techniques, sequences and procedures of construction, unless the associated means, method, technique, sequence, or procedure is directed by the Contract Documents. Contractor is solely responsible for complying with the Contract Times.

1.02 REFERENCES

A. Definitions:

1. Activity: An element of the construction work that has the following specific characteristics: consumes time, consumes resources, has a definable start and finish, is assignable, and is measurable.

2. Constraint: An imposed date on the Progress Schedule or an imposed tie between Activities. The Contract Times are Constraints.

3. CPM Progress Schedule: Computerized Progress Schedule in Critical Path Method (CPM) format which accounts for the entire Work, defines the interrelationships between elements of the Work, reflects the uncompleted Work, and indicates the sequence with which the Work has been completed, indicates the sequence in which uncompleted Work will be completed, and indicates the duration of each Activity.

4. Critical Path: The continuous chain of Activities with the longest duration for completion within the Contract Times.

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5. Early Start: The earliest possible date an Activity can start according to the assigned relationships among Activities.

6. Early Finish: The earliest date an Activity can finish according to the assigned relationships among the Activities.

7. Late Finish: The latest date an Activity can finish without extending the Contract Times.

8. Late Start: The latest date an Activity can start without extending the Contract Times.

9. Float: The time difference between the calculated duration of the Activity chain and the Critical Path.

10. Total Float: The total number of days that an Activity (or chain of Activities) can be delayed without affecting the Contract Times.

11. Network Diagram: A time-scaled logic diagram depicting the durations and relationships of the Activities.

12. Work Areas, Area, or System: A logical breakdown of the Project elements or a group of Activities which, when collectively assembled, are readily identifiable on the Project (for example, yard piping, a structure or building, a treatment process, or other logical grouping).

1.03 ADMINSTRATIVE REQUIREMENTS

A. Initial Progress Schedule:

1. Type and Organization of Progress Schedules:

a. Prepare one Progress Schedule covering the entire Project using scheduling software that is acceptable to Engineer.

b. Sheet Size: 11” by 17”, unless otherwise accepted by Engineer.

c. Time Scale: Indicate first date of each work week.

d. Organization:

1) Indicate on the separate Schedule of Submittals dates for submitting and reviewing Shop Drawings, Samples, and other submittals.

2) Group deliveries of materials and equipment into a separate sub-schedule that is part of the Progress Schedule.

3) Group construction into Work Area sub-schedules (that are part of the Progress Schedule) by Activity.

4) Clearly indicate the Critical Path on the Progress Schedule.

5) Organize each Work Area sub-schedule by Specification Section number.

2. Preliminary Progress Schedule:

a. Contractor shall submit to Engineer the preliminary Progress Schedule with associated Network Diagrams within 28 days after the Contract Times commence running.

b. Submit electronic copies of preliminary Progress Schedule and associated reports and schedule-related documents to accompany the preliminary Progress Schedule, in accordance with the Submittals Article of this Section.

3. Initial Acceptance of Progress Schedule:

a. At least 10 days before submission of the first Application for Payment, Contractor shall schedule a conference at the Site for review of the preliminary Progress Schedule.

1) Attendees shall include Contractor, Engineer, Owner and others as required.

2) Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the Progress Schedule and associated Network Diagram.

3) Owner reserves the right to not make progress payment to Contractor until acceptable Progress Schedule, Network Diagram, and other reports and schedule-related documents required are submitted to Engineer.

b. Submit electronic copies each of acceptable Progress Schedule with Network Diagram, reports, and other schedule-related documents required to accompany the initial acceptable Progress Schedule, in accordance with the Submittals Article of this Section.

c. Initially-accepted Progress Schedule shall be identified as the baseline Progress Schedule.

B. Progress Schedule Updates:

1. Update the Progress Schedule each month. If during progress of the Work events develop that necessitate changes in the initially accepted Progress Schedule (i.e., baseline Progress Schedule), identify updated Progress Schedules sequentially as Progress Schedule Revision 1, 2, 3, and continuing in sequence as required.

2. The update to the Progress Schedule shall be based on retained logic. Progress override logic is not allowed.

3. Required scheduling software, and schedule organization, format, and content for updated Progress Schedules are identical to that required in this Section for initial Progress Schedules.

4. Submit to Engineer electronic copies of the updated Progress Schedule, Network Diagram, narrative report, and other schedule-related reports and documents required.

5. Submit updated Network Diagrams when revisions are proposed to the logic. Indicate in the narrative report delays that have occurred since the previous updated Progress Schedule. Engineer will not recommend payment by Owner of progress payments until updated Progress Schedule is received, reviewed, and accepted by Engineer. Payment for out-of-sequence Work is not allowed.

1.04 NETWORK DIAGRAMS (PERT CHARTS)

A. General:

1. Contractor shall prepare and submit Network Diagrams, as generated using the scheduling software on paper of the size indicated for Progress Schedules in this Section.

2. Group Network Diagrams by Area and show the order and interdependence of Activities and sequence and quantities in which the Work will be accomplished.

3. Do not use match lines on Network Diagrams. Depict interrelationships to or from Activities outside the Area shown using an Activity symbol with Activity number and description.

4. In preparing Network Diagrams, comply with the basic concept of precedence diagramming method (PDM) network scheduling to show how start of a given Activity depends on completion of preceding Activities, and how the Activity's completion may affect the start of subsequent Activities.

5. Level of schedule detail shall define the day-to-day Activities of the Work.

B. Content:

1. Clearly indicate the Critical Path and distinguish the Critical Path from other paths on the network.

2. Organize Network Diagrams by grouping into major Work Areas, including one for procurement of materials and equipment, and by specific Activity within each Area.

3. Logic diagrams shall include the following:

    a. Activity number.

    b. Activity description.

    c. Activity duration (in work days).

    d. Critical Path denoted.

    e. Float for each Activity.

    f. Activity or System designation.

    g. Coded Area designation.

    h. Responsibility code (e.g., each prime contractor and their respective Subcontractors, trade, operation, Suppliers, or other entity responsible for accomplishing an Activity).

    i. Shift number (if more than one shift per day is to be employed).

C. Revisions:

1. When conditions develop that require revisions to logic or durations of the Network Diagram associated with the initially accepted Progress Schedule (i.e., baseline Progress Schedule), identify updates to the Network Diagram in the same manner required in this Section for Progress Schedule updates.

2. Revision of the logic or durations from the baseline Progress Schedule initially accepted by Engineer shall be submitted to Engineer for acceptance.

3. Incorporate into the Progress Schedule revisions to logic or duration accepted by Engineer and include in monthly narrative report both a description of revisions and listing of Activities affected by revisions.

4. Changes resulting from Change Orders and other additions or deletions, shall be fully incorporated into the Progress Schedule and Network Diagram on the first update after the associated Change Order is approved by Owner, including adjustments to the Contract Price.

1.05 RECOVERY SCHEDULES

A. General:

1. When updated Progress Schedule indicates that the ability to comply with the Contract Times falls 30 or more days behind schedule, and there is no excusable delay, Change Order, or Work Change Directive to support an extension of the Contract Times, Contractor shall prepare and submit a Progress Schedule demonstrating Contractor's plan to accelerate the Project to achieve compliance with the Contract Times (i.e., "recovery schedule") for Engineer's acceptance.

2. Submit recovery schedule within 14 days after submittal of updated Progress Schedule where need for recovery schedule is indicated.

B. Implementation of Recovery Schedule:

1. At no additional cost to Owner, Contractor shall do one or more of the following:

a. Furnish additional labor and construction equipment

b. Employ additional work shifts

c. Expedite procurement of materials and equipment to be incorporated into the Work

d. Other measures necessary to complete the Work within the Contract Times.

2. Upon acceptance of recovery schedule by Engineer, incorporate recovery schedule into the next Progress Schedule update.

C. Lack of Action: Contractor's refusal, failure or neglect to submit a recovery schedule, shall constitute reasonable evidence that Contractor is not prosecuting the Work or separable part thereof with the diligence that will ensure completion within the Contract Times. Such lack of action shall constitute sufficient basis for Owner to exercise remedies available to Owner under the Contract Documents

1.06 SUBMITTALS

A. Action/Informational Submittals:

1. Initial Progress Schedules:

a. Preliminary Progress Schedule with associated Network Diagrams.

b. Acceptable Progress Schedule with associated Network Diagrams.

2. Progress Schedule Updates:

a. Progress Schedule updates shall comply with requirements of this Section, and shall include updated Progress Schedule, updated Network Diagram when relationships among Activities are changed.

b. Submit updated Progress Schedule at each progress meeting. If a Progress Schedule remains unchanged from one progress meeting to the next, submit a written statement to that effect.

3. Time Impact Analyses: Submit in accordance with this Section.

4. Recovery Schedule: Submit in accordance with this Section.

5. Qualifications: Progress Schedule preparer, and other personnel that will assist Progress Schedule preparer in preparing and maintaining the Progress Schedule.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Testing Laboratory Services

1. Laboratory testing and checking required by the Specifications, including the cost of transporting all samples and test specimens, shall be provided and paid for by the **Contractor and reimbursed by Owner via Materials Testing Allowance**.

2. Materials to be tested include, but are not necessarily limited to the following: contaminated soils, cement, concrete aggregate, concrete, bituminous paving materials, structural and reinforcing steel, waterproofing, select backfill, crushed stone or gravel and sand.

3. Tests required by the Owner shall not relieve the Contractor from the responsibility of supplying test results and certificates from manufacturers or suppliers to demonstrate conformance with the Specifications.

4. Procedure

a. The Contractor shall plan and conduct his operations to permit taking of field samples and test specimens, as required, and to allow adequate time for laboratory tests.

b. The collection, field preparation and storage of field samples and test specimens shall be as directed by the Engineer with the cooperation of the Contractor.

5. Significance of Tests

a. Test results shall be binding on both the Contractor and the Owner, and shall be considered irrefutable evidence of compliance or noncompliance with the Specification requirements, unless supplementary testing shall prove, to the satisfaction of the Owner, that the initial samples were not representative of actual conditions.

6. Supplementary and Other Testing

a. Nothing shall restrict the Contractor from conducting tests he may require. Should the Contractor at any time request the Owner to consider such test results, the test reports shall be certified by an independent testing laboratory acceptable to the Owner. Testing of this nature shall be conducted at the Contractor's expense.

1.02 IMPERFECT WORK, EQUIPMENT, OR MATERIALS

A. Any defective or imperfect work, equipment, or materials furnished by the Contractor which is discovered before the final acceptance of the work, as established by the Certificate of Substantial Completion, or during the subsequent guarantee period, shall be removed immediately even though it may have been overlooked by the Engineer and estimated for payment. Any equipment or materials condemned or rejected by the Engineer shall be tagged as such and shall be immediately removed from the site. Satisfactory work or materials shall be substituted for that rejected.

B. The Engineer may order tests of imperfect or damaged work, equipment, or materials to determine the required functional capability for possible acceptance, if there is no other reason for rejection. The cost of such tests shall be borne by the Contractor; and the nature, tester, extent and supervision of the tests will be as determined by the Engineer. If the results of the tests indicate that the required functional capability of the work, equipment, or material was not impaired, consistent with the final general appearance of same, the work, equipment, or materials may be deemed acceptable. If the results of such tests reveal that the required functional capability of the questionable work, equipment, or materials has been impaired, then such work, equipment, or materials shall be deemed imperfect and shall be replaced. The Contractor may elect to replace the imperfect work, equipment, or material in lieu of performing the tests.

1.03 INSPECTION AND TESTS

A. The Contractor shall allow the Engineer ample time and opportunity for testing materials and equipment to be used in the work. He shall advise the Engineer promptly upon placing orders for material and equipment so that arrangements may be made, if desired, for inspection before shipment from the place of manufacture. The Contractor shall at all times furnish the Engineer and his representatives, facilities including labor, and allow proper time for inspecting and testing materials, equipment, and workmanship. The Contractor must anticipate possible delays that may be caused in the execution of his work due to the necessity of materials and equipment being inspected and accepted for use. The Contractor shall furnish, at his own expense, all samples of materials required by the Engineer for testing, and shall make his own arrangements for providing water, electric power, or fuel for the various inspections and tests of structures and equipment.

B. The Contractor shall furnish the services of representatives of the manufacturers of certain equipment, as prescribed in other Sections of the Specifications. The Contractor shall also place his orders for such equipment on the basis that, after the equipment has been tested prior to final acceptance of the work, the manufacturer will furnish the Owner with certified statements that the equipment has been installed properly and is ready to be placed in functional operation. Tests and analyses required of equipment shall be paid for by the Contractor, unless specified otherwise in the Section which covers a particular piece of equipment.

C. Where other tests or analyses are specifically required in other Sections of these Specifications, the cost thereof shall be borne by the party (Owner or Contractor) so designated in such Sections. The Owner will bear the cost of all tests, inspections, or investigations undertaken by the order of the Engineer for the purpose of determining

conformance with the Contract Documents if such tests, inspection, or investigations are not specifically required by the Contract Documents, and if conformance is ascertained thereby. Whenever nonconformance is determined by the Engineer as a result of such tests, inspections, or investigations, the Contractor shall bear the full cost thereof or shall reimburse the Owner for said cost. In this connection, the cost of any additional tests and investigations, which are ordered by the Engineer to ascertain subsequent conformance with the Contract Documents, shall be borne by the Contractor.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION –

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SECTION 01510

TEMPORARY UTILITIES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The General Contractor shall provide temporary light and power, heating, water service and sanitary facilities for his operations, for the construction operations of the other Contractors of this Project at the site. The temporary services shall be provided for use throughout the construction period.

B. The General Contractor shall coordinate and install all temporary services in accordance with the requirements of the utility companies having jurisdiction and as required by applicable codes and regulations.

C. At the completion of the work, or when the temporary services are no longer required, the facilities shall be restored to their original conditions.

D. All costs in connection with the temporary services including, but not limited to, installation, utility company service charges, maintenance, relocation and removal shall be borne by the Contractor at no additional cost to the Owner.

E. Some temporary facilities that may be required may be indicated on the Drawings; however, the Drawings do not necessarily show any or all of the temporary facilities that the Contractor ultimately uses to complete the work.

F. Temporary Light and Power

1. The temporary general lighting and small power requirements shall be serviced by 120/240 V, 1 phase, 3 wire temporary systems furnished and installed by the General Contractor. This service shall be furnished complete with main disconnect, overcurrent protection, meter outlet, branch circuit breakers, and wiring as required; including branch circuit breakers and wiring as required for furnishing temporary power to the various Contractor's field office service connections, all in accordance with the requirements of the servicing power company and applicable standards and codes. The meter for the temporary 120/240 V service for construction purposes shall be registered in the name of the General Contractor and all energy charges for furnishing this temporary electric power shall be borne by the General Contractor. Any Contractor with a need for power other than the 120/240 V, 1 phase, 3 wire shall provide such power at his own expense.

2. The General Contractor shall make all necessary arrangements, and pay for all permits, inspections, and power company charges for all temporary service installations. All temporary systems shall comply with and meet the approval of the local authorities having jurisdiction. All temporary electrical systems shall consist of wiring, switches, necessary insulated supports, poles, fixtures, sockets, receptacles,

lamps, guards, cutouts, and fuses as required to complete such installations. The General Contractor shall furnish lamps and fuses for all temporary systems furnished by him and shall replace broken and burned out lamps, blown fuses, damaged wiring and as required to maintain these systems in adequate and safe operating condition. All such temporary light and power system shall be installed without interfering with the work of the other Contractors.

When it is necessary during the progress of construction that a temporary electrical facility installed under this Division interferes with construction operations, the General Contractor shall relocate the temporary electrical facilities to maintain temporary power as required at no additional cost to the Owner. The General Contractor shall be responsible at all times for any damage or injury to equipment, materials, or personnel caused by improperly protected or installed temporary installations and equipment.

3. The various Contractors doing the work at the site shall be permitted to connect into the temporary general lighting system small hand tools, such as drills, hammers, and grinders, provided that:

   a. Equipment and tools are suitable for 120 V, single phase, 60 Hz operation and operating input does not exceed 1,500 volt-amperes.

   b. Tools are connected to outlets of the system with only one (1) unit connected to a single outlet.

   c. In case of overloading of circuits, the General Contractor will restrict use of equipment and tools as required for correct loading.

4. The General Contractor shall keep the temporary general lighting and power systems energized fifteen minutes before the time that the earliest trade starts in the morning and de-energized fifteen minutes after the time the latest trade stops. This applies to all weekdays, Monday through Friday, inclusive, which are established as regular working days.

   Any Contractor requiring temporary light and power before or after the hours set forth hereinbefore, or on a Saturday, Sunday, or holiday, shall pay for the additional cost of keeping the system energized and repaired. If more than one Contractor is involved, the charges shall be prorated, such amounts to be determined from the meter readings or other acceptable means previously agreed upon by the Contractors involved. If it is necessary for any Contractor or his employees to be in any structure after regular working hours and the temporary general lighting system is not required for illumination, that Contractor shall provide such illumination required by means of flashlights, electric lanterns, or other devices not requiring use of electricity from the temporary general lighting system.

5. Each Contractor requiring additional power and lighting other than that specified herein (including power for temporary heating equipment to be provided by the General Contractor) shall furnish his own service complete with all fuses, cutouts, wiring and other material and equipment necessary for a complete system between the service point and the additional power consumers and shall install his own

metering equipment in accordance with the requirements of the servicing power company.

6. The temporary general lighting system shall be installed progressively in structures as the various areas are enclosed or as lighting becomes necessary because of partial enclosure. Lighting intensities shall be not less than 10 foot candles.

7. The General Contractor shall provide a separate temporary night lighting circuit for construction security. This system shall be energized at the end of each normal working day and de-energized at the start of each normal working day by the General Contractor. The system is to be left energized over Saturdays, Sundays, and all holidays. Lighting intensities shall be not less than 2 foot candles.

8. Electrical welders provided by each trade used in the erection and fabrication of the buildings, structures and equipment shall be provided with an independent grounding cable connected directly to the structure on which the weld is being made rather than adjacent conduit piping, etc.

   Electricians and other tradesmen necessary for the required connections and operation of welding equipment and generator, standby generators and similar equipment shall be furnished by the individual Contractors. All costs for such labor and equipment shall be borne by the individual Contractors.

9. Upon completion of the work, but prior to acceptance by the Owner, the General Contractor shall remove all temporary services, security lighting systems, temporary general lighting systems and all temporary electrical work from the premises.

G. Temporary Heating

1. The General Contractor shall provide temporary heating, ventilation coverings and enclosures necessary to properly protect all work and materials against damage by dampness and cold, to dry out the work and to facilitate work in all structures.

2. The equipment, fuel, materials, operating personnel and methods used shall be at all times satisfactory and adequate to maintain critical installation temperatures and ventilation for all work in those areas where the same is required.

3. After any structure is enclosed, the minimum temperature to be maintained is 50°F, unless otherwise specified, where work is actually being performed.

4. Before and during the application of interior finishing, painting, etc., the General Contractor shall provide sufficient heat to maintain a temperature of not less than 65°F.

5. Any work damaged by dampness or insufficient or abnormal heating shall be replaced by the General Contractor at no additional cost to the Owner.

H. Temporary Sanitary Service

1. Sanitary conveniences, in sufficient numbers, for the use of all persons employed on the work and properly screened from public observation, shall be provided and

maintained at suitable locations by the General Contractor, all as prescribed by State Labor Regulations and local ordinances. The contents of same shall be removed and disposed of in a manner consistent with local and state regulations, as the occasion requires. Each Contractor shall rigorously prohibit the committing of nuisances within, on, or about the work. Sanitary facilities shall be removed from the site when no longer required.

I. Temporary Water

1. The General Contractor shall provide temporary water service for construction purposes, sanitary facilities, fire protection, field offices and for cleaning from the Owner's existing distribution system.

   The Contractor shall pay all charges associated with the connection and all charges for potable water used under this Contract.

2. Each Contractor shall supply potable water for his employees either by portable containers or drinking fountains.

3. An adequate number of hose bibbs, hoses, and watertight barrels shall be provided for the distribution of water.

4. Water service shall be protected from freezing and the service shall be extended and relocated as necessary to meet temporary water requirements.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01521

FIELD OFFICE, EQUIPMENT, AND SERVICES - RPR

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall provide field offices as specified herein.

1.02 FIELD OFFICES

A. Resident Representative's Field Office

1. The Contractor shall provide and maintain a field office for the exclusive use of the Engineer. The facilities shall be available for his use during the entire life of the Project, and shall not be disturbed, moved, or interrupted without the Engineer's approval. The office shall be a separate structure containing approximately 720 square feet of floor area, restroom facilities, sealed from the weather, completed and ready for occupancy within thirty (30) days following the Notice to Proceed with the Project. The office shall be erected on a location approved by the Engineer. A mobile field office trailer a minimum of 12 feet wide and 60 feet long is acceptable if it contains the required facilities.

2. All doors and windows shall be equipped with locking devices to prevent unauthorized entry, and all keys to the door locks shall be loaned to the Engineer for his use during the life of the project. All entrances to office shall have a 72 square foot minimum covered porch with a separate roof and rainproof seal to the main structure. The office shall contain adequate heating, air conditioning, and ventilating facilities. Adequate electric lights shall be provided with a wall receptacle on each of the four walls. Functional, totally enclosed water closet and lavatory shall be provided.

3. An individual, direct-line telephone service with outside bell shall be located as directed for the exclusive use of the Engineer. High speed internet service with wireless capabilities shall be provided for the duration of the contract. Telephone service for all calls relation to the work including long distance and internet service, all heat, light, water and sanitary facilities shall be furnished and paid for by the Contractor. All supplies including wastebasket heavy duty liners, floor entry mats, mud-cleaning brushes, paper towels, toilet paper, copying machine paper (all sizes) shall be provided by the Contractor for the full duration of the Contract.

4. A 24-inch by 36-inch exterior grade plywood sign shall be erected on the outside wall of the field office in a location determined by the Engineer. The sign shall be painted white with green, 3-inch high lettering, neatly arranged, as indicated herein.

Field Office
HAZEN AND SAWYER

5. The following office furniture and equipment shall be furnished:

   a. One (1) flat top desks, 2-1/2 x 5 feet, with drawers at each end

   b. One (1) plywood drawing table, 3 feet x 6 feet tilt top with drafting stool

   c. Ten (10) straight chairs (stackable or folding)

   d. One (1) four-drawer, legal size steel filing cabinets with hangers, lock and key

   e. One (1) large metal waste baskets (13 gallon)

   f. One (1) rack from which to hang drawings, including related appurtenances

   g. Two (2) wall-mounted fire extinguishers

   h. One (1) electric water cooler with bottle water supply and disposable drink cups

   i. Four (4) metal or plastic office folding tables 30 inches x 60 inches (minimum)

   j. One (1) bookcase with 3 shelves, 3 feet long

   k. One (1) First Aid Cabinet

   l. One (1) tilt/swivel type office chairs

   m. One (1) Copying machine, with fax, scanner and printer capabilities and with local service contract

   n. One (1) Cordless phone

   o. One (1) 5 cu. ft. refrigerator

   p. One (1) 1100 watt microwave oven

   q. One (1) large wall calendar 24 inches x 36 inches (minimum)

6. On completion of the project, the field office shall be removed from the site. All office furniture and equipment that is not leased or rented shall be turned over the Owner.

B. The copy machine shall be EPSON (C11CC98201) WorkForce WF-7720 Wireless Color All-in-One Inkjet Printer with Scanner and Copier, or approved equal.

C. First Aid Cabinet shall conform to the OSHA requirements for an office of up to 15 persons or a construction site of up to 5 persons.

D. Contractor's Field Office

1. Each Contractor shall furnish, equip and maintain a field office at the site of a size required for his operations. Each Contractor shall provide his own telephone service and shall have readily accessible at the field office, copies of the Contract Documents, latest approved Shop Drawings and all field Project related correspondence, Change Order, etc.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

– END OF SECTION –

SECTION 01522

FIELD OFFICE, EQUIPMENT, AND SERVICES - CONTRACTOR

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Contractor's Field Office (Not Mandatory)

1. If needed, each Contractor shall furnish, equip and maintain a field office at the site of a size required for his operations. Each Contractor shall provide his own telephone service and shall have readily accessible at the field office, copies of the Contract Documents, latest approved Shop Drawings and all field Project related correspondence, Change Order, etc.

B. Project Sign and Sign Panel

1. Refer to Section 01580.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION –

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SECTION 01530

PROTECTION OF EXISTING FACILITIES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Contractor shall be responsible for the preservation and protection of property adjacent to the work site against damage or injury as a result of his operations under this Contract. Any damage or injury occurring on account of any act, omission or neglect on the part of the Contractor shall be restored in a proper and satisfactory manner or replaced by and at the expense of the Contractor to an equal or superior condition than previously existed.

B. Contractor shall comply promptly with such safety regulations as may be prescribed by the Owner or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by, or unsafe practices on the part of, his employees. In the event of the Contractor's failure to comply, the Owner may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the Engineer to direct the correction of unsafe conditions or practices shall not relieve the Contractor of his responsibility hereunder.

C. In the event of any claims for damage or alleged damage to property as a result of work under this Contract, the Contractor shall be responsible for all costs in connection with the settlement of or defense against such claims. Prior to commencement of work in the vicinity of property adjacent to the work site, the Contractor, at his own expense, shall take such surveys as may be necessary to establish the existing condition of the property. Before final payment can be made, the Contractor shall furnish satisfactory evidence that all claims for damage have been legally settled or sufficient funds to cover such claims have been placed in escrow, or that an adequate bond to cover such claims has been obtained.

1.02 PROTECTION OF WORK AND MATERIAL

A. During the progress of the work and up to the date of final payment, the Contractor shall be solely responsible for the care and protection of all work and materials covered by the Contract, except as provided for in Article 14.05 of the Supplementary Conditions.

B. All work and materials shall be protected against damage, injury or loss from any cause whatsoever, and the Contractor shall make good any such damage or loss at his own expense. Protection measures shall be subject to the approval of the Engineer.

1.03 BARRICADES, WARNING SIGNS AND LIGHTS

A. The General Contractor shall provide, erect and maintain as necessary, strong and suitable barricades, danger signs and warning lights along all roads accessible to the public, as required by the authority having jurisdiction, to insure safety to the public. All barricades and obstructions along public roads shall be illuminated at night and all lights for this purpose shall be kept burning from sunset to sunrise.

B. Each Contractor shall provide and maintain such other warning signs and barricades in areas of and around their respective work as may be required for the safety of all those employed in the work, the Owner's operating personnel, or those visiting the site.

1.04 EXISTING UTILITIES AND STRUCTURES

A. The term existing utilities shall be deemed to refer to both publicly-owned and privately-owned utilities such as electric power and lighting, telephone, water, gas, storm drains, process lines, sanitary sewers and all appurtenant structures.

B. Where existing utilities and structures are indicated on the Drawings, it shall be understood that all of the existing utilities and structures affecting the work may not be shown and that the locations of those shown are approximate only. It shall be the responsibility of the Contractor to ascertain the actual extent and exact location of existing utilities and structures. In every instance, the Contractor shall notify the proper authority having jurisdiction and obtain all necessary directions and approvals before performing any work in the vicinity of existing utilities.

C. Prior to beginning any excavation work, the Contractor shall, through field investigations, determine any conflicts or interferences between existing utilities and new utilities to be constructed under this project. This determination shall be based on the actual locations, elevations, slopes, etc., of existing utilities as determined in the field investigations, and locations, elevation, slope, etc. of new utilities as shown on the Drawings. If an interference exists, the Contractor shall bring it to the attention of the Engineer as soon as possible. If the Engineer agrees that an interference exists, he shall modify the design as required. Additional costs to the Contractor for this change shall be processed through a Change Order as detailed elsewhere in these Contract Documents. In the event the Contractor fails to bring a potential conflict or interference to the attention of the Engineer prior to beginning excavation work, any actual conflict or interference which does arise during the Project shall be corrected by the Contractor, as directed by the Engineer, at no additional expense to the Owner.

D. The work shall be carried out in a manner to prevent disruption of existing services and to avoid damage to the existing utilities. Temporary connections shall be provided, as required, to insure uninterruption of existing services. Any damage resulting from the work of this Contract shall be promptly repaired by the Contractor at his own expense in a manner approved by the Engineer and further subject to the requirements of any authority having jurisdiction. Where it is required by the authority having jurisdiction that they perform their own repairs or have them done by others, the Contractor shall be responsible for all costs thereof.

E. Where excavations by the Contractor require any utility lines or appurtenant structures to be temporarily supported and otherwise protected during the construction work, such support and protection shall be provided by the Contractor. All such work shall be performed in a manner satisfactory to the Engineer and the respective authority having jurisdiction over such work. In the event the Contractor fails to provide proper support or protection to any existing utility, the Engineer may, at his discretion, have the respective authority to provide such support or protection as may be necessary to insure the safety of such utility, and the costs of such measures shall be paid by the Contractor.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION –

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SECTION 01540

DEMOLITION AND REMOVAL OF EXISTING STRUCTURES AND EQUIPMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. This Section covers the demolition of the Woodlyn Rd Pump Station and existing Lower Brush Creek Gravity Sewer, removal, and disposal of sewer pipes, structures, pavement, curbs, and sidewalk, , and any existing equipment including electrical, plumbing, heating and ventilating equipment and piping as indicated on the Drawings and as specified hereinafter. The Contractor shall furnish all labor, materials and equipment to demolish structures and to remove piping and accessories designated to be removed on the Drawings.

1.02 TITLE TO EQUIPMENT AND MATERIALS

A. Contractor shall have no right or title to any of the equipment, materials or other items to be removed until said equipment, materials and other items have been removed from the premises. The Contractor shall not sell or assign, or attempt to sell or assign any interest in the said equipment, materials or other items until the said equipment, materials or other items have been removed.

B. Contractor shall have no claim against the Owner because of the absence of such fixtures and materials.

1.03 CONDITION OF STRUCTURES AND EQUIPMENT

A. The Owner does not assume responsibility for the actual condition of structures and equipment to be demolished and removed.

B. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner so far as practicable.

C. The information regarding the existing structures and equipment shown on the Drawings is based on visual inspection and a walk-through survey only. Neither the Engineer nor the Owner will be responsible for interpretations or conclusions drawn therefrom by the Contractor.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

3.01 DEMOLITION AND REMOVALS

A. The removal of all equipment, structures, and piping, and all materials from the demolition shall, when released by the Owner and Engineer, shall be done by the Contractor and shall become the Contractor's property, unless otherwise noted, for disposition in any manner not contrary to the Contract requirements and shall be removed from the site to the Contractor's own place of disposal.

B. The Contractor shall proceed with the removal of the equipment, piping and appurtenances in a sequence designed to maintain sewer operations and shall proceed only after approval of the Engineer.

C. Any equipment piping and appurtenances removed without proper authorization, which are necessary for the operation of the existing system shall be replaced to the satisfaction of the Engineer at no cost to the Owner.

D. Excavation caused by demolitions shall be backfilled with fill free from rubbish and debris.

3.02 PROTECTION

A. Demolition and removal work shall be performed by competent experienced workmen for the various type of demolition and removal work and shall be carried out through to completion with due regard to the safety of Owner employees, workmen on-site and the public. The work shall be performed with as little nuisance as possible.

B. The work shall comply with the applicable provisions and recommendation of ANSI A10.6 Safety Code for Building Construction, all governing codes, and as hereinafter specified.

C. The Contractor shall make such investigations, explorations and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal. The Contractor shall give particular attention to shoring and bracing requirements so as to prevent any damage to new or existing construction.

D. The Contractor shall provide, erect, and maintain catch platforms, lights, barriers, weather protection, warning signs and other items as required for proper protection of the public, , workmen engaged in demolition operations, and adjacent construction.

E. The Contractor shall provide and maintain temporary protection of the existing structure designated to remain where demolition, removal and new work is being done, connections made, materials handled or equipment moved.

F. The Contractor shall provide adequate fire protection in accordance with local Fire Department requirements.

G. The Contractor shall be responsible for any damage to the existing structure or contents by reason of the insufficiency of protection provided.

3.03 WORKMANSHIP

A. The demolition and removal work shall be performed as described in the Contract Documents. The work required shall be done with care, and shall include all required shoring, bracing, etc. The Contractor shall be responsible for any damage which may be caused by demolition and removal work to any part or parts of existing structures or items designated for reuse or to remain. The Contractor shall perform patching, restoration and new work in accordance with applicable Technical Sections of the Specifications and in accordance with the details shown on the Drawings. Prior to starting of work, the Contractor shall provide a detailed description of methods and equipment to be used for each operation and the sequence thereof for review by the Engineer.

B. All supports, pedestals and anchors shall be removed with the equipment and piping unless otherwise specified or required. Concrete bases, anchor bolts and other supports shall be removed to approximately 1-inch below the surrounding finished area and the recesses shall be patched to match the adjacent areas. Superstructure wall and roof openings shall be closed, and damaged surfaces shall be patched to match the adjacent areas, as specified under applicable Sections of these Specifications, as shown on the Drawings, or as directed by the Engineer. Wall sleeves and castings shall be plugged or blanked off, all openings in concrete shall be closed in a manner meeting the requirements of the appropriate Sections of these Specifications, as shown on the Drawings, and as directed and approved by the Engineer.

C. Materials or items designated to remain the property of the Owner shall be as hereinafter tabulated. Such items shall be removed with care and stored at a location at the site to be designated by the Owner.

D. Where equipment is shown or specified to be removed, the Contractor shall not proceed with removal of this equipment without specific prior approval of the Engineer.

E. Wherever piping is to be removed for disposition, the piping shall be drained by the Contractor and adjacent pipe and headers that are to remain in service shall be blanked off or plugged and then anchored in an approved manner.

F. Materials or items demolished and not designated to become the property of the Owner or to be reinstalled shall become the property of the Contractor and shall be removed from the property and legally disposed of.

G. The Contractor shall execute the work in a careful and orderly manner, with the least possible disturbance to the public and to the occupants of the building.

H. Where alterations occur, or new and old work join, the Contractor shall cut, remove, patch, repair or refinish the adjacent surfaces to the extent required by the construction conditions, so as to leave the altered work in as good a condition as existed prior to the start of the work. The materials and workmanship employed in the alterations, unless otherwise shown

on the Drawing or specified, shall comply with that of the various respective trades which normally perform the particular items or work.

I. The Contractor shall finish adjacent existing surfaces to new work to match the specified finish for new work. The Contractor shall clean existing surfaces of dirt, grease, etc., before refinishing.

J. The Contractor shall cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.

K. The Contractor shall remove temporary work, such as enclosures, signs, guards, and the like when such temporary work is no longer required or when directed at the completion of the work.

3.04 MAINTENANCE

A. The Contractor shall maintain the buildings, structures and public properties free from accumulations of waste, debris and rubbish, caused by the demolition and removal operations.

B. The Contractor shall provide on-site dump containers for collection of waste materials, debris and rubbish, and he shall wet down dry materials to lay down and prevent blowing dust.

C. At reasonable intervals during the progress of the demolition and removal work or as directed by the Engineer, the Contractor shall clean the site and properties, and dispose of waste materials, debris and rubbish.

- END OF SECTION –

SECTION 01550

SITE ACCESS AND STORAGE

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Access Roads

1. The General Contractor shall construct and maintain such temporary access roads as required to perform the work of this Contract.

2. Access roads, where possible, shall be located over the areas of the future road system.

3. Access roads shall be located within the property lines of the Owner unless the Contractor independently secures easements for his use and convenience. Contractor shall submit written documentation to the Engineer for any Contractor secured easements across privately held property. Easement agreement shall specify terms and conditions of use and provisions for site restoration and shall hold the City of Johnson City harmless. A written release from the property owner certifying that all terms of the easement agreement have been complied by the Contractor shall be furnished to the Engineer prior to final payment.

4. Existing access roads used by the Contractor shall be suitably maintained by the Contractor at his expense during construction. Contractor shall not be permitted to restrict Owner access to existing facilities. Engineer may direct Contractor to perform maintenance of existing access roads when Engineer determines that such work is required to insure all weather access by the Owner.

5. The Contractor shall obtain and pay all cost associated with any bonds required by the Tennessee Department of Transportation for the use of State maintained roads.

B. Parking Areas

1. Each Contractor shall construct and maintain suitable parking areas for his construction personnel on the project site where approved by the Engineer and the Owner.

C. Restoration

1. At the completion of the work, the surfaces of land used for access roads and parking areas shall be restored by each Contractor to its original condition and to the satisfaction of the Engineer. At a minimum, such restoration shall include establishment of a permanent ground cover adequate to restrain erosion for all disturbed areas.

D. Traffic Regulations

1. Contractor shall obey all traffic laws and comply with all the requirements, rules and regulations of the Tennessee Department of Transportation (TDOT) and other local authorities having jurisdiction to maintain adequate warning signs, lights, barriers, etc., for the protection of traffic on public roadways.

E. Storage of Equipment and Materials

1. Contractor shall store his equipment and materials at the job site in accordance with the requirements of the General Conditions, the Supplemental Conditions, and as hereinafter specified. All equipment and materials shall be stored in accordance with manufacturer's recommendations and as directed by the Owner or Engineer, and in conformity to applicable statutes, ordinances, regulations and rulings of the public authority having jurisdiction. Where space or strip heaters are provided within the enclosure for motors, valve operators, motor starters, panels, instruments, or other electrical equipment, the Contractor shall make connections to these heaters from an appropriate power source and operate the heaters with temperature control as necessary until the equipment is installed and being operated according to its intended use.

2. Contractor shall enforce the instructions of Owner and Engineer regarding the posting of regulatory signs for loadings on structures, fire safety, and smoking areas.

3. Contractor shall not store materials or encroach upon private property without the written consent of the owners of such private property.

4. Contractor shall not store unnecessary materials or equipment on the job site, and shall take care to prevent any structure from being loaded with a weight which will endanger its security or the safety of persons.

5. Materials shall not be placed within ten (10) feet of fire hydrants. Gutters, drainage channels and inlets shall be kept unobstructed at all times.

6. Contractor shall provide adequate temporary storage buildings/facilities, if required, to protect materials or equipment on the job site.

7. Contractor responsible for all site security for all equipment, personnel, and materials on the construction site.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01560

TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Dust Control

1. Contractor shall take all necessary measures to control dust from his operations, and to prevent spillage of excavated materials on public roads.

2. Contractor shall remove all spillage of excavated materials, debris or dust from public roads by methods approved by the Engineer.

3. Contractor shall sprinkle water at locations and in such quantities and at such frequencies as may be required by the Engineer to control dust and prevent it from becoming a nuisance to the surrounding area.

4. Dust control and cleaning measures shall be provided at no additional cost to the Owner.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

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SECTION 01580

PROJECT IDENTIFICATION AND SIGNS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Furnish, install, and maintain project identification signs per Section 01580.1.

B. Provide temporary on-site informational signs to identify key elements of construction facilities.

C. Remove signs on completion of construction.

D. Allow no other signs to be displayed.

1.02 RELATED REQUIREMENTS

A. Section 01510: Temporary Utilities

B. Section 01570: Traffic Regulations

1.03 PROJECT IDENTIFICATION SIGN.

A. Three (3) painted signs, of not less than 32 square feet area, with painted graphic content as shown on the sign detail sheet.

B. Erect on the site at a lighted location of high public visibility, adjacent to main entrance to site, as approved by Owner.

1.04 INFORMATIONAL SIGNS

A. Painted signs with painted lettering, or standard product.

1. Size of signs and lettering: as required by regulatory agencies, or as appropriate to usage.
2. Colors: as required by regulatory agencies, otherwise of uniform colors throughout Project.

B. Erect at appropriate locations to provide required information.

1.05 QUALITY ASSURANCE

A. Sign Painter: Professional experienced in type of work required.

B. Finishes, Painting: Adequate to resist weathering and fading for scheduled construction period.

PART 2 - PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: May be new or used, wood or metal, in sound condition structurally adequate to work and suitable for specified finish.

B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.

1. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.

C. Rough Hardware: Galvanized

D. Paint: Exterior quality

1. Use Bulletin colors for graphics.
2. Colors for structure, framing, sign surfaces and graphics: as selected by Owner.

PART 3 - EXECUTION

3.01 PROJECT IDENTIFICATION SIGN

A. Paint exposed surfaces of supports, framing and surface material; one (1) coat of primer and one (1) coat of exterior paint.

B. Paint graphics in styles, sizes, and colors as indicated on the Project Sign detail sheet.

3.02 INFORMATIONAL SIGNS

A. Paint exposed surfaces: one (1) coat of primer and one (1) coat of exterior paint.

B. Paint graphics in styles, sizes, and colors selected.

C. Install at a height for optimum visibility, on ground-mounted poles or attached to temporary structural surfaces.

3.03 MAINTENANCE

A. Maintain signs and supports in a neat, clean condition; repair damages to structure, framing, or sign.

B. Relocate information signs as required by progress of the work.

3.04 REMOVAL

A. Remove signs, framing, supports, and foundations at completion of project.

END OF SECTION

WATER & SEWER SERVICES DEPARTMENT

STATE REVOLVING FUND LOAN PROGRAM

LOWER BRUSH CREEK 42” INTERCEPTOR SEWER CONTRACT 1 (ITB# 6441)

JOHNSON CITY
TENNESSEE

BOARD OF COMMISSIONERS

Jenny Brock - Mayor
Joe Wise - Vice Mayor
Dr. Larry Calhoun - Commissioner
Dr. Todd Fowler - Commissioner
John Hunter - Commissioner

CITY STAFF

M. Denis Peterson - City Manager
Tom Witherspoon - Director WSS
Sunny R. Sandos - Staff Attorney

Project Cost: $

CONTRACTOR’S
LOGO HERE

Contractor:

Engineer:
Hazen and Sawyer
Nashville, TN

Hazen

CLEAN WATER STATE REVOLVING FUND

IDENTIFICATION SIGN

All plans and specifications for each project approved shall contain provisions for requiring the general contractor to provide identification signs. The signs shall conform to the following basic features:

1. The following diagram shall be used as a design:

CLEAN WATER FOR TENNESSEE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

GOVERNOR
BILL LEE

COMMISSIONER
DAVID SALYERS

CITY OF

MAYOR

STATE REVOLVING FUND PROJECT

CWSRF LOAN . . . $ _____

2. The sign shall be a 4'0" X 8'0" sheet of exterior grade plywood and shall be built so as to remain erected during the entire construction phase of the project.

3. The background of both sides shall be white. The lettering shall be black and shall be large enough to take advantage of the full size of the plywood. The stars shall be white set on a blue field and surrounded by a white ring placed inside a state map in red with a stripe of white and blue on the right side. The sign shall be bordered by a one-inch blue stripe.

Revised: MARCH 11, 2019

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish and Install

1. Where the words "furnish", "provide", "supply", "replace", or "install" are used, whether singularly or in combination, they shall mean to furnish and install, unless specifically stated otherwise.

2. In the interest of brevity, the explicit direction "to furnish and install" has sometimes been omitted in specifying materials and/or equipment herein. Unless specifically noted otherwise, it shall be understood that all equipment and/or materials specified or shown on the Drawings shall be furnished and installed under the Contract as designated on the Drawings.

1.02 EQUIPMENT AND MATERIALS

A. All equipment, materials, instruments or devices incorporated in this project shall be new and unused, unless indicated otherwise in the Contract Documents. Equipment and materials to be incorporated into the work shall be delivered sufficiently in advance of their installation and use to prevent delay in the execution of the work, and they shall be delivered as nearly as feasible in the order required for executing the work.

B. The Contractor shall protect all equipment and materials from deterioration and damage, including provisions for temporary storage buildings as needed and as specified in Section 01550, Site Access and Storage. Storage of equipment and materials shall be in locations completely protected from flooding, standing water, excessive dust, falling rock, brush fire, etc. Storage areas shall be located sufficiently distant from all construction activities and the movement of construction vehicles to minimize the potential for accidental damage. Any equipment or materials of whatever kind which may have become damaged or deteriorated from any cause shall be removed and replaced by good and satisfactory items at the Contractor's expense for both labor and materials.

1.03 SUBSTITUTIONS

A. Requests for substitutions of equipment or materials shall conform to the requirements of the General Conditions, Supplemental Conditions, and as hereinafter specified.

1. Contractor shall submit for each proposed substitution sufficient details, complete descriptive literature and performance data together with samples of the materials, where feasible, to enable the Owner and Engineer to determine if the proposed substitution is equal.

2. Contractor shall submit certified tests, where applicable, by an independent laboratory attesting that the proposed substitution is equal.

3. A list of installations where the proposed substitution is equal.

4. Requests for substitutions shall include full information concerning differences in cost, and any savings in cost resulting from such substitutions shall be passed on to the Owner.

B. Where the approval of a substitution requires revision or redesign of any part of the work, including that of other Contracts, all such revision and redesign, and all new drawings and details therefore, shall be provided by the Contractor at his own cost and expense, and shall be subject to the approval of the Owner and Engineer.

C. In the event that the Engineer is required to provide additional engineering services, then the Engineer's charges for such additional services shall be charged to the Contractor by the Owner in accordance with the requirements of the General Conditions, and the Supplemental Conditions.

D. In all cases the Owner and Engineer shall be the judge as to whether a proposed substitution is to be approved. The Contractor shall abide by their decision when proposed substitute items are judged to be unacceptable and shall in such instances furnish the item specified or indicated. No substitute items shall be used in the work without written approval of the Owner and Engineer.

E. Contractor shall have and make no claim for an extension of time or for damages by reason of the time taken by the Engineer in considering a substitution proposed by the Contractor or by reason of the failure of the Engineer to approve a substitution proposed by the Contractor.

F. Acceptance of any proposed substitution shall in no way release the Contractor from any of the provisions of the Contract Documents.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01700

PROJECT CLOSEOUT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Final Cleaning

1. At the completion of the work, the Contractor shall remove all rubbish from and about the site of the work, and all temporary structures, construction signs, tools, scaffolding, materials, supplies and equipment which he or any of his Subcontractors may have used in the performance of the work. Contractor shall broom clean paved surfaces and rake clean other surfaces of grounds.

2. Contractor shall thoroughly clean all materials, equipment and structures; all marred surfaces shall be touched up to match adjacent surfaces; dirty filters and burned out lights replaced as required; all glass surfaces cleaned and floors cleaned and polished so as to leave work in a clean and new appearing condition.

3. Contractor shall maintain cleaning until project, or portion thereof, is occupied by the Owner.

B. Final Cleanup; Site Rehabilitation

1. Before finally leaving the site, the Contractor shall wash and clean all exposed surfaces which have become soiled or marked, and shall remove from the site of work all accumulated debris and surplus materials of any kind which result from his operation, including construction equipment, tools, sheds, sanitary enclosures, etc. The Contractor shall leave all equipment, fixtures, and work, which he has installed, in a clean condition. The completed project shall be turned over to the Owner in a neat and orderly condition.

2. The site of the work shall be rehabilitated or developed in accordance with other sections of the Specifications and the Drawings. In the absence of any portion of these requirements, the Contractor shall completely rehabilitate the site to a condition and appearance equal or superior to that which existed just prior to construction, except for those items whose permanent removal or relocation was required in the Contract Documents or ordered by the Owner.

C. Final Inspection

1. Final cleaning and repairing shall be so arranged as to be finished upon completion of the construction work. The Contractor will make his final cleaning and repairing,

and any portion of the work finally inspected and accepted by the Engineer shall be kept clean by the Contractor, until the final acceptance of the entire work.

2. When the Contractor has finally cleaned and repaired the whole or any portion of the work, he shall notify the Engineer that he is ready for final inspection of the whole or a portion of the work, and the Engineer will thereupon inspect the work. If the work is not found satisfactory, the Engineer will order further cleaning, repairs, or replacement.

3. When such further cleaning or repairing is completed, the Engineer, upon further notice, will again inspect the work. The "Final Payment" will not be processed until the Contractor has complied with the requirements set forth, and the Engineer has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.

D. Project Close Out

1. As construction of the project enters the final stages of completion, the Contractor shall, in concert with accomplishing the requirements set forth in the Contract Documents, attend to or have already completed the following items as they apply to his contract:

   a. Correcting or replacing defective work, including completion of items previously overlooked or work which remains incomplete, all as evidenced by the Engineer's "Punch" Lists.

   b. Attend to any other items listed herein or brought to the Contractor's attention by the Engineer.

2. In addition, and before the Certificate of Substantial Completion is issued, the Contractor shall submit to the Engineer (or to the Owner if indicated) certain records, certifications, etc., which are specified elsewhere in the Contract Documents. A partial list of such items appears below, but it shall be the Contractor's responsibility to submit any other items which are required in the Contract Documents:

   a. Test results of project components.

   b. One set of neatly marked-up record drawings showing as-built changes and additions to the work under his Contract.

   c. Any special guarantees or bonds (Submit to Owner).

   d. Licensed surveyor’s report showing elevations specified in the Contract Drawings and the final surveyed elevation.

   e. Contractor's Certification Of Completion Of Work

   f. Affidavit of Release of Liens

g. Affidavit of Payment of Debts and Claims

h. Consent of Surety to Final Payment

3. The Contractor's attention is directed to the fact that required certifications and information under Item 2 above, must actually be submitted earlier in accordance with other Sections of the Specifications.

PART 2 -- PRODUCTS

(NOT USED)

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION –

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SECTION 01783
PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements for recording changes to record documents.

2. Requirements for electronic files furnished by Engineer.

B. Contractor shall maintain and submit to Engineer with record documents in accordance with the Specifications, General Conditions, and Supplementary Conditions.

1.02 ADMINSTRATIVE REQUIREMENTS

A. Maintenance of Record Documents:

1. The following record documents shall be maintained in the Contractor's field office:

a. Drawings, Specifications, and Addenda.

b. Shop Drawings, Samples, and other Contractor submittals, including records of test results, approved or accepted as applicable, by Engineer.

c. Change Orders, Work Change Directives, Field Orders, photographic documentation, survey data, and all other documents pertinent to the Work.

2. Update record documents on a monthly basis, minimum.

3. Provide files and racks for proper storage and easy access to record documents.

4. Make record documents available for inspection upon request of Engineer or Owner.

5. Do not use record documents for purpose other than serving as Project record. Do not remove record documents from Contractor's field office without Engineer's approval.

B. Submittal of Record Documents:

1. Submit to Engineer the following record documents: Drawings.

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2. Prior to readiness for final payment, submit to Engineer one copy of final record documents. Submit complete record documents; do not make partial submittals.

3. Submit record documents with transmittal letter on contractor letterhead complying with letter of transmittal requirements in Section 01300 – Submittal Procedures.

4. Record documents submittal shall include certification, with original signature of official authorized to execute legal agreements on behalf of Contractor.

C. Electronic Files Furnished by Engineer:

1. CADD files will be furnished by Engineer upon the following conditions:

a. Contractor shall submit to Engineer a letter on Contractor letterhead requesting CADD files and providing specific definition(s) or description(s) of how files will be used, and specific description of benefits to Owner (including credit proposal, if applicable) if the request is granted.

b. Contractor shall execute Engineer's standard agreement for release of electronic files and shall abide by all provisions of the agreement for release of electronic files.

c. Layering system incorporated in CADD files shall be maintained as transmitted by Engineer. CADD files transmitted by Engineer containing cross-referenced files shall not be bound by Contractor. Drawing cross-references and paths shall be maintained. If Contractor alters layers or cross-reference files, Contractor shall restore all layers and cross-references prior to submitting record documents to Engineer.

d. Contractor shall submit record drawings to Engineer in same CADD format that files were furnished to Contractor.

1.03 SUBMITTALS

A. Closeout Submittals: Provide record documentation as specified in this Section.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL REQUIREMENTS:

A. At the start of the Project, label each record document to be submitted as, "PROJECT RECORD" using legible, printed letters. Letters on record copy of the Drawings shall be two inches high.

B. Keep record documents current. Make entries on record documents within two working days of receipt of information required to record the change.

C. Do not permanently conceal the Work until required information has been recorded.

D. Accuracy of record documents shall be such that future searches for items shown on the record documents may rely reasonably on information obtained from Engineer-accepted record documents.

E. Marking of Entries:

1. Use erasable, colored pencils (not ink or indelible pencil) for marking changes, revisions, additions, and deletions to record documents.

2. Clearly describe the change by graphic line and make notations as required. Use straight-edge to mark straight lines. Writing shall be legible and sufficiently dark to allow scanning of record documents into legible electronic files.

3. Date all entries on record documents.

4. Call attention to changes by drawing a “cloud” around the change(s) indicated.

5. Mark initial revisions in red. In the event of overlapping changes, use different colors for subsequent changes.

3.02 RECORDING CHANGES TO DRAWINGS:

A. Record changes on copy of the Drawings. Submittal of Contractor-originated or -produced drawings as a substitute for recording changes on the Drawings is unacceptable.

B. Record changes on plans, sections, schematics, and details as required for clarity, making reference dimensions and elevations (to Project datum) for complete record documentation.

C. Record actual construction including:

1. Depths of various elements of foundation relative to Project datum.

2. Field changes of dimensions, arrangements, and details.

3. Changes made in accordance with Change Orders, Work Change Directives, and Field Orders.

4. Changes in details on the Drawings. Submit additional details prepared by Contractor when required to document changes.

3.03 RECORDING CHANGES FOR SCHEMATIC LAYOUTS:

A. In some cases, on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items are shown schematically and are not intended to portray physical layout. For such cases, the final physical arrangement shall be determined by Contractor subject to acceptance by Engineer.

B. Record on record documents all revisions to schematics on Drawings, including: piping schematics, ducting schematics, process and instrumentation diagrams, control and circuitry diagrams, electrical one-line diagrams, motor control center layouts, and other schematics when included in the Contract. Record actual locations of equipment, lighting fixtures, in-place grounding system, and other pertinent data.

C. When dimensioned plans and dimensioned sections on the Drawings show the Work schematically, indicate on the record documents, by dimensions accurate to within one inch in the field, centerline location of items of Work such as conduit, piping, ducts, and similar items

1. Clearly identify the Work item by accurate notations such as “cast iron drain”, “rigid electrical conduit”, “copper waterline”, and similar descriptions.

2. Show by symbol or note the vertical location of Work item; for example, “embedded in slab”, “under slab”, “in ceiling plenum”, “exposed”, and similar designations. For piping not embedded, also provide elevation dimension relative to Project datum.

3. Descriptions shall be sufficiently detailed to be related to Specifications.

D. Engineer may furnish written waiver of requirements relative to schematic layouts shown on plans and sections when, in Engineer’s judgment, dimensioned layouts of Work shown schematically will serve no useful purpose. Do not rely on waiver(s) being issued.

3.04 REQUIREMENTS FOR SUPPLEMENTAL DRAWINGS:

A. In some cases, drawings produced during construction by Engineer or Contractor supplement the Drawings and shall be included with record documents submitted by Contractor. Supplemental record drawings shall include drawings provided with Change Orders, Work Change Directives, and Field Orders and that cannot be incorporated into the Drawings due to space limitations.

B. Supplemental drawings provided with record drawings shall be integrated with the Drawings and include necessary cross-references between drawings. Supplemental record drawings shall be on sheets the same size as the Drawings.

C. When supplemental drawings developed by Contractor using computer-aided drafting/design (CADD) software are to be included in record drawings, submit electronic files for such drawings in AutoCAD (latest version) as part of record drawing submittal. Submit electronic files on compact disc labeled, “Supplemental Record Drawings”, together with Contractor name, Project name, and Contract name and number.

3.05 RECORDING CHANGES TO SPECIFICATIONS AND ADDENDA:

A. Mark each Section to record:

1. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually provided.

2. Changes made by Addendum, Change Orders, Work Change Directives, and Field Orders.

END OF SECTION

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SECTION 02050

DEMOLITION

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all labor, materials and equipment in accordance with the requirements of Section 01540 - Demolition and Removal of Existing Structures and Equipment.

B. In addition, the Contractor shall demolish and remove all concrete and asphaltic paving, curbs, sidewalk, and miscellaneous yard structures as required and shown on the Contract Drawings during the construction work.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01090 - Reference Standards

B. Section 01540 - Demolition and Removal of Existing Structures and Equipment

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. References shall be in accordance with reference standards, codes, and specifications as set forth herein and in Section 02100 - Clearing, Grubbing, and Site Preparation.

PART 2 -- EXECUTION

2.01 DEMOLITION

A. Existing concrete and asphaltic paving, curbs, sidewalk and miscellaneous yard structures within the areas designated for new construction work shall be completely demolished and all debris removed from the site.

B. Excavation caused by demolition shall be backfilled with fill free from rubbish and debris.

C. Work shall be performed in such manner as not to endanger the safety of the workmen or the public or cause damage to nearby structures.

D. Provide all barriers and precautionary measures in accordance with Owner's requirements and other authorities having jurisdiction.

E. Where parts of existing structures are to remain in service, demolish the portions to be removed, repair damage, and leave the structure in proper condition for the intended use. Remove concrete and masonry to the lines designated by drilling, chipping, or other suitable methods. Leave the resulting surfaces reasonably true and even, with sharp straight corners

that will result in neat joints with new construction and be satisfactory for the purpose intended. Where existing reinforcing rods are to extend into new construction, remove the concrete so that the reinforcing is clean and undamaged. Cut off other reinforcing 1/2-inch below the surface and fill with epoxy resin binder flush with the surface.

F. Prior to the execution of the work, the Contractor, Owner and Engineer shall jointly survey the condition of the adjoining and/or nearby structures. Photographs and records shall be made of any prior settlement or cracking of structures, pavements, and the like, that may become the subject of possible damage claims.

2.02 DISPOSAL OF MATERIAL

A. All debris resulting from the demolition and removal work shall be disposed of by the Contractor as part of the work of this Contract. Material designated by the Engineer to be salvaged shall be stored on the construction site as directed. All other material shall be disposed of off site by the Contractor at his expense.

B. Burning of any debris resulting from the demolition will not be permitted at the site.

- END OF SECTION -

SECTION 02100

CLEARING, GRUBBING, AND SITE PREPARATION

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Includes all labor, material, equipment and appliances required for the complete execution of any new construction work as shown on the Drawings and specified herein.

B. Principal items of work include:

1. Notifying all authorities owning utility lines running to or on the property. Protecting and maintaining all utility lines to remain and capping those that are not required in accordance with instructions of the Utility Companies, and all other authorities having jurisdiction.

2. Clearing the site within the Contract Limit Lines, including removal of grass, brush, shrubs, trees, loose debris and other encumbrances except for trees marked to remain.

3. Boxing and protecting all trees, shrubs, lawns and the like within areas to be preserved. Relocating trees and shrubs, so indicated on the Drawings, to designated areas.

4. Repairing all injury to trees, shrubs, and other plants caused by site preparation operations shall be repaired immediately. Work shall be done by qualified personnel in accordance with standard horticultural practice and as approved by the Engineer.

5. Removing topsoil to its full depth from designated areas and stockpiling on site where directed by the Engineer for future use.

6. Disposing from the site all debris resulting from work under this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02200 - Earthwork

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Tennessee Health, Safety, and Environmental Protection Code, Title 68.

1.04 STREET AND ROAD BLOCKAGE

A. Closing of streets and roads during progress of the work shall be in compliance with the requirements of the Owner and other authorities having jurisdiction. Access shall be provided to all facilities remaining in operation.

1.05 PROTECTION OF PERSONS AND PROPERTY

A. All work shall be performed in such a manner to protect all personnel, workmen, pedestrians and adjacent property and structures from possible injury and damage.

B. All conduits, wires, cables and appurtenances above or below ground shall be protected from damage.

C. Provide warning and barrier fence where shown on the Drawings and as specified herein.

PART 2 -- EXECUTION

2.01 CLEARING OF SITE

A. Before removal of topsoil, and start of excavation and grading operations, the areas within the clearing limits shall be cleared and grubbed.

B. Clearing shall consist of cutting, removal, and satisfactory disposal of all trees, fallen timber, brush, bushes, rubbish, sanitary landfill material, fencing, and other perishable and objectionable material within the areas to be excavated or other designated areas. Prior to the start of construction, the Contractor shall survey the entire Contract site and shall prepare a plan which defines the areas to be cleared and grubbed, trees to be pruned, extent of tree pruning, and/or areas which are to be cleared but not grubbed. This plan shall be submitted to the Engineer for approval. Should it become necessary to remove a tree, bush, brush or other plants adjacent to the area to be excavated, the Contractor shall do so only after permission has been granted by the Engineer.

C. Excavation resulting from the removal of trees, roots and the like shall be filled with suitable material, as approved by the Engineer, and thoroughly compacted per the requirements contained in Section 02200, Earthwork.

D. Unless otherwise shown or specified, the Contractor shall clear and grub a strip at least 35 ft ,or to the limits of the easement, wide along all permanent sewer easement under this Contract.

E. In temporary construction easement locations, only those trees and shrubs shall be removed which are in actual interference with excavation or grading work under this Contract, and removal shall be subject to approval by the Engineer. However, the Engineer reserves the right to order additional trees and shrubs removed at no additional cost to the Owner, if such, in his opinion, are too close to the work to be maintained or have become damaged due to the Contractor's operations.

2.02 STRIPPING AND STOCKPILING EXISTING TOPSOIL

A. Existing topsoil and sod on the site within areas designated on the Drawings shall be stripped to whatever depth it may occur, and stored in locations directed by the Engineer.

B. The topsoil shall be free of stones, roots, brush, rubbish, or other unsuitable materials before stockpiling the topsoil.

C. Care shall be taken not to contaminate the stockpiled topsoil with any unsuitable materials.

2.03 GRUBBING

A. Grubbing shall consist of the removal and disposal of all stumps, roots, logs, sticks and other perishable materials to a depth of at least 6-inches below ground surfaces.

B. Large stumps located in areas to be excavated may be removed during grading operations, subject to the approval of the Engineer.

2.04 DISPOSAL OF MATERIAL

A. All debris resulting from the clearing and grubbing work shall be disposed of by the Contractor as part of the work of this Contract. Material designated by the Engineer to be salvaged shall be stored on the construction site as directed by the Engineer for reuse in this Project or removal by others.

B. Burning of any debris resulting from the clearing and grubbing work will not be permitted at the site.

2.05 WARNING AND BARRIER FENCE

A. The fence shall be made of a visible, lightweight, flexible, high strength polyethylene material. The fence shall be MIRASAFE as manufactured by Mirafi, Inc., or equal.

B. Physical Properties

Fence:

Color:	International Orange
Roll Size:	4' x 164'
Roll weight:	34 lbs.
Mesh opening:	1-1/2" x 3"

Posts:

ASTM Designation:	ASTM 702
Length:	5 feet long (T-Type)
Weight:	1.25 #/Foot (min)
Area of Anchor Plate:	14 Sq. In.

C. Drive posts 12 to 18 inches into ground every 10' to 12'. Wrap fence material around first terminal post allowing overlap of one material opening. Use metal tie wire or plastic tie wrap to fasten material to itself at top, middle and bottom. At final post, cut with utility knife or scissors at a point halfway across an opening. Wrap around and tie at final post in the same way as the first post.

D. Use tie wire or tie wrap at intermediate posts and splices as well. Thread ties around a vertical member of the fence material and the post, and bind tightly against the post. For the most secure fastening, tie at top, middle and bottom. Overlap splices a minimum of four fence openings, tie as above, fastening both edges of the fence material splice overlap.

- END OF SECTION -

SECTION 02140

DEWATERING for PIPELINES

PART 1 - GENERAL

1.01 WORK INCLUDED

The Contractor shall provide all labor, materials, and equipment necessary to dewater trench and structure excavations a minimum of two (2) feet below subgrade, in accordance with the requirements of the Contract Documents where construction can be performed in dry conditions.

1.02 SUBMITTALS

The Contractor shall submit a dewatering plan to be reviewed by the Engineer prior to the beginning of construction activities requiring dewatering. Review by the Engineer of the Contractor's design shall not be construed as a detailed analysis of the adequacy of the dewatering system, nor shall any provisions of the above requirements be construed as relieving the Contractor of its overall responsibility and liability for the work.

1.03 QUALITY CONTROL

A. Schedule and perform work in manner that does not cause or contribute to incidence of overflows, releases or spills of sewage from sanitary sewer system or bypass operation.

B. The Contractor shall be solely responsible for the arrangement, location, and depths of the dewatering system necessary to accomplish the work described herein.

C. It shall be the sole responsibility of the Contractor to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence.

D. All dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the Contractor.

E. Where the critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points shall be established and observed at frequent intervals to detect any settlement which may develop. The responsibility for conducting the dewatering operation in a manner which will protect adjacent structures and facilities rests solely with the Contractor. The costs of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the Contractor.

PART 2 - PRODUCTS

2.01 MATERIALS

A. High-Density Polyethylene (HDPE).
   1. Homogenous throughout, free of visible cracks, discoloration, pitting, varying wall thickness, holes, foreign material, blisters, or other deleterious faults.
      a. Defective areas of pipe: Cut out and joint fused as stated herein.

   2. Assembled and joined at site using couplings, flanges or butt-fusion method to provide leak proof joint. Follow manufacturer's instructions and ASTM D 2657.
      a. Threaded or solvent joints and connections are not permitted.

   3. Fusing: By personnel certified as fusion technicians by manufacturer of HDPE pipe and/or fusing equipment.

   4. Butt-fused joint: True alignment and uniform roll-back beads resulting from use of proper temperature and pressure.

      a. Allow adequate cooling time before removal of pressure.
      b. Watertight and have tensile strength equal to that of pipe.
      c. Acceptance by Engineer before insertion.

B. Flexible Hoses and Associated Couplings and Connectors.
   1. Abrasion resistant.
   2. Suitable for intended service.
   3. Rated for external and internal loads anticipated, including test pressure.
      a. External loading design: Incorporate anticipated traffic loadings, including traffic impact loading.
   4. When subject to traffic loading, compose system, such as traffic ramps or covers.
      a. Install system and maintain H-20 loading requirements while in use or as directed by the Engineer.

C. Valves and Fittings: Determined according to flow calculations, pump sizes previously determined, and system operating pressures.

D. Plugs: Selected and installed according to size of line to be plugged, pipe and manhole configurations, and based on specific site.
   1. Additional plugs: Available in the event a plug fails. Plugs will be inspected before use for defects which may lead to failure.

E. Aluminum "irrigation type" piping or glued PVC piping will not be permitted.

2.02 EQUIPMENT

A. Dewatering, where required, may include the use of well points, sump pumps, temporary pipelines for water disposal, rock or gravel placement, and other means. Standby pumping equipment shall be maintained on the jobsite.

B. Materials, especially the well screen, shall be carefully chosen to be compatible with the environment to prevent erosion, deterioration, and clogging.

C. Surging of the natural formation to form a "gravel pack" is strictly prohibited.

PART 3 - EXECUTION

3.01 Dewatering

A. The contractor shall become familiar with the surface and subsurface site conditions.

B. The Contractor shall provide all equipment necessary for dewatering. The Contractor shall have on hand, at all times, sufficient pumping equipment and machinery in good working condition and shall have available, competent workers for the operation of the pumping equipment. Adequate standby equipment shall be kept available to insure efficient dewatering and maintenance of dewatering operation during power failure.

C. Dewatering for structures and pipelines shall commence when groundwater is first encountered and shall be continuous until such times as water can be allowed to rise in accordance with the provisions of this Section or other requirements.

D. At all times, site grading shall promote drainage. Surface runoff shall be diverted from excavations. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and be pumped or drained by gravity from the excavation to maintain a bottom free from standing water.

E. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at the proposed bottom of excavation.

F. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with drain rock at no additional cost to the Owner.

G. The Contractor shall maintain the water level below the bottom of excavation in all work areas where groundwater occurs during excavation construction, backfilling, and up to acceptance.

H. Dewatering systems shall be designed and operated so as to prevent removal of natural soils and so that the ground water level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property.

I. Flotation shall be prevented by the Contractor by maintaining a positive and continuous removal of water. The Contractor shall be fully responsible and liable for all damages which may result from failure to adequately keep excavations

dewatered.

J. If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sandpacked and/or other means used to prevent pumping of fine sands or silts from the subsurface. A continual check by the Contractor shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation.

K. The Contractor shall dispose of water from the work in a suitable manner without damage to the environment or adjacent property. The Contractor shall be responsible for obtaining any permits that may be necessary to dispose of water. No water shall be drained into work built or under construction without prior consent of the OWNER. Water shall be filtered using an approved method to remove sand and fine sized soil particles before disposal into any drainage system.

L. The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill and prevent flotation or movement of structures, pipelines, and sewers.

M. Dewatering of trenches and other excavations shall be considered as incidental to the construction of the work and all costs thereof shall be included in the various contract prices in the bid forms.

END OF SECTION

SECTION 02160

TEMPORARY SHEETING AND BRACING

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish all labor, materials and equipment to install steel sheet piling where the Contractor selects sheeting per Section 02200, Article 3.03, Paragraph B or otherwise required.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02200 - Earthwork

B. Section 02140 - Dewatering

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer tot he most current issue available at the time of Bid.

1. International Building Code

2. ASTM A328 - Standard Specification for Steel Sheet Piling

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Two (2) copies of mill test reports certifying that materials meet ASTM requirements.

2. Photographs of existing structures adjacent to work area.

3. Survey of existing structures adjacent to work area.

4. Sample driving record forms.

5. Schedule of Procedures and Operations.

6. Details of pile driving equipment.

7. Shop Drawings showing shades, sizes, dimensions and details of all bracing.

8. Contractor qualifications.

9. Design calculations showing design loads and stresses. Calculations shall be signed and sealed by a Professional Engineer registered in the State of Tennessee.

10. Driving Records.

11. Log of surveyed elevations.

1.05 QUALITY ASSURANCE

A. The Contractor shall have at least three years of experience in driving sheet pile and shall have completed at least three installations.

B. The Contractor shall be responsible for the adequacy of all sheeting and bracing and for all damage resulting from sheeting and bracing failure or from placing, maintaining and removing it.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Sheeting shall conform to the requirements of ASTM A328. Sheet piles shall be new and shall be of the continuous interlock type of the section, length and weight shown on the Contract Drawings.

B. Walers, braces, structures, tie-rod assemblies, plates and similar members shall conform to the requirements of Section 05010.

C. Bolts, nuts and washers shall conform to the requirements of Section 05010.

PART 3 -- EXECUTION

3.01 SCHEDULE OF PROCEDURES AND OPERATIONS

A. Schedule shall be submitted prior to commencing sheeting installation.

B. Schedule shall include proposed method of installation, sequence of all sheeting driving operations, catalog data and manufacturer's specification for all hammers and anvils to be used and method of lifting, handling, driving and cutting of sheeting.

C. Schedule submission does not relieve the Contractor of his responsibility for the successful completion of the work.

3.02 CONFIGURATION AND EXTENT

A. Extent of the sheeting and bracing is indicated on the Drawings and includes, but is not limited to, the following:

1. Sheeting and bracing necessary to protect existing structures, roads, walkways, utilities, and other improvements against loss of ground or caving embankments without producing damage to the adjacent building structures, roads, and/or utilities, and to provide safe working conditions.

2. Maintenance of the sheeting and support systems.

3. Removal and/or relocation of sheeting and bracing as required.

B. The configurations of the sheeting may include but are not limited to the following:

1. Steel sheet piling with walers and struts

2. Tied back steel sheet piling

3. Cantilevered steel sheet piling

3.03 FABRICATION

A. Sheeting shall be so fabricated that when driven in place, it will form a continuously interlocked wall for each structure to the extent shown on the Drawings. Sheeting shall be fabricated in one continuous length equal to that shown on the Contract Drawings.

B. Walers and braces may be prefabricated or fabricated in place. All welding shall conform to the requirements of Section 05010.

3.04 INSTALLATION

A. Sheeting shall be carefully located within easements or City owned property and driven in a plumb position, to the minimum tip elevations shown on the Drawings, each sheet pile interlocking with the adjacent sheet pile so as to form a single continuous wall. Pile hammers shall be maintained in proper alignment during driving operations. A suitable guide system shall be used to permit the sheeting to be driven plumb and on-line. Any obstructions encountered in driving the steel sheet piling shall be removed or otherwise disposed of so as to permit the proper installation of the sheeting. Any sheeting which at any time becomes damaged, displaced, separated from adjacent sheets or otherwise injured, shall be withdrawn and replaced with new sheeting at the expense of the Contractor.

B. Equipment: The Contractor shall provide and maintain in good operating condition, all equipment necessary for the proper and efficient handling and installation of the sheet piles. The Contractor shall have all major equipment items available for inspection by the Engineer. Any deficiencies in quality, quantity or type of equipment shall be corrected prior to commencing work and such correction shall be a required condition to properly fulfill the

Contract. This inspection and subsequent approval shall in no way relieve the Contractor from his obligation to provide all equipment required to properly perform the work.

C. Hammers: Pile hammers shall be steam, diesel, or air driven impact hammers. Vibratory type hammers shall NOT be sold. Hammers shall be maintained in good operating condition and shall be operated at the manufacturer's rated number of blows per minute. The lower end of the hammer shall be fitted with an anvil base that is built to fit the top of the sheeting under the center of the hammer during driving.

D. Driving Records: Sheeting shall be driven only in the presence of the Engineer. The Contractor shall provide a qualified individual to compile and turn over to the Engineer a daily record of driving data. The complete record of each day's activity shall include the number of sheets installed, the length of each, equipment and personnel utilized, and general remarks regarding the day's activity.

E. The Contractor shall exercise caution in the installation and removal of sheeting to insure that excessive or unusual loadings are not transmitted to any new or existing structures. The Contractor shall promptly repair at this expense any and all damage that can be reasonably attributed to sheeting installation or removal.

3.05 MONITORING

A. Before starting work, the Contractor shall check and verify governing dimensions and elevations. In company with the Engineer, he shall jointly survey the condition of adjoining structures. He shall take photographs, as directed by the Engineer, recording any prior settlement of cracking of structures, pavements, and other improvements. He shall prepare a list of such damages, verified by dated photographs, and signed by the Contractor and the Engineer.

B. The Contractor shall survey adjacent structures and improvements, establishing exact elevations at fixed points to act as bench marks. He shall clearly identify bench marks and record existing elevations. Datum level used to establish bench mark elevations shall be located at a sufficient distance so as not to be affected by movement resulting from excavation or construction operations.

C. During installation, the Contractor shall resurvey bench marks weekly, employing a licensed Land Surveyor or registered Professional Engineer. He shall maintain an accurate log of surveyed elevations for comparison with original elevations. He shall promptly notify the Engineer if changes occur or if cracks, sags or other damage is evident.

3.06 REMOVAL

A. All sheeting and bracing shall be removed upon completion of the work except as indicated herein. The Engineer may permit sheetings to be left in place at the request and expense of the Contractor. The Engineer may order certain sheetings left permanently in place in addition to that required by the Contract. The cost of the materials so ordered left in place, less a reasonable amount for the eliminated expense of the removal work omitted, will be paid as an extra by a Change Order in accordance with the General Conditions. Any sheeting or bracing left in place shall be cut off at least two (2) feet below the finished ground surface or as directed by the Engineer.

B. The Contractor shall take all reasonable measures to prevent loss of support beneath and adjacent to pipes and existing structures when sheeting is removed. If significant volumes of soil cannot be prevented from clinging to the extracted sheets, the voids shall be continuously backfilled as rapidly as possible. The Contractor shall thereafter limit the depth below subgrade that sheeting will be driven in similar soil conditions or employ other appropriate means to prevent loss of support.

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SECTION 02200

EARTHWORK

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish all labor, equipment and materials required to complete all work associated with excavation, including off-site borrow excavation, dewatering, backfill, drainage layers beneath and around structures, foundation and backfill stone, filter fabric, embankments, stockpiling topsoil and any excess suitable material in designated areas, in place compaction of embankments, backfill and subgrades beneath foundations and roadways, excavation support, disposing from the site all unsuitable materials, providing erosion and sedimentation control grading, site grading and preparation of pavement and structure subgrade, and other related and incidental work as required to complete the work shown on the Drawings and specified herein.

B. All excavations shall be in conformity with the lines, grades, and cross sections shown on the Drawings or established by the Engineer.

C. It is the intent of this Specification that the Contractor conducts the construction activities in such a manner that erosion of disturbed areas and off-site sedimentation be absolutely minimized.

D. All work under this Contract shall be done in conformance with and subject to the limitations of the latest editions of the Tennessee Department of Transportation Standard Specifications and the Tennessee Erosion and Sediment Control Handbook

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Requirements of related work are included in Division 1 and Division 2 of these Specifications.

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the Specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced Specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. Tennessee Department of Transportation Standard Specifications, latest edition.

2. American Society for Testing and Materials (ASTM):

ASTM C 127 Test for Specific Gravity and Absorption of Coarse Aggregate.

ASTM C 136 Test for Sieve Analysis of Fine and Coarse Aggregates.

ASTM C 535	Test for Resistance to Degradation of Large Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
ASTM D 698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft^3 (600 kN-m/m^3))
ASTM D1556	Test for Density of Soil in Place by the Sand-Cone Method.
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft^3 (2,700 kN-m/m^3))
ASTM D2167	Test for Density of Soil in Place by the Rubber-Balloon Method.
ASTM D2216	Test for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures.
ASTM D2487	Test for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
ASTM D4253	Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
ASTM D4318	Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
ASTM D5084	Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

1.04 SUBSURFACE CONDITIONS

A. Information on subsurface conditions is referenced under Division 1, General Requirements.

B. Attention is directed to the fact that there may be water pipes, storm drains and other utilities located in the area of proposed excavation. Perform all repairs to same in the event that excavation activities disrupt service.

1.05 SUBMITTALS

A. In accordance with the procedures and requirements set forth in Section 01300 - Submittals, the Contractor shall submit the following:

1. Name and location of all material suppliers.

2. Certificate of compliance with the standards specified above for each source of each material.

3. List of disposal sites for waste and unsuitable materials and all required permits for use of those sites.

4. Plans and cross sections of open cut excavations showing side slopes and limits of the excavation at grade.

5. Qualifications of independent Quality Control testing agency, including resumes for Registered Professional Engineer responsible for testing and reporting program, technicians, laboratory personnel, and descriptions for testing equipment to be used.

6. Submit descriptive information on compaction and excavation equipment to be used for construction of the embankment and appurtenant structures. The data shall include type of equipment, manufacturer, model number, axle weights, tire inflation pressure, and other descriptive information. Also submit descriptive information on proposed earth moving equipment and a schedule for the work.

7. Samples of synthetic filter fabric and reinforced plastic membrane with manufacturer's certificates or catalog cuts stating the mechanical and physical properties. Samples shall be at least one (1) foot wide and four (4) feet long taken across the roll with the warp direction appropriately marked.

8. Construction drawings and structural calculations for any types of excavation support required. Drawings and calculations shall be sealed by a currently registered Professional Engineer in the State of Tennessee.

9. Monitoring plan and pre-construction condition inspection and documentation of all adjacent structures, utilities, and roadways near proposed installation of excavation support systems.

10. Dewatering procedures.

1.06 PRODUCT HANDLING

A. Soil and rock material shall be excavated, transported, placed, and stored in a manner so as to prevent contamination, segregation and excessive wetting. Materials which have become contaminated or segregated will not be permitted in the performance of the work and shall be removed from the site.

1.07 USE OF EXPLOSIVES

A. When the use of explosives is necessary for the prosecution of the work, the Contractor shall exercise the utmost care not to endanger life or property. The Contractor shall be responsible for any and all damage or injury to persons or property resulting from the use of explosives. Use of explosives shall be in accordance with Specification Section 02202, Excavation By Blasting.

PART 2 -- PRODUCTS

2.01 ROCK

A. Any material occupying an original volume of at least one cubic yard which cannot be excavated with a single-tooth riper drawn by a crawler tractor having minimum draw bar pull rated at not less than 60,000 pounds (Caterpillar D 8N, or equivalent).

2.02 COMPACTED ON-SITE OR IMPORTED SOILS

A. Approved on-site or imported soils capable of being compacted to the specified densities, with the exceptions of topsoil and organic material, meeting the requirements stipulated in Paragraph B below, may be used as structural fill for construction of earth berms used as flood control structures as shown on the Drawings. Compacted Embankment materials shall be compacted at a moisture content satisfactory to the Engineer, which shall be approximately that required to produce the maximum density except that the moisture content shall not be more than 1% below nor more than 5% above the optimum moisture content for the particular material tested in accordance with the ASTM D698. The Contractor shall dry or add moisture to the Compacted Embankment material when required to provide a uniformly compacted and stable embankment. When air drying of excavated material is necessary, the Contractor may spread, disc, windrow, etc. as necessary at locations on site as directed by the Engineer.

B. The Compacted Embankment shall consist of on-site, clean natural cohesive soil classified as SM, SC, ML, CL-ML, or CL using the Unified Soil Classification System (USCS) containing no topsoil or other deleterious material.

C. Select Fill shall exhibit a maximum hydraulic conductivity of 1×10^{-5} cm/sec as measured using ASTM D5084 at the moisture and in-place density specified herein.

C. Rock fragments, cobbles and boulders shall not exceed 18 inches in any dimension for Compacted Embankment.

D. Soils imported from off-site considered for use as Compacted Embankment shall meet the requirements outlined in this section and shall be approved in advance by the Engineer after review of soils testing data outlined in Paragraph 1.04, Submittals.

2.03 SELECT FILL

A. Soils from the excavations meeting requirements stipulated herein with the exceptions of topsoil and organic material may be used as select fill for backfilling, constructing embankments, reconstructing existing embankments, except for embankments constructed using Compacted Embankment as outlined in 2.02 above, and as structural subgrade support.

B. Select fill used as backfill beneath or within 5-ft laterally of structures shall be a silty or clayey soil material with a maximum Liquid Limit (LL) of 50 and a Plasticity Index (PI) between 7 and 20.

C. Select fill used for backfilling shall either be material as described in Paragraph B above or a granular soil material with a Maximum Plasticity Index (PI) of 6.

D. Regardless of material used as select fill, materials shall be compacted at a moisture content satisfactory to the Engineer, which shall be approximately that required to produce the maximum density except that the moisture content shall not be more than 2% below nor more than 2% above the optimum moisture content for the particular material tested in accordance with the ASTM D698.

E. Select fill used as subgrade support shall be a coarse aggregate material meeting the gradation requirements of #57 or #78 aggregates in accordance with ASTM C-33, or Aggregate Base Course (ABC) as defined in Section 02207 – Aggregate Materials.

F. Where excavated material does not meet requirements for select fill, Contractor shall furnish off-site borrow material meeting the specified requirements herein. Determination of whether the borrow material will be paid for as an extra cost will be made based on Article 4 of the General Conditions, as amended by the Supplementary Conditions. When the excavated material from required excavations is suitable for use as backfill, bedding, or embankments, but is replaced with off-site borrow material for the Contractor's convenience, the costs associated with such work and material shall be borne by the Contractor.

2.04 TOPSOIL

A. Topsoil shall be considered the surface layer of soil and sod, suitable for use in seeding and planting. It shall contain no mixture of refuse or any material toxic to plant growth.

1. General Characteristics – Topsoil should be friable and loamy, free of debris, objectionable weeds and stones, and contain no toxic substances that may be harmful to plant growth. Topsoil should be handled only when it is dry enough to work without damaging the soil structure.

2. Texture – Loam, sandy loam, and silt loam are best; sandy clay loam, silty clay loam, clay loam, and loamy sand are fair. Heavy clay and organics such as peat or muck should not be used as topsoil.

3. Organic Matter Content – Organic materials should be greater than 2% by weight.

4. Fertility and nutrients – pH range should be 5.5 to 7.0; liming may be specified if pH is less than 5.5. Soil test for nutrients as well, based upon the type of vegetation to be established.

PART 3 -- EXECUTION

3.01 STRIPPING OF TOPSOIL

A. In all areas to be excavated, filled, paved, or graveled the topsoil shall be stripped to its full depth and shall be deposited in storage piles on the site, at locations designated by the Engineer, for subsequent reuse. Topsoil shall be kept separated from other excavated materials and shall be piled free of roots and other undesirable materials.

3.02 EXCAVATION

A. All material excavated, regardless of its nature or composition, shall be classified as **UNCLASSIFIED EXCAVATION** unless noted otherwise herein. Excavation shall include the removal of all soil, rock, weathered rock, rocks of all types, boulders, conduits, pipe, and all other obstacles encountered and shown to be removed within the limits of excavation shown on the Drawings or specified herein. The cost of excavation shall be included in the Lump Sum Bid Price and no additional payment will be made for the removal of obstacles encountered within the excavation limits shown on the Drawings and specified herein.

B. Where blasting is necessary to perform the required excavations, blasting shall be performed as stipulated in Section 02202, Excavation By Blasting. Rock excavation, including off-site disposal, as defined in Section 02202, shall be included in the Unit Price Bid Items.

C. All suitable material removed in the excavation shall be used as far as practicable in the formation of embankments, subgrades, and shoulders, and at such other places as may be indicated on the Drawings or indicated by the Engineer. No excavation shall be wasted except as may be permitted by the Engineer. Refer to the drawings for specific location and placement of suitable excavated materials in the formation of embankments, backfill, and structural and roadway foundations. THE ENGINEER WILL DESIGNATE MATERIALS THAT ARE UNSUITABLE. The contractor shall furnish permanent permitted off-site disposal areas for any and all soil spoil materials encountered during the construction of the project at no additional cost to the Owne. Where suitable materials containing excessive moisture are encountered above grade in cuts, the Contractor shall construct above grade ditch drains prior to the excavation of the cut material when in the opinion of the Engineer such measures are necessary to provide proper construction.

D. All excavations shall be made in the dry and in such a manner and to such widths as will give ample room for properly constructing and inspecting the structures and/or piping they are to contain and for such excavation support, pumping and drainage as may be required. Excavation shall be made in accordance with the grades and details shown on the Drawings and as specified herein.

E. Excavation slopes shall be flat enough to avoid slides that will cause disturbance of the subgrade or damage of adjacent areas. Excavation requirements and slopes shall be as indicated in the Drawings. The Contractor shall intercept and collect surface runoff both at the top and bottom of cut slopes. The intersection of slopes with natural ground surfaces, including the beginning and ending of cut slopes, shall be uniformly rounded as shown on the Drawings or as may be indicated by the Engineer. Concurrent with the excavation of cuts the Contractor shall construct intercepting berm ditches or earth

berms along and on top of the cut slopes at locations shown on the Drawings or designated by the Engineer. All slopes shall be finished to reasonably uniform surfaces acceptable for seeding and mulching operations. No rock or boulders shall be left in place which protrude more than 1 foot within the typical section cut slope lines, and all rock cuts shall be cleaned of loose and overhanging material. All protruding roots and other objectionable vegetation shall be removed from slopes. The Contractor shall be required to submit plans of open-cut excavation for review by the Engineer before approval is given to proceed.

F. It is the intent of these Specifications that all structures shall bear on an aggregate base, crushed stone or screened gravel bedding placed to the thickness shown on the Drawings, specified in these Specifications, or not less than 6-inches. Bedding for process piping shall be as specified in Section 15000 - Basic Mechanical Requirements, or as shown on the Drawings.

G. The bottom of all excavations for structures and pipes shall be examined by the Engineer for bearing value and the presence of unsuitable material. If, in the opinion of the Engineer, additional excavation is required due to the low bearing value of the subgrade material, or if the in-place soils are soft, yielding, pumping and wet, the Contractor shall remove such material to the required width and depth and replace it with thoroughly compacted select fill, and/or crushed stone or screened gravel as indicated by the Engineer. Payment for such additional work ordered by the Engineer shall be made as an extra by a Change Order in accordance with the General Conditions and Division 1. No payment will be made for subgrade disturbance caused by inadequate dewatering or improper construction methods.

H. All cuts shall be brought to the grade and cross section shown on the Drawings, or established by the Engineer, prior to final inspection and acceptance by the Engineer.

I. Slides and overbreaks which occur due to negligence, carelessness or improper construction techniques on the part of the Contractor shall be removed and disposed of by the Contractor as indicated by the Engineer at no additional cost to the Owner. If grading operations are suspended for any reason whatsoever, partially completed cut and fill slopes shall be brought to the required slope and the work of seeding and mulching or other required erosion and sedimentation control operations shall be performed.

J. Where the excavation exposes sludge, sludge contaminated soil or other odorous materials, the Contractor shall cover such material at the end of each workday with a minimum of 6-inches and a maximum of 24-inches of clean fill. The work shall be an odor abatement measure and the material shall be placed to the depth deemed satisfactory by the Engineer for this purpose.

3.03 EXCAVATION SUPPORT

A. The Contractor shall furnish, place, and maintain such excavation support which may be required to support sides of excavation or to protect pipes and structures from possible damage and to provide safe working conditions. If the Engineer is of the opinion that at any point sufficient or proper supports have not been provided, he may order additional

supports put in at the expense of the Contractor. The Contractor shall be responsible for the adequacy of all supports used and for all damage resulting from failure of support system or from placing, maintaining and removing it.

B. Selection of and design of any proposed excavation support systems is exclusively the responsibility of the Contractor. Contractor shall submit drawings and calculations on proposed systems sealed by a Professional Engineer currently registered in the State of Tennessee. Refer to Section 02160.

C. The Contractor shall exercise caution in the installation and removal of supports to insure that excessive or unusual loadings are not transmitted to any new or existing structure. The Contractor shall promptly repair at his expense any and all damage that can be reasonably attributed to installation or removal of excavation support system.

D. Contractor shall monitor movement in the excavation support systems as well as movement at adjacent structures, utilities and roadways near excavation supports. Contractor shall submit a monitoring plan developed by the excavation support design engineer. All pre-construction condition assessment and documentation of adjacent structures on-site and off-site shall be performed by the Contractor. If any sign of distress such as cracking or movement occurs in any adjacent structure, utility or roadway during installation of supports, subsequent excavation, service period of supports, subsequent backfill and construction, or removal of supports, Engineer shall be notified immediately. Contractor shall be exclusively responsible for any damage to any roadway, structure, utility, pipes, etc. both on-site and off-site, as a result of his operations.

E. All excavation supports shall be removed upon completion of the work except as indicated herein. The Engineer may permit supports to be left in place at the request and expense of the Contractor. The Engineer may order certain supports left permanently in place in addition to that required by the Contract. The cost of the materials so ordered left in place, less a reasonable amount for the eliminated expense of the removal work omitted, will be paid as an extra by a Change Order in accordance with the General Conditions and Division

1. Any excavation supports left in place shall be cut off at least two (2) feet below the finished ground surface or as directed by the Engineer.

3.04 PROTECTION OF SUBGRADE

A. To minimize the disturbance of bearing materials and provide a firm foundation, the Contractor shall comply with the following requirements:

1. Use of heavy rubber-tired construction equipment shall not be permitted on the final subgrade unless it can be demonstrated that drawdown of groundwater throughout the entire area of the structure is at least 3 feet below the bottom of the excavation (subgrade). Even then, the use of such equipment shall be prohibited should subgrade disturbance result from concentrated wheel loads.

2. Subgrade soils disturbed through the operations of the Contractor shall be excavated and replaced with compacted select fill or crushed stone at the Contractor's expense as indicated by the Engineer.

3. The Contractor shall provide positive protection against penetration of frost into materials below the bearing level during work in winter months. This protection can consist of a temporary blanket of straw or salt hay covered with a plastic membrane or other acceptable means.

3.05 PROOFROLLING

A. The subgrade of all structures and all areas that will support pavements or select fill shall be proofrolled. After stripping of topsoil, excavation to subgrade and prior to placement of fills, the exposed subgrade shall be carefully inspected by probing and testing as needed. Any topsoil or other organic material still in place, frozen, wet, soft, or loose soil, and other undesirable materials shall be removed. The exposed subgrade shall be proofrolled with a heavily loaded tandem-wheeled dump truck to check for pockets of soft material hidden beneath a thin crust of better soil. Any unsuitable materials thus exposed shall be removed and replaced with an approved compacted material.

3.06 DEWATERING

A. The Contractor shall do all dewatering as required for the completion of the work. Procedures for dewatering proposed by the Contractor shall be submitted to the Engineer for review prior to any earthwork operations. All water removed by dewatering operations shall be disposed of in accordance with Tennessee Department of Environment and Conservation.

B. The dewatering system shall be of sufficient size and capacity as required to control groundwater or seepage to permit proper excavation operations, embankment construction and reconstruction, subgrade preparation, and to allow concrete to be placed in a dry condition. The system shall include a sump system or other equipment, appurtenances and other related earthwork necessary for the required control of water. The Contractor shall drawdown groundwater to at least 3 feet below the bottom of excavations (subgrade) at all times in order to maintain a dry and undisturbed condition. Refer to Section 2140.

C. The Contractor shall control, by acceptable means, all water regardless of source. Water shall be controlled and its disposal provided for at each berm, structure, etc. The entire periphery of the excavation areas shall be ditched and diked to prevent water from entering the excavation. The Contractor shall be fully responsible for disposal of the water and shall provide all necessary means at no additional expense to the Owner. The Contractor shall be solely responsible for proper design, installation, proper operation, maintenance, and any failure of any component of the system.

D. The Contractor shall be responsible for and shall repair without cost to the Owner, any damage to work in place and the excavation, including damage to the bottom due to heave and including removal of material and pumping out of the excavated area. The Contractor shall be responsible for damages to any other area or structure caused by his

failure to maintain and operate the dewatering system proposed and installed by the Contractor.

E. The Contractor shall take all the steps that he considers necessary to familiarize himself with the surface and subsurface site conditions, and shall obtain the data that is required to analyze the water and soil environment at the site and to assure that the materials used for the dewatering systems will not erode, deteriorate, or clog to the extent that the dewatering systems will not perform properly during the period of dewatering. Copies of logs of borings and laboratory test results are available to the Contractor. This data is furnished for information only, and it is expressly understood that the Owner and Engineer will not be held responsible for any interpretations or conclusions drawn therefrom by the Contractor.

F. Prior to the execution of the work, the Contractor, Owner and Engineer shall jointly survey the condition of adjoining structures. Photographs and records shall be made of any prior settlement or cracking of structures, pavements, and the like, that may become the subject of possible damage claims.

3.07 EMBANKMENTS

A. The Contractor shall perform the construction of embankments in such a manner that cut and fill slopes will be completed to final slopes and grade in a continuous operation. The operation of removing excavation material from any cut and the placement of embankment in any fill shall be a continuous operation to completion unless otherwise permitted by the Engineer.

B. Surfaces upon which embankments are to be constructed shall be stripped of topsoil, organic material, rubbish and other extraneous materials. After stripping and prior to placing embankment material, the Contractor shall compact the top 12-inches of in place soil as specified under Paragraph 3.09, COMPACTION.

C. Any soft or unsuitable materials revealed before or during the in place compaction shall be removed as indicated by the Engineer and replaced with select fill.

D. Ground surfaces on which embankment is to be placed, shall be scarified or stepped in a manner which will permit bonding of the embankment with the existing surface. The embankment soils shall be as specified under Part 2 - Products, and shall be deposited and spread in successive, uniform, approximately horizontal layers not exceeding 8-inches in compacted depth for the full width of the cross section, and shall be kept approximately level by the use of effective spreading equipment. Hauling shall be distributed over the full width of the embankment, and in no case will deep ruts be allowed to form during the construction of the embankment. The embankment shall be properly drained at all times. Each layer of the embankment shall be thoroughly compacted to the density specified under Paragraph 3.09, COMPACTION.

E. The embankment or fill material in the layers shall be of the proper moisture content before rolling to obtain the prescribed compaction. Wetting or drying of the material and manipulation when necessary to secure a uniform moisture content throughout the layer shall be required. Should the material be too wet to permit proper compaction or rolling, all work on all portions of the embankment thus affected shall be delayed until the

material has dried to the required moisture content. Samples of all embankment materials for testing, both before and after placement and compaction, will be taken at frequent intervals. From these tests, corrections, adjustments, and modifications of methods, materials, and moisture content will be made to construct the embankment.

F. Where embankments are to be placed and compacted on hillsides, or when new embankment is to be compacted against embankments, or when embankment is built in part widths, the slopes that are steeper than 4:1 shall be loosened or plowed to a minimum depth of 6 inches or, if in the opinion of the Engineer, the nature of the ground is such that greater precautions should be taken to bind the fill to the original ground then benches shall be cut in the existing ground as indicated by Engineer.

G. When rock and other embankment material are excavated at approximately the same time, the rock shall be incorporated into the outer portions of the embankments, except for embankments used as flood control as shown on the Drawings, and the other material which meets the requirements for select fill shall be incorporated into the formation of the embankments. Stones or fragmentary rock larger than 4-inches in their greatest dimension will not be allowed within the top 6-inches of the final grade. Stones, fragmentary rock, or boulders larger than 12-inches in their greatest dimension will not be allowed in any portions of embankments and shall be disposed of by the Contractor as indicated by the Engineer. When rock fragments or stone are used in embankments, the material shall be brought up in layers as specified or directed and every effort shall be exerted to fill the voids with finer material to form a dense, compact mass which meets the densities specified for embankment compaction.

1. For embankments used for flood control purposes and constructed using Compacted Embankment, stones or fragmentary rock larger than 4-inches in their greatest dimension shall be prohibited except where shown on the Drawings or approved in advance by the Engineer.

H. The exposed surface of Compacted Embankment shall be rolled with a flat drum roller at the end of each work day to protect from adverse weather conditions. Scarify the exposed subgrade prior to placement of any overlying lifts of soil or crushed stone aggregate.

I Lift compaction of Compacted Embankment shall be performed with an appropriately heavy, properly ballasted, penetrating-foot compactor having an operating weight of 30 tons or greater. Compaction equipment shall be subject to approval by the Engineer. If the Contractor cannot demonstrate that the compactor used will consistently and efficiently compact the lift of Compacted Embankment in accordance with these Specifications, the Contractor shall mobilize a suitable compactor or reduce the loose lift thickness.

J. Quality Control during placement of the Compacted Embankment, embankment beneath structures, backfill around structures, pipe backfill and all other embankments shall be provided by an experienced independent third party testing agency (“Quality Control Testing Agency”) selected and paid for by the Contractor and approved in advance by the Engineer. The Quality Control testing program shall be completed under the supervision of a Registered Professional Engineer. The Quality Control Testing Agency shall provide reports to the Engineer on a daily basis and shall provide complete field

and laboratory test data to the Engineer. The Owner reserves the right to hire a separate testing agency for purposes of conducting Quality Assurance testing.

K. The frequency of field compaction tests shall be determined by the Engineer. No fill or compaction work shall be performed unless the Engineer and the Quality Control Testing Agency is present on the project site and is informed of the intent to perform such work. The Contractor shall cooperate with the Engineer and the Quality Control Testing Agency when compaction or other required tests are taken and make adjustments, as requires, in the filling and compacting operations to meet the compaction specifications. If the compaction test results do not meet the specified requirements, the Contractor shall add water or dry the material, as may be necessary and continue compaction to achieve the compaction requirements, at his own expense.

L. Minimum testing frequency for Compacted Embankment used for flood control purposes shall be as follows:

1. Standard Proctor (for each soil type used):
   1 test per 5,000 cy in place

2. Hydraulic Conductivity (for each soil type used):
   1 test per 10,000 cy in place

3. Soil Classification (USCS, including gradation and Consistency Limits):
   1 test per 2,500 cy in place

4. In-Place Density Testing: the greater of the following:
   a. 1 test per 1,000 linear feet of berm per full lift,
   b. 1 test per 500 cy in place of backfill
   c. 2 tests per day of placement of backfill

3.08 BACKFILLING

A. All structures and pipes shall be backfilled with the type of materials shown on the Drawings and specified herein. Select fill shall be deposited in successive, uniform, approximately horizontal layers not exceeding 8-inches in compacted depth for the full width. Stones or fragmentary rock larger than 4-inches in their greatest dimension will not be allowed within the top 6-inches of the ground nor within 6 inches of pipes. No stone or fragmentary rock larger than 18-inches in their greatest dimension will be allowed for any portion of backfill. Compaction shall be in accordance with the requirements of Paragraph 3.09, COMPACTION.

B. Where excavation support is used, the Contractor shall take all reasonable measures to prevent loss of support beneath and adjacent to pipes and existing structures when supports are removed. If significant volumes of soil cannot be prevented from clinging to the extracted supports, the voids shall be continuously backfilled as rapidly as possible. The Contractor shall thereafter limit the depth below subgrade that supports will be installed in similar soil conditions or employ other appropriate means to prevent loss of support.

3.09 COMPACTION

A. The Contractor shall compact embankments, backfill, crushed stone, aggregate base, and in place subgrade in accordance with the requirements of this Section. The densities specified herein refer to percentages of maximum density as determined by the noted test methods. Compaction of materials on the project shall be in accordance with the following schedule:

	Density % Std. Proctor (D698)	Density % Mod. Proctor (D1557)	Max. Lift Thickness as Compacted Inches
Embankments Beneath Structures*	98	95	8
Other Embankments	95	92	8
Compacted Embankment	95	92	8
Backfill Around Structures	95	92	8
Backfill in Pipe Trenches	95	92	8
Crushed Stone Beneath Structures	**	**	12
Select Sand	--	98	8
Aggregate Base Course (ABC) Beneath Pavements and Structures	--	98	8
Crushed Stone Backfill	**	**	12
Crushed Stone Pipe Bedding	**	**	12
In place Subgrade Beneath Structures	98	95	Top 12-inches

* Embankments beneath structures shall be considered to include a zone 10 feet out from the foundation of the structure extending down to the natural ground on a 45° slope.

** The aggregate shall be compacted to a degree acceptable to the Engineer by use of a vibratory compactor and/or crawler tractor.

B. Field density tests will be made by the Contractor's Quality Control Testing Agency to determine if the specified densities have been achieved, and these tests shall be the basis for accepting or rejecting the compaction. In-place density tests will be performed in accordance with ASTM D 1556, ASTM D 2167, or ASTM D 6938. The Engineer will be the sole judge as to which test method will be the most appropriate. Failure to achieve the specified densities shall require the Contractor to re-compact the material or remove it as required. The Contractor shall, if necessary, increase his compactive effort by increasing the number of passes, using heavier or more suitable compaction equipment, or by reducing the thickness of the layers. The Contractor shall adjust the

moisture contents of the soils to bring them within the optimum range by drying them or adding water as required.

3.10 REMOVAL OF EXCESS AND UNSUITABLE MATERIALS

A. The Contractor shall remove and dispose of off-site all unsuitable materials. Within thirty (30) consecutive days after Notice to Proceed, the Contractor shall submit to the Engineer for review all required permits and a list of disposal sites for the unsuitable materials. If the disposal site is located on private property, the submittal shall also include written permission from the owner of record.

B. All unsuitable materials shall be disposed of in locations and under conditions that comply with federal, state and local laws and regulations.

C. The Contractor shall obtain an off-site disposal area prior to beginning demolition or excavation operations.

D. All excess and unsuitable materials shall be hauled in trucks of sufficient capacity and tight construction to prevent spillage. Trucks shall be covered to prevent the propagation of dust.

E. When all excess and unsuitable material disposal operations are completed, the Contractor shall leave the disposal sites in a condition acceptable to the Owner and Owner(s) of the disposal site(s).

3.11 BORROW EXCAVATION

A. Description

The work covered by this section consists of the excavation of approved material from borrow sources and the hauling and utilization of such material as required on the Drawings or directed by the Engineer. It shall also include the removing, stockpiling, and replacement of topsoil on the borrow source; the satisfactory disposition of material from the borrow source which is not suitable for use; and the satisfactory restoration of the borrow source and haul roads to an acceptable condition upon completion of the work.

Borrow excavation shall not be used before all available suitable unclassified excavation has been used for backfill and incorporated into the embankments.

B. Coordination with Seeding Operations

The Contractor shall coordinate the work covered by this section with the construction of embankments so that the requirements of Section 02276 and 02910 are met.

C. Materials

All material shall meet the requirements of Division 2 shown below:

Borrow Material ..... Section 02200, Subsection 2.01 - Select Fill

D. Construction Methods

1. General

The surface of the borrow area shall be thoroughly cleared and grubbed and cleaned of all unsuitable material including all organics, topsoil, etc., before beginning the excavation. Disposal of material resulting from clearing and grubbing shall be in accordance with Section 02100.

Each borrow operation shall not be allowed to accumulate exposed, erodible slope area in excess of 1 acre at any one given time without the Contractor's beginning permanent seeding and mulching of the borrow source or other erosion control measures as may be approved by the Engineer.

The topsoil shall be removed and stockpiled at locations that will not interfere with the borrow operations and that meet the approval of the Engineer. Temporary erosion control measures shall be installed as may be necessary to prevent the erosion of the stockpile material. Once all borrow has been removed from the source or portion thereof, the stockpiled topsoil shall be spread uniformly over the source.

Where it is necessary to haul borrow material over existing roads, the Contractor shall use all necessary precautions to prevent damage to the existing roads. The Contractor shall also conduct his hauling operations in such a manner as to not interfere with the normal flow of traffic and shall keep the traffic lanes free from spillage at all times.

2. Owner Furnished Sources

Where borrow sources are furnished by the Owner the location of such sources will be as designated on the Drawings or as directed by the Engineer.

The Owner will furnish the necessary haul road right-of-way at locations designated by the Engineer. All haul roads required shall be built, maintained, and when directed by the Engineer, obliterated, at no cost to the Owner. Where the haul road is to be reclaimed for cultivation the Contractor shall plow or scarify the area to a minimum depth of 8 inches.

The borrow sources shall be left in a neat and presentable condition after use. All slopes shall be smoothed, rounded, and constructed not steeper than 3:1. Where the source is to be reclaimed for cultivation the source shall be plowed or scarified to a minimum depth of 8 inches, disc harrowed, and terraces constructed. The source shall be graded to drain such that no water will collect or stand and a functioning drainage system shall be provided.

All sources shall be seeded and mulched in accordance with Section 02910.

3. Contractor Furnished Sources

Prior to the approval of any off-site borrow source(s) developed for use on this

project, the Contractor shall obtain certification from the State Historic Preservation Officer of the State Department of Cultural Resources certifying that the removal of the borrow material from the borrow source(s) will have no effect on any known district, site building, structure, or object that is included or eligible for inclusion in the National Register of Historic Places. A copy of this certification shall be furnished to the Engineer prior to performing any work on the proposed borrow source.

The approval of borrow sources furnished by the Contractor shall be subject to the following conditions:

a. The Contractor shall be responsible for acquiring the right to take the material and any rights of access that may be necessary; for locating and developing the source; and any clearing and grubbing and drainage ditches necessary.

   Such right shall be in writing and shall include an agreement with the Owner that the borrow source may be dressed, shaped, seeded, mulched, and drained as required by these Specifications after all borrow has been removed.

b. Except where borrow is to be obtained from a commercial source, the Contractor and the property owner shall jointly submit a borrow source development, use, and reclamation plan to the Engineer for his approval prior to engaging in any land disturbing activity on the proposed source other than material sampling that may be necessary. The Contractor's plan shall address the following:

   1) Drainage

      The source shall be graded to drain such that no water will collect or stand and a functioning drainage system shall be provided. If drainage is not practical, and the source is to serve as a pond, the minimum average depth below the water table shall be 4 feet or the source graded so as to create wetlands as appropriate.

   2) Slopes

      The source shall be dressed and shaped in a continuous manner to contours which are comparable to and blend in with the adjacent topography, but in no case will slopes steeper than 3:1 be permitted.

   3) Erosion Control

      The plan shall address the temporary and permanent measures that the Contractor intends to employ during use of the source and as a part of the reclamation. The Contractor's plan shall provide for the use of staged permanent seeding and mulching on a continual basis while the source is in use and the immediate total

reclamation of the source when no longer needed.

4) Maintenance

During construction and until final acceptance the Contractor shall use any methods approved by the Engineer which are necessary to maintain the work covered by this section so that the work will not contribute to excessive soil erosion.

3.12 EARTHWORK TOLERANCES

A. Roadways

The Contractor shall take the necessary steps to prevent the loss of material from the roadway due to the actions of wind or water. During construction of the roadway, the road bed shall be maintained in such condition that it will be well drained at all times.

The excavated surface shall be less than 0.08 feet above or below the grades specified after deducting for the roadway pavement thickness, if any.

Vertical alignment tolerances permitted on the roadway surfaces shall not exceed plus or minus 0.20 feet from the vertical alignment specified, with the provision that, within the tolerance range, local surface irregularities shall not exceed 0.15 feet as measured by the gap between the roadway surface and a 10-foot straightedge placed on any flat graded surface. On vertical curves the same standards will apply except that an additional gap allowance will be made for the road surface curvature over the 10-foot length of the straightedge.

Horizontal alignment tolerances permitted shall not exceed plus or minus 1 foot, providing the departure is relatively uniform over any specific length of the roadway.

B. Earthwork

Earthwork shall be constructed to the lines and grades as shown on the Contract Drawings. Maximum allowable deviation from the lines and grades, as shown on the Contract Drawings are shown in the following table.

Allowable Deviation from the Lines and Grades

1.	Horizontal Geometry, Location	± 1.0 ft
2.	Embankment Surface Elevation	± 0.10 ft
3.	Embankment Side Slope, when expressed in percent (vertical/horizontal x 100)	± 0.5%
4.	Theoretical Area of Swale	± 2.0%

C. The Contractor shall be responsible for verifying lines and grades by surveying methods by a Registered Professional Surveyor. Survey data shall be provided to the Engineer for review and approval.

D. The Engineer may verify lines, grades and thickness of key components of construction. A combination of direct measurement, excavation and measurement and survey methods will be employed by the Engineer for Quality Assurance purposes. The Contractor shall cooperate with the Engineer and his representatives during quality assurance measurements and shall add or remove soil as required to meet earthwork tolerances presented above. CQA measurements conducted by the Engineer shall not replace the As-Built Surveys that are the responsibility of the Contractor.

3.13 AS-BUILT DOCUMENTATION

A. The Contractor shall employ the services of a Registered Professional Surveyor in the State of Tennessee to prepare As-Built Drawings for all earthwork (including undercuts and variations from the Drawings),permanent stormwater and sediment and erosion control structures, piping (including type, diameter, length and inverts), utilities, tree lines and roadways. All areas of the Work shall be included in the As Built Drawings and shall be in accordance with the requirements of Section 01300 of these Specifications.

B. The As Built Drawings shall be provided on signed and sealed drawings as well as digitally and tied into grid coordinates and benchmarks provided to the Contractor by the Owner. The Overall Plan Drawing shall be provided in a separate AutoDesk drawing file (.dwg) including all planimetric data and generated contours. The Surface Point Database shall be in comma or tab delimited in PNEZD format (Point Number, Northing, Easting, Elevation, and Description). The file format may vary from .txt, .xls, or .csv. The Surface Model may be provided in one of four (4) formats:

1. LandXML file containing surface model of ground shots and surveyor placed breaklines. This file should be exported from AutoDesk's Land Development Desktop or Civil 3D, Bentley's GEOPAK or PowerCivil, Trimble's Terramodel, or other survey/civil software package.

2. AutoDesk's Land Development Desktop drawing file (.dwg) and database containing data as described above.

3. DEM file (.dem) containing data as described above.

4. TIN file (.tin) containing data as described above.

- END OF SECTION -

SECTION 02202

EXCAVATION BY BLASTING

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish all labor, equipment and materials required to drill, blast, loosen, excavate, and dispose material to complete the work shown on the Drawings and specified herein.

B. The work shall include, but not be limited to:

1. Blast round design.

2. Planning and execution of appropriate site-specific safety measures to be employed during all blasting operations, and the safe handling and storage of high explosives and blasting agents.

3. Drilling blast holes, loading blast holes with explosives, and wiring and safe detonation of blast rounds.

4. Removal from the site of all excess excavated soil, debris, and rock as indicated in the contract Documents, or as directed by the Engineer, and disposal of excess materials at a permitted disposal site.

5. Dewatering and maintenance of groundwater and surface water in all excavations.

6. Performance of all surveys necessary to establish and verify the lines and grades, and to determine the amount of material removed.

7. Implementation of monitoring program to monitor condition of existing structures and utilities in vicinity of proposed blasting operations to insure existing features remain undamaged by blasting procedures.

C. All excavations shall be in conformity with the lines, grades, and cross sections shown on the Drawings or established by the Engineer.

D. It is the intent of this Specification that the Contractor conduct the construction activities in such a manner that erosion of disturbed areas and off-site sedimentation be absolutely minimized, both at the excavation site and at the disposal site, as well as along any haul routes used.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02100 – Clearing, Grubbing, and Site Preparation

B. Section 02140 – Dewatering

C. Section 02200 – Earthwork

D. Section 02276 – Erosion and Sedimentation Control

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Tennessee Occupational Safety and Health Standards in Construction for Blasting & Use of Explosives.

1.04 SUBSURFACE CONDITIONS

A. Reference is made to Section 01010 – Summary of Work of the Specifications for the identification of those surveys and investigation reports of subsurface or latent physical conditions at the site or otherwise affecting performance of the work which have been relied upon by Engineer in preparing the Drawings and Specifications.

B. Attention is directed to the fact that there may be other water pipes, storm drains, sewer lines, electric conduits, and other utilities located in the area of the proposed excavation. Contractor shall perform all repairs to same in the event that excavation activities should disrupt service.

1.05 SUBMITTALS

A. In accordance with the procedures and requirements set forth in Section 01300 - Submittals, the Contractor shall submit the following at least 30 working days prior to beginning any blasting operations:

1. Names, addresses, telephone numbers, and qualifications of the blasting subcontractor(s) and explosives supplier(s) that will be used, including the designated Blaster-In-Charge.

2. Copies of Training Certificates for the designated Blaster-In-Charge, blasting foreman and any other key personnel that will be responsible for the work, showing that they have received specialized training in the proper handling of explosives.

3. A Blasting Plan, indicating the methods, materials and equipment to be used. The Blasting Plan should indicate the types of explosives to be used, drilling patterns, and a general layout and schedule for executing the work in accordance with state regulations.

4. A ground vibration and air blast monitoring plan, indicating structures that will be monitored, monitoring equipment that will be used, and personnel that will perform the monitoring.

B. At least 24 hours before each blast round, Contractor shall submit a detailed blast round design plan to the Engineer's on-site representative. The blasting plan submitted is for quality control and record keeping purposes. Review by the Engineer shall not relieve the Contractor of his responsibilities as provided herein. The blast round design submittals shall include:

1. Location (state, grid coordinates) and limits of the shot.

2. Number, diameter, and depth of blast holes to be detonated in the round, and a plan showing the drill hole pattern, spacing and distance to the free face.

3. Depth of overburden.

4. Total weight of explosives in the round and the types of explosives to be used.

5. Loading diagram showing the location of explosives, primers, and initiators; and location, depth, and type of stemming to be used in each hole.

6. Initiation sequence, including delay timer and delay system, total weight of explosive to be detonated on each delay, and a list of the timing of the delays.

7. Manufacturer's data sheet for all explosives, primers, and initiators to be used.

8. Planned seismic monitoring positions, distances from the blast round, and seismograph types to be used to monitor vibrations and air blast overpressures.

9. Type and amount of blasting mats and/or depth of soil cover to be used over the top surface of the shot.

10. Any other information required by applicable state and federal regulations.

C. Within 24 hours after each blast round, Contractor shall submit a blasting report to the Engineer. The blasting report shall include:

1. Date and time of shot.

2. Foreman's name.

3. Number and depth of holes detonated.

4. Weather conditions at the time of detonation.

5. Type of explosives and detonators used.

6. Peak particle velocity of ground motion and primary frequency for all ground vibration monitoring stations.

7. Peak air blast overpressure measured.

8. Distance from the blast round to each monitoring station for vibrations and air blast.

9. Amount of explosive used in each hole, and maximum weight of explosive detonated on any single delay in the blast round.

1.06 USE OF EXPLOSIVES

A. When the use of explosives is necessary for the prosecution of the work, the Contractor shall exercise the utmost care not to endanger life or property. The Contractor shall be

responsible for any and all damage or injury to persons or property resulting from the use of explosives.

B. All explosives shall be stored in a secure manner, in compliance with all laws, and all such storage places shall be marked clearly "DANGEROUS EXPLOSIVES".

C. The Contractor shall notify any public utility company having facilities in close proximity to the site of the work of his intention to use explosives. This notice shall be given sufficiently in advance to enable the utility companies to take whatever steps they may consider necessary to protect their property from injury. The Contractor shall also give the Engineer, all occupants of adjacent property, and all other Contractors working in or near the Project, notice of his intention to use explosives.

PART 2 -- PRODUCTS

2.01 MATERIAL REQUIRING EXCAVATION BY BLASTING

A. Any material occupying an original volume of at least one cubic yard which cannot be excavated with a single-tooth ripper drawn by a crawler tractor having draw bar pull rated at not less than 60,000 pounds at a velocity of 1.0 mph (Caterpillar D8N or equivalent).

2.02 INITIATORS

A. Contractor is advised of the possible presence of high-voltage electric power lines and radio towers at the project site. Only non-electric type initiators may be used.

PART 3 -- EXECUTION

3.01 BLASTING OPERATIONS

A. Explosives shall be of such quantity and power and shall be used in such locations as will neither open seams nor otherwise disturb the material outside the prescribed limits of excavation. As the excavation approaches its final limits, the depth of holes for blasting and the amount of explosives used for each hole shall be reduced so that the underlying or adjacent rock will not be disturbed or shattered.

B. BLASTING SHALL NOT BE PERFORMED WITHIN 100 FEET OF NEWLY PLACED CONCRETE THAT HAS CURED LESS THAN 7 DAYS. NO BLASTING SHALL BE PERMITTED WITHIN 50 FEET OF ANY EXISTING STRUCTURE OR ANY NEW STRUCTURE IN PROGRESS. BLASTING SHALL NOT BE PERMITTED WITHIN 50 FEET OF A STREAM.

3.02 BLAST MONITORING

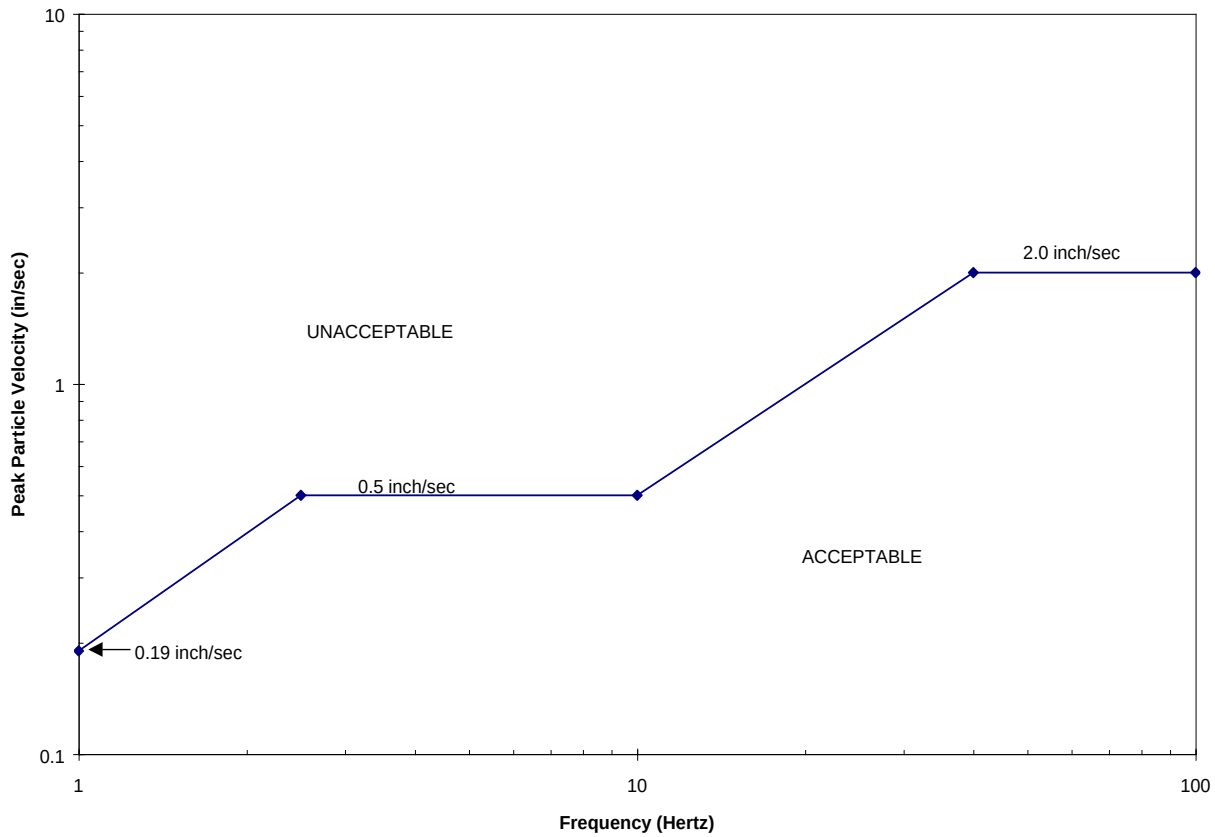
A A pre-construction condition inspection and documentation of adjacent structures on-site and off-site shall be performed by the Contractor. The Contractor shall exercise the utmost care not to damage property on-site and off-site. The Contractor shall notify each adjoining property owner within 5000 feet of the site of the anticipated ground vibrations and noise which will occur due to his blasting operations. This notice shall be given 30 days in

advance to enable the adjacent property owners to take whatever precautions they may consider necessary. The Contractor shall limit his operations to minimize any disturbance to the adjacent property owners. Motorists on adjacent roadways shall be notified in accordance with state regulations. The Contractor shall be responsible for any damage to any structure or utility line, pipes, etc., on-site and off-site as a result of his operations.

B. For each blast round, Contractor shall monitor and record noise and air blast overpressures at the site perimeter nearest the blast location and at the on-site or off-site structure located nearest to the round. Peak air blast overpressure shall not exceed 0.018 psi, measured at the site perimeter.

C. The site of every blast round shall be sufficiently covered with blasting mats or other devices to prevent any flying debris. The number and type of blasting mats must be satisfactory to the Engineer. The Contractor will be fully responsible for any damage caused by flying debris, both to on-site and off-site properties.

D. Whenever blasting is to be performed, the Contractor shall measure the peak particle velocities of ground vibration resulting from each blast in a minimum of three (3) mutually perpendicular directions at a point. When blasting is to be performed within 500 feet of any existing structure, additional individual monitoring shall occur on the near side of every structure located within 500 feet of the blasting location regardless of the number of structures in lieu of the three (3) perpendicular monitors. Vibrations shall be monitored utilizing a seismograph capable of providing a record of particle velocity and frequency along three mutually perpendicular axes utilizing internal calibration. Measured peak particle velocity of ground motion at the monitored structure shall not exceed the values shown in the following graph:



- END OF SECTION –

SECTION 02207

AGGREGATE MATERIALS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all labor, equipment and materials required to complete all work associated with the installation of aggregate material beneath foundations, as backfill and as roadway subgrades and other related and incidental work as required to complete the work shown on the Drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01090 - Reference Standards

B. Section 02200 - Earthwork

C. Section 02276 - Erosion and Sedimentation Control

D. Section 02510 - Paving and Surfacing

E. Section 02910 - Final Grading and Landscaping

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the Specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. Tennessee Department of Transportation (TDOT) Standard Specifications for Roads and Bridge Construction

2. ASTM C 127 Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.

3. ASTM C 136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

4. ASTM C 535 Standard Test Method for Resistance to Degradation of Large Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Materials gradation and certification.

2. ASTM C127, ASTM C136, and ASTM C535 test results

PART 2 -- PRODUCTS

2.01 CRUSHED STONE, SCREENED GRAVEL and AGGREGATE BASE COURSE (ABC)

A. Crushed stone or screened gravel shall meet the requirements of Aggregate Standard Size No. 57 or No. 67 as defined by TDOT Standard Specifications.

B. ABC shall meet the requirements of ABC as defined by TDOT Standard Specifications.

2.02 SELECT SAND

A. Select sand shall meet the requirements of Sections 903.01 of TDOT Standard Specifications for Road and Bridge Construction.

2.03 SHOTROCK FILL

A. Shotrock fill shall be well graded with a maximum rock size of 18 inches and shall be placed in lifts not to exceed 24 inches in thickness. Shotrock fill shall have adequate sizes and fines to effectively “choke” the larger rock pieces, filling all voids and open spaces. The larger rock pieces should lie flat and not overlap each other. Shotrock fill should be compacted using a minimum of 6 to 8 complete passes of a D-8 class crawler or other approved method. A pass is defined as a complete coverage of the surface with the D-8 track overlapping 50 percent. Half of the passes shall be in each perpendicular direction. Shotrock fill compaction should be based on proof rolls with loaded rubber tired dump trucks. Shotrock fill placement shall be performed under the observation of the Engineer.

B. Shotrock fill shall be placed to the horizontal and vertical limits shown on the Drawings as a minimum.

PART 3 -- EXECUTION

3.01 CRUSHED STONE, SCREENED GRAVEL AND AGGREGATE BASE COURSE (ABC)

A. Contractor shall install crushed stone, screened gravel and ABC in accordance with the TDOT Standard Specifications and as shown on the Drawings and indicated in the Contract Documents.

1. Unless otherwise stated herein or shown on the Drawings, all mat foundations (bottom slabs) for the proposed structures shall have a blanket of crushed stone or ABC 6-inches thick minimum placed directly beneath the proposed mat. The blanket shall extend a minimum of 12 inches beyond the extremities of the mat.

2. For subgrade preparation at structures and structural fill, the foundation material shall be ABC where specifically specified on Drawings, otherwise, crushed stone or screened gravel shall be used.

3. For ground under drains, pipe bedding, and drainage layers beneath structures the coarse aggregate shall meet the requirements of aggregate standard Size No. 57 or No. 67, as defined by TDOT Standard Specifications.

3.02 SELECT SAND

A. Contractor shall install select sand in accordance with the TDOT Standard Specifications and as shown on the Drawings and indicated in the Contract Documents.

- END OF SECTION –

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SECTION 02214

FLOWABLE FILL

PART 1 – GENERAL

1.01 WORK INCLUDED

A. The Contractor shall furnish all labor, equipment, materials and services, including pumping equipment and application, necessary for the manufacture, transportation and placement of all cementitious flowable fill as shown on the Contract Drawings or as ordered by the Engineer, except for the work specifically included under other items.

1.02 RELATED WORK

A. Division 3 - Concrete

1.03 SUBMISSIONS

A. In accordance with the procedures and requirements set forth in the General Conditions and Division 1, the Contractor shall submit the following:

1. Shop Drawings
2. Certifications of specification compliance for all sources of each material
3. Manufacturer's data on all admixtures
4. Mix design and trial mix test results
5. Aggregate gradation

1.04 QUALITY CONTROL

A. The Contractor shall engage the services of a testing laboratory, with the qualifications required by Section 03300 - Cast-In-Place Concrete, and experienced in the design and testing of flowable fill materials and mixes, to perform material evaluation tests and to design mixes for flowable fill. A trial mix shall be performed to verify the flowable fill mix design. The trial mix shall also report slump, air content, yield, cement content, and dry unit weight per ASTM C143 and ASTM D6023.

PART 2 – MATERIALS

2.01 CEMENTITIOUS FLOWABLE FILL

A. Flowable fill (controlled low strength material) shall be a uniform mixture of sand, Type II Portland cement, fly ash, admixtures and water. The mix design shall produce a flowable material with little or no bleed water, which produces a minimum compressive strength of 50 psi and maximum compressive strength of 100 psi at 56 days. The cured material shall be excavatable and have a maximum dry weight of 100 pounds per cubic foot. Slump of mix at the point of application shall be 7-inches to 10-inches.

B. Admixtures specifically designed for flowable fill shall be used to improve flowability, reduce unit weight, control strength development, reduce settlement and reduce bleed water. Admixtures shall be MasterCell 25 (formally Rheocell-Rheofill) by BASF Construction Chemicals; Darafill by Grace Construction Products; or approved equal. Cement and all other materials shall be as specified in Section 03300 - Cast-In-Place Concrete.

C. Fine Aggregate (Sand) shall consist of natural or manufactured siliceous sand, clean and free from deleterious substances, and graded within the following limits:

Sieve Size	Percent Passing by Weight
3/8"	100
No. 4	95 to 100
No. 8	80 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30
No. 100*	2 to 10

*For manufactured sand, the percent passing the No. 100 Sieve may be increased up to 20%.

PART 3 – EXECUTION

3.01 PLACEMENT OF FLOWABLE FILL

A. Flowable fill shall be batched and premixed by an approved producer, dispensed from ready-mix trucks, and placed by approved methods and equipment.

B. Flowable fill shall be placed so as to completely fill the space to receive it with no trapped air pockets or other voids. Positive means of allowing the air to escape shall be provided where necessary and after approval of the Engineer. Where placed against, around and inside existing structures, lift heights shall be limited so as not to overload the structure. The Engineer shall approve lift heights and procedures. Specific procedures and methods shall be included in the Contractor's shop drawing submittals.

C. Where flowable fill is placed around piping and other elements subject to floating within the fill space, positive means shall be taken to provide temporary balancing loads to prevent uplift, or fill lift heights shall be limited to prevent uplift.

D. Application of loads or placement of other fill materials or concrete on top of flowable fill shall not occur until the flowable fill surface is determined to be suitable for loading per ASTM D6024 subject to the approval of the Engineer.

- END OF SECTION -

SECTION 02220

CASING INSTALLATION

PART 1: GENERAL

1.01 SCOPE OF WORK

The work under this section consists of providing all labor, materials, tools, equipment, and services required to perform all casing installation and related work as indicated on the Drawings and as specified within this section and related sections of the Specifications. Contractor shall furnish and install all products.

1.02 GENERAL REQUIREMENTS

A. The installation of casing pipe shall conform to these Specifications and any Federal, State or local Highway requirements or applicable Railroad requirements whichever may be more restrictive.

B. Contractor shall perform any general excavation and boring required prior to placing casing pipe. Material resulting from boring shall be disposed of off-site by the Contractor in a suitable`` manner. Contractor shall provide all necessary access including access ladders, ramps, etc. to bore and receiving pits in compliance with all applicable safety requirements prior to the commencement of the boring and jacking operations.

C. Contractor shall furnish the names and experience records of all Subcontractors proposed for this Work. The Contractor or Subcontractor performing the boring and jacking construction shall have a minimum of three (3) years' experience in boring and jacking casing pipe on similar projects of similar pipe diameters.

A. Highway crossings shall comply with standards set forth in the TDOT policies and procedures, Standard Specifications For Road And Bridge Construction (latest revision), and the "Standard Specifications for Highway Bridges" from AASHTO (latest revision).

B. Railway crossings shall comply with standards set forth under "Standard Specifications for Pipelines Conveying Non-Flammable Substances" in the *Manual of Railway Engineering* from the American Railway Engineering and Maintenance-of-Way Association,

C. The materials covered by these Specifications are intended to be standard materials of proven reliability and as manufactured by reputable manufacturers having experience in the production of such materials. The materials furnished shall be designed, constructed, and installed in accordance with the best practices and methods.

1.03 SUBMITTALS

Contractor shall submit Shop Drawings, manufacturer's literature and product data, installation instructions, certifications, and other required submittals for all products furnished under this section in accordance with Section 01300, including the following:

A. Casing pipe Shop Drawings and material data from casing pipe manufacturer.

B. Bore pit excavation details including footprint drawing of bore pit, design and calculations for any sheeting or shoring utilized signed and sealed by a professional engineer registered in the State of Tennessee.

C. Construction sequence plan including drilling, casing, and grouting placement procedures.

D. Casing spacer manufacturer's data and Shop Drawings.

E. Casing end seal manufacturer's data and Shop Drawings.

F. Casing field weld procedure details to be used, which shall be in accordance with AWWA C206 Sec. 4.6.

G. Experience qualifications of Contractor or Subcontractor.

H. Results of welder qualification testing conducted by an independent testing agency in accordance with American Welding Society D1.1 requirements. Results of previous qualification tests performed within six months from the date of pipe installation will be acceptable. Results from qualification tests performed prior to six months from the date of pipe installation will not be acceptable.

1.04 RELATED WORK

A. Section 01010 Summary of Work

B. Section 01025 Measurement and Payment

C. Section 01300 Submittals

D. Section 01600 Materials and Equipment

E. Section 02140 Dewatering

F. Section 02100 Clearing and Grubbing

G. Section 02276 Erosion and Sedimentation Control

H. Section 02510 Paving and Surfacing

I. Section 02910 Final Grading and Landscaping

J. Section 03300 Cast-in-Place Concrete

K. Section 15000 Piping – Basic Mechanical Requirements

L. Section 15105 Ductile Iron Pipe

1.05 REFERENCE

Unless otherwise indicated, all references herein to other standards (e.g. AWWA, ASTM, ASME, ANSI etc.) shall mean the most current available revision. The following referenced documents are a part of this section. Comply with all applicable provisions and recommendations of the following documents, except as otherwise specified herein. Where a referenced document contains references to other standards, those other standards are included as references under this section as if referenced directly. In the event of a conflict between the requirements of this section and those of the referenced documents, the requirements of this section shall prevail.

A. ASTM A53 – Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

B. ASTM A139 – Electro-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over)

C. AWWA C200 – Steel Water Pipe, 6 In. and Larger

D. AWWA C206 – Field Welding of Steel Water Pipe

E. AWWA C600 – AWWA Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances

F. AASHTO "Standard Specifications for Highway Bridges"

G. INDOT policies and procedures

H. *Manual of Railway Engineering*, The American Railway Engineering and Maintenance-of-Way Association

PART 2: PRODUCTS

2.01 CASING PIPE

A. The casing pipe shall be smooth wall, longitudinally-rolled or spiral welded steel pipe. Smooth wall steel plates with a nominal diameter of over 72 inches shall not be permitted. Casing pipe shall be leak-proof construction and be capable of withstanding highway or railroad loadings where applicable. Casing pipe shall be steel pipe in sizes 8-inches nominal and larger manufactured from steel having a minimum yield stress strength of 35,000 psi.

B. The steel casing pipe diameter and wall thickness shall be as indicated in the table below or as indicated on the Drawings, whichever is larger. All casing thicknesses are for uncoated casings. The inside diameter of the casing pipe shall be at least four (4) inches greater than the outside diameter of the carrier

pipe joints or couplings for carrier pipe less than six (6) inches in diameter and at least six (6) inches greater than the outside diameter of the carrier pipe joints or couplings for carrier pipe six (6) inches and greater in diameter. Contractor shall ensure that casing pipe size is large enough to comply with these requirements and to afford easy removal of the carrier pipe without disturbing the casing pipe or roadbed. Consideration shall be given to the specific pipe product, joint types, joint restraints, and casing spacers to be used. If larger casing pipe size than indicated in the following table is necessary, Contractor shall provide the larger casing pipe at no additional cost to the Owner.

Casing Outside Diameter (inches)	Carrier Pipe Nominal Sizes Allowed (inches)	Casing Wall Thickness (inches)	
		Highway Crossings	Railroad Crossings
<10	<=2	0.188	0.188
10	<=2	0.188	0.250
12	<=3	0.188	0.250
14	<=3	0.188	0.250
16	<=4	0.219	0.281
18	<=6	0.250	0.312
20	<=8	0.281	0.344
22	<=10	0.281	0.344
24	<=12	0.312	0.375
30	<=16	0.406	0.469
36	<=20	0.469	0.532
42	<=24	0.562	0.625
48	<=30	0.625	0.688
54	<=36	0.719	0.781
60	<=42	0.781	0.844
66	<=48	0.875	0.938
72	<=54	0.938	1.000

C. The casing pipe shall conform to AWWA C200 and ASTM A139, Grade B (without hydro-test) or ASTM A53, Grade B (without hydro-test).

2.02 SPLIT CASINGS

In locations where a casing is required to be installed around an existing water main, the Contractor shall install one of the following casing types:

A. Steel casing pipe as specified above, which is cut into two equal halves longitudinally (along the length of the pipe) by the supplier prior to shipment to the project site. The two halves shall be assembled over the existing water main, with casing spacers already installed; and the casing pipe shall be welded along the seam as specified herein. Only stainless steel casing spacers shall be used

when this type of split casing is used (since plastic coatings could be damaged by welding of casing).

B. Split steel casings with weldable split sleeve and weld protection liner, to protect the carrier pipe and casing spacers, as manufactured by Westatlantic Tech Corp. Except when flanged gasketed maintenance pipe casing is used, all split casings installed on carrier pipes made of PVC, HDPE, fiberglass and other materials potentially subject to damage from welding shall be split steel casings with weld protection liners unless otherwise approved by the Engineer.

C. In cases where required by the Drawings or otherwise approved by the Engineer, water tight split casings shall be flanged gasketed galvanized steel maintenance pipe with EPDM or NBR seals and bolted, flanged fasting joints. End seals shall be supplied by the casing manufacturer and shall be water tight unless otherwise indicated on the Drawings. Flanged gasketed maintenance pipe shall be as manufactured by Westatlantic Tech Corp. CARRIER PIPE

The carrier pipe shall be ductile iron restrained joint pipe as specified in Section 15105, unless otherwise indicated in Section 01011 or shown on the Drawings.

2.03 GROUT

A. Grout shall be composed of Portland Cement and sand, consisting of one part Portland Cement to three parts sand. Sand shall conform to the requirements of ASTM C144. Water amount shall be the minimum amount necessary to achieve desired consistency without compromising strength requirements. The minimum compressive strength at 28 days shall be 4000 psi.

B. For annular spaces wider than 1-1/2 inch and/or where free passage of grout will not be obstructed by coarse aggregate, 1-1/2 parts of coarse aggregate having a top size of 3/8 inch should be added.

C. Contractor or boring Subcontractor may use admixture approved by the Engineer to allow workability of grout at his option and at no additional cost to the Owner.

2.04 CASING SPACERS

A. Casing spacers shall be sized according to the manufacturer's specifications for pipe sizes from the following list of approved manufacturers and casing types:

1. Cascade Water Works Manufacturing Company (Stainless Steel only).
2. Pipeline Seal and Insulator, Inc. (Carbon Steel with polyvinyl chloride or the Ranger II model).
3. Advanced Products and Systems, Inc. (Model SI).
4. Power Seal Pipeline Products Corp. (Model 4810).
5. RACI (polyethylene model F-60 for 12-inch carrier pipe and smaller). RACI shall not be used for carrier pipe larger than 12-inch.

B. At the sole discretion of the Engineer, alternate manufactures in lieu of those described above and new or improved products by the same manufactures may be permitted. To seek approval, adequately describe any proposed alternate product and submit the same with Shop Drawings and specifications to the Engineer. The Contractor shall not proceed to employ said alternate products prior to receiving written approval of from the Engineer.

C. Timber skids are not allowed.

2.05 CASING END SEALS

A. End seals shall consist of pull-over type rubber seals that are designed to be installed after pipe installation by wrapping the seal around the pipes and securing the overlapping seam with pressure-sensitive butyl mastic (or other approved adhesive) to seal the seam.

B. End seals shall be at least 1/8-inch thick EPDM or Neoprene rubber.

C. End seals shall be attached to the casing and carrier pipe with Type 304 or 316 stainless steel bands, at least ½-inch wide, with entirely non-magnetic worm gear mechanism.

D. End seals and bands shall be properly sized for the casing and carrier pipe with the manufacturer's recommended seam overlap.

E. Acceptable Manufacturers:

1. Cascade Waterworks Manufacturing Model CCES
2. Advance Products Systems Model AW

PART 3: EXECUTION

3.01 EXCAVATION

Excavation, backfilling and compaction for jacking and receiving pits and for open cut installation shall conform to the requirements set forth in Section 02210.

3.02 ALIGNMENT AND GRADE

Locate pipelines to cross roadways or tracks at approximately right angles where practicable, but preferably at not less than 45 degrees. Do not place pipelines in culverts or under bridges where there is a likelihood of their restricting the area required for the purposes for which the bridges or culverts were built, or of endangering the foundations. Install the casing pipe on an even grade for its entire length and sloped to one end or as noted in a profile plan if provided. Satisfy a maximum tolerance of 1.5% (18" in one hundred feet) with the desired location of the

casing or as otherwise required by regulation or specified on the Drawings, whichever is more restrictive.

3.03 WELDING

A. Connect steel casing sections by full-circumference metal arc-welding. All joints shall be butt welded with a full depth, single "V" groove weld. Welding shall conform to AWWA Standard C206.

B. Welding shall be performed by certified welders. The Contractor shall be responsible for the qualification of welders with qualification testing conducted by an independent testing agency in accordance with American Welding Society D1.1 requirements. All costs associated with qualification testing shall be included in the unit prices bid.

3.04 DEPTH OF INSTALLATION

Unless the depth of casing pipe is specifically specified on the Drawings, the casing pipe depth shall be in accordance with highway or railroad requirements.

3.05 INSTALLATION OF CASING

Refer to contract drawings for typical casing installation detail.

Install casing pipes by one of the following methods:

A. Jacking:

This method shall be in accordance with the current American Railway Engineering and Maintenance-of-Way Association Specifications, Chapter 1, Part 4, Section 15, "Earth Boring and Jacking Culvert Pipe through Fills", except that steel pipe shall be used with welded joints. Conduct this operation without hand mining ahead of the pipe and without the use of any type of boring, auguring or drilling equipment.

Design the bracing, backstops, and jacks so that the jacking can progress without stoppage (except for adding lengths of pipe).

B. Drilling:

This method employs the use of an oil field type rock roller bit, or a plate bit made up of individual roller cutter units, welded to the pipe casing being installed. Turn the pipe for its entire length from the drilling machine to the head to give the bit the necessary cutting action against the ground being drilled. Inject high density slurry (oil field drilling mud) through a supply line to the head to act as a cutter lubricant. Inject this slurry at the rear of the cutter units to prevent any jetting action ahead of the pipe. Advance the drilling machine on a set of steel rails (thus advancing the pipe) by a set of hydraulic jacks. The method can be used to drill earth or rock.

If required, casing installation may be accomplished by the directional drill method with the following criteria: The drilling operation shall not result in a boring hole larger than 24” in diameter.

C. Boring:

This method consists of pushing the pipe into the fill with a boring auger rotating within the pipe to remove the soil. When augers or similar devices are used for pipe placement, the front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger and cutting head from leading the pipe so that there will be no unsupported excavation ahead of the pipe. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. The over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than one-half inch. The face of the cutting head shall be arranged to provide reasonable obstruction to the free flow of soft or poor material.

If an obstruction is encountered during installation that stops the forward action of the pipe, and if it becomes evident that it is impossible to advance the pipe, operations will cease and the pipe shall be abandoned in place and filled completely with grout.

If voids are encountered or occur outside the casing pipe, grout holes shall be installed in the top section of the casing pipe at 4 foot (maximum) centers and the voids filled with grout with sufficient water added to produce a flowable mixture and at sufficient pressure to prevent settlement. The Contractor shall be prepared to bore through weathered or partially weathered rock, if encountered, with a specialized bit or hand-mine. Costs associated with this provision shall be deemed as included in the Unit Price Bid for each location and no additional payment will be made. Grout holes shall only be used in casings where it is feasible. Grout around outside of casing pipe when bore hole diameter is great than outside diameter of casing pipe by more than 1 inch.

In the event an obstruction is encountered during the boring and jacking operation, and the casing pipe is at least 30-inches in diameter, the auger shall be withdrawn and the obstruction removed. If a boulder is encountered and is removed by blasting or other approved method, the void shall be filled with grout, as previously specified. No blasting shall be permitted until a detailed blasting plan is submitted to and approved by the TDOT, and the Engineer. No blasting shall be permitted within railroad right of way.

The recommended methods and details shown on the Drawings and specified herein, are intended to indicate the minimum acceptable standard of quality required for the casing/tunnel installation. Other methods of installation, based on acceptable industry standards and techniques, may be acceptable for the installation. Under no conditions shall jetting or wet boring of the casing/tunnel be allowed.

Prior to the beginning of any casing/tunnel excavation, a surface settlement monitoring grid system shall be installed on the highway/railroad. This grid shall consist of PK nails installed along the tunnel centerline at ten foot intervals. Additional lines of PK nails shall be installed ten feet each side of the centerline.

These points shall be initially read and the elevations recorded prior to the start of the casing/tunnel construction. If no visible settlement is occurring during casing/tunnel excavations, these points shall be read only at such times as the Contractor's surveyor is present to transfer the line and grade into the casing/tunnel. These points shall be checked and elevations recorded on a daily basis, until the casing/tunnel installation is completed. Elevations of casing and pavement or railroad tracks shall be referenced to the nearest benchmark elevation and recorded on the record drawings.

3.06 CARRIER PIPE INSTALLATION

The carrier pipe and casing shall be separated by casing spacers. The spacing of casing spacers shall be in accordance with the manufacturer's recommendation to support the weight of the pipe and contents. As a minimum, a casing spacer shall be placed within a maximum of 3 feet on each side of a joint and evenly spaced along the carrier pipe with 3 casing spacers per each length of carrier pipe—or more frequently if recommended by the casing spacer manufacturer. Maximum distance between casing spacer and internal wall of casing pipe shall be 2-inches. The required procedure to install the carrier pipe is to attach the casing spacers and assemble the pipe joints outside the casing and push the assembled carrier pipe through the casing on the casing spacers. Timber skids are not allowed.

3.07 PROTECTION AT ENDS OF CASING

A. After installation of the carrier pipe within the casing and successful pressure testing of the carrier pipe, provide casing end seals in accordance with the Owner's standard details at each end of casing pipe as a barrier against backfill debris and seepage. End seals shall be as specified above and shall be installed in accordance with manufacturer's recommendations.

B. Prior to installation of end seals, the carrier pipe shall be properly and sufficiently secured to prevent movement.

C. End seals shall overlap the casing pipe by at least two inches (2"). Bands shall be placed approximately 1½-inches from each edge of the end seal.

D. Grout shall not be used to seal casing pipe ends or to fill the annular space within the casing.

END OF SECTION

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SECTION 02274

GEOTEXTILES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish and install all Geotextiles, including all necessary and incidental items, as detailed or required for the Contractor to complete the installation in accordance with the Drawings and these Specifications.

B. For the location of each type of Geotextile see the Drawings.

1.02 REFERENCES

A. AASHTO Standards

1. AASHTO M 288-06 (2011) Geotextile Specification for Highway Applications

1.03 SUBMITTALS

A. Prior to shipping to the site, the Contractor shall submit to the Engineer two copies of a mill certificate or affidavit signed by a legally authorized official of the Manufacturer for each type of Geotextile. The Supplier shall also submit three Geotextile samples of each product, 1 yard square each, seamed and unseamed as appropriate, with the mill certificate for each Geotextile type supplied. The mill certificate or affidavit shall attest that the Geotextile meets the chemical, physical and manufacturing requirements stated in the specifications. The samples shall be labeled with the manufacturer's lot number, machine direction, date of sampling, project number, specifications, manufacturer and product name.

B. The Engineer shall be furnished copies of the delivery tickets or other acceptable receipts as evidence for materials received that will be incorporated into construction.

PART 2 -- MATERIALS

2.01 MATERIALS

A. Filter Geotextile shall be a minimum 6-ounce per square yard (nominal) nonwoven needle punched synthetic fabric consisting of staple or continuous filament polyester or polypropylene manufactured in a manner accepted by the Engineer and the Owner. The Geotextiles shall be inert and unaffected by long-term exposure to chemicals or liquids with a pH range from 3 to 10. The Geotextiles shall have a minimum threshold water head of 0.25-inches in the "as received" condition.

1. Filter Geotextile shall have a Survivability Class of Class 1, 2 or 3 in accordance with AASHTO M288, unless otherwise specified herein.

B. Cushion Geotextile shall be a minimum 16-ounce per square yard nonwoven needle punched synthetic fabric consisting of continuous filament or staple polyester or polypropylene manufactured in a manner accepted by the Engineer and the Owner. The Geotextiles shall be inert and unaffected by long-term exposure to chemicals or liquids with a pH range from 3 to 10.

1. Cushion Geotextile shall have a Survivability Class of Class 1 in accordance with AASHTO M288.

C. Type I Separator Geotextile shall be a minimum 8-ounce per square yard (nominal) nonwoven neddlepunched synthetic fabric consisting of staple or continuous filament polyester or polypropylene manufactured in a manner accepted by the Engineer and the Owner. The Geotextiles shall be inert and unaffected by long term exposure to chemicals or liquids with a pH range from 3 to 10.

1. Type I Separator Geotextile shall have a Survivability Class of Class 1 or 2 in accordance with AASHTO M288, unless otherwise specified herein.

D. Type II Separator Geotextile shall be a woven slit film or monofilament synthetic fabric consisting of polyester or polypropylene in a manner approved by the Engineer. Geotextile shall be treated to resist degradation due to exposure to ultraviolet light.

1. Type II Separator Geotextile shall have a Survivability Class of Class 1 in accordance with AASHTO M288, unless otherwise specified herein.

E. All Geotextiles shall conform to the properties listed using the test methods listed in Table 1. The Contractor shall be responsible for timely submittals of all confirmation test data for Geotextiles.

PART 3 -- EXECUTION

3.01 SHIPPING, HANDLING AND STORAGE

A. During all periods of shipment and storage, all Geotextiles shall be protected from direct sunlight, temperature greater than 140°F water, mud, dirt, dust, and debris.

B. To the extent possible, the Geotextile shall be maintained wrapped in heavy-duty protective covering until use. Geotextile delivered to the project site without protective covering shall be rejected. After the protective covering has been removed, the Geotextile shall not be left uncovered for longer than fourteen (14) days, under any circumstances.

C. The Owner shall approve the shipping and delivery schedule prior to shipment. The Owner shall designate the on-site storage area for the Geotextiles. Unloading and storage of Geotextiles shall be the responsibility of the Contractor.

D. Geotextiles that are damaged during shipping or storage shall be rejected and replaced at Contractor expense.

3.02 QUALITY ASSURANCE CONFORMANCE TESTING

A. At the option of the Engineer representative samples of Geotextiles shall be obtained and tested by the Engineer to assure that the material properties conform to these Specifications. Conformance testing shall be conducted by the Engineer and paid for by the Owner.

B. Conformance testing shall be completed at a minimum frequency of one sample per 100,000 square feet of Geotextile delivered to the project site. Sampling and testing shall be as directed by the Engineer.

C. Conformance testing of the Geotextiles shall include but not be limited to the following properties:

1. Mass Per Unit Area (ASTM D5261)
2. Grab Tensile Strength (ASTM D4632)
3. Trapezoidal Tear (ASTM D4533)
4. Puncture Resistance (ASTM D6241)

D. The Engineer may add to, remove or revise the test methods used for determination of conformance properties to allow for use of improved methods.

E. All Geotextile conformance test data shall meet or exceed requirements outlined in Table 1 of these Specifications for the particular category of Geotextile prior to installation. Any materials that do not conform to these requirements shall be retested or rejected at the direction of the Engineer.

F. Each roll of Geotextile will be visually inspected by the Engineer or his representative. The Engineer reserves the right to sample and test at any time and reject, if necessary, any material based on visual inspection or verification tests.

G. A Geotextile that is rejected shall be removed from the project site and replaced at the Contractor's expense. Sampling and conformance testing of the Geotextile supplied as replacement for rejected material shall be performed by the Engineer at Contractor's expense.

3.03 INSTALLATION

A. Geotextiles shall be placed to the lines and grades shown on the Drawings. At the time of installation, the Geotextile shall be rejected by the Engineer if it has defects, rips, holes, flaws, evidence of deterioration, or other damage.

B. It is the intent of these Specifications that Geotextiles used to protect natural drainage media be placed the same day as the drainage media to prevent soil, sediment or windblown soils to make contact with the drainage media.

C. The Geotextiles shall be placed smooth and free of excessive wrinkles. Geotextiles shall conform to and be in contact with the approved subgrade.

D. When the Geotextiles are placed on slopes, the upslope fabric portion shall be lapped such that it is the upper or exposed Geotextile.

E. Geotextiles shall be temporarily secured in a manner accepted by the Engineer prior to placement of overlying materials.

F. In the absence of specific requirements shown on the Drawings, the following shall be used for overlaps of adjacent rolls of Geotextile:

GEOTEXTILE TYPE/ APPLICATION	OVERLAP OF ADJACENT ROLLS[(1)] (INCHES)	TRANSVERSE END OVERLAP (INCHES)
Filter Geotextile	6 min	12 min
Cushion Geotextile	12 min	12 min
Separator-Roadway Applications	12 min	24 min
Separator-Slope Protection	18 min	24 min
Separator Geotextile	12 min	18 min

[(1)] Overlaps may be reduced if adjacent panels are sewn or heat bonded where approved by the Engineer.

G. Any Geotextile that is torn or punctured shall be repaired or replaced as directed by the Engineer by the Contractor at no additional cost to the Owner. The repair shall consist of a patch of the same type of Geotextile placed over the failed areas and shall overlap the existing Geotextile a minimum of 12-inches from any point of the rupture.

H. Any Geotextile that is subjected to excessive sediment buildup on its surface during construction shall be replaced by the Contractor prior to placement of overlying material.

TABLE 1 - MINIMUM REQUIRED GEOTEXTILE PROPERTIES*

GEOTEXTILE PROPERTY	FILTER GEOTEXTILE	CUSHION GEOTEXTILE	TYPE I SEPARATOR GEOTEXTILE	TYPE II SEPARATOR GEOTEXTILE
Geotextile Construction	Nonwoven Needlepunched	Nonwoven Needlepunched	Nonwoven Neddlepunched	Woven
Mass per Unit Area (Unit Weight), ASTM D5261 (oz/yd^2)	5.6	15.7	7.8	N/A
Ultraviolet Resistance, (500 hrs.) ASTM D4355, Average % Strength Retention	70	70	70	70
Grab Tensile Strength (lbs.), ASTM D4632	150	340	200	$390^{(1)}X250^{(2)}$
Grab Tensile elongation (%) ASTM D4632	50	50	50	20 MAX
Wide Width Tensile Strength, (lbs./in.) ASTM D4595	N/A	N/A	N/A	N/A
Trapezoid Tear Strength (lbs) ASTM D4533	65	155	90	100
Apparent Opening Size (AOS), (mm), ASTM D4751	0.25	N/A	0.25	0.4
Permittivity at 50 mm constant head (sec^{-1}), ASTM D4491	1.6	N/A	1.2	0.1
Puncture Resistance, ASTM D6241 (lb)	430	1100	575	950

*** MINIMUM AVERAGE ROLL VALUE (MARV)**

(1) Warp Direction

(2) Fill Direction

- END OF SECTION –

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SECTION 02276

EROSION AND SEDIMENTATION CONTROL

PART 1 -- GENERAL

1.01 THE REQUIREMENTS

A. The Contractor is responsible for implementing Best Management Practices (BMPs) to prevent and minimize erosion and resultant sedimentation in all cleared and grubbed areas during and after construction. This item covers the work necessary for the installation of structures and measures for the prevention of soil erosion and control of sedimentation. The Contractor shall furnish all material, labor and equipment necessary for the proper installation, maintenance, inspection, monitoring, reporting, and removal (where applicable) of erosion prevention and sediment control measures and, if applicable, to cause compliance with all local permits and the State of Tennessee National Pollutant Discharge Elimination System (NPDES) General Permit TNR100000 for Discharges of Stormwater Associated with Construction Activities for any land disturbance or construction activity of one (1) acre or more, under this Section 02276.

B. Any land disturbance as the result of modifications to a site's drainage features or topography requires protection from erosion and sedimentation.

C. All excavations shall be in conformity with the lines, grades, and cross sections shown on the Contract Drawings or established by the Engineer.

D. It is the intent of this Specification that the Contractor conducts the construction activities in such a manner that erosion of disturbed areas and offsite sedimentation be absolutely minimized.

E. All work under this Contract shall be done in conformance with and subject to the limitations of the Tennessee Department of Environment and Conservation (TDEC), Division of Water Pollution Control, Erosion & Sediment Control Handbook (ESCH, Fourth Edition, August, 2012) and in accordance with the Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101).

F. All work under this Contract shall be done in conformance with and subject to the limitations of the Tennessee NPDES General Permit TNR100000 for Discharges of Stormwater Associated with Construction Activities.

G. The following excerpts from the regulations are particularly important:

1. Pursuant to the Tennessee General NPDES Permit for Discharges of Stormwater Associated with Construction Activities, Permit No. TNR100000, Section 4.1.3, Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating or other earth-disturbing activities have temporarily or permanently ceased on any portion of the site and will not resume for a period exceeding fourteen (14) calendar days.

H. Due to the nature of the work required by this Contract, it is anticipated that the location and nature of the erosion and sediment control devices will be adjusted on several occasions to reflect the current phase of construction. The construction schedule adopted by the Contractor will impact the placement and need for specific devices required for the control of erosion. The Contractor shall develop and implement such additional techniques as may be required to minimize erosion and off-site sedimentation. The location and extent of erosion and sedimentation control devices shall be revised at each phase of construction that results in a change in either the quantity or direction of surface runoff from constructed areas. All deviations from the erosion and sedimentation control provisions shown on the Contract Drawings shall have the prior acceptance of the Engineer and shall be completed at no additional cost to the Owner.

I. Erosion and sedimentation controls applicable to this project shall be as shown on the Contract Drawings, as specified herein, as indicated by the Engineer and as detailed in the TDEC, Erosion & Sediment Control Handbook.

J. The Contractor shall provide temporary or permanent ground cover adequate to restrain erosion on erodible slopes or other areas that will be left unworked for periods exceeding fourteen (14) calendar days.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Section 02100 – Clearing, Grubbing, and Site Preparation

C. Section 02140 – Dewatering

D. Section 02200 – Earthwork

E. Section 02500 – Surface Restoration

F. Section 02910 – Final Grading and Landscaping

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of other requirements of these specifications, all work hereunder shall conform to the applicable requirements of the referenced portions of the following documents, to the extent that the requirements therein are not in conflict with the provisions of this Section.

1. Tennessee Water Quality Control Act of 1977 (T.C.A. 69-3-101)

2. TDEC, Erosion & Sediment Control Handbook, latest edition.

3. Tennessee NPDES General Permit TNR100000 for Discharges of Stormwater Associated with Construction Activities, for any land disturbance or construction activity of one (1) acre or more.

B. See Specification Section 01090 - Reference Standards.

1.04 REGULATORY COMPLIANCE

A. Land disturbance activities are not authorized to begin until after all required stormwater and/or erosion and sediment control permits are obtained from the United States, the State of Tennessee, and local authorities, as necessary. Contractor is the Co-Primary Permittee and Operator under the provisions of the NPDES Permit. As such, the Contractor will be required to sign certain certifications as described in the NPDES Permit. Contractor shall comply with requirements specified in the Contract Documents, on the approved Erosion Control Plan, and by the Engineer. Contractor shall also comply with all other laws, rules, regulations, ordinances and requirements concerning soil erosion and sediment control established in the United States, the State of Tennessee and local authorities as applicable. The following documents and the documents referenced therein define the regulatory requirements for this Section 02276.

1. NPDES PERMIT: The Tennessee NPDES General Permit TNR100000 for Discharges of Stormwater Associated with Construction Activities governs land disturbance or construction activities of one (1) acre or more. On applicable sites, Contractor is responsible for complying with terms and conditions of this permit.

2. TDEC, Erosion & Sediment Control Handbook (ESCH), latest edition.

B. During the period beginning on the effective date of the permit and lasting until expiration, the Permittee is authorized to discharge stormwater associated with construction activity including clearing, grading and excavation activities resulting in the disturbance of land and related support activities. Such discharges shall be controlled, limited and monitored as specified below.

1. The Contractor, as Co-Primary Permittee and Operator under the provisions of the NPDES Permit, shall submit a plan for compliance with the Owner-provided approved erosion and sedimentation control plan to the Engineer for approval. Land disturbing activity shall not commence until the plan is approved by the Engineer. Maintain an up-to-date copy of the approved plan on the site.

2. Implement the approved plan. Deviation from the plan is allowed only to correct emergency situations of sediment discharge offsite or when minor modifications are made to improve performance of the measures and the approval authority has been notified. Note allowed deviations on the plan maintained on the site.

3. Manage onsite activities such that no adverse impacts to water quality occur from site activities or allowed discharges. The following activities, and others on a site-specific basis, require oversight throughout the construction and development process to assure that all water quality standards are protected.

a. Equipment Operation and Maintenance: Equipment utilized during the construction activity on a site must be operated and maintained in such a manner as to prevent the potential or actual pollution of the surface or ground waters of the State. Fuels, lubricants, coolants, and hydraulic fluids, or any other petroleum products, shall not be discharged onto the ground or into surface waters. Spent fluids shall be disposed of in a

manner so as not to enter the waters, surface or ground, of the State and in accordance with applicable state and federal disposal regulations. Any spilled fluids shall be cleaned up to the extent practicable and disposed of in a manner so as not to allow their entry into the waters, surface or ground, of the State.

b. Material Handling: Herbicide, pesticide, and fertilizer usage during the construction activity shall be consistent with the Federal Insecticide, Fungicide, and Rodenticide Act and shall be in accordance with label restrictions.

c. Building Material Waste Handling: All wastes composed of building materials shall be disposed of in accordance with Tennessee Code Annotated (TCA), and the TDEC Division of Solid and Hazardous Waste Management, Chapter 1200.

d. Litter and Sanitary Waste: The Permittee shall control the management and disposal of litter and sanitary waste from the site.

e. Concrete Handling: Concrete materials onsite, including excess concrete, must be controlled and managed to avoid contact with surface waters, wetlands or buffers. (Note that discharges from onsite concrete plants may require coverage under a separate NPDES permit).

C. Violations and Fines

1. Contractor shall be responsible for reimbursing the Owner for any fines incurred as a result of violations to the City of Johnson City, Tennessee, the NPDES General Permit for Stormwater Discharges on Construction Sites, and any applicable delegated local program's sediment control regulations until construction activities are complete and the project is accepted by the Owner. These include fines levied by the TDEC, the City of Johnson City, and delegated local programs.

2. If violations result in the issuance of a Notice of Violation, the Contractor shall comply with the requirements of the Notice within the specified time period for compliance. Failure to comply could result in the assessment of a penalty for each day of the continuing violation, beginning with the date of the violation.

3. Violations may result in civil and/or criminal penalties which include fines and imprisonment.

1.05 SUBMITTALS

A. Prior to the start of the work, the Contractor shall prepare and submit a plan for implementing the temporary and permanent erosion and sedimentation control measures as shown on the Erosion and Sediment Control Plan approved by the appropriate regulatory authority. Construction work shall not commence until the schedule of work and the methods of operations have been reviewed and approved.

B. The Contractor shall perform inspections of erosion and sedimentation control measures and stormwater discharge outfalls and prepare inspection reports as described in Part 3 of this Section. Copies of the inspection reports shall be submitted to the Engineer on a monthly basis.

C. In accordance with the procedures and requirements set forth in the General Conditions Division 1 and Section 01300 - Submittals, the Contractor shall submit the following:

1. Name and location of all material suppliers.

2. Certificate of compliance with the standards specified above for each source of each material.

3. List of disposal sites for waste and unsuitable materials and evidence of all required permits for use of those sites.

1.06 GUARANTEE

A. All restoration and re-vegetation work shall be subject to the one-year guarantee period of the Contract as specified in the General Conditions.

PART 2 -- MATERIALS

2.01 MATERIALS

A. Materials for use in erosion and sedimentation control devices shall be in accordance with the TDEC, ESCH, latest edition.

B. All erosion and sediment control bid prices shall include all excavation, grading, maintenance, legal sediment disposal, permits and all other work and appurtenances necessary to design, install and maintain the sediment and erosion control measures as detailed herein and in accordance with the TDEC, ESCH, latest edition.

2.02 SILT FENCE

A. Silt (or sediment) fence shall be constructed as shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH. Silt fences shall be installed below small disturbed areas that are less than ¼ acre disturbed per 100-feet of fence when slopes are less than 2%. Contractor shall refer to Table 1, page SF-1 of the TDEC, ESCH for criteria. Silt fence shall not be installed across streams, ditches, or waterways or other areas of concentrated flows.

B. Silt fence shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH. Silt fence shall be a woven geotextile filter fabric made specifically for sediment control. Filter fabric shall not rot when buried and shall resist attack from soil chemicals, alkalines and acids in the pH range from 2 to 13, and shall resist damage due to prolonged ultraviolet exposure. Filter fabric shall meet or exceed criteria outlined in the following table, or approved equal. The cost of silt fence shall

include the materials, excavation, backfill, aggregate, etc. and all maintenance and restoration activities required.

C. Silt fence shall be stable for the 10-year peak storm runoff. Fabric shall meet the following specifications:

Fence Type				
		A	**B**	**C**
Tensile Strength (lbs. min)[1]	ASTM D-4632	Warp – 120 Fill – 100	Warp – 120 Fill – 100	Warp – 260 Fill – 180
Elongation (% max)	ASTM D-4632	40	40	40
AOS (apparent opening size) (max sieve size)	ASTM D-4751	#30	#30	#30
Flow Rate (gpm/sf)	GDT-87	25	25	70
Ultraviolet Stability[2]	ASTM D-4632 after 300 hrs weathering in accordance with ASTM D-4355	80	80	80
Bursting Strength (psi, min)	ASTM D-3786 Diaphragm bursting strength tester	175	175	175
Fabric Width (inches, min)		36	22	36

NOTES:

[1] Minimum roll average of five specimens.

[2] Percent of required initial minimum tensile strength.

Post Size			
	Length (min)	**Type of Post**	**Size of Post**
Type A	4 ft	Soft wood Oak Steel	3" dia or 2x4 1.5" x 1.5" 1.3lb/ft min
Type B	3 ft	Soft wood Oak Steel	2" dia or 2x2 1" x 1" .75lb/ft min
Type C	4 ft	Steel	1.3 lb/ft min

Fasteners for Wood Posts				
	Gauge	**Crown**	**Legs**	**Staples/Post**
Wire Staples	17 min	3/4" wide	1/2" long	5 min
Nails	14 min	1"	3/4"	4 min

NOTES:
Filter fabric may also be attached to the post by wire, cord, and pockets.

D. The synthetic filter fabric shall consist of at least 95% by weight of polyolefins or polyester, certified by the manufacturer, and as specified in the TDEC, ESCH.

E. The posts for silt fences shall be as outlined in the above table.

F. For reinforcement of standard strength filter fabric use wire fence with a minimum 14 gauge and a maximum mesh spacing of 6 inches.

2.03 STONE FOR EROSION CONTROL

A. The Contractor shall place stone for erosion control as shown on the Contract Drawings, as specified herein, as specified in the TDOT Standard Specifications for Road and Bridge Construction, and as detailed in the TDEC ESCH. The stone for erosion control shall consist of field stone or rough un-hewn quarry stone. The stone shall be sound, tough, dense, and resistant to the action of air and water. The stone for erosion control shall be Class (A) or Class (B) as specified in the TDOT Standard Specifications, the TDEC ESCH, unless otherwise shown on the Contract Drawings.

B. Stone for erosion control shall be designed, installed and maintained in accordance with Part 3 of this Section, the TDOT Standard Specifications, and the TDEC, ESCH. The

cost for stone for erosion control shall include furnishing, weighing, stockpiling, re-handling, placing and maintaining stone; disposal of any stone not incorporated into the project if directed by the Engineer; and any other incidentals necessary to complete the work.

2.04 RIP RAP

A. The Contractor shall place rip rap as shown on the Contract Drawings, as specified in the TDOT Standard specifications for plain rip rap, and as detailed in TDEC, ESCH. The stone for rip rap shall consist of field stone or rough un-hewn quarry stone. The rip rap shall be sound, tough, dense, and resistant to the action of air and water. Neither the width nor thickness of individual stones shall be less than one third their length. The rip rap shall be Class A-1, A-3, or Class B as specified in the TDOT Standard Specifications, unless otherwise shown on the Contract Drawings.

B. Rip rap shall be designed, installed and maintained in accordance with Part 3 of this Section, the TDOT Standard Specifications, and the TDEC, ESCH. The cost for rip rap shall include furnishing, weighing, stockpiling, rehandling, placing and maintaining rip rap; disposal of any rip rap not incorporated into the project if directed by the Engineer; and any other incidentals necessary to complete the work.

2.05 ROLLED EROSION CONTROL MATTING PRODUCTS (RECMs)

A. RECMs, including Turf Reinforcement Mat (TRM), shall be installed as shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC ESCH. RECMs should be utilized to aid stabilization of slopes greater than 2.5:1 and with more than 10 feet of vertical relief. RECMs should also be used when mulch cannot be adequately tacked and where immediate ground cover is required to prevent erosion damage. Examples of RECMs are blankets, nets and matting.

B. RECMs shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC ESCH. The cost for RECMs shall include all excavation, grading, and materials, and all maintenance activities.

C. RECMs shall be used to aid in permanent stabilization of vegetated channels where runoff velocity will exceed 2 feet/second on bare earth during the 2-year rainfall event that produces peak runoff.

D. RECMs shall be chosen based on the Design Criteria detailed in the TDEC, ESCH. Typically, nets shall be used in conjunction with mulch; the use of mulch is typically not required with excelsior, woven straw blankets and coir blankets.

E. The recommended anchoring devices are 12-inch minimum length wooden stakes, 11-gauge staples that are at least 6 inches long by 1 inch wide, or rigid, biodegradable stakes of a minimum of 6 inches in length. If Manufacturer’s recommendations are more stringent, they shall supersede.

F. The minimum bare soil shear stress values for specific RECMs are as follows:

1. Straw with net temporary RECM shall be Tensar (North American Green) EroNet S150, Curlex Erosion Control Blanket by American Excelsior Co., Landlok S1 by Propex, or equal with a minimum bare soil shear stress value of 1.5 lb/ft^2.

2 Curled wood or coconut fiber RECM shall be American Excelsior Curlex Double Net (Curlex II), Tensar (North American Green) EroNet C125, Propex Landlok C2 or equal matting with a minimum bare soil shear stress value of 2.0 lb/ft^2.

3. Synthetic Turf Reinforcement Mat (TRM) shall be Enkamat 7020 as manufactured by Bonar Civil Products, Propex Landlok 1051, Miramesh GR as manufactured by TenCate Mirafi, or equal matting with a minimum long-term vegetated shear stress value of 5.0 lb/ft^2.

2.06 TEMPORARY AND PERMANENT DIVERSIONS

A. Temporary diversions shall be constructed as shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH. Permanent diversions shall be constructed as shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH. Temporary diversions shall be constructed adjacent to disturbed areas to collect surface runoff from disturbed areas and direct the runoff to sediment basins or to a stable outlet or to divert non-sediment laden runoff away from undisturbed areas and/or sediment basins. All temporary diversions transporting sediment-laden runoff shall terminate in a sediment trapping device or stable outlet. Permanent diversions should be planned as a part of initial site development and should be coordinated with temporary diversions. Permanent diversions shall be used to divert water to locations where it can be used or released without erosion or flood damage. Dimensions shall be as shown on the Contract Drawings.

B. Temporary diversions shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH, to the satisfaction of the Engineer, until the site has been stabilized. Permanent diversions shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH. The cost of temporary and permanent diversions shall include the excavation, grading, materials, etc. and all maintenance and restoration activities required.

2.07 TEMPORARY SLOPE DRAINS

A. Temporary slope drains shall be constructed as shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH. Temporary slope drains are used to convey concentrated runoff down the face of a slope without causing erosion and are generally used in conjunction with temporary diversions.

B. The pipe diameter for temporary slope drains shall be selected according to criteria outlined in the TDEC, ESCH. The pipe shall be heavy-duty flexible material such as non-perforated, corrugated plastic pipe or specially designed flexible tubing.

C. Temporary slope drains shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH, to the satisfaction of the Engineer, until the

site has been stabilized. The cost of the temporary slope drains shall include the piping, earthwork, stone for erosion control, and all maintenance activities required.

2.08 TEMPORARY GRAVEL CONSTRUCTION ENTRANCES/EXITS

A. Temporary gravel construction entrances/exits shall be located at points where vehicles enter and leave a construction site, at other locations indicated by the Engineer, as specified herein, and as detailed in TDEC, ESCH.

B. Temporary gravel construction entrances/exits shall be constructed with a minimum 6 inch layer of 2 – 3 inch washed stone placed over a stable foundation and shall be a minimum of 50 feet in length and 20 feet in width. Geotextile fabric shall be used under stone as shown on the Contract Drawings.

C. Temporary gravel construction entrances/exits shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH, to the satisfaction of the Engineer, until the site has been stabilized. The cost of temporary gravel construction entrances/exits shall include the materials and all maintenance activities required, including additional tire washing as may be necessary.

2.09 TEMPORARY AND PERMANENT STABILIZATION OF DISTURBED AREAS

A. Temporary and permanent stabilization of disturbed areas will be provided at the locations shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH. The Contractor shall provide ground cover on disturbed areas where work has temporarily ceased within seven (7) working days. Disturbed areas where construction activities have permanently ceased shall be stabilized with permanent seeding within fourteen (14) calendar days.

B. Soil amendments, including lime and fertilizer, shall be as detailed in the TDEC, ESCH.

C. Sod and seed mixtures shall be selected based on site location and seasonal recommendations outlined in the TDEC, ESCH.

D. Mulch shall be as detailed in the TDEC, ESCH. RECMs shall be as detailed in 2.05 herein and in the TDEC, ESCH.

E. Temporary soil stabilizer shall consist of a specially prepared highly concentrated powder which, when mixed with water, forms a thick liquid such as "Enviroseal M10-2001" by Enviroseal Corporation, "Bind | Atlas Superduty" by Quattro Environmental, Inc., or "CHEM-CRETE ECO-110" by International CHEM-CRETE Corporation, and having no growth or germination inhibiting factors. The agent shall be used for hydroseeding grass seed in combination with other approved amendments resulting in a highly viscous slurry which, when sprayed directly on the soil, forms a gelatinous crust.

F. Temporary and permanent stabilization of disturbed areas shall be achieved in accordance with Part 3 of this Section and the TDEC, ESCH. The cost of temporary and permanent stabilization of disturbed areas shall include all grading, excavation and materials as well as all reseeding and other maintenance activities required until stabilization is achieved.

2.10 CHECK DAMS AND CHECK DAMS WITH WEIRS

A. Check dams and check dams with weirs shall be constructed at the locations shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH.

B. Check dams and check dams with weirs shall not be constructed in an intermittent or perennial stream. The drainage area for any one check dam or check dam with weir shall be limited to one (1) acre.

C. Dimensions shall be as shown on the Contract Drawings. Check dams shall be constructed of stone or riprap with filter fabric, fiber filtration tubes, or sediment logs, as indicated on the Contract Drawings. Check dams with weirs shall be constructed of stone or riprap with filter fabric. Material specifications for stone, riprap, fiber filtration tubes, and sediment logs appear herein. If Manufacturer's recommendations are more stringent, they shall supersede. Filter fabric shall be Type II Separator Geotextile, as specified in Section 02274 – Geotextiles.

D. Check dams and check dams with weirs shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH. The cost of check dams and check dams with weirs shall include all excavation, grading and materials as well as all maintenance activities required.

2.11 INLET EROSION CONTROL MEASURES

A. Yard, Curb and other Inlet Erosion Control Measures shall be constructed at the locations shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH. Inlet erosion control measures shall be used to prevent or limit the introduction of sediment to storm drain systems and allow early use of the of the storm drainage system. Maximum drainage areas for inlet erosion control measures shall be ½ acre. Runoff from larger drainage areas shall be routed to a sediment trap or sediment basin. In addition to the inlet protection measures described in the TDEC, ESCH, other measures may be specified by the Engineer. For measures not detailed in the TDEC, ESCH, the materials will be as specified by the Engineer's and Manufacturer's instructions, with more stringent specifications superseding.

B. Materials for Inlet Erosion Control Measures consist of silt fence, riprap, stone (gravel), hardware wire, sod, concrete blocks, and sediment logs. Riprap and stone for erosion control shall be as specified herein. Hardware wire shall be as specified in the TDEC, ESCH. Sod shall conform to the specifications set forth in the TDEC, ESCH. Concrete blocks shall be as specified in the TDEC, ESCH. Material specifications for sediment logs appear within. If Manufacturer's recommendations are more stringent, they shall supersede.

C. Inlet Erosion Control Measures shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH. Measures not described in the TDEC, ESCH shall be designed, installed, and maintained in accordance with the Engineer's and Manufacturer's instructions, with more stringent instructions superseding.

The cost of inlet erosion control measures shall include all excavation, grading and materials as well as all maintenance activities required.

2.12 FIBER FILTRATION TUBES (FFTs) AND SEDIMENT LOGS

A. FFTs and sediment logs shall be installed at the locations shown on the Contract Drawings, at other locations indicated by the Engineer, and as specified herein.

B. FFTs shall consist of composite wood fibers and man-made fibers, with or without performance-enhancing polymers, encased with cylindrical tubes composed of a heavy-duty, knitted, high density polyethylene mesh. The photodegradable mesh shall be oriented in a diamond or hexagonal pattern and shall move freely at all knitted yarn intersections.

C. Sediment logs shall consist of natural fibers (wood, coconut, etc.) inside heavy duty knitted cylindrical tubing.

D. FFTs and sediment logs shall be designed, installed and maintained as specified herein. If Manufacturer's recommendations are more stringent, they shall supersede. The cost of FFTs shall include all excavation, grading and materials as well as all maintenance activities required.

2.13 TEMPORARY AND PERMANENT CHANNELS

A. Temporary and permanent channels shall be installed at the locations shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH. Temporary and permanent channels shall be used to convey concentrated runoff without damage from erosion, deposition or flooding.

B. Temporary and permanent channels shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH. The cost of all temporary and permanent channels shall include all excavation, grading and materials as well as all maintenance activities required.

2.14 TEMPORARY SEDIMENT TRAPS, SEDIMENT BASINS, AND SKIMMER SEDIMENT BASINS

A. Temporary sediment traps shall be constructed as shown on the Contract Drawings, at the termination of all temporary diversions diverting sediment laden runoff, at other locations indicated by the Engineer, as specified herein, and as detailed in the . These temporary measures shall not be constructed within an intermittent or perennial stream and shall be installed prior to any land disturbance activities within the drainage area. Temporary sediment traps shall be constructed by excavating the appropriate size rectangular basin and constructing a rock-fill dam on the discharge end. Where specific elevations are not indicated on the Contract Drawings, Contractor shall maintain basins at the depths shown below working grades.

B. Sediment basins shall be installed at the locations shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH. Skimmer sediment basins shall be installed at the locations shown on the

Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH. Sediment basins and skimmer sediment basins shall be used where drainage areas are too large for temporary sediment traps. They shall retain sediment on the site and prevent off site sediment in waterways, and they shall not be located in intermittent or perennial streams. Sediment basins and skimmer sediment basins shall be installed prior to any land disturbance activities within the drainage area.

C. Porous baffles shall be installed in temporary sediment traps, sediment basins, and skimmer sediment basins as shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH. Porous baffles are used to reduce the velocity and turbulence of the water flowing through the structure and to facilitate the settling of sediment in the water before discharge. They effectively spread the flow across the entire width of a structure.

D. Material used for porous baffles shall be as indicated on the Contract Drawings. Typical materials include coir erosion blanket, coir mesh, and tree protection fence (folded in half to reduce mesh opening size). Other materials may be used as noted on the Contract Drawings and indicated by the Engineer.

E. The structure life for temporary sediment traps shall be limited to 18 months. Temporary sediment traps shall be spaced to limit the maximum tributary drainage area to ten (10) acres. The basin life of sediment basins and skimmer sediment basins shall be limited to 18 – 30 months unless they are designed as permanent structures. The drainage area for sediment basins and skimmer sediment basins shall be limited to 50 acres.

F. The principal spillway for sediment basins shall consist of a riser and barrel. Ensure that the pipe is capable of withstanding the maximum expected load without yielding, buckling, or cracking. The basin should be provided with a skimmer or flashboard riser to dewater the basin from the water surface. The emergency spillway shall be constructed in undisturbed soil. The principal spillway outlet and emergency spillway shall be stabilized as shown on the Contract Drawings. Materials shall be as noted on the Contract Drawings.

G. The principal spillway for skimmer sediment basins shall consist of a skimmer which dewaters the basin from the top of the water surface at a controlled rate. A dewatering rate of 24 to 72 hours is recommended. The skimmer outlet pipe shall be capable of withstanding the maximum expected load without yielding, buckling, or cracking. The emergency spillway shall be constructed in undisturbed soil whenever possible and shall be lined with impermeable geotextile fabric in accordance with Section 02274 – Geotextiles. The principal spillway outlet and emergency spillway shall be stabilized as shown on the Contract Drawings.

H. Temporary sediment traps shall be designed, constructed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH, to the satisfaction of the Engineer, until the sediment producing areas have been permanently stabilized. The cost of the temporary sediment traps shall include the excavation, grading, fill, baffles, stone for erosion control, washed stone, geotextile, etc. and all maintenance activities required.

I. Sediment basins shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH. The cost of sediment basins and skimmer sediment basins shall include all excavation, grading and materials as well as all maintenance activities required.

J. Porous baffles shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH. The cost of porous baffles shall include all excavation, grading and materials as well as all maintenance activities required.

2.15 OUTLET STABILIZATION STRUCTURE

A. Outlet stabilization structures shall be constructed at the locations shown on the Contract Drawings, at other locations indicated by the Engineer, as specified herein, and as detailed in the TDEC, ESCH. These structures shall be used where the discharge velocity of the upstream water conveyance structure exceeds the permissible velocity of the receiving channel or disposal area.

B. Structures shall be sized for a capacity equivalent to a 25-year, peak runoff or design discharge of the water conveyance structure, whichever is greater. Riprap materials shall be as specified on the Contract Drawings. Filter fabric shall be Type II Separator Geotextile, as specified in Section 02274 – Geotextiles.

C. Outlet stabilization structures shall be designed, installed and maintained in accordance with Part 3 of this Section and the TDEC, ESCH. The cost of outlet stabilization structures shall include all excavation, grading and materials as well as all maintenance activities required.

2.16 FLEXIBLE GROWTH MEDIUM

A. Flexible growth medium shall be applied at the locations shown on the Contract Drawings, at other locations indicated by the Engineer, and as specified herein.

B. Flexible growth medium is a spray-on flexible blanket that controls soil erosion and accelerates seed germination for establishment of vegetation. It is made of wood fibers, man-made fibers, and additives that are applied wet to the prepared surface. The flexible growth medium shall be mixed with seed and fertilizer prior to application. Seed and fertilizer rates shall comply with applicable stabilization of disturbed area requirements of this Section and Section 02910 – Final Grading and Landscaping.

C. Flexible growth medium shall not be used in areas of concentrated flow unless installed in conjunction with a RECM or TRM.

D. Flexible growth medium shall be installed and maintained in accordance with Part 3 of this Section. If Manufacturer’s recommendations are more stringent, they shall supersede. The cost of flexible growth medium shall include all materials as well as all maintenance activities required.

2.17 TREE PROTECTION FENCE

A. Tree protection fence shall be installed at the locations shown on the Contract Drawings,

at other locations indicated by the Engineer, and as specified herein.

B. Tree protection fence shall used to protect trees and their root zones during construction. Tree protection fence shall be brightly-colored, UV-resistant poly barricade fabric. Signs designating the area as protected shall be installed on all sides of the fence. Wording and spacing of the signage shall be as indicated on the Contract Drawings.

C. Tree protection fence shall be installed and maintained in accordance with Part 3 of this Section. The cost of tree protection fence shall include all materials as well as all maintenance activities required.

PART 3 -- EXECUTION

3.01 INSTALLATION AND MAINTENANCE

A. All installation and maintenance shall be conducted in accordance with this specification and the TDEC, ESCH. In the event of a discrepancy between this specification, Manufacturer's recommendations and the TDEC, ESCH, the more stringent requirements shall take precedence.

B. If applicable, all requirements of the NPDES Permit shall be followed. In the event of a discrepancy between this specification and the NPDES Permit requirements, the more stringent requirements shall take precedence.

C. If possible, erosion and sedimentation control devices shall be established prior to clearing operations in a given area. Where such practice is not feasible, the erosion and sedimentation control device(s) shall be established concurrent with the clearing operations or immediately following completion of the clearing operations.

D. The Contractor shall furnish the labor, materials and equipment required for routine maintenance of all erosion and sedimentation control devices. At a minimum, maintenance shall be scheduled as required for a particular device to maintain the removal efficiency and intent of the device. Note that specific maintenance intervals for various measures and practices are specified within the TDEC, ESCH. Of the maintenance requirements specified herein and in the TDEC, ESCH, the more stringent shall take precedence for each and every sediment and erosion control measure utilized on the site. Maintenance shall include but not be limited to 1) the removal and satisfactory, legal disposal of accumulated sediment from traps or silt barriers and 2) replacement of filter fabrics used for silt fences and stone impaired by sediment in stone filters, gravel construction entrances, etc. Maintenance as noted in items 1) and 2) above shall be performed as required, and at least once every 3 months for the duration of construction activities. Sediment removed from erosion and sedimentation control devices shall be disposed of in locations that will not result in off-site sedimentation as acceptable to the Engineer, at no additional cost to the Owner. If no suitable on site locations are available, all such sediment will be legally disposed of off site, at no additional cost to the Owner.

3.02 SILT FENCE

A. Silt Fence shall be designed, installed and maintained in accordance with the requirements of the TDEC, ESCH. Silt fence shall be erected at the locations shown on the Contract Drawings and at all other locations as may be directed by the Engineer. Silt fence shall be erected and maintained to the satisfaction of the Engineer until a vegetative ground cover has been established. Replacement of the filter fabric and its associated appurtenances, if required by the Engineer, will be at the Contractor's expense.

B. Silt fence shall not be installed across streams, ditches, waterways or other areas of concentrated flow.

C. Dig a trench approximately 8 inches deep and 4 inches wide and place the fabric in the bottom of the excavated ditch or use the slicing method to insert the fabric into a cut sliced in the ground with a disc. Ensure that the height of the sediment fence is 16 inches to 28 inches above the ground surface, dependent upon fence type (refer to the TDEC, ESCH for specific criteria).

D. Install posts 4 feet apart in critical areas and 6 feet apart on standard applications when extra strength filter fabric is used. When wire mesh support is used, posts shall be installed a maximum of 6 feet apart. Install posts 2 feet deep on the downstream side of the silt fence, as close as possible to the fabric.

E. Joints should be avoided along the fencing. When joints are necessary, securely fasten the filter cloth only at a support post with 4 feet minimum overlap to the next post.

F. Compaction is vitally important for effective results. Compact the soil immediately next to the silt fence fabric with the front wheel of the tractor, skid steer or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of 4 trips.

G. Stabilized outlets for silt fence shall be provided at locations shown on the Contract Drawings. The outlet section shall have a maximum width of 4 feet. The height of silt fence at the outlet shall be a maximum of 1 foot. A 5 foot x 5 foot (minimum) apron of #57 washed stone shall be provided on the downstream side of the silt fence outlet.

H. Silt fence shall be erected around all catch basins which are located downstream from any construction work unless other inlet protection is specified. Should any catch basins be indicated to be relocated or modified, silt fence shall be utilized until work is completed on the catch basins. Upon completion of the modification, the area shall be rough graded, as shown on the Contract Drawings, until the end of the project, at which time final grading shall occur.

I. Inspect silt fence at least once a week and after each rainfall event. Make any required repairs immediately.

J. Should the fabric of any silt fence collapse, tear, decompose or become ineffective, replace it promptly. All fabric shall be replaced after the first 3 months of construction activity and every 3 months thereafter until construction activities are complete.

K. Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence. Take care to avoid undermining the fence during cleanout.

L. Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized. Removal of any silt fence shall be permitted only with the prior approval of the Engineer or the local governing agency.

3.03 STONE FOR EROSION CONTROL

A. Stone for erosion control shall be designed, installed, and maintained in accordance with the requirements of the TDEC, ESCH. Stone for erosion control shall be dumped and placed in such manner that the larger rock fragments are uniformly distributed throughout the rock mass and the smaller fragments fill the voids between the larger fragments. Rearranging of individual stones by equipment or by hand shall only be required to the extent necessary to secure the results specified above, to protect structures from damage when rock material is placed against the structures, or to protect the underlying Separator Geotextile from damage during installation.

B. Inspect at least weekly and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period. Remove accumulated sediment and replace stone impaired by sediment as necessary.

3.04 RIPRAP

A. Riprap shall be designed, installed and maintained in accordance with the requirements of the TDEC, ESCH. Riprap shall be graded so that the smaller stones are uniformly distributed through the mass. The Contractor may place the stone by mechanical methods, augmented by hand placing where necessary or ordered by the Engineer. The placed riprap shall form a properly graded, dense, neat layer of stone. The placed riprap shall have a minimum depth of 24 inches unless otherwise specified by the Engineer. Type II Separator Geotextile, as specified in Section 02274 – Geotextiles, shall be used under all riprap unless otherwise noted.

B. Inspect periodically for scour or dislodged stones. Control of weed and brush growth may be needed.

3.05 ROLLED EROSION CONTROL MATTING PRODUCTS (RECMs)

A. RECMs shall be designed, installed and maintained in accordance with the requirements of the TDEC, ESCH. The Engineer may direct the Contractor to place RECMs in permanent channels or on slopes at other locations in addition to those shown on the Contract Drawings. If Manufacturer's instructions are more stringent, they shall supersede.

B. The Contractor shall place the RECMs where directed immediately after the channel or slope has been properly graded and, if applicable, prepared, fertilized, and seeded.

C. Grade the surface of the installation area so that the ground is smooth and loose. When seeding prior to installation, follow the steps in matting specifications in the TDEC, ESCH as applicable. Remove all large rocks, debris, etc. so as to ensure that good contact between the RECM and the ground is maintained so that no erosion occurs beneath the RECM. Terminal anchor trenches are required at RECM ends and intermittent trenches must be constructed across channels at 25-foot intervals. Terminal anchor trenches should be a minimum of 12 inches in depth and 6 inches in width, while intermittent trenches should be a minimum of 6 inches deep and 6 inches wide. Take care to maintain direct contact between the soil and the RECM.

D. For slope installation, place RECM 2-3 feet over top of slope and into an approximately 12 inch deep by 6 inch wide excavated end trench. Using staples, stakes, or pins, anchor the RECM at 1 foot intervals along the bottom of the trench, backfill, and compact. Along the slope, pin the RECM in a 3 foot center-to-center pattern; provide a minimum 3 inch overlap for adjacent rolls.

E. For channel installations, excavate 12 inch deep by 6 inch wide terminal trenches across the upper and lower end of the lined channel. Anchor the RECM at a minimum of 25 foot intervals utilizing either two rows of anchors or 6 inch by 6 inch cross trenches. Bury outside RECM edges in longitudinal trenches 6 inches deep and wide along the channel edges. Pin the RECM in at 1 foot intervals along the bottom of terminal trenches, backfill, and compact. Overlap adjacent rolls a minimum of 3 inches and pin at 1 foot intervals. Place the first RECM at the downstream end of the channel and unroll upstream. When starting installation of a new roll, begin in a trench or shingle-lap ends of rolls a minimum of 1 foot with upstream RECM on top to prevent uplifting.

F. Staples, stakes, and pins shall be driven so that the top is flush with the ground.

G. During the establishment period, check RECMs at least weekly and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period. Immediately make repairs. Good contact with the ground must be maintained. Monitor and repair the RECM as necessary until ground cover is established.

3.06 TEMPORARY AND PERMANENT DIVERSIONS

A. Temporary and permanent diversions shall be designed, installed and maintained in accordance with the requirements of the TDEC, ESCH. The Contractor shall provide temporary and permanent diversions at all locations noted on the Contract Drawings and at all other locations as may be directed by the Engineer.

B. Remove and properly dispose of all trees, debris, etc. Fill and compact all ditches, swales, etc. that will be crossed to natural ground level or above.

C. Excavate, shape and stabilize diversions as shown on the Contract Drawings and described herein. Unless otherwise noted, provide vegetative stabilization immediately after installation of permanent diversions. Temporary diversions that are to serve longer than fourteen (14) calendar days shall be seeded and mulched as soon as they are constructed to preserve dike height and reduce maintenance. Seed and mulch disturbed areas draining into the diversions within fourteen (14) calendar days of completing any phase of grading.

D. For temporary diversions, ensure that the top of the dike is not lower at any point than the design elevation plus the specified settlement. Provide sufficient room around temporary diversions to permit machine re-grading and cleanout. Vegetate the ridge of temporary diversions immediately after construction unless they will remain in place less than fourteen (14) calendar days.

E. Provide outlet protection adequate to accept flow from diversion plus any other contributing runoff. Sediment-laden runoff shall be routed through a sediment-trapping device or stabilized outlet.

F. Inspect temporary diversions once a week and after every rainfall event. Immediately remove sediment from the flow area and repair the diversion ridge. Carefully check outlets and make timely repairs as needed. When the area protected is permanently stabilized, remove the ridge and the channel to blend with the natural ground level and appropriately stabilize it. Inspect permanent diversions weekly and after every rainfall event during construction operations until permanent vegetation is established. After vegetation is established, inspect after major storms. Immediately remove any debris and make repairs as needed in a timely manner. Maintain healthy vegetation at all times.

3.07 TEMPORARY SLOPE DRAINS

A. Temporary slope drains shall be designed, installed and maintained in accordance with the requirements of the TDEC, ESCH. The Contractor shall provide temporary slope drains with inlet and outlet protection and associated diversion channels at all locations noted on the Contract Drawings, and at other locations as may be directed by the Engineer.

B. Place slope drains on undisturbed soil or well compacted fill. Slightly slope the section of pipe under the dike toward its outlet. Hand-tamp the soil under and around the entrance section in lifts not to exceed 6 inches.

C. Ensure that all slope drain connections are watertight. Ensure that all fill material is well-compacted. Securely fasten the exposed section of the drain with grommets or stakes spaced no more than 10 feet apart. Extend the drain beyond the toe of the slope and provide outlet protection.

D. Immediately stabilize all disturbed areas following construction.

E. Inspect the temporary slope drain, inlet and outlet protection, and supporting diversions weekly and after every rainfall event and promptly make any necessary repairs. When the protected area has been permanently stabilized, temporary measures may be removed, materials disposed of properly, and all disturbed areas stabilized appropriately.

3.08 TEMPORARY GRAVEL CONSTRUCTION ENTRANCES/EXITS

A. Temporary gravel construction entrances/exits shall be designed, installed and maintained in accordance with the requirements of the TDEC, ESCH. The Contractor

shall provide temporary gravel construction entrances/exits at all locations noted on the Contract Drawings and at all other locations as may be directed by the Engineer.

B. Maintain the gravel pad as specified in the TDEC, ESCH and in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with 2 – 3 inch stone. Inspect each construction entrance at least weekly and after each rainfall event and replace stone impaired by sediment as necessary. Immediately remove all objectionable materials spilled, washed, or tracked onto public roadways.

C. If, despite the use of a gravel construction entrance/exit, most of the mud and sediment are not removed from vehicle tires, tire washing may be necessary as detailed in the TDEC, ESCH. If necessary this shall be done at no additional cost to the Owner.

3.09 TEMPORARY AND PERMANENT STABILIZATION OF DISTURBED AREAS

A. The Contractor shall temporarily stabilize disturbed areas that will not be brought to final grade within fourteen (14) calendar days. Temporary seeding shall be applied on areas that include diversions, dams, temporary sediment basins, temporary road banks and topsoil stockpiles. Areas to be stabilized with permanent vegetation must be seeded or planted within fourteen (14) calendar days after final grade is reached, unless temporary stabilization is applied. Temporary seeding provides protection for no more than 1 year, after which permanent stabilization should be initiated. The Contractor shall provide ground cover on disturbed areas where work has temporarily ceased within seven (7) working days.

B. Complete grading before preparing seedbeds, and install all necessary erosion control measures. Minimize steep slopes. If soils become compacted during grading, loosen to a depth of 6-8 inches.

C. Reseed and mulch temporary seeding areas where seedling emergence is poor, or where erosion occurs, as soon as possible. Do not mow. Protect from traffic as much as possible.

D. Refer to the TDEC, ESCH for additional information and specifications regarding seedbed requirements, plant selection, seeding and mulching for temporary seeding applications.

E. The operation of equipment is restricted on slopes steeper than 3:1. Provisions for vegetation establishment can be made during final grading. Vegetation chosen for these sites must not require mowing or other intensive maintenance. Good mulching practices are critical for protecting against erosion on steep slopes.

F. Generally, a stand of vegetation cannot be determined to be fully established until soil cover has been maintained for one full year from planting. Inspect seeded areas for failure and make necessary repairs and reseedings within the same season, if possible.

G. Reseeding – If a stand has inadequate cover, re-evaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand after seedbed preparation or

over-seed the stand. Consider seeding temporary, annual species if the time of year is not appropriate for permanent seeding.

H. If vegetation fails to grow, soil must be tested to determine if acidity or nutrient imbalance is responsible.

I. Fertilization - On the typical disturbed site, full establishment usually requires re-fertilization in the second growing season. Fine turf requires annual maintenance fertilization. Use soil tests if possible or follow the guidelines given for the specific seeding mixture.

J. Refer to the TDEC, ESCH for additional information and specifications regarding seedbed requirements, plant selection, seeding and mulching for permanent seeding applications.

K. Refer to the TDEC, ESCH for additional information and specifications regarding soil preparation, sod selection, installation, and maintenance for sodding.

L. Inspect all seeded areas weekly and after heavy rains until permanent cover is established. Inspect within 6 weeks of planting to see if stands are adequate. Fertilize, reseed and mulch damaged and sparse areas immediately.

3.10 CHECK DAMS AND CHECK DAMS WITH WEIRS

A. Check dams and check dams with weirs shall be designed, installed and maintained in accordance with the requirements of the TDEC, ESCH. The Contractor shall provide check dams or check dams with weirs at all locations noted on the Contract Drawings and at all other locations as may be directed by the Engineer.

B. Stone shall be placed on a filter fabric foundation. Center stone shall be at least 9 inches below natural ground level and stone shall extend 1.5 feet beyond ditch bank.

C. For check dams with weirs, provide an apron with a length 3 times the height of the dam and a width a minimum of 4 feet. A 12-inch layer (minimum) of sediment control stone shall be placed on the upstream side of the dam. Excavate sediment storage area to the dimensions shown on the Contract Drawings.

D. Fiber filtration tubes and sediment logs may be specified for use as check dams. These measures shall be installed according to instructions included herein. If Manufacturer's recommendations are more stringent, they shall supersede.

E. Spacing shall be such that the elevation of the top of the lower dam is the same as the toe elevation of the upper dam.

F. Check dams and check dams with weirs shall be inspected at least weekly and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period. Sediment, limbs and other debris shall be cleared from the channel. Repairs shall be made immediately.

3.11 INLET EROSION CONTROL MEASURES

A. Inlet erosion control measures shall be designed, installed and maintained in accordance with the applicable requirements of the TDEC, ESCH. If inlet erosion control measures shown on the Contract Drawings are not included in the ESCH, Engineer's and Manufacturer's instructions for design, installation, and maintenance shall be followed, with more stringent instructions superseding. The Contractor shall provide inlet erosion control measures at all locations noted on the Contract Drawings, and at all other locations as may be directed by the Engineer.

B. Excavated drop inlet protection shall be installed and maintained in accordance with details provided on the Contract Drawings. Drainage area is limited to 1 acre. The minimum volume of excavated area around the drop inlet is 1800 ft^3/acre disturbed. Minimum depth of the excavated area shall be 1 foot and maximum depth shall be 2 feet as measured from the crest of the inlet structure. Weep holes shall be protected by gravel. Inspect the excavated basin at least weekly and after every storm event until the contributing drainage area has been permanently stabilized. Remove sediment when the storage volume has been reduced by one-half.

C. Block and gravel inlet protection shall be installed and maintained in accordance with the TDEC, ESCH. Drainage area shall be limited to 1 acre unless site conditions allow for frequent removal of accumulated sediment. The height of the block barrier shall be no more than 12 inches and no less than 24 inches. On the bottom row, place some of the blocks on their side to allow for dewatering. Place wire mesh over all block openings to hold gravel in place. Lateral support may be provided by placement of 2 x 4 wood studs through block openings. Place gravel 2 inches below the top of the block barrier. The top elevation of the structure must be at least 6 inches below the ground elevation downslope from the inlet to ensure that all stormwater flows over the structure and enters the storm drain instead of bypassing the structure. Block and gravel inlet protection shall not be used near the edge of fill material and shall not divert water away from the storm drain. Inspect at least weekly and after every storm event until the contributing drainage area has been permanently stabilized. Remove sediment as necessary to provide adequate storage volume for subsequent rains. Replace stone as needed.

D. Rock pipe inlet protection shall be installed and maintained in accordance with details provided on the Contract Drawings. Rock pipe inlet protection may be used at pipes with a maximum diameter of 36 inches. It shall not be installed in intermittent or perennial streams. The minimum crest width of the riprap berm shall be 3 feet, with a minimum bottom width of 11 feet and minimum height of 2 feet. The top of the riprap shall be 1 foot lower than the shoulder of the embankment or diversions. The outside face of the riprap should be covered with a 12-inch thick layer of #5 or #57 washed stone. The sediment storage area should be excavated upstream of the rock pipe inlet protection, with a minimum depth of 18 inches below grade. The rock pipe inlet protection shall be inspected at least weekly and after any storm event of greater than ½ inch of rain per 24-hour period. Repairs shall be made immediately. Remove sediment when the volume of the sediment storage area has been decreased by one-half and replace the contaminated part of the gravel facing.

3.12 FIBER FILTRATION TUBES (FFTs) AND SEDIMENT LOGS

A. FFTs and sediment logs shall be placed along slopes to function as slope breaks and to minimize sediment transport and in diversions/channels to serve as check dams. The Contractor shall provide FFTs and sediment logs at all locations noted on the Contract Drawings, and at all other locations as may be directed by the Engineer.

B. FFTs and sediment logs shall be installed to maintain contact with the soil surface. Install prior to seeding. May be installed before or after installation of RECMs.

C. Anchor the upstream/upslope side of the FFTs using wire staples or approved devices at 1-foot intervals. Drive wooden stakes through downstream/downslope side of the FFTs at 2-foot intervals. Take care not to compress the FFTs. Backfill and compact loose soil against the upstream/upslope side. Overlap adjacent FFT ends by a minimum of 1 foot.

D. For channel installation, construct anchor trench 3 inches deep by FFT diameter and place loose soil against upstream side of FFT. For channel gradients of 2%, install trenches on 25-foot intervals. Decrease interval distance with steeper channel gradients or more highly erosive soils.

E. Any sediment accumulation at the base of the FFT must be removed when it reaches one-third of the height of the tube. FFT may need to be removed if fully loaded with captured sediment for maximum product performance. FFTs are to be left in place or removed from the site as directed by the Engineer.

F. Sediment logs do not require installation trenches. Wood stakes shall be placed at least every 2 feet along the length of the sediment log. Stakes shall only penetrate the netting around the log. They shall not be driven through the center of the log. Sediment logs are to be left in place or removed from the site as directed by the Engineer.

G. The FFTs and sediment logs shall be shall be inspected at least weekly and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period. Look for signs of flow undercutting the logs. Re-anchor and replace as necessary.

3.13 TEMPORARY AND PERMANENT CHANNELS

A. Temporary and permanent channels shall be designed, installed and maintained in accordance with the requirements of the TDEC, ESCH. The Contractor shall provide temporary and/or permanent channels at all locations noted on the Contract Drawings, and at all other locations as may be directed by the Engineer.

B. Remove all trees, brush, stumps, etc. from the channel area and dispose of properly.

C. Excavate the channel to the dimensions shown on the plans, over-excavating to allow for liner thickness. Remove and properly dispose of all excess soil so that surface water may enter the channel freely.

D. Armor the channel as specified on the Contract Drawings. If the specified channel lining requires an establishment period, protect the channel with mulch or a temporary liner sufficient to withstand anticipated velocities during this period.

E. During the establishment period, inspect channels weekly and after every rainfall. After lining has been fully established, inspect channels after any storm event of greater than ½ inch of rain per 24-hour period. Immediately make repairs.

F. Perform all channel construction to keep erosion and water pollution to a minimum. Immediately upon completion of the channel, vegetate all disturbed areas or otherwise protect them against soil erosion. Where channel construction will take longer than 21 days, stabilize channels by reaches.

G. Inspect the channel outlet and all road crossings for bank stability and evidence of piping or scour holes. Give special attention to outlets and points where concentrated flow enters the channel.

H. Maintain all vegetation adjacent to and in the channel in a healthy, vigorous condition to protect the area from erosion.

I. Remove all significant sediment accumulations to maintain the designed carrying capacity.

3.14 TEMPORARY SEDIMENT TRAPS, SEDIMENT BASINS, AND SKIMMER SEDIMENT BASINS

A. Temporary sediment traps sediment basins, and skimmer sediment basins shall be designed, installed and maintained in accordance with the requirements of the TDEC, ESCH. The Contractor shall provide these structures at all locations shown on the Contract Drawings and at all other locations as may be directed by the Engineer.

B. Care shall be taken to ensure that proper site preparation operations are conducted prior to trap or basin construction. Clear, grub and strip embankment location.

C. A cut-off trench shall be excavated along the center line of the earth fill embankment for sediment basins and skimmer sediment basins. Keep the trench dry during backfilling and compaction operations.

D. Fill material shall be free of roots, woody vegetation, rocks, and other objectionable materials. Fill shall be placed in 6 to 8 inch layers and compacted. Construct the embankment to an elevation 10 percent (minimum of 6 inches) higher than the design height to allow for settling.

E. Inlets to the sediment traps and basins shall be constructed so as to prevent erosion. Use diversions to divert sediment-laden water to the upper end of the basin.

F. Shape the sediment trap or basin to the specified dimensions.

G. Following construction of the embankment, clear the sediment trap or basin area below the crest elevation of the spillway to facilitate sediment cleanout. Provide access for cleanout of accumulated sediment.

H. Spillway/outlet configuration shall be constructed as specified below.

I. Temporary sediment trap

1. Construct riprap outlet in embankment. Use filter fabric or a keyway cutoff trench between the riprap and the soil to protect it from piping. The outlet weir must be level and constructed to grade to assure design capacity**.** Ensure that the stone spillway outlet extends downstream past the toe of the embankment until the outlet velocity is acceptable for the receiving stream. A combination of coarse aggregate and rip rap should be used. Smaller stone should be TDOT #3, #357, or #5 Coarse Aggregate and rip rap shall be Class A-1.

2. Provide emergency bypass in natural, stable areas, located so that flow will not damage the embankment.

J. Sediment basin

1. Securely attach the riser to the barrel or barrel stub to make a watertight structural connection. Secure all barrel connections with approved watertight assemblies. Install anti-seep collar(s) as noted on the Contract Drawings. Ensure that the pipe stays in firm contact with its foundation when compacting fill around the pipe. Do not use pervious material as backfill around the pipe. Anchor the riser to prevent floatation. Install trash guard to prevent the riser and barrel from becoming clogged.

2. Install basin dewatering mechanism as noted on the Contract Drawings.

3. Install outlet protection as specified at principal spillway outlet. Install the emergency spillway in undisturbed soil and provide stabilization as specified.

K. Skimmer sediment basin

1. Excavate a shallow pit under the skimmer or provide a low support of stone or timber under the skimmer to prevent the skimming device from settling into the mud.

2. Place the barrel on a firm, smooth foundation of impervious soil. Do not use pervious material to backfill around the pipe. Ensure that the barrel stays in firm contact with its foundation when compacting fill around the pipe.

3. Assemble the skimmer following the Manufacturer's instructions, or as designed.

4. Lay the assembled skimmer on a 3'x3' gravel pad on the bottom of the basin with the flexible joint at the inlet of the barrel pipe Attach the flexible joint to the barrel pipe and position the skimmer over the excavated pit or support. . The gravel pad will provide a resting place for the skimmer during low basin volumes, preventing the skimmer from becoming trapped in mud. Attach a rope to the skimmer and anchor it to the side of the basin so that the skimmer may be pulled to the side for maintenance.

5. Install the spillway in undisturbed soil to the greatest extent possible and line with laminated plastic or impermeable geotextile fabric. Anchor the edges of the

fabric in a trench with staples or pins. Install outlet protection as specified at the principal spillway outlet.

L. Install porous baffles in temporary sediment traps, sediment basins, and skimmer sediment basins as shown on the Contract Drawings and as specified herein. Porous baffles shall be designed, installed and maintained in accordance with the details provided in the Contract Drawings. The Contractor shall provide porous baffles at all locations noted on the Contract Drawings, and at all other locations as may be directed by the Engineer.

1. Care shall be taken when installing porous baffles so they perform as designed. Baffle material shall be secured at the bottom and sides of sediment trap or basin. Fabric shall not be spliced but a continuous piece shall be used across the trap or basin.

2. Install at least three rows of baffles between the inlet and outlet discharge point. Sediment traps and basins less than 20 feet in length may use 2 baffles.

3. Posts or saw horses shall be installed across the width of the sediment trap or basin unless an alternate baffle configuration is shown on the Contract Drawings. Steel posts shall be driven to a depth of 24 inches, spaced a maximum of 4 feet apart. Baffle weirs shall be installed at locations and according to details on the Contract Drawings. Except in locations of baffle weirs, the top of the fabric shall be 6 inches higher than the invert of the spillway and 2 inches lower than the top of the berms.

M. Sediment traps and basins shall be constructed so that the area disturbed and resulting erosion is minimized. The emergency spillway, embankment, and all other disturbed areas above the crest of the principal spillway are to be stabilized immediately after construction.

N. Sediment traps and basins may attract children and should be considered dangerous. Steep side slopes should be avoided and fences with warning signs may be necessary if trespassing is likely.

O. Inspect temporary sediment traps, sediment basins, and skimmer sediment basins once a week and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period. Repairs shall be made immediately.

1. Sediment, limbs and other debris shall be cleared and the trap or basin shall be restored to its original dimensions when it accumulates to one-half the design depth or more frequently as directed by the Engineer. Sediment material removed from traps and basins shall be disposed of by the Contractor in locations that will not result in off-site sedimentation as acceptable to the Engineer, at no additional cost to the Owner. If no suitable on site locations are available, all such sediment will be legally disposed of off site, at no additional cost to the Owner.

2. The embankment, spillways and outlet shall be checked for erosion damage and the embankment shall be checked for piping and settlement. Immediately fill any

settlement of the embankment to slightly above design grade. Any riprap displaced from the spillway must be replaced immediately. Replace contaminated gravel facing of riprap outlets as necessary. Inspect vegetation. Reseed and re-mulch as necessary.

3. Baffles, fabric and skimmer shall be inspected for damage. Repairs shall be made immediately. Re-anchor baffles if water is flowing under or around them.

4. Debris shall be removed from the skimmer to prevent clogging. Special precautions shall be taken in winter to prevent the skimmer from plugging with ice.

3.15 OUTLET STABILIZATION STRUCTURE

A. Outlet stabilization structures shall be designed, installed and maintained in accordance with the requirements specified in the TDEC, ESCH.

B. The Contractor shall ensure the subgrade, riprap and gravel filter conforms to the grading limits shown on the plans.

C. Riprap shall be installed in accordance with the specifications contained herein, with filter fabric placed under the riprap.

D. The apron shall be constructed on zero grade with no overfill. Ensure the apron is properly aligned with the receiving stream.

E. All disturbed areas shall be stabilized with vegetation immediately after construction.

F. Outlet stabilization structures shall be inspected at least weekly and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period to see if any erosion around or below the riprap has taken place or if stones have been dislodged. Repairs shall be made immediately.

3.16 FLEXIBLE GROWTH MEDIUM

A. Flexible growth medium shall be applied and maintained in accordance with the requirements detailed herein. If Manufacturer’s recommendations are more stringent, they shall supersede.

B. Grade area according to the Contract Drawings and prepare seedbed in accordance with this Section and Section 2910 – Final Grading and Landscaping.

C. Apply flexible growth medium at rate noted on the Contract Drawings. Application may be made either in conjunction with application of seed and fertilizer or following application of seed and fertilizer. Slope interruption devices are recommended when slope lengths exceed 100 feet. Traffic shall be kept off treated areas.

D. Areas treated with flexible growth medium shall be inspected at least weekly and within 24 hours after any storm event of greater than ½ inch of rain per 24-hour period until vegetation is established. Reapply in areas where seedling emergence is poor.

3.17 TREE PROTECTION FENCE

A. Tree protection fence shall be installed and maintained in accordance with the details provided on the Contract Drawings. If Manufacturer's recommendations are more stringent, they shall supersede.

B. Install tree protection fence around all designated tree protection areas prior to clearing, deliveries, and other construction activities onsite. Post signs designating area as protected on all sides of the fencing.

C. Inspect tree protection fence weekly. Repair and replace as needed.

3.18 ADDITIONAL REQUIREMENTS

A. All storm sewer piping shall be blocked at the end of every working day until the inlet is constructed above grade.

B. All streets around the construction area shall be scraped as necessary to prevent accumulation of dirt and debris.

C. The Contractor shall provide adequate means to prevent any sediment from entering any storm drains, curb inlets (curb inlet filter box), ditches, streams, or bodies of water downstream of any area disturbed by construction. Excavation materials shall be placed upstream of any trench or other excavation to prevent sedimentation of offsite areas. Silt fence will be provided, at no additional cost to the Owner, around excavation materials if deemed necessary by the Engineer. In areas where a natural buffer area exists between the work area and the closest stream or water course, this area shall not be disturbed.

D. The Engineer may direct the Contractor to place any additional sediment and erosion control devices at other locations not shown on the Drawings.

3.19 INSPECTIONS AND MAINTENANCE

A. The Contractor shall designate an Authorized Representative to perform inspections and maintenance as described herein. During inspections the following will be observed and appropriate maintenance activities shall be performed:

1. The conformance to specifications and current condition of all erosion and sediment control structures.

2. The effectiveness and operational success of all erosion and sediment control measures.

3. The presence of sediments or other pollutants in storm water runoff at all runoff discharge points.

4. The presence of sediments or other pollutants in receiving waters.

5. Evidence of off-site tracking at all locations where vehicles enter or exit the site.

6. Evidence of impacts to water quality due to site activities pertaining to equipment operation and maintenance, material handling, and material storage and construction laydown areas exposed to precipitation.

B. Immediate action shall be taken to repair/maintain erosion and sediment control measures that are not performing as designed. The State reserves the right to stop all construction activities not related to these measures until such deficiencies are repaired.

C. In areas that have undergone final stabilization, inspections and, if necessary, maintenance by Contractor will occur at least once per month for the duration of the contract or project, whichever is longer.

3.20 MONITORING AND REPORTING

A. Monitoring: The Contractor shall be responsible for the implementation of the Inspections and Maintenance Procedures as included in the approved erosion and sediment control plan. The implementation must comply with guidelines as set forth in the NPDES General Permit TNR100000 (Appendix F: Minimum Requirements for Stormwater Pollution Prevention Plan: Reporting and Recordkeeping Requirements), as well as those of any local regulatory authorities. Minimum monitoring requirements are as follows:

1. A rain gauge shall be maintained in good working order on the site.

2. A written record of the daily rainfall amounts shall be retained. (Note: if no rainfall occurred the Contractor must record “zero”).

3. The control measures shall be inspected to ensure that they are operating correctly. Inspection records must be maintained for each inspection event and for each measure. All erosion and sedimentation control measures must be inspected by the Contractor at least once every seven calendar days and within 24 hours after any storm event of greater than ½ inch of rain per 24 hour period unless otherwise noted herein. Some measures require inspection following each rainfall event.

4. Once land disturbance has begun on the site, stormwater runoff discharge outfalls shall be inspected by observation for erosion, sedimentation and other stormwater discharge characteristics such as clarity, floating solids, and oil sheens. Inspections of the outfalls shall be made at least once every seven calendar days and within 24 hours after any storm event of greater than ½ inch of rain per 24 hour period. Inspection records must be maintained for each inspection event and for each discharge location.

5. If any visible sedimentation is leaving the site or entering waters of the State, corrective action shall be taken immediately to control the discharge of

sediments. **Where visible deposition of sediment has occurred in surface waters or wetlands, the Contractor must verbally contact the Engineer and the Division of Water Pollution within 24 hours of becoming aware of the deposition. Written notification shall be made to the Engineer and the Division of Water Pollution within 5 days of becoming aware of the deposition.**

B. Reporting: The Contractor must keep a record of inspections onsite with a copy of the approved erosion and sediment control plan. Inspection records shall be made available to DWP or its authorized agent upon request. Copies of inspection records shall be sent to the Engineer on a monthly basis. The records must provide the details of each inspection including observations and corrective actions taken as described below. The required rainfall and monitoring observations shall be recorded on an "Inspection Record for Activities Under Stormwater General Permit TNR100000" form provided in Appendix D of the Permit, or a similar inspection form that is inclusive of all of the elements contained in the Division's form

1. Control Measure Inspections: Inspection records must include at a minimum: 1) identification of the measures inspected, 2) date and time of the inspection, 3) name of the person performing the inspection, 4) indication of whether the measures were operating properly, 5) description of maintenance needs for the measure, 6) corrective actions taken and 7) date of actions taken.

2. Stormwater Discharge Inspections: Inspection records must include at a minimum: 1) identification of the discharge outfall inspected, 2) date and time of the inspection, 3) name of the person performing the inspection, 4) evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5) indication of visible sediment leaving the site, 6) actions taken to correct/prevent sedimentation and 7) date of actions taken.

3. Visible Sedimentation Found Outside the Site Limits: Inspection records must include 1) an explanation as to the actions taken to control future releases, 2) actions taken to clean up or stabilize the sediment that has left the site limits and 3) the date of actions taken.

4. Visible Sedimentation Found in Streams or Wetlands: All inspections should include evaluation of streams or wetlands onsite or offsite (where accessible) to determine if visible sedimentation has occurred.

5. Visible Stream Turbidity – If the discharge from a site results in visible stream turbidity, inspection records must record that evidence and actions taken to reduce sediment contributions.

C. The State reserves the right to use its own resources to duplicate monitoring and verify the work required by the Contractor in this section.

D. Sites discharging to streams named on the state's 303(d) list as impaired for sediment-related causes may be required to perform additional monitoring, inspections or application of more stringent management practices if it is determined that the additional requirements are needed to assure compliance with the federal or state impaired-waters

conditions. Inspection records must be maintained for each inspection event and for each discharge location. If a discharge covered by this permit enters a stream segment that is listed on the Impaired Stream List for sediment-related causes, and a Total Maximum Daily Load (TMDL) has been prepared for those pollutants, the Permittee must implement measures to ensure that the discharge of pollutants from the site is consistent with the assumptions and meets the requirements of the approved TMDL. The TDEC Division of Water Pollution 303(d) list can be found at: http://www.tn.gov/environment/water.shtml.

3.21 REMOVAL OF TEMPORARY SEDIMENT CONTROL STRUCTURES

A. At such time that temporary erosion and sediment control structures are no longer required under this item, the Contractor shall notify the Engineer of its intent and schedule for the removal of the temporary structures. The Contractor shall obtain the Engineer's approval in writing prior to removal. Once the Contractor has received such written approval from the Engineer, the Contractor shall remove, as approved, the temporary structures and all sediments accumulated at the removed structure shall be returned upgrade and stabilized so they do not re-erode. In areas where temporary control structures are removed, the site shall be left in a condition that will restore original drainage. Such areas shall be evenly graded and seeded as specified in Section 02910 - Final Grading and Landscaping.

- END OF SECTION -

(The Inspection Record for Activities under Stormwater General Permit TNR100000 are included in the SWPPP)

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SECTION 02445

BORED OR TUNNELED HIGHWAY/RAILROAD CROSSING

PART 1 – GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all labor, equipment and materials and perform all operations in connection with the complete installation of a bored casing or tunnel liner, as specified herein and as shown on the Drawings. The Contractor shall be responsible for the structural design of the tunnel liner plates and casing pipe and coordinating work in this Section with related work specified elsewhere in this Contract so as to provide all hardware and accessories for a complete installation.

B. The highway/railroad crossing(s) shall comply with standards set forth by the “Standard Specifications for Pipelines Conveying Flammable and Non-Flammable Substances" from the American Railway Engineering Association, and the "Standard Specifications for Highway Bridges" from AASHTO (Latest Revision).

C. All parts of the materials furnished shall be amply designed, manufactured and constructed for the maximum stresses occurring during fabrication and erection. All materials shall be new and both workmanship and materials shall; be of the very best quality, entirely suitable for the service to which they will be subjected and shall conform to all applicable sections of these Specifications. Manufacturer's designs shall accommodate all the requirements of these Specifications.

PART 2 -- SUBMITTALS

2.01 Shop Drawings

A. The Contractor shall submit Shop Drawings, Material Certification, design certifications and other information as specified for all materials in this Section in accordance with Section 1, General. Shop Drawings shall also include complete erection, installation, and adjustment instructions and recommendations.

PART 3 -- PRODUCT

3.01 CASING PIPE

A. The casing pipe shall be smooth wall or spiral welded steel pipe with a minimum yield strength of 35,000 psi. The minimum pipe size and wall thickness shall be as indicated in the table below. Actual thickness shall be determined and certified after design by the Contractor. All joints shall be butt welded with a full depth, single "V" groove weld. The casing pipe shall conform to ASTM A 139, Grade B (without hydro-test) or ASTM A53, Grade B (without hydro-test). The carrier pipe shall be Ductile Iron as specified in Section 4, unless otherwise noted herein.

3.02 MANUFACTURERS

A. The materials covered by these Specifications are intended to be standard materials of proven reliability and as manufactured by reputable manufacturers having experience in the production of such materials. The materials furnished shall be designed, constructed, and installed in accordance with the best practices and methods. Refer to Section 02220 – Casing Installation

PART 4 -- EXECUTION

4.01 INSTALLATION - GENERAL

A. The Contractor shall be responsible for the design, adequacy and methodology of the bored and jacked casing pipe or tunnel liner plate installation. The Contractor shall submit the proposed method of installation, detailed layout information, methods to be implemented if unusual or adverse soil conditions (i.e.: running sand, water, etc.) are encountered during installation, and design certifications, all sealed and signed by a professional engineer registered in the State of North Tennessee to the Engineer prior to starting work.

B. The Contractor shall have the option of providing, either a bored and jacked casing pipe or a tunnel liner plate installation or a combination of both at the location(s) and in conformance with the lines and grades, shown on the Drawings.

C. If a combination of casing and tunnel is required, details of the proposed junction shall be submitted to and approved by the Engineer.

D. The recommended methods and details shown on the Drawings and specified herein, are intended to indicate the minimum acceptable standard of quality required for the casing/tunnel installation. Other methods of installation, based on acceptable industry standards and techniques, may be acceptable for the installation. Under no conditions shall jetting or wet boring of the casing/tunnel be allowed.

E. All excavations and pits shall be well sheeted and braced as necessary for safe and adequate access for workmen, inspections, and materials and shall be of a size suitable to equipment and material handling requirements.

F. All of the Contractors plans, specifications and design computations for pit shoring shall be sealed and signed by a Professional Engineer registered in the State of Tennessee.

G. All pits required for the installation of the casing/tunnel and located within right-of-way shall be completely isolated from the roadway traffic with precast concrete barriers.

4.02 BORING AND JACKING

A. Boring and jacking installations shall be jacked through dry bores slightly larger than the pipe bored progressively ahead of the leading edge of the advancing pipe as spoil is mucked by the auger back through the pipe. As the dry boring operation progresses, each new section of the casing pipe shall be 360° butt-welded, using a full depth, single "V" groove weld, to the next section previously jacked into place.

B. The boring equipment to be used for installing the jacked casing shall be of such size and capacity to allow the boring to proceed in a safe and expeditions manner. The installation of the casing and boring of the hole shall be done as rapidly as possible and shall be done simultaneously to avoid voids, cave-ins or settlement and for safety of traffic above.

C. A special lubricant may be used to facilitate movement or lessen the danger of jacked pipe from freezing.

D. If voids are encountered or occur outside the casing pipe, grout holes shall be installed in the top section of the casing pipe at 10 foot (maximum) centers and the voids filled with 1:3 Portland Cement to sand grout with sufficient water added to produce a flowable mixture and at sufficient pressure to prevent settlement. **The Contractor shall be prepared to bore through weathered or partially weathered rock, if encountered, with a specialized bit.** Costs associated with this provision shall be deemed as included in the Unit Price Bid for each location and no additional payment will be made.

E. In the event an obstruction is encountered during the boring and jacking operation, and the casing pipe is at least 30-inches in diameter, the auger shall be withdrawn and the obstruction removed. If a bolder is encountered and is removed by blasting or other approved method, the void shall be filled with grout, as previously specified. No blasting shall be permitted until a detailed blasting plan is submitted to and approved by the Engineer.

4.03 CASING/TUNNEL ALIGNMENT

A. The Contractor shall check the vertical and horizontal alignment of the casing/tunnel by survey instrument at least once during each four feet of advance, or as directed by the Engineer.

4.04 CARRIER PIPE CRADLE INSTALLATION

A. Following completion of the tunnel excavation and grouting operations, a concrete pipe cradle shall be formed and poured as shown on the Drawings. The forms shall be constructed of wood, poured into place with concrete at a spacing adequate to support the carrier pipe. The forms shall be placed such that they produce a true cradling channel whereby the pipe shall be skidded into place on its required alignment and grade. In lieu of the wood cradle, adequately designed and spaced pipe alignment guides (spiders) may be used to slide the pipe along the concrete pipe cradle. The concrete pipe cradle can be eliminated when using a casing pipe with pipe alignment guides.

4.05 CARRIER PIPE INSTALLATION

A. For all casing installations the carrier pipe shall be installed with adequately designed and spaced pipe alignment guides "spiders", secured, and bulkheaded as shown on the Drawings. The proposed procedure to install the carrier pipe is to "bell-up" the pipe outside the casing and push the carrier pipe through the casing.

B. Following completion of the tunnel liner plate installation and pipe cradle operations, the carrier pipe shall be installed, secured, bulkheaded, and grout backfilled, as shown on the Drawings. The proposed procedure to install "push-on" type carrier pipe is one joint at a

time, skidding it into place. Upon reaching the proper stationing, the pipe spigot shall be jacked up to the appropriate grade and wood blocking shall be placed under it and the pipe shall be belled up. Wood blocking to prevent flotation shall be placed at the pipe crown and springline locations. The proposed procedure to install "restrained joint" type carrier pipe is to "bell-up" the pipe outside the tunnel and push the carrier pipe through the tunnel. Blocking to prevent flotation shall be attached to the casing/tunnel prior to the installation of the restrained joint carrier pipe. Stationing of the blocking shall be such that when the pipe installation is complete, the blocks are located at the pipe bells. Blocking shall be set so that as the pipe slides through the tunnel, the pipe bells will have a clearance of ±1/2". In lieu of the wood cradle, adequately designed and spaced pipe alignment guides may be used to slide the carrier pipe along the concrete pipe cradle.

C. Concrete brick and mortar bulkheads with air and water vent holes shall be constructed at the terminal ends of the casing/tunnel.

D. In addition, a Class B concrete cradle shall be provided from the end of the casing/tunnel bulkhead to the first pipe joint outside the casing/tunnel.

4.06 SURFACE SETTLEMENT MONITORING

A. Prior to the beginning of any casing/tunnel excavation, a surface settlement monitoring grid system shall be installed on the highway/railroad. This grid shall consist of PK nails installed along the tunnel centerline at ten (10) foot intervals. Additional lines of PK nails shall be installed ten feet each side of the centerline. These points shall be initially read and the elevations recorded prior to the start of the casing/tunnel construction. If no visible settlement is occurring during casing/tunnel excavations, these points shall be read only at such times as the Contractor's surveyor is present to transfer the line and grade into the casing/tunnel. These points shall be checked and elevations recorded on a daily basis, until the casing/tunnel installation is completed.

- END OF SECTION -

SECTION 02500

SURFACE RESTORATION

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Provide all labor, equipment, and materials necessary for final grading, topsoil placement, and miscellaneous site work not included under other Sections but required to complete the work as shown on the Drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02200 - Earthwork

B. Section 02276 - Erosion and Sedimentation Control

C. Section 02910 - Final Grading and Landscaping

PART 2 -- MATERIALS

2.01 TOPSOIL

A. Topsoil shall meet the requirements of Section 02200 – Earthwork.

PART 3 -- EXECUTION

3.01 FINAL GRADING

A. Following approval of rough grading the subgrade shall be prepared as follows:

1. For riprap, bare soil 24 inches below finish grade or as directed by Engineer.

2. For topsoil, scarify 2-inches deep at 4 inches below finish grade, minimum, match existing.

3.02 TOPSOIL PLACEMENT

A. Topsoil shall be placed over all areas disturbed during construction under any contract except those areas which will be paved, graveled or rip rapped.

B. Topsoil shall be spread in place for lawn and road shoulder seed areas at a 6-inch consolidated depth and at a sufficient quantity for plant beds and backfill for shrubs and trees.

C. Topsoil shall not be placed in a frozen or muddy condition.

D. Final surface shall be hand or mechanically raked to an even finished surface to finish grade as shown on Drawings.

E. All stones and roots over 3-inches and rubbish and other deleterious materials shall be removed and disposed of.

F. Prior to spreading seed and fertilizer al disturbed areas shall be thoroughly combed with a mechanical device for removing stones such as a Rock Hound or Harley Rake.

- END OF SECTION -

SECTION 02510

PAVING AND SURFACING

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all labor, equipment and materials and perform all operations in connection with the construction of asphalt concrete pavement, asphalt concrete overlay, reinforced concrete pavement, gravel roads, concrete curb and gutter, repair and reconstruction of existing asphalt concrete pavement, repair of existing gravel roads, and pavement markings complete as specified herein and as detailed on the Drawings.

B. All new roads including the replacement of portions of the existing roads shall be to the limits, grades, thicknesses and types as shown on the Drawings. Patches for pipe crossings and areas damaged during the construction work shall be asphalt and/or gravel, depending upon the material encountered, unless otherwise indicated.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Requirements of related work are included in Division 1, Division 2 and Division 3 of these Specifications.

1.03 RELATED SECTIONS

A. Section 02200 - Earthwork

B. Section 03300 - Cast-In-Place Concrete

1.04 STANDARD SPECIFICATIONS

A. Except as otherwise provided in the Specifications or on the plans, all work shall be in accordance with the Tennessee Department of Transportation Standard Specifications for Roads and Bridge Construction, 2015 except that any reference to "TDOT", "Department" or "Unit" shall mean the "Owner".

B. Except with the approval of the Engineer, the placing of concrete or asphalt concrete surface paving shall be subject to the Seasonal and Weather Restrictions set forth in TDOT Specifications.

1.05 UTILITY ROAD CUTS

A. Contractor is required to immediately cold patch any road cut crossings on the project if the re-paving of the road cut is scheduled for a later date. All cold patch pavement work for temporary road cut crossings must be approved by Owner prior to allowing vehicle traffic over the road cut crossing. Gravel at the surface of road cuts will not be allowed without prior approval by the Owner. Contractor is also required to complete daily inspection of all

temporary road cuts after rainfall events, including weekends, until all temporary road cuts have been paved. No additional payment will be made for temporary cold asphalt patches.

PART 2 -- MATERIALS

2.01 SELECT FILL

A. The Contractor shall place select fill as necessary to complete the embankments, shoulders, subgrade foundation and replacement for removed unsuitable material in accordance with TDOT Section 2, and Section 02200, Earthwork.

2.02 GRAVEL

A. All work, including materials, associated with gravel shall be in accordance with TDOT Section 903.05.

2.03 AGGREGATE STABILIZATION

A. All work, including materials, associated with Aggregate Stabilization shall be in accordance with TDOT Section 300.

2.04 AGGREGATE BASE COURSE (ABC)

A. All work, including materials, associated with Aggregate Base Course shall be in accordance with TDOT Section 303, Mineral Aggregate Base Course, except that Articles 303.14 and 303.15 shall be deleted. Type "A" or "B" aggregate will be acceptable for this project.

2.05 ASPHALT BINDER FOR PLANT MIX

A. All work, including materials, associated with asphalt binder shall be in accordance with Section 407, Bituminous Plant Mix. of the TDOT Standard Specifications for Road and Bridge Construction, except Articles 407.19 and 407.20 shall be deleted.

2.06 ASPHALT PAVEMENTS

A. All work, including materials, associated with asphalt pavement shall be in accordance with Section 411, Asphalt Concrete Surface, of the TDOT Standard Specifications for Road and Bridge Construction, except Articles 411.09 and 411.10 shall be deleted.

B. The job mix formulas shall be delivered to the Engineer at least two (2) weeks prior to beginning paving operations.

2.07 RIGID PORTLAND CEMENT CONCRETE PAVEMENT

A. All work, including materials associated with rigid concrete pavement shall be in accordance with Section 03300, Cast-In-Place Concrete. Class A concrete shall be used. Placement

shall be in accordance with Section 03300 and TDOT Section 501, General Requirements for Portland Cement Concrete Pavement

2.08 RIGID CONCRETE PAVEMENT REINFORCING

A. Reinforcing, if specified, shall be as shown on the Structural Drawings and as specified under Section 03200, Reinforcing Steel.

2.09 CONCRETE CURB AND GUTTERS

A. Concrete shall be Class B in accordance with the requirements of Section 03300, Cast-In-Place Concrete, except that concrete shall be air-entrained to provide an air content of 6% ± 1.5%.

B. Premolded expansion joint filler for expansion joints shall conform to ASTM D 1751 and shall be 1/2-inch thick, minimum.

2.10 ASPHALT TACK COAT

A. All work, including materials, associated with asphalt tack coat shall be in accordance with Section 403, Asphalt Tack Coat, of the TDOT Standard Specifications for Roads and Bridge Construction, except that Article 403.06 and 403.07 shall be deleted.

PART 3 -- EXECUTION

3.01 EMBANKMENT

A. The embankment shall be constructed in accordance with Section 02200, Earthwork.

3.02 SUBGRADE

A. The subgrade, where shown on the Drawings, shall be aggregate stabilized by the addition and mixing of coarse aggregate with the top 3-inches of subgrade in accordance with TDOT Section 302. Aggregate stabilization shall be applied to the subgrade at a rate of 300-pounds per square yard. Following the application of stabilizer aggregate, the subgrade shall be formed true to crown and grade, and shall be compacted with a minimum of four (4) passes of a 15-ton vibratory roller to conform to the maximum densities determined by AASHTO T99 Standard Specifications.

3.03 BASE COURSE

A. The finished base course of all paving shall be ABC and shall be of the thickness shown on the Drawings, formed true to crown and grade. Gravel roads, including repair to existing gravel roads shall be ABC and shall be of the thicknesses shown on the Drawings, formed true to crown and grade. No fill material except new ABC shall be placed on top of existing gravel.

3.04 ASPHALT BASE COURSE (OR INTERMEDIATE COURSE)

A. Asphalt Concrete Base (or Intermediate) Course shall be placed in accordance with TDOT Standard Specifications for Roads and Bridge Construction Section 407.14, Spreading and Finishing. Asphalt Concrete Base (or Intermediate) Course shall be compacted in accordance with TDOT Standard Specifications for Roads and Bridge Construction Section 407.15, Compaction. Thicknesses shall be as shown on the Drawings.

3.05 ASPHALT CONCRETE SURFACE COURSE

A. Prior to placement of the asphalt concrete surface course, the base/intermediate course shall be inspected for damage or defects and repaired to the satisfaction of the Engineer. The surface of the base/intermediate course shall be approved by the Engineer.

B. The asphalt tack coat shall be applied to the surface of the approved base/binder course as described in TDOT Section 403. Equipment for applying the tack coat shall be power-oriented pressure spraying or distributing equipment suitable for the materials to be applied and approved by the Engineer.

C. The Asphalt Concrete Surface Course shall be placed and compacted on the base/intermediate course in layers not to exceed 2-inches and at the rate of 110-pounds per square yard per inch. Surface Course shall be compacted in accordance with TDOT Standard Specification for Roads and Bridge Construction Section 407.15. Thicknesses shall be as shown on the Drawings.

3.06 RIGID PORTLAND CEMENT CONCRETE

A. The subgrade and base course beneath portland cement concrete pavement shall be prepared in accordance with the applicable Sections of these Specifications and referenced Standard Specifications, except that the Contractor shall use an approved automatically controlled fine grading machine to produce final subgrade and base surfaces meeting the lines, grades, and cross sections (thicknesses) shown on the Drawings or established by the Engineer.

B. The surface of the base shall be damp at the time the concrete is placed. The Contractor shall sprinkle the base when necessary to provide a damp surface. The Contractor shall satisfactorily correct all soft areas in the subgrade or base prior to placing concrete.

C. Hauling over the base course shall not be allowed except where specifically permitted by and in writing by the Engineer. The Engineer may allow equipment dumping concrete to operate on the base to the extent and under the conditions the Engineer deems necessary to facilitate placing and spreading the concrete.

D. Installation of the rigid concrete pavement shall be in accordance with the details shown on the Drawings and Division 3 - Concrete. The rigid concrete pavement shall cure a minimum of ten (10) calendar days and until the concrete has attained a minimum flexural strength of 550 psi as indicated by flexural strength testing. Flexural testing shall be paid for under the Soils and Concrete Testing cash allowance. The Contractor shall provide assistance to the testing firm in obtaining samples. The Contractor shall dispose of and clean up all excess material.

E. Contraction joints shall be spaced at intervals as shown on the Drawings. Transverse contraction joints shall be formed by an approved joint insert. Expansion joints shall be placed when the pavement abuts a structure using 1-inch expansion joint material (filler) and sealant as specified herein.

3.07 CONCRETE CURB AND GUTTER

A. The expansion joint filler for concrete curb and gutters shall be cut to conform with the cross section of the curb. Expansion joints shall be spaced at intervals of not more than 25-feet. Formed control joints shall be installed at intervals not exceeding 10 feet. Depth of joint shall be 1/3 the thickness. Curved forms shall be used where radii are indicated; straight segments shall not be permitted. Upon removal of the forms, exposed curb faces shall be immediately rubbed down to a smooth and uniform surface. No plastering shall be permitted.

3.08 UNDERGROUND UTILITY LINES

A. Where an underground utility line is beneath the new roadway, the backfilling shall be carried out with special care, and the final consolidation shall be accomplished by a vibratory roller. Construction of the roadway over the trench shall be deferred as long as practicable.

3.09 JUNCTION WITH OTHER PAVING

A. Where new asphalt concrete pavement abuts existing asphalt concrete pavement, the existing pavement shall be cut back to insure obtaining the specified compaction of the new pavement courses and interlocking adjoining courses. Existing subbase courses shall be cut back from the subgrade level of the new pavement on a one-on-one slope into the existing pavement, and the asphalt courses of the existing pavement shall be removed for an additional 6-inches back from the slope. The edge of the existing asphalt courses shall be saw cut straight and true. The faces between new and existing asphalt courses shall receive an application of tack coat.

B. Where new rigid concrete pavement abuts existing rigid concrete or asphalt concrete paving, the existing paving shall be saw cut straight and true. An expansion joint of a 1/2-inch minimum thickness with filler material and sealant shall be placed between the new concrete pavement and the existing rigid concrete or asphalt concrete paving.

3.10 ASPHALT CONCRETE OVERLAY

A. Where asphalt concrete is proposed to be placed over an existing asphalt or rigid concrete surface, the surfaces shall be thoroughly cleaned by power brooming and a tack coat shall be applied in accordance with TDOT Section 403, Tack Coat, of the TDOT Standard Specifications for Road and Bridge Construction, prior to installing the overlay. The overlay shall be applied in accordance with Subsections 2.06 and 3.05 and Standard Details shown on the Drawings.

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SECTION 02604

UTILITY STRUCTURES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish all materials, labor, equipment, and tools required for the design, fabrication, delivery and installment of utility structures and appurtenances in accordance with the Drawings and as specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02200 – Earthwork

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. ASTM C990 – Sealing Compound, Preformed Plastic, For Expansion Joints And Pipe Joints

2. ASTM C32 - Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)

3. ASTM C129 - Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes

4. ASTM C478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections

5. ASTM C857 – Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures

6. ASTM C923 - Standard Specification for Resilient Connections Between Reinforced Concrete Manhole Structures, Pipes and Laterals

1.04 SUBMITTALS

A. Submit samples and/or Shop Drawings in accordance with Section 01300, Submittals.

B. In addition to items listed in Section 03400, Precast Concrete, Shop Drawings shall include, but not be limited to:

1. Complete layout and installation Drawings and schedules with clearly marked dimensions.

2. Material certificates on all materials.

3. Structural design calculations sealed by a P.E. registered in Tennessee. Design calculations for precast manholes and vaults shall include confirmation structures adequately resist flotation when they are totally empty and subjected to groundwater full height of structure.

4. Results of leakage test.

C. A certification letter from the Pre-caster and admixture Supplier shall be included with the Manhole submittal confirming the correct product and amount will be added to the concrete mix.

PART 2 -- PRODUCTS

2.01 PRECAST MANHOLES, VAULTS, AND METER BOXES

A. Precast utility structures shall be furnished with waterstops, sleeves and openings as noted on the Drawings. Box out for wall pipes shall conform accurately to the sizes and elevations of the adjoining pipes. Precast utility structures shall be watertight and conform to the requirements of ASTM C 478 and ASTM C857 with the following modifications there to:

1. Materials shall conform to Section 03400, Precast Concrete.

2. Manholes shall meet the following:

a. Manhole section shall have an internal minimum diameter of 4'-0", unless noted otherwise.

b. Minimum manhole wall thicknesses shall be 5 inches for 4 foot diameter manholes, 6 inches for 5 foot diameter manholes, 7 inches for 6 foot diameter manholes and 8 inches for 7 foot diameter manholes, and 9 inches for 8 foot diameter manholes.

c. Manholes and utility structures shall include ballast concrete and/or other means necessary to insure manholes resist flotation when empty and subjected to groundwater full height of structure.

d. Precast manholes and utility structures shall be as manufactured by Permatile Concrete Products, Tindall Products, or equal.

3. The date and name of manufacturer shall be marked inside each precast section.

4. No more than two lift holes may be cast or drilled in each section.

5. Dimensions shall be as shown on the Drawings.

6. Covers and frames shall be as specified in Section 2.13.

B. Joints between manhole and utility structures riser sections and at base slabs shall be groove type.

2.02 BRICK

A. Brick is prohibited for casting grade adjustment.

2.03 MORTAR

A. Mortar shall conform to Section 04100 Mortar and Masonry Grout.

2.04 CONCRETE

A. Concrete shall conform to Section 03300, Cast-in-Place Concrete.

2.05 REINFORCING

A. Reinforcing shall conform to Section 03200, Reinforcing Steel.

2.06 PRECAST CONCRETE

A. Precast concrete shall conform to Section 03400, Precast Concrete.

2.07 CASTINGS

A. Castings shall conform to Section 05540, Castings. Casting shall be of the type and size indicated on the Drawings.

2.08 STEPS

A. Steps shall be constructed of Grade 60 steel reinforcing rod (min. 1/2-inch) and completely encapsulated with a wear resistant and chemical resistant rubber.

B. Each step shall have a minimum vertical load resistance of 800 pounds and a minimum pull-out resistance of 400 pounds.

C. The steps shall have 11-inch minimum tread width and shall be placed at 16-inches on center, as shown on the Drawings.

D. Steps shall be cast in place with the concrete.

E. Steps shall only be installed as shown on the Drawings or required in the Specifications.

2.9 JOINT SEALANT

A. Joint sealant rope sealing the tongue and groove joints shall be a Preformed Flexible Compound conforming to the requirements of ASTM C990, "Sealing Compound, Preformed Plastic for Pipe Joints", Type I, Rope Form.

2.10 JOINT WRAP

A. Joint wrap shall be a Butyl adhesive tape with EPDM rubber backing. Butyl shall consist of 50% min. butyl rubber, contain 2% or less volatile matter, and be 0.03" thick with a 0.045" EPDM rubber backing. The tape shall be 6" wide and overlapped at least twice its width without stretching and applied on a surface freshly cleaned and dried primed (2" wider than the width of the tape). Wrap shall be manufactured by Press-Seal Corp. model EZ-WRAP or approved equivalent.

2.11 FLEXIBLE RUBBER SLEEVE

A. The spring set type shall have a stainless steel interior power sleeve or expander and shall be the PSX assembly by Press-Seal Gasket Corporation or the Kor-N-Seal II 206 Series assembly by Trelleborg Pipe Seals.

B. The cast-in-place type shall conform to ASTM C923 and shall include stainless steel take up clamps.

C. Flexible seal assemblies shall permit at least an eight (8) degree deflection from the center line of the opening in any direction while maintaining a watertight connection.

2.12 RUBBER BLADDER

A. The rubber bladder sealing the casting to the cone section when multiple grade rings are used shall conform to ASTM C923 suitable for pressure testing at 10 psi minimum, with a 3/8-inch minimum wall thickness.

B. The rubber bladder seal shall contain an environmentally safe, anti-bacterial compound which turns into a high viscosity gel when in contact with pressurized water.

C. The rubber bladder seal shall be LSS Internal Chimney Seal by Cretex, or equal.

2.13 COVERS AND FRAMES

A. Covers and frames shall comply with Section 05540, Castings and shall be provided by the utility structure manufacturer.

B. Manhole covers and frames shall meet the following requirements:

1. Locate so that there is ready access to the manhole steps

2. Clear opening shall be a minimum of 24 inches, unless otherwise indicated on the Drawings.

3. Watertight manhole frames and covers shall be suitable for 20 psi internal pressure and shall be US Foundry & Mfg. Corp model USF 755 Ring & ON Cover BWT with City of Johnson City Logo.

4. Non-watertight manhole covers shall contain the City of Johnson City Logo, non-perforated.

C. All frames and covers shall be given one shop coat of asphalt or coal tar varnish, unless otherwise specified.

D. Frames and covers shall be identical throughout the Contract.

2.14 GRATES

A. Grates are prohibited.

2.15 CONCRETE BALLAST

A. Concrete ballast shall be Class B concrete in conformance with Section 03300, Cast-in-Place Concrete. Ballast shall be provided as necessary to ensure manhole resists flotation when empty and subjected to full height groundwater conditions.

2.16 FLEXIBLE JOINT SEALER

A. Flexible joint sealer shall be a rubber ring waterstop as manufactured by Fernco Joint Sealer Co., or equal.

2.17 EPOXY BONDING AGENT

A. Epoxy bonding agent shall conform to Section 03250, Concrete Accessories.

2.18 WATERPROOFING

A. Waterproofing agent shall be cementitious crystalline forming admixture that that forms throughout the pores and capillary tracts of the concrete that permanently seals the concrete. Approved admixture shall be Xypex Admix C-1000 added at a rate of 2-3% by weight of cement, approximately 10 pounds per cubic yard.

PART 3 -- EXECUTION

3.01 DESIGN CRITERIA

A. Minimum structural design loading for underground precast concrete vaults shall be as indicated in ASTM C857, unless otherwise noted herein. Precast items subjected to vehicular traffic shall be designed for H-20 traffic loading. Other precast items shall be designed for a vertical live load of 300 psf.

B. Walls of precast items shall be designed for a vertical surcharge of 100 psf.

C. Precast manholes and vaults shall be designed to resist flotation when totally empty and subjected to groundwater full height of the manhole/vault.

3.02 FABRICATION AND CASTING

A. Fabrication and casting shall conform to Section 03400, Precast Concrete, and to Section 03300, Cast-in-Place Concrete.

B. All base sections designated to receive concrete ballast and all electrical manholes shall extend monolithically a minimum of 6 inches beyond the outside face of the wall for the entire periphery. All other utility structures shall have a standard base.

C. Utility structures built around existing pipe shall have a cast-in-place base slab.

3.03 HANDLING, TRANSPORTING, AND STORING

A. Handling, transporting and storing of precast items shall comply with Section 03400, Precast Concrete.

3.04 INSTALLATION

A. Installation shall conform with Section 03400, Precast Concrete and with the manufacturer's recommendations or to Section 03300, Cast-in-Place Concrete.

B. Frames and covers or grates shall be set so that tops are at elevations indicated on the Drawings or flush with finished grade where no elevation is indicated.

C. Joints between riser sections shall be sealed with joint sealant.

D. All openings in utility structures shall have flexible rubber sleeves sized to fit the connecting pipe and installed to provide watertight joints in accordance with the manufacturer's recommendations. The interior of the sleeve shall be filled with Class B concrete.

E. Openings that are too large for flexible rubber sleeves shall utilize rubber bladder seals which are expanded by water injected using a pressure pump.

F. All units shall be installed plumb and level.

G. All lift holes and joints shall be filled with non-shrink grout conforming to Section 03600, grout inside and out. No penetrations through structure walls will be allowed.

H. The manhole frames shall be set to their required elevations either with 1” – 4” grade rings.

I. Concrete ballast shall be placed so that it bears directly on the utility structure base against the outer wall monolithically encircling the structure for the full height indicated on the Drawings. Additional ballast may be required where the depth or elevation of the structure varies from the Drawings.

J. Brick or Concrete Block

A. Prohibited

K. Connection to Existing Pipe

1. Verify the diameter and invert elevation of existing pipe to be connected to new utility structures prior to beginning work on the structures.

2. Provide adequate protection to prevent damage to the existing pipe.

3. Provide adequate means for plugging and/or transferring the existing flow in the pipe to allow for the construction of inverts and grouting.

4. Cut off the existing pipe sufficiently for connection to the new structure and remove.

5. Thoroughly clean all foreign matter and coat the pipe surface with epoxy adhesive where the pipe joins the new structure.

6. Install a flexible joint sealer around the pipe.

L. Backfill structures in accordance with Section 02200, Earthwork.

M. Clean all structures of any accumulation of silt, debris, or foreign matter and keep clean until final acceptance of the work.

N. Excavation shall conform to Section 02200, Earthwork.

O. Structure bases shall bear on a minimum of 8 inches of compacted stone unless otherwise indicated on the Drawings.

P. Channel Inverts

1. Inverts shall be placed using Class B concrete with forms sufficient to provide a smooth half-round shape as shown on the Drawings. Manhole bases employing full depth precast inverts are acceptable.

2. Where the slope of the line does not change through a manhole, a constant slope shall be maintained in the invert. Where slope changes occur within a

given manhole, the transition shall be smooth and shall occur at the approximate center of the manhole.

3. Inverts shown on the Drawings are taken at the center of the manhole unless otherwise noted.

3.05 ADJUSTMENTS TO EXISTING UTILITY STRUCTURES

A. Adjust structures as indicated on the Drawings using concrete or cast iron adjustment rings by approved methods.

B. Clean covers and inlet castings of all foreign material and paint with one coat of coal tar epoxy.

3.06 ADJUSTING COLLARS AND FINAL ADJUSTMENTS

A. Adjusting collars shall be as shown on the Drawings. Final adjustments shall be made so that the manhole ring and cover will be smooth and flush with the finished grade of the adjacent surface, or as otherwise indicated on the Drawings for manholes shown above grade.

B. A maximum of 24-inches of adjustable grade rings are allowed. Anything over 24-inches requires approval from the City of Johnson City Water & Sewer Department.

3.07 VACUUM TESTING OF SEWER MANHOLES

A. All new manholes are to be vacuum tested as soon as is practicable after assembly is completed. No standing water shall be allowed in the manhole excavation that may affect the accuracy of the test. Leakage testing on newly rehabilitated manholes shall be accomplished in accordance with ASTM C1244-05A rather than as specified in this Paragraph.

B. All lifting holes and exterior joints shall be filled and pointed with non-shrink grout for concrete manholes or sealed with compatible sealant for other materials.

C. All pipes and other entrances into the manhole should be suitably plugged and blocked in such a manner as to prevent displacement of the plugs while the vacuum is being pulled.

D. Installation and operation of the vacuum equipment and indicating devices shall be in accordance with equipment specifications and instructions provided by the manufacturer. Gauges used for manhole testing shall be oil-filled gauges.

E. The casting opening shall be sealed with an appropriate testing/sealing device and a vacuum of 10.0 inches of mercury (5 PSIG) pulled on the manhole (DO NOT PUT A POSITIVE PRESSURE ON THE MANHOLE). The time for the vacuum to drop to 9.0 inches of mercury shall be recorded.

F. Acceptance manholes shall be defined as when the time to drop from 10.0 inches to 9.0 inches of mercury meets or exceeds the following:

Depth (ft)	48	60	72	84	96	108	120
6'	15	20	25	29	34	38	43
8	20	26	33	38	45	51	57
10	25	33	41	48	56	63	71
12	30	39	49	57	67	76	85
14	35	46	57	67	78	89	100
16	40	52	67	76	89	101	114
18	45	59	73	86	100	114	128
20	50	65	81	95	111	126	142
22	55	72	89	105	122	139	156
24	59	78	97	114	133	152	170
26	64	85	105	124	144	164	185
28	69	91	113	133	155	177	199
30	74	98	121	143	166	189	213
d. VF	+2.5	+3.25	+4.0	+4.75	+5.5	+6.5	+7.0

G. If the manhole fails the test, necessary repairs shall be made at the Contractor's expense and the vacuum test repeated until the manhole passes the test. A significant number of leaks on a single manhole may be considered as a basis for rejection and replacement at the Contractor's expense.

H. If the manhole joint mastic or gasket is displaced during the vacuum test, the manhole shall be disassembled and the seal replaced.

I. Damage to Flexible Rubber Boot – If the flexible manhole to pipe connector is **the type cast into the manhole** and is damaged during installation, the entire manhole base is to be replaced.

- END OF SECTION –

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SECTION 02665

TEMPORARY BYPASS PUMPING

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Under this item the Contractor is required to design and furnish all materials, labor, equipment, power, fuel, fuel storage, maintenance, etc. to implement a temporary pumping system for the purpose of diverting the existing flow around the work area on a daily basis, for the duration of the project.

B. The design, installation, and operation of the temporary pumping system shall be the Contractor's responsibility throughout the duration required. All components of the temporary bypass pumping system shall be provided by the Contractor.

C. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction. Contractor shall also be responsible for any fines imposed by local, state, and/or federal agencies for failure to maintain flows or contain spills and/or overflows.

D. The Contractor shall implement best management practices to prevent and minimize erosion and resultant sedimentation during all bypass pumping activities in accordance with Section 02276 – Erosion and Sedimentation Control.

E. Contractor shall install bypass pumps at an elevation a minimum of 2 feet above the 100-year flood elevation if at all possible or shall provide an acceptable emergency plan, subject to Engineer's review, if the pumps are installed below the 100-year flood elevation and flooding occurs. However, Contractor's Bid shall be based on maintaining operation at all times during required operation of the bypass pumping system.

F. Contractor shall be responsible for maintaining the existing interceptor(s) in service without wastewater spills during the entirety of the construction period.

1.02 SUBMITTALS

A. Submit the Bypass Pumping Plan for review in accordance Section 01300 - Submittals. The Bypass Pumping Plan shall include detailed drawings and descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing wastewater flows. The plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials, and all other incidental items necessary and/or required to insure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in these Contract Documents. No construction shall begin until all provisions and requirements have been reviewed by the Engineer. The plan shall include, but is not limited to, the following details:

1. Staging areas for pumps

2. Plugging methods and types of plugs

3. Number, size, material, method of installation, and location of suction piping,

4. End of suction pipe shall be deep enough into manhole to prevent prolonged surcharging of upstream collection system.

5. Number, size, material, method of installation, and location of discharge piping

6. Bypass pump sizes, capacity, number of each size to be on site, and power requirements

7. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range are to be submitted)

8. Standby power generator size (if necessary), location

9. Thrust and restraint block sizes and locations

10. Method of noise control for each pump and/or generator?

11. Any temporary pipe supports and anchoring required

12. Design for access to bypass pumping locations indicated on the drawings

13. Selection of bypass pumping pipe size and material (include method of connections to pump and other piping)

14. Schedule for installation of and maintenance of bypass pumping lines

15. Describe how bypass pumping system will be monitored

16. Demonstrate upstream manholes will not overflow from surcharging and that upstream service connections will not be surcharged

17. Show discharge from force main will not surcharge downstream discharge manhole

18. Show single standby pump to be equal in capacity to the largest pump in the system with common power supply, controls, suction piping, and discharge piping.

19. Show force main pipe material and thickness can withstand all normal operating and surge pressures with a safety factor of 2.0

20. Denote any conditions that will cause pumps to lose suction lift (prime) and describe procedures to rectify

21. Show that the emergency switchover from primary to secondary pumping will be automatic should equipment fail

22. Show emergency plan to be used if flooding occurs at work site

23. Show suction and discharge piping is protected from possible damage from varying creek flows and construction activities

24. Show any planned shifting of bypass equipment during construction

B. Sequence of Construction Plan: Furnish in accordance with Section 01300 – Submittals.

1. At least two (2) weeks prior to implementing any bypass pumping operations the Contractor shall submit a sequence of construction plan, which details the methods, means, techniques, and sequences to be used to establish a base element of surety against a wastewater spill to the Engineer for review and approval by the Owner. Such plan shall provide assurance against a wastewater spill, with at least one level of backup.

2. The Contractor's Sequence of Construction shall define work to be performed, including the following items:

   a. Purpose of the proposed interruption(s).
   b. Definition of the start date, duration and end date.
   c. Provide a complete list to equipment and material required to perform each segment of work.
   d. Define activities to be performed by or witnessed by the Owner and date on which these activities are to be performed.
   e. Scheduling/timing of manufacturers field services, as specified.

3. One week prior to connections being made to existing structures or pipes, a coordination meeting shall be held between the Contractor, Engineer, and Owner to discuss the construction plan previously submitted by the Contractor. The schedule of construction, interconnecting details, and other revisions necessary for proper interfacing of the Work are to be subsequently modified by Contractor accounting for results of said coordination meeting.

4. The Engineer and Owner are to be notified 24 hours prior to any actual interruptions or connections being made. Begin no work prior to securing Owner's approval of respective connection plan and work schedule.

PART 2 -- PRODUCTS

2.01 PUMPING EQUIPMENT

A. General:

1. This sanitary sewer interceptor is part of a regional system that must be kept in service at all times. It is essential to the operation of the existing wastewater system that there shall be no interruption in the conveyance of wastewater throughout the duration of the project. To this end, the Contractor shall provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other

labor and equipment necessary to intercept the wastewater flow before it reaches the point where it would interfere with his work, carry it past his work and return it to the existing system downstream of his work.

2. It is the Contractor's responsibility to provide equipment that is adequate for the performance of the Work under this Contract within the time specified. All equipment shall be kept in satisfactory operating condition, shall be capable of safely and efficiently performing the required Work, and shall be subject to review by the Owner's representative at any time within the duration of the Contract. All Work hereunder shall conform to the applicable requirements of the OSHA Standards for Construction.

3. Wastewater system operational requirements take precedence over Contractor activities. Therefore, interruption of wastewater system operations must be coordinated with and are subject to the operational requirements of the Owner. Contractor shall assume that any interruption of wastewater system operations may be deferred by up to one (1) week from the requested time due to operational constraints.

4. The Contractor shall provide for utilities and services for its own operations. The Contractor shall furnish, install and maintain all temporary utilities during the contract period including removal upon completion of the Work.

5. Pumps are to be fully automatic self-priming units that do not require the use of foot valves, vacuum pumps, or diaphragm pumps in the priming system.

6. The pumps shall be diesel powered and shall be equipped with **sound attenuation equipment capable of reducing noise to 90 dB.**

    a. Contractor shall be responsible for providing and storing a sufficient quantity of diesel fuel on-site to continually operate the pumps for the duration of the temporary bypass pumping period.

    b. Contractor shall check the pump fuel levels and shall re-fill the tanks to full capacity on a daily basis.

7. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of the flows.

8. Each pump and driver shall be rated for continuous duty operation over the specified range of conditions without cavitating or overheating, and without excessive vibration or noise. In addition, each pump and driver shall be rated to operate intermittently at shut-off head against a closed discharge valve for periods of not less than 5 minutes without excessive cavitation, overheating, or vibration.

9. Furnish each pump with the necessary stop/start controls.

10. Contractor will not be permitted to stop or impede the main flows under any circumstances except as otherwise defined under the Sequence of Construction.

B. Temporary Bypass Pumping Requirements: The Contractor is responsible for the construction of the bypass facilities as described herein and indicated on the Drawings. Requirements for the bypass pumping system is as follows:

1. Bypass pumping system is required to be operated continuously during construction activities while the existing sanitary sewer interceptor is modified.

2. Contractor shall determine the number of pumps required to convey the bypass pumping flows listed in this Section. Contractor shall provide a backup pump equal to the largest pump included in the overall system. The backup pump shall be piped into the suction and discharge headers and shall be on-line, isolated from the primary system by a valve.

3. The bypass pumping equipment shall be capable of pumping raw wastewater at the below rates (MGD).

   Due to varying ranges of flow from average to peak, variable speed or staged pumps will be required to avoid surcharging the lines and to avoid sewer backups in system. At no time should depth exceed 3 feet in the manhole being pumped from.

	Pipe Dia	**Avg DW Daily Flow (mgd)**	**Peak WW Daily Flow (mgd)**
Existing Interceptor Sewer	30”	8.5	20.0

4. Provide all pipeline plugs, pumps of adequate size to handle the peak daily flow, and temporary discharge piping to ensure that the total interceptor flow can be safely diverted around the work area while the sanitary sewer interceptor is modified. Wet weather flow projections are estimated. Contractor has the options of either sizing by-pass pumps for the wet weather flow, or provide contingency plan of placing pipe or keeping pipe in service in the event of wet weather flow.

5. The Contractor shall make all arrangements for bypass pumping during the time when the sanitary sewer interceptor is being modified for any reason.

6. Discharge piping shall be constructed of steel, ductile iron, or polyethylene pipe with positive, restrained joints. Under no circumstances will aluminum “irrigation” type piping or glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by specific permission from the Engineer.

7. The bypass pumps are to have variable capacity by controlling the speed of the diesel engine. Each pump shall have a separate control panel.

8. Provide pressure and vacuum gauges on the suction and discharge headers.

9. Provide pressure switches to start and stop the pumps and a pressure transmitter to vary the speed of the pumping units.

PART 3 -- EXECUTION

3.01 PREPARATION

A. The Contractor is responsible for locating any existing utilities in the area where the Contractor selects to locate the bypass pumps and pipelines. The Contractor shall locate his bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the Owner and the Engineer. All costs associated with relocating utilities and obtaining all approvals shall be paid by the Contractor.

B. During bypass pumping operations, the Contractor shall protect the wastewater system, including the interceptor and manholes, from damage inflicted by his equipment. The Contractor shall be responsible for all physical damage to the wastewater system caused by human or mechanical failure.

C. Contractor shall keep spare parts for pumps and piping on-site. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

3.02 INSTALLATION AND REMOVAL

A. The Contractor shall pipe sections or make connections to the existing interceptor and construct temporary bypass pumping structures only at the access location and as may be required to provide an adequate suction conduit.

B. The temporary bypass pumping system shall be tested before placing the system in operation. Testing periods shall occur only between the hours of 8:30 a.m. and 3:00 p.m., Monday through Thursday. Testing of bypass pumping system shall NOT be allowed Friday through Sunday, on the Owner's scheduled Holidays, or on the day immediately prior to an Owner's scheduled Holiday. In addition, testing of bypass pumping system shall only be performed during the Owner's normally scheduled work days. Testing shall include leakage testing, pressure testing, and operational testing.

1. Leakage and pressure test: Contractor shall perform leakage and pressure testing for a minimum of two (2) hours on the pump duty suction piping and duty discharge piping in accordance with Article 3.03, Paragraph A. Contractor shall then remove the duty piping and shall install the standby suction piping and standby discharge piping and perform the same test for an additional two (2) hours.

2. Operation test: Contractor shall operate the temporary bypass pumping system for as long as necessary to demonstrate reliable operation of the entire system, including but not limited to pumps and controls, to the satisfaction of the Owner.

C. Plugging or blocking of wastewater flows shall incorporate primary and secondary plugging devices. When plugging or blocking is no longer needed for performance of the work, the plugs are to be removed in a manner that permits the wastewater flow to slowly return to normal without surge, surcharging, or causing other major disturbances downstream.

D. At the conclusion of the bypass pumping operation and once written permission is granted by the Owner and Engineer, Contractor shall remove all temporary bypass components and restore the site to original conditions to the satisfaction of the Owner and Engineer.

3.03 QUALITY CONTROL AND MAINTENANCE

A. Testing: Contractor shall perform leakage and pressure tests of the bypass pump suction and discharge piping using clean water prior to actual operation. Low pressure air test shall be conducted on suction piping at a test pressure of 5 psi. Contractor shall test discharge piping by filling with clean water and pressurizing to 75 psi and held for 2 hours with no leakage. The Engineer will be given 24 hours notice prior to testing.

B. Inspection: During the time the Contractor is working at the project site, Contractor shall inspect the bypass pumping system every two (2) hours to ensure that the system is working correctly and shall keep a written log of the pump inspection results. Contractor shall inspect the bypass pumping system a minimum of either one (1) time per day or as often as necessary to ensure full fuel tanks for the bypass pumps.

C. Maintenance Service: Contractor shall insure that the temporary pumping system is properly maintained and a responsible and competent mechanic/operator shall be on call at all times.

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SECTION 02713

WATER DISTRIBUTION SYSTEMS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Installation, testing and disinfecting of water lines and appurtenances.

1.02 RELATED WORK

A. Section 02200: Earthwork

B. Section 02207: Aggregate Materials

C. Section 02500: Surface Restoration

PART 2 PRODUCTS

2.01 POLYVINYL CHLORIDE PIPE (PVC) AND FITTINGS

A. Locate wire shall be provided on all installations. The locate wire shall be 12 AWG copper-clad carbon steel with 30 mils (minimum) of insulation and a minimum break strength of 450 pounds. The external color shall be blue. The locate wire shall be brought to grade within a valve box or location station box at all “entry point locations” and all “exit point locations” with 18” of slack coiled up inside the box. There is no maximum length or interval between the locate wire stations. If the locate line breaks or if it is not continuous, the Contractor shall, at the Contractors expense, provide soft-digs every 50 LF along the main to provide detailed as-built data. The soft dig data shall be recorded on the as-built drawings.

B. For pipe diameters 4 inches and larger unless called for in the Drawings provide PVC pipe meeting AWWA C-900 DR 14 or less where increased pressure dictates. AWWA C-900 Pipe

should meet the following requirements:

1. PVC 1120 pipe manufactured from virgin, National Sanitation Foundation (NSF) approved compounds meeting the requirements of ASTM D-1784.
2. Pressure rated based on Dimension Ratios (DR) and pressure classes (pressure classes are working pressure ratings):

Dimension Ratio (DR)	Pressure Class (psi)
14	305

3. Outside diameter equivalent to the same outside diameter of ductile iron pipe.
4. The minimum wall thickness of the bell, at any point, shall conform to the DR requirements of the pipe.
5. Furnish in standard laying lengths of twenty (20) feet.
6. Clearly mark with the manufacturer's name, nominal diameter, DR, PVC 1120, pressure class, AWWA C-900, and NSF approval seal.
7. PVC joints shall be sealed with a rubber ring and non-toxic lubricant provided by the pipe manufacturer as specified in ASTM D-3139 and ASTM F-477.
8. Gasket and pipe must be tested and approved for contact with potable water in accordance with ANSI/NSF 61 and NSF 14.

C. All remaining pipe diameters 4 inches and less not specified in the Drawings as AWWA C-900 DR 14 shall be SDR 21 or SDR 13.5 PVC. SDR 21 or SDR 13.5 PVC should meet the following requirements:

1. Pipe and fittings shall be made in accordance with ASTM D-2241 from a compound conforming to a cell classification of 12454 as defined by ASTM D-1784.
2. Pressure rated based on Dimension Ratios (DR) and working pressures:

Dimension Ratio (DR)	Working Pressure (psi)
13.5	> 135
21	≤ 135

3. The minimum wall thickness of the bell, at any point, shall conform to the DR requirements of the pipe.
4. All PVC pipe and fittings shall be clearly marked with manufacturer’s name, nominal diameter, SDR, ASTM D-2241, pressure rating, and NSF approval seal.
5. PVC joints shall be sealed with a rubber ring and non-toxic lubricant provided by the pipe manufacturer as specified in ASTM D-3139 and ASTM F-477.
6. Gasket and pipe must be tested and approved for contact with potable water in accordance with ANSI/NSF 61 and NSF 14.

2.02 DUCTILE IRON PIPE AND FITTINGS

A. For pipe diameter 6 inches and larger unless called for in the Drawings provide Ductile Iron Pipe Pressure Class 350. Pipe and fittings shall also be lead free as defined in the "Reduction of Leak in Drinking Water Act", Public Law 111-380, when effective on January 4, 2014.

B. Pipe:

1. Manufactured in accordance with ANSI A-21.51-96 (AWWA C-151) and ANSI A-21.10-93 (AWWA C-110).
2. A cement lining meeting the requirements of ANSI 21.4-95 (AWWA C-104).
3. A minimum of 1 mil thick bituminous coating on the outside surface.
4. Clearly mark with manufacturer's name, D.I. or Ductile, weight, class or nominal thickness, and casting period.
5. Unless otherwise specified or shown on the plans, ductile iron pipe shall be pressure class 350 for all pipe sizes and laying conditions.

C. Fittings:

1. Fittings 4" - 24": Pressure rated at 350 psi.
2. Fittings 30" - 36": Pressure rated at 250 psi.
3. Joints meeting the requirements of ANSI A-21.11-95 (AWWA C-111).
4. All concreted fittings shall be wrapped in plastic.
5. A cement lining meeting the requirements of ANSI 21.4-95 (AWWA C 104).
6. A minimum of 1 mil thick bituminous coating on the outside surface.

2.03 HIGH DENSITY POLYETHYLENE PIPE AND FITTINGS

A. Materials used for the manufacturer of polyethylene pipe and fittings shall be PE3408 high density polyethylene meeting cell classification 345464C per ASTM D3350; and meeting type III, Class B or Class C, Category 5, Grade P34 per ASTM D1248; and shall be listed in the mane of the pipe and fitting manufacturer in PPI TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1600 psi at 73 degrees per ASTM D2837. The manufacturer shall certify that the materials used to manufacture pipe and fittings meet these requirements.

B. Polyethylene Pipe 4" through 12" shall conform to AWWA C906, DR-11, or less where increased pressure dictates, Ductile Iron Pipe Size and NSF 61 Standard. HDPE shall be

manufactured in accordance with ASTM F714, Polyethelylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter and shall be so marked. Each production lot of pipe shall be tested for melt index, density, % carbon, dimensions and either quick burst or ring tensile strength (equipment permitting).

C. The pipe shall have permanent identification marked by co-extruding multiple equally spaced blue stripes on the pipe outside surface or by a solid blue colored pipe shell to indicate pipe carries potable water.

D. Polyethylene fittings and custom fabrications shall be molded or fabricated by the pipe manufacturer or trained personnel. Butt fusion outlets shall be made to the same outside diameter, wall thickness and tolerances as the mating pipe. All fittings and custom fabrications shall be fully rated for the same internal pressure as the mating pipe. Fabricated fittings must have the same working pressure as the mating pipe.

1. Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock or molded fittings.
2. Molded fittings shall be manufactured in accordance with ASTM D3261, Butt Head Fusion Polyethylene (PE) Plastic Pipe and Tubing and shall be so marked. Each Production lot of molded fittings shall be subjected to the test required under ASTM D3261.

E. Polyethylene Mechanical Joint (MJ) Adapters to ductile iron piping shall be through a self-restraining, fusible adapter with or without an integral, internal stainless steel insert. Mechanical joint adapters shall be of the same SDR rating as the pipe. A separate, loose stainless steel type insert will only be allowed for pipe sizes 4” through 8”.

F. Services 2” and smaller shall include an integral shut-off valve and be Philmac Fuse-A-Corp fusible valve; or Central Plastics electro fusion saddle tapping tee (use shell cutter to cut the HDPE or method approved by the City of Johnson City).

G. Drilling fluids for HDPE operations shall be bentonite slurry. Contractor is responsible for obtaining, transporting and sorting any fluids, including water, to the work site.

H. Disposal of fluids for HDPE operations is the responsibility of the contractor. Disposal of fluids shall be done in a manner that is in compliance with all permits and applicable federal, state and local environmental regulations. The bentonite slurry may be recycled for reuse in the hole opening operation or shall be hauled by the Contractor to an approved location or landfill for proper disposal. The Contractor shall thoroughly clean the entire area of any fluid residue upon completion of installation and replace any and all plants and sod damaged, discolored or stained by drilling fluid.

I. Locate wire shall be provided on all installations. The locate wire shall be 12 AWG copper-clad carbon steel with 45 mils (minimum) of insulation and a minimum break strength of 1,150 pounds. The external color shall be blue. The locate wire shall be brought to grade within a valve box or location station box at all “entry point locations” and all “exit point locations” with 18” of slack coiled up inside the box. There is no maximum length or interval between the locate wire stations. If the locate line breaks or if it is not continuous, the Contractor shall, at the Contractors expense, provide soft-digs every 50 LF along the main to provide detailed as-built data. The soft dig data shall be recorded on the as-built drawings.

2.04 MAIN LINE METERS

A. Propeller type with 125 lb. Flanged joints.

B. Shall be Neptune Model T10 or equal.

2.05 SERVICE PIPE:

A. Copper Pipe:

1. Seamless copper tubing meeting the requirements of ASTM B-88, Type K.
2. Contain not less than 99.90% copper and not more than 0.04% phosphorous.
3. Suitable for use with a working water pressure of 160 psi.
4. 3/4 inch nominal diameter unless otherwise specified or shown on the plans.
5. Service pipe shall be used to connect the corporation stop with the meter yoke. Use the minimum length required to make a straight line connection including a gooseneck.
6. Shall be manufactured in USA.

2.06 WATER SERVICE ASSEMBLIES

A. All service assembly components must be lead free as defined in the “Reduction of Lead in Drinking Water Act”, Public Law 111-380, when effective on January 4, 2014.

B. Water Meters:

1. AWWA C-700
2. 5/8" x 3/4" unless otherwise specified or shown on the plans.
3. Frost proof with a cast bronze casing and a hinged cover.

4. Direct reading register, in gallons, unless otherwise specified.
5. Disc or piston operated with magnetic drive.
6. A suitable non-corrosive strainer located over the inlet to the measuring chamber.
7. The name of the manufacturer cast in the lid of the register box and the meter serial number imprinted thereon.
8. Shall be manufactured by Neptune only.

C. Water Main Connections:

1. Tap water mains in the upper half of the pipe at a 45 degree angle or provide brass tapped couplings with AWWA threads.
2. Do not exceed the pipe manufacturer's recommended maximum tap size.
3. Use service clamps on all taps for PVC pipe.

D. Corporation Stops:

1. AWWA C-800.
2. Water tight and individually tested for leaks.
3. Waterway diameter approximately equal to the nominal size of the stop.
4. Coat or cap all threads for protection prior to installation.
5. Shall be manufactured by Ford or approved equal, shall be manufactured in USA.

E. Meter Yokes:

1. Copper tubing with an integral brace and meter stop.
2. Provide with outlets designed for the use of polyethylene or copper service pipe.
3. Shall be manufactured by Ford or approved equal, shall be manufactured in USA.

F. Service Clamps:

1. Bronze with neoprene gasket and double straps.
2. Shall be manufactured by Mueller, Rockwell, or Kennedy only.

G. Meter Boxes:

1. Rectangular pre-cast concrete, cast iron or plastic.
2. Pre-cast concrete and cast iron meter boxes shall have a cast iron lid.
3. Depth of the meter box not less than 18 inches.
4. Of sufficient size to facilitate easy installation and removal of the water meter.

5. Where service assemblies include a pressure reducing valve, sufficiently sized for installation of the pressure reducing valve in the meter box. Shall be NDS with solid cast iron overlapping cover or approved equal, shall be manufactured in USA.

H. Pack Joint Coupling (MIP x SJ Adapter)

1. All brass conforming to AWWA Standard C800 (ASTM B-62 and ASTM 584,UNS NO C83600 - 85-5-5-5).
2. Body design provides hexagonal wrench flats for proper installation.

2.07 VALVES AND VALVE BOXES

A. 2" Gate Valves:

1. AWWA C-515, as applicable.
2. Valve operating stem shall be non-rising and manganese bronze only.
3. All cast iron surfaces of the body and bonnet shall be completely coated with a corrosion resistant coating.
4. 2" square wrench nut for operation of the valve.
5. Minimum design working water pressure of 200 psi for valves, unless otherwise specified or shown on the Plans.
6. Valves shall be threaded connection.
7. Bonnet or body markings: Manufacturer's name, year of casting, size, pressure rating, and OPEN with direction.
8. Open by counter-clockwise operation.
9. Valves shall be of domestic manufacture only. Approved Products: Kennedy Valve, M&H Valve, or Mueller Valve, Stockham Valve and U.S. Pipe Valve.

B. 4" – 12" Gate Valves:

1. AWWA C-515.
2. Of iron body, bronze mounted, double disc, parallel seat, non-rising stem type.
3. Stuffing boxes: O-ring seal type with two (2) rings in the stem located above the thrust collar.
4. 2" square wrench nut for operation of the valve.
5. Minimum design working water pressure of 200 psi for valves with diameters 2"-54", unless otherwise specified or shown on the Plans.
6. Joints: ANSI A-21.11 (AWWA C-111).
7. Bonnet or body markings: Manufacturer's name, year of casting, size, pressure rating, and OPEN with direction.

8. Open by counter-clockwise operation.
9. Shall be manufactured by American Flow Control, Kennedy, M&H, Mueller, or U.S. Pipe only.

C. Butterfly Valves:

1. All valves 16" and larger shall be of the butterfly type.
2. AWWA C-504.
3. Cast iron body, with ends for mechanical joints, rubber molded-in-place seat design type.
4. Cast markings: valve size, manufacturer's name, class, direction of opening, and the year of casting.
5. Class 250, suitable for working water pressure of 250 psi unless otherwise specified or shown on the plans.
6. Open by counter-clockwise operation.
7. Valves shall be of the bury type with side operated spur gear box with a typical AWWA 2" operating nut.
8. Pratt "Groundhog" or approved equal, shall be manufactured in USA.

D. Main Line Pressure Reducing Valves:

1. The reducing valve shall function to maintain a uniform valve downstream pressure as pre-adjusted on the control pilot hand-wheel or adjusting screw.

2. The valve piston shall be guided on its outside diameter by long stroke stationary V-ports which shall be downstream of the seating surface to minimize the consequences of throttling. Throttling shall be done by the valve V-ports and not the valve seating surfaces.

3. The valve shall be capable of operating in any position and shall incorporate only one flange cover at the valve top from which all internal parts shall be accessible.

4. The valve body shall be of cast iron ASTM-126 with flanges conforming to the latest ANSI Standards. The valve shall be extra heavy construction throughout. The valve interior trim shall be bronze B-62 as well as the main valve operation.

5. The valve seals shall be easily renewable. The valve shall operate by a pressure differential piston design; no diaphragm shall be permitted within the main valve body.

6. All controls and piping shall be non-corrosive construction.

7. A visual valve position indicator shall be provided for observing the valve piston position at any time.

8. The operating range shall be from 175 psi to 100 psi.

9. Golden Anderson or approved equal, shall be manufactured in USA.

E. Valve Boxes:

1. Cast iron, 2 or 3 piece, screw type with shaft diameter of not less than 5".
2. Heavy roadway type equipped with a cover containing the word "WATER" in raised letters on the top.
3. Base of such size as to permit its installation without allowing it to come in contact with either the valve or the pipe.
4. Valve boxes for lines 12” and larger shall be 5¼” shaft, 2 piece, screw-type, adjustable valve box with square drop-in lid with 1-1½” skirt, as manufactured by Bingham & Taylor, or equal.
5. Valve boxes for lines smaller than 12” shall be 5¼”shaft, screw-type, series 6850 as manufactured by Tyler/Union, or equal.

2.08 TAPPING SLEEVE

A. Tapping sleeves shall be stainless steel with removable bolts and 360° gasket.

B. Shall meet AWWA C-223 requirements.

C. Tapping sleeves shall be Mueller H-304, Ford FTSS, Romac SST or approved equal.

2.09 COMBINATION AIR RELEASE ASSEMBLIES

A. Shall be lead free as defined in “Reduction of Lead in Drinking Water Act”, Public Law 111-380, when effective on Jan 4, 2014.

B. Furnish 1" nominal diameter ARI D-040 for mains less than 12”, 1” nominal diameter APCO 143C for 12” mains, and 2" nominal diameter APCO 145C for mains greater than 12” unless otherwise specified or shown on the Plans.

C. Combination air release assemblies shall consist of:

1. Double strap, bronze service clamp with neoprene gasket.

2. Brass pipe of the nominal diameter required by ARV size.

3. Red brass corporation stop. Refer to Section 02713 2.06 D.

4. Brass elbow.

5. Ball valve.

D. This valve shall have the same functions of an air/vacuum valve and air release valve combined.

E. Combination Valves 2 inches and smaller shall be the single body type with the air/vacuum and air release functions in one housing.

F. Unless shown otherwise on the project drawings, valves 2 inches and smaller shall have N.P.T. inlets and outlets.

G. Cover air release assembly with a large meter box, adding risers as necessary.

1. 1” ARV are installed in 18” meter box.

2. 2” ARV are installed in 17” x 30” (nominal dimensions) meter box

H. The copper piping installed from the water main to the ARV must be installed at a minimum of 1% slope maintaining the line size to match the size of the ARV. Air Release Valve shall not be installed in the road, within drainage ditches, or located within floodplain areas without prior approval from the City of Johnson City. ARV must be structurally supported in the meter box by contractor by method approved by City of Johnson City.

I. Place crushed stone from the top of the main to 12" below the bottom of the main.

2.10 FIRE HYDRANTS

A. Fire Hydrants:

1. AWWA C-502.

2. Cast iron bodies, fully bronze mounted, designed for operation at a working water pressure of 150 psi.

3. Furnish with two 2-1/2" threaded brass hose nozzles and one threaded brass pumper nozzle.

4. Compression type main valve 4-1/2" in diameter faced with a suitable yielding material such as rubber, leather, or balata.

5. So designed that, when it is installed, no excavation is required to remove the main valve or the movable parts of the drain valve.

6. Inside diameter of barrel: at least 120 percent of the hydrant valve size.

7. Inlet connection: minimum of 6" mechanical joint on all lines, unless otherwise specified or shown on the plans.

8. Equipped with safety flange located not more than 2" above ground and a two piece shaft break-away assembly.

9. Open on counter-clockwise operation, unless otherwise specified.

10. Hydrants shall be painted silver.

11. Cast markings: manufacturer's name, size of the main valve, year of manufacture, and direction of opening.

12. Field touch-up, if the surface has been marred, with paint supplied by the manufacturer of the same color and type as that used during shop painting.

13. Shall be Kennedy Guardian K81-D as manufactured by the Kennedy Valve Company, American Darling Mark 73-5 as manufactured by American Flow Control, or Super Centurion A423 as manufactured by Mueller Company.

PART 3 EXECUTION

3.01 PREPARATION

A. Prior to laying pipe, prepare suitable bedding according to Section 02200.

B. Before placing pipe in the trench, field inspect for cracks or other defects; remove defective pipe from the construction site.

C. Swab the interior of the pipe to remove all undesirable material.

D. Prepare the bell end and remove undesirable material from the gasket and gasket recess.

E. The Contractor shall provide any environmental protection necessary to contain any hydraulic or drilling fluids and shall be put in place, including berms, liners, turbidity curtains and other measures during drilling for HDPE. The Contractor shall adhere to all applicable environmental regulations including environmental conditions stated in local, state and federal permits.

F. Prior to drilling, the Contractor shall utilize all verified location information to determine the drill pathway.

3.02 INSTALLING DIP/PVC WATER LINES

A. Lay all pipe in a straight line on a uniform grade with at least 36” of cover measured from the top of the pipe.

B. After applying gasket lubricant, take extreme care to keep the spigot end from contacting the ground.

C. Hone the pipe with suitable tools or equipment.

D. Closely follow the manufacturer's instruction in laying and joining pipe.

E. Cut pipe for inserting valves, fittings, etc. in a neat and workmanlike manner without damaging the pipe so as to leave a smooth end at right angles to the axis of the pipe.

F. All pipe ends shall be sealed at the end of the work day. When work is resumed the next day and seals removed the first joint of pipe shall be inspected for damages or debris.

G. If dirt enters the pipe it shall be removed and the interior of the pipe surface swabbed with a 1% to 5% hypochlorite solution. If, in the opinion of the purchaser, the dirt remaining in the pipe will not be removed using the flushing operation, then the interior of the pipe shall be cleaned by mechanical means in conjunction with the application of a 1% hypochlorite disinfection solution.

H. During construction calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500 feet intervals. The quantity of granules shall be as shown:

PIPE DIAMETERS	CALCIUM HYPOCHLORITE GRANULES
INCHES	OUNCES
4	1.7
6	3.8
8	6.7
10	10.5
12	15.1
14 AND LARGER	D2 X 15.1
	(D IS THE INSIDE PIPE DIAMETER IN FEET)

I. Pipe is not to be strung out in mud unless the ends are sealed.

J. Locate waterlines in relation to other piped utilities in accordance with Section 02605.

3.03 HDPE DRILLING PROCEDURES

A. The Contractor shall provide and maintain instrumentation necessary to accurately locate the pilot hole (both horizontally and vertically), measure pilot string torsional and axial and measure the drilling fluid discharge rate and pressure. The City of Johnson City shall have access to the instrumentation and reading at all times during the operation.

B. The pilot hole shall be drilled along the path shown on the plans or as directed by the City of Johnson City representative in the field. Unless approved otherwise, the pilot hole tolerances shall be as follows:
   1. Elevation as shown on plans
   2. Alignment equal to +/- 5 feet and within 3 feet of right-of-way or easement boundary.

3. Curve radius shall be no less than 80% maximum bending radius as recommended by the pipe manufacturer. In no case shall the bending radius be less than 30 pipe diameters, unless approved otherwise by the City of Johnson City.
4. The exact pilot hole entry point location shall be within +/- 5 feet of the location shown on the drawing or as directed by the City of Johnson City representative in the field.
5. The exit point location shall be within +/- 5 feet of the location shown on the drawing or as directed by the City of Johnson City representative in the field.
6. If not noted on the plans, 6" HDPE and smaller shall be installed with a depth of 2.5 – 5 feet and 8" HDPE pipe through 12" pipe shall be installed with a depth of 2.5 – 6 feet unless it is required to install the pipe deeper due to utility conflicts. Where utilities cross under roads, the depth of cover shall comply with applicable road permits.

3.04 HDPE PULL BACK OPERATIONS

A. After successfully reaming the bore hole the required diameter, the Contractor will pull the pipe through the bore hole. In front of the pipe will be a swivel and reamer to compact the bore hole walls. Once the pull-back operations have commenced, operations must continue without interruption until the pipe is completely pulled into the bore hole. During pull-back operations, the Contractor will not apply more than the maximum safe pull pressure at any time. Maximum allowable tensile force imposed on the pull section shall be equal to 80% of the pipe manufacturer's safety pull (or tensile) strength.

1. Torsional stress shall be minimized by using a swivel to connect a pull section to the reaming assembly.

2. The pull-back section of the pipeline shall be supported during pull-back operations so that it moves freely and the pipe is not damaged.

3. External pressures shall be minimized during installation of the pull-back section in the reamed hole. Damaged pipe resulting from external pressure shall be replaced at no cost to the City of Johnson City.

4. Buoyancy modifications shall be at the discretion of the Contractor and shall be approved by the City of Johnson City representative. The Contractor shall be responsible for any damage to the pull section resulting from such modifications.

5. In the event that the pipe does become stuck, the Contractor will cease pulling operations to allow for any potential hydro-lock to subside. After subsidence, pulling operations may be restarted. If the pipe remains stuck, the Contractor

will notify the City of Johnson City representative to discussion of options and then work will proceed accordingly.

6. The Contractor shall provide rated break-away link for each material and pipe sizes(s) required for the project.

3.05 HDPE PIPE ASSEMBLY

A. Joints between plain end pipes and fittings shall be made by butt fusion when possible. Electro fusion welding may also be used to complete when the location is not accessible to butt fusion welding equipment. External and internal beads shall not be removed unless approved by the City of Johnson City.

B. Pipe shall be welded/fused together in one length, if space permits. Pipe may be placed on pipe rollers before pulling into bore hole to minimize damage to the pipe. It is critical that all original oxidized pipe surfaces be removed in order for the fusion to take place. The scrapping process requires that approximately 0.10" of the outer "skin" be removed in order to penetrate the oxidation and contamination barrier. Oxidized pipe simply will not bond.

C. Mechanical joints and flange connections shall be installed in accordance with the manufacturer's recommended procedures. Flange faces shall be centered and aligned to each other before assembling and tightening the bolts. In no case shall the flange bolts be used to draw the flanges into alignment. Bolt threads shall be lubricated and flat washers shall be fitted under the flange nuts. Bolts shall be evenly tightened according to the tightening pattern and torque recommendations of the manufacturer. At least 1 hour after initial assembly, flange connections shall be re-tightened following the tightening pattern and torque step recommendations of the manufacturer. The final tightening torque shall be 100 ft-lbs or less as recommended by the manufacturer.

D. Locate wire shall be provided on all installations. The locate wire shall be 12 AWG copper-clad carbon steel with 30 mils (minimum) of insulation. The external color shall be either white or yellow. The locate wire shall be brought to grade within a valve box or location station box at all "entry point locations" and all "exit point locations". There is no maximum length or interval between the locate wire stations. If the locate line breaks or if it is not continuous, the Contractor shall, at the Contractors expense, provide soft-digs every 50 LF along the main to provide detailed as-built data. The soft dig data shall be recorded on the as-built drawings.

J. Cuts or gouges that reduce the wall thickness by more than 10% is not acceptable and must be cut out and discarded.

K. When requested by the City of Johnson City representative, butt fusion testing will be performed. The test fusion shall be allowed to cool completely and then fusion test straps shall be cut out. The test strap shall be 12" (minimum) or 30 times the wall thickness in length with the fusion in the center and 1" (minimum) or 1.5 times the wall thickness in width. Bend the test strap until the ends of the strap touch. If the fusion fails at the joint, a new fusion shall be made, cooled and completely retested.

L. Cap pipe at the end of the working day or after pull-back operations to prevent foreign materials from entering the pipe.

3.06 INSTALLING APPURTENANCES

A. Securely plug open ends of pipe at the close of each work day and during temporary discontinuance of pipe laying.

B. Set all valves, fittings, hydrants, and other specials in a neat workmanlike manner.

C. Use thrust blocks as shown on the Plans, when suitable undisturbed soil is present in trench walls. Backfill on thrust blocks shall not be completed until proper cure time has been attained for the thrust block unless prior approval by the City of Johnson City Water and Sewer Services Department. Where suitable soil is not present or where called for in the Drawings use ductile cast iron mechanical joint retainer glands installed in accordance with manufacturer's directions.

D. Erect hydrants to stand plumb with the pumper nozzle facing the road.

E. Effect drainage of hydrants by using 6 cubic feet of gravel.

F. Close dead ends with cast iron plugs or caps and equip with blow-off assemblies, where shown on the drawings.

3.07 HIGHWAY AND RAILROAD CROSSINGS

A. Perform highway crossings by the open cut method, unless otherwise shown on the drawings or required by the appropriate authorities.

3.08 CONCRETE ENCASEMENT

A. Concrete encase water line as shown in the Drawings or where directed to do so by the Engineer.

3.09 WATER LINE PRESSURE TESTS

A. After the pipe has been laid, subject all newly laid pipe or any valved section thereof to a hydrostatic pressure test in accordance with AWWA C600. When possible, conduct test on pipe lengths of less than 1000’ or where this is not possible from one valve to the next closest valve.

B. Pipe should be properly restrained. Insure that all concrete thrust blocks are properly cured.

C. Contractor shall provide all necessary testing equipment to complete required testing. Contractor shall perform all testing which will be observed by the Owners field representative.

D. Test pressures shall:

1. Not be less than 1.5 times the working pressure at the highest point along the test section (150 psi minimum and 200 psi maximum).
2. Not exceed the pipe or thrust restraint design pressures.
3. Be of at least 2-hour duration.
4. Not vary by more than ±5 psi.
5. Not exceed twice the rated pressure of closed valves or hydrants included in the test section.
6. Not exceed the rated pressure of resilient-seated butterfly valves.
7. Not be completed when outside temperatures are below freezing (32°F) unless prior approval by the City of Johnson City Water and Sewer Services Department.

E. Pressurization:

1. Slowly fill each valved section of pipe with water.
2. Apply the specified test pressure, based on the elevation of the lowest point of the line or section under test and correct to the elevation of the test gauge by means of a pump connected to the pipe in a manner satisfactory to the Owner.

E. Air Removal:

1. Before applying the specified test pressure, expel air completely from the pipe, valves, and hydrants.
2. If permanent air vents are not located at all high points, install corporation cocks at such points to expel air as the line is filled with water.
3. After all the air has been expelled, close the corporation cocks and apply the test pressure.
4. At the conclusion of the pressure test, remove the corporation cocks and plug or leave in place at the discretion of the Owner.

F. Examination:

1. Carefully examine all exposed pipe, fittings, valves, hydrants, and joints.
2. Repair or replace any damaged or defective pipe, fittings, valve, or hydrants that are discovered with sound material and repeat the test until it is satisfactory to the Owner.

3.10 WATERLINE LEAKAGE TESTS

A. Concurrently conduct a leakage test with the pressure test in accordance with AWWA C600.

B. Leakage Defined: the quantity of water that must be supplied into the newly laid pipe to maintain the specified test pressure after the air in the pipeline has been expelled and the pipe has been filled with water.

C. Allowable Leakage:

1. Determine allowable leakage by:
$$L = \frac{ND(P)^{1/2}}{7400}$$
Where L is the allowable leakage, in gallons per hour; N is the number of joints in the tested pipeline; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in psi.
2. Allow leakage at various pressures:
Allowable Leakage Per 1000 ft. of Pipeline*

Ave. Test Pressure	Allowable Leakage Per 1000 ft. of Pipeline (Gallons per Hour) Nominal Pipe Diameter - Inches																
PSI	2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48	52
450	0.32	0.48	0.64	0.95	1.27	1.59	1.91	2.23	2.55	2.87	3.18	3.82	4.78	5.73	6.69	7.64	8.60
400	0.30	0.45	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00	3.60	4.50	5.41	6.31	7.21	8.11
350	0.28	0.42	0.56	0.84	1.12	1.40	1.69	1.97	2.25	2.53	2.81	3.37	4.21	5.06	5.90	6.74	7.58
300	0.26	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60	3.12	3.90	4.68	5.46	6.24	7.02
275	0.25	0.37	0.50	0.75	1.00	1.24	1.49	1.74	1.99	2.24	2.49	2.99	3.73	4.48	5.23	5.98	6.72
250	0.24	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.37	2.85	3.56	4.27	4.99	5.70	6.41
225	0.23	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25	2.70	3.38	4.05	4.73	5.41	6.03
200	0.21	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12	2.55	3.19	3.82	4.46	5.09	5.73
175	0.20	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98	2.38	2.98	3.58	4.17	4.77	5.36
150	0.19	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84	2.21	2.76	3.31	3.84	4.41	4.97
125	0.17	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68	2.01	2.52	3.02	3.53	4.03	4.53
100	0.15	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.80	2.25	2.70	3.15	3.60	4.05

*For Mechanical or push-on joint pipe with 18-ft. nominal lengths. To obtain the recommended allowable leakage for pipe with 20-ft. nominal lengths, multiply the leakage calculated from the above table by 0.9. If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

3. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.078 gal/hr/in. of nominal valve size shall be allowed.

4. When hydrants are in the test section, test against the closed hydrant.

3.11 ACCEPTANCE OF INSTALLATION

A. For acceptance, all waterlines must be inspected, pressure tested, disinfected, flushed and pass a bacterial test. Prior to final acceptance, the City reserves the right to require the re-testing of waterlines if a time period of 6 months or longer has lapsed since the passing of initial tests.

B. Inspection: Waterlines shall be inspected by a City of Johnson City Inspector for materials and installation methods.

C. Pressure Testing: If any test of pipe laid shows leakage greater than that specified in 3.07 of this section **or** the pressure differs from the beginning test pressure by ±5 psi as specified in 3.06 of this section, the pipe is considered failed and will not be accepted. Contractor should locate and repair the defective material until the leakage and pressure tests are within the specified allowance. Repair all visible leaks regardless of the amount of leakage.

D. Flushing: Waterlines are to be flushed at a flow rate to achieve a velocity of 3 feet per second.

3.12 CLEANING AND DISINFECTION OF WATER LINES

A. Waterline disinfection shall be in accordance with AWWA C651.

B. For disinfection, use only Sodium Hypochlorite or Calcium Hypochlorite meeting ANSI/AWWA B300 and manufactured expressly for the disinfection of water lines.

C. Flush water lines clean prior to disinfecting.

D. The main shall be filled with water at the rate to ensure the water within the main will flow at a velocity no greater than 1 ft/second.

1. Use chlorine disinfecting agent applied to produce a 25 ppm dosage.
2. Allow water to escape from the ends of all lines to cause dispersion of the chlorine solution into all parts of the system.
3. Operate all valves and hydrants during the time disinfection is occurring.
4. Retain the chlorine solution in the lines for a period of 24 hours.
5. At the end of the 24 hour period, the residual chlorine must be a minimum of 10 ppm. Otherwise, repeat the disinfecting procedure again.
6. Flush the waterline.

E. After the applicable retention time, heavily chlorinated water should not remain in the line. In order to prevent damage to the pipe lining or to prevent corrosion damage to the pipe, the chlorinated water shall be flushed from the main until the chlorine measurements show that the concentration in the water leaving the main is no higher than the generally prevailing in the distribution system or that is acceptable for domestic use.

F. The environment to which the chlorinated water is to be discharged shall be inspected. If there is any possibility that the chlorinated discharge will cause damage to the environment, then field dechlorination shall be performed in accordance with AWWA C655.

3.13 BACTERIAL SAMPLING

A. After flushing with potable water, waterlines are to be tested for the presence of coliform bacteria in accordance with AWWA C651 by the City of Johnson City Water and Sewer Services Department by one of the two following procedures:

a. Preferred Method: One set of samples will be collected. After a 16 hour period, the second sample shall be collected.

b. Two (2) sets of samples will be collected 15 minutes apart after a 16 hr holding period. Water should be allowed to run continuously from the sampling taps between samples.

B. Collect samples for bacteriological analysis at the beginning, at the end, and from each branch. If the line exceeds 1200 feet additional samples are collected every 1200 ft of the new main and each branch. If the same is acceptable, the lines may be connected to the system. Otherwise repeat the disinfecting procedure until acceptable samples are obtained.

3.14 WATER SERVICE CONNECTIONS

A. The Contractor shall give the Owner one week's notice before the water service is to be turned off to make cuts to the existing waterline or to make customer tie-overs. This notice is required to provide time to field locate cut-off valves in the surrounding area and to notify customers of an interruption in service.

3.15 FLOWABLE FILL TRENCH PLUGS

A. Flowable fill trench plugs will be placed throughout any trench running parallel within 50 feet of a stream channel, spaced at a maximum of 200 linear feet apart, or halfway between stream crossings, if less than 400 feet. Trench plugs will be at least ten feet in length, and extend to approximately 6 inches below normal surface elevation.

3.16 SEWER SERVICE LATERALS

A. It is the responsibility of the contractor to coordinate with the City of Johnson City for the location of any and all existing sanitary sewer service laterals prior to water line installation. The Contractor shall give the City of Johnson City one week's notice of planned work. The contractor will receive a plan view drawing with approximate locations of the sewer gravity line and sewer service laterals within the project area determined by CCTV. The City of Johnson City will also assist the contractor in field locating any existing sewer cleanouts.

B. Any damages by the contractor to a sewer service lateral that has been noted on the provided plan view drawing or by the field location of a sewer cleanout is the responsibility of the contractor. The contractor may be required to provide monetary compensation to the City of Johnson City for any repairs required to the existing sewer service lateral or cleanout.

C. If contractor elects to bore new water line across a roadway, the City of Johnson City reserves the right to require the contractor to pot hole the location of the bore prior to installation to determine the existing location of any utilities, including but not limited to, sewer service laterals.

D. The City of Johnson City reserves the right to review the CCTV of a sewer service lateral and/or cleanout that was repaired by the contractor. The City of Johnson City prefers hard piping on PVC sewer service lateral and/or cleanout installed at location of repair by contractor, but contractor has option of using other methods approved by owner. If the repair is deemed unacceptable by the City of Johnson City, the contractor is required to complete an additional repair on the sewer lateral or cleanout at their own cost. The contractor may be required to provide monetary compensation to the City of Johnson City for any additional repairs to a sewer service lateral and/or cleanout that are completed by the City of Johnson City.

END OF SECTION

SECTION 02910

FINAL GRADING AND LANDSCAPING

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish all labor, equipment, and materials necessary for final grading, topsoiling, seeding, and miscellaneous site work not included under other Sections, but required to complete the work as shown on the Drawings and specified herein. Under this Section, all areas of the project site disturbed by excavation, materials storage, temporary roads, etc., shall be reseeded as specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02276 - Erosion and Sedimentation Control.

B. Section 02500 - Surface Restoration.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Product Data

2. Certification of all materials

3. Three (3) copies of composition and germination certification and of test results for grass seed.

PART 2 -- PRODUCTS

2.01 CONTRACTOR'S RESPONSIBILITIES

A. Furnish and submit certification for the materials used as specified in the General Conditions, Division 1 and Division 2.

2.02 TOPSOIL

A. Upon completion and approval of the rough grading, the Contractor shall place the topsoil over all areas disturbed during construction under any contract except those areas which will be paved, graveled or rip rapped. Topsoil shall not be placed in a frozen or muddy condition and shall contain no toxic materials harmful to grass growth. Topsoil shall be as defined under Section 02200, Earthwork.

2.03 WATER

A. Water shall be furnished to the Contractor by the Owner from existing facilities as directed by the Engineer.

B. The Contractor shall furnish all hoses and connections necessary to complete the landscaping work.

2.04 FERTILIZER

A. Fertilizer shall be a complete commercial fertilizer with components derived from commercial sources. Fertilizer analysis shall be determined from field soil sampling in appropriate number taken by the Contractor and analyzed by the T.N. Department of Agriculture or other independent laboratory. Contractor shall furnish fertilizer in accordance with the recommendations of the T.N. Department of Agriculture.

B. One-quarter of the Nitrogen shall be in the form of nitrates, one-quarter in the form of ammonia salts, and one-half in the form of natural organic Nitrogen. Available Phosphoric Acid shall be free from superphosphate, bone, or tankage. Potash shall be Sulphate of Potash. Elements shall conform to the standards of Association of Official Agricultural Chemists.

C. Fertilizer shall be delivered in standard size bags marked with the weight, analysis of contents, and the name of the manufacturer. Fertilizer shall be stored in weatherproof storage areas and in such a manner that its effectiveness will not be impaired.

2.05 LIME

A. At least 50% shall pass a No. 200 U.S.S. mesh sieve. At least 90% shall pass a No. 100 U.S.S. mesh sieve and 100% shall pass a No. 10 U.S.S. mesh sieve. Total carbonates shall not be less than 80% or 44.8% Calcium Oxide equivalent. For the purpose of calculation, total carbonates shall be considered as Calcium Carbonate.

2.06 GRASS SEED

A. The Contractor shall furnish the kinds and amounts of seed to be seeded in all areas disturbed by the construction work. All seed shall be labeled to show that it meets the requirements of the Tennessee Seed Law. All seed must have been tested within six (6) months immediately preceding the planting of such material on the job.

B. The inoculant for treating legume seed shall be a pure culture of nitrogen-fixing bacteria prepared specifically for the species. Inoculants shall not be used later than the date indicated on the container. The quality of the seed shall conform to the following:

Type	Minimum Seed Purity (%)	Minimum Germination (%)	Maximum Weed Seed (%)
Fescue (fungus free)	98	90	1.00
English Rye	98	85	0.10
Bermuda grass	98	85	0.25
Millet	98	85	0.50
Korean Lespedeza			
Scarified	98	85	0.50
Unscarified	98	85	0.50

C. Scarified Lespedeza may contain 20% hard seed and unscarified 50% hard seed. Seed containing prohibited noxious weed seed shall not be accepted. Seed shall be in conformance with T.N. Seed Law restrictions for restricted noxious weeds.

D. Seed mixtures to be used on the project shall be as follows:

P - February 1 – July 1:
Kentucky 31 Fescue (120 lb/ac); Korean lespedeza (22 lb/ac); English Rye (7 lb/ac)

June 1 – August 15:
Kentucky 31 Fescue (82 lb/ac); English Rye (30 lb/ac); Korean lespedeza (22 lb/ac); German Millet (15 lb/ac)

April 15 – August 15:
Bermudagrass (hulled) (105 lb/ac)
Annual lespedeza (45 lb/ac)

August 1-December 1:
Kentucky 31 Fescue (105 lb/ac): English Rye (30 lb/ac); White Clover (15 lb/ac)

December 1 – February 1:
Kentucky 31 Fescue (105 lb/ac); Crown Vetch (37 lb/ac); English Rye (7 lb/ac).

TW - Italian Rye (56 lb/ac); Korean lespedeza (56 lb/ac); Summer Oats (58 lb/ac).

TS - Sudan-Sorghum (40 lb/ac) or Starr Millet (40 lb/ac)

TF - Balboa Rye (80 lb/ac); Italian Rye (40 lb/ac)

Note: P - Permanent Seeding (see above, for dates).

TW - Temporary Winter Seeding (January 1st – May 1st),
TS - Temporary Summer Seeding (May 1st – July 15th).
TF – Temporary Fall Seeding (July 15th – January 1st).

E. Sericea Lespedeza seed shall be scarified for spring plantings and unscarified for fall plantings.

2.07 WOOD CELLULOSE FIBER MULCH

A. For use in hydroseeding grass seed in combination with fertilizers and other approved additions, shall consist of especially prepared wood cellulose fibers such as "Conwed", "Mat-Fiber", or equal, and have no growth or germination inhibiting factors, and be dyed green.

B. The wood cellulose fiber shall have the additional characteristic of dispersing rapidly in water to form a homogeneous slurry and remain in such state when agitated in the hydraulic mulching unit, or adequate equal, with the specified materials.

C. When applied, the wood cellulose fiber with additives will form an absorptive mat but not a plant inhibiting membrane, which will allow moisture, natural or mechanical, to percolate into underlying soil.

C. The mulch shall be supplied, compressed in packages containing 50 pounds of material having an equilibrium air dry moisture content at time of manufacture of 12% plus or minus 3%. Wood cellulose fiber mulch shall be stored in a weatherproof storage area and in such a manner that effectiveness will not be impaired.

2.08 STRAW MULCH

A. Straw used for mulch shall be small grain hay. Hay shall be undamaged, air dry, threshed straw, free of undesirable weed seed. Straw mulch is not required for seeded areas treated with a temporary soil stabilizer.

2.09 TEMPORARY SOIL STABILIZER

A. The temporary agent for soil erosion control shall consist of an especially prepared highly concentrated powder which, when mixed with water, forms a thick liquid such as "Enviroseal 2001" by Enviroseal Corporation, "Terra Control" by Quattro Environmental, Inc., or "CHEM-CRETE ECO-110" by International CHEM-CRETE Corporation, and having no growth or germination inhibiting factors. The agent shall be used for hydroseeding grass seed in combination with other approved amendments resulting in a highly viscous slurry which, when sprayed directly on the soil, forms a gelatinous crust.

2.10 ROLLED EROSION CONTROL MATTING PRODUCTS

A. The rolled erosion control matting products (RECMs) shall be as specified in Section 02276 - Erosion and Sedimentation Control.

2.11 RIPRAP AND HERBICIDES

A. Furnish and install sufficient quantity of landscape gravel or riprap to cover over the ground to a minimum 4-inch depth for gravel and 24-inch depth for riprap, unless otherwise noted, or indicated on the Drawings. Also furnish and apply an approved herbicide to the subgrade surface just prior to installing the landscape gravel or riprap.

B. During placing, the stone shall be graded so that the smaller stones are uniformly distributed through the mass. The Contractor may place the stone by mechanical methods, augmented by hand placing where necessary or ordered by the Engineer. The placed riprap shall form a properly graded, dense, neat layer of stone.

C. All topsoil and vegetative matter shall be removed from the subgrade surfaces prior to the application of the weed killer (herbicide) and to the placement of landscape gravel or riprap. Apply commercial-type herbicide as preemergence control of miscellaneous grasses and broadleaf weeds in granular or liquid form such as "Treflan", "Dymid", or equal. Methods and rates of application shall be in strict compliance to manufacturer's directions and acceptable to the Engineer.

D. The herbicide selected shall be safe for use around ornamental plantings, have long-lasting weed control, and shall be resistant to leaching away under excessive rainfall.

E. A second application of the herbicide shall be made on the surface of the landscape gravel or riprap sometime after the first six (6) months, but not later than 12-months. Same methods and rates apply as specified previously.

PART 3 -- EXECUTION

3.01 GRADING

A. After approval of the rough grading, the Contractor shall commence his preparations of the subgrade for the various major conditions of the work as follows:

1. Bare soil for riprap area at subgrade (24-inches below final grade, or as directed by the Engineer).

2. Topsoil for lawn and road shoulder seed area - scarify 2-inch depth of subgrade (4-inches below final grade) prior to placing topsoil.

B. Final surface grading of the topsoiled, landscape graveled, and riprapped areas shall be mechanically raked or hand raked to an even finished surface alignment.

3.02 TOPSOIL

A. Topsoil shall be spread in place for quantity required for lawn and road shoulder seed areas at a minimum of 12-inch consolidated depth within trench excavation limits (or match existing topsoil depth outside trench limits), and sufficient quantity for certain plant beds and backfill for shrubs and trees as specified.

3.03 SEEDBED PREPARATION

A. Contractor shall prepare all areas to receive temporary or permanent seeding measures prior to planting.

B. Topsoil shall be placed in areas to be seeded and roughened with tracked equipment or other suitable measures. Slopes steeper than 3:1 may be roughened by grooving, furrowing, tracking, or stairstep grading. Slopes flatter than 3:1 should be grooved by disking, harrowing, raking, operating planting equipment on the contour.

D. Soil amendments including, but not limited to, lime and fertilizer shall be spread as necessary, and at the rates specified in this Section. Seeding shall be as per the type and rates specified in this Section. Seed shall be broadcast as soon as possible following roughening, before surface has been sealed by rainfall.

3.04 HYDROSEEDING (FLEXIBLE GROWTH MEDIUM, FGM), AND GRASS

A. The Contractor shall grow a stand of grass by hydroseeding or FGM method on all disturbed areas, (where indicated) and as specified in Section 02276 – Erosion and Sediment Control. The Contractor shall be responsible for the satisfactory growth of grass throughout the period of the one-year guarantee.

B. The Contractor's work shall include the preparation of the topsoil and bare soil seed bed, application of fertilizer, limestone, mulching, inoculant, temporary soil stabilizer, watering, and all other operations necessary to provide a satisfactory growth of sod at the end of the one-year maintenance period. Areas without satisfactory sod at the end of one (1) year shall be replanted until satisfactory growth is obtained and acceptable to the Engineer.

C. All areas to be seeded shall be done by the hydraulic seeding method including all additives and amendments required. A "Reinco", "Finn", or "Bowie" type hydromulcher with adjustable nozzles and extension hoses, or equal, shall be utilized. General capacity of tank should range from 500 to 2,500 gallons, or as approved by the Engineer.

D. Hydraulic seeding shall be carried out in three steps. Step one shall consist of the application of lime. In step two the seed mixture shall be mixed with the fertilizer, wood cellulose fiber mulch, and any required inoculants and applied to the seed bed. Step three shall consist of application of top dressing during the first spring or fall, whichever comes first, after step two.

E. Top dressing shall consist of a commercial grade fertilizer plus Nitrogen or other analysis as may be recommended by soil testing. Types and application rates of seed mixtures, lime, fertilizer, and wood cellulose fiber mulch, shall be as shown in the Seeding Schedule.

F. Ingredients for the mixture and steps should be dumped into a tank of water and thoroughly mixed to a homogeneous slurry and sprayed out under a minimum of 300-350 pounds pressure, in suitable proportions to accommodate the type and capacity of the hydraulic machine to be used. Applications shall be evenly sprayed over the ground surface. The Contractor shall free the topsoil of stones, roots, rubbish, and other deleterious materials and dispose of same off the site. The bare soil, except existing steep embankment area,

shall be rough raked to remove stones, roots, and rubbish over 4-inches in size, and other deleterious materials and dispose of same off the site.

G. No seeding should be undertaken in windy or unfavorable weather, when the ground is too wet to rake easily, when it is in a frozen condition, or too dry. Any bare spots shown in two to three weeks shall be recultivated, fertilized at half the rate, raked, seeded, and mulched again by mechanical or hand broadcast method acceptable to the Engineer.

H. Areas that have been seeded with a temporary seed mixture shall be mowed to a height of less than 2-inches and scarified prior to seeding with the permanent seed mixture.

I. The Contractor shall provide, at his own expense, protection for all seeded areas against trespassing and damage at all times until acceptance of the work. Slopes shall be protected from damage due to erosion, settlement, and other causes and shall be repaired promptly at the Contractor's expense.

J. The Contractor shall water newly seeded areas of the lawn and road shoulder mix once a week until the grasses have germinated sufficiently to produce a healthy turf, or unless otherwise directed by the Engineer. Each watering shall provide three (3) gallons per square yard. The Contractor shall furnish all necessary hoses, sprinklers, and connections.

K. The first and second cutting of the lawn grasses only shall be done by the Contractor. All subsequent cuttings will be done by the Owner's forces in a manner specified by the Contractor.

3.05 DITCH AND SWALE EROSION PROTECTION

A. All ditches and swales indicated on the Drawings shall be lined with a rolled erosion control matting product (RECM). The area to be covered shall be properly graded and seeded before the RECM is installed. Installation shall be in accordance with Section 02276, Erosion and Sedimentation Control.

3.06 MAINTENANCE

A. The Contractor shall be responsible for maintaining all seeded areas through the end of his warranty period. Maintenance shall include but not be limited to, annual fertilization, mowing, repair of seeded areas, irrigation, and weed control. The Contractor shall provide, at his own expense, protection for all seeded areas against trespassing and damage at all times until acceptance of the work. Slopes shall be protected from damage due to erosion, settlement, and other causes and shall be repaired promptly at the Contractor's expense.

B. Annual fertilization shall consist of an application of 500#/acre of 10-10-10 commercial grade fertilizer, or its equivalent and 60#/acre of nitrogen in early fall, or other analysis as may be determined by soil test. Annual fertilization shall be in addition to top dressing and shall be performed by the Contractor each fall season after planting until the work is substantially complete.

C. Mowing shall be scheduled so as to maintain a minimum stand height of 4-inches or as directed by the Engineer. Stand height shall be allowed to reach 8 to 10-inches prior to mowing.

D. All seeded areas shall be inspected on a regular basis and any necessary repairs or reseedings made within the planting season, if possible. If the stand should be over 60% damaged, it shall be re-established following the original seeding recommendations.

E. Weed growth shall be maintained mechanically and/or with herbicides. When chemicals are used, the Contractor shall follow the current Tennessee Agricultural Experiment Stations' weed control recommendations and adhere strictly to the instructions on the label of the herbicide. No herbicide shall be used without prior approval of the Engineer.

3.07 CLEANUP

A. The Contractor shall remove from the site all subsoil excavated from his work and all other debris including, but not limited to, branches, paper, and rubbish in all landscape areas, and remove temporary barricades as the work proceeds.

B. All areas shall be kept in a neat, orderly condition at all times. Prior to final acceptance, the Contractor shall clean up the entire landscaped area to the satisfaction of the Engineer.

3.08 SEEDING SCHEDULE

A. All seeding and mulching to be completed by the Contractor shall conform to the following schedule at the end of this section. Areas seeded with temporary seed mixtures shall be reseeded by the Contractor at no additional cost to the Owner with permanent seed as directed by the Engineer.

B. Application rates of seed mixtures, lime, fertilizer, mulch and top dressing are shown in the schedule.

SEEDING SCHEDULE

Application Rates (Pounds/Acre)								
Seed Mixture	**Planting Season**	**Lime[a]**	**Seed**	**Fertilizer**	**Straw[b] Mulch**	**Top Dressing[a]**	**Annual Fertilizer**	**Comments**
P	Feb. 1-July 1 June 1-Aug. 15 April 15-Aug. 15 Aug. 1-Dec. 1 Feb. 1-Dec.1	4000	150	1000	4000	500 of 10-10-10 60 of Nitrogen	Same as Topdressing	
TW	Jan. 1-May 1	2000	170	750	4000	-	-	Over seed with Type P seed mixture during next planting season.
TS	May 1-July 15	2000	40	750	4000	-	-	Over seed with Type P seed mixture during next planting season.
TF	July 15-Jan. 1	2000	120	1000	4000	-	-	Over seed with Type P seed mixture during next planting season.

Footnotes:

a. Application rates and/or chemical analysis shall be confirmed or established by soil test.
b. On cut and fill slopes 2:1 or steeper, add 30#/acre Sericea Lespedeza to Type P seed mixture. Use scarified seed for spring plantings and unscarified for fall plantings.
c. Apply asphalt at rate of 0.10 gallon per square yard (10 gal/1000 ft^2) to tack straw mulch.

- END OF SECTION –

SECTION 02960

TRAFFIC CONTROL

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall follow the construction procedure and maintenance of traffic as shown on their approved Traffic Control Plan submittal unless an alternative plan is agreed to by the Engineer prior to or during the prosecution of the work.

1.02 STREET SIGNS AND MARKERS AND ROUTE MARKERS

A. The Contractor shall move any existing street signs and markers and route markers out of the construction limits of the project and install the street signs and markers and route markers so that they will be visible to the traveling public if there is sufficient right of way for these signs and markers outside of the construction limits.

B. Near the completion of the project and when so directed by the Engineer, the Contractor shall move the signs and markers and install them in their proper location in regard to the finished pavement of the project.

C. Any signs or markers which cannot be relocated due to lack of right-of-way, or any signs and markers which will no longer be applicable after the construction of the project, shall be stockpiled at locations directed by the Engineer for removal by others.

D. The Contractor will be responsible to the Owner for any damage to any street signs and markers or route markers during the above described operations.

E. No direct payment will be made for relocating, reinstalling, and/or stockpiling the street signs and markers and route markers as such work will be considered incidental.

PART 2 -- MATERIALS

2.01 CONSTRUCTION TRAFFIC CONTROL DEVICES

A. Description - The work covered by this Section consists of furnishing, erecting, maintaining, relocating, and removing traffic control devices in accordance with the Drawings, Specifications, MUTCD, or as directed by the Engineer. The MUTCD referred to in this provision shall be the current edition of the Manual on Uniform Traffic Control Devices for Streets and Highways, as prepared by the National Advisory Committee on Uniform Traffic Control Devices, including all standard documents referred to in the second paragraph of Section 1A-7 of the MUTCD. The current edition shall be the edition current on the date of advertisement for the Project. All traffic control devices furnished by the Contractor shall remain the property of the Contractor, unless otherwise required by the Contract. Traffic control devices shall include, but not be limited to signs, non-metallic drums, barricades,

cones, delineators, temporary guardrail, temporary pavement marking, raised reflective pavement markers, flaggers and pilot vehicles, as required.

B. Materials - General - Unless otherwise required, materials used in the fabrication and installation of construction traffic control devices shall be in accordance with the applicable provision of the MUTCD. When traffic control devices are no longer required for traffic handling in the initial phase of construction requiring their use, they may be reused at various locations throughout the project provided the device is not defaced, is structurally sound, clean, and otherwise conforms to the above requirements.

C. Traffic control devices which do not meet the requirements of this Section shall not be used; and, when during the life of a project, a device ceases to meet the requirements of this Section it shall be promptly removed and replaced with a conforming device at no additional compensation. The Engineer shall have the authority to determine the acceptability of the traffic control devices.

D. Construction Methods - General - Traffic control devices shall be installed at the inception of construction operations, and shall be properly maintained, relocated as necessary, cleaned, and operated during the time they are in use. They shall remain in place only as long as they are needed and shall be immediately removed thereafter. Where operations are performed in stages, only those devices that apply to the conditions present shall be left in place.

E. The location, legends, sheeting, dimensions, number of supports, and horizontal and vertical placement of warning signs, barricades, and other traffic control devices shall be as required by the Drawings or the MUTCD or as directed by the Engineer. The Contractor may submit for the Engineer's consideration a method for handling traffic other than as shown on the Drawings. The alternate traffic handling plans shall not be used until they are approved by the Engineer in writing. During periods when not warranted, warning signs and other devices shall be removed from the work area, covered with specified material, or otherwise positioned so they do not convey their message to the traveling public. If covered, the covering material shall be exterior plywood and shall cover the entire face of the sign panel. The covering material shall be installed in such a manner that the sign panel will not be defaced. Covering material shall be maintained in a neat and workmanlike manner during its use.

F. Weeds, brush, trees, construction materials, equipment, etc., shall not be allowed to obscure any traffic control device in use.

G. If cones are used for delineation at night, each cone shall have any appropriate white reflectorized cone collar as detailed on the Drawings, or as directed by the Engineer.

H. Competent and properly trained flaggers, properly attired and equipped, shall be provided as shown on the Drawings, when directed by the Engineer, or when the Contractor deems it necessary to safely handle traffic through the construction area.

I. The Contractor shall assume full responsibility for the continuous and expeditious maintenance of all construction warning signs, barricades, and other traffic control devices. Maintenance shall include repair and replacement of traffic control devices which, in the

opinion of the Engineer, are damaged by traffic or other means, or deteriorated beyond effectiveness. Conditions covered under maintenance shall include but not be limited to replacement due to loss of reflectivity; replacement of broken supports; plumbing of leaning signs; cleaning of dirty signs, barricades, and other devices; repair of defaced sheeting and legend; and replacement of stolen or vandalized items. All items used for traffic control shall be maintained in a satisfactory condition. Failure to maintain all traffic control devices in a satisfactory condition may be cause for suspension of construction operations until proper traffic control is re-established.

J. The Contractor shall continuously review and maintain all traffic handling measures to assure that adequate provisions have been made for the safety of the public and workers.

2.02 STATIONARY CONSTRUCTION SIGNS

A. Description - The work covered by this Section consists of furnishing, erecting, relocating, maintaining, and removing stationary signs necessary for controlling traffic.

B. Materials - Reflective sheeting shall be used on all sign facing and shall meet the requirements of AASHTO M268. The reflective sheeting shall be enclosed lens (Engineers grade) sheeting and shall have a smooth, sealed outer surface which will display the same color both day and night. The reflective sheeting on each sign shall have a smooth appearance. The reflective sheeting shall be applied in a workmanlike manner so that there are no bubbles or wrinkles in the material.

C. Construction Methods - All work shall be in accordance with requirements of Section 2.01.

2.03 TYPE III BARRICADES

A. Description - The work covered by this Section consists of furnishing, erecting, maintaining, and removing Type III Barricades.

B. Construction Methods - All work shall be in accordance with requirements of Section 2.01.

2.04 PORTABLE TEMPORARY TRAFFIC CONTROL DEVICES

A. Description - The work covered by this Section consists of furnishing erecting, relocating, maintaining, and removing portable temporary traffic control devices necessary for controlling traffic. Portable temporary traffic control devices shall include but not be limited to portable signs, non-metallic drums, barricades, cones, delineators, flaggers, pilot vehicles, and any other traffic control device not covered by any other Sections included in this Contract.

B. Portable Signs - Reflective sheeting shall be used on all sign facing and shall meet the requirement of AASHTO M268. The reflective sheeting shall be enclosed lens (Engineers grade) sheeting and shall have a smooth, sealed outer surface which will display the same color both day and night. The reflective sheeting on each sign shall have a smooth appearance. The reflective sheeting shall be applied in a workmanlike manner so that there are no bubbles or wrinkles in the material.

C. Non-Metallic Drums - The drums shall be made of plastic impact resistant material. The drums shall have a two-piece, breakaway design that will maintain its integrity upon impact throughout a temperature range of –20°F to 125°F. Upon impact the upper portion of the drum shall deform and breakaway from the base, minimizing damage to drums or vehicles. The base and ballast shall remain in position and vehicle shall easily pass over it.

1. The drums shall be designed to have two TYPE "A" or "C" light wells located on the top surface of the drums. The drums shall be designed with a top to completely seal the drums to prevent water from accumulating and freezing in the bottom of the drums. The base shall be designed to accommodate a sandbag of 40 lbs. to 60 lbs. A sandbag with 50 lbs. of sand shall be supplied with each drum.

2. The drums shall have an assembled minimum height of 36", a minimum outside base diameter of 21", and a combined minimum weight of 12 lbs.

3. The Contractor shall be required to furnish the Engineer a sample drum and its specifications for approval prior to the delivery of drums of the project.

4. The markings on drums shall be horizontal, circumferential, orange and white stripes six to eight inches wide, covering entire outside. The entire area of orange and white shall be reflectorized with the enclosed lens (Engineers grade) sheeting, except for the corrugation area where a 2" non-reflectorized band will be allowed. There shall be at least two orange and two white stripes on each drum. Reflectorized material shall have a smooth, sealed outer surface which will display the same approximate color day and night. The reflective sheeting shall meet the requirement os AASHTO M268.

D. Construction Methods - All work shall be in accordance with the requirements of Section 2.01.

2.05 FLASHING ARROW PANELS

A. Description - The work covered by this Section consists of furnishing, maintaining, moving, and relocating flashing arrow panels mounted on a trailer, truck, or other mobile unit, as shown on the Contract Drawings.

B. Materials - The flashing arrow panels shall meet the requirements of the MUTCD (Section 6E) for a Type A panel.

C. Construction Methods - All work shall be in accordance with the requirements of Section 2.01.

D. During periods of times that traffic is shifted from its normal pattern, a mobile flashing arrow panel shall be used at locations shown on the Drawings or at locations directed by the Engineer.

PART 4 -- PAYMENT

4.01 GENERAL DESCRIPTION

A. All work required by this Section for "Stationary Construction Signs" shall be by total lump sum for all the sign panels which have been installed at each location required by the Contract.

B. All work required by this Section for "Type III Barricades" shall be the lump sum for Type III Barricades which have been installed in accordance with this provision. Measurement will be made for the total length of the Barricade(s).

C. All work required by this Section for "Portable Temporary Traffic Control Devices" shall be paid for at the Lump Sum Price Bid for "Portable Temporary Traffic Control Devices." Partial payments for this pay item shall be made as follows:

1. 25% of the Lump Sum Price when the project work is 10% complete as indicated by approved progress payments exclusive of stored materials.

2. 50% of the Lump Sum Price when the project is 50% complete as indicated by approved progress payments exclusive of stored materials.

3. 25% of the Lump Sum Price when the project is substantially complete.

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SECTION 03100

CONCRETE FORMWORK

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Provide materials, labor, and equipment required for the design and construction of all concrete formwork, bracing, shoring and supports in accordance with the provisions of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03200 - Reinforcing Steel

B. Section 03250 - Concrete Accessories

C. Section 03290 - Joints in Concrete

D. Section 03300 - Cast-in-Place Concrete

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. ACI 318 - Building Code Requirements for Structural Concrete

2. ACI 301 - Specifications for Structural Concrete for Buildings

3. ACI 347 - Recommended Practice for Concrete Formwork

4. U.S. Product Standard for Concrete Forms, Class I, PS 1

5. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Manufacturer's data on proposed form release agent

2. Manufacturer's data on proposed formwork system including form ties

1.05 QUALITY ASSURANCE

A. Concrete formwork shall be in accordance with ACI 301, ACI 318, and ACI 347.

PART 2 -- PRODUCTS

2.01 FORMS AND FALSEWORK

A. All forms shall be smooth surface forms unless otherwise specified.

B. Wood materials for concrete forms and falsework shall conform to the following requirements:

1. Lumber for bracing, shoring, or supporting forms shall be Douglas Fir or Southern Pine, construction grade or better, in conformance with U.S. Product Standard PS20. All lumber used for forms, shoring or bracing shall be new material.

2. Plywood for concrete formwork shall be new, waterproof, synthetic resin bonded, exterior type Douglas Fir or Southern Pine high density overlaid (HDO) plywood manufactured especially for concrete formwork and shall conform to the requirements of PS1 for Concrete Forms, Class I, and shall be edge sealed. Thickness shall be as required to support concrete at the rate it is placed, but not less than 5/8-inch thick.

C. Other form materials such as metal, fiberglass, or other acceptable material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line and grade indicated may be submitted to the Engineer for approval, but only materials that will produce a smooth form finish equal or better than the wood materials specified will be considered.

2.02 FORMWORK ACCESSORIES

A. Form ties shall be provided with a plastic cone or other suitable means for forming a conical hole to insure that the form tie may be broken off back of the face of the concrete. The maximum diameter of removable cones for rod ties, or of other removable form-tie fasteners having a circular cross-section, shall not exceed 7/8-inch, and all such fasteners shall be such as to leave holes of regular shape for reaming.

B. Form ties for water-retaining structures shall have integral waterstops. Removable taper ties may be used when acceptable to the Engineer. A preformed mechanical EPDM rubber plug shall be used to seal the hole left after the removal of the taper tie. Plug shall be X-Plug by the Greenstreak Group, Inc., or approved equal. Friction fit plugs shall not be used.

C. Form release agent shall be a blend of natural and synthetic chemicals that employs a chemical reaction to provide quick, easy and clean release of concrete from forms. It shall not stain the concrete and shall leave the concrete with a paintable surface. Formulation of the form release agent shall be such that it would minimize formation of "bug holes" in cast-in-place concrete.

PART 3 -- EXECUTION

3.01 FORM DESIGN

A. Forms and falsework shall be designed for total dead load, plus all construction live load as outlined in ACI 347. Design and engineering of formwork and safety considerations during construction shall be the responsibility of the Contractor.

B. Forms shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. The maximum deflection of facing materials reflected in concrete surfaces exposed to view shall be 1/240 of the span between structural members.

C. All forms shall be designed for predetermined placing rates per hour, considering expected air temperatures and setting rates.

3.02 CONSTRUCTION

A. The type, size, quality, and strength of all materials from which forms are made shall be subject to the approval of the Engineer. No falsework or forms shall be used which are not clean and suitable. Deformed, broken or defective falsework and forms shall be removed from the work.

B. Forms shall be smooth and free from surface irregularities. Suitable and effective means shall be provided on all forms for holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets, or similar surface defects in the finished concrete. Joints between the forms shall be sealed to eliminate any irregularities. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to a practical minimum.

C. Forms shall be true to line and grade, and shall be sufficiently rigid to prevent displacement and sagging between supports. Curved forms shall be used for curved and circular structures. Straight panels joined at angles will not be acceptable for forming curved structures. Forms shall be properly braced or tied together to maintain their position and shape under a load of freshly-placed concrete. Facing material shall be supported with studs or other backing which shall prevent both visible deflection marks in the concrete and deflections beyond the tolerances specified.

D. Forms shall be mortar tight so as to prevent the loss of water, cement and fines during placing and vibrating of the concrete. Specifically, the bottom of wall forms that rest on concrete footings or slabs shall be provided with a gasket to prevent loss of fines and paste during placement and vibration of concrete. Such gasket may be a 1 to 1-1/2 inch diameter polyethylene rod held in position to the underside of the wall form.

E. All vertical surfaces of concrete members shall be formed, and side forms shall be provided for all footings, slab edges and grade beams, except where placement of the concrete against the ground is called for on the Drawings. Not less than 1-inch of concrete shall be added to the thickness of the concrete member as shown where concrete is permitted to be placed against trimmed ground in lieu of forms. Such permission will be granted only for members of comparatively limited height and where the character of the ground is such that

it can be trimmed to the required lines and will stand securely without caving or sloughing until the concrete has been placed.

F. All forms shall be constructed in such a manner that they can be removed without hammering or prying against the concrete. Wood forms shall be constructed for wall openings to facilitate loosening and to counteract swelling of the forms.

G. Adequate clean-out holes shall be provided at the bottom of each lift of forms. Temporary openings shall be provided at the base of column forms and wall forms and at other points to facilitate cleaning and observation immediately before the concrete is deposited. The size, number and location of such clean-outs shall be as acceptable to the Engineer.

H. Construction joints shall not be permitted at locations other than those shown or specified, except as may be acceptable to the Engineer. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory effect whatsoever on the concrete. For flush surfaces at construction joints exposed to view, the contact surface of the form sheathing over the hardened concrete in the previous placement shall be lapped by not more than 1 inch. Forms shall be held against hardened concrete to prevent offset or loss of mortar at construction joints and to maintain a true surface.

I. The formwork shall be cambered to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads. Set forms and intermediate screed strips for slabs accurately to produce the designated elevations and contours of the finished surface. Ensure that edge forms and screed strips are sufficiently strong to support vibrating screeds or roller pipe screeds if the nature of the finish specified requires the use of such equipment. When formwork is cambered, set screeds to a like camber to maintain the proper concrete thickness.

J. Positive means of adjustment (wedges or jacks) for shores and struts shall be provided and all settlement shall be taken up during concrete placing operation. Shores and struts shall be securely braced against lateral deflections. Wedges shall be fastened firmly in place after final adjustment of forms prior to concrete placement. Formwork shall be anchored to shores or other supporting surfaces or members to prevent upward or lateral movement of any part of the formwork system during concrete placement. If adequate foundation for shores cannot be secured, trussed supports shall be provided.

K. Runways shall be provided for moving equipment with struts or legs. Runways shall be supported directly on the formwork or structural member without resting on the reinforcing steel.

3.03 TOLERANCES

A. Unless otherwise indicated in the Contract Documents, formwork shall be constructed so that the concrete surfaces will conform to the tolerance limits listed in ACI 117.

B. Structural framing of reinforced concrete around elevators and stairways shall be accurately plumbed and located within 1/4 in. tolerance from established dimensions.

C. The Contractor shall establish and maintain in an undisturbed condition and until final completion and acceptance of the project, sufficient control points and bench marks to be used for reference purposes to check tolerances. Plumb and string lines shall be installed before concrete placement and shall be maintained during placement. Such lines shall be used by Contractor's personnel and by the Engineer and shall be in sufficient number and properly installed. During concrete placement, the Contractor shall continually monitor plumb and string line form positions and immediately correct deficiencies.

D. Regardless of the tolerances specified, no portion of the building shall extend beyond the legal boundary of the building.

3.04 FORM ACCESSORIES

A. Suitable moldings shall be placed to bevel or round all exposed corners and edges of beams, columns, walls, slabs, and equipment pads. Chamfers shall be 3/4 inch unless otherwise noted.

B. Form ties shall be so constructed that the ends, or end fasteners, can be removed without causing appreciable spalling at the faces of the concrete. After ends, or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than 2 inches from the formed face of the concrete that is exposed to wastewater or enclosed surfaces above the wastewater, and not less than 1 inch from the formed face of all other concrete. Holes left by the removal of form tie cones shall be reamed with suitable toothed reamers so as to leave the surface of the holes clean and rough before being filled with mortar as specified in Section 03350 - Concrete Finishing. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete member. The use of snap-ties which cause spalling of the concrete upon form stripping or tie removal will not be permitted. No snap ties shall be broken off until the concrete is at least three days old. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste.

3.05 APPLICATION - FORM RELEASE AGENT

A. Forms for concrete surfaces that will not be subsequently waterproofed shall be coated with a form release agent. Form release agent shall be applied on formwork in accordance with manufacturer's recommendations.

3.06 INSERTS AND EMBEDDED ITEMS

A. Sleeves, pipe stubs, inserts, anchors, expansion joint material, waterstops, and other embedded items shall be positioned accurately and supported against displacement prior to concreting. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.

3.07 FORM CLEANING AND REUSE

A. The inner faces of all forms shall be thoroughly cleaned prior to concreting. Forms may be reused only if in good condition and only if acceptable to the Engineer. Light sanding between uses will be required wherever necessary to obtain uniform surface texture.

Unused tie rod holes in forms shall be covered with metal caps or shall be filled by other methods acceptable to the Engineer.

3.08 FORM REMOVAL AND SHORING

A. Forms shall not be disturbed until the concrete has attained sufficient strength. Sufficient strength shall be demonstrated by structural analysis considering proposed loads, strength of forming and shoring system, and concrete strength data. Shoring shall not be removed until the supported member has acquired sufficient strength to support its weight and the load upon it. Members subject to additional loads during construction shall be adequately shored to sustain all resulting stresses. Forms shall be removed in such manner as not to impair safety and serviceability of the structure. All concrete to be exposed by form removal shall have sufficient strength not to be damaged thereby.

B. Provided the strength requirements specified above have been met and subject to the Engineer's approval, forms may be removed at the following minimum times. The Contractor shall assume full responsibility for the strength of all such components from which forms are removed prior to the concrete attaining its full design compressive strength. Shoring may be required at the option of the Engineer beyond these periods.

Ambient Temperature (°F.) During Concrete Placement

	Over 95°	70°-95°	60°-70°	50°-60°	Below 50°
Walls	5 days	2 days	2 days	3 days	Do not remove until directed by Engineer (7 days minimum)
Columns	7 days	2 days	3 days	4 days	
Beam Soffits	10 days	7 days	7 days	7 days	
Elevated Slabs	12 days	7 days	7 days	7 days	

C. When, in the opinion of the Engineer, conditions of the work or weather justify, forms may be required to remain in place for longer periods of time.

D. An accurate record shall be maintained by the Contractor of the dates of concrete placings and the exact location thereof and the dates of removal of forms. These records shall be available for inspection at all times at the site, and two copies shall be furnished the Engineer upon completion of the concrete work.

3.09 RESHORING

A. When reshoring is permitted or required the operations shall be planned in advance and subjected to approval by the Engineer.

B. Reshores shall be placed after stripping operations are complete but in no case later than the end of the working day on which stripping occurs.

C. Reshoring for the purpose of early form removal shall be performed so that at no time will large areas of new construction be required to support their own weight. While reshoring is under way, no construction or live loads shall be permitted on the new construction. Reshores shall be tightened to carry their required loads but they shall not be overtightened

so that the new construction is overstressed. Reshores shall remain in place until the concrete has reached its specified 28-day strength, unless otherwise specified.

D. For floors supporting shores under newly placed concrete, the original supporting shores shall remain in place or reshores shall be placed. The shoring or reshoring system shall have a capacity sufficient to resist the anticipated loads and in all cases shall have a capacity equal to at least one-half of the capacity of the shoring system above. Reshores shall be located directly under a reshore position above unless other locations are permitted.

E. In multi-story buildings, reshoring shall extend over a sufficient number of stories to distribute the weight of newly placed concrete, forms, and construction live loads so the design superimposed loads of the floors supporting shores are not exceeded.

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SECTION 03200

REINFORCING STEEL

PART 1 -- GENERAL

1.01 THE REQUIREMENTS

A. Provide all concrete reinforcing including all cutting, bending, fastening and any special work necessary to hold the reinforcing steel in place and protect it from injury and corrosion in accordance with the requirements of this section.

B. Provide deformed reinforcing bars to be grouted into reinforced concrete masonry walls.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03100 - Concrete Formwork

B. Section 03250 - Concrete Accessories

C. Section 03300 - Cast-in-Place Concrete

D. Section 03400 - Precast Concrete

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1.	CRSI	-	Concrete Reinforcing Institute Manual of Standard Practice
2.	ACI SP66	-	ACI Detailing Manual
3.	ACI 315	-	Details and Detailing of Concrete Reinforcing
4.	ACI 318	-	Building Code Requirements for Structural Concrete
5.	WRI	-	Manual of Standard Practice for Welded Wire Fabric
6.	ASTM A 615	-	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcing
7.	ASTM A 1064	-	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Detailed placing and shop fabricating drawings, prepared in accordance with ACI 315 and ACI Detailing Manual - (SP66), shall be furnished for all concrete reinforcing. These drawings shall be made to such a scale as to clearly show joint locations, openings, and the arrangement, spacing and splicing of the bars.

2. Mill test certificates - 3 copies of each.

3. Description of the reinforcing steel manufacturer's marking pattern.

4. Requests to relocate any bars that cause interferences or that cause placing tolerances to be violated.

5. Proposed supports for each type of reinforcing.

6. Request to use splices not shown on the Drawings.

7. Request to use mechanical couplers along with manufacturer's literature on mechanical couplers with instructions for installation, and certified test reports on the couplers' capacity.

8. Request for placement of column dowels without the use of templates.

9. Request and procedure to field bend or straighten partially embedded reinforcing.

10. International Code Council–Evaluation Services Evaluation Services Report (ICC-ES ESR) for dowel adhesives.

11. Certification that all installers of dowel adhesive are certified as Adhesive Anchor Installers in accordance with the ACI-CRSI Anchor Installer Certification Program.

12 Adhesive dowel testing plan.

1.05 QUALITY ASSURANCE

A. If requested by the Engineer, the Contractor shall provide samples from each load of reinforcing steel delivered in a quantity adequate for testing. Costs of initial tests will be paid by the Owner. Costs of additional tests due to material failing initial tests shall be paid by the Contractor.

B. Installer Qualifications for Drilled-In Rebar: Drilled-in rebar shall be installed by an Installer with at least three years of experience performing similar installations. Installer shall be certified as an Adhesive Anchor Installer in accordance with ACI-CRSI Adhesive Anchor Installation Certification Program.

C. Installer Training: Conduct a thorough training with the manufacturer or the manufacturer's representative for the Installer on the project. Training shall consist of a review of the complete installation process for drilled-in anchors, to include but not be limited to the following:

1. Hole drilling procedure.

2. Hole preparation and cleaning technique.

3. Adhesive injection technique and dispenser training/maintenance.

4. Rebar doweling preparation and installation.

5. Proof loading/torquing.

PART 2 -- PRODUCTS

2.01 REINFORCING STEEL

A. Bar reinforcing shall conform to the requirements of ASTM A 615 for Grade 60 Billet Steel reinforcing. All reinforcing steel shall be from domestic mills and shall have the manufacturer's mill marking rolled into the bar which shall indicate the producer, size, type and grade. All reinforcing bars shall be deformed bars. Smooth reinforcing bars shall not be used unless specifically called for on Drawings.

B. Welded wire fabric reinforcing shall conform to the requirements of ASTM A 1064 and the details shown on the Drawings.

C. A certified copy of the mill test on each load of reinforcing steel delivered showing physical and chemical analysis shall be provided, prior to shipment. The Engineer reserves the right to require the Contractor to obtain separate test results from an independent testing laboratory in the event of any questionable steel. When such tests are necessary because of failure to comply with this Specification, such as improper identification, the cost of such tests shall be borne by the Contractor.

D. Field welding of reinforcing steel will not be allowed.

E. Use of coiled reinforcing steel will not be allowed.

2.02 ACCESSORIES

A. Accessories shall include all necessary chairs, slab bolsters, concrete blocks, tie wires, dips, supports, spacers and other devices to position reinforcing during concrete placement. Slab bolsters shall have gray plastic-coated legs.

B. Concrete blocks (dobies), used to support and position bottom reinforcing steel, shall have the same or higher compressive strength as specified for the concrete in which it is located.

2.03 MECHANICAL COUPLERS

A. Mechanical couplers shall develop a tensile strength which exceeds 100 percent of the ultimate tensile strength and 125 percent of the yield strength of the reinforcing bars being spliced. The reinforcing steel and coupler used shall be compatible for obtaining the required strength of the connection.

B. Where the type of coupler used is composed of more than one component, all components required for a complete splice shall be supplied.

C. Hot forged sleeve type couplers shall not be used. Acceptable mechanical couplers are Dayton Superior Dowel Bar Splicer System by Dayton Superior, Dayton, Ohio, or approved equal. Mechanical couplers shall only be used where shown on the Drawings or where specifically approved by the Engineer.

D. Where the threaded rebar to be inserted into the coupler reduces the diameter of the bar, the threaded rebar piece shall be provided by the coupler manufacturer.

2.04 DOWEL ADHESIVE SYSTEM

A. Where shown on the Drawings, reinforcing bars anchored into hardened concrete with a dowel adhesive system shall use a two-component adhesive mix which shall be injected with a static mixing nozzle following manufacturer's instructions.

B. All holes shall be drilled in accordance with the manufacturer’s instructions except that core drilled holes shall not be permitted unless specifically allowed by the Engineer. Cored holes, if allowed by the manufacturer and approved by the Engineer, shall be roughened in accordance with manufacturer’s requirements.

C. Thoroughly clean drill holes of all debris, drill dust, and water in accordance with manufacturer’s instructions with compressed air and a wire brush prior to installation of adhesive and reinforcing bar.

D. Degree of hole dampness shall be in strict accordance with manufacturer recommendations. Installation conditions shall be either dry or water-saturated. Water filled or submerged holes shall not be permitted unless specifically approved by the Engineer.

E. Injection of adhesive into the hole shall be performed in a manner to minimize the formation of air pockets in accordance with the manufacturer’s instructions.

F. Embedment Depth:

1. The embedment depth of the bar shall be as shown on the Drawings. Although all manufacturers listed below are permitted, the embedment depth shown on the Drawings is based on “PE 1000+” by Powers Fasteners the Contractor submits one of the other named dowel adhesives from the list below, the Engineer shall evaluate the required embedment and the Contractor shall provide the required embedment depth stipulated by the Engineer specific to the approved dowel adhesive.

2. Where the embedment depth is not shown on the Drawings, the embedment depth shall be determined to provide the minimum allowable bond strength equal to the tensile strength of the rebar according to the manufacturer's ICC-ES ESR.

3. The embedment depth shall be determined using the actual concrete compressive strength, a cracked concrete state, maximum long term temperature of 110 degrees F, and maximum short term temperature of 140 degrees F. In no case shall the embedment depth be less than the minimum, or more than the maximum, embedment depths stated in the manufacturer's ICC-ES ESR.

G. Engineer's approval is required for use of this system in locations other than those shown on the Drawings.

H. The adhesive system shall be IBC compliant for use in both cracked and uncracked concrete in all Seismic Design Categories and shall be "Epcon C6+ Adhesive Anchoring System" as manufactured by ITW Redhead, " HIT-HY 200 Adhesive Anchoring System" as manufactured by Hilti, Inc. "SET-XP Epoxy Adhesive Anchors" as manufactured by Simpson Strong-Tie Co. or "PE-1000+ Epoxy Adhesive Anchor System" by Powers Fasteners. Fast-set epoxy formulations shall not be acceptable. No or equal products will be considered, unless pre-qualified and approved.

I. All individuals installing dowel adhesive system shall be certified as an Adhesive Anchor Installer in accordance with the ACI-CRSI Anchor Installation Certification Program.

PART 3 – EXECUTION

3.01 TEMPERATURE REINFORCING

A. Unless otherwise shown on the Drawings or in the absence of the concrete reinforcing being shown, the minimum cross sectional area of horizontal and vertical concrete reinforcing in walls shall be 0.0033 times the gross concrete area and the minimum cross sectional area of reinforcing perpendicular to the principal reinforcing in slabs shall be 0.0020 times the gross concrete area. Temperature reinforcing shall not be spaced further apart than five times the slab or wall thickness, nor more than 18 inches.

3.02 FABRICATION

A. Reinforcing steel shall be accurately formed to the dimensions and shapes shown on the Drawings and the fabricating details shall be prepared in accordance with ACI 315 and ACI 318, except as modified by the Drawings.

B. The Contractor shall fabricate reinforcing bars for structures in accordance with the bending diagrams, placing lists and placing Drawings.

C. No fabrication shall commence until approval of Shop Drawings has been obtained. All reinforcing bars shall be shop fabricated unless approved to be bent in the field. Reinforcing bars shall not be straightened or rebent in a manner that will injure the material. Heating of bars will not be permitted.

D. Welded wire fabric with longitudinal wire of W9.5 size or smaller shall be either furnished in flat sheets or in rolls with a core diameter of not less than 10 inches. Welded wire fabric with longitudinal wires larger than W9.5 size shall be furnished in flat sheets only.

3.03 DELIVERY, STORAGE AND HANDLING

A. All reinforcing shall be neatly bundled and tagged for placement when delivered to the job site. Bundles shall be properly identified for coordination with mill test reports.

B. Reinforcing steel shall be stored above ground on platforms or other supports and shall be protected from the weather at all times by suitable covering. It shall be stored in an orderly manner and plainly marked to facilitate identification.

C. Reinforcing steel shall at all times be protected from conditions conducive to corrosion until concrete is placed around it.

D. The surfaces of all reinforcing steel and other metalwork to be in contact with concrete shall be thoroughly cleaned of all dirt, grease, loose scale and rust, grout, mortar and other foreign substances immediately before the concrete is placed. Where there is delay in depositing concrete, reinforcing shall be reinspected and if necessary recleaned.

3.04 PLACING

A. Reinforcing steel shall be accurately positioned as shown on the Drawings and shall be supported and wired together to prevent displacement, using annealed iron wire ties or suitable clips at intersections. All reinforcing steel shall be supported by concrete, plastic or metal supports, spacers or metal hangers which are strong and rigid enough to prevent any displacement of the reinforcing steel. Where concrete is to be placed on the ground, supporting concrete blocks (or dobies) shall be used in sufficient numbers to support the reinforcing bars without settlement. In no case shall concrete block supports be continuous.

B. The portions of all accessories in contact with the formwork shall be made of plastic or steel coated with a 1/8 inch minimum thickness of plastic which extends at least 1/2 inch from the concrete surface. Plastic shall be gray in color.

C. Tie wires shall be bent away from the forms in order to provide the specified concrete coverage.

D. Reinforcing bars additional to those shown on the Drawings, which may be found necessary or desirable by the Contractor for the purpose of securing reinforcing in position, shall be provided by the Contractor at no additional cost to the Owner.

E. Reinforcing placing, spacing, and protection tolerances shall be within the limits specified in ACI 318 except where in conflict with the Building Code, unless otherwise specified.

F. Reinforcing bars may be moved within one bar diameter as necessary to avoid interference with other concrete reinforcing, conduits, or embedded items. If bars are moved more than one bar diameter, or enough to exceed placing tolerances, the resulting arrangement of bars shall be as acceptable to the Engineer.

G. Welded wire fabric shall be supported on slab bolsters spaced not less than 30 inches on centers, extending continuously across the entire width of the reinforcing mat and supporting the reinforcing mat in the plane shown on the Drawings.

H. Reinforcing shall not be straightened or rebent unless specifically shown on the drawings. Bars with kinks or bends not shown on the Drawings shall not be used. Coiled reinforcement shall not be used.

I. Dowel Adhesive System shall be installed in strict conformance with the manufacturer's recommendations and as required in Article 2.04 above. A representative of the manufacturer must be on site prior to adhesive dowel installation to provide instruction on proper installation procedures for all adhesive dowel installers. Testing of adhesive dowels shall be as indicated below. If the dowels have a hook at the end to be embedded in subsequent work, an approved mechanical coupler shall be provided at a convenient distance from the face of existing concrete to facilitate adhesive dowel testing while maintaining required hook embedment in subsequent work.

J. Adhesive Dowel Testing

1. At all locations where adhesive dowels are shown on the Drawings, at least 5 percent of all adhesive dowels installed shall be tested to the value indicated on the Drawings, with a minimum of one tested dowel per group. If no test value is indicated on the Drawings but the installed dowel is under direct tension, the Contractor shall notify the Engineer to verify the required test value.

2. Contractor shall submit a plan and schedule indicating locations of dowels to be tested, load test values and proposed dowel testing procedure (including a diagram of the testing equipment proposed for use) prior to conducting any testing. The testing equipment shall have a minimum of three support points and shall be of sufficient size to locate the edge of supports no closer than two times the anchor embedment depth from the center of the anchor.

3. Where Contract Documents indicate adhesive dowel design is the Contractor's responsibility, the Contractor shall submit a plan and schedule indicating locations of dowels to be tested and load test values, sealed by a Professional Engineer currently registered in the Tennessee. The Contractor shall also submit documentation indicating the Contractor's testing procedures have been reviewed and the proposed procedures are acceptable.

4. Adhesive Dowel shall have no visible indications of displacement or damage during or after the proof test. Concrete cracking in the vicinity of the dowel after loading shall be considered a failure. Dowels exhibiting damage shall be removed and replaced. If more than 5 percent of tested dowels fail, then 100 percent of dowels shall be proof tested.

5. Proof testing of adhesive dowels shall be performed by an independent testing laboratory hired directly by the Contractor. The Contractor shall be responsible for costs of all testing, including additional testing required due to previously failed tests.

3.05 SPLICING

A. Reinforcing bar splices shall only be used at locations shown on the Drawings. When it is necessary to splice reinforcing at points other than where shown, the splice shall be as acceptable to the Engineer.

B. The length of lap for reinforcing bars, unless otherwise shown on the Drawings shall be in accordance with ACI 318 for a class B splice.

C. Laps of welded wire fabric shall be in accordance with ACI 318. Adjoining sheets shall be securely tied together with No. 14 tie wire, one tie for each 2 running feet. Wires shall be staggered and tied in such a manner that they cannot slip.

D. Mechanical splices shall be used only where shown on the drawings or when approved by the Engineer.

E. Couplers which are located at a joint face shall be a type which can be set either flush or recessed from the face as shown on the Drawings. The couplers shall be sealed during concrete placement to completely eliminate concrete or cement paste from entering. After the concrete is placed, couplers intended for future connections shall be plugged and sealed to prevent any contact with water or other corrosive materials. Threaded couplers shall be plugged with plastic plugs which have an O-ring seal.

3.06 INSPECTION

A. The Contractor shall advise the Engineer of his intentions to place concrete and shall allow him adequate time to inspect all reinforcing steel before concrete is placed.

B. The Contractor shall advise the Engineer of his intentions to place grout in masonry walls and shall allow him adequate time to inspect all reinforcing steel before grout is placed.

3.07 CUTTING OF EMBEDDED REBAR

A. The Contractor shall not cut embedded rebar cast into structural concrete without prior approval.

- END OF SECTION -

SECTION 03250

CONCRETE ACCESSORIES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish all materials, labor and equipment required to provide all concrete accessories including waterstops, expansion joint material, joint sealants, expansion joint seals, contraction joint inserts, and epoxy bonding agent.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03100 - Concrete Formwork

B. Section 03290 - Joints in Concrete

C. Section 03300 - Cast-in-Place Concrete

D. Section 07900 - Joint Fillers, Sealants, and Caulking

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1.	ASTM C881	Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
2.	ASTM D412	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
3.	ASTM D 624	Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
4.	ASTM D 638	Standard Test Method for Tensile Properties of Plastics
5.	ASTM D1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (nonextruding and resilient bituminous types)
6.	ASTM D 1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

7. ASTM D 1171 Standard Test Method for Rubber Deterioration – Surface Ozone Cracking Outdoors (Triangular Specimens)

8. ASTM D 471 Standard Test Method for Rubber Property – Effect of Liquids

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Manufacturer's literature on all products specified herein including material certifications.

2. Proposed system for supporting PVC waterstops in position during concrete placement

3. Samples of products if requested by the Engineer.

PART 2 -- PRODUCTS

2.01 JOINT SEALANTS

A. Joint sealants shall comply with Section 07900, Joint Fillers, Sealants, and Caulking.

2.02 EXPANSION JOINT MATERIAL

A. Preformed expansion joint material shall be non-extruding, and shall be of the following types:

1. Type I - Sponge rubber, conforming to ASTM D1752, Type I.

2. Type II - Cork, conforming to ASTM D1752, Type II.

3. Type III - Self-expanding cork, conforming to ASTM D1752, Type III.

4. Type IV - Bituminous fiber, conforming to ASTM Designation D1751.

2.03 EXPANSION JOINT SEAL

A. Expansion Joint Seal System shall consist of a preformed neoprene profile, installed using the same dimensions as the joint gap, bonded with a two-component epoxy adhesive and pressurized during the adhesive cure time.

B. The expansion joint system shall be Jeene Structural Sealing joint system by BASF, Inc.

2.04 CONTRACTION JOINT INSERTS

A. Contraction joint inserts shall be ZipCap Control Joint former by Greenstreak Plastic Products.

2.05 EPOXY BONDING AGENT

A. Epoxy bonding agent shall conform to ASTM C881 and shall be Sikadur 32 Hi-Mod, Sika Corporation, Lyndhurst, N.J.; Euco #452 Epoxy System, Euclid Chemical Company, Cleveland, OH, MasterInject 1500 by BASF Master Builder Solutions (BASF).

2.06 EPOXY RESIN BINDER

A. Epoxy resin binder shall conform to the requirements of ASTM C-881, Type III, Grade 3, Class B and C for epoxy resin binder and shall be Sikadur 23, Low-Mod-Gel, manufactured by the Sika Corporation, Lyndhurst, N.J., Flexocrete Gel manufactured by DuraJoint Concrete Accessories or Euco #352 Gel, Euclid Chemical Company, MasterEmaco ADH 327 or 327 RS by BASF Master Builder Solutions.

PART 3 -- EXECUTION

3.01 INSTALLATION OF EXPANSION JOINT MATERIAL AND SEALANTS

A. Type I, II, or III shall be used in all expansion joints in structures and concrete pavements unless specifically shown otherwise on the Drawings. Type IV shall be used in sidewalk and curbing and other locations specifically shown on the Drawings.

B. All expansion joints exposed in the finish work, exterior and interior, shall be sealed with the specified joint sealant. Expansion joint material and sealants shall be installed in accordance with manufacturer's recommended procedures and as shown on the Drawings.

C. Expansion joint material that will be exposed after removal of forms shall be cut and trimmed to ensure a neat appearance and shall completely fill the joint except for the space required for the sealant. The material shall be held securely in place and no concrete shall be allowed to enter the joint or the space for the sealant and destroy the proper functions of the joint.

D. A bond breaker shall be used between expansion joint material and sealant. The joint shall be thoroughly clean and free from dirt and debris before the primer and the sealant are applied. Where the finished joint will be visible, masking of the adjoining surfaces shall be carried out to avoid their discoloration. The sealant shall be neatly tooled into place and its finished surfaces shall present a clean and even appearance.

E. Type 1 joint sealant shall be used in all expansion and contraction joints in concrete, except where Type 7 or Type 8 is required as stated below, and wherever else specified or shown on the Drawings. It shall be furnished in pour grade or gun grade depending on installation requirements. Primers shall be used as required by the manufacturer. The sealant shall be furnished in colors as directed by the Engineer.

F. Type 8 joint sealant shall be used in all concrete pavements and floors subject to heavy traffic and wherever else specified or shown on the Drawings.

G. Type 7 joint sealant shall be used for all joints in chlorine contact tanks and wherever specified or shown on the Drawings.

3.02 EXPANSION JOINT SEAL

A. The expansion joint seal system shall be installed as shown on the Drawings in strict accordance with the manufacturer's recommendations.

3.03 CONTRACTION JOINT INSERTS

A. For contraction joints in slabs, inserts shall be floated in fresh concrete during finishing.

B. For contraction joints in walls, inserts shall be secured in place prior to casting wall.

C. Inserts shall be installed true to line at the locations of all contraction joints as shown on the Drawings.

D. Inserts shall extend into concrete sufficient depth as indicated on the Drawings or specified in Section 03290, Joints in Concrete.

E. Inserts shall not be removed from concrete until concrete has cured sufficiently to prevent chipping or spalling of joint edges due to inadequate concrete strength.

3.04 EPOXY BONDING AGENT

A. The Contractor shall use an epoxy bonding agent for bonding fresh concrete to existing concrete as shown on the Drawings.

B. Bonding surface shall be clean, sound and free of all dust, laitance, grease, form release agents, curing compounds, and any other foreign particles.

C. Application of bonding agent shall be in strict accordance with manufacturer's recommendations.

D. Fresh concrete shall not be placed against existing concrete if epoxy bonding agent has lost its tackiness.

3.05 EPOXY RESIN BINDER

A. Epoxy resin binder shall be used to seal all existing rebar cut and burned off during demolition operations. Exposed rebar shall be burned back 1/2-inch minimum into existing concrete and the resulting void filled with epoxy resin binder.

- END OF SECTION -

SECTION 03290

JOINTS IN CONCRETE

PART 1 -- GENERAL

1.01 THE REQUIREMENTS

A. Provide all materials, labor and equipment required for the construction of all joints in concrete specified herein and shown on the Drawings.

B. Types of joints in concrete shall be as follows:

1. Construction Joints - Joints between adjacent concrete placements continuously connected with reinforcement.

2. Expansion Joints - Joints in concrete which allow thermal expansion and contraction of concrete. Reinforcement terminates within concrete on each side of joint.

3. Contraction Joints - Joints formed in concrete to provide a weakened plane in concrete section to control formation of shrinkage cracks.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03100 - Concrete Formwork

B. Section 03250 - Concrete Accessories

C. Section 03300 - Cast-in-Place Concrete

D. Section 07900 - Joint Fillers, Sealants and Caulking

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. ACI 301 - Specifications for Structural Concrete for Buildings

2. ACI 318 - Building Code Requirements for Structural Concrete

3. ACI 350 – Code Requirements for Environmental Engineering Concrete Structures

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Layout drawings showing location and type of all joints to be placed in each structure.

2. Details of proposed joints in each structure.

PART 2 -- MATERIALS

2.01 MATERIALS

A. All materials required for joint construction shall comply with Section 03250 - Concrete Accessories, and Section 07900 - Joint Fillers, Sealants and Caulking.

PART 3 -- EXECUTION

3.01 CONSTRUCTION JOINTS

A. Construction joints shall be as shown on the Drawings. Otherwise, Contractor shall submit description of the joint and its location to Engineer for approval.

B. Unless noted otherwise on the Drawings, construction joints shall be located near the middle of the spans of slabs, beams, and girders unless a beam intersects a girder at this point. In this case, the joints in the girders shall be offset a distance equal to twice the width of the beam. Joints in walls and columns shall be at the underside of floors, slabs, beams, or girders and the top of footings or floor slabs unless noted otherwise on Drawings. Beams, girders, brackets, column capitals, haunches, and drop panels shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.

C. Maximum distance between horizontal joints in slabs and vertical joints in walls shall be 45'-0". For exposed walls with fluid or earth on the opposite side, the spacing between vertical and horizontal joints shall be a maximum of 25’-0”.

D. All corners shall be part of a continuous placement, and should a construction joint be required, the joint shall not be located closer than five feet from a corner.

E. All reinforcing steel and welded wire fabric shall be continued across construction joints. Keys and inclined dowels shall be provided as shown on the Drawings or as directed by the Engineer. Longitudinal keys shall be provided in all joints in walls and between walls and slabs or footings, except as specifically noted otherwise on the Drawings. Size of keys shall be as shown on the Drawings.

F. All joints in water bearing structures shall have a waterstop. All joints below grade in walls or slabs which enclose an accessible area shall have a waterstop.

3.02 EXPANSION JOINTS

A. Size and location of expansion joints shall be as shown on the Drawings.

B. All expansion joints in water-bearing structures shall have a center-bulb type waterstop. All expansion joints below grade in walls or slabs which enclose an accessible area shall have a center-bulb type waterstop. Waterstop shall be as shown on Drawings and specified in Section 03250, Concrete Accessories.

3.03 CONTRACTION JOINTS

A. Location of contraction joints shall be as shown on the Drawings.

B. Contraction joints shall be formed with contraction joint inserts as specified in Section 03250, Concrete Accessories.

C. Sawcutting of contraction joints in lieu of forming will not be allowed unless otherwise noted on the Drawings. Where sawcutting is allowed, joints shall be sawed as soon as the concrete can support foot traffic without leaving any impression, normally the same day as concrete is placed and in no case longer than 24 hours after concrete is placed.

D. Unless noted otherwise on Drawings, depth of contraction joints shall be 1-1/2 inches in reinforced concrete and 1/3 of concrete thickness in unreinforced concrete.

3.04 JOINT PREPARATION

A. No concrete shall be allowed to enter the joint or the space for the sealant and destroy the proper functions of the joint.

B. The surface of the concrete at all joints shall be thoroughly cleaned and all laitance removed by wire brushing, air or light sand blasting.

C. The joint shall be thoroughly clean and free from dirt and debris before the primer and the sealant are applied. Where the finished joint will be visible, masking of the adjoining surfaces shall be carried out to avoid their discoloration. The sealant shall be neatly tooled into place and its finished surface shall present a clean and even appearance.

D. All joints shall be sealed as shown on the Drawings and specified in Section 03250, Concrete Accessories.

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Provide all labor, equipment, materials and services necessary for the manufacture, transportation and placement of all plain and reinforced concrete work, as shown on the Drawings or as ordered by the Engineer.

B. The requirements in this section shall apply to the following types of concrete:

1. Class A1 Concrete: Normal weight structural concrete to be used in all structures, sidewalks and pavements, except where noted otherwise in the Contract Documents. All concrete shall be Class A1 concrete unless another class is specifically called for on Contract Documents or specified herein.

2. Class A2 Concrete: Normal weight structural concrete to be used for interior slabs where a Type ”D” Steel Troweled Finish is required.

3. Class A3 Concrete: Normal weight structural concrete to be used where specifically called for on Contract Drawings or where specifically requested by Contractor and approved by Engineer. Class A3 concrete shall be similar to Class A1 except Class A3 concrete shall contain a mandatory addition of high range water reducer to aid in placement of concrete.

4. Class A4 Concrete: Normal weight structural concrete to be used where specifically called for on Contract Drawings or areas where specifically requested by Contractor and approved by Engineer. Class A4 concrete is identical to Class A1 concrete except that coarse aggregate specified in Article 2.05 below shall be Size #8 in accordance with ASTM C33. Class A4 concrete may also require a mandatory addition of high range water reducer to aid in placement of concrete.

5. Class A5 Concrete: Normal weight structural concrete used where concrete is indicated to be placed underwater.

6. Class A6 Concrete: Normal weight structural concrete used where concrete is placed under pressure (pumped). Class A6 concrete shall be used only where specifically approved by Engineer.

7. Class B Concrete: Normal weight structural concrete used for duct bank encasements, catch basins, fence and guard post embedment, concrete fill, and other areas where specifically noted on Contract Drawings.

8. Class C Concrete: Light weight structural concrete used only where specifically noted on Contract Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03100 - Concrete Formwork

B. Section 03200 - Reinforcing Steel

C. Section 03250 - Concrete Accessories

D. Section 03290 - Joints in Concrete

E. Section 03350 - Concrete Finishes

F. Section 03370 - Concrete Curing

G. Section 03600 - Grout

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the Specifications, all work herein shall conform to or exceed the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. International Building Code

2. ACI 214R Guide to Evaluation of Strength Test Results of Concrete

3. ACI 301 Specifications for Structural Concrete

4. ACI 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete

5. ACI 305R Guide to Hot Weather Concreting

6. ACI 306R Guide to Cold Weather Concreting

7. ACI 309R Guide for Consolidation of Concrete

8. ACI 318 Building Code Requirements for Structural Concrete and Commentary

9. ACI 350 Code Requirements for Environmental Engineering Concrete Structures

10. ASTM C 31 Standard Practice for Making and Curing Concrete Test Specimens in the Field

11. ASTM C 33 Standard Specification for Concrete Aggregates

12.	ASTM C 39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
13.	ASTM C42	Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
14.	ASTM C 88	Standard Test Method for Soundness of Aggregates by use of Sodium Sulfate or Magnesium Sulfate
15.	ASTM C 94	Standard Specification for Ready-Mixed Concrete
16.	ASTM C 114	Standard Test Method for Chemical Analysis of Hydraulic Cement
17.	ASTM C 136	Standard Method for Sieve Analysis of Fine and Coarse Aggregate
18.	ASTM C 138	Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
19.	ASTM C 143	Standard Test Method for Slump of Hydraulic-Cement Concrete
20.	ASTM C 150	Standard Specification for Portland Cement
21.	ASTM C 172	Standard Practice for Sampling Freshly Mixed Concrete
22.	ASTM C 192	Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
23.	ASTM C 231	Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
24.	ASTM C 260	Standard Specification for Air-Entraining Admixtures for Concrete
25.	ASTM C 295	Standard Guide for Petrographic Examination of Aggregates for Concrete
26.	ASTM C 457	Standard Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete
27.	ASTM C 494	Standard Specification for Chemical Admixtures For Concrete
28.	ASTM C 595	Standard Specification for Blended Hydraulic Cements
29.	ASTM C 618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use in Concrete
30.	ASTM C 989	Standard Specification for Slag Cement for Use in Concrete and Mortars

31. ASTM C 1077 Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation

32. ASTM C 1260 Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar Bar Method)

33. ASTM C 1567 Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)

34. ASTM C 1602 Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete

35. ASTM C 1778 Standard Guide for Reducing the Risk of Deleterious Alkali – Aggregate Reaction in Concrete

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Sources of all materials and certifications of compliance with specifications for all materials.

2. Certified current (less than 1 year old) chemical analysis of the Portland Cement or Blended Cement to be used.

3. Certified current (less than 1 year old) chemical analysis of fly ash or slag cement to be used.

4. Aggregate test results showing compliance with required standards, i.e., sieve analysis, aggregate soundness tests, petrographic analysis, mortar bar expansion testing, etc.

5. Manufacturer's data on all admixtures stating compliance with required standards.

6. Concrete mix design for each class of concrete specified herein.

7. Field experience records and/or trial mix data for the proposed concrete mixes for each class of concrete specified herein.

1.05 QUALITY ASSURANCE

A. Tests on materials used in the production of concrete shall be required as specified in PART 2 -- PRODUCTS. These tests shall be performed by an independent testing laboratory approved by the Engineer at no additional cost to the Owner.

B. Trial concrete mixes shall be tested when required in accordance with Article 3.01 at no additional cost to the Owner.

C. Field quality control tests, as specified in Article 3.10, unless otherwise stated, will be performed by a materials testing consultant employed by the Contractor. The Contractor shall be charged for the cost of any additional tests and investigation on work performed which does not meet the Specifications. Any individual who samples and tests concrete to determine if the concrete is being produced in accordance with this Specification shall be certified as a Concrete Field Testing Technician, Grade I, in accordance with ACI CP-2. Testing laboratory shall conform to requirements of ASTM C-1077.

PART 2 -- PRODUCTS

2.01 HYDRAULIC CEMENT

A. Portland Cement

1. Portland Cement shall be Type II conforming to ASTM C 150. Type I cement may be used provided either fly ash or slag cement is also included in the mix in accordance with Articles 2.02 or 2.03 respectively.

2. When potentially reactive aggregates as defined in Article 2.05 are to be used in concrete mix, cement shall meet the following requirements:

   a. For concrete mixed with only Portland Cement, the total alkalies in the cement (calculated as the percentage of NA_2O plus 0.658 times the percentage of K_2O) shall not exceed 0.40%.

   b. For concrete mixed with Portland Cement and an appropriate amount of fly ash (Article 2.02) or slag cement (Article 2.03) the total alkalies in the Portland Cement (calculated as the percentage of NA_2O plus 0.658 times the percentage of K_2O) shall not exceed 0.85%.

3. When non-reactive aggregates as defined in Article 2.05 are used in concrete mix, total alkalies in the cement shall not exceed 1.0%.

4. The proposed Portland Cement shall not contain more than 8% tricalcium aluminate and more than 12% tetracalcium aluminoferrite.

B. Blended Cement

1. Blended cements shall be Type IP (Portland Fly Ash Cement) or Type IS (Portland Slag Cement) conforming to ASTM C 595.

2. Type IP cement shall be an interground blend of Portland Cement and fly ash in which the fly ash constituent is between 15% and 25% of the weight of the total blend.

3. Type IS cement shall be an interground blend of Portland Cement and slag cement in which the slag constituent is between 35% and 50% of the weight of the total blend.

4. Fly ash and slag cement used in the production of blended cements shall meet the requirements of Articles 2.02 and 2.03, respectively.

5. When reactive aggregates as defined in Article 2.05 are used in concrete mix, the total alkalies in the Portland Cement (calculated as the percentage of Na_2O plus 0.658 times the percentage of K_2O) shall not exceed 0.85%. The percentage of fly ash or slag cement shall be set to meet provisions of Article 2.05.G.2.

C. Different types of cement shall not be mixed nor shall they be used alternately except when authorized in writing by the Engineer. Different brands of cement or the same brand from different mills may be used alternately. A resubmittal will be required if different cements are proposed during the Project.

D. Cement shall be stored in a suitable weather-tight building so as to prevent deterioration or contamination. Cement which has become caked, partially hydrated, or otherwise damaged will be rejected.

2.02 FLY ASH

A. Fly ash shall meet the requirements of ASTM C 618 for Class F, except that the loss on ignition shall not exceed 4%. Fly ash shall also meet the optional physical requirements for uniformity as shown in Table 3 of ASTM C 618.

B. For fly ash to be used in the production of type IP cement, the Pozzolan Activity Index shall be greater than 75% as specified in Table 3 of ASTM C 595.

C. Where reactive aggregates as defined in Article 2.05 are used in concrete mix, the fly ash constituent shall be between 15% and 25% of the total weight of the combined Portland Cement and fly ash. The percentage of fly ash shall be set to meet the provisions of Article 2.05.G.2.

D. For concrete to be used in environmental concrete structures, i.e. process structures or fluid containing structures, inclusion of fly ash or slag cement in the concrete mix, is mandatory.

E. Additional fly ash shall not be included in concrete mixed with Type IS or IP cement.

2.03 SLAG CEMENT

A. Slag cement shall meet the requirements of ASTM C 989 including tests for effectiveness of slag in preventing excessive expansion due to alkali-aggregate reactivity as described in Appendix X-3 of ASTM C 989.

B. Where reactive aggregates as defined in Article 2.05 are used in concrete mix, the slag cement constituent shall be between 35% and 40% of the total weight of the combined Portland Cement and slag. The percentage of slag cement shall be set to meet the provisions of Article 2.05.G.2.

C. For concrete to be used in environmental concrete structures, i.e. process structures or fluid containing structures, inclusion of fly ash or slag cement in the concrete mix, is mandatory.

D. Additional slag cement shall not be included in concrete mixed with type IS or IP cement.

2.04 WATER

A. Water used for mixing concrete shall be clear, potable and free from deleterious substances such as objectionable quantities of silty organic matter, alkali, salts and other impurities.

B. Water shall not contain more than 100 PPM chloride.

C. Water shall not contain more than 500 PPM dissolved solids.

D. Water shall have a pH in the range of 4.5 to 8.5.

E. Water shall meet requirements of ASTM C 1602.

2.05 AGGREGATES

A. All aggregates used in normal weight concrete shall conform to ASTM C 33.

B. Fine Aggregate (Sand) in the various concrete mixes shall consist of natural or manufactured siliceous sand, clean and free from deleterious substances, and graded within the limits of ASTM C 33.

C. Coarse aggregates shall consist of hard, clean, durable gravel, crushed gravel or crushed rock. Coarse aggregate shall be size #57 or #67 as graded within the limits given in ASTM C 33 unless otherwise specified.

D. For Class A4 concrete, coarse aggregate shall be Size #8M in accordance with ASTM C33.

E. Aggregates shall be tested for gradation by sieve analysis tests in conformance with ASTM C 136.

F. Aggregates shall be tested for soundness in accordance with ASTM C 88. The loss resulting after five cycles shall not exceed 10 percent for fine or coarse aggregate when using magnesium sulfate.

G. Non-reactive aggregates shall meet the following requirements:

1. All aggregates shall be evaluated in accordance with ASTM C 1778 to determine potential reactivity.

2. A petrographic analysis in accordance with ASTM C295 shall be performed to identify the constituents of the fine and coarse aggregate. Non-reactive aggregates shall meet the following limitations:

(1) Optically strained, microfractured, or microcrystalline quartz, 5.0%, maximum.

(2) Chert or chalcedony, 3.0%, maximum.

(3) Tridymite or cristobalite, 1.0%, maximum.

(4) Opal, 0.5%, maximum.

(5) Natural volcanic glass in volcanic rocks, 3.0%, maximum.

3. If aggregates are deemed potentially reactive as per ASTM C 1778, proposed concrete mix including proposed aggregates shall be evaluated by ASTM C-1567. Mean mortar bar expansions at 16 days shall be less than 0.08%. Tests shall be made using exact proportion of all materials proposed for use on the job in design mix submitted.

H. All aggregates shall be considered reactive unless they meet the requirements above for non-reactive aggregates. Aggregates with a lithology essentially similar to sources in the same region found to be reactive in service shall be considered reactive regardless of the results of the tests above.

I. Contractor shall submit a new trial mix to the Engineer for approval whenever a different aggregate or gradation is proposed.

J. Lightweight aggregate for Class C concrete shall conform to ASTM C330.

2.07 ADMIXTURES

A. Air entraining agent shall be added to all concrete unless noted otherwise. The agent shall consist of a neutralized vinsol resin solution or a purified hydrocarbon with a cement catalyst which will provide entrained air in the concrete in accordance with ASTM C 260. The admixture proposed shall be selected in advance so that adequate samples may be obtained and the required tests made. Air content of concrete, when placed, shall be within the ranges given in the concrete mix design.

B. The following admixtures are required or used for water reduction, slump increase, and/or adjustment of initial set. Admixtures permitted shall confirm to the requirements of ASTM C 494. Admixtures shall be non-toxic after 30 days and shall be compatible with and made by the same manufacturer as the air-entraining admixtures.

1. Water reducing admixture shall conform to ASTM C 494, Type A and shall contain no more than 0.05% chloride ions. Acceptable products are “Eucon Series” by the Euclid Chemical Company, “Master Pozzolith Series” by BASF, and “Plastocrete Series” by Sika Corporation.

2. High range water reducer shall be sulfonated polymer conforming to ASTM C 494, Type F or G. The high range water reducer shall be added to the concrete at either the batch plant or at the job site and may be used in conjunction with a water reducing admixture. The high range water reducer shall be accurately measured and pressure injected into the mixer as a single dose by an experienced technician. A standby system shall be provided and tested prior to each day’s operation of the job site system. Concrete shall be mixed at mixing speed for a minimum of 100

mixer revolutions after the addition of the high range water reducer. Acceptable products are “Eucon 37” or Plastol 5000 by the Euclid Chemical Company, “Master Rheobuild 1000 or Master Glenium Series” by BASF, and “Daracem 100 or Advaflow Series” by W.R. Grace.

3. A non-chloride, non-corrosive accelerating admixture may be used where specifically approved by the Engineer. The admixture shall conform to ASTM C 494, Type C or E, and shall not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory (of at least a year’s duration) using an acceptable accelerated corrosion test method such as that using electrical potential measures. Acceptable products are “Accelguard 80/90 or NCA” by the Euclid Chemical Company and “Daraset” by W.R. Grace.

4. A water reducing retarding admixture may be used where specifically approved by the Engineer. The admixture shall conform to ASTM C494, Type D and shall not contain more than 0.05% chloride ions. Acceptable products are “Eucon NR or Eucon Retarder 100” by the Euclid Chemical Company, “Pozzolith Retarder” by BASF, and “Plastiment” by Sika Corporation.

C. Admixtures containing calcium chloride, thiocyanate or more than 0.05 percent chloride ions are not permitted. The addition of admixtures to prevent freezing is not permitted.

D. The Contractor shall submit manufacturer's data including the chloride ion content of each admixture and certification from the admixture manufacturer that all admixtures utilized in the design mix are compatible with one another and properly proportioned prior to mix design review.

2.08 CONCRETE MIX DESIGN

A. The proportions of cement, aggregates, admixtures and water used in the concrete mixes shall be based on the results of field experience or preferably laboratory trial mixes in conformance with Section 5.3. "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318 and ACI 350. When trial mixes are used they shall also conform to Article 3.01 of this Section of the Specifications. If field experience records are used, concrete strength results shall be from concrete mixed with all of the ingredients proposed for use on job used in similar proportions to mix proposed for use on job. Contractor shall submit verification confirming this stipulation has been followed. Field experience records and/or trial mix data used as the basis for the proposed concrete mix design shall be submitted to the Engineer along with the proposed mix.

B. Structural concrete shall conform to the following requirements. Cementitious materials refer to the total combined weight of all cement, fly ash, and slag cement contained in the mix.

1. Compressive Strength (28-Day)

a.	Concrete Class A1, A2, A3, A4, A5, A6	4,500 psi (minimum) 7,500 psi (maximum)
b.	Class B	3,000 psi (minimum)

2. Maximum water/cementitious materials ratio, by weight

a.	Concrete Class A1, A2, A3, A4, A5, A6	0.42
b.	Class B	0.50

3. Slump range — 4" nominal unless high range water reducing admixture is used. 3" max. before addition of high range water reducing admixture.

4. Air Content

a.	Class A1, A3, A4, A5, A6	6% ±1.5%
b.	Class A2, B	3% Max

C. Lightweight concrete (Class C) shall be composed of cement, lightweight aggregate, sand, water, and admixtures, and shall conform to the following requirements:

1.	Compressive Strength (28-Day)	4,500 psi (minimum) 6,000 psi (maximum)
2.	Minimum Cementitious Materials Content	550 lb/cy
3.	Air Content	6% ±1.5%
4.	Maximum Slump	4"-8" after addition of high range water reducer
5.	Maximum Unit Weight	115 PCF

6. Lightweight aggregate shall be presoaked for 48 hours prior to mixing concrete.

PART 3 -- EXECUTION

3.01 TRIAL MIXES

A. When trial mixes are used to confirm the quality of a proposed concrete mix in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318 and ACI 350, an independent qualified testing laboratory designated and retained by the Contractor shall test a trial batch of each of the preliminary concrete mixes submitted by the Contractor. The trial batches shall be prepared using the aggregates, cement and admixtures proposed for the project. The trial batch materials shall be of a quantity such that the testing laboratory can obtain enough samples to satisfy requirements stated below. Tests on individual materials stated in PART 2 -- PRODUCTS should already be performed before any trial mix is done. The cost of laboratory trial batch tests for each specified concrete mix will be borne by the Contractor and the Contractor shall furnish and deliver the materials to the testing laboratory at no cost to the Owner.

B. The independent testing laboratory shall prepare a minimum of fifteen (15) standard test cylinders in accordance with ASTM C 31 in addition to conducting slump (ASTM C 143), air content (C 231) and unit weight (C 138) tests. Compressive strength test on the cylinders shall subsequently be performed by the same laboratory in accordance with ASTM C 39 as follows: Test 3 cylinders at age 7 days; test 3 cylinders at age 21 days; test 3 cylinders at age 28 days and test 3 cylinders at 56 days. The cylinders shall be carefully identified as "Trial Mix, Contract No. _____, Product _____." If the average 28-day compressive strength of the trial mix is less than that specified, or if any single cylinder falls below the required strength by more than 500 psi, the mix shall be corrected, another trial batch prepared, test cylinders taken, and new tests performed as before. Any such additional trial batch testing required shall be performed at no additional cost to the Owner. Adjustments to the mix shall be considered refinements to the mix design and shall not be the basis for extra compensation to the Contractor.

3.02 PRODUCTION OF CONCRETE

A. All concrete shall be machine mixed. Hand mixing of concrete will not be permitted. The Contractor may supply concrete from a ready mix plant or from a site mixed plant. In selecting the source for concrete production the Contractor shall carefully consider its capability for providing quality concrete at a rate commensurate with the requirements of the placements so that well bonded, homogenous concrete, free of cold joints, is assured.

B. Ready-Mixed Concrete

1. At the Contractor's option, ready-mixed concrete may be used meeting the requirements for materials, batching, mixing, transporting, and placing as specified herein and in accordance with ASTM C 94.

2. Truck mixers shall be equipped with electrically-actuated counters by which the number of revolutions of the drum or blades may be readily verified. The counter shall be of the resettable, recording type, and shall be mounted in the driver's cab. The counters shall be actuated at the time of starting mixers at mixing speeds.

3. Each batch of concrete shall be mixed in a truck mixer for not less than 100 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of equipment. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed. All materials including mixing water shall be in the mixer drum before actuating the revolution counter for determining the number of revolutions of mixing.

4. Truck mixers and their operation shall be such that the concrete throughout the mixed batch, as discharged, is within acceptable limits of uniformity with respect to consistency, mix and grading. If slump tests taken at approximately the 1/4 and 3/4 points of the load during discharge give slumps differing by more than one inch when the specified slump is 3 inches or less, or if they differ by more than 2 inches when the specified slump is more than 3 inches, the mixer shall not be used on the work unless the causing condition is corrected and satisfactory performance is verified by additional slump tests. All mechanical details of the mixer, such as water measuring and discharge apparatus, condition of the blades, speed of rotation, general mechanical condition of the unit and clearance of the drum, shall be checked before a further attempt to use the unit will be permitted.

5. Ready-mixed concrete shall be delivered to the site for the work and discharge shall be completed before the drum has been revolved 300 revolutions and within the time requirements stated in Article 3.03 of this Section.

6. Each and every concrete delivery shall be accompanied by a delivery ticket containing at least the following information:

   a. Date and truck number
   b. Ticket number
   c. Mix designation of concrete
   d. Cubic yards of concrete
   e. Cement brand, type and weight in pounds
   f. Weight in pounds of fine aggregate (sand)
   g. Weight in pounds of coarse aggregate (stone)
   h. Air entraining agent, brand, and weight in pounds and ounces
   i. Other admixtures, brand, and weight in pounds and ounces
   j. Water, in gallons, stored in attached tank
   k. Water, in gallons, maximum that can be added without exceeding design water/cement ratio
   l. Water, in gallons, actually used (by truck driver)
   m. Time of loading
   n. Time of delivery to job (by truck driver)

7. Any truck delivering concrete to the job site, which is not accompanied by a delivery ticket showing the above information will be rejected and such truck shall immediately depart from the job site.

8. The use of non-agitating equipment for transporting ready-mixed concrete will not be permitted. Combination truck and trailer equipment for transporting ready-mixed concrete will not be permitted. The quality and quantity of materials used in ready-

mixed concrete and in batch aggregates shall be subject to continuous inspection at the batching plant by the Engineer.

C. Site Mixed Concrete

1. Scales for weighing concrete ingredients shall be accurate when in use within ±0.4 percent of their total capacities. Standard test weights shall be available to permit checking scale accuracy.

2. Operation of batching equipment shall be such that the concrete ingredients are consistently measured within the following tolerances:

a.	Cement, fly ash, or slag cement	± 1 percent
b.	Water	± 1 percent
c.	Aggregates	± 2 percent
d.	Admixtures	± 3 percent

3. Each batch shall be so charged into the mixer that some water will enter in advance of the cement and aggregates. Water shall continue for a period which may extend to the end of the first 25 percent of the specified mixing time. Controls shall be provided to prevent batched ingredients from entering the mixer before the previous batch has been completely discharged.

4. The concrete shall be mixed in a batch mixer capable of thoroughly combining the aggregates, cement, and water into a uniform mass within the specified mixing time, and of discharging the concrete without harmful segregation. The mixer shall bear a manufacturer's rating plate indicating the rate capacity and the recommended revolutions per minute and shall be operated in accordance therewith.

5. Mixers with a rate capacity of 1 cu.yd. or larger shall conform to the requirements of the Plant Mixer Manufacturers' Division of the Concrete Plant Manufacturers' Bureau.

6. Except as provided below, batches of 1 cu. yd. or less shall be mixed for not less than 1 minute. The mixing time shall be increased 15 seconds for each cubic yard or fraction thereof of additional capacity.

7. Shorter mixing time may be permitted provided performance tests made in accordance with of ASTM C 94 indicate that the time is sufficient to produce uniform concrete.

8. Controls shall be provided to insure that the batch cannot be discharged until the required mixing time has elapsed. At least three-quarters of the required mixing time shall take place after the last of the mixing water has been added.

9. The interior of the mixer shall be free of accumulations that will interfere with mixing action. Mixer blades shall be replaced when they have lost 10 percent of their original height.

10. Air-entraining admixtures and other chemical admixtures shall be charged into the mixer as solutions and shall be measured by means of an approved mechanical dispensing device. The liquid shall be considered a part of the mixing water. Admixtures that cannot be added in solution may be weighed or may be measured by volume if so recommended by the manufacturer.

11. If two or more admixtures are used in the concrete, they shall be added separately to avoid possible interaction that might interfere with the efficiency of either admixture or adversely affect the concrete.

12. Addition of retarding admixtures shall be completed within 1 minute after addition of water to the cement has been completed, or prior to the beginning of the last three-quarters of the required mixing, whichever occurs first. Retarding admixtures shall not be used unless approved by the Engineer.

13. Concrete shall be mixed only in quantities for immediate use and within the time and mixing requirements of ASTM C 94.

3.03 CONCRETE PLACEMENT

A. No concrete shall be placed prior to approval of the concrete mix design. Concrete placement shall conform to the recommendations of ACI 304.

B. Prior to concrete placement, all reinforcement shall be securely and properly fastened in its correct position. Formwork shall be clean, oiled and form ties at construction joints shall be retightened. All bucks, sleeves, castings, hangers, pipe, conduits, bolts, anchors, wire, and any other fixtures required to be embedded therein shall be in place. Forms for openings to be left in the concrete shall be in place and anchored by the Contractor. All loose debris in bottoms of forms or in keyways shall be removed and all debris, water, snow, ice and foreign matter shall be removed from the space to be occupied by the concrete. The Contractor shall notify the Engineer in advance of placement, allowing sufficient time for a concurrent inspection and for any corrective measures which are subsequently required.

C. On horizontal joints where concrete is to be placed on hardened concrete, flowing concrete containing a high range water reducing admixture or cement grout shall be placed with a slump not less than 8 inches for the initial placement at the base of the wall. Concrete or cement grout shall meet all strength and service requirements specified herein for applicable class of concrete. This concrete shall be worked well into the irregularities of the hard surface.

D. All concrete shall be placed during the daylight hours except with the consent of the Engineer. If special permission is obtained to carry on work during the night, adequate lighting must be provided.

E. When concrete arrives at the project with slump below that suitable for placing, as indicated by the Specifications, water may be added to bring the concrete within the specified slump range provided that the design water-cement ratio is not exceeded. The water shall be incorporated by additional mixing equal to at least half of the total mixing required. Water may be added only to full trucks. On-site tempering shall not relieve the Contractor from furnishing a concrete mix that meets all specified requirements.

F. Concrete shall be conveyed as rapidly as practicable to the point of deposit by methods which prevent the separation or loss of the ingredients. It shall be so deposited that rehandling will be unnecessary. Discharge of the concrete to its point of deposit shall be completed within 90 minutes after the addition of the cement to the aggregates. In hot weather, or under conditions contributing to quick stiffening of the concrete, the time between the introduction of the cement to the aggregates and discharge shall not exceed the requirements stated in Article 3.09 of this Section.

G. Where concrete is conveyed to position by chutes, a practically continuous flow in the chute shall be maintained. The angle and discharge arrangement of the chute shall be such as to prevent segregation of the concrete ingredients. The delivery end of the chute shall be as close as possible to the point of deposit and in no case shall the free pour from the delivery end of the chute exceed five feet, unless approved otherwise.

H. Special care must be exercised to prevent splashing of forms or reinforcement with concrete, and any such splashes or accumulations of hardened or partially hardened concrete on the forms or reinforcement above the general level of the concrete already in place must be removed before the work proceeds. Concrete shall be placed in all forms in such way as to prevent any segregation.

I. Placing of concrete shall be so regulated that the pressure caused by the wet concrete shall not exceed that used in the design of the forms.

J. All concrete for walls shall be placed through openings in the form spaced at frequent intervals or through tremies (heavy duct canvas, rubber, etc.), equipped with suitable hopper heads. Tremies shall be of variable lengths so the free fall shall not exceed five (5) feet and a sufficient number shall be placed in the form to ensure the concrete is kept level at all times.

K. When placing concrete which is to be exposed, sufficient illumination shall be provided in the interior of the forms so the concrete, at places of deposit, is visible from deck and runways.

L. Concrete shall be placed so as to thoroughly embed all reinforcement, inserts, and fixtures.

M. When forms are removed, surfaces shall be even and dense, free from aggregate pockets or honeycomb. To achieve this, concrete shall be consolidated using mechanical vibration, supplemented by forking and spading by hand in the corners and angle of forms and along form surfaces while the concrete is plastic under the vibratory action. Consolidation shall conform to ACI 309.

N. Mechanical vibration shall be applied directly to the concrete, unless otherwise approved by the Engineer. The bottom of vibrators used on floor slabs must not be permitted to ride the form supporting the slab. Vibration shall be applied at the point of deposit and in the area of freshly placed concrete by a vertical penetration of the vibrator. Vibrators shall not be used to move concrete laterally within the forms.

O. The intensity of vibration shall be sufficient to cause settlement of the concrete into place and to produce monolithic joining with the preceding layer. It shall be of sufficient duration

to accomplish thorough compaction and complete embedment of reinforcement and fixtures with a vibrator transmitting not less than 7,500 impulses per minute. Since the duration of vibration per square foot of surface is dependent on the frequency (impulses per minute), size of vibrator, and slump of concrete, the length of time must therefore be determined in the field. Vibration, however, shall not be continued in any one location to the extent that pools of grout are formed.

P. Care shall be taken to prevent cold joints when placing concrete in any portion of the work. The concrete placing rate shall be such as to ensure that each layer is placed while the previous layer is soft or plastic, so that the two layers can be made monolithic by penetration of the vibrators. Maximum thickness of concrete layers shall be 18 inches. The surface of the concrete shall be level whenever a run of concrete is stopped.

Q. To prevent featheredges, construction joints located at the tops of horizontal lifts near sloping exposed concrete surfaces shall be inclined near the exposed surface, so the angle between such inclined surface and the exposed concrete surface will be not less than 50°.

R. In placing unformed concrete on slopes, the concrete shall be placed ahead of a non-vibrated slip-form screed extending approximately 2-1/2 feet back from its leading edge. The method of placement shall provide a uniform finished surface with the deviation from the straight line less than 1/8 inch in any concrete placement. Concrete ahead of the slip-form screed shall be consolidated by internal vibrators so as to ensure complete filling under the slip-form. Prior to placement of concrete on sloped walls or slabs, the Contractor shall submit a plan specifically detailing methods and sequence of placements, proposed concrete screed equipment, location of construction joints and waterstops, and/or any proposed deviations from the aforementioned to the Engineer for review and approval.

S. Concrete shall not be placed during rains sufficiently heavy or prolonged to wash mortar from coarse aggregate on the forward slopes of the placement. Once placement of concrete has commenced in a block, placement shall not be interrupted by diverting the placing equipment to other uses.

3.04 PLACING FLOOR SLABS ON GRADE

A. The subgrade for slabs on ground shall be well drained and of adequate and uniform loadbearing nature. The in-place density of the subgrade soils shall be at least the minimum required by the specifications. No foundation, slab, or pavement concrete shall be placed until the depth and character of the foundation soils have been inspected and approved by the materials testing consultant.

B. The subgrade shall be free of frost before concrete placing begins. If the temperature inside a building where concrete is to be placed is below freezing it shall be raised and maintained above 50° long enough to remove all frost from the subgrade.

C. The subgrade shall be moist at the time of concreting. If necessary, it shall be dampened with water in advance of concreting, but there shall be no free water standing on the subgrade nor any muddy or soft spots when the concrete is placed.

D. Thirty-pound felt paper shall be provided between edges of slab-on-grade and vertical and horizontal concrete surfaces, unless otherwise indicated on the Drawings.

E. Contraction joints shall be provided in slabs-on-grade at locations indicated on the Drawings. Contraction joints shall be installed as per Section 03290 - Joints in Concrete.

F. Floor slabs shall be screeded level or pitched to drain as indicated on the Drawings. Finishes shall conform with requirements of Section 03350 - Concrete Finishes.

3.05 PLACING CONCRETE UNDERWATER (CLASS A5 CONCRETE)

A. Placing concrete underwater will be permitted only when shown on the Drawings. Concrete deposited under water shall be carefully placed in a compacted mass in final position by means of a tremie, a closed bottom dump bucket or other approved method. Care must be exercised to maintain still water at the point of deposit. Concrete shall not be placed in running water. Underwater formwork shall be watertight. The consistency of the concrete shall be regulated to prevent segregation of materials. The method of depositing concrete shall be regulated such that the concrete enters the mass of the previously placed concrete from within, displacing water with a minimum disturbance to the surface of the concrete.

B. Tremie shall consist of a tube having a diameter of not less than 10 inches and constructed in sections having flanged couplings fitted with gaskets. The tremie shall be supported to permit free movement of the discharge and over the entire top surface of the work and shall permit rapid lowering when necessary to choke off or retard the flow. The discharge end shall be entirely sealed at all times and the tremie tube kept full to the bottom of the hopper. When a batch is dumped into the hopper, the tremie shall be slightly raised, but not out of the concrete at the bottom, until the batch discharges to the bottom of the hopper. The flow shall then be stopped by lowering the tremie. The flow shall be continuous until the placement has been completed.

3.06 PLACING CONCRETE UNDER PRESSURE (CLASS A6 CONCRETE)

A. Where concrete is conveyed and placed by mechanically applied pressure, the equipment shall have the capacity for the operation. The operation of the pump shall be such that a continuous stream of concrete without air pockets is produced. To obtain the least line resistance, the layout of the pipeline system shall contain a minimum number of bends with no change in pipe size. If two sizes of pipe must be used, the smaller diameter should be used at the pump end and the larger at the discharge end. When pumping is completed, the concrete remaining in the pipelines, if it is to be used, shall be ejected in such a manner that there will be no contamination of the concrete or separation of the ingredients.

B. Priming of the concrete pumping equipment shall be with cement grout only. Use of specialty mix pump primers or pumping aids will not be allowed.

C. No aluminum parts shall be in contact with the concrete during the entire placing of concrete under pressure at any time.

D. Prior to placing concrete under pressure, the Contractor shall submit the concrete mix design together with test results from a materials testing consultant proving the proposed mix meets all requirements. In addition, an actual pumping test under field conditions is required prior to acceptance of the mix. This test requires a duplication of anticipated site conditions from beginning to end. The batching and truck mixing shall be the same as will be used; the same pump and operator shall be present and the pipe and pipe layouts will

reflect the maximum height and distance contemplated. All submissions shall be subject to approval by the Engineer.

E. If the pumped concrete does not produce satisfactory end results, the Contractor shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.

F. The pumping equipment must have two cylinders and be designed to operate with one cylinder only in case the other one is not functioning. In lieu of this requirement, the Contractor may have a standby pump on the site during pumping.

G. The minimum diameter of the hose (conduits) shall be four inches.

H. Pumping equipment and hoses (conduits) that are not functioning properly shall be replaced.

I. Concrete samples for quality control in accordance with Article 3.10 will be taken at the placement (discharge) end of the line.

3.07 ORDER OF PLACING CONCRETE

A. In order to minimize the effects of shrinkage, the concrete shall be placed in units as bounded by construction joints shown on the Drawings and maximum lengths as indicated on Drawings. Where required on the Drawings and wherever else practical, the placing of such units shall be done in a strip pattern in accordance with ACI 302.1. A minimum of 72 hours shall pass prior to placing concrete directly adjacent to previously placed concrete.

3.08 CONCRETE WORK IN COLD WEATHER

A. Cold weather concreting procedures shall conform to the requirements of ACI 306.

B. The Engineer may prohibit the placing of concrete at any time when air temperature is 40°F. or lower. If concrete work is permitted, the concrete shall have a minimum temperature, as placed, of 55°F. for placements less than 12" thick, 50°F. for placements 12" to 36" thick, and 45°F. for placements greater than 36" thick. The temperature of the concrete as placed shall not exceed the aforementioned minimum values by more than 20°F, unless otherwise approved by the Engineer.

C. All aggregate and water shall be preheated. Precautions shall be taken to avoid the possibility of flash set when aggregate or water are heated to a temperature in excess of 100°F. in order to meet concrete temperature requirements. The addition of admixtures to the concrete to prevent freezing is not permitted. All reinforcement, forms, and concrete accessories with which the concrete is to come in contact shall be defrosted by an approved method. No concrete shall be placed on frozen ground.

3.09 CONCRETE WORK IN HOT WEATHER

A. Hot weather concreting procedures shall conform to the requirements of ACI 305.

B. When air temperatures exceed 85°F., or when extremely dry conditions exist even at lower temperatures, particularly if accompanied by high winds, the Contractor and his concrete supplier shall exercise special and precautionary measures in preparing, delivering, placing, finishing, curing and protecting the concrete mix. The Contractor shall consult with the Engineer regarding such measures prior to each day's placing operation and the Engineer reserves the right to modify the proposed measures consistent with the requirements of this Section of the Specifications. All necessary materials and equipment shall be on hand an in position prior to each placing operation.

C. Preparatory work at the job site shall include thorough wetting of all forms, reinforcing steel and, in the case of slab pours on ground or subgrade, spraying the ground surface on the preceding evening and again just prior to placing. No standing puddles of water shall be permitted in those areas which are to receive the concrete.

D. The temperature of the concrete mix when placed shall not exceed 90°F.

E. Temperature of mixing water and aggregates shall be carefully controlled and monitored at the supplier's plant, with haul distance to the job site being taken into account. Stockpiled aggregates shall, if necessary, be shaded from the sun and sprinkled intermittently with water. If ice is used in the mixing water for cooling purposes, it must be entirely melted prior to addition of the water to the dry mix.

F. Delivery schedules shall be carefully planned in advance so that concrete is placed as soon as practical after it is properly mixed. For hot weather concrete work (air temperature greater than 85°F), discharge of the concrete to its point of deposit shall be completed within 60 minutes from the time the concrete is batched.

G. The Contractor shall arrange for an ample work force to be on hand to accomplish transporting, vibrating, finishing, and covering of the fresh concrete as rapidly as possible.

3.10 QUALITY CONTROL

A. Field Testing of Concrete

1. The Contractor shall coordinate with the Engineer's project representative the on-site scheduling of the materials testing consultant personnel as required for concrete testing.

2. Concrete for testing shall be supplied by the Contractor at no additional cost to the Owner, and the Contractor shall provide assistance to the materials testing consultant in obtaining samples. The Contractor shall dispose of and clean up all excess material.

B. Consistency

1. The consistency of the concrete will be checked by the materials testing consultant by standard slump cone tests. The Contractor shall make any necessary adjustments in the mix as the Engineer and/or the materials testing consultant may direct and shall upon written order suspend all placing operations in the event the

consistency does not meet the intent of the specifications. No payment shall be made for any delays, material or labor costs due to such eventualities.

2. Slump tests shall be made in accordance with ASTM C 143. Slump tests will be performed as deemed necessary by the materials testing consultant and each time compressive strength samples are taken.

3. Concrete with a specified nominal slump shall be placed having a slump within 1" (higher or lower) of the specified slump. Concrete with a specified maximum slump shall be placed having a slump less than the specified slump.

C. Unit Weight

1. Samples of freshly mixed concrete shall be tested for unit weight by the materials testing consultant in accordance with ASTM C 138.

2. Unit weight tests will be performed as deemed necessary by the Engineer and each time compressive strength samples are taken.

D. Air Content

1. Samples of freshly mixed concrete will be tested for entrained air content by the materials testing consultant in accordance with ASTM C 231.

2. Air content tests will be performed as deemed necessary by the materials testing consultant and each time compressive strength samples are taken.

3. In the event test results are outside the limits specified, additional testing shall occur. Admixture quantity adjustments shall be made immediately upon discovery of incorrect air entrainment.

E. Compressive Strength

1. Samples of freshly mixed concrete will be taken by the materials testing consultant and tested for compressive strength in accordance with ASTM C 172, C 31 and C 39, except as modified herein.

2. In general, one sampling shall be taken for each placement in excess of five (5) cubic yards, with a minimum of one (1) sampling for each day of concrete placement operations, or for each one hundred (100) cubic yards of concrete, or for each 5,000 square feet of surface area for slabs or walls, whichever is greater.

3. Each sampling shall consist of at least five (5) 6x12 cylinders or (8) 4x8 cylinders. Each cylinder shall be identified by a tag, which shall be hooked or wired to the side of the container. The materials testing consultant will fill out the required information on the tag, and the Contractor shall satisfy himself that such information shown is correct.

4. The Contractor shall be required to furnish labor to the Owner for assisting in preparing test cylinders for testing. The Contractor shall provide approved curing

boxes for storage of cylinders on site. The insulated curing box shall be of sufficient size and strength to contain all the specimens made in any four consecutive working days and to protect the specimens from falling over, being jarred or otherwise disturbed during the period of initial curing. The box shall be erected, furnished and maintained by the Contractor. Such box shall be equipped to provide the moisture and to regulate the temperature necessary to maintain the proper curing conditions required by ASTM C 31. Such box shall be located in an area free from vibration such as pile driving and traffic of all kinds and such that all specimen are shielded from direct sunlight and/or radiant heating sources. No concrete requiring inspection shall be delivered to the site until such storage curing box has been provided. Specimens shall remain undisturbed in the curing box until ready for delivery to the testing laboratory but not less than sixteen hours.

5. The Contractor shall be responsible for maintaining the temperatures of the curing box during the initial curing of test specimens with the temperature preserved between 60°F and 80°F as measured by a maximum-minimum thermometer. The Contractor shall maintain a written record of curing box temperatures for each day curing box contains test specimens. Temperature shall be recorded a minimum of three times a day with one recording at the start of the work day and one recording at the end of the work day.

6. When transported, the cylinders shall not be thrown, dropped, allowed to roll, or be damaged in any way.

7. Compression tests shall be performed in accordance with ASTM C 39. For 6x12 cylinders, two test cylinders will be tested at seven days and two at 28 days. For 4x8 cylinders, three test cylinders will be tested at seven days, three at 28 days. The remaining cylinders will be held to verify test results, if needed.

F. Evaluation and Acceptance of Concrete

1. Evaluation and acceptance of the compressive strength of concrete shall be according to the requirements of ACI 214, ACI 318, and ACI 350.

2. The strength level of concrete will be considered satisfactory if all of the following conditions are satisfied.

   a. Every arithmetic average of any three consecutive strength tests equals or exceeds the minimum specified 28-day compressive strength for the mix (see Article 2.08).

   b. No individual compressive strength test results falls below the minimum specified strength by more than 500 psi.

   c. No more than 10% of the compressive tests have strengths greater than the maximum strength specified.

3. In the event any of the conditions listed above are not met, the mix proportions shall be corrected for the next concrete placing operation.

4. In the event that condition 2B is not met, additional tests in accordance with Article 3.10, paragraph H shall be performed.

5. When a ratio between 7-day and 28-day strengths has been established by these tests, the 7-day strengths shall subsequently be taken as a preliminary indication of the 28-day strengths. Should the 7-day test strength from any sampling be more than 10% below the established minimum strength, the Contractor shall:

    a. Immediately provide additional periods of curing in the affected area from which the deficient test cylinders were taken.

    b. Maintain or add temporary structural support as required.

    c. Correct the mix for the next concrete placement operation, if required to remedy the situation.

6. All concrete which fails to meet the ACI requirements and these specifications is subject to removal and replacement at no additional cost to the Owner.

G. When non-compliant concrete is identified, test reports shall be sent immediately to the Engineer for review.

H. Additional Tests

1. When ordered by the Engineer, additional tests on in-place concrete shall be provided and paid for by the Contractor.

2. In the event the 28-day test cylinders fail to meet the minimum strength requirements as outlined in Article 3.10, paragraph F, the Contractor shall have concrete core specimens obtained and tested from the affected area immediately.

    a. Three cores shall be taken for each sample in which the strength requirements were not met.

    b. The drilled cores shall be obtained and tested in conformance with ASTM C 42. The tests shall be conducted by a materials testing consultant approved by the Engineer.

    c. The location from which each core is taken shall be approved by the Engineer. Each core specimen shall be located, when possible, so its axis is perpendicular to the concrete surface and not near formed joints or obvious edges of a unit of deposit.

    d. The core specimens shall be taken, if possible, so no reinforcing steel is within the confines of the core.

    e. The diameter of core specimens should be at least 3 times the maximum nominal size of the course aggregate used in the concrete, but must be at least 2-inches in diameter.

f. The length of specimen, when capped, shall be at least twice the diameter of the specimen.

g. The core specimens shall be taken to the laboratory and when transported, shall not be thrown, dropped, allowed to roll, or damaged in any way.

h. Two (2) copies of test results shall be mailed directly to the Engineer. The concrete in question will be considered acceptable if the average compressive strength of a minimum of three test core specimens taken from a given area equal or exceed 85% of the specified 28-day strength and if the lowest core strength is greater than 75% of the specified 28-day strength.

3. In the event that concrete placed by the Contractor is suspected of not having proper air content, the Contractor shall engage a materials testing consultant approved by the Engineer, to obtain and test samples for air content in accordance with ASTM Specification C 457.

4. Concrete placed with compressive strengths greater than the maximum strength specified shall be removed and replaced or repaired as deemed necessary by the Engineer.

3.11 CARE AND REPAIR OF CONCRETE

A. The Contractor shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance by the Owner. Particular care shall be taken to prevent the drying of concrete and to avoid roughening or otherwise damaging the surface. Care shall be exercised to avoid jarring forms or placing any strain on the ends of projecting reinforcing bars. Any concrete found to be damaged, or which may have been originally defective, or which becomes defective at any time prior to the final acceptance of the completed work, or which departs from the established line or grade, or which, for any other reason, does not conform to the requirements of the Contract Documents, shall be satisfactorily repaired or removed and replaced with acceptable concrete at no additional cost to the Owner.

B. Areas of honeycomb shall be chipped back to sound concrete and repaired as directed.

C. Concrete formwork blowouts or unacceptable deviations in tolerances for formed surfaces due to improperly constructed or misaligned formwork shall be repaired as directed. Bulging or protruding areas, which result from slipping or deflecting forms shall be ground flush or chipped out and redressed as directed by the Engineer.

D. Areas of concrete in which cracking, spalling, or other signs of deterioration develop prior to final acceptance shall be removed and replaced, or repaired as directed. This stipulation includes concrete that has experienced cracking due to drying or thermal shrinkage of the concrete. Structural cracks shall be repaired using an approved epoxy injection system. Non-structural cracks shall be repaired using an approved hydrophilic resin pressure injected grout system, unless other means of repair are deemed necessary and approved. Extensive repair or replacement will be considered for concrete placed having compressive strengths greater than maximum strength specified. All repair work shall be performed at no additional cost to the Owner.

E. Concrete which fails to meet the strength requirements as outlined in Article 3.10, paragraph F, will be analyzed as to its adequacy based upon loading conditions, resultant stresses and exposure conditions for the particular area of concrete in question. If the concrete in question is found unacceptable based upon this analysis, that portion of the structure shall be strengthened or replaced by the Contractor at no additional cost to the Owner. The method of strengthening or extent of replacement shall be as directed by the Engineer.

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SECTION 03350

CONCRETE FINISHES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish all materials, labor, and equipment required to provide finishes of all concrete surfaces specified herein and shown on the Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03100 – Concrete Formwork

B. Section 03300 – Cast-in-Place Concrete

C. Section 03600 – Grout

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. ACI 301 – Specifications for Structural Concrete

2. ACI 318 – Building Code Requirements for Structural Concrete and Commentary

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300 – Submittals.

1. Manufacturer's literature on all products specified herein.

PART 2 -- PRODUCTS

2.01 CONCRETE LIQUID DENSIFIER AND SEALANT

A. Concrete liquid densifier and sealant shall be a high performance, deeply penetrating concrete densifier and sealant. Product shall be odorless, colorless, VOC-compliant, non-yellowing siliconate based solution designed to harden, dustproof and protect concrete floors subjected to heavy vehicular traffic and to resist black rubber tire marks on concrete surfaces. The product must contain a minimum solids content of 20% of which 50% is siliconate. Acceptable products are Diamond Hard by the Euclid Chemical Company, Seal

Hard by L&M Construction Chemicals and MasterKure HD 210 WB by BASF Master Builder Solutions.

PART 3 -- EXECUTION

3.01 FINISHES ON FORMED CONCRETE SURFACES

A. After removal of forms, the finishes described below shall be applied in accordance with Article 3.05 - Concrete Finish Schedule. Unless the finish schedule specifies otherwise, all surfaces shall receive at least a Type I finish. The Engineer shall be the sole judge of acceptability of all concrete finish work.

1. Type I - Rough: All fins, burrs, offsets, marks and all other projections left by the forms shall be removed. Projections, depressions, etc. below finished grade required to be removed will only be those greater than ¼-inch. All holes left by removal of ends of ties, and all other holes, depressions, bugholes, air/blow holes or voids shall be filled solid with cement grout after first being thoroughly wetted and then struck off flush. The only holes below grade to be filled will be tie holes and any other holes larger than ¼-inch in any dimension. Honeycombs shall be chipped back to solid concrete and repaired as directed by the Engineer. All holes shall be filled with tools, such as sponge floats and trowels, that will permit packing the hole solidly with cement grout. Cement grout shall consist of one part cement to three parts sand, epoxy bonding agent (for tie holes only) and the amount of mixing water shall be as little as consistent with the requirements of handling and placing. Color of cement grout shall match the adjacent wall surface.

2. Type II - Grout Cleaned: Where this finish is required, it shall be applied after completion of Type I finish. After the concrete has been predampened, a slurry consisting of one part cement (including an appropriate quantity of white cement in order to produce a color matching the surrounding concrete) and 1-1/2 parts sand passing the No. 16 sieve, by damp loose volume, shall be spread over the surface with clean burlap pads or sponge rubber floats. Mix proportions shall be submitted to the Engineer after a sample of the work is established and accepted. Any surplus shall be removed by scraping and then rubbing with clean burlap.

3. Type III - Smooth Rubbed: Where this finish is required, it shall be applied after the completion of the Type II finish. No rubbing shall be done before the concrete is thoroughly hardened and the mortar used for patching is firmly set. A smooth, uniform surface shall be obtained by wetting the surface and rubbing it with a carborundum stone to eliminate irregularities. Unless the nature of the irregularities requires it, the general surface of the concrete shall not be cut into. Corners and edges shall be slightly rounded by the use of the carborundum stone. Brush finishing or painting with grout or neat cement will not be permitted. A 100 square foot example shall be established at the beginning of the project to establish acceptability.

3.02 SLAB AND FLOOR FINISHES

A. The finishes described below shall be applied to slabs and top of walls in accordance with Article 3.03 - Concrete Finish Schedule. The Engineer shall be the sole judge of acceptability of all such finish work.

1. Type "D" - Steel Troweled: This finish shall be obtained after completion of a Type "B" finish. When the concrete has hardened sufficiently to prevent excess fine material from working to the surface, the surface shall be compacted and smoothed with not less than two thorough and complete steel troweling operations. In areas which are to receive a floor covering such as tile, resilient flooring, or carpeting, the applicable Specification Sections and Contract Drawings shall be reviewed for the required finishes and degree of flatness. In areas that are intermittently wet such as pump rooms, only one troweling operation is required to provide some trowel marks for slip resistance. All edges shall be edged with an 1/8-inch tool as directed by the Engineer. The finish shall be brought to a smooth, dense surface, free from defects and blemishes.

2. Type "E" - Broom or Belt: This finish shall provide the surface with a transverse scored texture by drawing a broom or burlap belt across the surface immediately after completion of a Type "B" finish. All edges shall be edged with an 1/8-inch tool as directed by the Engineer.

3. Type "H" - Non-Slip Finish: This finish shall be provided by applying a non-slip flooring additive concurrently with the application of a Type "D" finish and/or installation of floor sealants. Application procedure shall be in accordance with manufacturer's instructions. Finish shall be applied where specifically required on the Contract Drawings or specified herein.

4. Type "J" - Raked Finish: This finish shall be provided by raking the surface as soon as the condition of the concrete permits by making depressions of ±1/4 inch.

3.03 CONCRETE FINISH SCHEDULE

Item	Type of Finish
Exterior concrete walls below grade	I
Exterior exposed concrete walls, manholes, hand holes, miscellaneous structures and columns (including top of wall) to one foot below grade. All other exposed concrete surfaces not specified elsewhere	II
Exterior concrete sidewalks, steps, ramps, decks, slabs on grade and landings exposed to weather	E

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SECTION 03370

CONCRETE CURING

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Protect all freshly deposited concrete from premature drying and from the weather elements. The concrete shall be maintained with minimal moisture loss at a relatively constant temperature for a period of time necessary for the hydration of the cement and proper hardening of the concrete in accordance with the requirements specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03100 – Concrete Formwork

B. Section 03300 – Cast-In-Place Concrete

C. Section 03350 – Concrete Finishes

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. ACI 301 – Specifications for Structural Concrete

2. ACI 304R – Guide for Measuring, Mixing, Transporting, and Placing Concrete

3. ACI 305R – Guide to Hot Weather Concreting

4. ACI 306R – Guide to Cold Weather Concreting

5. ACI 308R – Guide to External Curing of Concrete

6. ASTM C171 – Standard Specification for Sheet Materials for Curing Concrete

7. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

8. ASTM C1315 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Proposed procedures for protection of concrete under wet weather placement conditions.

2. Proposed normal procedures for protection and curing of concrete.

3. Proposed special procedures for protection and curing of concrete under hot and cold weather conditions.

4. Proposed method of measuring concrete surface temperature changes.

5. Manufacturer's literature and material certification for proposed curing compounds.

PART 2 -- PRODUCTS

2.01 LIQUID MEMBRANE-FORMING CURING COMPOUND

A. Clear curing and sealing compound shall be a clear styrene acrylate type complying with ASTM C 1315, Type 1, Class A with a minimum solids content of 30%. Moisture loss shall not be greater than 0.40 kg/m^2 when applied at 300 sq.ft./gal. Manufacturer's certification is required. Acceptable products are Super Diamond Clear VOX by the Euclid Chemical Company, MasterKure CC 300SB by BASF Master Builder Solutions, and Cure & Seal 30 by Dayton Superior.

B. Where specifically approved by Engineer, on slabs to receive subsequent applied finishes, compound shall conform to ASTM C 309. Acceptable products are "Kurez DR VOX" or "Kurez W VOX" by the Euclid Chemical Company. Install in strict accordance with manufacturer's requirements.

2.02 EVAPORATION REDUCER

A. Evaporation reducer shall be BASF, "MasterKure ER 50", or Euclid Chemical "Euco-Bar".

PART 3 -- EXECUTION

3.01 PROTECTION AND CURING

A. All freshly placed concrete shall be protected from the elements, flowing water and from defacement of any nature during construction operations.

B. As soon as the concrete has been placed and horizontal top surfaces have received their required finish, provision shall be made for maintaining the concrete in a moist condition for at least a 5-day period thereafter except for high early strength concrete, for which the period shall be at least the first three days after placement. Horizontal surfaces shall be kept covered, and intermittent, localized drying will not be permitted.

C. Walls that will be exposed on one side with either fluid or earth backfill on the opposite side shall be continuously wet cured for a minimum of five days. Use of a curing compound will not be acceptable for applications of this type.

D. The Contractor shall use one of the following methods to insure that the concrete remains in a moist condition for the minimum period stated above.

1. Ponding or continuous fogging or sprinkling.

2. Application of mats or fabric kept continuously wet.

3. Continuous application of steam (under 150°F).

4. Application of sheet materials conforming to ASTM C171.

5. If approved by the Engineer, application of a curing compound in accordance with Article 3.04.

E. The Contractor shall keep absorbent wood forms wet until they are removed. After form removal, the concrete shall be cured by one of the methods in paragraph D.

F. Any of the curing procedures used in Paragraph 3.01-D may be replaced by one of the other curing procedures listed in Paragraph 3.01-D after the concrete is one-day old. However, the concrete surface shall not be permitted to become dry at any time.

3.02 CURING CONCRETE UNDER COLD WEATHER CONDITIONS

A. Suitable means shall be provided for a minimum of 72 hours after placing concrete to maintain it at or above the minimum as placed temperatures specified in Section 03300, Cast-In-Place Concrete, for concrete work in cold weather. During the 72-hour period, the concrete surface shall not be exposed to air more than 20°F above the minimum as placed temperatures.

B. Stripping time for forms and supports shall be increased as necessary to allow for retardation in concrete strength caused by colder temperatures. This retardation is magnified when using concrete made with blended cements or containing fly ash or ground granulated blast furnace slag. Therefore, curing times and stripping times shall be further increased as necessary when using these types of concrete.

C. The methods of protecting the concrete shall be approved by the Engineer and shall be such as will prevent local drying. Equipment and materials approved for this purpose shall be on the site in sufficient quantity before the work begins. The Contractor shall assist the Engineer by providing holes in the forms and the concrete in which thermometers can be placed to determine the adequacy of heating and protection. All such thermometers shall be furnished by the Contractor in quantity and type which the Engineer directs.

D. Curing procedures during cold weather conditions shall conform to the requirements of ACI 306.

3.03 CURING CONCRETE UNDER HOT WEATHER CONDITIONS

A. When air temperatures exceed 85°F, the Contractor shall take extra care in placing and finishing techniques to avoid formation of cold joints and plastic shrinkage cracking. If ordered by the Engineer, temporary sun shades and/or windbreakers shall be erected to guard against such developments, including generous use of wet burlap coverings and fog sprays to prevent drying out of the exposed concrete surfaces.

B. Immediately after screeding, horizontal surfaces shall receive an application of evaporation reducer. Apply in accordance with manufacturer's instructions. Final finish work shall begin as soon as the mix has stiffened sufficiently to support the workmen.

C. Curing and protection of the concrete shall begin immediately after completion of the finishing operation. Continuous moist-curing consisting of method 1 or 2 listed in paragraph 3.01D is mandatory for at least the first 24 hours. Method 2 may be used only if the finished surface is not marred or blemished during contact with the coverings.

D. At the end of the initial 24-hour period, curing and protection of the concrete shall continue for at least six (6) additional days using one of the methods listed in paragraph 3.01D.

E. Curing procedures during hot weather conditions shall conform to the requirements of ACI 305.

3.04 USE OF CURING COMPOUND

A. Curing compound shall be used only where specifically approved by the Engineer. Curing compound shall never be used for curing exposed walls with fluid or earth backfill on the opposite side. A continuous wet cure for a minimum of five days is required for these applications. Curing compound shall not be used on surfaces exposed to water in potable water storage tanks and treatment plants unless curing compound is certified in accordance with ANSI/NSF Standard 61.

B. When permitted, the curing compound shall maintain the concrete in a moist condition for the required time period, and the subsequent appearance of the concrete surface shall not be affected.

C. The compound shall be applied in accordance with the manufacturer's recommendations after water sheen has disappeared from the concrete surface and after finishing operations. Maximum coverage for the curing and sealing compound shall be 300 square feet per gallon for trowel finishes and 200 square feet per gallon for floated or broom surfaces. Maximum coverage for compounds placed where subsequent finishes will be applied shall be 200 square feet per gallon. For rough surfaces, apply in two directions at right angles to each other.

3.05 EARLY TERMINATION OF CURING

A. Moisture retention measures may be terminated earlier than the specified times only when at least one of the following conditions is met:

1. The strength of the concrete reaches 85 percent of the specified 28-day compressive strength in laboratory-cured cylinders representative of the concrete in

place, and the temperature of the in-place concrete has been constantly maintained at 50 degrees Fahrenheit or higher.

2. The strength of concrete reaches the specified 28-day compressive strength as determined by accepted nondestructive methods or laboratory-cured cylinder test results.

- END OF SECTION –

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SECTION 03400

PRECAST CONCRETE

PART 1 -- GENERAL

1.01 REQUIREMENTS

A. The Contractor shall construct all precast concrete items as required in the Contract Documents, including all appurtenances necessary to make a complete installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02604 - Utility Structures

B. Section 03200 - Reinforcing Steel

C. Section 03300 - Cast-in-Place Concrete

D. Section 03350 - Concrete Finishes

E. Section 03370 - Concrete Curing

F. Section 03600 - Grout

G. Section 05010 - Metal Materials

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of other requirements of these Specifications, all work specified herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the end of the Bid.

1. ACI 318-Building Code Requirements for Structural Concrete and Commentary

2. PCI Standard MNL-116 - Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products

3. PCI Design Handbook

1.04 SUBMITTALS

A. The Contractor shall submit the following for review in accordance with Section 01300, Submittals.

1. Shop drawings for all precast concrete items showing all dimensions, locations, and type of lifting inserts, and details of reinforcement and joints.

2. A list of the design criteria used by the manufacturer for all manufactured, precast items.

3. Design calculations, showing at least the design loads and stresses on the item, shall be submitted. Calculations shall be signed and sealed by a Professional Engineer registered in the State of Tennessee.

4. Certified reports for all lifting inserts, indicating allowable design loads.

5. Information on lifting and erection procedures.

1.05 QUALITY ASSURANCE

A. All manufactured precast concrete units shall be produced by an experienced manufacturer regularly engaged in the production of such items. All manufactured precast concrete and site-cast units shall be free of defects, spalls, and cracks. Care shall be taken in the mixing of materials, casting, curing and shipping to avoid any of the above. The Engineer may elect to examine the units at the casting yard or upon arrival of the same at the site. The Engineer shall have the option of rejecting any or all of the precast work if it does not meet with the requirements specified herein or on the Drawings. All rejected work shall be replaced at no additional cost to the Owner.

B. Manufacturer Qualifications

The precast concrete manufacturing plant shall be certified by the Prestressed Concrete Institute, Plant Certification Program, prior to the start of production. Certification is only required for plants providing prestressed structural members such as hollow core planks, double-T members, etc.

C. Plant production and engineering must be under direct supervision and control of an Engineer who possesses a minimum of five years experience in precast concrete work.

PART 2 -- PRODUCTS

2.01 CONCRETE

A. Concrete materials including portland cement, aggregates, water, and admixtures shall conform to Section 03300, Cast-in-Place Concrete.

B. For prestressed concrete items, minimum compressive strength of concrete at 28 days shall be 5,000 psi unless otherwise specified. Minimum compressive strength of concrete at transfer of prestressing force shall be 3,500 psi unless otherwise specified.

C. For non-prestressed concrete items, minimum compressive strength of concrete at 28 days shall be 4000 psi unless otherwise specified.

2.02 GROUT

A. Grout for joints between panels shall be a cement grout in conformance with Section 03600, Grout.

B. Minimum compressive strength of grout at 7 days shall be 3,000 psi.

2.03 REINFORCING STEEL

A. Reinforcing steel used for precast concrete construction shall conform to Section 03200, Reinforcing Steel.

2.04 STEEL INSERTS

A. Steel inserts shall be in accordance with Section 05010, Metal Materials.

B. Plastic bearing pads shall be multi-monomer plastic strips which are non-leaching and support construction loads with no visible overall expansion, manufactured specifically for the purpose of bearing precast concrete.

PART 3 -- EXECUTION

3.01 FABRICATION AND CASTING

A. All precast members shall be fabricated and cast to the shapes, dimensions and lengths shown on the Drawings and in compliance with PCI MNL-116. Precast members shall be straight, true and free from dimensional distortions, except for camber and tolerances permitted later in this clause. All integral appurtenances, reinforcing, openings, etc., shall be accurately located and secured in position with the form work system. Form materials shall be steel and the systems free from leakage during the casting operation.

B. All cover of reinforcing shall be the same as detailed on the Drawings.

C. Because of the critical nature of the bond development length in prestressed concrete panel construction, if the transfer of stress is by burning of the fully tensioned strands at the ends of the member, each strand shall first be burned at the ends of the bed and then at each end of each member before proceeding to the next strand in the burning pattern.

D. The Contractor shall coordinate the communication of all necessary information concerning openings, sleeves, or inserts to the manufacturer of the precast members.

E. Concrete shall be finished in accordance with Section 03350, Concrete Finishes.

F. Curing of precast members shall be in accordance with Section 03370, Concrete Curing. Use of a membrane curing compound will not be allowed.

G. The manufacturer shall provide lifting inserts or other approved means of lifting members.

3.02 HANDLING, TRANSPORTING AND STORING

A. Precast members shall not be transported away from the casting yard until the concrete has reached the minimum required 28 day compressive strength and a period of at least 5 days has elapsed since casting, unless otherwise permitted by the Engineer.

B. No precast member shall be transported from the plant to the job site prior to approval of that member by the plant inspector. This approval will be stamped on the member by the plant inspector.

C. During handling, transporting, and storing, precast concrete members shall be lifted and supported only at the lifting or supporting points as indicated on the shop drawings.

D. All precast members shall be stored on solid, unyielding, storage blocks in a manner to prevent torsion, objectionable bending, and contact with the ground.

E. Precast concrete members shall not be used as storage areas for other materials or equipment.

F. Precast members damaged while being handled or transported will be rejected or shall be repaired in a manner approved by the Engineer.

3.03 ERECTION

A. Erection shall be carried out by the manufacturer or under his supervision using labor, equipment, tools and materials required for proper execution of the work.

B. Contractor shall prepare all bearing surfaces to a true and level line prior to erection. All supports of the precast members shall be accurately located and of required size and bearing materials.

C. Installation of the precast members shall be made by leveling the top surface of the assembled units keeping the units tight and at right angles to the bearing surface.

D. Grouting between adjacent precast members and along the edges of the assembled precast members shall be accomplished as indicated on the drawings, care being taken to solidly pack such spaces and to prevent leakage or droppings of grout through the assembled precast members. Any grout which seeps through the precast members shall be removed before it hardens.

E. In no case shall concentrated construction loads, or construction loads exceeding the design loads, be placed on the precast members. In no case shall loads be placed on the precast members prior to the welding operations associated with erection, and prior to placing of topping (if required).

F. No Contractor, Subcontractor or any of his employees shall arbitrarily cut, drill, punch or otherwise tamper with the precast members.

G. Precast members damaged while being erected will be rejected or shall be repaired in a manner approved by the Engineer.

- END OF SECTION –

SECTION 03600

GROUT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish all materials, labor, and equipment required to provide all grout used in concrete work and as bearing surfaces for base plates, in accordance with the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Requirements of related work are included in Division 1 and Division 2 of these Specifications.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1.	CRD-C 621	Corps of Engineers Specification for Non-shrink Grout
2.	ASTM C 109	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch or 50 mm cube Specimens)
3.	ASTM C 531	Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
4.	ASTM C 579	Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Monolithic Surfacings, and Polymer Concretes
5.	ASTM C 827	Standard Test Method for Early for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures
6.	ASTM C 144	Standard Specification for Aggregate for Masonry Mortar
7.	ASTM C 1107	Standard Specification for Packaged Dry, Hydraulic Cement Grout (Nonshrink)

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300 - Submittals.

1. Certified test results verifying the compressive strength and shrinkage and expansion requirements specified herein.

2. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of grout used in the work.

1.05 QUALITY ASSURANCE

A. Field Tests

1. Compression test specimens will be taken during construction from the first placement of each type of grout and at intervals thereafter as selected by the Engineer to insure continued compliance with these Specifications. The specimens will be made by the Engineer or its representative.

a. Compression tests and fabrication of specimens for cement grout and non-shrink grout will be performed as specified in ASTM C 109 at intervals during construction as selected by the Engineer. A set of three specimens will be made for testing at seven days, 28 days and any additional time period as appropriate.

b. Compression tests and fabrication of specimens for epoxy grout will be performed as specified in ASTM C 579, Method B, at intervals during construction as selected by the Engineer. A set of three specimens will be made for testing at seven days and any other time period as appropriate.

2. The cost of all laboratory tests on grout will be borne by the Owner, but the Contractor shall assist the Engineer in obtaining specimens for testing. The Contractor shall be charged for the cost of any additional tests and investigation on work performed which does not meet the specifications. The Contractor shall supply all materials necessary for fabricating the test specimens, at no additional cost to the Owner.

3. All grout, already placed, which fails to meet the requirements of these Specifications, is subject to removal and replacement at no additional cost to the Owner.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Cement Grout

1. Cement grout shall be composed of Portland Cement and sand in the proportion specified in the Contract Documents and the minimum amount of water necessary to obtain the desired consistency. If no proportion is indicated, cement grout shall consist of one part Portland Cement to three parts sand. Water amount shall be as required to achieve desired consistency without compromising strength

requirements. White portland cement shall be mixed with the Portland Cement as required to match color of adjacent concrete.

2. The minimum compressive strength at 28 days shall be 4000 psi.

3. For beds thicker than 1-1/2 inch and/or where free passage of grout will not be obstructed by coarse aggregate, 1-1/2 parts of coarse aggregate having a top size of 3/8 inch should be added. This stipulation does not apply for grout being swept in by a mechanism. These applications shall use a plain cement grout without coarse aggregate regardless of bed thickness.

4. Sand shall conform to the requirements of ASTM C144.

B. Non-Shrink Grout

1. Non-shrink grout shall conform to CRD-C 621 and ASTM C 1107, Grade B or C when tested at a max. fluid consistency of 30 seconds per CDC 611/ASTM C939 at temperature extremes of 45°F and 90°F and an extended working time of 15 minutes. Grout shall have a min. 28-day strength of 7,000 psi. Non-shrink grout shall be, "Euco N-S" by the Euclid Chemical Company, "Sikagrout 212" by Sika Corporation, Conspec 100 Non-Shrink Non-Metallic Grout by Conspec, Masterflow 555 Grout by BASF Master Builder Solutions.

C. Epoxy Grout

1. Epoxy grout shall be "Sikadur 32 Hi-Mod" by Sika Corporation, "Duralcrete LV" by Euchlid Chemical, or "Euco #452 Series" by Euclid Chemical, MasterEmaco ADH 1090 RS by BASF Master Builder Solutions.

2. Epoxy grout shall be modified as required for each particular application with aggregate per manufacturer's instructions.

D. Epoxy Base Plate Grout

1. Epoxy base plate grout shall be Sikadur 42, Grout-Pak by Sika Corporation, or Masterflow 648 by BASF Master Builder Solutions.

2.02 CURING MATERIALS

A. Curing materials shall be as specified in Section 03370, Concrete Curing for cement grout and as recommended by the manufacturer for prepackaged grouts.

PART 3 -- EXECUTION

3.01 GENERAL

A. The different types of grout shall be used for the applications stated below unless noted otherwise in the Contract Documents. Where grout is called for in the Contract Documents which does not fall under any of the applications stated below, non-shrink grout shall be used unless another type is specifically referenced.

1. Cement grout shall be used for grout toppings and for patching of fresh concrete.

2. Non-shrink grout shall be used for grouting beneath base plates of structural metal framing.

3. Epoxy grout shall be used for bonding new concrete to hardened concrete.

4. Epoxy base plate grout shall be used for precision seating of base plates including base plates for all equipment such as engines, mixers, pumps, vibratory and heavy impact machinery, etc.

B. New concrete surfaces to receive cement grout shall be as specified in Section 03350, Concrete Finishes, and shall be cleaned of all dirt, grease and oil-like films. Existing concrete surfaces shall likewise be cleaned of all similar contamination and debris, including chipping or roughening the surface if a laitance or poor concrete is evident. The finish of the grout surface shall match that of the adjacent concrete. Curing and protection of cement grout shall be as specified in Section 03370, Concrete Curing.

C. All mixing, surface preparation, handling, placing, consolidation, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

D. The Contractor, through the manufacturer of a non-shrink grout and epoxy grout, shall provide on-site technical assistance upon request, at no additional cost to the Owner.

3.02 CONSISTENCY

A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow.

3.03 MEASUREMENT OF INGREDIENTS

A. Measurements for cement grout shall be made accurately by volume using containers. Shovel measurement shall not be allowed.

B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

3.04 GROUT INSTALLATION

A. Grout shall be placed quickly and continuously, shall completely fill the space to be grouted and be thoroughly compacted and free of air pockets. The grout may be poured in place, pressure grouted by gravity, or pumped. The use of pneumatic pressure or dry-packed grouting requires approval of the Engineer. For grouting beneath base plates, grout shall be poured from one side only and thence flow across to the open side to avoid air-entrapment.

- END OF SECTION -

SECTION 04100

MORTAR AND MASONRY GROUT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish labor, materials, equipment and appliances required for complete execution of Work shown on Drawings and specified herein.

B. Principal items of work include:

1. Mortar for unit masonry work.

2. Grout for grouting masonry.

3. Mortar for pointing and touchup.

1.02 RELATED WORK SPECIFIED ELSEWHERE

1. NA

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of the Specifications, the Work shall conform to the applicable requirements of the following documents:

1.	ASTM C91	Standard Specification for Masonry Cement
2.	ASTM C144	Standard Specification for Aggregate for Masonry Mortar
3.	ASTM C150	Standard Specification for Portland Cement
4.	ASTM C207	Standard Specification for Hydrated Lime for Masonry Purposes
5.	ASTM C270	Standard Specification for Mortar for Unit Masonry
6.	ASTM C476	Standard Specification for Grout for Masonry
7.	ASTM C979	Standard Specification for Pigments for Integrally Colored Concrete
8.	ASTM C1019	Standard Test Method for Sampling and Testing Grout

9. ACI 530.1/ASCE 6 Building Code Requirements and Specification for Masonry Structures and Companion Commentaries

1.04 SUBMITTALS

A. In accordance with the procedures and requirements set forth in Section 01300 - Submittals, submit the following:

1. Manufacturer's data and mixing instructions for each product.

2. Certificate of compliance with these specifications for each material specified below.

3. Test reports.

4. Samples of colored masonry mortar.

1.05 DELIVERY AND STORAGE

A. Deliver materials in manufacturer's original containers, bearing labels indicating product and manufacturer's name.

B. Store cementitious materials in waterproof locations to prevent damage by elements. Reject containers showing evidence of damage.

C. Store aggregates in separate bins to prevent intrusion of foreign particles. Do not use bottom 6 inches of sand or other aggregate stored in contact with the ground.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Specifications provide products manufactured by one of the following:

1. LaFarge, Reston, VA

2. Lehigh Cement Company, Allentown, PA

3. Holcim, Inc., Dundee, MI

4. Or local equivalent

2.02 MATERIALS

A. Mortar and Grout Materials

1. Portland Cement: ASTM C-150, Type I above grade and Type II below grade.

2. Hydrated lime: ASTM C-207, Type "S".

3. Sand: Clean, coarse, free of loam, salt, organic and foreign matter and conforming to ASTM C-144.

4. Coarse and fine aggregates for grout: ASTM C-404.

5. Masonry Cement: ASTM C 91, Type S and meet the following criteria:

   a. Prepackaged masonry cement shall contain Portland Cement, hydrated lime and plasticizing admixtures or hydraulic hydrated lime. Masonry cements which contain other materials, including ground limestone, ground slag, or other cementitious and non-cementitious materials, are not acceptable.

6. Water - clean, fresh, potable and free from injurious amounts of oil, acids, alkalies, salts, organic matter or other deleterious substances.

B. Admixtures

1. Do not use calcium chloride.

2. Provide water repellant admixture in mortar used for architectural concrete masonry units. Admixture shall be compatible with ACMU water repellant admixture.

3. Do not use admixtures, without written approval of Engineer.

C. Mortar pigment

1. Natural or synthetic iron oxide and chromium oxides meeting the requirements of ASTM C979.

2. Pigment shall not exceed 10% of the weight of Portland cement. Carbon black shall not exceed 2% of Portland cement.

3. Color shall be selected by the Owner from the manufacturer's full range of colors.

2.03 GROUT AND MORTAR MIXES

A. Masonry mortar shall be Type "S" according to ASTM C-270. Proportions for masonry mortar shall be one of the following:

1. Proportions by volume: 1 part Portland cement to 1/4 - 1/2 parts hydrated lime, and aggregate volume of not less than 2-1/4 or more than 3 times the sum of the volumes of cement and lime.

2. Proportions by volume: 1/2 part Portland cement to 1 part masonry cement, and aggregate volume of not less than 1-1/4 or more than 3 times the sum of the volumes of cement and lime.

B. Proportions for pointing mortar.

1. Proportions by volume: 1 part Portland cement to 1/4 part hydrated lime and 2 parts extra fine sand.

C. Masonry Grout shall conform to the requirements of ASTM C 476 and ACI 530.1/ASCE 6, strength of grout, tested in accordance with ASTM C 1019 shall be equal to f'm as specified in Section 04200, but not less than 2,000 psi.

1. Test grout for every 5,000 square feet of masonry, with a minimum of one test per structure.

PART 3 -- EXECUTION

3.01 FIELD MORTAR MIXING

A. Mixing shall be by mechanically operated batch mixer. Entirely discharge before recharging. Mix sand, lime, cement and admixtures dry for two (2) minutes minimum, add water and mix for three (3) minutes minimum. Control batching procedures by measuring materials by volume. Measurement by shovel count shall not be permitted. Mix mortar with less water than the maximum amount, consistent with workability, to provide near maximum tensile bond strength. Mix only quantity that can be used before initial set, or within the first one-half hour.

B. Mixers, wheel barrows, mortar boards, etc., shall be kept clean.

C. Retempering of mortar will not be permitted and mortar allowed to stand more than one (1) hour shall not be used.

3.02 INSTALLATION

A. Install mortar and grout in accordance with ACI 530.1/ASCE 6.

3.03 REPOINTING MORTAR

A. Prehydrate the mortar by mixing ingredients together dry, and then add only enough water to make a damp, stiff mix that will retain its form when pressed into a ball. After one to two hours, add water to bring it to the proper consistency.

- END OF SECTION -

SECTION 05010

METAL MATERIALS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Metal materials not otherwise specified shall conform to the requirements of this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Requirements for specific products made from the materials specified herein are included in other sections of the Specifications. See the section for the specific item in question.

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A.	ASTM A36	Standard Specification for Carbon Structural Steel
B.	ASTM A47	Standard Specification for Ferritic Malleable Iron Castings
C.	ASTM A48	Standard Specification for Gray Iron Castings
D.	ASTM A53	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
E.	ASTM A276	Standard Specification for Stainless Steel Bars and Shapes
F.	ASTM A307	Standard Specification for Carbon Steel Bolts, Studs and Threaded Rod 60 000 PSI Tensile Strength
G.	ASTM A653	Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
H.	ASTM A500	Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
I.	ASTM A501	Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
J.	ASTM A529	Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality
LK.	ASTM A536	Standard Specification for Ductile Iron Castings
L.	ASTM A1011	Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High Strength Low-Alloy, High Strength Low-Allow with Improved Formability and Ultra-High Strength

M. ASTM A572 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel

N. ASTM A992 Standard Specification for Structural Steel Shapes

O. ASTM A666 Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel, Sheet, Strip, Plate, and Flat Bar

P. ASTM A1085 Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS)

Q. ASTM B26 Standard Specification for Aluminum-Alloy Sand Castings

SR. ASTM B85 Standard Specification for Aluminum-Alloy Die Castings

S. ASTM B108 Standard Specification for Aluminum-Alloy Permanent Mold Castings

T. ASTM B138 Standard Specification for Manganese Bronze Rod, Bar, and Shapes

U. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

V. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

W. ASTM B308 Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles

X. ASTM B574 Standard Specification for Low-Carbon Nickel-Chromium-Molybdenum, Low-Carbon Nickel-Molybdenum-Chromium, Low-Carbon Nickel-Molybdenum-Chromium-Tantalum, Low-Carbon Nickel-Chromium-Molybdenum-Copper and Low-Carbon Nickel-Chromium-Molybdenum-Tungsten Alloy Rod

Y. ASTM F468 Standard Specification for Nonferrous Bolts, Hex Cap Screws, Socket Head Cap Screws and Studs for General Use

Z. ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs

1.04 SUBMITTALS

A. Material certifications shall be submitted along with any shop drawings for metal products and fabrications required by other sections of the Specifications.

1.05 QUALITY ASSURANCE

A. Owner may engage the services of a testing agency to test any metal materials for conformance with the material requirements herein. If the material is found to be in conformance with Specifications the cost of testing will be borne by the Owner. If the material does not conform to the Specifications, the cost of testing shall be paid by the

Contractor and all materials not in conformance as determined by the Engineer shall be replaced by the Contractor at no additional cost to the Owner. In lieu of replacing materials the Contractor may request further testing to determine conformance, but any such testing shall be paid for by the Contractor regardless of outcome of such testing.

PART 2 -- PRODUCTS

2.01 CARBON AND LOW ALLOY STEEL

A. Material types and ASTM designations shall be as listed below:

1.	Steel W Shapes	A992
2.	Steel HP Shapes	A572 Grade 50
3.	Steel M, S, C,and MC shapes and Angles, Bars, and Plates	A36
4.	Rods	F 1554 Grade 36
5.	Pipe - Structural Use	A53 Grade B
6.	Hollow Structural Sections	A500 Grade C or A1085
7.	Cold-Formed Steel Framing	A 653

2.02 STAINLESS STEEL

A. All stainless steel fabrications exposed to underwater service shall be Type 316. All other stainless steel fabrications shall be Type 304, unless noted otherwise.

B. Material types and ASTM designations are listed below:

1.	Plates and Sheets	ASTM A666 Grade A
2.	Structural Shapes	ASTM A276
3.	Fasteners (Bolts, etc.)	ASTM F593

2.03 ALUMINUM

A. All aluminum shall be alloy 6061-T6, unless otherwise noted or specified herein.

B. Material types and ASTM designations are listed below:

1.	Structural Shapes	ASTM B308
2.	Castings	ASTM B26, B85, or B108
3.	Extruded Bars	ASTM B221 - Alloy 6061
4.	Extruded Rods, Shapes and Tubes	ASTM B221 - Alloy 6063
5.	Plates	ASTM B209 - Alloy 6061
6.	Sheets	ASTM B221 - Alloy 3003

C. All aluminum shall be provided with mill finish unless otherwise noted.

D. Where bolted connections are indicated, aluminum shall be fastened with stainless steel bolts.

E. Aluminum in contact with dissimilar materials shall be insulated with an approved dielectric.

2.04 CAST IRON

A. Material types and ASTM designations are listed below:

1.	Gray	ASTM A48 Class 30B
2.	Malleable	ASTM A47
3.	Ductile	ASTM A536 Grade 60-40-18

2.05 BRONZE

A. Material types and ASTM designations are listed below:

1.	Rods, Bars and Sheets	ASTM B138 - Alloy B Soft

2.06 HASTELLOY

A. All Hastelloy shall be Alloy C-276.

PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 05540

CASTINGS

PART 1 -- GENERAL

1.01 REQUIREMENT

A. Furnish all materials, labor, and equipment required to provide all castings in accordance with the requirements of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02604 – Utility Structures

B. Section 05010 - Metal Materials

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. International Building Code

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01300, Submittals.

1. Complete fabrication and erection drawings of all castings specified herein.

2. Other submittals as required in accordance with Section 05010, Metal Materials, and Section 05050, Metal Fastening.

PART 2 -- PRODUCTS

2.01 METAL MATERIALS

A. Metal materials used for castings shall conform to Section 05010, Metal Materials, unless noted otherwise.

2.02 METAL FASTENING

A. NA

2.03 IRON CASTINGS

A. General - Iron Castings shall include, but not be limited to frames and covers for sewer manholes.

1. Castings shall be of gray iron of uniform quality, free from defects, smooth and well cleaned by shotblasting.

2. Catalog numbers on the Drawings are provided only to show required types and configuration. All covers shall be cast with raised letters as designated on the Drawings.

B. Covers

1. Covers shall be provided with matching frames. Cover shall fit flush with the surrounding finished surface. The cover shall not rock or rattle when loading is applied.

2. Round covers and frames shall have machined bearing surfaces.

3. Design loadings:

a. Where located within a structure, a minimum design loading of 300 psf shall be used, unless noted otherwise.

b. At all locations not within a structure, the design loading shall be a standard AASHTO H-20 truck loading, unless otherwise noted.

C. Watertight gasketing, bolting, locking devices, patterns, lettering, pickholes, vents, or self-sealing features shall be as detailed on the Drawings.

D. Anti-seize compound shall be placed on all bolts.

E. Watertight frames shall have slots for inserting locking bar.

PART 3 -- EXECUTION

3.01 FABRICATION

A. All measurements and dimensions shall be based on field conditions and shall be verified by the Contractor prior to fabrication. Such verification shall include coordination with adjoining work.

B. All fabricated work shall be shop fitted together as much as practicable, and delivered to the field, complete and ready for erection. All miscellaneous items such as stiffeners, fillets, connections, brackets, and other details necessary for a complete installation shall be provided.

C. Finished members shall conform to the lines, angles, and curves shown on the Drawings and shall be free from distortions of any kind.

3.02 INSTALLATION

A. Assembly and installation of fabricated system components shall be performed in strict accordance with manufacturer's recommendations.

B. All castings shall be erected square, plumb and true, accurately fitted, adequately anchored in place, and set at proper elevations and positions.

- END OF SECTION –

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SECTION 07900

JOINT FILLERS, SEALANTS AND CAULKING

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish labor, materials, equipment and appliances required for the complete execution of Work shown on the Drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03250 - Concrete Accessories

B. Section 03290 - Joints in Concrete

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of the other requirements of the specifications, all work herein shall conform to the applicable requirements of the following documents. All referenced specifications, codes, and standards refer to the most current issue available at the time of Bid.

1. ASTM C-920 Standard Test Method for Tack-Free Time of Elastomeric Sealants

2. ASTM D-1056 Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber1,2

3. SWRI Sealant and Caulking Guide Specification

1.04 SUBMITTALS

A. In accordance with the procedures and requirements set forth in Section 01300 – Submittals, submit the following:

1. Manufacturers literature and installation instructions.

2. Color samples of each type of sealant.

1.05 QUALITY ASSURANCE

A. Applicator shall be a company specializing in the installation of sealants with a minimum of five years experience.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in unopened labeled packages.

B. Store materials in location protected from freezing or damages.

C. Reject and remove from the site materials within broken or damaged packaging.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Sealants

1. Type 1: Multi-component, non-sag, low-modulus polyurethane rubber sealant meeting ASTM C-920, Type M, Grade NS, Class 25, use NT, M, A, and O. Capable of withstanding 50% in extension or compression such as Sikaflex-2C NS/SL, Sika Corporation, or Sonolastic NP-2, Sonneborn, or DynaTrol II by Pecora Corporation.

2. Type 2: Single component polyurethane sealant meeting ASTM C-920, Type S, Grade NS, Class 25, Use NT, M, A, and O. Capable of withstanding 25% in extension or compression such as Sikaflex 1A by Sika Corporation, DynaTrol 1-XL by Pecora Corporation, or Sonolastic NP-1 by BASF Construction Chemicals.

3. Type 3: Single component, low-modulus moisture curing silicone meeting ASTM C-920, Type S, Grade NS, Class 25, Use NT, M, G, and A. Capable of withstanding 50% extension and compression. Pecora 890 by Pecora Corporation, Sonolastic Omni Seal by BASF Construction Chemicals.

4. Type 4: Single component, mildew resistant, moisture-curing silicone meeting ASTM C-920, Type S, Grade NS, Class 25, Use NT, M, G, and A. Pecora 898 by Pecora Corporation, Sonolastic Omni Plus by BASF Construction Chemicals.

5. Type 5: Single component, acrylic latex meeting ASTM C-834. AC-20+ Silicone by Pecora Corporation, Sonneborn Sonolac by BASF Construction Chemicals.

6. Type 6: High grade butyl sealant meeting Federal Specification TT-S-00-1657. BC-158 by Pecora Corporation or equal.

7. Type 7: Multi-component chemical resistant polysulfide sealant conforming to ASTM C-920, Type M, Grade NS, Class 25 such as Deck-O-Seal by W.R. Meadows, Tammsflex by DuraJoint Concrete Accessories, or Synthacalk GC2+ by Pecora Corporation.

8. Type 8: Nonsag, Multi Component, traffic grade polyurethane sealant meeting ASTM C920, Type 19, Grade NS, Class 25, use T, M, A, and O. DynaTread by Pecora Corporation, Sonolastic Ultra by BASF Construction Chemicals.

B. Primer: Non-staining primer recommended by sealant manufacturer for the substrates on this project.

C. Backer Rod: Closed cell foam, nonreactive with caulking materials, non-oily, and approved by the sealant manufacturer. Minimum density shall be 2.00 pounds per cubic foot. Use no asphalt or bitumen-impregnated fiber with sealants.

D. Joint Cleaner: Recommended by sealant or caulking compound manufacturer.

E. Bond breaker: Either polyethylene film or plastic tape as recommended by the sealant manufacturer.

F. Color: Where manufacturer's standard colors do not closely match materials being sealed, provide a custom color.

PART 3 -- EXECUTION

3.01 QUALITY CONTROL

A. Coordinate work with details shown on approved shop drawings prepared by other trades.

B. Verify conditions in the field.

C. Schedule work to follow closely the installation of other trades.

D. Apply sealants and related items in temperatures and dry conditions recommended by the manufacturers.

E. Do not paint sealant, unless recommended by sealant and paint manufacturer.

3.02 PREPARATION

A. Protect finished surfaces adjoining by using masking tape or other suitable materials.

B. Clean and prime joints before starting any caulking or sealing work.

C. Thoroughly clean joints and spaces of mortar and other foreign materials. Cleaning agent shall be Xylol or similar non-contaminating solvent to remove any film from metal surfaces. Masonry or concrete surfaces shall be brushed or air jet cleaned.

D. Joint Requirements

1. All joints and spaces to be sealed in exterior work shall be less than 1/2 inch deep and not less than 1/4 inch wide. If joints in masonry are less than that specified herein, the mortar shall be cut out to the required width and depth. All joints and spaces to receive sealant shall be completely prepared and thoroughly dry before installation of sealant.

2. Unless otherwise specified, joints and spaces which are open to a depth of 1/2 inch or greater shall be solidly filled with back-up material to within 1/4 inch of the surface. Back-up material shall be packed tightly and made continuous throughout the length of the joints. Bond breaker shall be applied as required. If joints are less than 1/4 inch deep, the back-up material may be omitted, a bond breaker substituted

and the joint completely filled with sealant. The back-up material shall not project beyond the 1/4 inch depth of the open space in any joint. The following width-to-depth ratio table shall be adhered to, unless otherwise recommended by manufacturer.

Joint Width	Sealant Depth	
	Minimum	Maximum
¼ inch	1/4 inch	1/4 inch
Over 1/4 inch to 1/2 inch	1/4 inch	Equal to width
Over 1/2 inch to 1 inch	1/2 inch	Equal to width
Over 1 inch to 2 inch	1/2 inch	1/2 of width

3.03 APPLICATION

A. Exercise care before, during, and after installation so as not to damage any material by tearing or puncturing. All finished work shall be approved before covering with any other material or construction.

B. Apply sealant by an approved type of gun except where the use of a gun is not practicable, suitable hand tools shall be used. Avoid applying the compound to any surface outside of the joints or spaces to be sealed. Mask areas where required to prevent overlapping of sealant.

C. All joints shall be waterproof and weathertight.

D. Point sealed joints to make a slightly concave joint, the edges of which are flush with the surrounding surfaces. Exposed joints in the interior side of the door and other frames shall be neatly pointed flush or to match adjacent jointing work.

E. Adjacent materials which have been soiled shall be cleaned immediately and the work left in neat and clean condition.

F. Comply with sealant manufacturer's written instructions except where more stringent requirements are shown or specified and except where manufacturer's technical representative directs otherwise.

3.04 ADJUSTMENT AND CLEANING

A. Remove misplaced sealant compounds promptly using methods and materials recommended by the manufacturer, as the work progresses.

B. Allow sealants to cure and remove protective edging, of doors, louvers, saddles windows etc. as directed by the Engineer.

3.05 SCHEDULE

Schedule of Sealants

Application	**Sealant**	**Color**
Vertical and horizontal expansion and construction joints in concrete structures unless	Type 1	To closely match adjacent surfaces or mortar and as

Application	Sealant	Color
noted otherwise herein or on Drawings.		selected by the Owner.
Vertical and horizontal joints bordered on both sides by masonry, precast concrete, natural stone or other porous building material, unless noted otherwise herein or on Drawings.	Type 2	To closely match adjacent surfaces or mortar and as selected by the Owner.
Masonry expansion and control joints less than 1¼" wide.	Type 2	To closely match adjacent surfaces and as selected by the Owner.
Masonry expansion and control joints equal or greater than 1¼ inches wide and not to exceed 2".	Type 1	To closely match adjacent surfaces and as selected by the Owner.
Horizontal Joints exposed to vehicular or pedestrian traffic.	Type 8	To closely match adjacent surfaces.
Other joints indicated on the drawings or customarily sealed but not listed.	Type recommended by manufacturer	To closely match adjacent surfaces and as selected by the Owner.

- END OF SECTION –

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SECTION 15000

BASIC MECHANICAL REQUIREMENTS

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish and install all piping together with all fittings and appurtenances required for a complete installation.

B. The Contractor shall furnish and install fittings, couplings, connections, sleeves, adapters, harness rods and closure pieces as required to connect pipelines of dissimilar materials and/or sizes herein included under this Section and other concurrent Contracts for a complete installation.

C. The Contractor shall furnish all labor, materials, equipment, tools, and services required for the furnishing, installation and testing of all piping as shown on the Drawings, specified in this Section and required for the Work. Piping shall be furnished and installed of the material, sizes, classes, and at the locations shown on the Drawings and/or designated in this Section. Piping shall include all fittings, adapter pieces, couplings, closure pieces, harnessing rods, hardware, bolts, gaskets, wall sleeves, wall pipes, hangers, supports, joint accessories and other associated appurtenances for required connections to equipment, valves, or structures for a complete installation.

D. The Contractor shall provide taps on piping where required for service connections or shown on the Drawings.

E. The work shall include, but not be limited to, the following:

1. Test excavations necessary to locate or verify existing pipe and appurtenances.

2. Installation of all new pipe and materials required for a complete installation.

3. Connections to existing pipelines

4. Cleaning, testing and disinfecting as required of the completed work.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Division 2, Sitework

B. Division 3, Concrete

C. Division 4, Masonry

D. All Division 15 Specifications included herein.

1.03 MATERIAL CERTIFICATION AND SHOP DRAWINGS

A. The Contractor shall furnish to the OWNER (through the Engineer) a certification from the manufacturer stating that the pipe materials and specials furnished under this Section conform to all applicable provisions of the corresponding Specifications. Specifically, the Certification shall state compliance with the applicable standards (ASTM, AWWA, etc.) for fabrication and testing. Certifications shall be included in shop drawing submittal(s).

B. Shop Drawings for piping systems shall be prepared and submitted in accordance with Section 01300 – Submittals. In addition to the requirements of Section 01300 – Submittals, the Contractor shall submit laying schedules for all piping as specified and shown on the Drawings.

C. Shop Drawings shall include, but not be limited to pipe material, sizes, class, locations, necessary dimensions, elevations, supports, pipe joints, and the details of fittings including methods of joint restraint. No fabrication or installation shall begin until Shop Drawings are approved by the Engineer.

D. Shop Drawings shall include copies of manufacturers written directions regarding material handling, delivery, storage and installation.

E. Shop Drawings shall include written verification of required pressure, leakage and disinfection tests. Submit written verification of required factory acceptance testing.

PART 2 -- PRODUCTS

2.01 GENERAL

A. All specials and every length of pipe shall be marked with the manufacturer's name or trademark, size, class, and the date of manufacture. Special care in handling shall be exercised during delivery, distribution, and storage of pipe to avoid damage and unnecessary stresses. Damaged pipe will be rejected and shall be replaced at the Contractor's expense. Pipe and specials stored prior to use shall be stored in such a manner as to keep the interior free from dirt and foreign matter and protected from direct sunlight for long periods of time when recommended by the manufacturer.

B. Testing of pipe before installation shall be as described in the corresponding ASTM or AWWA Specifications and in the applicable standard specifications listed in the following sections. Testing after the pipe is installed shall be as specified herein.

C. Joints in piping shall be of the type as specified in the applicable individual specification section herein.

D. Piping shall have restrained joints, concrete or thrust blocking where shown on the Drawings. All exposed exterior piping shall have flanged joints, unless otherwise specified or shown on the Drawings.

E. The Drawings indicate work affecting existing piping and appurtenances. The Contractor shall excavate test pits as required of all connections and crossings which may affect the

Contractor's work prior to ordering pipe and fittings to determine sufficient information for ordering materials. The Contractor shall take whatever measurements that are required to complete the work as shown or specified.

2.02 PIPE MATERIALS

A. Pipe shall be as shown on the Drawings, listed in the Bid, and as specified in Section 15390.

2.03 SOLID SLEEVE COUPLINGS

A. Solid sleeve couplings shall be used to connect buried service piping where shown on the Drawings. Solid sleeves shall be ductile iron and shall conform to the requirements of ANSI A21.10 (AWWA C110). Unless otherwise shown or specified, solid sleeve couplings shall be mechanical joint as manufactured by US Pipe, Tyler Union, American Cast Iron Pipe Co., or equal.

2.04 OUTLET/TAPPING SADDLES

A. Outlet/Tapping saddles shall be furnished AWWA C110 mechanical joint outlet and be installed on the pipe with a hole already machine cut. Straps shall be alloy steel, 1/4”x1/2” cross section with3/4” threaded ends. Saddle shall be sealed by confined circular O-Ring SBR rubber gasket with 70 durometer hardness. Saddles shall be manufactured by American Ductile Iron Pipe Co. or approved equal.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. All piping shall be installed by skilled workmen and in accordance with the best standard practice for piping installation as shown on the Drawings, specified or recommended by the pipe manufacturer. Proper tools and appliances for the safe and convenient handling and installing of the pipe and fittings shall be used. Great care shall be taken to prevent any pipe coating from being damaged on the inside or outside of the pipe and fittings. All pieces shall be carefully examined for defects, and no piece shall be installed which is known to be cracked, damaged, or otherwise defective. If any defective pieces should be discovered after having been installed, it shall be removed and replaced with a sound one in a satisfactory manner by the Contractor and at his own expense. Pipe and fittings shall be thoroughly cleaned before they are installed. All piping shall be erected to accurate lines and grades. All exposed piping shall be installed with vertical and horizontal angles properly related to adjoining surfaces or pipes to give the appearance of good workmanship.

B. No pressure testing shall be performed until the pipe has been properly backfilled in place.

C. JOINT DEFLECTION SHALL NOT EXCEED 75 PERCENT OF THE MANUFACTURERS RECOMMENDED DEFLECTION. Excavation and backfilling shall conform to the requirements of Section 02200 Earthwork, and as specified herein. Maximum trench widths

shall conform to the Trench Width Excavation Limits shown on the Drawings or as indicated in Section 02200 Earthwork.

D. Following proper preparation of the trench subgrade, pipe and fittings shall be carefully lowered into the trench so as to prevent dirt and other foreign substances from gaining entrance into the pipe and fittings. Inspect and clean each pipe length as required. Proper facilities shall be provided for lowering sections of pipe into trenches. UNDER NO CIRCUMSTANCES SHALL ANY OF THE MATERIALS BE DROPPED OR DUMPED INTO THE TRENCH.

E. ALL PIPING SHALL HAVE TYPE BEDDING AS SHOWN ON THE DRAWINGS.

F. Pipe that has the grade or joint disturbed after laying shall be taken up and relayed by the Contractor at his own expense. Pipe shall not be laid in water or when trench conditions are unsuitable for work. Water shall be kept out of the trench until jointing and backfilling are completed. When work is not in progress, open ends of pipe shall be securely closed so that no water, earth, or other substance will enter the pipes. Pipe ends left for future connections shall be plugged, or capped, and anchored as required. All piping shall be installed in such a manner that it will be free to expand and/or contract without injury to itself or to structures to which it is connected. During the laying of pipe, each pipe manufacturer shall provide his own supervisor to instruct the Contractor's pipe laying personnel in the correct procedure to be followed.

G. Water shall be kept out of the trench until jointing and backfilling are completed. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no water, earth, or other substance will enter the pipes, fitting, or valves. Pipe ends left for future connections shall be plugged, or capped, and sealed as required. Due to the unavailability of adequate flushing water, Contractor shall take the utmost care to ensure pipeline is as clean as possible during installation.

H. All piping shall be installed in such a manner that it will be free to expand and/or contract without injury to itself or to structures to which it is connected.

I. All piping shall be erected to the line and grade indicated on the Drawing unless otherwise approved by the Engineer with no abrupt changes in line or grade and shall be supported and braced against movement, temporary, or permanent.

J. Use of a laser device to maintain the trench and pipe alignment is required. The laser device shall be re-checked for correct elevation and pipe alignment prior to pipe installation if the device is left in the pipe overnight. Corrected invert elevations at each manhole and any adjustments will be coordinated with and approved by the Engineer.

K. Use full lengths of pipe (as furnished by the pipe manufacturer) except for closure pieces at manholes or other structures and where joint deflection is required.

L. The full length of each section of pipe shall rest solidly upon the bed of the trench, with recesses excavated to accommodate bells, couplings, joints, and fittings. Before joints are made, each pipe shall be well bedded on a solid foundation. No pipe shall be brought into position until the preceding length has been thoroughly bedded and secured in place. Pipe

that has the grade or joint disturbed after laying shall be taken up and relayed by the Contractor at his own expense. Pipe shall not be installed in water or when trench conditions are unsuitable for work.

M. Pipes crossing within a vertical distance of less than or equal to one (1) foot in ditches on streams shall be encased in stone, concrete, or flowable fill at the point of crossing to prevent damage to the adjacent pipes as shown on the Drawings.

N. No testing shall be performed until the pipe has been properly backfilled in place.

O. Proper and suitable tools and appliances for the safe convenient handling and laying of pipe shall be used and shall in general agree with manufacturer's recommendations.

P. AT THE CLOSE OF EACH WORKDAY THE END OF THE PIPELINE SHALL BE TIGHTLY SEALED WITH A FITTED PLUG SO THAT NO WATER, DIRT, OR OTHER FOREIGN SUBSTANCE MAY ENTER THE PIPELINE, AND THIS PLUG SHALL BE KEPT IN PLACE UNTIL PIPE LAYING IS RESUMED. BRACED PLYWOOD IS NOT AN ACCEPTEBLE BULKHEAD.

Q. AT THE CLOSE OF WORK EACH DAY PIPELINE TRENCHES SHALL BE COMPLETELY BACKFILLED. IN PAVED AREAS THE SURFACE SHALL BE RESTORED AS SPECIFIED IN SECTION 02510, PAVING AND SURFACING, TO ALLOW FOR TRAFFIC OVER THE TRENCH DURING NON-WORKING HOURS. UNDER NO CONDITIONS SHALL ANY PIPELINE TRENCH BE LEFT OPEN DURING NON-WORKING HOURS.

R. Detector tape shall be installed 12 inches below final grade and directly above all buried piping where indicated on the drawings. The tape shall be green and shall be clearly and permanently labeled “SEWER.” Detector tape shall be Lineguard III as manufactured by Lineguard, Inc., or equal.

3.02 REINFORCED CONCRETE PIPE, CONCRETE CULVERT, AND DRAIN PIPE (RCP)

A. The laying of reinforced concrete pipe shall conform to the applicable sections of the Concrete Pipe Handbook as published by the American Concrete Pipe Association.

3.03 DUCTILE IRON PIPE

A. Ductile iron pipe (DIP) shall be installed in accordance with the requirements of the Ductile Iron Pipe Handbook published by the Ductile Iron Pipe Research Association, and AWWA C600. DIP shall be furnished as specified in Section 15006, Ductile Iron Pipe.

B. Where it is necessary to cut ductile iron pipe in the field, such cuts shall be made carefully in a neat workmanlike manner using approved methods to produce a clean square cut. The outside of the cut end shall be conditioned for use by filing or grinding a small taper, at an angle of approximately 30 degrees.

C. UNLESS OTHERWISE APPROVED BY THE ENGINEER, FIELD WELDING OF DUCTILE IRON WILL NOT BE PERMITTED.

3.04 PVC/CPVC AND HDPE PIPE

A. Polyvinyl chloride (PVC), chlorinated polyvinyl chloride (CPVC) and High Density Polyethylene (HDPE) pipe shall be laid and joints assembled according to the respective manufacturer's recommendation. PVC pipe installation shall comply with applicable sections of the Uni-Bell PVC Pipe Association Recommended Standard Specifications.

B. Plastic piping shall not be installed when the temperature is less then 60°F except as otherwise recommended by the manufacturer and approved by the Engineer.

3.05 TYPICAL SEWER SERVICE INSTALLATION

A. The Contractor shall furnish and install sewer services as specified herein and as shown on the Drawings including all fittings, transition pieces, cleanouts (if required) and appurtenances for a complete installation.

B. Wherever used in the Contract Documents, the term sewer service shall mean a gravity flow pipe connecting a residence or building wastewater collection system to the main sewer line. All sewer services shall be 6-inch diameter, Schedule 40 PVC pipe, unless otherwise noted on the Drawings. Installation of a sewer service pipe shall be from the main sewer line to the extents indicated in the service lateral detail shown on the Drawings unless sewer service is to replace an existing sewer service. Sewer services that are to replace existing sewer services shall include the service lateral plus any additional pipe, fittings, etc., required to connect to the existing sewer service. Pipe materials, joints, and connections shall be as specified herein and as shown on the Drawings.

C. Sewer laterals shall be connected to the main by means of a sewer saddle, installed over a hole cut in the top quadrant of the main at an angle of forty-five degrees (45°), with respect to direction of flow. The hole shall be cut with a mechanical hole cutter designed for the particular use and rendering a smooth, uniform cut with no damage to the pipe.

3.06 JOINTS IN PIPING

A. Restrained joints shall be provided on all pipe joints as specified herein and shown on the Drawings. Restrained joints shall be made up similar to that for push-on joints.

B. Push-on joints include a single rubber gasket which fits into the bell end of the pipe. The gasket shall be wiped clean, flexed and then placed in the socket. Any bulges in the gasket which might interfere with the entry of the plain end of the pipe shall be removed. A thin film of lubricant shall be applied to the gasket surface which will come into contact with the spigot end of the pipe. The lubricant shall be furnished by the pipe manufacturer. The plain end of the pipe, which is tapered for ease of assembly, shall be wiped clean and a thick film of lubricant applied to the outside. The pipe shall be aligned and carefully entered into the socket until it just makes contact with the gasket. The joint assembly shall be completed by entering the pipe past the gasket until it makes contact with the bottom of the socket. The pipe shall be pulled "home" with an approved jack assembly as recommended by the pipe manufacturer. If assembly is not accomplished by reasonable force, the plain end shall be removed, and the condition corrected.

C. Flanged joints shall be brought to exact alignment and all gaskets and bolts or studs inserted in their proper places. Bolts or studs shall be uniformly tightened around the joints. Where stud bolts are used, the bolts shall be uniformly centered in the connections and equal pressure applied to each nut on the stud. Pipes in all lines subject to temperature changes shall be cut short and cold sprung into place to compensate for expansion when hot.

D. Mechanical joints shall be made up with gaskets, glands and bolts. When a joint is to be made up, the bell or socket and plain end shall be cleaned and washed with a solution of mild soap in water; the gland and gasket shall be slid onto the plain end and the end then entered into the socket until it is fully "home" on the centering ring. The gasket shall then be painted with soapy water and slid into position, followed by the gland. All bolts shall be inserted and made up hand tight and then tightened alternately to bring the gland into position evenly. Excessive tightening of the bolts shall be avoided. All nuts shall be pulled up using a torque wrench which will not permit unequal stresses in the bolts. Torque shall not exceed the recommendations of the manufacturer of the pipe and bolts for the various sizes. Care shall be taken to assure that the pipe remains fully "home" while the joint is being made. Joints shall conform to the applicable AWWA Specifications.

E. Threaded and/or screwed joints shall have long tapered full depth threads to be made with the appropriate paste or jointing compound, depending on the type of fluid to be processed through the pipe. All pipe up to, and including 1-1/2-inches, shall be reamed to remove burr and stood on end and well pounded to remove scale and dirt. Wrenches on valves and fittings shall be applied directly over the joint being tightened. Not more than three pipe threads shall be exposed at each connection. Pipe, in all lines subject to temperature changes shall be cut short and cold sprung into place to compensate for expansion when hot. Joints in all piping used for chlorine gas lines shall be made up with a glycerine and litharge cement. Joints in plastic piping (PVC/CPVC) shall be laid and joints made with compounds recommended by the manufacturer. Installation shall conform to the requirements of ASTM D2774 and ASTM D2855. Unions required adjacent to valves and equipment.

F. Soldered joints shall have the burrs removed and both the outside of pipe and the inside of fittings shall be thoroughly cleaned by proper tools recommended for that purpose. Flux shall be applied to both pipe and inside of fittings and the pipe placed into fittings and rotated to insure equal distribution of flux. Joints shall be heated and solder applied until it shows uniformly around the end of joints between fitting and pipe. All joints shall be allowed to self-cool to prevent the chilling of solder. Combination flux and solder paste manufactured by a reputable manufacturer is acceptable. Unions required adjacent to valves and equipment.

G. Welded joints shall be made by competent operators in a first class workmanlike manner, in complete accordance with ANSI B31.1 and AWWA C206. Welding electrodes shall conform to ASTM A233, and welding rod shall conform to ASTM A251. Only skilled welders capable of meeting the qualification tests for the type of welding which they are performing shall be employed. Tests, if so required, shall be made at the expense of the Contractor, if so ordered by the Engineer. Unions shall be required adjacent to valves and equipment.

H. Copper joints shall be thoroughly cleaned and the end of pipes uniformly flared by a suitable tool to the bevels of the fittings used. Wrenches shall be applied to the bodies of fittings where the joint is being made and in no case to a joint previously made. Dimensions of tubing and copper piping shall be in complete accordance with the fittings used. No flare joints shall be made on piping not suited for flare joints. Installations for propane gas shall be in accordance with NFPA 54 and/or 58.

I. Solvent or adhesive welded joints in plastic piping shall be accomplished in strict accordance with the pipe manufacturer's recommendations, including necessary field cuttings, sanding of pipe ends, joint support during setting period, etc. Care shall be taken that no droppings or deposits of adhesive or material remain inside the assembled piping. Solvent or adhesive material shall be compatible with the pipe itself, being a product approved by the pipe manufacturer. Unions are required adjacent to valves and equipment. Sleeve-type expansion joints shall be supplied in exposed piping to permit 1-inch minimum of expansion per 100 feet of pipe length.

J. Dielectric isolation such as flange isolation kits, dielectric unions, or similar, shall be installed wherever dissimilar metals are connected according to the following table.

	Zinc	Galvanized Steel	Aluminum	Cast Iron	Ductile Iron	Mild Steel/ Carbon	Copper	Brass	Stainless Steel
Zinc			●	●	●	●	●	●	●
Galvanized Steel			●	●	●	●	●	●	●
Aluminum	●	●		●	●	●	●	●	●
Cast Iron	●	●	●				●	●	●
Ductile Iron	●	●	●				●	●	●
Mild Steel/ Carbon Steel	●	●	●				●	●	●
Copper	●	●	●	●	●	●			●
Brass	●	●	●	●	●	●			●
Stainless Steel	●	●	●	●	●	●	●	●	

1. "●" signifies dielectric isolation is required between the two materials noted.
2. Consult Engineer for items not listed in table.
3. Provide flange isolation kits for all flanged connections of dissimilar metals and hardware including connections to equipment.
4. Contractor shall include all isolation descriptions with piping submittals.

K. Eccentric reducers shall be installed where air or water pockets would otherwise occur in mains because of a reduction in pipe size.

3.07 FILLING AND TESTING

A. The Contractor shall receive from Owner reasonable quantities of water for all filling and testing. The Contractor shall furnish and install all means and apparatus necessary for getting the water into the pipe and filling and testing; including pumps, gauges, and meters, any necessary plugs and caps, and any temporary blow off piping required to discharge water, etc., complete with any necessary reaction blocking to prevent pipe movement during the filling and testing. When filling of the new line is achieved by accepting water from an existing water main, a double check valve assembly or a backflow preventer at the source of the supply shall be installed to protect against the backflow of water from the new line into the existing line. Water for these purposes shall be metered. All pressure testing of pipe shall be limited to the distance between isolation valves or manholes as shown on the Drawings at any one time, unless otherwise approved, in writing, by the Engineer. Certified test gauges shall be furnished by the Contractor for testing. All pipe shall be tested in such lengths or sections as agreed upon among the Owner, Engineer, and Contractor. The Contractor shall give the Owner and Engineer reasonable notice of the time when he intends to test portions of the pipe. The Engineer reserves the right, within reason, to request testing of any section or portion of the pipe.

B. Gravity Sewers

1. After backfilling, all sewers shall be inspected for obstructions and shall be flushed with water. Sewers shall be flushed until no evidence of debris remains and for a duration acceptable to the Engineer. Flushing shall remove all dirt, stones, pieces of wood and other debris which accumulated in the sewer during construction. The Contractor shall provide a means acceptable to the Engineer for capture and removal of debris flushed from each section of sewer. If after flushing, any obstructions remain, they shall be removed at the Contractor's expense.

2. Visual Inspection - Sewers shall be visually inspected from every manhole by use of mirrors, television cameras, or other devices for visual inspection, and the pipe shall exhibit a full circular pattern when viewed from one manhole to the next. Sewers which do not exhibit a true line and grade or have structural defects shall be corrected to the satisfaction of the Engineer.

3. Manholes will be tested in accordance with requirements set forth on Section 02604 – Utility Structures.

4. Pipe less than or equal to 24” diameter pipe shall be low pressure air tested in accordance with below in Section 3.07 below.

5. Pipe larger than 24” shall be joint tested in accordance with Section 3.08 below.

6. Infiltration testing shall be in accordance with Section 3.09 below.

7. Deflection testing shall be in accordance with Section 3.10 below.

3.08 LOW PRESSURE AIR TESTING OF GRAVITY PIPELINES

A. Low pressure air testing for gravity sewer lines less than 24” in diameter shall be done in accordance with UNI-B-6-98 (or latest revision).

B. Prior to testing, all pipes and service laterals shall be cleaned of debris, then plugged and braced with plugs appropriate for the test pressure. Adequate bracing shall be furnished by the Contractor to brace plug for the resultant force on plug when being tested.

C. Due to the dangers in air testing of lines, no one will be allowed in or around the manholes where test plugs are installed during pressurization, testing, and depressurization. Pressure in the pipe shall be completed relieved before any plug is loosened for removal.

D. Manufacturers shall be consulted for maximum test pressures for pipe and appurtenances greater than 24-inch in diameter.

E. Contractor shall furnish all equipment necessary for the air test including, but not limited to, the following:

1. Two calibrated 2-inch pressure gauges with a range from 0 to 10 psi with divisions of 0.10 psi and accuracy of ±0.04 psi. Gauges shall be capable of being read at a location remote from the line being tested.

2. Rotameter with standard CFM reading and accuracy of ±2%.

3. Test plugs for the pipe line(s) being tested. Plugs shall be in good condition and rated for the test pressure force. Resultant force anticipated on the plug shall be calculated by the following formula:

$$\text{Force (lbf)} = (\text{Area of Pipe, ft}^2)(\text{Test pressure, psi})\ (144, \text{in}^2/\text{ft}^2)$$

4. An air compressor capable of pressurizing the pipe within a reasonable amount of time. Air compressor shall provide an oil-free air source and shall have a shut-off valve, pressure regulating valve, 9 psig pressure relief valve, input pressure gauge, and a continuous monitoring pressure gauge with a range from 0 to 10 psi with divisions of 0.10 psi and accuracy of ±0.04 psi.

F. Test Procedure:

1. Determine required test time using Table 1 at the end of this Section or using the following equation:

   Calculate Test Time (T) for a single pipe:

   T = 0.085 DK/Q

   Where:
   T = minimum time allowed for an air pressure drop of 1.0 psig, seconds,
   K = 0.000419 DL but not less than 1.0,
   Q = leak rate in CFM/SF = 0.0015 CFM/SF
   D = inside diameter, in.
   L = length of test section, ft.

   Example:
   Find the test time (T) for 400 LF of 30-inch diameter pipe.

   T = 0.085 D[K/Q]
   T = 0.085 (30) {((0.000419)(30)(400))/0.0015]
   T = 0.085 (30) (3352)
   T = 8.547 seconds, = 142.46 minutes (142 minutes and 28 seconds) =
   2.37 hour (2 hours and 22 minutes and 28 seconds).

   In order to reduce test time, use 0.5 psi drop. Find the test time of the 0.5 psi drop:
   T/2 = 2.37 hrs/2 = 1.185 (1 hour and eleven minutes and 14 seconds).

2. Prior to placement of plugs Contractor shall make a visual inspection of the pipe adjacent to the manhole to detect any evidence of shear in the pipe near the manhole.

3. Slowly fill the test section to line to a Fill Pressure of 4 psig greater than the average back pressure of any groundwater above top of pipe. If groundwater is above the pipe then the average depth of groundwater for the section being tested must be determined. Since water produces a pressure of 0.43 psi per foot of depth, air pressures must be increased to offset the depth of ground water over the pipe however Test Pressure is limited to a maximum of 9 psig, for water bearing soils. If ground water is in excess of 12 feet above top of pipe, or if air pressure required for the test is greater than 9 psi gauge, the air test method shall not be used. The groundwater level shall be lowered by pumping or dewatering unless otherwise approved by the Engineer.

   Example:
   Find fill pressure and test pressure if a average groundwater is 5 feet above pipe.

   Fill Pressure = 4.0 psi + (5 x .43) psi = 6.15 psi
   Test Pressure = 3.5 psi + (5 x .43) psi = 5.65 psi

4. Regulate air supply to maintain a pressure between 3.5 and 4.0 psig (plus groundwater psi) for a minimum of two minutes.

5. Once air pressure has stabilized, determine the rate of air loss by the Time-Pressure Drop Method.

    i. Once air pressure has stabilized, disconnect air supply and allow pressure to drop to Test Pressure of 3.5 psig (plus groundwater psi).

    ii. Determine the time required for the pressure to drop 1 psig (i.e., from 3.5 psig to 2.5 psig). Long sections or large diameter pipe can utilize a timed-pressure drop of 0.5 psig, and required test times shall be exactly one-half the time required for the 1.0 psig test.

    iii. If the pressure drops more than 1.0 psig before the required test time has elapsed, the line has failed the test. Once leak is repaired, retest line. If the pressure drops less than 1.0 psig when the required test time has elapsed, the pipe is acceptable. It is not necessary to hold the test for the entire period of time if it is evident that the rate of air loss is zero or less than the allowable, and is approved by the Owner/Engineer.

    iv. Once the test is completed, allow all air to escape prior to removing plugs.

3.09 JOINT TESTING

A. Gravity sewer mains larger in diameter than 24” shall be joint tested unless otherwise approved by the Engineer. The pressures required to seal the end element tubes shall be as specified by the manufacturer of the testing apparatus. The line for pressurizing the void volume shall include a 6 psi pressure relief valve to reduce hazards and avoid over-pressurization.

B. Tests shall be performed in accordance with the most current version of ASTM C 1103 (Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines), regardless of pipe material, and as modified below. Test pressure shall be measured by gauges furnished and installed by the Contractor a safe distance away from the test joint, the testing equipment, and the air supply. A minimum of two pressure gauges shall be installed at separate locations along the test line. The Contractor shall furnish all test equipment as required.

C. The Contractor shall test joints of installed sewer pipe, regardless of pipe material, with air to demonstrate the integrity of the joint. Joints shall be tested after backfilling, and without any groundwater effect. Assuming the backfilling operations has covered approximately one-half the last joint of pipe installed, the joint to be tested shall be the third joint from the open bell of the last joint installed. Before the joint test, all joints shall be tested with a feeler gauge supplied by the pipe manufacturer to determine if the joint gasket has been properly seated.

D. The Contractor shall apply all necessary prep material required for the interior of the pipe barrel a minimum distance of 6” from each end of the pipe to facilitate testing.

E. All joint testing equipment (including an air compressor and hose) shall be furnished by the Contractor and shall be as manufactured by Cherne Industries Incorporated, or approved equal. The joint tester end element sealing tubes (when inflated) shall create an airtight seal over the joint of the pipe. Inflate end element sealing tubes with air in accordance with the equipment manufacturer's instructions.

F. The center cavity between the end elements shall be pressurized with air to 5 psi. Pumps, dewatering equipment, or wellpoint systems (provided by the Contractor) shall be used to maintain the groundwater elevation a minimum of 6 inches below the bottom of the pipe.

G. If the pressure in the cavity holds or drops less than 1 psi in 5 seconds, the pipe joint shall be found to be acceptable. If the pressure drop is greater 1 psi in 5 seconds, the joint is defective and shall be disassembled and remade or repaired and then retested by the Contractor.

H. Testing of pipe joints shall be performed immediately after installing and backfilling the next pipe section. The Contractor shall keep a log of all tests performed documenting the following:

1. Joint number from specific numbered manholes

2. Date and time

3. Name of test operator

4. Sealing pressure used

5. Joint test pressure used

6. Number of seconds joint held pressure to 1 psi drop

7. Whether joint passed or failed

8. Action taken if failure occurred, including retesting

3.10 INDIVIDUAL JOINT TESTING FOR GRAVITY SEWER LINES

A. For all pipes larger than 24", individual joints may be pressure tested with a portable tester to 5 psi max with air or 20 psi max with water in lieu of line infiltration, exfiltration, or air testing, only as approved by the Engineer. Test time for portable tester method shall be based on single joint length.

3.11 INFILTRATION TESTING

A. No sooner than ten (10) days after final backfill installation and discontinuing dewatering operations in the area to be tested, the Contractor along with the Engineer will be required to determine the level of the ground water for each section (manhole to manhole) of pipe. If the ground water table is above the top of the pipe, the section of pipe shall be tested for infiltration.

B. Contractor shall provide the weirs for testing infiltration. Infiltration shall not exceed 100 gallons per day per inch diameter per mile. Sections of the same diameter pipe may be combined for up to one mile. However, when excessive infiltration can be isolated to a particular section (manhole to manhole) the limit will be applied to that section. There shall be no visible points of infiltration. Any section must be isolated and tested separately if so directed by the Engineer. Owner reserves the right to TV any sewer line to detect sources of infiltration.

3.12 CCTV OF SEWERS

A. Following complete installation of the new gravity outfall sewer line, the Contractor shall CCTV the entire line by a third party who is PACP certified.

B. After the sewers are completely cleaned, the sewers shall be inspected via closed circuit television (CCTV).

C. The camera equipment used for the CCTV inspections shall be self-powered tractor assemblies specifically designed and constructed for such inspection.

D. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe.

E. The camera shall be a full color, pan-and-tilt camera.

F. The complete video system (camera, lens, lighting, cables, monitors, and recorders) shall be capable of providing picture quality and definition acceptable the Engineer.

G. The video system shall record directly to a digital computer file format.

H. The digital files shall be fully compatible with WinCan VX or other format as approved by the Owner.

I. Digital files shall include all view and edit features, standard and custom data fields, video overlay and video format compatible to the City standard.

J. The camera shall be moved through the line in either direction at a uniform rate, but not greater than 20 feet per minute. The camera shall follow closely behind the mandrel. Following distance shall be acceptable to the Engineer and shall allow the Engineer to observe the trailing edge of the mandrel to determine the amount of pipe deflection. Following distance shall also allow the Engineer to observe other conditions of the pipe, including joints, defects, connections and ponding water. The camera shall be stopped at any defect and service connections and shall be panned, tilted and rotated to fully view the defects and connections. Particular attention should be paid to service connections and changes in pipe materials. All such inspections shall be documented. Gravity Sewer ductile iron pipe shall be CCTV inspected and shall not require a mandrel.

K. The inspections shall be completed from manhole to manhole without the need for reverse setups unless approved otherwise by the Engineer.

L. The accuracy of the measurements cannot be stressed too strongly. Daily calibration of

measuring devices shall be performed. Accurate and continuous footage readings shall be superimposed on the recording for the sections inspected. The date of inspection and manhole designation for each manhole on the section of line inspected shall also be shown.

M. Upon completion of the cleaning and television inspection work, the Contractor shall submit one copy of the final television inspection video and inspection logs to the Engineer. The video and inspection logs shall be clearly labeled as to their contents.

N. This item includes furnishing all materials, equipment, and labor necessary to use the appropriate equipment to thoroughly clean all debris from a sewer segment.

O. This pay item includes cleaning laterals and mainline sewer.

P. The Contractor shall use a dual purpose (Jet-Vac) truck that combines a very powerful vacuum with a high-pressure water jetting system specifically designed for cleaning sewers. The Jet-Vac truck should the type used in municipal, commercial and industrial applications for vacuum cleaning of lift stations, ejector pits, sanitary sewers, storm sewers, catch basins; where heavy grit, sediment, sludge and other semi-solid and wet solid removal is needed.

Q. All solids shall be removed at the downstream manhole of the section being cleaned. Passing material from one sewer segment to another will not be permitted. Cleaning operations shall begin at the most upstream sewer and proceed downstream. The solids shall be removed from the site and properly disposed of at approved locations provided by the Contractor.

R. Water for cleaning operations shall be obtained from a permitted fire hydrant meter or other approved metered source.

3.13 FLUSHING AND TESTING OF WATER LINES

A. All piping shall be properly flushed and tested unless specifically exempted elsewhere in the Specifications or otherwise approved by the Engineer. Pipelines shall be flushed and tested with potable water. The Contractor shall furnish and install all means and apparatus necessary for getting the water into the pipeline for flushing and testing including pumps, compressors, gauges, and meters, any necessary plugs and caps, and any required blow-off piping and fittings, etc., complete with any necessary reaction blocking to prevent pipe movement during the flushing and testing. All pipelines shall be flushed and tested in such lengths or sections as agreed upon among the Owner, Engineer, and Contractor. Test pressure shall 150 psi with zero (0) leakage observed. The Contractor shall give the Owner and Engineer reasonable notice of the time when he intends to test portions of the pipelines. The Engineer reserves the right, within reason, to request flushing and testing of any section or portion of a pipeline.

B. The Contractor shall provide water for all flushing and testing of the pipelines. Only potable water shall be used for flushing and testing the potable water system.

C. At the conclusion of the installation work, the Contractor shall thoroughly clean all new liquid conveying pipe by flushing with water or other means to remove all dirt, stones, pieces of wood, etc., which may have entered the pipe during the construction period. If after this cleaning any obstructions remain, they shall be corrected by the Contractor, at his own expense, to the satisfaction of the Engineer. Liquid conveying pipelines shall be flushed at the rate of at least 2.5 feet per second for a duration suitable to the Engineer or shall be flushed by other methods approved by the Engineer.

D. During testing the piping shall show no leakage. Any leaks or defective piping disclosed by the leakage test shall be repaired or replaced by the Contractor, at his own expense, and the test repeated until all such piping shows tight.

E. After flushing, all liquid conveying pipelines shall be hydrostatically tested at 150 psi. The procedure used for the hydrostatic test shall be in accordance with the requirements of AWWA C600. Each pipeline shall be filled with water for a period of no less than 24 hours and then subjected to the specified test pressure, (150 psi) for 2 hours. During this test, exposed piping shall show no leakage. Allowable leakage in buried piping shall not be allowed.

F. Any leaks or defective pipe disclosed by the hydrostatic test shall be repaired or replaced by the Contractor, at his own expense, and the test repeated until all such piping shows tight.

3.14 CLEANING AND DISINFECTION OF WATER LINES

A. Waterline disinfection shall be accordance with AWWA C651.

B. Flush water lines clean prior to disinfecting.

C. The main shall be filled with water at the rate to ensure the water within the main will flow at a velocity no greater than 1ft/second.
   1. Use chlorine disinfecting agent applied to produce 50 ppm dosage
   2. Allow water to escape from the ends of all lines to cause dispersion of the chlorine solution into all parts of the system.
   3. Operate all valves and hydrants during the time disinfection is occurring.
   4. Retain the chlorine solution in the lines for a period of 48 hours.
   5. At the end of the 48-hour period, the residual chlorine must be a minimum of 25 ppm. Otherwise, repeat the disinfecting procedure again.
   6. Flush the waterline and let the water sit for 48 hours.
   7. Collect on set of samples for bacteriological analysis at the beginning, one from the end, and one at each branch. If the line exceeds 1200 ft additional samples are collected every 1200 ft on the new main and each branch. If the same is acceptable, the lines may be connected to the system. Otherwise repeat the disinfecting procedure until acceptable samples are obtained.

D. After the applicable retention time, heavily chlorinated water should not remain in the line. In order to prevent damage to the pipe lining or to prevent corrosion damage to the pipe, the

chlorinated water shall be flushed from the main until the chlorine measurements show that the concentration in the water leaving the main is no higher than the generally prevailing in the distribution system or that is acceptable for domestic use.

E. The environment to which the chlorinated water is to be discharged shall be inspected. If there is any possibility that the chlorinated discharge will cause damage to the environment, then neutralizing chemical shall be applied to the water to be wasted.

3.15 WATER SERVICE CONNECTIONS

A. The Contractor shall give the Owner a week notice before the water service is to be turned off to make cuts to the existing waterline or to make customer tie-overs. This notice is required to give the Owner time to discover cut-off valves in the surrounding area and notify customers of an interruption in service.

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SECTION 15006

DUCTILE IRON PIPE

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Ductile iron pipe (DIP) of the sizes shown or specified shall conform to ANSI A21.51 (AWWA C151), Grade 60-42-10 for ductile iron pipe centrifugally cast in metal molds or sand-lined molds. All ductile iron pipe shall conform to ANSI A21.50 (AWWA C150) for thickness design and shall be supplied in 18 or 20 foot nominal lengths or as required to meet the requirements of the Drawings. Fittings and specials shall be cast iron or ductile iron, conforming to the requirements of ANSI A21.10 (AWWA C110) or ANSI A21.53 (AWWA C153) and shall have a minimum rated working pressure of 250 psi.

1.02 SUBMITTALS

A. Shop Drawings

1. See Section 01300 & 15000.

2. Certification of factory hydrostatic testing.

3. Certification of interior pipe coating testing.

4. Layout drawings and/or schedule.

PART 2 -- PRODUCT

2.01 ACCEPTABLE MANUFACTURERS

A. DIP manufacturer requirements:

1. The manufacturer shall have a minimum of five (5) years experience successfully manufacturing and furnishing all sizes of pipe fittings and joint types involved on this project.

2. The pipe manufacturer shall provide both the pipe and fittings.

3. All pipe, restraining devices, and accessories specified in this section shall be manufactured in the United States of America.

B. Acceptable manufacturers:

1. American Ductile Iron Pipe

2. United States Pipe and Foundry Company

3. McWane Ductile

2.02 DUCTILE IRON PIPE AND FITTINGS

A. Interior Linings

1. All gravity sewer pipe and fittings shall be ceramic epoxy lined. The interior shall be lined with, Permox CTF or Ceramapure PL 90. The lining shall be applied by a certified firm with a successful history of applying linings to the interior of ductile iron pipe and fittings. Surface preparation shall be in strict accordance with NAPF 500-03, latest revision. The ceramic epoxy lining shall cover the inner surface of the pipe as follows:

   a. The lining material should be applied to the interior of the pipe within 12 hours in order to avoid any possible post blast surface contamination. Any area found to have rust bloom prior to application must be reblasted

   b. The protective lining Joint Compound shall be applied by brush to ensure coverage. Care should be taken that the Joint Compound is smooth without excess buildup in the gasket seat or on the spigot ends. Coating of bell sockets and spigot ends require the gasket area and spigot ends up to 6 inches back Dry film thickness determination for all DIP and Fittings must be checked
   and verified using a properly calibrated magnetic film thickness gauge and testing shall be accomplished using the method outlined in SSPC-PA-2 Film Thickness Ratingfrom the end of the spigot end must be coated with 6 mils nominal, 10 mils maximum using pipe lining manufacturer’s Joint Compound.

   c. Coating of the gasket seat and spigot ends shall be done after the application of the lining. The lining shall extend from the spigot end through the socket to the edge of the gasket sealing area.

   d. The lining in fittings shall cover the interior surfaces including the socket areas as defined above.

   e. The barrel of the pipe from the inside shoulder of the gasket groove to the end of the interior spigot shall receive a nominal coating of 40 mils dry film thickness of the protective lining.

   f. Dry film thickness determination for all DIP and Fittings must be checked and verified using a properly calibrated magnetic film thickness gauge and testing shall be accomplished using the method outlined in SSPC-PA-2 Film Thickness Rating

g. The barrel of all pipe and fittings shall undergo a non-destructive 2,500-volt pinhole test. Any pinholes detected must be repaired.

h. Repair procedures for damaged ceramic epoxy lining shall be made with Joint Compound in strict accordance with the manufacturer's recommendations.

i. The pipe or fitting manufacturer must supply a written certificate attesting to the fact that the applicator met the requirements of this specification, that the material used was as specified, and that the material was applied as required by the specification

j. Each pipe joint and fitting shall be marked in accordance with the application date of the lining system including its numerical sequence of application for that date. Applicator shall be required to maintain such records for a minimum of one (1) year.

k. Any request for substitution must be accompanied by a successful history of lining pipe and fittings for sewer service, a test report verifying the following properties, and a certification of the test results.

   a. Physical Properties Testing:

      - ASTM B-117 Salt Spray (scribed panel) – Results to equal 0.00 undercutting after two years.

      - ASTM D-1653 Permeability, Method A 40-mils free cast film 30-day duration. 0.00 perms.

      - ASTM G-95 Cathodic Disbondment 1.5 volts @ 77°F. Results to equal no more than 0.5 mm undercutting after 30 days.

      - ASTM D-4541 Adhesion 700 psi minimum.

      - ASTM D-4060 Abrasion Resistance shall not exceed a weight loss of more than 0.30 grams (CS17 Wheel, 1000-gram load, 1000 cycles).

      - ASTM G-53-77 Moisture/UV Light. UVB-313 Bulb. Cycle-8 hrs. UV @ 60° C followed by 100 % Humidity @ 40° C. 1 year – pass, no crazing, cracking, or loss of adhesion.

      - ASTM D-2794 Direct Impact Resistance 140 in./lbs. minimum.

b. Immersion Testing rated using ASTM D-714.87.

- ASTM D-1308 evaluated by ASTM D-714, 20% Sulfuric Acid @ 77°F – No effect after two years.
- 25% Sodium Hydroxide @ 140°F – No effect after two years.
- Distilled Water @ 160°F – No effect after two years.
- 120°F Tap Water (scribed panel) 0.0 undercutting after two years with no effect.

B. Exterior Coatings

1. All pipe and fittings shall have a bituminous coating on the exterior surface in accordance with ANSI A21.15 (AWWA C151).

2. All ductile iron pipe and fittings shall be wrapped with V-BIO Polyethylene Encasement with anti-microbial infused into the 3-layer co-extruded film and secured with tape provided by the manufacturer. V-BIO encasement shall conform to ANSI/AWWA C105/A21.5. Polyethylene encasement shall be provided in tube rolls, accordion bundles or sheets, and shall be manufactured of virgin polyethylene material conforming to ANSI/ASTM D1248. The specified nominal thickness for low-density polyethylene film is 0.008 in. (8 mils). The specified nominal thickness for high-density cross-laminated polyethylene film is 0.004 in. (4 mils). The minus thickness tolerance shall not exceed 10% of the nominal thickness on both material types. Joints in the polyethylene encasement shall be sealed using tape that's supplied by manufacturer. Installation of polyethylene encasement shall conform to ANSI/AWWA C105/A21.5 and DIPRA's "Polyethylene Encasement" brochure.

C. Pipe and fittings shall be the class that equals or exceeds the pipe class as specified on the Drawings. Requirements for various types of joints are described in the following paragraphs.

D. Push-On Joint – Push-on joint includes a single synthetic rubber gasket which fits into the bell end of the pipe. The gasket shall be wiped clean, flexed, and then placed in the socket. Any bulges in the gasket which might interfere with the entry of the plain end of the pipe shall be removed. A thin film of lubricant shall be applied to the gasket surface which will come into contact with the spigot end of the pipe. The lubricant shall be furnished by the pipe manufacturer.

The plain end of the pipe, which is tapered for ease of assembly, shall be wiped clean and a thick film of lubricant applied to the outside. The pipe shall be aligned and carefully entered into the socket until it just makes contact with the gasket. The joint assembly shall be completed by entering the pipe past the gasket until it makes contact with the bottom of the socket. The pipe shall be pulled "home" with an approved jack assembly as recommended by the pipe manufacturer. If assembly is not accomplished by reasonable force, the plain end shall be removed and the condition corrected.

All joints and joint accessories shall conform to the requirements of ANSI A21.11 (AWWA C111).

E. Gaskets shall be the "Ring Gasket" type, Plain Rubber-Styrene Butadiene Copolymer (SBR), or Buna-N-Butadien (NBR), and shall be suitable for the service intended. Gaskets for glass lined pipe shall be TORUSEAL flange gasket, or equal. Bolts shall be of the size and length called for and in accordance with the "American Standard" and comply with the requirements of the ANSI/AWWA and ASME Standards. The bolts for flanged joints shall be a minimum ASTM A307; Grade B carbon steel and be in accordance with ANSI A21.10, (AWWA C110). The bolts shall have hexagonal heads and nuts, no washers shall be used.

1. Sta. 0+00 – Sta. 130+75: SBR

F. Bell and spigot pipe shall be provided with push on, O-ring rubber gasket, compression type joints and shall conform to the requirements of ANSI A21.11 (AWWA C111). Fittings and specials shall be supplied with mechanical joints as specified for mechanical joint pipe. If required by installation conditions, pipe shall have cast-on lugs for adequately tying it together.

G. Mechanical joints and fittings shall conform to the requirements of ANSI A21.11, (AWWA C111). Joints shall be made employing a tapered rubber gasket forced into a tapered groove with a ductile iron follower ring. If required by installation conditions, pipe and fittings shall have cast-on lugs for adequately tying the pipe and fittings together. These shall be in conformance with standard practice and as outlined under the appropriate AWWA Specifications.

H. Threaded restraining rods and bolts, and clamping bolts and nuts shall be fluorocarbon coated or type 304 stainless steel. All stainless steel connectors shall be coated with an approved anti-galling material such as “Never Seez”.

I. Provide green detector tape, Lineguard III, or equal, labeled “SEWER” over entire length of installed buried pipelines.

J. Restrained joint pipe and fittings shall be used inside steel casing pipe and consist of bolted retainer rings, ductile iron locking segments held in place by rubber retainers, or ductile iron retaining rings that lock over the bell of the joint and are secured to prevent rotation, and factory welded retainer beads or rings on the spigot of the pipe. All components of the bolted or snap ring assemblies shall be constructed of corrosion-resistant, high strength, low-alloy steel. Restrained pipe and fittings shall be Flex-Ring or Lok-Ring type joints as manufactured by American Cast Iron Pipe Company, TR Flex or HP-LOK as manufactured by US Pipe, or equal. Fittings 12” and smaller may be mechanical joint with EBAA Mega-Lug or equal. No field fabrication of push-on or other type pipe joints to furnish restrained joints shall be allowed unless specifically approved by the Engineer. Special gripping gaskets in lieu of welded ring-type restrained joints shall not be permitted on this project.

2.02 SOURCE QUALITY CONTROL

A. Factory Test and Certification:

1. Subject pipe to factory hydrostatic test of not less than 500 psi for minimum 10 seconds. Submit results with each shipment.

2. Subject each pipe interior coating to wet film (4 locations, 2 per end) and dry film (9 locations, 3 per end and middle) tests. Submit results with each shipment.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. Joining Method –Mechanical (Gland-Type) Joints:

1. Install in accordance with AWWA C111.

2. Assemble mechanical joints carefully according to manufacturer's recommendations.

3. If effective sealing is not obtained, disassemble, thoroughly clean, and reassemble the joint.

4. Do not overstress bolts.

5. Where piping utilizes mechanical joints with tie rods, align joint holes to permit installation of harness bolts.

B. Joining Method – Push-On Joints:

1. Install in accordance with AWWA C115.

2. Assemble push-on joints in accordance with manufacturer's directions.

3. Bevel and lubricate spigot end of pipe to facilitate assembly without damage to gasket. Use lubricant that is non-toxic, does not support the growth of bacteria, has no deteriorating effects on the gasket material, and imparts no taste or odor to water in pipe.

4. Assure the gasket groove is thoroughly clean.

5. For cold weather installation, warm gasket prior to placement in bell.

6. Taper of bevel shall be approximately 30 degrees with centerline of pipe and approximately 1/4 IN back.

D. Cutting:

1. Do not damage interior lining material during cutting.

2. Use abrasive wheel cutters or saws.

3. Make square cuts.

4. Bevel and free cut ends of sharp edges after cutting.

E. Support exposed pipe in accordance with Section 15000.

F. Install buried piping in accordance with Section 15000.

G. Install restrained joint systems where specified.

3.02 FIELD QUALITY CONTROL

A. Test piping systems in accordance with Section 15000.

B. Contractor shall supply Owner/Engineer with a Positest® Magnetic Coating Thickness Gauge or equivalent to confirm proper thickness of lining upon arrival of pipe to the site.

- END OF SECTION –

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SECTION 15014

PVC GRAVITY SEWER PIPE - SOLID WALL

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Polyvinyl chloride (PVC) solid wall sewer pipe and fittings shall conform to ASTM D3034 (4”-15”) and F679 (18”-60”), stiffness series 46 for PVC pipe. All PVC solid wall pipe average nominal inside diameter and manufacturing tolerance shall be as listed for stiffness series 46 in Table 1 as shown in ASTM F D 2412 for solid wall pipe. The thermoplastic material shall be PVC plastic and shall meet or exceed the requirements of ASTM D 1784 for a minimum cell classification of 12454 or 12364. Molded fittings conforming to the requirements of ASTM F 679 may also be used with profile gravity sewer pipe provided an adapter, when required, is used to make the connection. Product shall also conform to ASTM F794 and ASTM F949 where applicable.

B. Bell and spigot joints shall be integral bell push-on type elastomeric gasket joints conforming to ASTM D3212. Gaskets shall be synthetic rubber conforming to ASTM F477. Natural rubber gaskets shall not be acceptable.

C. Field cut joints and connections to other piping materials shall be by Fernco “Flexible Couplings”, or Mission “Eastern Standard Band-Seal Couplings” with stainless steel shear rings, or approved equal.

D. Pipe or fittings having spiral external reinforcing ribs shall not be acceptable.

E. Each pipe shall be identified with the name of the manufacturer, nominal size, cell classification, ASTM designation F-1803, pipe stiffness designation and manufacturer’s date code.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Reference Sections 15000 and 15390.

PART 2 -- PRODUCTS

2.01 POLYVINYL CHLORIDE (PVC) SOLID WALL SEWER PIPE AND FITTINGS WITH ELASTOMERIC SEAL JOINTS

A. All pipe and fittings shall be uniform in color, opacity, density and other properties. The surfaces shall be semi-matte or glossy in appearance and free of sticky, or tacky material and also be free of excessive bloom, cracks, holes, blisters, voids, foreign inclusions or other visible defects that may affect the wall integrity.

B. Gasketed Joint – The integral bell gasketed joint, coupling, or fitting joints shall be designed

so that when assembled, the gasket (which is attached to either the bell or the spigot) will be compressed radially on the pipe spigot or in the bell to form a water-tight seal. All joint surfaces upon which the gasket may bear shall be smooth and free of imperfections, ridges, fractures, and cracks. All joints shall show no signs of leakage when tested in accordance with ASTM D 3212.

C. Gaskets shall be elastomeric gaskets and shall comply with the requirements described in ASTM F 477. The lubricant for gaskets shall be furnished by the pipe manufacturer and shall have no detrimental effect on the gasket or on the pipe or fitting.

The plain end and the spigot ends of the pipe shall be wiped clean and a thick film of lubricant applied to the outside of the spigot end. The pipe shall be aligned and carefully entered into the socket until it makes contact with the gasket. The joint assembly shall be completed by entering the pipe past the gasket until it makes contact with the bottom of the socket. The pipe shall be pulled "home" by the approved method recommended by the pipe manufacturer. If assembly is not accomplished by reasonable force, the plain end shall be removed and the condition corrected.

D. Flatting testing of the pipe shall consist of flatten three specimens of pipe between parallel plates in a suitable press until the distance between the plates, expressed as a % of the pipe diameter, by the greater of 40% or of the value as determined by [3.43 (OD)/(OD-ID)]. The rate of loading shall be uniform and such that the compression is complete within 2 to 5 minutes. The specimen shall pass if no splitting, cracking, breaking, or separation of seams is observed under normal light with the unaided eye.

E. Pipe bedding shall be as shown on the Contract Drawings.

F. Pipe deflection shall comply with ASTM D 3034 so as not to exceed the maximum allowable deflection.

G. Pipe certification shall be furnished by the manufacturer that the manufacturing of the pipe is in accordance with ASTM Reference Standards listed in the specifications.

PART 3 -- EXECUTION, INSTALLATION AND TESTING

3.01 INSTALLATION AND TESTING OF (PVC) SOLID WALL GRAVITY SEWER PIPE

A. Installation of (PVC) solid wall sewer pipe shall be installed in accordance with Section 15000 requirements and other related sections for installation, testing and flushing of pipe and as set forth in this section.

- END OF SECTION -

SECTION 15390
SCHEDULES

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Reference Section 15000 - Basic Mechanical Requirements.

1.02 PIPING SYSTEM SCHEDULES

A. Piping requirements for this Section are outlined on the Drawings, and in the Piping System Schedule as shown below. In the absence of a specified test pressure, pipe shall be tested at a pressure 50 percent greater than the normal operating pressure as determined by the Engineer or 10 psig, whichever is greater unless the Schedule indicates that no test is required.

B. If the pipe material is not shown on the drawings, the piping shall be the following materials shall be used:

Pipe Size	Material	Type of Joint	Class/Design	Test Pressure
36-inch	ELDI	Bell/Spigot	PC150	(1, 3)
42-inch	ELDI	Bell/Spigot	PC150 PC 250	(1, 3)
18-inch	ELDI	Bell/Spigot	PC250	(2)
10-inch	ELDI	Bell/Spigot	PC350	(2)
8-inch	ELDI	Bell/Spigot	PC350	(2)
6-inch	ELDI	Bell/Spigot	PC350	(2)
4-inch	ELDI	Bell/Spigot	PC350	(2)
42-inch	PVC	Bell/Spigot	PS 46	(2)
36-inch	PVC	Bell/Spigot	PS 46	(2)
18-inch	PVC	Bell/Spigot	PS 46	(2)
10-inch	PVC	Bell/Spigot	SDR 35	(2)

8-inch	PVC	Bell/Spigot	SDR 35	(2)
6-inch	PVC	Bell/Spigot	SDR 35	(2)
4-inch	PVC	Bell/Spigot	SDR 35	(2)
6-inch	PVC	Bell/Spigot	C-900	(5)
0.5-inch	Copper	Solder	Type K	(4)

(1) Factory Proof Test at minimum 580, 665 psi
(2) Per specification 15000, section 3.07
(3) Per specification 15000, section 3.09
(4) Per specification 15000, section 3.12
(5) Per specification 15000, section 3.13 and 02713 section 3.09

- END OF SECTION –

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