

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
HIGHWAY DIVISION 11

**PROPOSAL**

**DATE AND TIME OF BID OPENING: May 20, 2021 AT 2:00 PM**

**CONTRACT ID: 11-00-146**

**WBS ELEMENT NO.: 11RE.108638**

**FEDERAL AID NO.: STATE FUNDED**

**COUNTY: SURRY**

**TIP NO.: N/A**

**MILES: N/A**

**ROUTE NO.: N/A**

**LOCATION: I-77 WELCOME CENTER**

**TYPE OF WORK: WASTEWATER TREATMENT PLANT REHABILITATION**

**NOTICE:**

**ALL BIDDERS SHALL COMPLY WITH ALL APPLICABLE LAWS REGULATING THE PRACTICE OF GENERAL CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA WHICH REQUIRES THE BIDDER TO BE LICENSED BY THE N.C. LICENSING BOARD FOR CONTRACTORS WHEN BIDDING ON ANY NON-FEDERAL AID PROJECT WHERE THE BID IS \$30,000 OR MORE, EXCEPT FOR CERTAIN SPECIALTY WORK AS DETERMINED BY THE LICENSING BOARD. BIDDERS SHALL ALSO COMPLY WITH ALL OTHER APPLICABLE LAWS REGULATING THE PRACTICES OF ELECTRICAL, PLUMBING, HEATING AND AIR CONDITIONING AND REFRIGERATION CONTRACTING AS CONTAINED IN CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA. NOTWITHSTANDING THESE LIMITATIONS ON BIDDING, THE BIDDER WHO IS AWARDED ANY FEDERAL - AID FUNDED PROJECT SHALL COMPLY WITH CHAPTER 87 OF THE GENERAL STATUTES OF NORTH CAROLINA FOR LICENSING REQUIREMENTS WITHIN 60 CALENDAR DAYS OF BID OPENING.**

**BID BONDS ARE NOT REQUIRED.**

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**NAME OF BIDDER**

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**ADDRESS OF BIDDER**

**PROPOSAL FOR THE CONSTRUCTION OF  
CONTRACT No. 11-00-146 IN SURRY COUNTY, NORTH CAROLINA**

**Date \_\_\_\_\_ 20 \_\_\_\_\_**

**DEPARTMENT OF TRANSPORTATION,  
RALEIGH, NORTH CAROLINA**

The Bidder has carefully examined the location of the proposed work to be known as Contract No. 11-00-146; has carefully examined the plans and specifications, which are acknowledged to be part of the proposal, the special provisions, the proposal, the form of contract, and the forms of contract payment bond and contract performance bond; and thoroughly understands the stipulations, requirements and provisions. The undersigned bidder agrees to bound upon his execution of the bid and subsequent award to him by the Department of Transportation in accordance with this proposal to provide the necessary contract payment bond and contract performance bond within fourteen days after the written notice of award is received by him. The undersigned Bidder further agrees to provide all necessary machinery, tools, labor, and other means of construction; and to do all the work and to furnish all materials, except as otherwise noted, necessary to perform and complete the said contract in accordance with *the 2018 Standard Specifications for Roads and Structures* by the dates(s) specified in the Project Special Provisions and in accordance with the requirements of the Engineer, and at the unit or lump sum prices, as the case may be, for the various items given on the sheets contained herein.

The Bidder shall provide and furnish all the materials, machinery, implements, appliances and tools, and perform the work and required labor to construct and complete State Highway Contract No. 11-00-146 in Surry County, for the unit or lump sum prices, as the case may be, bid by the Bidder in his bid and according to the proposal, plans, and specifications prepared by said Department, which proposal, plans, and specifications show the details covering this project, and hereby become a part of this contract.

The published volume entitled *North Carolina Department of Transportation, Raleigh, Standard Specifications for Roads and Structures, January 2018* with all amendments and supplements thereto, is by reference incorporated into and made a part of this contract; that, except as herein modified, all the construction and work included in this contract is to be done in accordance with the specifications contained in said volume, and amendments and supplements thereto, under the direction of the Engineer.

If the proposal is accepted and the award is made, the contract is valid only when signed either by the Contract Officer or such other person as may be designated by the Secretary to sign for the Department of Transportation. The conditions and provisions herein cannot be changed except over the signature of the said Contract Officer or Division Engineer.

The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Department of Transportation may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient.

An increase or decrease in the quantity of an item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for the contract.

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## **INSTRUCTIONS TO BIDDERS**

### **PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE PREPARING AND SUBMITTING YOUR BID.**

All bids shall be prepared and submitted in accordance with the following requirements. Failure to comply with any requirement may cause the bid to be considered irregular and may be grounds for rejection of the bid.

#### **TRADITIONAL PAPER BIDS:**

1. Download the entire proposal from the Connect NCDOT website and return the entire proposal with your bid.
2. All entries on the itemized proposal sheet (bid form) shall be written in ink or typed.
3. The Bidder shall submit a unit price for every item on the itemized proposal sheet. The unit prices for the various contract items shall be written in figures. Unit prices shall be rounded off by the Bidder to contain no more than FOUR decimal places.
4. An amount bid shall be entered on the itemized proposal sheet for every item. The amount bid for each item shall be determined by multiplying each unit bid by the quantity for that item, and shall be written in figures in the "Amount" column of the form.
5. The total amount bid shall be written in figures in the proper place on the bid form. The total amount bid shall be determined by adding the amounts bid for each item.
6. Changes to any entry shall be made by marking through the entry in ink and making the correct entry adjacent thereto in ink. A representative of the Bidder shall initial the change in ink. Do not use correction fluid, correction tape or similar product to make corrections.
7. The bid shall be properly executed on the included **Execution of Bid – Non-collusion, Debarment and Gift Ban Certification** form. All bids shall show the following information:
  - a. Name of corporation, partnership, Limited Liability Company, joint venture, individual or firm, submitting bid.  
Corporations that have a corporate seal should include it on the bid.
  - b. Name of individual or representative submitting bid and position or title held on behalf of the bidder.
  - c. Name, signature, and position or title of witness.
8. The bid shall not contain any unauthorized additions, deletions, or conditional bids.
9. The Bidder shall not add any provision reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.
10. **THE PROPOSAL WITH THE ITEMIZED PROPOSAL SHEET ATTACHED SHALL BE PLACED IN A SEALED ENVELOPE AND SHALL BE DELIVERED TO AND RECEIVED IN THE NCDOT DIVISION OFFICE, LOCATED AT 801 STATESVILLE ROAD, P. O. BOX 250, BY 2:00 PM ON THURSDAY, MAY 20, 2021.**
11. The sealed bid must display the following statement on the front of the sealed envelope:

**QUOTE NO. 11-00-146 – I-77 WELCOME CENTER WASTERWATER TREATMENT PLANT TO  
BE OPENED AT 2:00 PM ON, THURSDAY, MAY 20, 2021**

12. If delivered by mail, the sealed envelope shall be placed in another sealed envelope and the outer envelope shall be addressed as follows:

**N. C. DEPARTMENT OF TRANSPORTATION  
ATTN: Kenny H. Heavner  
801 Statesville Road, P. O. Box 250  
North Wilkesboro, NC 28659**

**PROJECT SPECIAL PROVISIONS****GENERAL****DIVISION LET CONTRACT PREQUALIFICATION:**

(07-01-14)(12-1-16)

SPD 01-410

Any firm that wishes to bid as a prime contractor shall be prequalified as a Bidder or PO Prime Contractor prior to submitting a bid. Information regarding prequalification can be found at: <https://connect.ncdot.gov/business/Prequal/Pages/default.aspx>.

Prior to performing the work, the prime contractor and/or subcontractor(s) shall be prequalified in the work code(s) which are identified as work items in the prime contractor's construction progress schedule that they will complete themselves. Any contractor identified as working outside their expertise may be considered in default of contract.

**BOND REQUIREMENTS – No Bonds Required**

(06-01-16)

SPD 01-420B

The provisions of Articles 102-10 and 103-7 of the *2018 Standard Specifications for Roads and Structures* are waived for this project. No bonds required.

**CONTRACT TIME AND LIQUIDATED DAMAGES:**

(7-1-95) (Rev. 12-18-07)

108

SP1 G10 A

The date of availability for this contract is **June 1, 2021**.

The completion date for this contract is **July 31, 2021**.

Except where otherwise provided by the contract, observation periods required by the contract will not be a part of the work to be completed by the completion date and/or intermediate contract times stated in the contract. The acceptable completion of the observation periods that extend beyond the final completion date shall be a part of the work covered by the performance and payment bonds.

The liquidated damages for this contract are **Six Hundred Dollars (\$ 600.00)**per calendar day.

**INTERMEDIATE CONTRACT TIME NUMBER 1 AND LIQUIDATED DAMAGES:**

(2-20-07)

108

SP1 G14 A

The Contractor shall keep the closing of the wastewater treatment plant to a minimum.

In addition, the Contractor shall not close the wastewater treatment plant during holidays, holiday weekends, special events, or any other time when traffic is unusually heavy, including the following schedules:

**HOLIDAY AND HOLIDAY WEEKEND WWTP CLOSURE RESTRICTIONS**

1. For **unexpected occurrence** that creates unusually high traffic volumes, as directed by the Engineer.
2. For **New Year's Day**, between the hours of **3:00 PM** December 31st and **9:00 AM** January 2nd. If New Year's Day is on a Friday, Saturday, Sunday, or Monday, then until **9:00 AM** the following Tuesday.
3. For **Easter**, between the hours of **3:00 PM** Thursday and **9:00 AM** Monday.
4. For **Memorial Day**, between the hours of **3:00 PM** Friday and **9:00 AM** Tuesday.
5. For **Independence Day**, between the hours of **3:00 PM** the day before Independence Day and **9:00 AM** the day after Independence Day.  
  
If **Independence Day** is on a Friday, Saturday, Sunday or Monday, then between the hours of **3:00 PM** the Thursday before Independence Day and **9:00 AM** the Tuesday after Independence Day.
6. For **Labor Day**, between the hours of **3:00 PM** Friday and **9:00 AM** Tuesday.
7. For **Thanksgiving Day**, between the hours **3:00 PM** Tuesday and **9:00 AM** Monday.
8. For **Christmas**, between the hours of **3:00 PM** the Friday before the week of Christmas Day and **9:00 AM** the following Tuesday after the week of Christmas Day.

Holidays and holiday weekends shall include New Year's, Easter, Memorial Day, Independence Day, Labor Day, Thanksgiving, and Christmas. The Contractor shall schedule his work so that WWTP closures will not be required during these periods, unless otherwise directed by the Engineer.

The liquidated damages are **Two Hundred Dollars (\$ 200.00)** per hour.

**NO MAJOR CONTRACT ITEMS:**

(2-19-02) (Rev. 8-21-07)

104

SP1 G31

None of the items included in this contract will be major items.

**NO SPECIALTY ITEMS:**

(7-1-95)

108-6

SP1 G34

None of the items included in this contract will be specialty items (see Article 108-6 of the 2018 Standard Specifications).

**SCHEDULE OF ESTIMATED COMPLETION PROGRESS:**

(7-15-08) (Rev. 5-13-19)

108-2

SP1 G58

The Contractor's attention is directed to the Standard Special Provision entitled *Availability of Funds Termination of Contracts* included elsewhere in this proposal. The Department of Transportation's schedule of estimated completion progress for this project as required by that Standard Special Provision is as follows:

	<b><u>Fiscal Year</u></b>	<b><u>Progress (% of Dollar Value)</u></b>
2022	(7/01/21 - 6/30/22)	<b>50%</b> of Total Amount Bid
2023	(7/01/22 - 6/30/23)	<b>50%</b> of Total Amount Bid

The Contractor shall also furnish his own progress schedule in accordance with Article 108-2 of the 2018 Standard Specifications. Any acceleration of the progress as shown by the Contractor's progress schedule over the progress as shown above shall be subject to the approval of the Engineer.

**MINORITY BUSINESS ENTERPRISE AND WOMEN BUSINESS ENTERPRISE (DIVISIONS):**

(10-16-07)(Rev. 2-19-19)

102-15(J)

SP1 G67

**Description**

The purpose of this Special Provision is to carry out the North Carolina Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts financed in whole or in part with State funds.

**Definitions**

*Additional MBE/WBE Subcontractors* - Any MBE/WBE submitted at the time of bid that will not be used to meet the Combined MBE/WBE goal. No submittal of a Letter of Intent is required.

*Combined MBE/WBE Goal:* A portion of the total contract, expressed as a percentage that is to be performed by committed MBE/WBE subcontractors.

*Committed MBE/WBE Subcontractor* - Any MBE/WBE submitted at the time of bid that is being used to meet the Combined MBE / WBE goal by submission of a Letter of Intent. Or any MBE or WBE used as a replacement for a previously committed MBE or WBE firm.

*Contract Goal Requirement* - The approved participation at time of award, but not greater than the advertised Combined MBE/WBE contract goal.

*Goal Confirmation Letter* - Written documentation from the Department to the bidder confirming the Contractor's approved, committed participation along with a listing of the committed MBE and WBE firms.

*Manufacturer* - A firm that operates or maintains a factory or establishment that produces on the premises, the materials or supplies obtained by the Contractor.

*MBE Participation (Anticipated)* - A portion of the total contract, expressed as a percentage that is anticipated to be performed by committed MBE subcontractor(s).

*Minority Business Enterprise (MBE)* - A firm certified as a Disadvantaged Minority-Owned Business Enterprise through the North Carolina Unified Certification Program.

*Regular Dealer* - A firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for the performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business. A regular dealer engages in, as its principal business and in its own name, the purchase and sale or lease of the products in question. A regular dealer in such bulk items as steel, cement, gravel, stone, and petroleum products need not keep such products in stock, if it owns and operates distribution equipment for the products. Brokers and packagers are not regarded as manufacturers or regular dealers within the meaning of this section.

*Replacement / Substitution* – A full or partial reduction in the amount of work subcontracted to a committed (or an approved substitute) MBE/WBE firm.

*North Carolina Unified Certification Program (NCUCP)* - A program that provides comprehensive services and information to applicants for MBE/WBE certification. The MBE/WBE program follows the same regulations as the federal Disadvantaged Business Enterprise (DBE) program in accordance with 49 CFR Part 26.

*United States Department of Transportation (USDOT)* - Federal agency responsible for issuing regulations (49 CFR Part 26) and official guidance for the DBE program.

*WBE Participation (Anticipated)* - A portion of the total contract, expressed as a percentage that is anticipated to be performed by committed WBE subcontractor(s).

*Women Business Enterprise (WBE)* - A firm certified as a Disadvantaged Women-Owned Business Enterprise through the North Carolina Unified Certification Program.



**Forms and Websites Referenced in this Provision**

*Payment Tracking System* - On-line system in which the Contractor enters the payments made to MBE and WBE subcontractors who have performed work on the project.  
<https://apps.dot.state.nc.us/Vendor/PaymentTracking/>

*DBE-IS Subcontractor Payment Information* - Form for reporting the payments made to all MBE/WBE firms working on the project. This form is for paper bid projects only.  
<https://connect.ncdot.gov/business/Turnpike/Documents/Form%20DBE-IS%20Subcontractor%20Payment%20Information.pdf>

*RF-1 MBE/WBE Replacement Request Form* - Form for replacing a committed MBE or WBE.  
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/DBE%20MBE%20WBE%20Replacement%20Request%20Form.pdf>

*SAF Subcontract Approval Form* - Form required for approval to sublet the contract.  
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Subcontract%20Approval%20Form%20Rev.%202012.zip>

*JC-1 Joint Check Notification Form* - Form and procedures for joint check notification. The form acts as a written joint check agreement among the parties providing full and prompt disclosure of the expected use of joint checks.  
<http://connect.ncdot.gov/projects/construction/Construction%20Forms/Joint%20Check%20Notification%20Form.pdf>

*Letter of Intent* - Form signed by the Contractor and the MBE/WBE subcontractor, manufacturer or regular dealer that affirms that a portion of said contract is going to be performed by the signed MBE/WBE for the estimated amount (based on quantities and unit prices) listed at the time of bid.  
<http://connect.ncdot.gov/letting/LetCentral/Letter%20of%20Intent%20to%20Perform%20as%20a%20Subcontractor.pdf>

*Listing of MBE and WBE Subcontractors Form* - Form for entering MBE/WBE subcontractors on a project that will meet the Combined MBE/WBE goal. This form is for paper bids only.  
[http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20\(State\).docx](http://connect.ncdot.gov/municipalities/Bid%20Proposals%20for%20LGA%20Content/09%20MBE-WBE%20Subcontractors%20(State).docx)

*Subcontractor Quote Comparison Sheet* - Spreadsheet for showing all subcontractor quotes in the work areas where MBEs and WBEs quoted on the project. This sheet is submitted with good faith effort packages.  
<http://connect.ncdot.gov/business/SmallBusiness/Documents/DBE%20Subcontractor%20Quote%20Comparison%20Example.xls>

**Combined MBE/WBE Goal**

The Combined MBE/WBE Goal for this project is **0.0 %**

The Combined Goal was established utilizing the following anticipated participation for Minority Business Enterprises and Women Business Enterprises:

(A) Minority Business Enterprises **0.0 %**

- (1) *If the anticipated MBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that MBEs participate in at least the percent of the contract as set forth above.
- (2) *If the anticipated MBE participation is zero*, the Contractor shall make an effort to recruit and use MBEs during the performance of the contract. Any MBE participation obtained shall be reported to the Department.

(B) Women Business Enterprises **0.0 %**

- (1) *If the anticipated WBE participation is more than zero*, the Contractor shall exercise all necessary and reasonable steps to ensure that WBEs participate in at least the percent of the contract as set forth above.
- (2) *If the anticipated WBE participation is zero*, the Contractor shall make an effort to recruit and use WBEs during the performance of the contract. Any WBE participation obtained shall be reported to the Department.

The Bidder is required to submit only participation to meet the Combined MBE/WBE Goal. The Combined Goal may be met by submitting all MBE participation, all WBE participation, or a combination of MBE and WBE participation.

**Directory of Transportation Firms (Directory)**

Real-time information is available about firms doing business with the Department and firms that are certified through NCUCP in the Directory of Transportation Firms. Only firms identified in the Directory as MBE and WBE certified shall be used to meet the Combined MBE / WBE goal. The Directory can be found at the following link.

<https://www.ebs.nc.gov/VendorDirectory/default.html>

The listing of an individual firm in the directory shall not be construed as an endorsement of the firm's capability to perform certain work.

**Listing of MBE/WBE Subcontractors**

At the time of bid, bidders shall submit all MBE and WBE participation that they anticipate to use during the life of the contract. Only those identified to meet the Combined MBE/WBE goal will be considered committed, even though the listing shall include both committed MBE/WBE

subcontractors and additional MBE/WBE subcontractors. Any additional MBE/WBE subcontractor participation above the goal will follow the banking guidelines found elsewhere in this provision. All other additional MBE/WBE subcontractor participation submitted at the time of bid will be used toward the Department's overall race-neutral goals. Only those firms with current MBE and WBE certification at the time of bid opening will be acceptable for listing in the bidder's submittal of MBE and WBE participation. The Contractor shall indicate the following required information:

(A) Electronic Bids

Bidders shall submit a listing of MBE and WBE participation in the appropriate section of the electronic submittal file.

- (1) Submit the names and addresses of MBE and WBE firms identified to participate in the contract. If the bidder uses the updated listing of MBE and WBE firms shown in the electronic submittal file, the bidder may use the dropdown menu to access the name and address of the firms.
- (2) Submit the contract line numbers of work to be performed by each MBE and WBE firm. When no figures or firms are entered, the bidder will be considered to have no MBE or WBE participation.
- (3) The bidder shall be responsible for ensuring that the MBE and WBE are certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE goal.

(B) Paper Bids

- (1) *If the Combined MBE/ WBE goal is more than zero,*
  - (a) Bidders, at the time the bid proposal is submitted, shall submit a listing of MBE/WBE participation, including the names and addresses on *Listing of MBE and WBE Subcontractors* contained elsewhere in the contract documents in order for the bid to be considered responsive. Bidders shall indicate the total dollar value of the MBE and WBE participation for the contract.
  - (b) If bidders have no MBE or WBE participation, they shall indicate this on the *Listing of MBE and WBE Subcontractors* by entering the word "None" or the number "0." This form shall be completed in its entirety. **Blank forms will not be deemed to represent zero participation.** Bids submitted that do not have MBE and WBE participation indicated on the appropriate form will not be read publicly during the opening of bids. The Department will not consider these bids for award and the proposal will be rejected.

- (c) The bidder shall be responsible for ensuring that the MBE/WBE is certified at the time of bid by checking the Directory of Transportation Firms. If the firm is not certified at the time of the bid-letting, that MBE's or WBE's participation will not count towards achieving the Combined MBE/WBE goal.
- (2) *If the Combined MBE/WBE Goal is zero*, entries on the *Listing of MBE and WBE Subcontractors* are not required for the zero goal, however any MBE or WBE participation that is achieved during the project shall be reported in accordance with requirements contained elsewhere in the special provision.

### **MBE or WBE Prime Contractor**

When a certified MBE or WBE firm bids on a contract that contains a Combined MBE/WBE Goal, the firm is responsible for meeting the goal or making good faith efforts to meet the goal, just like any other bidder. In most cases, a MBE or WBE bidder on a contract will meet the Combined MBE/WBE goal by virtue of the work it performs on the contract with its own forces. However, all the work that is performed by the MBE or WBE bidder and any other similarly certified subcontractors will count toward the goal. The MBE or WBE bidder shall list itself along with any MBE or WBE subcontractors, if any, in order to receive credit toward the goals.

MBE/WBE prime contractors shall also follow Sections A or B listed under *Listing of MBE/WBE Subcontractors* just as a non-MBE/WBE bidder would.

### **Written Documentation – Letter of Intent**

The bidder shall submit written documentation for each MBE/WBE that will be used to meet the Combined MBE/WBE goal of the contract, indicating the bidder's commitment to use the MBE/WBE in the contract. This documentation shall be submitted on the Department's form titled *Letter of Intent*.

The documentation shall be received in the office of the Engineer no later than 2:00 p.m. of the fifth calendar day following opening of bids, unless the fifth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 10:00 a.m. on the next official state business day.

If the bidder fails to submit the Letter of Intent from each committed MBE and WBE to be used toward the Combined MBE/WBE goal, or if the form is incomplete (i.e. both signatures are not present), the MBE/WBE participation will not count toward meeting the Combined MBE/WBE goal. If the lack of this participation drops the commitment below the Combined MBE/WBE goal, the Contractor shall submit evidence of good faith efforts for the goal not met, completed in its entirety, to the Engineer no later than 2:00 p.m. of the eighth calendar day following opening of bids, unless the eighth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 10:00 a.m. on the next official state business day.

**Banking MBE/WBE Credit**

If the committed MBE/WBE participation submitted exceeds the algebraic sum of the Combined MBE/WBE goal by \$1,000 or more, the excess will be placed on deposit by the Department for future use by the bidder. Separate accounts will be maintained for MBE and WBE participation and these may accumulate for a period not to exceed 24 months.

When the apparent lowest responsive bidder fails to submit sufficient participation by MBE and WBE firms to meet the advertised goal, as part of the good faith effort, the Department will consider allowing the bidder to withdraw funds to meet the Combined MBE/WBE goal as long as there are adequate funds available from the bidder's MBE and WBE bank accounts.

**Submission of Good Faith Effort**

If the bidder fails to meet or exceed the Combined MBE/WBE goal, the apparent lowest responsive bidder shall submit to the Department documentation of adequate good faith efforts made to reach that specific goal.

One complete set and **three (3)** copies of this information shall be received in the office of the Engineer no later than 2:00 p.m. of the fifth calendar day following opening of bids, unless the fifth day falls on Saturday, Sunday or an official state holiday. In that situation, it is due in the office of the Engineer no later than 10:00 a.m. on the next official state business day.

Note: Where the information submitted includes repetitious solicitation letters, it will be acceptable to submit a representative letter along with a distribution list of the firms that were solicited. Documentation of MBE/WBE quotations shall be a part of the good faith effort submittal. This documentation may include written subcontractor quotations, telephone log notations of verbal quotations, or other types of quotation documentation.

**Consideration of Good Faith Effort for Projects with a Combined MBE/WBE Goal More Than Zero**

Adequate good faith efforts mean that the bidder took all necessary and reasonable steps to achieve the goal which, by their scope, intensity, and appropriateness, could reasonably be expected to obtain sufficient MBE/WBE participation. Adequate good faith efforts also mean that the bidder actively and aggressively sought MBE/WBE participation. Mere *pro forma* efforts are not considered good faith efforts.

The Department will consider the quality, quantity, and intensity of the different kinds of efforts a bidder has made. Listed below are examples of the types of actions a bidder will take in making a good faith effort to meet the goals and are not intended to be exclusive or exhaustive, nor is it intended to be a mandatory checklist.

- (A) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising, written notices, use of verifiable electronic means through the use of the

NCDOT Directory of Transportation Firms) the interest of all certified MBEs/WBEs that are also prequalified subcontractors. The bidder must solicit this interest within at least 10 days prior to bid opening to allow the MBEs/WBEs to respond to the solicitation. Solicitation shall provide the opportunity to MBEs/WBEs within the Division and surrounding Divisions where the project is located. The bidder must determine with certainty if the MBEs/WBEs are interested by taking appropriate steps to follow up initial solicitations.

- (B) Selecting portions of the work to be performed by MBEs/WBEs in order to increase the likelihood that the Combined MBE/WBE goal will be achieved.
  - (1) Where appropriate, break out contract work items into economically feasible units to facilitate MBE/WBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.
  - (2) Negotiate with subcontractors to assume part of the responsibility to meet the advertised goal when the work to be sublet includes potential for MBE/WBE participation (2<sup>nd</sup> and 3<sup>rd</sup> tier subcontractors).
- (C) Providing interested certified MBEs/WBEs that are also prequalified subcontractors with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- (D)
  - (1) Negotiating in good faith with interested MBEs/WBEs. It is the bidder's responsibility to make a portion of the work available to MBE/WBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available MBE/WBE subcontractors and suppliers, so as to facilitate MBE/WBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of MBEs/WBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for MBEs/WBEs to perform the work.
  - (2) A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including MBE/WBE subcontractors, and would take a firm's price and capabilities as well as the advertised goal into consideration. However, the fact that there may be some additional costs involved in finding and using MBEs/WBEs is not in itself sufficient reason for a bidder's failure to meet the advertised goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidding contractors are not, however, required to accept higher quotes from MBEs/WBEs if the price difference is excessive or unreasonable.
- (E) Not rejecting MBEs/WBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry,

membership in specific groups, organizations, or associates and political or social affiliations (for example, union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

- (F) Making efforts to assist interested MBEs/WBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or bidder.
- (G) Making efforts to assist interested MBEs/WBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (H) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; Federal, State, and local minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of MBEs/WBEs. Contact within 7 days from the bid opening the Business Opportunity and Work Force Development Unit at [BOWD@ncdot.gov](mailto:BOWD@ncdot.gov) to give notification of the bidder's inability to get MBE or WBE quotes.
- (I) Any other evidence that the bidder submits which shows that the bidder has made reasonable good faith efforts to meet the advertised goal.

In addition, the Department may take into account the following:

- (1) Whether the bidder's documentation reflects a clear and realistic plan for achieving the Combined MBE/WBE goal.
- (2) The bidders' past performance in meeting the contract goal.
- (3) The performance of other bidders in meeting the advertised goal. For example, when the apparent successful bidder fails to meet the goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the advertised goal, but meets or exceeds the average MBE and WBE participation obtained by other bidders, the Department may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made a good faith effort.

If the Department does not award the contract to the apparent lowest responsive bidder, the Department reserves the right to award the contract to the next lowest responsive bidder that can satisfy to the Department that the Combined MBE/WBE goal can be met or that an adequate good faith effort has been made to meet the advertised goal.

### **Non-Good Faith Appeal**

The Engineer will notify the contractor verbally and in writing of non-good faith. A contractor may appeal a determination of non-good faith made by the Goal Compliance Committee. If a

contractor wishes to appeal the determination made by the Committee, they shall provide written notification to the Engineer. The appeal shall be made within 2 business days of notification of the determination of non-good faith.

### **Counting MBE/WBE Participation Toward Meeting the Combined MBE/WBE Goal**

(A) Participation

The total dollar value of the participation by a committed MBE/WBE will be counted toward the contract goal requirements. The total dollar value of participation by a committed MBE/WBE will be based upon the value of work actually performed by the MBE/WBE and the actual payments to MBE/WBE firms by the Contractor.

(B) Joint Checks

Prior notification of joint check use shall be required when counting MBE/WBE participation for services or purchases that involves the use of a joint check. Notification shall be through submission of Form JC-1 (*Joint Check Notification Form*) and the use of joint checks shall be in accordance with the Department's Joint Check Procedures.

(C) Subcontracts (Non-Trucking)

A MBE/WBE may enter into subcontracts. Work that a MBE subcontracts to another MBE firm may be counted toward the anticipated MBE participation. The same holds for work that a WBE subcontracts to another WBE firm. Work that a MBE/WBE subcontracts to a non-MBE/WBE firm does not count toward the contract goal requirement. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the MBE or WBE participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified firms and there is no interest or availability, and they can get assistance from other certified firms, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE breakdown. If a MBE or WBE contractor or subcontractor subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of standard industry practices, it shall be presumed that the MBE or WBE is not performing a commercially useful function.

(D) Joint Venture

When a MBE or WBE performs as a participant in a joint venture, the Contractor may count toward its contract goal requirement a portion of the total value of participation with the MBE or WBE in the joint venture, that portion of the total dollar value being a distinct clearly defined portion of work that the MBE or WBE performs with its forces.



(E) Suppliers

A contractor may count toward its MBE /WBE requirement 60 percent of its expenditures for materials and supplies required to complete the contract and obtained from a MBE or WBE regular dealer and 100 percent of such expenditures from a MBE or WBE manufacturer.

(F) Manufacturers and Regular Dealers

A contractor may count toward its MBE /WBE requirement the following expenditures to MBE/WBE firms that are not manufacturers or regular dealers:

- (1) The fees or commissions charged by a MBE/WBE firm for providing a *bona fide* service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, provided the fees or commissions are determined to be reasonable and not excessive as compared with fees and commissions customarily allowed for similar services.
- (2) With respect to materials or supplies purchased from a MBE/WBE, which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site (but not the cost of the materials and supplies themselves), provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services.

**Commercially Useful Function**

(A) MBE/WBE Utilization

The Contractor may count toward its contract goal requirement only expenditures to MBEs and WBEs that perform a commercially useful function in the work of a contract. A MBE/WBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the MBE/WBE shall also be responsible with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing (where applicable) and paying for the material itself. To determine whether a MBE/WBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the MBE/WBE credit claimed for its performance of the work, and any other relevant factors. If it is determined that a MBE or WBE is not performing a Commercially Useful Function, the contractor may present evidence to rebut this presumption to the Department.

(B) MBE/WBE Utilization in Trucking

The following factors will be used to determine if a MBE or WBE trucking firm is performing a commercially useful function:

- (1) The MBE/WBE shall be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there shall not be a contrived arrangement for the purpose of meeting the Combined MBE/WBE goal.
- (2) The MBE/WBE shall itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
- (3) The MBE/WBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
- (4) The MBE may subcontract the work to another MBE firm, including an owner-operator who is certified as a MBE. The same holds true that a WBE may subcontract the work to another WBE firm, including an owner-operator who is certified as a WBE. When this occurs, the MBE or WBE who subcontracts work receives credit for the total value of the transportation services the subcontracted MBE or WBE provides on the contract. It should be noted that every effort shall be made by MBE and WBE contractors to subcontract to the same certification (i.e., MBEs to MBEs and WBEs to WBEs), in order to fulfill the participation breakdown. This, however, may not always be possible due to the limitation of firms in the area. If the MBE or WBE firm shows a good faith effort has been made to reach out to similarly certified transportation service providers and there is no interest or availability, and they can get assistance from other certified providers, the Engineer will not hold the prime responsible for meeting the individual MBE or WBE participation breakdown.
- (5) The MBE/WBE may also subcontract the work to a non-MBE/WBE firm, including from an owner-operator. The MBE/WBE who subcontracts the work to a non-MBE/WBE is entitled to credit for the total value of transportation services provided by the non-MBE/WBE subcontractor not to exceed the value of transportation services provided by MBE/WBE-owned trucks on the contract. Additional participation by non-MBE/WBE subcontractors receives credit only for the fee or commission it receives as a result of the subcontract arrangement. The value of services performed under subcontract agreements between the MBE/WBE and the Contractor will not count towards the MBE/WBE contract requirement.
- (6) A MBE/WBE may lease truck(s) from an established equipment leasing business open to the general public. The lease must indicate that the MBE/WBE has exclusive use of and control over the truck. This requirement does not preclude the

leased truck from working for others during the term of the lease with the consent of the MBE/WBE, so long as the lease gives the MBE/WBE absolute priority for use of the leased truck. This type of lease may count toward the MBE/WBE's credit as long as the driver is under the MBE/WBE's payroll.

- (7) Subcontracted/leased trucks shall display clearly on the dashboard the name of the MBE/WBE that they are subcontracted/leased to and their own company name if it is not identified on the truck itself. Magnetic door signs are not permitted.

### **MBE/WBE Replacement**

When a Contractor has relied on a commitment to a MBE or WBE subcontractor (or an approved substitute MBE or WBE subcontractor) to meet all or part of a contract goal requirement, the contractor shall not terminate the MBE/WBE subcontractor for convenience. This includes, but is not limited to, instances in which the Contractor seeks to perform the work of the terminated subcontractor with another MBE/WBE subcontractor, a non-MBE/WBE subcontractor, or with the Contractor's own forces or those of an affiliate.

The Contractor must give notice in writing both by certified mail and email to the MBE/WBE subcontractor, with a copy to the Engineer of its intent to request to terminate and/or substitute, and the reason for the request. The Contractor must give the MBE/WBE subcontractor five (5) business days to respond to the Contractor's Notice of Intent to Request Termination and/or Substitution. If the MBE/WBE subcontractor objects to the intended termination/substitution, the MBE/WBE, within five (5) business days must advise the Contractor and the Department of the reasons why the action should not be approved. The five-day notice period shall begin on the next business day after written notice is provided to the MBE/WBE subcontractor.

A committed MBE/WBE subcontractor may only be terminated after receiving the Department's written approval based upon a finding of good cause for the proposed termination and/or substitution. For purposes of this section, good cause shall include the following circumstances:

- (a) The listed MBE/WBE subcontractor fails or refuses to execute a written contract;
- (b) The listed MBE/WBE subcontractor fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the MBE/WBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the prime contractor;
- (c) The listed MBE/WBE subcontractor fails or refuses to meet the prime contractor's reasonable, nondiscriminatory bond requirements;
- (d) The listed MBE/WBE subcontractor becomes bankrupt, insolvent, or exhibits credit unworthiness;
- (e) The listed MBE/WBE subcontractor is ineligible to work on public works projects because of suspension and debarment proceedings pursuant to 2 CFR Parts 180, 215 and 1,200 or applicable state law;
- (f) The listed MBE/WBE subcontractor is not a responsible contractor;

- (g) The listed MBE/WBE voluntarily withdraws from the project and provides written notice of withdrawal;
- (h) The listed MBE/WBE is ineligible to receive MBE/WBE credit for the type of work required;
- (i) A MBE/WBE owner dies or becomes disabled with the result that the listed MBE/WBE contractor is unable to complete its work on the contract;
- (j) Other documented good cause that compels the termination of the MBE/WBE subcontractor. Provided, that good cause does not exist if the prime contractor seeks to terminate a MBE/WBE it relied upon to obtain the contract so that the prime contractor can self-perform the work for which the MBE/WBE contractor was engaged or so that the prime contractor can substitute another MBE/WBE or non-MBE/WBE contractor after contract award.

The Contractor shall comply with the following for replacement of a committed MBE/WBE:

(A) Performance Related Replacement

When a committed MBE/WBE is terminated for good cause as stated above, an additional MBE/WBE that was submitted at the time of bid may be used to fulfill the MBE/WBE commitment to meet the Combined MBE/WBE Goal. A good faith effort will only be required for removing a committed MBE/WBE if there were no additional MBE/WBEs submitted at the time of bid to cover the same amount of work as the MBE/WBE that was terminated.

If a replacement MBE/WBE is not found that can perform at least the same amount of work as the terminated MBE/WBE, the Contractor shall submit a good faith effort documenting the steps taken. Such documentation shall include, but not be limited to, the following:

- (1) Copies of written notification to MBE/WBEs that their interest is solicited in contracting the work defaulted by the previous MBE/WBE or in subcontracting other items of work in the contract.
- (2) Efforts to negotiate with MBE/WBEs for specific subbids including, at a minimum:
  - (a) The names, addresses, and telephone numbers of MBE/WBEs who were contacted.
  - (b) A description of the information provided to MBE/WBEs regarding the plans and specifications for portions of the work to be performed.
- (3) A list of reasons why MBE/WBE quotes were not accepted.
- (4) Efforts made to assist the MBE/WBEs contacted, if needed, in obtaining bonding or insurance required by the Contractor.

**(B) Decertification Replacement**

- (1) When a committed MBE/WBE is decertified by the Department after the SAF (*Subcontract Approval Form*) has been received by the Department, the Department will not require the Contractor to solicit replacement MBE/WBE participation equal to the remaining work to be performed by the decertified firm. The participation equal to the remaining work performed by the decertified firm will count toward the contract goal requirement.
- (2) When a committed MBE/WBE is decertified prior to the Department receiving the SAF (*Subcontract Approval Form*) for the named MBE/WBE firm, the Contractor shall take all necessary and reasonable steps to replace the MBE/WBE subcontractor with another MBE/WBE subcontractor to perform at least the same amount of work to meet the Combined MBE/WBE goal requirement. If a MBE/WBE firm is not found to do the same amount of work, a good faith effort must be submitted to NCDOT (see A herein for required documentation).

All requests for replacement of a committed MBE/WBE firm shall be submitted to the Engineer for approval on Form RF-1 (*DBE Replacement Request*). If the Contractor fails to follow this procedure, the Contractor may be disqualified from further bidding for a period of up to 6 months.

**Changes in the Work**

When the Engineer makes changes that result in the reduction or elimination of work to be performed by a committed MBE/WBE, the Contractor will not be required to seek additional participation. When the Engineer makes changes that result in additional work to be performed by a MBE/WBE based upon the Contractor's commitment, the MBE/WBE shall participate in additional work to the same extent as the MBE/WBE participated in the original contract work.

When the Engineer makes changes that result in extra work, which has more than a minimal impact on the contract amount, the Contractor shall seek additional participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Engineer makes changes that result in an alteration of plans or details of construction, and a portion or all of the work had been expected to be performed by a committed MBE/WBE, the Contractor shall seek participation by MBEs/WBEs unless otherwise approved by the Engineer.

When the Contractor requests changes in the work that result in the reduction or elimination of work that the Contractor committed to be performed by a MBE/WBE, the Contractor shall seek additional participation by MBEs/WBEs equal to the reduced MBE/WBE participation caused by the changes.

**Reports and Documentation**

A SAF (*Subcontract Approval Form*) shall be submitted for all work which is to be performed by a MBE/WBE subcontractor. The Department reserves the right to require copies of actual subcontract agreements involving MBE/WBE subcontractors.

When using transportation services to meet the contract commitment, the Contractor shall submit a proposed trucking plan in addition to the SAF. The plan shall be submitted prior to beginning construction on the project. The plan shall include the names of all trucking firms proposed for use, their certification type(s), the number of trucks owned by the firm, as well as the individual truck identification numbers, and the line item(s) being performed.

Within 30 calendar days of entering into an agreement with a MBE/WBE for materials, supplies or services, not otherwise documented by the SAF as specified above, the Contractor shall furnish the Engineer a copy of the agreement. The documentation shall also indicate the percentage (60% or 100%) of expenditures claimed for MBE/WBE credit.

**Reporting Minority and Women Business Enterprise Participation**

The Contractor shall provide the Engineer with an accounting of payments made to all MBE and WBE firms, including material suppliers and contractors at all levels (prime, subcontractor, or second tier subcontractor). This accounting shall be furnished to the Engineer for any given month by the end of the following month. Failure to submit this information accordingly may result in the following action:

- (A) Withholding of money due in the next partial pay estimate; or
- (B) Removal of an approved contractor from the prequalified bidders' list or the removal of other entities from the approved subcontractors list.

While each contractor (prime, subcontractor, 2nd tier subcontractor) is responsible for accurate accounting of payments to MBEs/WBEs, it shall be the prime contractor's responsibility to report all monthly and final payment information in the correct reporting manner.

Failure on the part of the Contractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from further bidding until the required information is submitted.

Failure on the part of any subcontractor to submit the required information in the time frame specified may result in the disqualification of that contractor and any affiliate companies from being approved for further work on future projects until the required information is submitted.

Contractors reporting transportation services provided by non-MBE/WBE lessees shall evaluate the value of services provided during the month of the reporting period only.

At any time, the Engineer can request written verification of subcontractor payments.

The Contractor shall report the accounting of payments through the Department's DBE Payment Tracking System.

### **Failure to Meet Contract Requirements**

Failure to meet contract requirements in accordance with Subarticle 102-15(J) of the *2018 Standard Specifications* may be cause to disqualify the Contractor.

### **CONTRACTOR'S LICENSE REQUIREMENTS:**

(7-1-95)

102-14

SP1 G88

If the successful bidder does not hold the proper license to perform any plumbing, heating, air conditioning, or electrical work in this contract, he will be required to sublet such work to a contractor properly licensed in accordance with *Article 2 of Chapter 87 of the General Statutes* (licensing of heating, plumbing, and air conditioning contractors) and *Article 4 of Chapter 87 of the General Statutes* (licensing of electrical contractors).

### **RESTRICTIONS ON ITS EQUIPMENT AND SERVICES:**

(11-17-20)

SP01 G090

All telecommunications, video or other ITS equipment or services installed or utilized on this project must be in conformance with UNIFORM ADMINISTRATIVE REQUIREMENTS, COST PRINCIPLES, AND AUDIT REQUIREMENTS FOR FEDERAL AWARDS **2 CFR, § 200.216** **Prohibition on certain telecommunications and video surveillance services or equipment.**

### **USE OF UNMANNED AIRCRAFT SYSTEM (UAS):**

(8-20-19)

SP1 G092

The Contractor shall adhere to all Federal, State and Local regulations and guidelines for the use of Unmanned Aircraft Systems (UAS). This includes but is not limited to US 14 CFR Part 107 *Small UAS Rule*, NC GS 15A-300.2 *Regulation of launch and recovery sites*, NC GS 63-95 *Training required for the operation of unmanned aircraft systems*, NC GS 63-96 *Permit required for commercial operation of unmanned aircraft system*, and NCDOT UAS Policy. The required operator certifications include possessing a current Federal Aviation Administration (FAA) Remote Pilot Certificate, a NC UAS Operator Permit as well as operating a UAS registered with the FAA.

Prior to beginning operations, the Contractor shall complete the NCDOT UAS – Flight Operation Approval Form and submit it to the Engineer for approval. All UAS operations shall be approved by the Engineer prior to beginning the operations.

All contractors or subcontractors operating UAS shall have UAS specific general liability insurance to cover all operations under this contract.

The use of UAS is at the Contractor's discretion. No measurement or payment will be made for the use of UAS. In the event that the Department directs the Contractor to utilize UAS, payment will be in accordance with Article 104-7 Extra Work.

**EQUIPMENT IDLING GUIDELINES:**

(1-19-21)

107

SP1 G096

Exercise reduced fuel consumption and reduced equipment emissions during the construction of all work associated with this contract. Employees engaged in the construction of this project should turn off vehicles when stopped for more than thirty (30) minutes and off-highway equipment should idle no longer than fifteen (15) consecutive minutes.

These guidelines for turning off vehicles and equipment when idling do not apply to:

1. Idling when queuing.
2. Idling to verify the vehicle is in safe operating condition.
3. Idling for testing, servicing, repairing or diagnostic purposes.
4. Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane, mixing concrete, etc.).
5. Idling required to bring the machine system to operating temperature.
6. Emergency vehicles, utility company, construction, and maintenance vehicles where the engines must run to perform needed work.
7. Idling to ensure safe operation of the vehicle.
8. Idling when the propulsion engine is providing auxiliary power for other than heating or air conditioning. (such as hydraulic systems for pavers)
9. When specific traffic, safety, or emergency situations arise.
10. If the ambient temperature is less than 32 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants (e.g. to run the heater).
11. If the ambient temperature is greater than 90 degrees Fahrenheit. Limited idling to provide for the safety of vehicle occupants of off-highway equipment (e.g. to run the air conditioning) no more than 30 minutes.
12. Diesel powered vehicles may idle for up to 30 minutes to minimize restart problems.

Any vehicle, truck, or equipment in which the primary source of fuel is natural gas or electricity is exempt from the idling limitations set forth in this special provision.

**OUTSOURCING OUTSIDE THE USA:**

(9-21-04) (Rev. 5-16-06)

SP1 G150

All work on consultant contracts, services contracts, and construction contracts shall be performed in the United States of America. No work shall be outsourced outside of the United States of America.

*Outsourcing* for the purpose of this provision is defined as the practice of subcontracting labor, work, services, staffing, or personnel to entities located outside of the United States.

The North Carolina Secretary of Transportation shall approve exceptions to this provision in writing.



**STANDARD SPECIAL PROVISION**  
**AVAILABILITY OF FUNDS – TERMINATION OF CONTRACTS**

(5-20-08)

Z-2

*General Statute 143C-6-11. (h) Highway Appropriation* is hereby incorporated verbatim in this contract as follows:

(h) Amounts Encumbered. – Transportation project appropriations may be encumbered in the amount of allotments made to the Department of Transportation by the Director for the estimated payments for transportation project contract work to be performed in the appropriation fiscal year. The allotments shall be multiyear allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in *General Statute 143C-6-11(c)*. Payment for transportation project work performed pursuant to contract in any fiscal year other than the current fiscal year is subject to appropriations by the General Assembly. Transportation project contracts shall contain a schedule of estimated completion progress, and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any transportation project contract, and any transportation project contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the contractor shall be given a written notice of termination at least 60 days before completion of scheduled work for which funds are available. In the event of termination, the contractor shall be paid for the work already performed in accordance with the contract specifications.

Payment will be made on any contract terminated pursuant to the special provision in accordance with Subarticle 108-13(D) of the *2018 Standard Specifications*.

**STANDARD SPECIAL PROVISION****ERRATA**

(10-16-18) (Rev.2-16-21)

Z-4

Revise the *2018 Standard Specifications* as follows:

**Division 6**

**Page 6-7, Article 609-1 DESCRIPTION, line 29,** replace article number “609-10” with “609-9”.

**Division 7**

**Page 7-27, Article 725-1 MEASUREMENT AND PAYMENT, line 4,** replace article number “725-1” with “724-4”.

**Page 7-28, Article 725-1 MEASUREMENT AND PAYMENT, line 10,** replace article number “725-1” with “725-3”.

**Division 10**

**Page 10-78, Article 1056-4 GEOTEXTILES, TABLE 1056-1, Permittivity, Type 2,** replace “Table 6<sup>D</sup>” with “Table 7<sup>D</sup>” and **Permittivity, Type 3<sup>B</sup>,** replace “Table 7<sup>D</sup>” with “Table 8<sup>D</sup>”.

**Page 10-121, Article 1076-7, REPAIR OF GALVANIZING, line 8,** replace article number “1080-9” with “1080-7”.

**Page 10-162, Article 1080-50 PAINT FOR VERTICAL MARKERS, line 1,** replace article number “1080-50” with “1080-10”.

**Page 10-162, Article 1080-61 EPOXY RESIN FOR REINFORCING STEEL, line 5,** replace article number “1080-61” with “1080-11”.

**Page 10-162, Article 1080-72 ABRASIVE MATERIALS FOR BLAST CLEANING STEEL, line 22,** replace article number “1080-72” with “1080-12”.

**Page 10-163, Article 1080-83 FIELD PERFORMANCE AND SERVICES, line 25,** replace article number “1080-83” with “1080-13”.

**Division 17**

**Page 17-15, Article 1715-4 MEASUREMENT AND PAYMENT, lines 42-44,** replace the second sentence with the following:

An example is an installation of a single 1.25 inch HDPE conduit would be paid as:

Directional Drill (1)(1.25”) Linear Foot

**STANDARD SPECIAL PROVISION****PLANT AND PEST QUARANTINES****(Imported Fire Ant, Gypsy Moth, Witchweed, Emerald Ash Borer, Guava Root Knot Nematode, And Other Noxious Weeds)**

(3-18-03) (Rev. 5-21-19)

Z-04a

**Within Quarantined Area**

This project may be within a county regulated for plant and/or pests. If the project or any part of the Contractor's operations is located within a quarantined area, thoroughly clean all equipment prior to moving out of the quarantined area. Comply with federal/state regulations by obtaining a certificate or limited permit for any regulated article moving from the quarantined area.

**Originating in a Quarantined County**

Obtain a certificate or limited permit issued by the N.C. Department of Agriculture/United States Department of Agriculture. Have the certificate or limited permit accompany the article when it arrives at the project site.

**Contact**

Contact the N.C. Department of Agriculture/United States Department of Agriculture at 1-800-206-9333, 919-707-3730, or <https://www.ncagr.gov/plantindustry/Plant/quaran/table2.htm> to determine those specific project sites located in the quarantined area or for any regulated article used on this project originating in a quarantined county.

**Regulated Articles Include**

1. Soil, sand, gravel, compost, peat, humus, muck, and decomposed manure, separately or with other articles. This includes movement of articles listed above that may be associated with cut/waste, ditch pulling, and shoulder cutting.
2. Plants with roots including grass sod.
3. Plant crowns and roots.
4. Bulbs, corms, rhizomes, and tubers of ornamental plants.
5. Hay, straw, fodder, and plant litter of any kind.
6. Clearing and grubbing debris.
7. Used agricultural cultivating and harvesting equipment.
8. Used earth-moving equipment.
9. Any other products, articles, or means of conveyance, of any character, if determined by an inspector to present a hazard of spreading imported fire ant, gypsy moth, witchweed, emerald ash borer, guava root knot nematode, or other noxious weeds.

**STANDARD SPECIAL PROVISION****MINIMUM WAGES**

(7-21-09)

Z-5

**FEDERAL:** The Fair Labor Standards Act provides that with certain exceptions every employer shall pay wages at the rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

**STATE:** The North Carolina Minimum Wage Act provides that every employer shall pay to each of his employees, wages at a rate of not less than SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all skilled labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all intermediate labor employed on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

The minimum wage paid to all unskilled labor on this contract shall be SEVEN DOLLARS AND TWENTY FIVE CENTS (\$7.25) per hour.

This determination of the intent of the application of this act to the contract on this project is the responsibility of the Contractor.

The Contractor shall have no claim against the Department of Transportation for any changes in the minimum wage laws, Federal or State. It is the responsibility of the Contractor to keep fully informed of all Federal and State Laws affecting his contract.

**STANDARD SPECIAL PROVISION****TITLE VI AND NONDISCRIMINATION:**

(6-28-77)(Rev 6/19/2018)

Z-6

Revise the *2018 Standard Specifications* as follows:

Replace Article 103-4(B) with the following:

The North Carolina Department of Transportation is committed to carrying out the U.S. Department of Transportation's policy of ensuring nondiscrimination in the award and administration of contracts.

The provisions of this section related to United States Department of Transportation (US DOT) Order 1050.2A, Title 49 Code of Federal Regulations (CFR) part 21, 23 United States Code (U.S.C.) 140 and 23 CFR part 200 (or 49 CFR 303, 49 U.S.C. 5332 or 49 U.S.C. 47123) are applicable to all North Carolina Department of Transportation (NCDOT) contracts and to all related subcontracts, material supply, engineering, architectural and other service contracts, regardless of dollar amount. Any Federal provision that is specifically required not specifically set forth is hereby incorporated by reference.

**(1) Title VI Assurances (USDOT Order 1050.2A, Appendix A)**

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

**(a) Compliance with Regulations**

The contractor (hereinafter includes consultants) shall comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, Federal Highway Administration (FHWA), as they may be amended from time to time, which are herein incorporated by reference and made a part of this contract.

**(b) Nondiscrimination**

The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

**(c) Solicitations for Subcontractors, Including Procurements of Materials and Equipment**

In all solicitations, either by competitive bidding, or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or national origin.

**(d) Information and Reports**

The contractor shall provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and shall permit access to its books,

records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the FHWA to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish the information, the contractor shall so certify to the Recipient or the FHWA, as appropriate, and shall set forth what efforts it has made to obtain the information.

(e) Sanctions for Noncompliance:

In the event of a contractor's noncompliance with the Non-discrimination provisions of this contract, the Recipient will impose such contract sanctions as it and/or the FHWA may determine to be appropriate, including, but not limited to:

- (i) Withholding payments to the contractor under the contract until the contractor complies; and/or
- (ii) Cancelling, terminating, or suspending a contract, in whole or in part.

(f) Incorporation of Provisions

The contractor shall include the provisions of paragraphs (a) through (f) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations and directives issued pursuant thereto. The contractor shall take action with respect to any subcontract or procurement as the Recipient or the FHWA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the contractor may request the United States to enter into the litigation to protect the interests of the United States.

(2) **Title VI Nondiscrimination Program (23 CFR 200.5(p))**

The North Carolina Department of Transportation (NCDOT) has assured the USDOT that, as a condition to receiving federal financial assistance, NCDOT will comply with Title VI of the Civil Rights Act of 1964 and all requirements imposed by Title 49 CFR part 21 and related nondiscrimination authorities to ensure that no person shall, on the ground of race, color, national origin, limited English proficiency, sex, age, or disability (including religion/creed or income-level, where applicable), be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any programs, activities, or services conducted or funded by NCDOT. Contractors and other organizations under contract or agreement with NCDOT must also comply with Title VI and related authorities, therefore:

- (a) During the performance of this contract or agreement, contractors (e.g., subcontractors, consultants, vendors, prime contractors) are responsible for complying with NCDOT's Title VI Program. Contractors are not required to prepare or submit Title VI Programs. To comply with this section, the prime contractor shall:
  - 1. Post NCDOT's Notice of Nondiscrimination and the Contractor's own Equal Employment Opportunity (EEO) Policy in conspicuous locations accessible to all employees, applicants and subcontractors on the jobsite.
  - 2. Physically incorporate the required Title VI clauses into all subcontracts on federally-assisted and state-funded NCDOT projects, and ensure inclusion by subcontractors into all lower-tier subcontracts.

3. Required Solicitation Language. The Contractor shall include the following notification in all solicitations for bids and requests for work or material, regardless of funding source:

“The North Carolina Department of Transportation, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair 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. In accordance with other related nondiscrimination authorities, bidders and contractors will also not be discriminated against on the grounds of sex, age, disability, low-income level, creed/religion, or limited English proficiency in consideration for an award.”
  4. Physically incorporate the FHWA-1273, in its entirety, into all subcontracts and subsequent lower tier subcontracts on Federal-aid highway construction contracts only.
  5. Provide language assistance services (i.e., written translation and oral interpretation), free of charge, to LEP employees and applicants. Contact NCDOT OCR for further assistance, if needed.
  6. For assistance with these Title VI requirements, contact the NCDOT Title VI Nondiscrimination Program at 1-800-522-0453.
- (b) Subrecipients (e.g. cities, counties, LGAs, planning organizations) may be required to prepare and submit a Title VI Plan to NCDOT, including Title VI Assurances and/or agreements. Subrecipients must also ensure compliance by their contractors and subrecipients with Title VI. (23 CFR 200.9(b)(7))
- (c) If reviewed or investigated by NCDOT, the contractor or subrecipient agrees to take affirmative action to correct any deficiencies found within a reasonable time period, not to exceed 90 calendar days, unless additional time is granted by NCDOT. (23 CFR 200.9(b)(15))
- (d) The Contractor is responsible for notifying subcontractors of NCDOT’s External Discrimination Complaints Process.
1. Applicability  
Title VI and related laws protect participants and beneficiaries (e.g., members of the public and contractors) from discrimination by NCDOT employees, subrecipients and contractors, regardless of funding source.
  2. Eligibility  
Any person—or class of persons—who believes he/she has been subjected to discrimination based on race, color, national origin, Limited English Proficiency (LEP), sex, age, or disability (and religion in the context of employment, aviation, or transit) may file a written complaint. The law also prohibits intimidation or retaliation of any sort.
  3. Time Limits and Filing Options  
Complaints may be filed by the affected individual(s) or a representative and must be filed no later than 180 calendar days after the following:
    - (i) The date of the alleged act of discrimination; or

- (ii) The date when the person(s) became aware of the alleged discrimination; or
- (iii) Where there has been a continuing course of conduct, the date on which that conduct was discontinued or the latest instance of the conduct.

Title VI and related discrimination complaints may be submitted to the following entities:

- North Carolina Department of Transportation, Office of Civil Rights, Title VI Program, 1511 Mail Service Center, Raleigh, NC 27699-1511; toll free 1-800-522-0453
- Federal Highway Administration, North Carolina Division Office, 310 New Bern Avenue, Suite 410, Raleigh, NC 27601, 919-747-7010
- US Department of Transportation, Departmental Office of Civil Rights, External Civil Rights Programs Division, 1200 New Jersey Avenue, SE, Washington, DC 20590; 202-366-4070

4. Format for Complaints

Complaints must be in writing and signed by the complainant(s) or a representative, and include the complainant’s name, address, and telephone number. Complaints received by fax or e-mail will be acknowledged and processed. Allegations received by telephone will be reduced to writing and provided to the complainant for confirmation or revision before processing. Complaints will be accepted in other languages, including Braille.

5. Discrimination Complaint Form

Contact NCDOT Civil Rights to receive a full copy of the Discrimination Complaint Form and procedures.

6. Complaint Basis

Allegations must be based on issues involving race, color, national origin (LEP), sex, age, disability, or religion (in the context of employment, aviation or transit). “Basis” refers to the complainant’s membership in a protected group category.

**TABLE 103-1  
COMPLAINT BASIS**

Protected Categories	Definition	Examples	Applicable Nondiscrimination Authorities
Race and Ethnicity	An individual belonging to one of the accepted racial groups; or the perception, based usually on physical characteristics that a person is a member of a racial group	Black/African American, Hispanic/Latino, Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, White	Title VI of the Civil Rights Act of 1964; 49 CFR Part 21; 23 CFR 200; 49 U.S.C. 5332(b); 49 U.S.C. 47123. <i>(Executive Order 13166)</i>
Color	Color of skin, including shade of skin within a racial group	Black, White, brown, yellow, etc.	
National Origin <i>(Limited English Proficiency)</i>	Place of birth. Citizenship is not a factor. <i>(Discrimination based on language or a person’s accent is also covered)</i>	Mexican, Cuban, Japanese, Vietnamese, Chinese	
Sex	Gender. The sex of an individual.	Women and Men	1973 Federal-Aid Highway Act; 49 U.S.C. 5332(b); 49 U.S.C. 47123.



	<i>Note:</i> Sex under this program does not include sexual orientation.		
Age	Persons of any age	21-year-old person	Age Discrimination Act of 1975 49 U.S.C. 5332(b); 49 U.S.C. 47123.
Disability	Physical or mental impairment, permanent or temporary, or perceived.	Blind, alcoholic, para-amputee, epileptic, diabetic, arthritic	Section 504 of the Rehabilitation Act of 1973; Americans with Disabilities Act of 1990
Religion (in the context of employment) <i>(Religion/ Creed in all aspects of any aviation or transit-related construction)</i>	An individual belonging to a religious group; or the perception, based on distinguishable characteristics that a person is a member of a religious group. In practice, actions taken as a result of the moral and ethical beliefs as to what is right and wrong, which are sincerely held with the strength of traditional religious views. <i>Note:</i> Does not have to be associated with a recognized religious group or church; if an individual sincerely holds to the belief, it is a protected religious practice.	Muslim, Christian, Sikh, Hindu, etc.	Title VII of the Civil Rights Act of 1964; 23 CFR 230; FHWA-1273 Required Contract Provisions. <i>(49 U.S.C. 5332(b); 49 U.S.C. 47123)</i>

### (3) Pertinent Nondiscrimination Authorities

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest agrees to comply with the following non-discrimination statutes and authorities, including, but not limited to:

- (a) Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.
- (b) The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);
- (c) Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);
- (d) Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability) and 49 CFR Part 27;
- (e) The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);
- (f) Airport and Airway Improvement Act of 1982, (49 USC § 471, Section 47123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);
- (g) The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, sub-recipients and contractors, whether such programs or activities are Federally funded or not);

- (h) Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;
  - (i) The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);
  - (j) Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures Nondiscrimination against minority populations by discouraging programs, policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;
  - (k) Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of Limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);
  - (l) Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U.S.C. 1681 et seq).
  - (m) Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq., Pub. L. 88-352), (prohibits employment discrimination on the basis of race, color, religion, sex, or national origin).
- (4) **Additional Title VI Assurances**

*\*\*The following Title VI Assurances (Appendices B, C and D) shall apply, as applicable*

- (a) Clauses for Deeds Transferring United States Property (1050.2A, Appendix B)  
The following clauses will be included in deeds effecting or recording the transfer of real property, structures, or improvements thereon, or granting interest therein from the United States pursuant to the provisions of Assurance 4.

NOW, THEREFORE, the U.S. Department of Transportation as authorized by law and upon the condition that the North Carolina Department of Transportation (NCDOT) will accept title to the lands and maintain the project constructed thereon in accordance with the North Carolina General Assembly, the Regulations for the Administration of the Federal-Aid Highway Program, and the policies and procedures prescribed by the Federal Highway Administration of the U.S. Department of Transportation in accordance and in compliance with all requirements imposed by Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation pertaining to and effectuating the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252; 42 U.S.C. § 2000d to 2000d-4), does hereby remise, release, quitclaim and convey unto the NCDOT all the right, title and interest of the U.S. Department of Transportation in and to said lands described in Exhibit A attached hereto and made a part hereof.

(HABENDUM CLAUSE)

TO HAVE AND TO HOLD said lands and interests therein unto the North Carolina Department of Transportation (NCDOT) and its successors forever, subject, however, to the covenants, conditions, restrictions and reservations herein contained as follows, which will remain in effect for the period during which the real property or structures are used for a purpose for which Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits and will be binding on the NCDOT, its successors and assigns.

The NCDOT, in consideration of the conveyance of said lands and interests in lands, does hereby covenant and agree as a covenant running with the land for itself, its successors and assigns, that (1) no person will on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination with regard to any facility located wholly or in part on, over, or under such lands hereby conveyed [,] [and]\* (2) that the NCDOT will use the lands and interests in lands and interests in lands so conveyed, in compliance with all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, U.S. Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the U.S. Department of Transportation, Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations and Acts may be amended [, and (3) that in the event of breach of any of the above-mentioned nondiscrimination conditions, the Department will have a right to enter or re-enter said lands and facilities on said land, and that above described land and facilities will thereon revert to and vest in and become the absolute property of the U.S. Department of Transportation and its assigns as such interest existed prior to this instruction].\*

(\*Reverter clause and related language to be used only when it is determined that such a clause is necessary in order to make clear the purpose of Title VI.)

(b) Clauses for Transfer of Real Property Acquired or Improved Under the Activity, Facility, or Program (1050.2A, Appendix C)

The following clauses will be included in deeds, licenses, leases, permits, or similar instruments entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(a):

1. The (grantee, lessee, permittee, etc. as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree [in the case of deeds and leases add "as a covenant running with the land"] that:

- (i.) In the event facilities are constructed, maintained, or otherwise operated on the property described in this (deed, license, lease, permit, etc.) for a purpose for which a U.S. Department of Transportation activity, facility, or program is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, lessee, permittee, etc.) will maintain and operate such facilities and services in compliance with all requirements imposed by the Acts and Regulations (as may be amended) such that no person on the grounds of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities.
2. With respect to licenses, leases, permits, etc., in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to terminate the (lease, license, permit, etc.) and to enter, re-enter, and repossess said lands and facilities thereon, and hold the same as if the (lease, license, permit, etc.) had never been made or issued. \*
  3. With respect to a deed, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will have the right to enter or re-enter the lands and facilities thereon, and the above described lands and facilities will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. \*  
(\*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)
- (c) Clauses for Construction/Use/Access to Real Property Acquired Under the Activity, Facility or Program (1050.2A, Appendix D)
- The following clauses will be included in deeds, licenses, permits, or similar instruments/ agreements entered into by the North Carolina Department of Transportation (NCDOT) pursuant to the provisions of Assurance 7(b):
1. The (grantee, licensee, permittee, etc., as appropriate) for himself/herself, his/her heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add, "as a covenant running with the land") that (1) no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land, and the furnishing of services thereon, no person on the ground of race, color, or national origin, will be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) will use the premises in compliance with all other requirements imposed by or pursuant to the Acts and Regulations, as amended, set forth in this Assurance.
  2. With respect to (licenses, leases, permits, etc.), in the event of breach of any of the above Non-discrimination covenants, the NCDOT will have the right to terminate the (license, permit, etc., as appropriate) and to enter or re-enter and repossess said land and the facilities thereon, and hold the same as if said (license, permit, etc., as appropriate) had never been made or issued. \*

3. With respect to deeds, in the event of breach of any of the above Nondiscrimination covenants, the NCDOT will there upon revert to and vest in and become the absolute property of the NCDOT and its assigns. \*

(\*Reverter clause and related language to be used only when it is determined that such a clause is necessary to make clear the purpose of Title VI.)

**STANDARD SPECIAL PROVISION****ON-THE-JOB TRAINING**

(10-16-07) (Rev. 4-21-15)

Z-10

**Description**

The North Carolina Department of Transportation will administer a custom version of the Federal On-the-Job Training (OJT) Program, commonly referred to as the Alternate OJT Program. All contractors (existing and newcomers) will be automatically placed in the Alternate Program. Standard OJT requirements typically associated with individual projects will no longer be applied at the project level. Instead, these requirements will be applicable on an annual basis for each contractor administered by the OJT Program Manager.

On the Job Training shall meet the requirements of 23 CFR 230.107 (b), 23 USC – Section 140, this provision and the On-the-Job Training Program Manual.

The Alternate OJT Program will allow a contractor to train employees on Federal, State and privately funded projects located in North Carolina. However, priority shall be given to training employees on NCDOT Federal-Aid funded projects.

**Minorities and Women**

Developing, training and upgrading of minorities and women toward journeyman level status is a primary objective of this special training provision. Accordingly, the Contractor shall make every effort to enroll minority and women as trainees to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

**Assigning Training Goals**

The Department, through the OJT Program Manager, will assign training goals for a calendar year based on the contractors' past three years' activity and the contractors' anticipated upcoming year's activity with the Department. At the beginning of each year, all contractors eligible will be contacted by the Department to determine the number of trainees that will be assigned for the upcoming calendar year. At that time the Contractor shall enter into an agreement with the Department to provide a self-imposed on-the-job training program for the calendar year. This agreement will include a specific number of annual training goals agreed to by both parties. The number of training assignments may range from 1 to 15 per contractor per calendar year. The Contractor shall sign an agreement to fulfill their annual goal for the year.\

### Training Classifications

The Contractor shall provide on-the-job training aimed at developing full journeyman level workers in the construction craft/operator positions. Preference shall be given to providing training in the following skilled work classifications:

Equipment Operators	Office Engineers
Truck Drivers	Estimators
Carpenters	Iron / Reinforcing Steel Workers
Concrete Finishers	Mechanics
Pipe Layers	Welders

The Department has established common training classifications and their respective training requirements that may be used by the contractors. However, the classifications established are not all-inclusive. Where the training is oriented toward construction applications, training will be allowed in lower-level management positions such as office engineers and estimators. Contractors shall submit new classifications for specific job functions that their employees are performing. The Department will review and recommend for acceptance to FHWA the new classifications proposed by contractors, if applicable. New classifications shall meet the following requirements:

Proposed training classifications are reasonable and realistic based on the job skill classification needs, and

The number of training hours specified in the training classification is consistent with common practices and provides enough time for the trainee to obtain journeyman level status.

The Contractor may allow trainees to be trained by a subcontractor provided that the Contractor retains primary responsibility for meeting the training and this provision is made applicable to the subcontract. However, only the Contractor will receive credit towards the annual goal for the trainee.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment.

No employee shall be employed as a trainee in any classification in which they have successfully completed a training course leading to journeyman level status or in which they have been employed as a journeyman.

**Records and Reports**

The Contractor shall maintain enrollment, monthly and completion reports documenting company compliance under these contract documents. These documents and any other information as requested shall be submitted to the OJT Program Manager.

Upon completion and graduation of the program, the Contractor shall provide each trainee with a certification Certificate showing the type and length of training satisfactorily completed.

**Trainee Interviews**

All trainees enrolled in the program will receive an initial and Trainee/Post graduate interview conducted by the OJT program staff.

**Trainee Wages**

Contractors shall compensate trainees on a graduating pay scale based upon a percentage of the prevailing minimum journeyman wages (Davis-Bacon Act). Minimum pay shall be as follows:

60 percent	of the journeyman wage for the first half of the training period
75 percent	of the journeyman wage for the third quarter of the training period
90 percent	of the journeyman wage for the last quarter of the training period

In no instance shall a trainee be paid less than the local minimum wage. The Contractor shall adhere to the minimum hourly wage rate that will satisfy both the NC Department of Labor (NCDOL) and the Department.

**Achieving or Failing to Meet Training Goals**

The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and who receives training for at least 50 percent of the specific program requirement. Trainees will be allowed to be transferred between projects if required by the Contractor's scheduled workload to meet training goals.

If a contractor fails to attain their training assignments for the calendar year, they may be taken off the NCDOT's Bidders List.

**Measurement and Payment**

No compensation will be made for providing required training in accordance with these contract documents.





**TECHNICAL SPECIFICATIONS  
for the  
I-77 WELCOME CENTER WASTEWATER TREATMENT PLANT  
IMPROVEMENTS**

**prepared for:**

**NC DEPARTMENT OF TRANSPORTATION  
FACILITIES MANAGEMENT UNIT  
1 SOUTH WILMINGTON STREET  
RALEIGH, NORTH CAROLINA 27601**

**prepared by:**

**THE LANE GROUP  
119 NORTH MAIN STREET  
GALAX, VIRGINIA 24333**

**APRIL 2021**

**TECHNICAL SPECIFICATIONS  
for the  
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**APRIL 2021**



**I-77 WELCOME CENTER WASTEWATER TREATMENT PLANT IMPROVEMENTS  
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**TECHNICAL SPECIFICATIONS**

## SECTION 01000 - GENERAL REQUIREMENTS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specifications Sections, apply to this Section.

## 1.2 SCOPE OF WORK

- A. The Contractor shall furnish all materials, equipment, and labor necessary for work as shown on the drawings. The Contractor shall furnish all equipment and materials for testing.
- B. The Contractor shall be fully responsible for all materials installed and equipment which he has furnished and shall furnish necessary replacements as required for a complete and acceptable job.

## 1.3 APPLICABLE STANDARDS AND CODES

- A. The following is a partial list of typical abbreviations which may be used in the specifications and the organizations to which they refer:

AASHO	-	American Association of State Highway Officials
AASHTO	-	American Association of State Highway and Transportation Officials
ANSI-		American National Standard Institute
ACI	-	American Concrete Institute
AGMA	-	American Gear Manufacturers Association
IEEE	-	Institute of Electrical and Electronic Owner's Representatives
AISC -		American Institute of Steel Construction
ASTM	-	American Society for Testing and Materials
AWWA	-	American Water Works Association
IPCEA	-	Insulated Power Cable Owner's Representatives Association
NEMA	-	National Electrical Manufacturers Association
EEI	-	Edison Electric Institute
ACIFS	-	American Cast Iron Flange Standards
ASME	-	American Society of Mechanical Engineer's
AIA	-	American Institute of Architects
AWS	-	American Welding Society
API	-	American Petroleum Institute
UL	-	Underwriters Laboratory
NEC	-	National Electric Code
NCDOT	-	North Carolina Department of Transportation

## 1.4 NUMBER OF SHOP DRAWINGS

- A. The Contractor shall prepare and submit for review to the Owner's Representative shop drawings for all fabricated work and for all manufactured items required to be furnished by the Contractor as noted in the Contract Documents in accordance with Section 01300.

- B. Shop drawings shall be submitted as required by individual sections of the technical specifications.

#### 1.5 MEASUREMENT AND PAYMENT

- A. Payment for work described in this Section shall be made in accordance with the cost basis as identified on the Bid Form for the specific item. See also Section 01020 of the Contract Documents.

#### PART 2 - PRODUCTS (NOT APPLICABLE)

#### PART 3 - EXECUTION

##### 3.1 SCHEDULES

- A. Schedules shall be updated on a monthly basis and submitted with partial payment estimates.

##### 3.2 TEMPORARY FACILITIES

- A. The Contractor is responsible for providing and/or implementing those temporary measures required to complete project construction. See also Section 01500 of the Contract Documents.

##### 3.3 ELECTRICITY

- A. Make arrangements for, and provide temporary equipment, poles, wiring, switches, and outlets necessary to provide an adequate supply of electricity for lighting and power for construction purposes. Cost of temporary service shall be borne by the Contractor.
- B. The Contractor shall make arrangements for meter installation, service connections, and wiring to meet the requirements of the completed project.

##### 3.4 NOTICES

- A. It shall be the Contractor's responsibility to notify the Owner's Representative at least twenty-four hours in advance of beginning any construction work on the project.

##### 3.5 HANDLING AND STORAGE OF MATERIALS

- A. The Contractor shall be responsible for the shipping from Owner storage areas and storing of all materials which may be supplied by the Owner. Any material which is damaged or defective after receipt of same in good condition shall be replaced by the Contractor at the Contractor's own expense.
- B. If any material is furnished by the Owner, it shall be the Contractor's responsibility to examine such material at the point of delivery and to reject all defective material. If any Owner furnished material is found to be defective after installation and prior to final acceptance, the Contractor shall replace the defective material with sound material at the Contractor's own expense.
- C. The loading and unloading of all equipment and materials, piping, pumps and other accessories

shall be in accordance with the manufacturer's recommended practices and shall at all times be performed with care to avoid any damage to the material.

- D. All materials, once on the job site, shall be stored in accordance with the manufacturer's recommendations.
- E. All miscellaneous valves, fittings, and equipment shall be stored so that they are protected from weather elements. All pipes shall be kept free of dirt and other debris. Any damage to materials shall be repaired in a manner approved by the Owner's Representative. Mechanical equipment and electrical components shall not be stored outside. Mechanical equipment and electrical components shall be stored so that they are protected from outside exposure and moisture.
- F. The Contractor shall be responsible for safeguarding and protecting all material and equipment stored on the job site. The Contractor shall be responsible for the storage of materials in a safe and workmanlike manner to prevent injuries, during and after working hours, until the project is complete.
- G. Construction Water: The Owner provides metered water service to the treatment facility. During the construction period, the Owner will make available to the Contractor water needed for construction at no charge for up to 10,000 gallons/month. Any water consumption over this volume shall be billed to the Contractor at the Owner's prevailing water rates.

### 3.6 GENERAL TESTING REQUIREMENTS

- A. The Owner shall perform, or may require the Contractor to perform, such destructive and nondestructive testing, as it deems necessary in order to inspect the materials and workmanship. These tests shall be in accordance with the procedures established by ASTM and AASHTO.
- B. The Contractor may at any time employ an approved independent testing agency to check the results of the tests made by the Owner. If the Contractor engages a testing agency(ies) to perform additional tests, the cost of the tests shall be paid by the Contractor.

END OF SECTION 01000

## SECTION 01005 - SEQUENCE OF CONSTRUCTION

## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The wastewater treatment plant must remain operational to the greatest extent practical during the construction project. The Contractor shall take extra care to only take portions of the plant out of service at scheduled times and to return the treatment plant back to adequate operation as soon as required by the specifications. The Owner's operator shall be responsible for all operations at the treatment plant and pump stations. The Contractor must obtain prior approval from the operator to start and stop treatment equipment.
- B. The wastewater treatment facility has a permitted treatment capacity of 30,000 Gallons/Day. The biological treatment is provided by two (2) parallel 15,000 GPD extended aeration packaged wastewater treatment units followed by two (2) parallel intermittent sand filters. Other process units include a single comminutor, two (2) filter dosing pumps in a single wetwell, two (2) effluent pumps in a single wetwell, and a single chlorine contact tank.
- C. One (1) of the existing extended aeration packaged wastewater treatment units is currently out of service and is off-line.

## 1.2 NOTIFICATIONS

- A. The Contractor must provide 5 days' advance notice, unless noted otherwise, to the Owner and Engineer of the need for a plant operation shutdown. The treatment plant operates continuously; however, staff are normally present only periodically each day.

## 1.3 OPERATIONS

- A. Treatment unit shutdowns must be scheduled to occur during times of low wastewater influent flow, to the extent possible. The Contractor shall exercise extra caution to protect treated water quality during the construction process and shall take precautions to correct operation problems should effluent standards increase above maximum limits. Contractor shall provide temporary piping and/or bypass pumping as necessary to maintain operations during the construction period.

## 1.4 CONSTRUCTION SEQUENCE

- A. The Contractor shall have control over the construction sequence and may schedule work to occur at his convenience with the following conditions:
  - 1. During the construction period, at least one (1) complete packaged treatment unit (aeration basin, clarifier, sludge holding tank, and all components) and one (1) intermittent sand filter unit shall remain in service at all times.
  - 2. One (1) of the existing extended aeration packaged wastewater treatment units (Plant #2) is currently out of service and is off-line. The Owner has salvaged portions of the blower units, the effluent pipe has been disconnected, and this unit is completely isolated from the current wastewater flow stream.



3. In order to rehabilitate the comminutor unit, the Contractor will need to install either temporary bypass piping or bypass pumping around the unit in order to isolate it from the flow stream.
4. In order to rehabilitate the effluent pump tank, the Contractor will need to provide temporary bypass pumping from the extended aeration packaged wastewater treatment units to the intermittent sand filters.
5. In order to rehabilitate the chlorine contact tank, the Contractor will need to provide temporary bypass piping or bypass pumping from the filtered effluent pump tank to the gravity effluent line. The temporary flow provisions shall incorporate a means of providing chlorination and dechlorination.
6. The treatment facility has two (2) intermittent sand filters that operate in parallel. In order to rehabilitate the filters, one unit is to be temporarily taken off-line and rehabilitated while the other unit remains in operation.

#### 1.5 SUBMITTALS

- A. The Contractor shall submit a construction schedule for review showing when major items of construction will begin and end. The schedule shall be submitted at the pre-construction conference and shall be updated each month and submitted with the application for payment request.

END OF SECTION 01005

## SECTION 01010 - SUMMARY OF WORK

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawing and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 PROJECT DESCRIPTION - The Project includes but is not limited to rehabilitation of an existing 30,000 gpd extended aeration package wastewater treatment plant; including, but not limited to the following items:

- A. Rehabilitate two (2) parallel packaged WWTP units; including:
  - i) Drain, clean, sandblast, and repaint all exposed steel surfaces. Replace damaged sheet metal as required. Tank contents shall be cleaned by a licensed septic tank pumping service and contents transported to a licensed septage receiving station for disposal.
  - ii) Replace the existing aeration system for each treatment unit; including removal and replacement of two (2) complete blower assemblies, all air piping, valves, and diffuser drop assemblies. Furnish existing blower units to Owner for use as spares.
  - iii) For each WWTP unit, provide and install a new duplex blower electric control panel assembly. Replace existing wiring from panel to blower and from panel to main electric supply panel.
  - iv) Furnish one (1) extra blower unit (same model as four installed) to the Owner to serve as a spare.
- B. Rehabilitate existing comminutor assembly; including:
  - i) Drain, clean, sandblast, and repaint all exposed steel surfaces.
  - ii) Remove existing comminutor unit and control panel, clean the unit and furnish to Owner for a spare. Install a new comminutor unit and control panel assembly. Replace existing wiring from comminutor unit to main electric supply panel.
- C. Rehabilitate existing filter dosing tank; including:
  - i) Drain and clean tank interior. Tank contents shall be cleaned by a license septic tank pumping service and contents transported to a licensed septage receiving station for disposal.
  - ii) Remove existing effluent pumps and control panel, clean the items and furnish to Owner as a spare. Install two (2) new effluent pump assemblies and duplex pump control panel. Replace existing wiring from control panel to main electric supply panel.
  - iii) Install new pump discharge valve vault assembly.
- D. Rehabilitate two (2) existing intermittent sand filter systems; including:
  - i) Removal and replacement of existing 4" perforated distribution piping assemblies.
  - ii) Removal and replacement of existing gravity distribution boxes and gravity supply lines and replacement with new pressure distribution manifold assemblies and piping.
  - iii) Removal and replacement of the uppermost 6" of filter sand.
  - iv) Installation of additional masonry block on existing filter perimeter walls.

- v) Replacement of existing buried filter dosing pipe from filter units to dosing pump tank with new 4" pump discharge lines.
- E. Furnish two (2) new filter effluent pumps to the Owner to serve as spares.
- F. Rehabilitate chlorine contact tank unit; including:
  - i) Drain and clean tank interior. Contractor may use a portable pump to convey the tank contents to one of the facility's packaged WWTP units for treatment.
  - ii) Patch and recoat tank's interior concrete surfaces.
  - iii) Fabricate and install new support brackets for tablet dechlorinator
  - iv) Fabricate and install new 60° effluent weir box.
  - v) Replace existing tank grating panels
- G. Any other work as indicated on the plans.

### 1.3 CONTRACT DOCUMENTS

- A. Complete construction and everything properly incidental thereto as shown on the Drawings, stated in Specifications or reasonable implied in the Contract Documents shall be furnished, and details of installation must conform to the highest standards of the trades. What may be called for the Drawings and not in the Specifications or vice versa shall be binding in either case as if the same has been called for in both. The absence of specific details shall not warrant the omission of anything necessary for the proper completion of the work.

### 1.4 CONTRACTOR'S DUTIES

- A. The work to be done under this Contract shall be done in accordance with the Contract Documents and subject to the terms and conditions of the Agreement, complete and ready for use. The Contractor shall provide all labor, skill, materials, equipment, superintendence, temporary utilities, and all the facilities and services necessary for proper execution and completion of the work.
- B. The Contractor shall secure and pay for all fees, licenses, patents, insurance, and testing as necessary for the proper execution and completion of the Work as called for herein and in the General and Supplementary Conditions.
- C. The Contractor shall give required notices to all governing agencies for the timely completion of the Work of the Contract (request for inspections, etc.).
- D. The Contractor shall comply with codes, ordinances, rules, regulations, orders, and other legal requirements of public authorities, which bear on the performance of Work.
- E. The Contractor shall promptly submit written notice to Owner of apparent conflicts in the Contract Documents.

### 1.5 INCIDENTAL WORK AT THE CONTRACTOR'S EXPENSE

- A. The work to be done by the Contractor, specified and enumerated under this Contract, shall include any minor details of the work not specifically mentioned in the Specifications or shown on the Plans, but obviously necessary for the proper completion of the work, which shall be

considered incidental and as being a part of and included with the work for which prices are given in the Bid. The Contractor will not be entitled to any additional compensation therefore.

#### 1.6 WORK SEQUENCE

- A. The work will be conducted in a manner to provide the least possible interference to the activities of the Owner's personnel and to permit the existing treatment facility to remain in operation during the construction period.

#### 1.7 CONTRACTOR USE OF PREMISES

- A. General: Limit use of the premises to construction activities in area indicated; allow for Owner occupancy.
  - 1. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
  - 2. Keep driveways and entrances serving the premises clear and available to the Owner and the Owner's employees at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

#### 1.8 SAFETY REQUIREMENTS

- A. All work shall be done in accordance with current OSHA guidelines and regulations.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01010

## SECTION 01013 - MOBILIZATION

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions, and other Division 1 Specifications Sections, apply to this Section.

## 1.2 DESCRIPTION

- A. The work covered by this Section consists of preparatory work and operation, including but not limited to those necessary for the movement of personnel, equipment, supplies, and incidental to the project site; for the establishment of all offices, buildings, and other facilities necessary for work on the project; video taping of job site; and for all other work and operations which must be performed or costs incurred prior to beginning work on the various items on the project site.

## 1.3 MEASUREMENT AND PAYMENT

- A. All work covered by this Section shall be included in the lump sum price bid for this project. No measurement shall be made.

## PART 2 - PRODUCTS

## 2.1 VIDEO TAPE/DIGITAL RECORDING

- A. The Contractor is required to videotape the proposed work areas prior to start of construction in order to document existing conditions. A copy of the video shall be provided to the Engineer.

## PART 3 - EXECUTION

## 3.1 VIDEO RECORDING

- A. Format: The entire project site shall be videotaped/recorded prior to beginning work and the video tape(s)/digital DVD disc provided to the Owner's Representative. Contractor shall provide video camera and experienced cameraperson who shall walk the entire site. The taping shall be done on a sunny day to provide a clear video. Each taped segment shall begin with the cameraperson verbally noting "Project Name, Company, Camera person's Name, Date, Time and Brief Description of Segment to be Taped." Each video tape shall be clearly labeled as to project name, date, and volume. Provide log of each video tape which will include footage milestones and segments covered in that volume.
- B. Acceptance: Video tape(s) prepared by the Contractor shall be delivered to the Owner's Representative for review. Within seven (7) days of receipt the Owner's Representative shall determine and notify the Contractor if the video is acceptable. Video tape(s) shall be acceptable prior to beginning work.

END OF SECTION 01013

## SECTION 01020 - METHOD OF MEASUREMENT AND PAYMENT

## PART 1 - GENERAL

## 1.1 DESCRIPTION

- A. The following section shall define the method of measurement and payment for items included in the Bid Tabulation for payment other than Lump Sum.
- B. Payment for Lump Sum items shall be based upon Contractor's price breakdown or estimated percentage complete, in accordance with the Contractor's Schedule of Values, and as defined in the General Conditions.
- C. Where applicable, measurements are designated as vertical or linear foot or cubic yard. Vertical foot measurements shall be the vertical length as defined in Part 2. Linear foot measurements shall be horizontal survey measurements as defined in Part 2. Cubic yard measurement shall be calculated quantity based on vertical, horizontal and defined pay width as defined in Part 2. In the event field measurements conflict with survey measurements, the survey measurement shall govern unless an error is discovered in same. The Engineer shall make final determination of payment quantity measurements.
- D. These specifications are general in nature and some items listed in Part 2 may not apply to this project or contract of this project. This specification also may not include all items required as a result of construction. Items considered to be incidental to construction, based upon standard accepted methods of utility construction, shall be included by the Contractor in other payment items when the Contractor is preparing Bid.

## PART 2 – EXECUTION

- 2.1 LUMP SUM ITEMS – These items shall be paid for on a lump sum basis. Lump sum items are typically more complex in nature and/or difficult to quantify during the construction period. Lump sum items may be paid for based upon an estimate of the percentage completed or a more itemized Schedule of Values submitted by the Contractor and approved by the Engineer during the shop drawing review/approval period.
  - 2.1.1 Mobilization/ Demolition: Payment will be made at the Lump Sum Price listed in the Bid Schedule for this bid item. The price shall include and cover the furnishing of all labor, tools and equipment necessary for the assembling and setting up for the project, including the initial movement of personnel and equipment to the project site; application, fee payment, and acquisition for all necessary permits; the establishment of the Contractor's storage areas and other temporary facilities; insurance, bonds (if applicable), and other initial expense required for the start of work. This pay item shall also include the Contractor's expenses associated with demobilization from the project site once all work is completed.
  - 2.1.2 General Structural, Electrical, and Site Work – This Lump Sum bid item includes all general construction costs required to complete the project that isn't specifically covered by some other designated bid item. This item includes, but is not necessarily limited to all costs for furnishing all labor and materials, completion of excavation and site work, furnishing and installation of all equipment items, demolition, piping, painting, electrical, concrete, masonry, metal work, temporary measures, and all other work not covered by another bid item.

2.1.3 Schedule of Values - For Lump Sum bid items, the Owner reserves the right to request an itemized Schedule of Values in order to provide a more detailed breakdown of the submitted expenses. The proposed project is structured to be a Lump Sum bid. Following is a suggested format that the Contractor may consider using for the Schedule of Values with price values assigned as appropriate:

- A. Mobilization/ Demobilization/ Insurance
- B. Comminutor Assembly Rehabilitation
  - Replace comminutor assembly
  - Replace wiring back to main control panel
  - Temporary bypass pumping/piping
  - Clean, sandblast, and repaint tank assembly
- C. Packaged WWTP Assembly Rehabilitation
  - Replace blower assemblies and blower control panels
  - Furnish spare blower and motor
  - Replace wiring back to main control panel
  - Dewater tanks, clean/remove/dispose of tank contents
  - Miscellaneous sheet metal repairs
  - Replace air header piping and valves, diffuser drops, and diffuser assemblies
  - Replace sludge return/waste airlift assemblies and piping
  - Replace scum airlift assemblies and piping
  - Clean/ sandblast, and repaint tank assemblies
- D. Filter Dosing Pump Station Rehabilitation
  - Replace effluent pump assemblies and pump control panel
  - Replace wiring back to main control panel
  - Clean and dewater pump tank
  - Temporary bypass pumping
- E. Intermittent Sand Filter Rehabilitation
  - Remove and replace 6" of filter sand
  - Demolition and removal of existing distribution boxes and distribution piping
  - Replace 4" perforated distribution piping and anchor straps
  - Low-pressure dosing pipe manifold box assemblies
  - 4", 2", and ¾" low pressure dosing pipe and valve vault
  - Raise masonry block filter perimeter wall
  - Regrade and reshape drainage ditch beside filters

## F. Chlorine Contract Tank Rehabilitation

- Clean and dewater contact tank
- Temporary bypass pumping
- Replace effluent weir box and tablet dechlorinator support structure
- Recoat tank interior
- Replace tank grating
- Furnish spare effluent pumps

- 2.2 UNIT PRICE ITEMS - Not Applicable - All work for this project will be on a Lump Sum cost basis.
- 2.3 RETAINAGE - The Owner may withhold Retainage from progress payments in accordance with the terms and conditions as defined in the Contract Documents.
- 2.4 LIQUIDATED DAMAGES – The Construction Agreement specifies the allotted construction contract time and Liquidated Damages that will be assessed for this Project. Liquidated Damages represent the cost of administration, engineering supervision, inspection, and other expenses that will be charged against the Contractor for each calendar day beyond the Contract time limit that the Contract remains in an incomplete state.

## PART 3 - REPORTING

- 3.1 The Contractor shall include the sum of the measurements in a monthly pay request in accordance with the terms of the Contract. The Contractor and Owner's Field Representative shall concur on the quantity of items in each pay request before the Contractor submits such a pay request for payment.

END OF SECTION 01020



## SECTION 01200 - PROJECT MEETINGS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
  - 1. Preconstruction conferences.
  - 2. Progress meetings.
  - 3. Coordination meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Submittals" for submitting the Contractor's Construction Schedule.

## 1.3 PRECONSTRUCTION CONFERENCE

- A. Schedule and hold the conference at the Project Site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
  - 1. Attendees: Authorized representatives of the Owner, Owner's Representative, and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Critical work sequencing.
    - c. Designation of responsible personnel.
    - d. Procedures for processing field decisions and Change Orders.
    - e. Procedures for processing Applications for Payment.
    - f. Distribution of Contract Documents.
    - g. Submittal of Shop Drawings, Product Data, and Samples.
    - h. Preparation of record documents.
    - i. Use of the premises.
    - j. Parking availability.
    - k. Office, work, and storage areas.
    - l. Equipment deliveries and priorities.
    - m. Safety procedures.
    - n. First aid.
    - o. Security.
    - p. Housekeeping.
    - q. Working hours.

#### 1.4 PROGRESS MEETINGS

- A. Progress meetings can be requested and coordinated by any party as the need arises otherwise.
- B. Conduct progress meetings at the Project Site at regular intervals no greater than every 30 days. Notify the Owner and the Owner's Representative of scheduled meeting dates.
- C. Attendees: In addition to representatives of the Owner and the Owner's Representative, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- D. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
  - 1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.
  - 2. Review the present and future needs of each entity present, including the following:
    - a. Interface requirements.
    - b. Time.
    - c. Sequences.
    - d. Status of submittals.
    - e. Deliveries.
    - f. Off-site fabrication problems.
    - g. Access.
    - h. Site utilization.
    - i. Temporary facilities and services.
    - j. Hours of work.
    - k. Hazards and risks.
    - l. Housekeeping.
    - m. Quality and work standards.
    - n. Change Orders.
    - o. Documentation of information for payment requests.
- E. Reporting: No later than 7 days after each meeting, distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
  - 1. Schedule Updating: Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

#### 1.5 COORDINATION MEETINGS

- A. Conduct project coordination meetings at regular intervals convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special preinstallation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01200

## SECTION 01300 - SUBMITTALS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section includes the requirements for Shop Drawings, O & M Manuals, and other submittals required for this Project. Red ink is for Owner's Representative's use exclusively on submittals, shop drawings, and other data.

## 1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

## 1.3 DEFINITIONS

- A. Shop drawings and samples shall be submitted to Owner's Representative in sufficient quantity to permit the Owner's Representative to retain a minimum of four (4) sets and return the number of copies required by the Contractor. Submittals of less than five (5) sets will be returned without review. Submittals will be reviewed only if approved by General Contractor with his stamp.

- B. The work-related submittals of this Section, in addition to the definitions of the General Conditions and elsewhere in the Contract Documents, are further categorized for convenience as follows:

1. Shop Drawings: Submission of shop drawings shall comply with the following requirements:
  - a. Shop Drawings include specially-prepared technical data of all forms including Drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form for application to more than one (1) project.
  - b. The shop drawings shall be submitted sufficiently in advance of the work which they cover to afford ample time for checking, correcting, and rechecking if necessary. No claim for delay will be granted the Contractor if caused by his failure to comply with the requirements of this Section.
  - c. Before submitting for approval, the Contractor shall check all shop drawings, including those submitted by subcontractors, for accuracy and to ascertain that all work contiguous with and having bearing on other work shown on the shop drawings is accurately drawn, and that the work shown is in conformity with the contract requirements.
  - d. Shop drawings submitted for approval shall bear the Contractor's stamp of approval as evidence that such drawings and details have been checked by the Contractor. The submission of shop drawings (in either the original submission or when resubmitted with corrections) constitutes evidence that the Contractor has checked all information therein, and that he accepts and is willing to perform the work, as shown, in a workmanlike manner and in accordance with the best standard practices. No claim for an extra shall be based on work shown on the shop drawings, unless such claim is noted on the Contractor's transmittal letter accompanying the shop drawings.

The Contractor's approval stamp shall contain the following statement:

"The equipment and material shown and marked in this submittal is that proposed to be incorporated into this Project, and has been checked for and is in compliance with the Contract Documents unless otherwise shown in bold face type or lettering and listed on a page or pages headed 'DEPARTURES FROM CONTRACT DOCUMENTS,' and can be installed in the allocated spaces.

Checked By: \_\_\_\_\_ Date: \_\_\_\_\_"

The person signing the stamp shall be one designated in writing by the CONTRACTOR as having that authority. The signature shall be handwritten in ink. Stamped signatures are not acceptable.

- e. The Owner's Representative approval of shop drawings and schedules shall not relieve the Contractor from responsibility for deviation from drawings and specifications unless he has in writing called the Owner's Representative attention to such deviations at the time of submission. The Owner's Representative approval shall not relieve Contractor from responsibility for errors of any sort on shop drawings or schedules.
- C. **Product Data:** Product data include standard printed information on materials, products and systems; not specially-prepared for this Project, other than the designation of selections from among available choices printed therein.
  - D. **Samples:** Submission of samples shall comply with the following:
    - 1. Samples include both fabricated and unfabricated physical examples of materials, products and units of work; both as complete units and as smaller portions of units of work; either for limited visual inspection or (where indicated) for more detailed testing and analysis.
    - 2. Samples and manufacturers' literature shall be submitted in duplicate except where a greater number is specifically required by the specifications.
    - 3. Samples and manufacturers' literature shall be forwarded (prepaid) to Owner's Representative office accompanied with a transmittal letter containing the following information: Name of project, contractor, description of product, manufacturer, model number, ASTM or Federal Specification number where applicable. Catalogs shall be marked to indicate specific items submitted for approval.
    - 4. Samples which are rejected by the Owner's Representative must be re-submitted as soon as possible after notification of rejection, and shall be marked "Re-submitted Sample" in addition to other required information.
    - 5. The right is reserved to require submission of samples of any material or any material lists, whether or not particularly mentioned in the Specifications.
  - E. **Mock-Ups:** Mock-ups are a special form of samples, which are too large or otherwise inconvenient for handling in the specified manner for transmittal of sample submittals.
  - F. **Miscellaneous Submittals:** Miscellaneous submittals related directly to the work include warranties, maintenance agreements, workmanship bonds, survey data and reports, physical work records, statements of applicability, quality testing and certifying reports, copies of industry standards, record Drawings, field measurement data, operating and maintenance materials,

overrun stock, security/protection/safety keys and similar information, devices and materials applicable to the work and not processed as Shop Drawings, product data or samples.

#### 1.4 SUBMITTALS

- A. Submittals controlled by these general requirements shall include Shop Drawings, product data, samples and miscellaneous work-related submittals. The individual submittal requirements are specified in applicable sections for each unit of work.

#### 1.5 QUALITY ASSURANCE

- A. Contractor and Subcontractor shall approve Shop Drawings and other submittals prior to submitting to Owner's Representative for review.

#### 1.6 MEASUREMENT AND PAYMENT

- A. Payment for work described in this Section shall be included in the lump sum bid price for this project. No measurement shall be made.

### PART 2 - PRODUCTS

#### 2.1 SHOP DRAWINGS

- A. Provide newly-prepared information, with graphic information at accurate scale (except as otherwise indicated), with name of preparer indicated (firm name). Show dimensions and note which are based on field measurement. Identify materials and products in the work shown. Indicate measurement. Indicate compliance with standards and special coordination requirements. Do not allow shop drawing copies without appropriate final "Action" markings by Owner's Representative to be used in connection with the work.

#### 2.2 PRODUCT DATA

- A. Collect required data into one (1) submittal for each unit of work or system; and mark each copy to show which choices and options are applicable to Project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked, and special coordination requirements. Maintain one (1) set of product data (for each submittal) at Project site, available for reference by Owner's Representative or others.
- B. Submittals: Same as for Shop Drawings.

#### 2.3 SAMPLES

- A. Provide units identical with final condition of proposed materials or products for the work. Include "range" samples (not less than three (3) units) where unavoidable variations must be expected, and describe or identify variations between units of each set. Provide full set of optional samples where Owner's Representative selection is required. Prepare samples to match Owner's Representative's sample where so indicated. Include information with each sample to show generic description, source or product name and manufacturer, limitations, and compliance with

standards. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by Owner's Representative. Owner's Representative will not "test" samples (except as otherwise indicated) for other requirements, which are therefore the exclusive responsibility of Contractor.

## 2.4 WARRANTIES

- A. In addition to copies desired for Contractor's use, furnish two (2) executed copies, except furnish two (2) additional copies required for maintenance manuals. Furnish same number of copies of specified and coincidental product warranties, where specific execution for Project application is not required.

## 2.5 GENERAL DISTRIBUTION

- A. Provide additional distribution of submittals (not included in the aforementioned copy submittal requirements) to Subcontractors, suppliers, fabricators, installers, governing authorities and others as necessary for proper performance of the work. Include such additional copies in transmittal to Owner's Representative where required to receive "Action" marking before final distribution.

## 2.6 OPERATION AND MAINTENANCE MANUALS

- A. After the shop drawing has been approved, the Operation & Maintenance Manuals are then to be submitted to Owner's Representative. At least four (4) copies of these Manuals shall be submitted. The timely submittal of O & M Manuals should be made so as to not impact the Owner's 90% payment milestone. O&M manuals shall be submitted and accepted prior to operation of any equipment on the project.
- B. Content of Operation and Maintenance Manuals shall include, but not be limited to the following as applicable:
  - 1. Description of equipment.
  - 2. Description of operation and operating instructions.
  - 3. Disassembly and repair instructions.
  - 4. Alternate methods of operation.
  - 5. Safety precautions.
  - 6. Recommended maintenance procedures and schedule.
  - 7. Parts List(s).
  - 8. Diagrammatic descriptions, cuts, photographs, etc.
  - 9. Dimensional information.
  - 10. Parts list identifying all parts and materials of construction and recommended spare parts list.
  - 11. Address and telephone numbers for parts and service.
  - 12. Lubrication – list of specific lubricants, at least two (2) brand names and type and recommended lubrication frequencies.
  - 13. Warranty.

## PART 3 - EXECUTION

### 3.1 SCHEDULING

- A. Where appropriate in various required administrative submittals (listings of products, manufacturers, suppliers and Subcontractors, and in job progress schedule), show principal work-related submittal requirements and time schedules for coordination and integration of submittal activity with related work in each instance. Shop Drawing schedule to be submitted at time of pre-construction conference.

### 3.2 COORDINATION AND SEQUENCING

- A. Coordinate preparation and processing of submittals with performance of the work so that work will not be delayed by submittals. Coordinate and sequence different categories of submittals for the same work, and for interfacing units of work, so that one will not be delayed for coordination with another. No extension of time will be allowed because of failure to properly coordinate and sequence submittals.

### 3.3 PREPARATION OF SUBMITTALS

- A. Provide permanent marking on each submittal to identify Project, date, Contractor, Subcontractor, submittal name and similar information to distinguish it from other submittals. Use an alpha-numeric system for identifying original submittals; i.e., Submittal No. 20 (Original Submittal) and Submittal No. 20A (First Revision). Show Contractor's executed review and approval marking and provide space for Owner's Representative's "Action" marking. Package each submittal appropriately for transmittal and handling. Submittals which are received from sources other than through Contractor's office will be returned "without action."

### 3.4 OWNER'S REPRESENTATIVE'S ACTION

- A. Review is only for conformance with the design concept of the project. Markings or comments do not relieve the Contractor from compliance with the contract documents nor allows departure there from. The Contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for technique of assembly, for coordination of the work with all trades, and for performing this work in compliance with the contract documents.
- B. Where action and return is required or requested, Owner's Representative will review each submittal, mark with "Action."
  - 1. Final Unrestricted Release: Work may proceed, provided it complies with Contract Documents, when submittal is returned with the following marking:

"No Exceptions Taken"
  - 2. Final-But-Restricted Release: Work may proceed, provided it complies with notations and corrections on submittal and with Contract Documents, when submittal is returned with the following marking:

"Make Changes Noted"
  - 3. Returned for Resubmittal: Do not proceed with work. Revise submittal in accordance with notations thereon, and resubmit without delay to obtain a different action marking. Do not



allow submittals with the following marking (or unmarked submittals where a marking is required) to be used in connection with performance of the work:

"Revise and Resubmit"

4. Returned for Non-Compliance: Do not proceed with work. Product submitted does not comply with Contract Documents. Resubmit for product complying with the requirements of the Contract Documents. Do not allow submittals with the following marking to be used in connection with performance of the work:

"Rejected - Returned for Non-Compliance"

### 3.5 TESTING AND INSPECTIONS

- A. Testing and inspections shall be conducted in accordance with the requirements of the specific specification. Testing of concrete shall be in accordance with Division 3 and requirements for soil testing shall be in accordance with Division 2.
- B. The payment for the specified testing will be the responsibility of the Contractor. Non-specified testing required by the Owner will be paid for by the Owner unless the test results indicate a non-compliance with the contract documents. At such indication the cost of said testing and subsequent retesting shall be born by the Contractor.

END OF SECTION 01300

## SECTION 01500 - TEMPORARY FACILITIES

## PART 1 - GENERAL

- 1.1 Refer to General Conditions for comments which result in requirements for Contractor to provide temporary facilities as may be required for performance of the work and fulfillment of the Contract. This section specifies certain minimum temporary facilities to be provided by Contractor regardless of methods and means selected for performance of the work, but not by way of limitation and not assured for compliance with governing regulations. Use of alternate temporary facilities is Contractor's option, subject Engineer's acceptance. Temporary facilities is defined to exclude tools and construction machines, testing, demolition, alterations, soil borings, and mockups and similar items.

## PART 2 - PRODUCTS

- 2.1 **SHEDS AND STORAGE:** Provide suitable and sufficient enclosed and covered spaces, with raised flooring, to protect materials and equipment subject to damage by weather or construction.
- 2.2 **FENCING AND BARRICADES:** Provide fences and barricades and protection devices sufficiently to prevent injury to persons or damage to property in accordance with Safety Requirements of applicable standards, codes, ordinances, and insurance agencies.
- 2.3 **TOILETS:** Provide adequate temporary outside toilet facilities for use of persons working at sites. Provide toilet facilities with adequate light and ventilation and toilet tissue in suitable holder. Comply with applicable legal and health requirements. Locate as directed by Engineer.
- 2.4 **WATER:** Make arrangements for, and provide temporary equipment and piping necessary to provide any necessary adequate supply of water for construction and testing purposes. Cost shall be borne by the Contractor.
- 2.5 **TEMPORARY BYPASS PUMPING & PIPING:** As part of the WWTP rehabilitation procedures, it will be necessary for the Contractor to provide and use temporary bypass pumps and associated piping in order to convey flow around the treatment unit(s) being isolated. The Contractor shall be fully responsible for selection of an appropriate pump/piping system required to accomplish this task. Under no circumstances will the Contractor be permitted to allow wastewater spills or overflows to occur. In the event that any wastewater spills or overflows do occur as result of the Contractor's actions, the Contractor shall be fully responsible for all cleanup costs and any regulatory fines that may be imposed.
- 2.6 **TANK CLEANING & CONTENTS REMOVAL:** As part of the construction procedure, the Contractor is required to isolate one or more tanks included in the treatment system then drain and clean the tank contents prior to completing the repairs/rehabilitation work to that particular unit.
- The existing WWTP does not have a plant drain pump station. In order to drain the tank contents, the Contractor will be required to engage a licensed septic tank cleaning service to remove the tank contents and transport the contents to a licensed septage receiving facility for processing. The Contractor shall pay for the septic tank service's cleaning, transport, and processing charges.
- 2.7 **CONSTRUCTION OFFICE:** A field office is not required to be provided for this project.

**PART 3 - EXECUTION**

- 3.0 Maintain all temporary facilities until the project has been substantially completed and accepted by Owner.
- 3.1 Provide sheds and covered spaces suitably to store materials and equipment requiring protection.
- 3.2 Maintain lights and other safety equipment. Keep safety lights burning from dusk to dawn.
- 3.3 Install lifting and hoisting equipment to meet all applicable safety requirements.
- 3.4 Maintain adequate toilet facilities and keep toilets in clean and sanitary condition.
- 3.5 Make arrangements and install temporary water, electric, and telephone service required for the project.
- 3.6 Pump or drain water to keep work and storage area free from water which could interfere with the work, or could cause damage. Distribute discharge to prevent erosion.
- 3.7 Remove all temporary work at the completion of the project, unless directed otherwise by the Engineer.
- 3.8 Clean spaces that were occupied by temporary work. Remove debris and rubbish from the site.

END OF SECTION 01500

## SECTION 02055 - SELECTIVE DEMOLITION

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Demolition and removal of sheet metal and/or other related tank accessories identified to be replaced.
  - 2. Demolition and removal of existing aeration system piping and diffusers, froth control system and accessories, sludge and scum airlift assemblies, and filter distribution piping.
  - 3. Cleaning and disposal of WWTP tank contents and debris inside tanks.
  - 4. Salvage of existing items to be reused or recycled; including blowers, pumps, and electrical equipment.
  - 5. Removal and disposal of filter sand.
- B. Related Sections include the following:
  - 1. Division 1 Section 01500 "Temporary Facilities" for temporary construction and environmental-protection measures for selective demolition operations.

## 1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

## 1.4 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, time capsule, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
  - 1. Coordinate with Owner's representative, who will establish special procedures for removal and salvage.

## 1.5 SUBMITTALS

- A. Qualification Data: For demolition firm.

- B. Schedule of Selective Demolition Activities: Indicate the following:
1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
  2. Coordination for shutoff, capping, and continuation of utility services.
  3. Locations of proposed dust and noise control temporary partitions and means of egress.
- C. Predemolition Photographs: Show existing conditions of WWTP tankage and accessories, including any items that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.
1. Comply with submittal requirements in Division 1.

#### 1.6 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.

#### 1.7 PROJECT CONDITIONS

- A. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner.
- C. Storage or sale of removed items or materials on-site is not permitted.
- D. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

#### PART 2 - PRODUCTS (Not Used)

#### PART 3 - EXECUTION

##### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.
- E. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs, preconstruction videotapes, and templates.
- F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
  - 1. Comply with requirements for existing services/systems interruptions specified in Division 1 Section 01010 "Summary of Work."
- B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of the facility.
  - 3. The Contractor is cautioned to exercise all care to ascertain if utility services are active (live) or abandoned. Should any utility service not be cut off, capped, or disconnected, the Contractor shall not disturb the same and shall contact the utility company immediately for disconnection.

### 3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with those existing facilities that are to remain in operation.
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to existing facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of selective demolition.

### 3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Dispose of demolished items and materials promptly. Comply with requirements in Division 1.
- B. The Contractor shall take every precaution to guard against any movement or settlement of adjacent buildings or structures and shall provide and place, at his own expense, any bracing or shoring necessary or proper in connection therewith; and shall be solely and entirely responsible for the safety and support of such buildings or structures; and shall be solely liable for any such movement or settlement and any damage or injury caused thereby or resulting there from. If at any time the safety of any adjacent building or structure shall appear to be endangered, the Contractor shall cease operations, notify the Owner, and, at his own expense, shall take all proper means to support such building or structure and shall not resume operations until permission has been secured in writing from Owner or Engineer. If the Owner or Engineer considers additional bracing or shoring necessary to safeguard and prevent any such movement or settlement, the Contractor shall promptly design, provide and place, at his own expense, any such bracing or shoring as necessary. All designs shall be approved by a Professional Engineer.
- C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

### 3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Steel Plates: Damaged sections of steel plates to be removed and replaced shall be removed by cutting with a torch or steel saw as appropriate. The cut section shall extend to such locations as necessary to have adequate thickness/condition of remaining material. The cut edges and adjoining flat sections of steel shall be ground smooth in order to provide a suitable bonding surface for the replacement material.
- B. Steel Accessories, Grating Frames, Etc.: Steel Accessories (Air piping, Froth piping, etc.), grating frames, and other related items to be removed shall be removed by cutting with a torch or steel saw as appropriate.
- C. Tank Contents for Disposal: Existing WWTP tank contents required to be removed and disposed of shall be removed by pumping. Tank contents - both liquid and remaining tank solids (sludge, inert materials, gravel sand, etc.), and debris shall be removed by an approved septic tank cleaning service and transported to a licensed WWTP with septage receiving facilities for processing.

### 3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill. Tank contents to be removed and disposed of off-site for subsequent treatment shall be transported to a licensed WWTP for processing.
  - 1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Comply with requirements specified in Division 1.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

### 3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02055



## SECTION 02230 - EXCAVATING AND BACKFILLING FOR UTILITIES

## PART 1 - GENERAL

- 1.1 This Section covers the excavation and backfill for all underground utilities, except those within five (5) feet of building or structures.

## PART 2 - PRODUCTS

## 2.1 BACKFILL MATERIALS

## A. Initial backfill materials shall conform to the following:

1. USCS Soil Classification System (FHA Bulletin No. 373).
2. Class I: Angular, 6 to 25 mm (1/4 to 1 inch) graded stone, including a number of fill materials that have regional significance such as coral, slag, crushed stone, and crushed shells.
3. Class II: Coarse sands and gravels with maximum particle size of 25 mm (1 inch) including variously graded sands and gravels containing small percentages of fine, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SM, and SC are included in this class.
4. Class III: Fine sand and clayey gravels less than 1 inch, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil types GM, GC, SM, and SC are included in this class.

## PART 3 - EXECUTION

## 3.1 GENERAL

- A. All excavation shall be open-cut type except where otherwise shown on the plans and unclassified regardless of the nature of material encountered to the depths indicated on the plans and no separate payment will be made for excavation. The slope of the sides of the excavation shall be kept as nearly vertical as possible consistent with the types of materials encountered. Where trenches would become unreasonably large due to a deep excavation or extremely wet condition, the Contractor shall slope or bench the trench walls to maintain safe working conditions. A clear area shall be maintained a sufficient distance back from the top edge of the excavation to avoid overloading which may cause slides, cave-ins or shifting of the pipe. Any damage to pipes or structures occurring through settlements, heaving, water or earth pressures, slides, caving, or other causes shall be repaired by the Contractor at his own expense. The Contractor has the option of shoring, including sheet piling, which shall be installed during excavation where required for the protection of workmen, banks, adjacent paving, structures, and utilities or as directed by the Engineer. All excavation shall be done in accordance with the current OSHA guide lines. The Contractor is responsible for providing adequate equipment to comply with OSHA regulations.
- B. Shoring or sheeting shall be removed as the work progresses, unless left in place by written order of the Engineer. When excavation is made in fill section, the fill sections shall have been previously compacted in accordance with Section 3.4. All blasting operations shall conform to Section 3.8.

### 3.2 TRENCH EXCAVATION

- A. Trenches shall be of minimum width equal to the outside diameter of the pipe plus 18 inches, except that the minimum trench width shall not be less than 33 inches. The banks of pipe trenches shall be as nearly vertical as practicable to a point above the top of the pipe. Trenches shall be excavated to the design grade of the pipe to provide uniform bearing and support along the entire length of pipe.

#### Pressure or Gravity Line with Flexible Conduit Ductile Iron

Unless otherwise specified on the Plans, bedding for flexible Ductile Iron conduit will be a minimum of Type 1 as shown on the Detail Sheet of the Plans.

#### Pressure or Gravity Line with Flexible Conduit PVC

Unless otherwise specified on the Plans, bedding for flexible PVC conduit will be a minimum of Type 2 as shown on the Detail Sheet of the Plans.

- B. Over excavation of otherwise suitable material shall be replaced with suitable material as directed by the Engineer. The cost of such fill will be borne by the Contractor. (Where the bottom in pipe trenching occurs in rock, the rock shall be excavated to a minimum overdepth of 6 inches below the trench depth indicated on the drawings or as specified. Overdepths in rock excavation and unauthorized overdepths shall be backfilled with No. 57 crushed stone or gravel).
- C. Whenever wet or otherwise unstable material that is incapable of properly supporting the pipe is encountered in the bottom of the trench, such material shall be overexcavated to a depth to allow for construction of a stable pipe bedding. The width of the trench at and below the top of the pipe shall not exceed the outside diameter of the pipe plus 18 inches except the minimum trench width shall not be less than 33 inches.
- D. The width of the trench above the top of the pipe may be as wide as necessary for sheeting and bracing and the proper performance of the work. The trench shall be backfilled to a proper grade with suitable materials.
- E. Trench bedding shall be as shown on the details.
- F. Trench excavation shall be done within conformance of current OSHA guidelines.

### 3.3 BACKFILLING

- A. The Contractor will keep the project backfilled on a daily basis. No trench will be opened in excess of that which pipe can be installed and backfilled completely, including any testing the Contractor may wish to employ, prior to the end of the working day. All backfill shall be brought up equally along each side of the pipe in such manner as to avoid displacement of or damage to the pipe. In general, the backfill material shall consist of earth, loam, sandy clay, sand and gravel, soft shale or other approved materials, free of large clods of earth or stones larger than one (1) inch in diameter deposited in six (6) inch layers thoroughly and carefully tamped until the pipe has a cover of not less than one (1) foot.
- B. When, in the opinion of the Engineer, the excavated material is not satisfactory for use as backfill, the material shall be disposed of under direction of the Owner. Select material shall be brought in by the Contractor. No extra payment will be made for disposing of unsatisfactory material or

bringing in select material with the material to be used for backfill at a moisture content that will facilitate compaction.

- C. The trench shall be backfilled and compacted in layers not exceeding eight (8) inches. Other methods of achieving the compaction may be used; however, only with written approval of the Engineer. Backfill in open areas shall be compacted to a density equal to the existing ground. Backfill under roadways, or other similar installations shall be compacted to a minimum density of 95 percent as determined by the Modified Proctor method or to the degree of compaction as required for the fill through which it is placed, whichever is greater. The Contractor will be required to have one (1) test taken for each road crossing to ensure that the required density is being achieved. The Engineer shall select the depth that the test is to be taken. Backfill not compacted to the required density will be removed, recompacted, and retested at the Contractor's expense until the requirements are met. Excess material shall be disposed of as directed by the Engineer.
- D. All backfill shall be maintained in a satisfactory condition, and all places showing signs of settlement shall be filled and maintained during the life of the contract and for a period of one (1) year following the date of final acceptance of all work performed under the Contract. When the Contractor is notified by the Engineer or the Owner that any backfill is hazardous, he shall correct such hazardous condition at once.
- E. Backfill material shall comply as a minimum with the following standards of the American Society for Testing and Materials, and/or equivalent standards and methods.
  - D-1557 Moisture-Density Relations of Soils using a 10 pound hammer with 18 inch drop.
  - D-1556 Density of Soil In-place Sand Cone method.
  - D-1883 California Bearing Ratio.

### 3.4 COMPACTION

- A. Where sands and/or gravels are used for fill, the material shall be compacted to maximum possible density obtainable with a plate-type vibrating compactor of standard manufacture consisting of a variable speed power unit attached to a vibratory plate. The vibrator may be single or multiple type and shall provide sufficient unit pressure on the vibratory plate to obtain maximum density. When the proper moisture content is obtained for all other soils, they shall be compacted to a density of 95 percent of maximum density. Upon completion of the subgrade, the applicable moisture density relations shall be maintained until placement of the concrete.
- B. Moisture: Moisture density relations, specified for materials used for fills and backfill shall be determined and the degree of compaction controlled except where otherwise specified, in accordance with the requirements of ASTM D-1557, Modified Proctor Test.

### 3.5 FILL

- A. Fill shall be provided where required to raise the subgrade to the elevations shown. The material used, the maximum thickness of each layer prior to compaction, and the percent of maximum density required at optimum moisture content as determined by ASTM D-1557, "Moisture-Density Relation of Soils Using a 10 pound Hammer and an 18 inch Drop," shall be as stated hereinafter in this Specification. Fill material shall be free of debris, roots, and organic or frozen materials. No fill shall be placed until the subgrade has been checked and approved, and in no case shall fill be placed on a subgrade that is muddy, frozen, or that contains frost. Each layer shall be uniformly

spread, moistened, or dried by aeration when required to the proper moisture content for the required degree of compaction and uniformly compacted by a power roller vibrator or other approved equipment. The surface presented by the completed fill shall be brought to a reasonably true and even plane and shall be approved prior to further construction operations thereon.

- B. Placing: The approved materials shall be placed in successive horizontal layers of loose material not more than six (6) inches thick where compaction is by rollers or vibrators and four (4) inches thick where mechanical tamping is required. If sands or poorly graded gravels (either of which contain less than 15 percent passing the No. 200 sieve) are used, they shall be placed fully saturated to prevent bulking. Well graded gravel shall be placed at the optimum moisture content. For all other materials, each layer shall be wetted or dried by aeration to a moisture content of two (2) to four (4) percent above optimum.

### 3.6 BORROW

- A. Where satisfactory materials are not available in sufficient quantity from required excavations, approved materials shall be obtained from borrow areas. Acquisition of compactable borrow material shall be approved by the Engineer. No separate payment will be made for furnishing and placing approved borrow material. Compensation in full is included in the lump sum price paid under this Contract.

### 3.7 CONCRETE ENCASEMENT

- A. Where called for in the plans, pipe shall be encased in concrete. The concrete shall be 3,000 psi. The dimensions of the encasement shall conform to the dimensions shown on the plans. The concrete shall be placed carefully around the pipe to avoid displacing the pipe. No concrete shall be placed in water. The Contractor shall not backfill over concrete encasement until 24 hours after pouring unless directed otherwise by the Engineer.

### 3.8 BLASTING

- A. Blasting operations are prohibited.

### 3.9 AGGREGATE AND PAVING

- A. All open cuts through pavement on existing dedicated streets shall be replaced full trench depth with compacted crushed stone and one and one-half times the existing pavement thickness with surface mix bituminous concrete. When the existing road surface is not bituminous concrete, the cut shall be replaced with material of the same type to the dimensions observed in the cut. Disturbed gravel roads, driveways and shoulders shall be replaced with aggregate stone a minimum of six (6) inches or equal to original thickness, whichever is greater. Existing paved driveways that are disturbed shall be paved with plant mix bituminous concrete to the existing thickness, or the existing material at the existing line and grade.

### 3.10 GRADING

- A. Areas required to be graded unless otherwise shown, outside of each building and structure line shall be constructed true to grade, shall be shaped to drain, and shall be maintained free from extraneous accumulations until final inspection has been completed and the work has been accepted.

END OF SECTION 02230

## SECTION 02700 - PLANT PIPING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. This Section is intended to define the required quality standards of the materials furnished and the workmanship performed in connection with the herein specified items of piping and all the required accessories and appurtenances including, in part, all labor, tools, materials and equipment for the complete piping work for this contract which are not defined elsewhere in the Specifications or on the Drawings.
- B. All pipe four (4) inches and larger shall be DI CL 50 unless specifically marked.
- C. All process piping three (3) inches and smaller shall be Schedule 10 stainless steel unless specifically marked otherwise.

## 1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and Division 1 Specifications Sections apply to this Section.
- B. Requirements of other Divisions or Sections:
  - 1. Division 1, General Requirements.
  - 2. Division 2, Site Work.
  - 3. Division 3, Concrete.
  - 4. Division 9, Painting.

## 1.3 SUBMITTALS

- A. Manufacturer's data shall be submitted for all pipe and fittings for approval prior to purchasing. Data shall indicate compliance with specifications including thickness, materials, working pressure and joints.

## 1.4 OPERATION AND MAINTENANCE MANUALS

- A. Contractor shall provide copies of the manufacturer's information for the required operation and maintenance procedures for all equipment.
- B. The information shall include normal maintenance requirements as well as procedures for operation during malfunctions or equipment failure.
- C. The information shall include drawings showing all required parts.
- D. An address for obtaining replacement parts shall be included.

## 1.5 MEASUREMENT AND PAYMENT

- A. Payment for the work covered in this Section shall be included in the Lump Sum Price Bid for this project. No measurement shall be made.

## PART 2 - PRODUCTS

### 2.1 DUCTILE IRON PIPE

- A. General: Ductile iron pipe (D.I.P.) shall be centrifugally cast in metal molds or sand-lined molds. The jointed sections of the piping shall be so placed as to allow for maintenance and to permit units and equipment connected to these systems to be removed without disturbance to the main piping systems. All ductile iron pipe and fittings shall have the weight and class clearly designated on the exterior of each length or fitting with white paint and the trade mark of the manufacturer and the year cast into or on the hub.
- B. Pipe and Fittings: Ductile iron pipe and fittings shall conform to the latest revision of AWWA/ANSI C115/A21.15 for flanged pipe and AWWA/ANSI C151/A21.51 for mechanical joint pipe. All pipe and fittings shall be thickness Class 50 unless otherwise called for on the plans. Pipe and fittings shall be cement-lined in accordance with the latest revision of AWWA/ANSI C104/A21.4.
- C. Joints:
  - 1. All exposed fittings within buildings and structures shall be Class 125 flanged fittings in accordance with ANSI B16.1. All flanges shall be finished flat-faced for full area gasket bearing and shall be back-faced or have the back face spotted for full bearing of the nut.
    - a. Flanges shall be furnished with factory punched full face gaskets 1/16 inch thick, as manufactured by Crane Co., Chicago; Anchor Packing Co., Philadelphia, Garlock Packing Co., Palmyra, or equal. Steel regular unfinished square head machine bolts shall be threaded U.S. National Coarse Threads Series, ANSI B1.1., Class 2 Fit, and shall be furnished with heavy pattern unfinished hex nuts, ANSI B18.2. After threaded bolts or tapping nuts, threads shall be coated with a rust preventative lubricant and bolts and nuts packaged separately.
  - 2. All covered pipe fittings outside of buildings and structures shall be mechanical joint. The mechanical joint shall be of the stuffing box type and shall conform to latest revisions of ANSI A21.11. The joint consists of a bell cast integrally with the pipe or fitting provided with an exterior flange having cored or drilled bolt holes and an interior annular recess for receiving the sealing gasket and straight spigot end of the pipe or fitting, a wedge shaped sealing gasket of a vulcanized rubber especially compounded for sewage or water, a separate cast iron follower gland having cored or drilled bolt holes, and high strength cast iron tee head bolts threaded U.S. National Coarse Threads, Class 2 Fit, in accordance with American National Standard Institute (ANSI) B1.1, furnished with heavy pattern steel hex nuts. After threading or tapping, threads shall be coated with a rust preventative lubricant. Push-on or other type joints may be used with prior approval of the Owner's Representative.
  - 3. Mechanical joint restrainer glands shall be designed to fit standard mechanical joint bells with standard T head bolts conforming to ANSI/AWWA C 111/A21.11 and ANSI/AWWA C 153/A21. Glands shall be manufactured of ductile iron conforming to ASTM A 536-80 grade 60-42-10. Set-screws shall be of hardened ductile iron and require the same torque

in all sizes. Steel set-screws shall not be permitted. Glands shall have minimum pressure rating listed below with a minimum safety factor of 2:1 and shall be listed with Underwriters Laboratories and/or approved by Factory Mutual. Glands shall meet the following pressure requirements:

PIPE SIZE	WORKING PRESSURE
4	350
6	350
8	250
10	250
12	250
14	250
16	250
18	200
20	200
24	150
30	150
36	100
42	100

D. Coatings and Linings:

1. Bituminous:

- a. Outside Coating: Outside coating shall be a bituminous coating of either coal tar or asphalt base with a minimum 1 mil dry film thickness per ANSI A21.51 (AWWA C151). The coating shall be applied to all pipe unless otherwise specified. The finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and shall be strongly adhered to the pipe at all temperatures. When leaving the foundry, all outside abrasion marks shall be repaired with a coat of bituminous paint.
- b. Inside Coating: Inside of the pipe shall be cement-mortar lined in accordance with AWWA/ANSI C104/A21.4 or latest revision thereof. Cement shall be Portland cement in accordance with latest revision of ASTM C150. The water used for the mortar shall be potable water free of impurities. Sand shall be well graded, from fine to coarse, consisting of inert granular material having hard, strong, curable uncoated grains meeting all test requirements referenced in AWWA C104. Mortar shall be a mixture of cement, sand and water containing not less than one part of cement to two parts of sand by volume.
  - 1) Pipe manufacturer shall certify that cement-mortar lining is in compliance with AWWA/ANSI C104/A21.4 or latest revision thereof.
  - 2) Thickness of pipe lining shall not be less than 1/16 in. (1.6 mm) for 3-12 inch pipe; 3/32 in. (2.4 mm) for 14-24 inch pipe; and 1/8 in. (3.2 mm) for 30-54 in. pipe.
  - 3) Lining shall be cured to produce a properly hydrated mortar lining.
  - 4) The cement lining shall be given a seal coat of asphaltic material which shall adhere to the mortar lining. After a 48-hour drying time, the seal coat shall have no deleterious effect upon the quality, color, taste or odor of potable water.

- E. **Handling Ductile Iron Pipe:** Ductile iron pipe, fittings and accessories, shall be handled in such a manner as to ensure that sound, undamaged pipe entirely suitable in all respects to the specific requirements of each particular fitting, pipe and accessory is provided and installed. Particular care shall be taken not to injure either the coating, the pipe or threads. Equipment, tools and methods used in loading, reloading, unloading, hauling, and laying pipe and fittings shall be such that no damage is done thereto or the coatings thereon. Where hooks are used for lifting, they shall have broad well-padded contact surfaces and shall be of such design and length that they will provide uniform support for a distance back from the end of the pipe not less than one-half of the internal pipe diameter. Defective or damaged coatings or linings may be repaired, if properly done, by and at the expense of this Contractor, who may employ the pipe manufacturer to make such repairs, but in any case, all such field repairs shall be made under the direct supervision of a representative of the pipe manufacturer. No field repair work may be done on any damaged pipe coating or lining without the prior approval of the Owner's Representative. Any bituminous pipe coating that is damaged by shipment or by the Contractor, shall be repaired prior to installation or placing of any backfill or hanging within hangers, by removing all the damaged coating, wire brushing to expose the metal and applying two (2) coats of bituminous coating material of a type and quality equal to that used originally for the bituminous coating of the pipe.
- F. **Cutting, Cleaning and Inspecting Ductile Iron Pipe:** The cutting of pipe for closure pieces or for other reasons, shall be done in a neat and workmanlike manner by a method which will not damage the pipe or its liner. Unless otherwise approved by the Owner's Representative, all cutting of such pipe shall be done by means of mechanical cutter of an approved type. Wheel cutters shall be used wherever practical. After cutting, the interior of the pipe shall be thoroughly swabbed or cleaned of all foreign matter and shall be kept clean during and after installation. Before installation of any pipe and fitting, each piece shall be inspected for defects and shall be rung with a light hammer to detect any cracks. All defective, damaged or unsound pipe or fittings shall be rejected.

## 2.2 STAINLESS STEEL AIR PIPE

- A. SS pipe materials shall comply with ASTM A312, 304L, SCH 10S. for pipe (pressure to 150 PSI and temperatures to 200°F). SS pipe fittings shall comply with ASTM A774 and ASTM A351.
1. **NUTS, BOLTS AND WASHERS:**
    - a. ASTM A320, Type 304.
    - b. Two nuts provided for 1 IN DIA bolt applications and larger.
  2. **GASKET MATERIAL:**
    - a. Gaskets shall be high temperature resistant Viton.
    - b. Temperature rating of 300°F.
- B. **SS PIPE FABRICATIONS**
1. All tube, piping, fitting product to be immersion pickled subsequent to manufacturing and fabrication operations and prior to shipping. Pickling solution of 6 to 10 percent nitric acid and 3 to 4 percent hydrofluoric acid. Temperature and exact concentrations to be such only a modest etch is produced but all oxidation and ferrous contamination is removed from metal surface.



2. All pickling solution residues are to be neutralized after pickling. Diameter tolerance and wall thickness tolerance are to conform to ASTM A530.
3. Joints:
  - a. Shop welded circumferential butt-weld joints.
  - b. Van Stone joints using angle face rings with backing flanges.
  - c. Flanges: Flat faced.  
Welding neck or slip on type. ASTM A182, Type 304L.  
ANSI B16.1, Class 150d.
  - d. Expansion Joints:
    1. Fabricate for 15 psi internal pressure and 250°F operation.
    2. Ensure aerial travel in expansion joints of 3.1 IN minimum for 15,000 cycles or 5.2 IN for 1000 cycles.
    3. Furnish each assembly with minimum four control tie rods.
    4. Fabricate with 125 LB flanged end connections.

2.3 HANGERS AND SUPPORTS

- A. General: Hangers and supports shall include all hanging and supporting devices of metallic construction shown, specified, or required for pipe lines, apparatus, and equipment other than electrical equipment. The Contractor's working drawings, as required herein, shall show the quantity, type, design, and location of all hangers and supports required under the various items.
- B. Materials: Materials for hangers and supports of metallic construction shall conform to the requirements specified herein and to the following standards:

Structural steel	ASTM A36 and A283
Steel bars (Grade 1022)	ASTM A107
Steel castings (Grade N-1)	ASTM A27
Wrought steel pipe	
Grade A, Schedule 40)	ASTM A53
Wrought iron	ASTM A42
Iron castings (Grade 35)	ASTM A48
Cast Iron Fittings (Class 125)	ANSI B16.1
Malleable iron castings	ASTM A47
Bolting Materials, Steel	
Bolts, yokes and stud bolts	ASTM A307
Nuts	ASTM A563
Physical Requirements	
Tensile Strength	60,000-72,000 psi
Yield Strength	38,000-50,000 psi
Elongation	27% Minimum
Reduction of Area	37-55%

Bolting Materials, Silicon Bronze

Bolts, stud bolts, yokes and nut,(alloy A)	ASTM B98
Physical Requirements	
Tensile Strength	70,000 psi minimum
Yield Strength	38,000 psi minimum
Elongation	17% Minimum

**Bolting Materials, Stainless Steel**

Bolts, stud bolts and nuts (Type 316)	ASTM A276
Physical Requirements	
Tensile Strength	75,000 psi minimum
Yield Strength	30,000 psi minimum
Elongation	35% Minimum
Reduction of Area	45% Minimum

- C. Where specified or shown, bolts, stud bolts, rods, yokes and nuts of hangers and supports shall be of silicon bronze or stainless steel as specified above with the dimensions, threads and sizes equivalent to those specified in steel. Where submerged in process fluids or where located in covered manholes, bolts, stud bolts, rods, yokes and nuts of hangers and supports shall be of silicon bronze.
- D. Except where otherwise shown, specified or required, hangers, supports, anchors and concrete inserts shall be of the standard types as manufactured by Crane Company, Grinnell Company, Fee and Mason Manufacturing Company, or equal, meeting the requirements specified herein. All hangers, supports and concrete inserts shall be listed with the Underwriters' Laboratory.
- E. Design: Hangers and supports shall be adequate to maintain the pipe lines, apparatus and equipment, in proper position and alignment under all operating conditions and have springs where necessary. Hangers and supports shall be of standard design where possible, and be best suited for the service required, as approved by the Owner's Representative. Where required, they shall be screw adjustable after installation. Supporting devices shall be designed in accordance with the best practice and shall not be unnecessarily heavy. Sufficient hangers and supports shall be installed to provide a working safety factor of not less than 12 for each hanger, assuming that the hanger is supporting 12 feet of pipe filled with water. On pipes three (3) inches in diameter and larger which are covered with heating insulation, hangers and supports shall include proper pipe protection saddles.
- F. Hangers for Piping: Overhead hangers shall be supported by threaded rod properly fastened in place by suitable screws, clamps, inserts, or bolts or by welding. Hanger rod sizes shall be determined by the size of the pipe supported in accordance with the following schedule.

<u>Size of Pipe (inches)</u>	<u>Diameter of Pipe (inches)</u>
3/4 to 2 inclusive	3/8
2-1/2 to 3-1/2 inclusive	1/2
4 to 5 inclusive	5/8
6	3/4
8 to 12 inclusive	7/8
Over 12	1

The foregoing schedule is based on Schedule 80, wrought iron and wrought steel pipe, ANSI B36.10, filled with water. When heavier pipe is to be supported, the distance between rods shall be lessened or rods of greater diameter shall be used.

- G. Supports for Piping: Brackets for support of piping from walls and columns shall be made of welded wrought steel and shall be designed for three maximum loads classified as follows:

Light	750 pounds
Medium	1,500 pounds
Heavy	3,000 pounds

When medium or heavy brackets are bolted to walls, back plates of adequate size and thickness shall be furnished and installed to distribute the load against the wall. Where the use of back plates is not practicable, the brackets shall be fastened to the wall in such a manner that the safe bearing strength of the wall will not be exceeded. Pipe rolls or chairs, shall be of the cast iron type. Pipe rolls shall be provided with threaded rods.

- H. Spacing of Hangers: Spacing of hangers shall not exceed the following:

<u>Nominal Pipe Sizes (Inches)</u>	<u>Maximum Span (Feet)</u>
1	7
1-1/2	9
2	10
2-1/2	11
3	12
3-1/2	13
4	14
5	16
6	17
8	19

Where concentrations of valves, fittings, and equipment occur, closer spacing of supports will be required. In no case shall any total hanger load (weight of piping, insulation, and contents) exceed the following load carrying capacities for hot rolled road ASTM A107.

<u>Nominal Rod Diameter (Inches)</u>	<u>Maximum Safe Load (Lbs.)</u>
3/8	610
1/2	1,130
5/8	1,810
3/4	2,710
7/8	3,770
1	4,960
1-1/8	6,230
1-1/4	8,000
1-3/8	9,470
1-1/2	11,630

- I. Saddle Stands: Saddle stands shall be of the adjustable type. Each stand shall consist of a length of wrought pipe fitted at the base with a standard screw threaded cast iron flange and at the top with an adjustable saddle or roll. The base flange shall be bolted to the floor or foundation. Stanchions shall be of similar construction to the saddle stand, except that they shall be fitted at the top with cast iron pipe saddle supports or with pipe stanchion saddles with yokes and nuts. Where adjustable supporting devices are not required, pipe lines three (3) inches in diameter and smaller may be supported on approved cast iron, malleable iron, or wrought steelhooks, hook plates, ring or ring plates.
- J. Anchors: Anchors shall be furnished and installed where specified, shown or required for holding the pipe lines and equipment in position or alignment. Anchors shall be designed for rigid fastening to the structures either directly or through brackets. The design of all anchors shall be subject to approval by the Owner's Representative.
  - 1. Anchors for piping shall be of the cast iron chair type with wrought steel straps, except where anchors form an integral part of pipe fittings or where an anchor of special design is required.
- K. Inserts: Inserts for concrete shall be furnished galvanized and shall be installed in the concrete structures where required for fastening supporting devices. They shall be designed to permit the rods to be adjusted horizontally in one (1) plant and to lock the rod nut or head automatically. Nail slots shall be provided in the exposed flanges of the insert. Inserts shall be designed to carry safely the maximum load that can be imposed by the rod which they engage.

#### 2.4 WALL SLEEVES AND FLOOR, WALL, AND CEILING PLATES

- A. Wall sleeves above grade and not subject to hydrostatic pressure shall be finished flush at both wall faces and shall be constructed of 18 gauge sheet metal soldered and shall clear the pipe sides of the wall using yarn and hot-poured lead.
- B. Wall sleeves below grade or where lines are subjected to hydrostatic water pressure shall be of cast iron, bell and bell ended with center flanged water stop external to the sleeve at the mid-point of the wall or as shown on the Drawings. The line within the sleeve shall be caulked watertight both sides of the wall using yarn and hot-poured lead.

#### 2.5 WALL PIPES

- A. Wall pipes shall be furnished at the locations shown on the Drawings. Wall pipes shall meet the requirements of cast iron pipe as previously defined. Wall pipes shall have the ends as shown and meet the requirements for joints as previously defined. Wall pipes shall have integral center flange which shall be cast in the wall.

#### 2.6 COUPLINGS AND ADAPTERS

- A. All sleeve type couplings where shown on the plans shall be designed to fit accurately the outside diameters of the pipe to which they are to connect. Gaskets shall be molded rubber. Couplings shall be furnished complete with bolts, nuts and gaskets. Middle rings shall be made up with a pipe stop and shall be at least as thick as the steel pipe and with follower rings of appropriate thickness. Middle rings for couplings used on cast iron pipe shall be at least 3/8 inch thick. Middle rings shall be not less than seven (7) inches wide. Couplings shall be installed in strict accordance with the recommendations of the manufacturer.

- B. Flanged Adapters: Flanged adapters shall be cast iron construction and manufactured to meet ASTM A-126, Class B.
- C. All flexible couplings shown on the piping plans shall be constructed of flexible neoprene having an elastomeric bellows with ball-shaped design manufactured of multiple plies of nylon cord fabric and neoprene, both molded and cured in hydraulic rubber pressures. Couplings shall be rated for a minimum of 250 psi at 220 degrees F.

## 2.7 DRAINS

- A. Drains shall be made of high grade, strong, tough, and even-grained metals suitable for heavy duty use. Castings shall be free from blowholes, porosity, hard spots, excessive shrinkage, cracks, or other injurious defects. They shall be smooth and well-cleaned both inside and outside, and all fins and roughness shall be removed. Castings shall not be repaired, plugged, brazed, or "burned in." The wall thickness of iron castings shall be not less than 1/4 inch. The size of the drains shall be determined by the branch sizes indicated on drawings.

## 2.8 MECHANICAL JOINT RESTRAINTS

- A. Mechanical joint restraints shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, consist of a plurality of individually actuated gripping surfaces that impacts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Glands shall be manufactured of ductile iron conforming to ASTM A 536-80.
- B. Restraining devices shall be of ductile iron heat treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell and tee-head bolts conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of latest revision. Twist-off nuts shall be used to ensure roper actuating of the restraining devices.
- C. The mechanical joint resistant device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1. Restraining glands for PVC pipe shall have a pressure rating equal to that of the pipe on which it is used. The restraining glands shall have been tested to UNI-B-13-92, be listed by Underwriters Laboratories, and be approved by Factory Mutual.

## PART 3 - EXECUTION

- 3.1 In shipping, delivering, storing, and installing, pipe and accessories shall be kept in a sound, undamaged condition. Pipe coating shall not be injured, and no other pipe or material shall be placed inside a pipe or fitting after the coating has been applied.
- 3.2 All pipe between structures and terminus shall be of the same size and material and shall be furnished by the same manufacturer. Each pipe length and all fittings shall be clearly marked at intervals of five (5) feet or less with the manufacturer's name or trademark and pipe type or strength.

### 3.3 PIPING WITHIN BUILDINGS AND STRUCTURES

- A. Piping systems installed within the buildings and structures shall be installed essentially where and as shown on the drawings, with ample clearances and allowances for expansion or contraction; operation of all doors and windows; mechanical equipment, etc.; without blocking aisle space; and installed with provision for the weight of the pipe and contents; shall be supported at proper intervals to assure uniform alignment and all other conditions encountered; including, provisions for support connections to the structural members. These support connections are to be so applied as to relieve all structural members of undue stress or strain.
- B. It is the intent of this specification that all piping be installed "gas" and "water" tight. Any and all joints otherwise shall be repaired and faulty materials shall be removed from the project site. Test pressures shall be applied by the use of a pump or other suitable device. Pressure shall be maintained for such a time as required to permit the Owner or his representative to complete the inspection of all pipe under test and mark the location of defective joints or other items for further correction. Testing shall be as specified elsewhere in this Section.
- C. The Contractor shall be responsible for the location and size of any and all sleeves or openings required for the piping systems. He shall arrange for all chases, recesses, inserts or anchors, at proper times and at the proper elevation and location in the building construction. The failure to provide this information shall require that he pay for any and all costs incurred for these corrections. He shall arrange his work with all others engaged on the project, to maintain the proper relationship of this work with the work of all others.

### 3.4 PIPING OUTSIDE BUILDINGS AND STRUCTURES

- A. Systems installed outside the buildings and structures shall be installed essentially where and as shown on the drawings, with ample clearance and allowances for expansion or contraction; operation of all doors and windows; mechanical equipment, etc. It is the intent of this specification that all piping be installed "gas" and "water" tight. Testing shall be done as herein specified in this Section.
- B. Piping shall be laid to the elevation shown on the plans. Piping without specific elevations that conflicts with other piping that has specific elevations shown on the plans shall be varied in depth or necessary fittings shall be used to avoid the piping with specific elevations shown on the drawings.
- C. All ductile iron buried piping shall have a mechanical joint not more than two (2) feet and as close as practical to any building or structure it enters or exits. The next joint shall not be more than six (6) feet or less than four (4) feet from the first joint. The balance of the piping shall continue with standard laying lengths, or as shown on the plans. The first joint of buried piping (greater than three (3) inches) protruding through a floor slab shall be equipped with a mechanical joint retainer gland.
- D. Where restrained joint piping is required, the joints shall lock in place but be able to be deflected. Each restraining joint shall consist of a restraining locking ring bolted over a steel ring welded to the plain end of the pipe. Other types of restraining joints may be used with approval of the Owner's Representative.

### 3.5 INSTALLATION OF PIPING SYSTEMS

- A. **Equipment Pipe Connections:** Care shall be taken in bolting flanged joints, so that there is no restraint on the opposite end of the pipe or the fitting which would prevent uniform gasket pressure at the connection or would cause unnecessary stresses in the equipment flange. Bell and spigot joints shall only be yarned or otherwise packed until all flange joints affected thereby shall have been hand tightened without strain. Bolts shall be tightened gradually at a uniform rate and in a program that will result in uniform gasket compression over the entire area of the joint. Special care shall be taken when attaching suction and discharge piping to pumping equipment so that no stresses are transmitted to or imposed on the pump. All pumping connection to pumps or other equipment shall be so installed and so supported that accurate matching of the bolt holes and uniform contact over the entire area of abutting pump or equipment flange and connecting pipe line flange is obtained prior to the installation of any bolt in any flange. In addition, the pump connecting or equipment piping shall be free to move in all directions parallel to its longitudinal centerline when and while the bolts in the pump connection flange are tightened. Pumps or equipment shall not be grouted prior to the initial fitting and alignment of the pipes connected thereto. They shall; however, in each case be level, aligned, and wedged in place in position. The pumps or equipment shall be grouted prior to the final bolting of the connecting piping in accordance with the provision of this paragraph. To provide the maximum flexibility and ease of alignment, the pump or equipment connecting piping shall be assembled with the gaskets in place with only a portion of the flange bolts, not less than four per joint, installed and with the bell and spigot joints yarned but not leaded. After aligning and bolting, the pump or equipment connection shall be tested by loosening the flange bolts, if the piping is properly installed, there should be no change in the relationship of the piping flange to the pump or equipment connecting flange.
- B. **Lining Up Bell and Spigot Pipe:** Pipe lines or runs intended to be straight shall be so laid. Deflections from a straight line or grade, made necessary by vertical curves or horizontal curves or offsets, shall not exceed that recommended by the manufacturer of the pipe or approved by the Owner's Representative. If the specified or required alignment requires deflections in excess of those stipulated above, the Contractor shall provide either special bends as approved by the Owner's Representative, or pipes in shorter lengths in such length and number that the annular deflections at any joint, as required by the specified maximum deflections, are not exceeded.
- C. **Laying Pipe in Trench:** Each pipe length, having been properly cleaned and tested, shall be laid on the previously graded trench bottom after the bell hole has been dug; after proper joint cleaning, the joint gasket or rubber ring, if used, shall be placed on the pipe spigot as recommended by coverage, supports, and such additional pertinent data as will be required by future contractors for the replacement of any buried facility.
1. Only proper and suitable tools and appliances for the safe and convenient handling and laying of pipes and fittings shall be used. Pipe, fittings, and valves shall be carefully handled and lowered into the trench. Under no circumstances shall any pipe or fittings be dumped or rolled into trench or be allowed to drop against the pipe or fitting already in the trench. Great care shall be taken to prevent the pipe lining and coating from being damaged, and any lining or coating damaged in any way shall be repaired by the Contractor to the satisfaction of the Owner's Representative. Before being lowered and while suspended, the pipe shall be inspected for defects and ductile iron pipe rung with a light hammer to detect cracks. Defective, damaged or unsound pipe will be rejected.

2. The interior of the pipe shall be thoroughly cleaned of all foreign matter before being lowered into the trench and shall be kept clean during laying operations by means of plugs or other approved methods. The pipe shall not be laid in water or when the trench or weather conditions are unsuitable for such work. When work is not in progress, open ends of pipe and fittings shall be closed securely so that no trench water, earth, or other substances will enter the pipe or fittings.
3. The full length of each section of underground pipe shall rest solidly upon the pipe bed and any defects due to settlement shall be made good by the Contractor at his own expense. The ends of pipe shall abut against each other in such manner that there shall be no shoulder or unevenness on the inside of the main. Bell holes shall be dug sufficiently large to ensure the making of proper joints. Special precautions shall be exercised to prevent any pipe from resting on rock.
4. Any pipe that has the grade or joint disturbed after laying shall be taken up and relaid. Any pipe, pipe fittings, or appurtenance found defective after installation shall be replaced without additional expense to the Owner.
5. Except where otherwise necessary in making connections or closures, or as authorized by the Owner's Representative, bell-and-spigot pipe shall be laid with bells facing in the direction of flow for pressure pipe and bells on upstream for gravity pipe.
6. Where pipe cutting is necessary, it shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise authorized, cutting shall be done by means of an approved type of mechanical cutter which will leave a smooth end at right angles to the axis of the pipe and not otherwise damage the pipe or lining. Wheel cutters shall be used when practicable.
7. Jointing
  - a. Mechanical joints and push-on joints on ductile iron pipe and fittings shall be made in accordance with the recommendations of the joint manufacturer, as approved.
  - b. Permissible Deflection at Joints:
    - 1) No spring of joints to effect a change in direction will be allowed except by permission or direction or as shown on the drawings.
    - 2) Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, the amount of deflection shall not exceed that recommended by the pipe or joint manufacturer.
    - 3) If the required alignment necessitates greater deflections, special bends approved by the Owner's Representative or shorter lengths of pipe to provide angular deflections within acceptable limits shall be furnished.
    - 4) Alternate methods of jointing pipe will be considered by the Owner's Representative if the Contractor furnishes satisfactory evidence that the proposed alternate method has been used successfully and is acceptable to the manufacturer of the pipe.
8. Pipe excavation shall be kept free from water and no joint shall be made under water. The Contractor shall be careful during backfilling to prevent damage to or disturbing of joints and to protect the watertight integrity of the pipes at all times. There shall be no walking on or working over pipe until backfill is over pipe. Backfilling shall be commenced by



depositing and tamping earth layers not more than four (4) inches thick around and over the pipe to a point not less than one (1) foot in depth over the top, after which backfilling of the remainder of the trench may proceed.

9. Thrust Blocks:

- a. Plugs, caps, tees, and bends, vertically or horizontally, on force main shall be provided with thrust blocking where indicated on the plans.
- b. Thrust blocking shall be concrete, minimum 2,000 psi.
- c. Unless otherwise indicated or directed, the base and thrust bearing sides of thrust blocks shall be poured directly against undisturbed earth. The sides of thrust blocks not subject to thrust may be poured against forms. The area of bearing shall be as shown on the drawings or directed by the Owner's Representative.
- d. Blocking shall be placed so that the fitting joints will be accessible for repair.

NOTE: Mechanical joint restraint and rodding may be used in lieu of thrust blocks when shown on the drawings or approved by the Owner's Representative.

3.6 AIR TESTING

- A. All piping shall be tested under low air pressure listed on Table 1 below after completion of backfill and approval of compaction. The Contractor may perform preliminary tests at his own discretion for his information, without the presence of the Owner's Representative, at no cost to the Owner. The Contractor shall schedule the proposed tests with the Owner's Representative at least 48 hours in advance. Tests shall be performed in the presence of the Owner's Representative. All material, equipment, and labor required shall be provided by the Contractor. Test sewers from manhole to manhole or from manhole to terminus.
- B. Conduct tests as follows: Close valves. Add air slowly to the portion of the pipe being tested until internal air pressure is at a test pressure of 20 psi. Do not allow personnel in manholes after increasing air pressure. If, in the Owner's Representative's opinion there is any indication of leakage at the test plug, relieve the pressure before taking steps to eliminate the leak. Maintain test pressure for a minimum of two (2) minutes. Then disconnect hose and compressor. If pressure decreases to 3.5 psi, record the time required for the pressure to drop one (1) psi from 3.5 to 2.5 psi. Pipes failing to maintain minimum acceptable holding times set forth in the tables included herein will not be accepted. Make repairs or replacement as required at no cost to the Owner and retest.

TABLE 1  
AIR TEST TABLE

MINIMUM HOLDING TIME IN SECOND REQUIRED FOR PRESSURE  
TO DROP FROM 3-1/2 TO 2-1/2 PSIG

PIPE DIAMETER

L	8"	12"	18"	21"	24"	27"	30"	33"	36"	39"	42"	48"	54"
25	18	40	89	121	158	200	248	299	356	418	485	634	802
50	35	79	178	243	317	401	494	599	713	837	970	1268	1528
75	53	119	267	364	475	601	743	898	1020	1105	1189	1358	1528

100	70	158	356	485	634	765	851	935	1020	1105	1189	1358	1528
125	88	198	446	595	680	765	851	935	1020	1105	1189	1358	1528
150	106	238	510	595	680	765	851	935	1020	1105	1189	1358	1528
175	123	277	510	595	680	765	851	935	1020	1105	1189	1358	1528
200	141	317	510	595	680	765	851	935	1020	1105	1189	1358	1528
225	158	340	510	595	680	765	851	935	1020	1105	1189	1358	1528
250	176	340	510	595	680	765	851	935	1020	1105	1189	1358	1528
275	194	340	510	595	680	765	851	935	1020	1105	1189	1358	1528
300	211	340	510	595	680	765	851	935	1020	1105	1189	1358	1528
325	227	340	510	595	680	765	851	935	1020	1105	1189	1358	1528
350	227	340	510	595	680	765	851	935	1020	1105	1189	1358	1528
400	227	340	510	595	680	765	851	935	1020	1105	1189	1358	1528
450	227	340	510	595	680	765	851	935	1020	1105	1189	1358	1528
500	227	340	510	595	680	765	851	935	1020	1105	1189	1358	1528
550	227	340	510	595	680	765	851	935	1020	1105	1189	1358	1528
600	227	340	510	595	680	765	851	935	1020	1105	1189	1358	1528
650	227	340	510	595	680	765	851	935	1020	1105	1189	1358	1528

NOTE: TO BE USED WHEN TESTING ONE DIAMETER ONLY.

L = Length of line in feet.

Deflection may be tested using a deflectometer, calibrated television or photography, or a "go, no-go" mandrel or sewer ball. Deflection testing technique shall be approved by the Owner's Representative prior to use. Every sewer section shall be tested. Contractor shall repair or replace as necessary within 30 days and retest at no cost to the Owner until satisfactory results are obtained.

### 3.7 PAINTING

- A. Piping shall be painted in accordance with Division 9.

END OF SECTION 02700

## SECTION 02725 - VALVES, HYDRANTS AND APPURTENANCES

## PART 1 – GENERAL

## 1.1 SCOPE

- A. The General Provisions of the Contract, including the General and Supplemental Conditions, apply to the work specified in this Section.
- B. The Contractor shall furnish all equipment, labor, materials, and appurtenances required to accomplish the work specified herein.

1.2 DESCRIPTION: This section of the Specifications defines the class, type, pressure rating and materials that will be required for various valves, hydrants, and appurtenances used. Reference is made to Section 02700, "Plant Piping," regarding end types, materials, class, etc., of the various piping systems. The Contractor shall furnish, install, insulate where required, paint, test, and adjust all valves, hydrants and other miscellaneous equipment, including all auxiliary equipment and devices such as handwheels, operating stands, position indicators, valve tags, valve boxes, extension stems, stem guides, gasketing, and accessories and appurtenances as shown on the Drawings, specified or required for a complete installation.

1.3 MEASUREMENT AND PAYMENT: Payment for the work covered in this section shall be included in the lump sum price bid for this project. No measurement shall be made for valves, hydrants, and appurtenances listed in this section.

1.4 SHOP DRAWINGS: Shop Drawings shall be submitted for all items of equipment specified in this Section as outlined in Division 1.

1.5 OPERATION AND MAINTENANCE INFORMATION: The Contractor shall provide operation and maintenance information for equipment provided as required by Division 1.

## PART 2 - PRODUCTS

## 2.1 GATE VALVES

- A. Gate valves, 3-1/2 inches and smaller, shall be rising stem, bronze body and bronze trim type. All parts shall be bronze except the handwheel and stem. The stuffing box gland shall be so arranged that the valve may be repacked under pressure.
- B. Gate valves, four (4) inches and larger, shall be cast or iron body, bronze mounted, fully encapsulated resilient seals conforming to AWWA C509, Sec. 4.16. Valve ends shall be as required for the piping in which they are installed. Valve ends shall be furnished according to the following specifications:

- 1. End Type Specification:

- a. Flanged ANSI B 16.1, 125 psi.
- b. Mechanical Joint ANSI A 21.11.

- C. In general, interior gate valves shall have flanged ends with handwheel, and exterior valves shall have mechanical joint ends with non-rising stem and valve box. The Contractor shall refer to the

Drawings for all exceptions. Valve stems shall be manganese bronze with threads accurately cut to gauge. All valves shall have a clear waterway of full diameter of the valve. The handwheel or operating nut of each valve shall have an arrow cast on it showing the direction of opening. Where required, valves shall be equipped with gearing having a ratio of not less than 2 to 1. Gears and shafting shall be approved types and materials. Pinion shafts shall be bushed with bronze, composition A and shall be provided with suitable oil holes. All gears shall be machine cut. Gate valves shall conform to the following ratings. Working Hydrostatic Pressure Test Pressure.

1. Gate valves four (4) inches and 12 inches shall be CL 250.
2. Gate valves shall be American-Darling, Mueller or approved equal.

## 2.2 CHECK VALVES

- A. Valves 3-1/2 inches and smaller shall have solder or threaded ends with all parts bronze or copper. The valve shall have a bronze or composition swing disc suitable for the service use of the valve. Valves will comply with Federal Specification WW-V-51, Class A, Type IV. Valves with solder-joint ends shall conform to USAS B 16.18 for Cast Brass Solder-Joint Fittings.
- B. NP water check valve shall be PVC swing check equal to Hayward TC ball check.
- C. Check Valves four (4) inches and larger shall be iron body, bronze mounted, full opening swing check valves. Outside weight and lever or outside spring and lever check valves will be installed. These valves shall be furnished with the type ends required for the piping in which they are installed. Valves shall be 150 psi, working pressure.

2.3 Butterfly Air Control Valves: Butterfly valves shall be of the wafer body style for air service as noted on the plans and comply with MSS SP67. Valve and valve seat materials shall be suitable for high temperature service 250°F (EPDM seat) for all air piping installations. All four (4) inch and larger valves shall be suitable for use with ANSI 125 or 150 pound flanges. Bodies shall be cast iron ASTM A126 Class B. Valve sizes three (3) inch and smaller shall be wafer style and have NPT end connections rated for 150 psi service. All manually actuated valves 10 inch and larger shall be operated using a cast iron housed handwheel actuator. Valves eight (8) inch and smaller shall be level operated with 10 position settings. All nuts to have adjustable open and closed position stops with provisions to prevent accidental adjustment changes. Operating shaft to be supported axially and radially at input end by permanently lubricated bronze thrust and sleeve bearings. Valves shall be as manufactured by DeZurik or approved equal.

## 2.4 OPERATING MECHANISMS, VALVE BOXES, ETC.

- A. Extension Stems shall be made of stainless steel 304 of a diameter to safely withstand the opening and closing thrust encountered in operation of the valves. The exact length of all extension stems shall be determined by measurements in the field.
- B. Stem Guides shall be cast iron and bronze bushed. The guides shall be adjustable in two (2) directions to provide full adjustment for proper alignment with the stem. The slenderness ratio ( $L/4$ ) of the stem shall not exceed 200. Guides shall be spaced as shown recommended by manufacturer.
- C. Valve boxes shall be cast iron of the two (2) piece slip type, 5-1/4" shaft, arranged to adequately cover the stuffing box and other exposed working parts of the valves, and shall have round flush covers and frames appropriately marked. Valve boxes shall be set vertically and concentric with the valve stem. Provide pinned extension pieces as necessary to extend from valves to finished grade.

- D. All valves deeper than four (4) feet shall have valve stem extenders pinned at the valve.
- E. All valves shall be capable of being operated by a 48 inch valve wrench.

## 2.5 YARD HYDRANTS

- A. Hydrants shall be located and sized as shown on the Drawings. Hydrants shall be the anti-freezing post type and shall be suitable for a minimum bury depth of three (3) feet. Hydrants shall be constructed with brass working parts in a cast iron dry pipe. The working parts shall be removable by removing the brass nozzle and top cap. The hydrant shall be knob operated with drain plug. The drain plug shall be 100% sealed in the open position. The hydrant shall be Jay R. Smith model 5911 or equal (size as indicated on drawings).
- B. The Contractor shall provide and affix brass markers to the hydrant which shall state "NON-POTABLE WATER - DO NOT DRINK."

- 2.6 Ball Valve: Isolation valves used shall be brass ball valves. The ball valve shall comply with MSS-SP-110. The valve shall have glass reinforced Durafill, a hard chrome plated ball, adjustable stem packing gland with packing nut threaded to the body, and a blow-out proof stem. Valves shall be supplied with crank handles. The ball valves shall be rated for 50 psi minimum working pressure.

## PART 3 - EXECUTION

### 3.1 SETTING MISCELLANEOUS VALVES AND VALVE BOXES

- A. The Contractor shall be responsible for constructing all miscellaneous valve assemblies shown on the Drawings and listed in these specifications. The Contractor shall verify that all components in each assembly listed, shown, and approved shall be installed properly. The Contractor shall be responsible for making sure that the components listed and shown in the Contract Documents or approved "or equal" or "equivalent" components fit properly in each manhole and/or vault prior to assembly. Also, the Contractor shall verify that adequate clearance for maintenance of each particular valve is maintained and that the access hatch or manhole frame and cover will close securely and properly once the components are installed, complete.
- B. Valves shall be set at locations shown on the drawings with care being taken to support the valve properly and to accurately position the valve box over the operating nut of the valve. The top of the valve box shall be flush with the surface of the finish grade.
  - 1. When valves are located in unpaved areas, the boxes shall be adjusted to finish grade and a concrete block two (2) feet square and six (6) inches thick shall be poured around the box at grade line.

- 3.2 Exposed valves and floorstands shall be painted in accordance with Section 09900, "Painting."

- 3.3 Valves deeper than four (4) feet shall have operator extension rods installed, and shall be pinned at the operating nut. The extension shall come to within two (2) feet of the ground.

END OF SECTION 02725

## SECTION 02890 - SILTATION AND EROSION CONTROL

## PART 1 - GENERAL

- 1.1 This Section shall consist of temporary control measures as directed by the Engineer's or the Owner's construction representative during the life of the Contract to control erosion and water pollution through the use of berms, dikes, dams, sediment basins, fiber mats, netting, mulches, grasses, slope drains, temporary silt fences, and other control devices.
- 1.2 The temporary pollution control provisions contained herein shall be coordinated with the permanent erosion control features, to assure economical, effective, and continuous erosion control throughout the construction and post-construction period.
- 1.3 The Contractor shall comply with the requirements of the local authority and provide a plan if required by that Authority if disturbed area exceeds one (1) acre. Contractor shall provide separate performance bond to local Authority.
- 1.4 The Contractor shall comply with NPDES Construction Stormwater General Permit and the Erosion and Sediment Control Plan approved by the NCDEQ Land Quality Section.
- 1.5 If the amount of disturbance associated with the project does not exceed the regulatory threshold requiring an E&S permit, the Contractor shall still be required to implement measures as appropriate to minimize erosion and stabilize disturbed areas.

## PART 2 - PRODUCTS

## 2.1 TEMPORARY SEEDING AND MULCHING

- A. Temporary seeding and mulching are measures consisting of seeding, mulching, fertilizing, and matting utilized to reduce erosion. All cut and fill slopes including waste sites and borrow pits shall be seeded when and where necessary to eliminate erosion. A suitable seeding mixture shall be selected from the Handbook or as specified.

## 2.2 TEMPORARY BERMS

- A. A temporary berm is constructed of compacted soil, with or without a shallow ditch, at the top of fill slopes or transverse to centerline on fills.
- B. These berms are used temporarily at the top of newly constructed slopes to prevent excessive erosion until permanent controls are installed or slopes stabilized.
- C. Temporary Slope Drains: A temporary slope drain is a facility consisting of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, sod or other material acceptable to the Engineer that may be used to carry water down slopes to reduce erosion.
- D. Sediment Structures: Sediment basins, ponds, and traps, are prepared storage areas constructed to trap and store sediment from erodible areas in order to protect properties and stream channels below the construction areas from excessive siltation.

### 2.3 CHECK DAMS

- A. Check dams are barriers composed of logs and poles, large stones, or other materials placed across a natural or constructed drainway.
- B. Stone check dams shall not be utilized where the drainage exceeds 50 acres. Log and pole structures shall not be used where the drainage area exceeds five (5) acres.

### 2.4 BALED HAY OR STRAW CHECKS

- A. Baled hay or straw erosion checks are temporary measures to control erosion and prevent siltation. Bales shall be either hay or straw containing five (5) cubic feet or more of material.
- B. Baled hay or straw checks shall be used where the existing ground slopes toward or away from the embankment along the toe of slopes, in ditches, or other areas where siltation erosion or water run-off is a problem.

### 2.5 TEMPORARY SILT FENCES

- A. Silt fences are temporary measures utilizing woven wire or other approved material attached to posts with filter cloth composed of burlap, plastic filter fabric, etc., attached to the upstream side of the fence to retain the suspended silt particles in the run-off water.

## PART 3 - EXECUTION

### 3.1 PROJECT REVIEW

- A. During the pre-construction conference, the Contractor shall meet with the Engineer and go over in detail the expected problem areas in regard to the erosion control work. Different solutions should be discussed so that the best method might be determined. It is the responsibility of the Contractor to develop an erosion control plan acceptable to the Engineer.
- B. Within 10 days after the pre-construction conference and prior to the start of any work, the Contractor shall submit for acceptance his schedule for accomplishment of temporary and permanent erosion control work, as are applicable for clearing and grubbing, grading, bridges and other structures at watercourses, construction and paving. He shall also submit for acceptance his proposed method of erosion control on haul roads and borrow pits and his plan for disposal of waste materials. No work shall be started until the erosion control schedules and methods of operations have been accepted by the Engineer.
- C. All disturbed areas that have no construction activity in close proximity shall be temporary seeded within 30 days of completion of the disturbing activities.
- D. All siltation and erosion control devices installed during the course of construction shall be maintained in proper working order at all times, and shall not be removed until final stabilization of all disturbed areas or at the direction of the Engineer.

### 3.2 CONSTRUCTION REQUIREMENTS

- A. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, the surface of erodible earth material exposed by excavation, borrow and

fill operations and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of adjacent streams or other watercourses, lakes, ponds, or other water impoundment. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, and use of temporary mulches, mats, seeding or other control devices or methods as necessary to control erosion. Cut and fill slopes shall be seeded and mulched as the excavation proceeds to the extent directed by the Engineer.

- B. The Contractor shall be required to incorporate all permanent erosion control features into the project at the earliest practical time as outlined in his accepted schedule. Temporary pollution control measures shall be used to correct conditions that develop during construction that were not foreseen during the design state; that were needed prior to installation of permanent pollution control features; or that are needed temporarily to control erosion that develops during normal construction practices, but are not associated with permanent control features on the project.
- C. Where erosion is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise erosion control measures may be required between successive construction stages. Under no conditions shall the surface area of erodible earth material exposed at one time by clearing and grubbing, exceed 43,560 square feet without approval of the Engineer.
- D. The Engineer will limit the area of excavation, borrow, and embankment operations in progress commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding and other such permanent pollution control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.
- E. Under no conditions shall the amount of surface area or erodible earth material exposed at one time by excavation or fill within the project area exceed 43,560 square feet without prior approval by the Engineer.
- F. The Engineer may increase or decrease the amount of surface area of erodible earth material to be exposed at one time by clearing and grubbing, excavation, borrow and fill operations as determined by his analysis of project conditions.
- G. In the event of conflict between these requirements and pollution control laws, rules or regulations, or other Federal, state or local agencies, the more restrictive laws, rules or regulations shall apply.

### 3.3 CONSTRUCTION OF STRUCTURES

- A. **Temporary Berms:** A temporary berm shall be constructed of compacted soil, with a minimum width of 24 inches at the top and a minimum height of 12 inches with or without a shallow ditch, constructed at the top of fill slopes or transverse to centerline on fills. Temporary berms shall be graded so as to drain to a compacted outlet at the slope drain. The area adjacent to the temporary berm in the vicinity of the slope drain must be properly graded to enable this inlet to function efficiently and with minimum ponding in this area. All transverse berms required on the downstream side of a slope drain shall extend across the grade to the highest point at approximately a 10-degree angle with a perpendicular to centerline. The top width of these berms may be wider and the side slope flatter on transverse berms to allow equipment to pass over these berms with minimal disruptions. When practical and until final roadway elevations are



approached, embankments should be constructed with a gradual slope to one side of the embankment to permit the placement of temporary berms and slope drains on only one side of the embankment.

- B. Temporary Slope Drains: Temporary slope drains shall consist of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, flexible rubber, or other materials which can be used as temporary measures to carry water accumulating in the cuts and on the fills down the slopes prior to installation of permanent facilities or growth of adequate ground cover on the slopes.
- C. Fiber matting and plastic sheeting shall not be used on slopes steeper than 4:1 except for short distances of 20 feet or less.
- D. All temporary slope drains shall be adequately anchored to the slope to prevent disruption by the force of the water flowing in the drains. The base for temporary slope drains shall be compacted and concavely formed to channel the water or hold the slope drain in place. The inlet end shall be properly constructed to channel water into the temporary slope drain. Energy dissipators, sediment basins, or other approved devices shall be constructed at the outlet end of the slope drains to reduce erosion downstream. An ideal dissipator would be dumped rock or a small sediment basin, which would slow the water as well as pick up some sediment. All temporary slope drains shall be removed when no longer necessary and the site restored to match the surroundings.
- E. Sediment Structures: Sediment structures shall be utilized to control sediment at the foot of embankments where slope drains outlet; at the bottom as well as in the ditch lines atop waste sites; in the ditch lines or borrow pits. Sediment structures may be used in most drainage situations to prevent excessive siltation of pipe structures. All sediment structures shall be at least twice as long as they are wide.
- F. When use of temporary sediment structures is to be discontinued, all sediment accumulation shall be removed, and all excavation be restored to its natural or intended condition.
- G. Check Dams: Check dams shall be utilized to retard stream flow and catch small sediment loads. Materials utilized to construct check dams are varied and should be clearly illustrated or explained in the Contractor's erosion control plan.
- H. All check dams shall be keyed into the sides and bottom of the channel a minimum depth of two (2) feet. A design is not needed for check dams but some typical designs are shown in the standard plans.
- I. Stone check dams should generally not be utilized where the drainage area exceeds 50 acres. Log and pole structures should generally not be used where the drainage area exceeds five (5) acres.
- J. Baled Hay or Straw Erosion Checks: Hay or straw erosion checks shall be embedded in the ground four (4) to six (6) inches to prevent water flowing under them. The bales shall also be anchored securely to the ground by wooden stakes driven through the bales into the ground. Bales can remain in place until they rot, or be removed after they have served their purpose, as determined by the Engineer. The Contractor shall keep the checks in good condition by replacing broken or damaged bales immediately after damage occurs. Normal debris clean-out will be considered routine maintenance.

- K. Temporary Silt Fences: Temporary silt fences shall be placed on the natural ground, at the bottom of fill slopes, in ditches, or other areas where siltation is a problem. Silt fences are constructed of wire mesh fence with a covering of burlap or some other suitable material on the upper grade side of the fence and anchored into the soil.
- L. The Contractor shall be required to maintain the silt fence in a satisfactory condition for the duration of the project or until its removal is requested by the Engineer. The silt accumulation at the fence may be left in place and seeded, removed, etc., as directed by the Engineer. The silt fence becomes the property of the Contractor whenever the fence is removed.
- M. Temporary Seeding: Establish temporary cover for erosion control by seeding and/or mulching graded areas which may otherwise be exposed for a period greater than 30 days. This should be accomplished as soon as rough grading work is done.
- N. On all steep slopes, where erosion is probable, hydroseed areas as soon as possible in strict accordance with applicable portions of Sections 244 and 607, seeding V.D.O.T. Road and Bridge Specifications. Maximum allowable slope to be seeded is 2:1.
- O. Cleaning of Roads and Streets: The General Contractor shall maintain a vehicle wash rack or gravel bed according to the Handbook at all vehicle egress areas. All vehicles shall be thoroughly cleaned of mud and silt before leaving the construction site to avoid tracking mud and silt onto roads, streets, and highways. In the event that tracking does occur, the Contractor shall immediately clean the street or road of all debris, mud or silt and shall pay all damages resulting therefrom. A daily survey of the condition of the adjacent streets and roads shall be made and recorded in the field log along with daily cleanup of the streets of the tracking from the site onto roads, alleys, parking lots and highways.

#### 3.4 MAINTENANCE

- A. The temporary erosion control features installed by the Contractor shall be acceptably maintained by the Contractor until no longer needed or permanent erosion control methods are installed. Any materials removed shall become the property of the Contractor.
- B. In the event that temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of work as scheduled, and are ordered by the Engineer, such work shall be performed by the Contractor at his own expense.
- C. Where the work to be performed is not attributed to the Contractor's negligence, carelessness, or failure to install permanent controls and falls within the specifications for a work item that has a contract price, the units of work shall be paid for at the proper contract prices.
- D. Erosion Control Outside Project Area: Temporary pollution control shall include construction work outside the project area where such work is necessary as a result of construction such as borrow pit operations, haul roads, and equipment storage sites. Bid price in such cases shall include all necessary clearing and grubbing, construction incidentals, maintenance, and site restoration when no longer needed.

**3.5 PERMITS**

- A. The Contractor shall be responsible for obtaining any required permits through the Regional Department of Environmental Quality (DEQ) office or prevailing agency. The Engineer will prepare the erosion and sediment control plan to be submitted for the permit. Permit fees and bonds are the responsibility of the Contractor. No separate pay item will cover this permit. The Contractor shall include payment in other contract items.

END OF SECTION 02890

## SECTION 02910 - TOPSOILING AND SEEDING

## PART 1 - GENERAL

## 1.1 SCOPE

- A. The work covered by this Section consists of furnishing all plant, labor, equipment and materials, and in performing all operations in connection with topsoiling and seeding the graded areas, all slopes adjacent to the graded areas; all paving shoulders and slopes all disturbed or scarred areas, complete in strict accordance with the Plans and Specifications.

## PART 2 - PRODUCTS

## 2.1 SEED

- A. All seed used shall be labeled in accordance with U. S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of invitation for bids. All seed shall be furnished in sealed standard containers. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be acceptable. The permanent seed mix shall conform to the following:

Slope 3:1 or Less

10% Kentucky Bluegrass  
15% Annual Ryegrass  
75% Tall Fescue

Slope Greater than 3:1

50% Crown Vetch  
40% Perennial Ryegrass  
10% Redtop

- B. Certified copies of analysis indicating that seed mixture conforms to the above shall be submitted to the Engineer before seed is ordered. The Engineer shall be furnished with duplicate signed copies of a statement from the vendor, certifying that each container of seed delivered is fully labeled in accordance with the Federal Seed Act and is at least equal to the Specification requirements.

## 2.2 FERTILIZER

- A. Fertilizer shall be 5-20-10 grade, uniform in composition, free flowing and suitable for application with approved equipment, delivered to the site in bags or other convenient containers, each fully labeled, conforming to the applicable State fertilizer laws, and bearing the name, trade name or trade mark, and warranty of the producer.

## 2.3 LIME

- A. Lime shall be ground limestone containing not less than 85 percent of total carbonates and shall be ground to such fineness that at least 50 percent will pass through a 100-mesh sieve and at least 90 percent will pass through a 20-mesh sieve. Coarser materials will be acceptable provided the specified rates of application are increased proportionately, on the basis of quantities passing the 100-mesh sieve but no additional payment will be made for the increased quantity. The Engineer shall be furnished with duplicate copies of invoices for all fertilizer and lime used on the project. Invoices for fertilizer shall show the grade furnished. Invoices for lime shall show total minimum

carbonates and minimum percentages of the material furnished that pass the 100 and 20 mesh sieves.

#### 2.4 TOPSOIL

- A. Topsoil to be used under this Section shall be topsoil removed and stockpiled under other Sections. Additional topsoil if required under this Section shall be natural, friable material possessing the characteristics of representative soils in the vicinity which produce heavy growths of crops, grass or other vegetation, and shall be obtained from naturally well-drained areas. The topsoil shall be reasonably free from clay lumps, stones, stumps, roots or other objects larger than two (2) inches in diameter, toxic substances, or any other material or substance which might be harmful to plant growth or be a hindrance to grading and maintenance operations. Additional topsoil, if required, shall be furnished by the Contractor from his own sources off the site of the contract limits, at no additional cost. All topsoil shall be suitable to the Engineer.

#### 2.5 MULCH

- A. Mulching material shall consist of dry straw or any acceptable type as listed in the NPDES Construction Stormwater General Permit and free of noxious weeds. Mulch shall not be musty, moldy, caked, decayed or extremely dusty.

### PART 3 - EXECUTION

#### 3.1 SPREADING OF TOPSOIL

- A. On areas which are intended to be seeded, the compacted subgrade or slope shall be scarified to a depth of two (2) inches for the bonding of topsoil with subsoil. Topsoil is then to be evenly spread, compacted and graded to a thickness of not less than six (6) inches.

#### 3.2 PREPARATION OF SEED BED

- A. Fertilizer shall be distributed uniformly at a rate of 1,200 pounds per acre over the areas to be seeded, and shall be incorporated into the soil to a depth of at least three (3) inches by disking, harrowing, or other methods. Distribution by means of an approved seed drill equipped to sow seed and distribute fertilizer at the same time will be acceptable. Immediately following or simultaneously with the incorporation of the fertilizer, lime shall be incorporated into the soil to a depth of at least three (3) inches by disking, harrowing, or other methods. The incorporation of the lime together with the fertilizer may be performed in one operation. The topsoil shall have a minimum of six (6) inches in all areas.

#### 3.3 PLANTING SEED

- A. All seeding work shall be done between the dates of August 15 and October 1 or April 15 and May 30. When delays in operations carry the work beyond the planting season designated, or when conditions are such, by reason of drought, high winds, excessive moisture, or other factors that satisfactory results are not likely to be obtained, the Engineer will stop the work, and work shall be resumed only when conditions are favorable again or when approved alternate or corrective measures and procedures have been put into effect. If inspection during seeding operations or after there is a show of green indicates that strips wider than the space between the rows planted have been left or other areas skipped, the Engineer may require the sowing of additional seed on these areas. Seed shall be broadcast either by hand or approved sowing

equipment at the rate of 250 pounds per acre for the fescue mixture and 50 pounds per acre for the crown vetch mixture. The seed shall be uniformly distributed over the designated areas. Half the seed shall be sown with the sower moving in one direction, and the remainder shall be sown with the sower moving at right angles to the first sowing. The seed shall be covered to an average depth of 1/4 inch by means of a brush harrow, spike-tooth harrow, chain harrow, cultipacker, or other approved device. Broadcast seeding shall not be done during windy weather.

### 3.4 COMPACTING

- A. Immediately after the operations specified above have been completed, the entire area shall be compacted by means of a cultipacker, roller, or other approved equipment weighing 60- 90 pounds per linear foot of roller. When a cultipacker or similar equipment is used, the final rolling shall be at right angles to the existing slopes to prevent water erosion, or at right angles to the prevailing wind to prevent dust, as directed by the Engineer.

### 3.5 MULCHING

- A. Mulch shall be spread over all seeded areas at the rates listed in the NPDES Construction Stormwater General Permit. Mulch shall be applied to a uniform depth by an approved method and in such a manner that not more than 10 percent of the soil surface is exposed. The use of wet hay or straw will not be permitted.

### 3.6 MULCH ANCHORING

- A. Straw mulch shall be anchored by one (1) of the methods listed in the latest edition of the NPDES Construction Stormwater General Permit.

### 3.7 PROTECTION AND MAINTENANCE

- A. The area shall be protected against traffic or other use by erecting barricades immediately after seeding is completed and by placing warning signs on the various areas of a type approved by the Engineer. Seeded areas shall be maintained by mowing to the satisfaction of the Engineer. Any areas which do not produce a healthy show of grass shall be stabilized and maintained as directed by the Engineer and shall be re-seeded during the next proper season, at the Contractor's expense.

### 3.8 HYDRO-SEEDING

- A. At the Contractor's option, hydro-seeding methods may be used in lieu of previously described methods for the placement of seed. Contractor shall submit proposed method and equipment to the Engineer for approval.

END OF SECTION 02910

## SECTION 05100 - MISCELLANEOUS METALS

## PART 1 - GENERAL

## 1.1 SCOPE

- A. The General and Special Conditions and General Requirements shall apply to the work specified in this Section.
- B. Work under this Section includes all miscellaneous and ornamental metal work and related items necessary to complete the work as shown on the Plans or described herein and includes items fabricated from iron, steel, and aluminum shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems in other sections of these Specifications.

## 1.2 WORK NOT INCLUDED

- A. The following items are included in other sections of these Specifications:
  - 1. Structural Steel and Steel Decking.
  - 2. Any material or operation specified by reference to the published specifications of a manufacturer, The American Society for Testing and Materials (ASTM), The American Iron and Steel Institute (AISI), The American Institute of Steel Construction (AISC), The American Hot Dip Galvanizers Association (AHDGA), The American Welding Society (AWS), Aluminum Association (AA), Architectural Aluminum Manufacturers Association (AAMA), or other published standards, shall comply with the requirements of the current specification or standard listed. In case of a conflict between the referenced specification and the Project Specifications, the Project Specifications shall govern, unless written approval is obtained from the Project Engineer.

## 1.3 SHOP DRAWINGS

- A. Submit shop drawings for fabrication and erection of miscellaneous and ornamental metal fabrications. Drawings shall show general arrangement, design, type of metal, sizes, and finish. Dimensions, generally, shall be from field measurements, verified by the General Contractor and approved by the Project Engineer. Deviation from these established measurements by the affected trades shall not be permitted. However, the Project Engineer's approval of the drawings shall not relieve the General Contractor of the responsibility of satisfactory installation and performance of items shown on the drawings. The General Contractor is also obligated to verify all information contained in the shop drawings.

## 1.4 COORDINATING AND SCHEDULING WORK

- A. This Contractor shall coordinate and schedule his work in such a manner as to cause no delay in the work of other trades.

## 1.5 SAMPLES

- A. Submit one (1) set of representative samples of materials and finished products as may be requested by the Project Engineer. Project Engineer's review will be for color, texture, style, and finish only. All other requirements for the work are the Contractor's responsibility.

#### 1.6 FIELD MEASUREMENTS

- A. Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting wherever taking field measurements before fabrication might delay work.

#### 1.7 SHOP ASSEMBLY

- A. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Materials include, but are not necessarily limited to, the following:
  - 1. Corrosion Resisting Steel.
  - 2. Chromium Steel Plate: ASTM A 176, Specification for "Corrosion-Resistant Chromium Steel Plate, Sheet, and Strip." Type 410S, finish-hot rolled, annealed or heat treated, surface cleaned and polished.
  - 3. Chromium Steel Clad Plate: ASTM A263, Specification for "Corrosion-Resistant Chromium Steel Clad Plate, Sheet and Strip." Alloy cladding metal shall be Type 410S, single-clad finish-hot-rolled, annealed or heat treated, surface cleaned and polished.
  - 4. Steel Forgings: ASTM A235, Specification for "Carbon Steel Forgings for General Industrial Use."
  - 5. Steel Castings: Steel castings shall conform to Federal Specification QQ-S-681, "Steel Castings," except that repairs to castings shall not be made without the knowledge and prior approval of the Engineer. Minor surface imperfections not affecting the strength of castings may be welded in "green" if approved by the Inspector. Surface imperfections shall be considered minor when the depth of the cavity prepared for welding is not greater than 20 percent of the actual wall thickness, but in no case greater than one (1) inch. Defects other than minor surface imperfections may be welded only when specifically authorized in accordance with the following requirements:
    - a. The defects have been entirely removed and are judged not to affect the strength, use, or machinability of the castings when properly welded and stress relieved.
    - b. The proposed welding procedure, stress relieving and method of examination of the repair work have been submitted and approved.
  - 5. Structural Steel: Structural steel shall conform to ASTM A36.



6. Cast Mild Steel: ASTM A 27.
7. Cast Iron: Cast iron shall be gray cast iron conforming to ASTM A48, and shall be Class 30, unless otherwise required.
8. Wrought Iron:
  - a. Wrought Iron Bars: Wrought iron bars shall conform to ASTM A189, Grade A or B.
  - b. Wrought Iron Plate: Wrought iron plate shall conform to ASTM A42.
9. Aluminum: Aluminum shall be mill finished unless otherwise specified. All aluminum surfaces in contact with concrete, mortar, or dissimilar metals shall be thoroughly protected with a heavy coating of bituminous paint, 'Tnemec' series 66 epoxoline (4.0-6.0 mils) or by insulating materials where approved by the Engineer.
  - a. Plates and Sheets: Federal Specification QQ-A-250/4d, "Aluminum Alloy 2024, Plate and Sheet."
  - b. Bars, Rods and Wire: Federal Specification QQ-A-250/3c, "Aluminum Alloy Bar, Rod, Shapes and Tube, Extruded, 2024."
  - c. Castings: Federal Specification QQ-A-601, "Aluminum-Alloy Sand Castings."
  - d. Extrusions: ASTM B221 Alloy 6063-T5, except alloy 6063-T6 for pipe.
10. Bronze:
  - a. Castings: Federal Specification QQ-B-1005, "Leaded Tin and High Leaded Tin Bronze Castings."
  - b. Manganese Bronze Castings: Federal Specification QQ-B-726, "Bronze, Manganese and Aluminum-Manganese, Castings."
  - c. Rolled Manganese Bronze and Manganese Bronze Forgings: Federal Specification QQ-B-728, "Bronze Manganese; Rod, Shapes, Forgings, and Flat Products (Flat Wire, Strip, Sheet, Bar and Plate)."
11. Brass:
  - a. Sheets, Plates and Bars: Federal Specification QQ-B-613, "Brass, Leaded and Non-leaded; Flat Products (Plate, Bar, Sheet and Strip)."
  - b. Castings: Federal Specification QQ-B-621, "Brass; Castings, Leaded Yellow."
  - c. Naval Brass: Federal Specification QQ-B-637, "Brass, Naval; Rod, Wire, Shapes, Forgings, and Flat Products with Finished Edges (Bar, Flat Wire, and Strip)."
12. Everdur Metal: Everdur metal where required shall conform to ASTM B97 and B98.
13. Copper: Federal Specification QQ-C-576. "Copper Flat Products with Slit, Slit and Edge-Rolled, Sheared, Sawed, or Machine Edges (Plate, Bar, Sheet and Strip)."
14. Bolts and Nuts: Bolts and nuts shall conform to Federal Specification FF-B-575, "Bolts, Hexagon and Square." Bolts and nuts shall be hexagon type, stainless steel bolts, nuts, screws, washers and related appurtenances shall be equal to ASTM A167, Type 316.

15. Expansion Bolts: Expansion bolts shall be Cinch (type 38), Ackerman Johnson (screw anchor), Diamond (caulking anchor), Phillips Red Head (concrete anchor), or approved equal.
16. Toggle Bolts: Toggle bolts shall be Diamond, Keystone, Star, or approved equal.
17. Steel Plates, Shapes and Bars: ASTM A36.
18. Steel Plates to be Bent or Cold Formed: ASTM A283, Grade C.
19. Steel Tubing: Hot-formed, welded or seamless, ASTM A501.
20. Steel Bars and Bar-Size Shapes: ASTM A306, Grade 65, or ASTM A36.
21. Cold-Finished Steel Bars: ASTM A108, Grade as selected by fabricator.
22. Cold-Rolled Carbon Steel Sheets: ASTM A366.
23. Galvanized Carbon Steel Sheets: ASTM A526, with ASTM A525, G 90 Zinc coating.
24. Gray Iron Castings: ASTM A48, Class 30.
25. Malleable Iron Castings: ASTM A47, grade as selected.
26. Concrete Inserts: Threaded or wedge type, galvanized ferrous castings, either malleable iron ASTM A47 or cast steel ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.
27. Nonshrink Nonferrous Grout: CE CRD C588.
28. Fasteners:
  - a. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
  - b. Bolts and Nuts: Regular hexagon head type, ASTM A307, Grade A.
  - c. Lag Bolts: Square head type, FS FF-B-56l.
  - d. Machine Screws: Cadmium plated steel, FS FF-S-92.
  - e. Wood Screws: Flat head carbon steel, FS FF-S111.
  - f. Plain Washers: Round, carbon steel, FS FF-W-92.
  - g. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
29. Metal Primer Paint: Primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Division 9.

## 2.2 FABRICATIONS

- A. Rough Hardware: Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for anchoring or securing. Manufacture or fabricate items of sizes, shapes and dimensions required.

- B. Ladders and Walkways: Fabricate ladders or construct walkways at locations shown, with dimensions, spacings, and anchorages as indicated. Comply with the requirements of ANSI A 14.3, unless otherwise indicated.
1. Access ladders (ships ladder) shall be supplied by the manufacturer. The stairway shall have two handrails and the treads shall be non-skid design. The ladder shall be as detailed on the Plans.
  2. Provide sloping ladders (ship's ladders) where indicated. Ladders shall be fabricated using open type construction with structural aluminum channel or plate stringers, pipe handrails, and aluminum channel treads, unless otherwise indicated. Provide all necessary brackets, fittings, and anchorages for installation.
  3. Individual Rung Ladders: Furnish and install, where shown, and as detailed, individual rung ladders of non-slip aluminum construction and manufactured by Reliance Steel Products Company. Individual rung ladders and their accessories and installation must conform with all current requirements of OSHA.
  4. Access walkways with handrails and floor grating shall be provided where shown on the Plans, to provide access to valves and mechanical components requiring adjustment. The Contractor shall supply all grating and handrail indicated on the Plans.
- C. Gratings: N/A.
- D. Seat Brackets: N/A.
- E. Loose Bearing Plates and Steel Lintels: Fabricate to sizes shown. Galvanize after fabrication.
- F. Checkered Plate: Checkered plate shall be 3/8 inch thick aluminum provided with 3/4 inch lift holes. Plate shall rest on aluminum angle frame anchored to concrete. Provide stiffener angles as required and shims as required to make flush with adjacent surfaces. Plate shall conform to Federal Specifications QQ-F-461, Class 2, Pattern 8 or 10.
- G. Safety Nosing: Furnish and install, at all concrete steps, cast aluminum safety nosing as manufactured by American Floor Products Style 801, or approved equal.
- H. ACCESS HATCH: Single and Double leaf floor access door; each leaf shall be 1/4" aluminum diamond pattern plate to withstand a live load of 300 PSF with a maximum deflection of 1/150th of the span. Channel frame shall be 1/4" aluminum with an anchor flange around the perimeter. Door shall be equipped with heavy forged brass hinges. Compression spring operators enclosed in telescopic tubes shall automatically lock in the vertical position by means of heavy steel hold-open arm with release handle. Type 316 stainless steel snap locks with gasket cover plugs and removable turn handles shall be provided. Finish shall be a mill finish with a bituminous coating applied to the exterior of the frame. Hatch shall be equal to products manufactured Halliday, Bilco or approved equal.

## PART 3 - EXECUTION

### 3.1 INSPECTION

- A. The Installer must examine the areas and conditions under which miscellaneous metal items are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

### 3.2 WORKMANSHIP

- A. All work shall be fabricated in a shop capable of producing the highest grade of metal work and whose principle business is the manufacture of Architectural Metal. Perform cutting, drilling, and fitting required for installation. Set work accurately in location, alignment and elevation, measured from established lines and levels. Provide anchorage devices and fasteners where necessary for installation to other work. Set loose items on cleaned bearing surfaces, using wedges or other adjustments as required. Solidly pack open spaces with bedding mortar, consisting of one (1) part portland cement to three (3) parts sand and only enough water for packing and hydration, or use commercial non-shrink grout material. Use materials of size thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished products. Shop-paint all items not specified to be galvanized after fabrication. Weld corners and seams continuously; grind exposed welds smooth and flush. Form exposed connections with hairline, flush joints, and use concealed fasteners where possible.
1. Steel and wrought iron shall be well formed to shape and size, with sharp lines or angles. Shearing and punching shall have clean, true lines and surfaces. Weld or rivet permanent connections. Do not use screws or bolts where they can be avoided; where used, heads shall be countersunk, screwed up tight and threads nicked to prevent loosening. Curved work shall be evenly sprung.
  2. Fastening shall be concealed where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Joints exposed to weather shall be formed to exclude water. Provide holes and connections for the work of other trades.
  3. Expansion shields for bolts shall be of a type designed to be expanded by drawing a hard metal cone into a metal shield with a machine bolt. Where bolts are required for anchorage into concrete they may be approved drive type with split shanks, closed ends and round or countersunk heads. All shields and bolts shall be designed to give a holding power beyond the tensile and shearing strength of the bolt and the breaking strength of the nut.
  4. Anchors, inserts, etc., required for anchoring items to concrete or masonry, shall be furnished and delivered to the site in ample time for placing in forms before concrete is poured or building into masonry as work progresses.
  5. At the proper time, deliver and set in place items of metal work to be built into adjoining construction.
  6. Metal Surfaces: Metal surfaces shall be clean and free from mill scale, flake, rust and rust pitting; well formed and finished to shape and size, with sharp lines and angles and smooth surfaces. Shearing and punching shall leave clean true lines and surfaces. Weld or rivet permanent connections. Weld and flush rivets shall be finished flush and smooth on surfaces that will be exposed after installation. Do not use screws or bolts where they can be avoided; where used, heads shall be countersunk, screwed up tight and threads nicked to prevent loosening.
  7. Casting shall be of uniform quality, free from blowholes, porosity, hard spots, shrinkage distortion or other defects. Castings shall conform to the dimensions indicated, with a

tolerance of plus or minus 1/8 inch, except in the dimensions of covers and the openings to receive them, tolerance shall be limited to plus or minus 1/16 inch. Castings shall be smooth and well cleaned by shot blasting or other approved method. Covers subject to street or foot traffic shall have machined horizontal bearing surfaces; provide machined bearing or contact surface for other joints where indicated or required.

### 3.3 PAINTING

- A. Before steel leaves the shop, thoroughly clean off all loose mill scale, rust, spatter, scale or flux deposit, oil, dirt and other foreign matter.

### 3.4 GALVANIZING

- A. Provide a zinc coating for those items shown or specified to be galvanized, as follows:
  1. ASTM A153 for galvanizing iron and steel hardware.
  2. ASTM A123 for galvanizing iron and steel hardware.
  3. ASTM A123 for galvanizing assembled steel products.

### 3.5 SHOP PAINTING

- A. Shop paint miscellaneous metal work, except members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise specified.
  1. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mills scale in accordance with SSPC SP-2 "Hand Tool Cleaning," or SSPC SP-3 "Power Tool Cleaning," or SSPC SP-7 "Brush-Off Blast Cleaning."
  2. Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning."
  3. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at a rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.
  4. Apply one (1) shop coat to fabricated metal items, except apply two (2) coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

### 3.6 INSTALLATION

- A. Setting Loose Plates: Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces. Clean the bottom surface of bearing plates.
- B. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or

- shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout.
- C. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.
  - D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
  - E. Touchup Painting: Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 of these specifications.
  - F. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts and other connectors as required. Use railing manufacturer's standard methods of installation when acceptable to Project Engineer.
  - G. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation. Set the work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.
    - 1. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop-welded because of shipping size limitations. Grind joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of units which have been coated or finished after fabrication, and are intended for field connections.
  - H. Adjust railings prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length. Space posts not more than eight (8) feet on centers, unless otherwise shown. Plumb posts in each direction. Secure posts and rail ends to building construction as follows except where indicated otherwise: Anchor posts in concrete holes not less than one (1) inch greater than the outside diameter of post. Clean holes of all loose material, insert posts, and fill the space between post and concrete with nonshrink, nonferrous grout. Cover anchorage joint with a round steel flange welded to post.
  - I. Secure handrails to walls with wall brackets and end fittings. Provide brackets with clearance as indicated from center line of handrail to the finish wall surface. Drill wall plate portion of the bracket to receive one bolt. Locate brackets as indicated or, if not indicated, at not more than eight (8) feet zero inches o.c. Provide flush-type wall return fittings with the same projection as that specified for wall brackets. Secure wall brackets and wall return fittings to building construction as follows:
    - 1. For concrete and solid masonry anchorage, use bolt anchor expansion shields and lag bolts.
    - 2. For hollow masonry anchorage, use toggle bolts having square heads.
  - J. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

END OF SECTION 05100

## SECTION 09900 - PAINTING

## PART 1 - GENERAL

## 1.1 SCOPE

- A. The General and Special Conditions apply to the work specified in this Section. Painting applies to only new items and existing items specifically identified to be painted or existing surfaces with coatings disturbed during construction.

## 1.2 GENERAL

- A. Under this Section, painting or finishing is required for all surfaces except those specified as completely factory finished, non-ferrous metal or indicated unfinished. Exposed conduit, pipes, ducts, etc., to be painted. It will be the responsibility of the Contractor to determine the extent of painting required before bidding.
  - 1. The Contractor shall provide all scaffolding, staging, etc. required for the proper execution of the work. Care must be exercised to prevent damage to other work by this equipment.
  - 2. Extras: Any payment for work over the extent agreed upon at the time this Contract was awarded will not be allowed unless authorized in writing by the Engineer.

## 1.3 MATERIALS

- A. All materials used shall be first-line products, and any exception or variation must be requested by the Contractor in writing to the Engineer stating the reason for requesting the change.
- B. All materials must be delivered to the site in unopened containers bearing name of manufacturer and brand. Painting materials such as linseed oil, shellac, turpentine, etc., shall be of the highest quality, and shall have identifying labels on containers.
- C. Painting materials listed are by Tnemeco Co., Inc. The intent is to establish a quality and composition of material; products judged as equal by the Engineer will be accepted. Other manufacturers that have demonstrated equal products are Carboline and Sherwin Williams.
- D. All materials shall be applied in strict accordance with the manufacturer's directions printed on container, and any thinning required shall be done in the manner prescribed and only with the type of reducer recommended by the manufacturer.

- 1.4 COLOR SELECTION: Before beginning any work, the Contractor shall submit samples of all colors and intermixes to the Engineer. The Engineer will then give the Contractor a "Color Schedule."

- 1.5 STORAGE OF MATERIALS: Provision will be made by the Contractor for a secured space adequate for storage of all paint, materials, and equipment for the exclusive use of the Contractor. The Contractor shall maintain the space properly, ensuring the absence of fire hazards. When work is complete, the space shall be left in a clean condition.

## 1.6 DESCRIPTION OF WORK

## A. Work under this Section shall include:

1. All materials and operations required to paint and/or finish all surfaces shall be accomplished, unless stated otherwise, as shown in the “Finish Schedule” on the Plans, or specified herein.
2. Painting and finishing of interior and exterior exposed items and surfaces throughout the project, except as herein specified. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other Sections, except as otherwise specified.
3. The painting of all exposed surfaces whether or not colors are designated in “schedules,” except where the natural finish of the material is obviously intended and specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas. If color or finish is not designated, the Engineer will select these from standard colors available for the materials systems as specified.
4. Field painting of all bare and covered pipes and ducts (including color coding), and of hangars, exposed steel and iron work, and primed metal surfaces of equipment installed under mechanical and electrical work, except as otherwise specified. See Part 3, “Execution” of this Section for color coding.
5. Painting Not Included: The following categories of work are not included as part of the painter-applied finish work, or are included in other Sections of these Specifications, unless otherwise shown or specified:
  - a. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for structural steel, miscellaneous metal, hollow metal work, and similar items. This also includes fabricated components such as architectural woodwork, wood casework, and shop-fabricated or factory-built mechanical and electrical equipment or accessories.
  - b. Pre-finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items as (but not limited to) acoustic materials, architectural woodwork and casework, finished mechanical and electrical equipment including light fixtures, switchgear and distribution cabinets.
  - c. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, and duct shafts. Paint all piping, equipment, and other such items in concealed spaces, unless otherwise indicated.
  - d. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting, except as otherwise indicated.
  - e. Operating Parts and Labels: Do not paint any moving parts of operating units, mechanical and electrical parts, including valve and damper operators, linkages, sensing devices, and motor and fan shafts, unless otherwise indicated.
  - f. Do not paint over any code-required labels, such as Underwriters’ Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.



## 1.7 SUBMITTALS

- A. Manufacturer's Data for Painting: For information only, submit two (2) copies of manufacturer's specifications, including paint label analysis and application instructions for each material specified. Indicate by transmittal that a copy of each manufacturer's instructions has been distributed to the Contractor.
- B. Samples' Painting: Submit samples for Engineer's review of color and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor. Provide a listing of the material and application for each coat of each finish sample.
  - 1. On actual wood surfaces, provide two (2) 4" x 8" samples of each natural and painted wood finish as required. Label and identify each as to location and application.

## 1.8 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
  - 1. Specialize in manufacture of coatings with a proven successful experience.
  - 2. Able to demonstrate successful performance on comparable projects.
  - 3. Single Source Responsibility: Coatings and coating application reducers and additives shall be products of a single manufacturer.
- B. Applicator's Qualifications:
  - 1. Experienced in application of specified coatings on projects of similar size and complexity to this work.
  - 2. Applicator's Personnel: Employ persons trained for application of specified coatings.
- C. Preapplication Meeting: Convene a preapplication meeting two (2) weeks before start of application of coating systems. Require attendance of parties directly affecting work of this section, including Contractor, Engineer, applicator, and manufacturer's representative. Review the following:
  - 1. Environmental requirements.
  - 2. Protection of surfaces not scheduled to be coated.
  - 3. Surface preparation.
  - 4. Application.
  - 5. Repair.
  - 6. Field quality control.
  - 7. Cleaning.
  - 8. Protection of coating systems.

9. One (1) year inspection.
10. Coordination with other work.

#### 1.9 REFERENCE STANDARDS

- A. ASTM D 16 - Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
- B. ASTM D 4263 - Indicating Moisture in Concrete by the Plastic Sheet Method.
- C. ASTM F 1869 - Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
- D. AWWA D 102 - Painting Steel Water Storage Tanks
- E. International Concrete Repair Institute (ICRI) Guideline No. 310.2-1997 (formerly 03732) - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.
- F. NACE SP0188 - Standard Recommended Practice, Discontinuity (Holiday) Testing of Protective Coatings.
- G. NAPF 500-03-04 Abrasive Blast Cleaning.
- H. SSPC-SP 1 - Solvent Cleaning.
- I. SPPC-SP 5/NACE 1 - White Metal Blast Cleaning.
- J. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.
- K. SSPC-SP 10/NACE 2 - Near-White Metal Blast Cleaning.
- L. SSPC-SP 13/NACE 6 - Surface Preparation of Concrete.
- M. SSPC-SP 16 - Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals
- N. SSPC-TU 11 - Inspection of Fluorescent Coating Systems

#### 2.0 ENVIRONMENTAL REQUIREMENTS

- A. Weather:
  1. Air and Surface Temperatures: Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with manufacturer's instructions.
  2. Surface Temperature: Minimum of five (5) degrees F (three (3) degrees C) above dew point.
  3. Relative Humidity: Prepare surfaces and apply and cure coatings within relative humidity range in accordance with manufacturer's instructions.

4. Precipitation: Do not prepare surfaces or apply coatings in rain, snow, fog, or mist.
  5. Wind: Do not spray coatings if wind velocity is above manufacturer's limit.
- B. Ventilation: Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with AWWA D 102.
- C. Dust and Contaminants:
1. Schedule coating work to avoid excessive dust and airborne contaminants.
  2. Protect work areas from excessive dust and airborne contaminants during coating application and curing.

## PART 2 - PAINTING SCHEDULE

### 2.1 CARBON STEEL - STRUCTURAL STEEL, TANKS, PIPE, INTERIOR OR EXTERIOR, IMMERSION OR NON-IMMERSION

#### A. Interior, Immersion:

Surface Preparation : SSPC-SP10 Near-White Blast Cleaning

1st Coat: 66-Color Hi-Build Epoxoline (Tnemec), 4.0 - 6.0  
 Carboguard 893 SG (Carboline)  
 Macropox 646 (Sherwin Williams)

2nd Coat: 66-Color Hi-Build Epoxoline (Tnemec), 4.0 - 6.0  
 Carboguard 893 SG (Carboline)  
 Macropox 646 (Sherwin Williams)

8.0 - 12.0 mils Total

#### B. Interior, Non Immersion:

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

1st Coat: 66-Color Hi-Build Epoxoline (Tnemec), 4.0 - 6.0  
 Carboguard 893 SG (Carboline)  
 Macropoxy 646 (Sherwin Williams)

2nd Coat: 73-Color Endura-Shield (Tnemec), 2.0 - 3.0  
 Carbothane 133 HB (Carboline)  
 Macropoxy 646 (Sherwin Williams)

6.0 - 9.0 mils Total

#### C. Exterior, Non-Immersion:

System No. 66-2 Epoxy-Polyamide

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

- 1st Coat: 66-1211 Epoxoline Primer (Tnemec), 3.0 - 5.0  
 Carboguard 893 SG (Carboline)  
 Macropoxy 646 (Sherwin Williams)
- 2nd Coat: 66-Color Hi-Build Epoxoline (Tnemec), 4.0 - 6.0  
 Carboguard 893 SG (Carboline)  
 Acrolon Ultra or Hi-Solids Polyurethane (Sherwin Williams)  
 7.0 - 11.0 mils Total

D. High Temperature Surfaces - to 1,200 degrees F:

Surface Preparation: SSPC-SP10 Near-White Blast Cleaning

- 1st Coat: 39-1261 Silicone Aluminum (Tnemec), Thermaline 4765 (Carboline) 0.7 - 1.5
- 2nd Coat: 39-1261 Silicone Aluminum (Tnemec), Thermaline 4765 (Carboline) 0.7 - 1.5  
 1.4 - 3.0 mils Total

E. Exterior, Underground:

1. Two (2) coats Tnemec-Tar, Bitumastic 300M, 8-10 mils each coat, total thickness 16-20 mils.
2. Also, exposed exterior surfaces to be painted in accordance with paragraph 2.1.C.

2.2 MILL COATED STEEL PIPE (ASPHALT OR COAL-TAR COATED)  
 (FOR MOIST CONDITIONS, CONTACT THE COATING MANUFACTURER)

A. Exterior or Interior - Non-Immersion:

- 1st Coat: 66-1211 Epoxoline Primer (Tnemec), 3.0 - 5.0  
 Carboguard 893 SG (Carboline)  
 Macropoxy 646 (Sherwin Williams)
- 2nd Coat: 66-Color Hi-Build Epoxoline (Tnemec), 4.0 - 6.0  
 Carboguard 893 SG (Carboline)  
 Acrolon Ultra or Hi-Solids Polyurethane (Sherwin Williams)  
 (Optional)
- 3rd Coat: (As selected) 7.0 - 11.0 mils Total

B. Immersion - Potable or Non-Potable Water:

System No. 20-1 Epoxy Polyamide

- 1st Coat: 20-1211 Pota-Pox Primer (Tnemec), 3.0 - 5.0  
 Carboguard 561 (Carboline)  
 Macropoxy 646 PW White (Sherwin Williams)
- 2nd Coat: 20-2000 Pota-Pox Finish (Tnemec), 4.0 - 6.0  
 Carboguard 561 (Carboline)  
 Macropoxy 646 PW White (Sherwin Williams)  
 7.0 - 11.0 mils Total

## 2.3 GALVANIZED STEEL, PIPE AND MISCELLANEOUS FABRICATIONS

## A. Exterior:

1st Coat: 66-Color Hi-Build Epoxoline (Tnemec), 4.0 - 6.0  
 Carboguard 893 SG (Carboline)  
 Macropoxy 646 (Sherwin Williams)

2nd Coat: 73-Color Endura-shield (Tnemec), 2.0 - 3.0  
 Carbothane 133 HB (Carboline)  
 Acrolon Ultra or Hi-Solids Polyurethane (Sherwin Williams)  
 6.0 - 9.0 mils Total

B. Immersion or Non-Immersion - Potable or Non-Potable Water:  
 Surface Preparation: SSPS-SP10  
 System No. 20-1 Epoxy Polyamide

1st Coat: 20-1211 Pota-Pox Primer (Tnemec), 3.0-5.0  
 Carboguard 561 (Carboline)  
 Macropoxy 646 PW White (Sherwin Williams)

2nd Coat: 20-2000 Pota-Pox Finish (Tnemec), 4.0-6.0  
 Carboguard 561 (Carboline)  
 Macropoxy 646 PW White (Sherwin Williams)  
 7.0-11.0 mils Total

## 2.4 INSULATED PIPE

## A. Interior:

Surface Preparation: Surface shall be clean and dry

1st Coat: 6-Color Tneme-Cryl (Tnemec), Carbocrylic 3359 (Carboline) 2.0-3.0  
 Primer: Pro Industrial Pro-Cryl Universal Primer (Sherwin Williams)  
 Pro Industrial Acrylic (Sherwin Williams)

2nd Coat: 6-Color Tneme-Cryl (Tnemec), Carbocrylic 3359 (Carboline) 2.0-3.0  
 Pro Industrial Acrylic (Sherwin Williams)  
 4.0-6.0 mils Total

## 2.5 Previously painted ferrous metal:

## A. Exterior, Non Immersion:

Surface Preparation: SSPS-SP6

1st Coat: 66-Color Hi-Build Epoxoline (Tnemec), 4.0-6.0  
 Carboguard 893 SG (Carboline)  
 Macropoxy 646 (Sherwin Williams)

2nd Coat: 70-Color Endura-Shield (Tnemec), 1.5-2.5  
 Carbothane 133 HB (Carboline)  
 Macropoxy 646 (Sherwin Williams)  
 5.5-8.5 mils Total

## B. Exterior, Immersion:

Surface Preparation: SSPS-SP10

1st Coat: 66-1211 Epoxoline Primer (Tnemec), 3.0-5.0  
 Carboguard 893 SG (Carboline)  
 Macropoxy 646 PW White (Sherwin Williams)

2<sup>nd</sup> Coat: 66-Color Hi-Build Epoxoline (Tnemec), 4.0-6.0  
 Carbuguard 893 SG (Carboline)  
 Macropoxy 646 PW (Sherwin Williams)

7.0-11.0 mils Total

## 2.6 CONCRETE FLOORS

## A. Interior:

1. Surface Preparation: Surface shall be clean and dry
2. Two (2) Coats - H&C Low VOC waterproof Sealer

## 2.7 CONCRETE &amp; MASONRY COATED TANKS

## A. Interior, Immersion:

1. Surface Preparation: Pressure washed and clean, dry surface
  - 1<sup>st</sup> Coat: Series 130 Envirofill cementitious acrylic (Tnemec)
  - 2<sup>nd</sup> Coat: Series N69F High Build Epoxoline II (Tnemec)

## PART 3 - EXECUTION

## 3.1 GENERAL

- A. Work shall be performed only by skilled personnel. All materials shall be applied under adequate illumination and shall be applied evenly and smoothly, without sags or runs.
- B. The Contractor shall be held responsible for the finished appearance and satisfactory completion of the work. The Contractor shall not commence any painting until all surfaces to be painted are in proper condition in every respect. The Contractor will protect the work and all adjacent work and materials by suitable covering or other methods to be used during progress of the work.
- C. Before painting, remove hardware, accessories, plates, lighting fixtures and similar items, or provide ample protection of each item.
- D. All surfaces to be painted shall be dry, clean, and free of loose dirt and dust. All paint coats shall be dry and lightly sanded before applying succeeding coats. Enamel and varnish undercoats shall be sanded smooth prior to recoating.
- E. At the time of application and drying of paint and until normal occupancy of the building, a minimum temperature of 60 degrees F shall be maintained. Maintain constant temperature and

provide adequate ventilation to prevent condensation. No exterior painting shall be undertaken at temperatures under 45 degrees F or immediately following rain, frost or dew. Determine safe painting levels by use of an electronic moisture meter.

- F. If substrates are changed for new materials, notify the Engineer of the change in painting schedule.
- G. Any work not meeting the approval of the Engineer shall be corrected immediately. If this is not done, the Engineer reserves the right to deduct from the amount due the Contractor under the contract.
- H. At the completion of this work in any area, remove all equipment, trash, rags, paint droppings, etc., and leave in a clean, orderly condition.
- I. Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block, cement plaster and cement-asbestos board to be painted by removing all efflorescence, chalk, dust, dirt, grease and oils, and by roughening as required to remove glaze. Concrete shall cure 28 days before applying coatings.
- J. Clean concrete floor surfaces scheduled to be painted with a five (5) percent solution of muriatic acid, or other etching cleaner as approved by paint manufacturer. Flush floor with clean water to dilute acid, and allow to dry before painting.
- K. Wood: Clean wood surfaces to be painted. Remove all dirt, oil, or other foreign substances by using scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off.
- L. Ferrous Metals: All ferrous metal to be primed in the shop shall have all rust, dust and scale, as well as all other foreign substances, removed by sandblasting or pickling.
- M. Cleaned metal shall be primed or pre-treated immediately after cleaning to prevent new rusting. All ferrous metals not primed in the shop shall be sandblasted in the field prior to application of the primer, pretreatment or paint. All nonferrous metals, whether to be shop or field primed, shall be cleaned with solvent cleaner prior to the application of the pretreatment and/or primer.
- N. Color Coding: Color coding of pipes shall be provided as follows:

1. Water:

a.	Raw Water	Olive Green	EN07 Clover
b.	Settled or Clarified Water	Aqua	GB36 Aqua Sky
c.	Finished or Potable Water	Dark Blue	SC06 Safety Blue

2. Wastewater:

a.	Sewage Plant Effluent	Clay	EN13 Terra Cotta
b.	Backwash Waste	Light Brown	YB31 Twine
c.	Sludge	Dark Brown	EN05 Weathered Bark
d.	Sewer (Sanitary or Other)	Dark Gray	GR28 Fossil

3. Chemical:

a.	Alum or Primary Coagulant	Orange	SC03 Safety Orange
b.	Ammonia	White	WH01 White
c.	Carbon Slurry	Black	IN06 Black
d.	Caustic	Yellow with Green Band	SC01 Safety Yellow with SC07 Safety Green Band
e.	Chlorine Gas (pressure)	Yellow	SC01 Safety Yellow
f.	Chlorine (vacuum)	Bright Yellow	SC02 Bright Yellow
g.	Chlorine Solution	Yellow with Dark Blue Band	SC01 Safety Yellow with SC06 Safety Blue Band
h.	Fluoride	Light Blue with Red Band	GB04 Fountainbleu with SC09 Safety Red Band
i.	Lime Slurry	Light Green	PA30 Daiquiri Ice
j.	Ozone	Yellow with Orange Band	SC01 Safety Yellow with SC03 Safety Orange Band
k.	Phosphate Compounds	Light Green with Red Band	PA30 Daiquiri Ice with SC09 Safety Red Band
l.	Polymers or Coagulant Aids	Orange with Green Band	SC03 Safety Orange with SC07 Safety Green Band
m.	Potassium Permanganate	Violet	SC08 Safety Purple
n.	Soda Ash	Light Green with Orange Band	PA30 Daiquiri Ice with SC03 Safety Orange Band
o.	Sulfuric Acid	Yellow with Red Band	SC01 Safety Yellow with SC09 Safety Red Band
p.	Sulfur Dioxide	Light Green with Yellow Band	PA30 Daiquiri Ice with SC01 Safety Yellow Band

## 4. Other:

a.	Compressed Air	Dark Green	EN09 Balsam
b.	Gas	Red	SC05 Monterrey Tile
c.	Other Lines	Light Gray	IN01 Light Gray
d.	Hoists/Trolleys	Yellow	SC01 Safety Yellow
e.	Fire Protection	Red	SC09 Safety Red
f.	Non-Potable Water	Light Gray with Yellow Band	IN01 Light Gray with SC01 Safety Yellow
g.	Hot Water	Dark Blue with Red Band	SC06 Safety Blue with SC09 Safety Red Band

- O. In addition to color coding, pipes shall be labeled in accordance with ANSI Standard A13.1-1991 latest edition, "Scheme for the Identification of Piping Systems." Normal direction of flow arrows after each bend wall penetration or 10 foot internal direction arrow shall be black one (1) inch band, six (6) inch long with two (2) inch head.
- P. Any existing pipes not complying with these specifications shall be painted and/or labeled to match new piping.
- Q. Color coding not covered by this specification shall comply with the requirements of the Occupational Safety and Health Act and shall be approved by the Engineer.

END OF SECTION 09900



## SECTION 16100 - GENERAL SPECIFICATIONS - ELECTRICAL WORK

## PART 1 -GENERAL

1.1 SCOPE

This section of the specifications shall govern all phases of Electrical work referenced hereto.

1.2 PRIORITY OF SPECIFICATIONS

"General Conditions", "Special Conditions", "Instructions to Bidders", or other similar general specification requirements issued for this project shall apply to all Electrical work.

1.3 DRAWINGS

The Electrical Drawings show the general arrangement of all equipment, and appurtenances and shall be followed as closely as actual building construction and the work of other trades will permit. Because of the small scale of the Electrical Drawings, it is not feasible to indicate all offsets, fittings and accessories which may be required. The Contractor shall investigate the construction conditions affecting the work and provide fittings and accessories as required to meet actual conditions.

1.4 PERMITS, LICENSES, TAXES AND INSPECTION CERTIFICATES

All permits, bonds, licenses, inspection fees and taxes required for the execution of the work shall be obtained and paid for by the Contractor. Under each phase of the Electrical work the Contractor shall furnish three copies of certificates of final inspection to the Engineer from any inspection authority having jurisdiction. The payment of all power, and telephone fees and aides to construction shall be paid for by the Owner.

1.5 VISITING THE SITE

This Contractor shall visit the site or premises to familiarize himself with all conditions to be met in the execution of the work under this contract. No additional compensation will be allowed for any changes he may be required to make because of these conditions.

1.6 MATERIALS AND WORKMANSHIP

Equipment and material used in the project shall be new and undamaged. The Electrical installation shall fit into the space allotted and shall allow adequate, acceptable, clearances for entry, servicing and maintenance. Similar types of equipment shall be products of the same manufacturer unless specified otherwise. Work shall be performed by mechanics or tradesmen skilled in the trade involved.

1.7 EQUIPMENT SUBMITTAL DATA

- a. Submission of Data: Shop drawings, catalog data sheets or such other data necessary to fully describe and substantiate compliance with the specifications shall be submitted for all equipment and materials. Within 30 days after award of contract, the Contractor shall submit a complete list of equipment to be furnished, giving Manufacturer's name and catalog number for each item. Intent to furnish the exact make named for any item does not relieve the Contractor of this responsibility. If a submittal of this list is not made, the

Architect/Engineer reserves the right to make a full selection of equipment, which shall be final and binding, and shall be furnished without additional cost to the Owner. Submittal data for all related equipment shall be submitted at one time. Three copies of the submitted data will be retained by the Architect/Engineer. If extra copies are required, they shall be the responsibility of the Contractor.

- b. Equivalents: Trade names and catalog numbers shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. Unless definitely stated otherwise, the Contractor may use any article which, in his judgement is equal to that specified and is accepted by the Engineer. If any item proposed necessitates changes in ductwork, piping, wiring or any other building system from that shown on the drawings, the Contractor is responsible for any additional costs involved. Where such changes are required, detail drawings indicating the required changes shall be submitted for review at the same time the manufacturer's drawings are submitted.
- c. Identification: All submittal data shall be correctly identified to show project name, and the exact model, style, or size of item being submitted. Improperly identified submittals will not be reviewed by the Engineer.
- d. Contractor Review: Each item submitted for review shall bear the Electrical Subcontractor's stamp which states that they have reviewed the submission, that it is complete, and that in their opinion it meets the contract requirements. Any submission which has not been reviewed and stamped by the Electrical Subcontractor will not be reviewed by the Engineer.

#### 1.8 EXCAVATION AND BACKFILLING

- a. General: This Contractor shall perform all excavation of every description and of whatever substances encountered, to the depths required for installation of his work. All excavated materials not required or suitable for backfill shall be removed and wasted as indicated on the drawings or as directed by the Engineer. Shoring shall be provided as necessary to protect existing facilities, new work and the safety of personnel. Excavation shall be by open cut except that short sections of a trench may be tunneled if the conduit or cable can be properly installed.
- b. Trench Excavation: Trenches shall be of necessary width for the proper laying of the cable or conduit, and the banks shall be as nearly vertical as practicable. Trench width at top of pipe shall be not more than 8" on either side of conduit. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the cable or conduit on undisturbed soil at every point along its entire length. Except where rock is encountered, care shall be taken not to excavate below the depths required. Rock shall be excavated to a minimum overdepth of 6 inches below the trench depths required. All trench overdepths shall be backfilled with sand, fine gravel or loose, granular, moist earth and thoroughly tamped. Unstable soil that is incapable of properly supporting cable or conduit shall be removed to the depth required and the trench treated as overdepth.
- c. Excavation for Appurtenances: Excavation for manholes, vaults, pullboxes, and similar appurtenances shall be sufficient to leave at least 12 inches in the clear between their outer surfaces and the embankment or shoring. Final earth supporting elevations shall be of bearing capacity for loads encountered. Rock and overdepth shall be treated same as described for trench excavation.

- d. Protection of Existing Utilities: Existing utility lines to be retained, whether known or unknown and uncovered during excavation operations, shall be protected from damage during excavation and backfilling, and if damaged, shall be restored to original condition.
- e. Backfilling: Do not backfill until all tests have been performed and the utility systems installed conform to the requirements of the Contract Documents. Trenches shall be carefully backfilled with clean earth, sand and gravel, soft shale or other approved materials, free from clods of earth or stones over 2-1/2 inch dimension, deposited in 6 inch layers and thoroughly tamped until the pipe or conduit has a cover of less than 1 foot. The remainder of the backfill shall be placed in the trench in 1 foot layers and tamped. Settling the backfill with water will be permitted. The surface shall be graded to reasonable uniformity and mounded over trenches. Compacted backfill shall be used for all excavation under slabs on grade, building structures, concrete or asphaltic paving, and driveway or parking areas. Compacted backfill shall be in accordance with the requirements of compacted backfill for the general construction specifications and test shall also be made per that specification.

#### 1.9 COORDINATION OF WORK

- a. General: The Contract Documents indicate the extent and general arrangement of the Electrical systems. The Contractor shall be responsible for the coordination and proper relation of the work of all trades to the building structure and to the work of other trades. No additional compensation nor extension of completion time will be granted for extra work caused by the lack of coordination.
- b. Cooperation: This Contractor shall provide dimensions and locations of all openings, shafts, and similar items to the proper trades and install work as required so as not to interfere with, or delay, the building construction.
- c. Locations of lines and equipment shall be determined from actual field measurements. The outlines of the building shown on the Electrical Drawings are intended only as a guide to indicate relative locations of the Electrical work. Refer to Civil and Structural drawings for building construction details. If conflicts prevent installation of Electrical work at the locations indicated, minor deviations shall be made subject to acceptance by the Engineer, and without additional compensation.
- d. Cutting and Patching: Unless stated otherwise, each Contractor shall do all cutting necessary for the installation of his work. All work should be installed sufficiently in advance of new construction in order to permit installation of support, sleeves and similar items without cutting. Cutting which will in any way affect the building structure shall not be performed without permission of the Architect/Engineer. Each Contractor is responsible for patching where he does cutting. Patching shall be done to the satisfaction of the Architect/Engineer.
- e. Damage to Other Work: The Contractor is responsible for damage to other work caused by his work or workmen. Repairing of damaged work shall be done by the Contractor who installed the work, and as directed by the Architect//Engineer; the cost of which shall be paid for by the Contractor responsible for the damage.
- f. Roughing-In: Receptacles, switches, speakers, thermostats, hose bibbs, gas outlets, and other similar items shall align vertically or horizontally with each other, the building structure and other features thereof when it appears obvious and logical that they should.

Each Subcontractor shall consult with the General Construction Superintendent regarding this requirement and also for the locations of other building machines, door swings, block coursing, alignment of tile and other similar features before roughing-in for these components.

#### 1.10 SLEEVES AND INSERTS

- a. General: The Contractor shall provide sleeves and inserts, correctly located in the structure, as required for his work.
- b. Inserts shall be steel and of proper size for loads encountered.
- c. Sleeves shall be provided for all conduits passing through concrete or masonry walls, partitions, concrete slabs of beams. Install during construction to avoid later cutting. Sleeves placed horizontally in walls, partitions, or in any position in beams shall be standard weight ASTM A53 steel pipe of length equal to thickness of standard wall, partition, or beam. Those placed vertically in nonwaterproof floors shall be 20 gauge galvanized sheet steel of length equal to thickness of slab, flared and nailed to the form, or fastened to reinforcing fabric and filled with sand during pouring to prevent deformation. Sleeves occurring in floors of kitchens, toilets, janitors closets, equipment rooms, other similar rooms where hose bibbs or floor drains occur, and in pipe spaces, shall be standard weight steel pipe projecting 1/2 inch above the finish floor except in Equipment Rooms they shall project 4 inches above floor. Sleeves in floors with waterproof membrane shall be provided with flanges or flashing rings and shall be clamped or flashed into the membrane. All sleeves shall be of sufficient diameter to clear conduit by 1.4" all around except sleeves on lines subject to movement by expansion shall clear the conduit 1 inch all around. Conduits through exterior walls shall have modular mechanical type seals consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the conduit and wall sleeve. Sleeve shall have anchor and water stop plate. The entire assembly shall be tightened and adjusted to make watertight. Sleeves for conduits through fire rated partitions, walls or floors shall be packed tight with 3M Flameseal or other mineral fiber fire safing insulation.

#### 1.11 EQUIPMENT INSTALLATION

- a. General: Equipment shall be installed in accordance with manufacturers instructions to conform with the details and application indicated.
- b. Supports: Provide necessary supports for all equipment and appurtenances as required; this includes but is not limited to frames or supports for items such as transformers, electrical panels and other similar items requiring supports. Floor mounted equipment in Equipment Rooms shall be set on 4 inch high concrete foundation pads unless shown otherwise. Concrete for foundations shall be provided by the Electrical Contractor unless indicated otherwise.
- c. Temporary Requirements: Openings in equipment shall be kept plugged at all times until connection is made to the system. The ends of all conduit shall be kept plugged or capped properly with approved devices. Approved devices are items such as specially molded plastic caps or pipe plugs.

#### 1.12 ELECTRICAL WIRING AND EQUIPMENT

- a. Motors required to drive equipment specified in the Detail Specifications shall be provided in place by the Contractor furnishing the driven equipment, ready for electrical connections. Motors shall be in accordance with NEMA Standards and of design suitable for the starting and running characteristics of the driven equipment.
- b. Motor Starters shall be provided under section ELECTRICAL DETAIL SPECIFICATIONS except where specified to be furnished specifically with the driven equipment. Motor starters shall be as specified under section ELECTRICAL DETAIL SPECIFICATIONS. Accessories such as auxiliary contacts, hand-off automatic switches, start-stop switches, pilot lights, control power transformers and other similar items shall be provided in or on the controllers as required by the control sequence indicated. Starting equipment, unless factory mounted on the equipment, shall be installed under section ELECTRICAL DETAIL SPECIFICATIONS.
- c. Wiring shall be accomplished under section ELECTRICAL DETAIL SPECIFICATIONS and shall be in accordance with manufacturer's recommendations to comply with the sequence of control indicated.
- d. Disconnects and Motor Protective Switches shall be provided for each item of equipment under section ELECTRICAL DETAIL SPECIFICATIONS unless specified otherwise in other sections.
- e. Miscellaneous manual or automatic control and protective or signal devices required for the sequence of operation indicated shall be provided under the section of the specifications where the driven equipment is specified unless indicated otherwise.

#### 1.13 RECORD OF UNDERGROUND LINES

On completion of the project, the Contractor shall prepare and submit to the Engineer a drawing on tracing paper and one blue line print to show the location of any underground lines installed in locations different from those on the Engineer's drawings. The location of pull boxes, and the distance from the building to outside conduits shall be dimensioned. Also, cross sections of the duct bank systems shall show the size and number of conductors. Wire and cable identification numbers shall be shown on record plans.

#### 1.14 MARKING AND DESIGNATION OF EQUIPMENT

Properly mark operating and control parts of the equipment and systems such as panels, disconnect switches, motor starters, and control devices. Starters, disconnect switches, panels, and electric control instruments shall have black background and white letters on laminated engraved plastic nameplates fastened with sheet metal screws or bolts, except NEMA 4x units shall have nameplates fastened with "Superglue". Identification symbols or designations shall be the same as shown on the Contract Documents.

#### 1.15 CATALOG DATA FOR OWNER

The Contractor shall provide one bound copy of compilation of catalog data of each manufactured item of equipment used in the Electrical work and shall present this compilation to the Engineer for transmittal to the Owner before final payment is made. Two copies of operating and maintenance instructions for each item of equipment bound individually shall be provided. A complete index shall be provided listing the products alphabetically by name.

#### 1.16 INSTRUCTION OF OWNER'S REPRESENTATIVE

Contractors shall instruct the representative of the Owner in the proper operation and maintenance of all elements of the Electrical systems. Competent representatives of the Contractor shall spend time as necessary to fully prepare the Owner to operate and maintain the Electrical systems.

#### 1.17 GUARANTEE

Electrical equipment, materials and labor required by these specifications and accompanying drawings shall be guaranteed to be free from defective materials or workmanship for a period of one year after final acceptance of the project. Defects in material or workmanship occurring during this period shall be corrected with new material and equipment of additional labor at no cost to the Owner.

#### 1.18 INSPECTION REPORTS

Each item of discrepancies noted on final inspection reports prepared by the Engineer shall be answered in detail in writing by the Contractor before final acceptance of the systems can be recommended.

#### 1.19 PAINTING

- a. Concealed Areas: All metal surfaces not otherwise protected in pipe spaces or concealed spaces shall be painted with one thorough coat of black asphaltum paint. Copper and galvanized material shall not be painted except where galvanized finish has been damaged.
- b. Finished Areas: All new conduit in finished areas in buildings will be painted to match existing finish.
- c. Preparation: All surfaces shall be thoroughly cleaned before the paint is applied, and the painting shall not be done until the plant has been thoroughly tested out and otherwise completed, and not until the building operations have progressed to a point where the painted surfaces will not be defaced. Before applying paint to any galvanized surface, the surface shall be cleaned with naphtha.
- d. Responsibility: The Contractor shall be responsible for painting all work installed by him as required above.

## SECTION 19100 - AERATION SYSTEM

## PART 4 - GENERAL

- 4.1 SCOPE: The Contractor shall furnish and install an aeration system as indicated on the plans and as specified herein. The system shall include all necessary equipment to provide diffused aeration at the places shown and shall be complete up to, and including, the fitting connections to the air main.
- 4.2 RELATED WORK SPECIFIED ELSEWHERE: The provisions and intent of the Contract Documents, including the General Conditions and Special Conditions, apply to the work specified in this Section.
- 4.3 SHOP DRAWINGS: Shop drawings shall be submitted for all items of equipment as specified in this Section and as outlined elsewhere in Division 1.

## PART 5 - PRODUCTS

## 5.1 AERATION EQUIPMENT

- A. The aeration system required for this project includes both fin bubble and coarse bubble applications; with fine bubble diffuser assemblies to be used in the aeration basins and coarse bubble diffuser assemblies to be used in the sludge holding tanks. The Contractor shall furnish and install the number of fine bubble aeration systems as shown on the Plans and as specified herein. Equipment shall meet the criteria below and shall be as manufactured by Environmental Dynamics, Inc., or approved equal.
- B. Aeration Basins - The Contractor shall furnish and install air diffuser assemblies in the aeration basins in accordance with the following table. The indicated diffuser model numbers are based upon Environmental Dynamics International (EDI). The Contractor is not limited to this manufacturer, but alternates shall be equal in order to be considered.

i)	Bubble Size	Fine
ii)	Diffuser Type	Flexible Membrane Tube
iii)	Membrane Material	EPDM
iv)	EDI Diffuser Model	Flex Air T 62 x 310
v)	Diffuser Diameter/ Length	2.6 inches/ 24 inches
vi)	Total Design Airflow	85 scfm
vii)	Req'd Number of Diffusers	24
viii)	Diffuser Inlet Connection	¾ inch SS nipple
ix)	Diffuser Drop Pipe Size	1 -½ inch
x)	Total Number of Diffuser Drops	10

The diffuser assemblies shall be pre-assembled by the manufacturer prior to shipment. Diffusers shall be installed in accordance with the manufacturer's recommendations, including connections and supports.

- C. Sludge Holding Tanks - The Contractor shall furnish and install air diffuser assemblies in the sludge holding tanks in accordance with the following table. The indicated diffuser model numbers are based upon Environmental Dynamics International (EDI). The Contractor is not limited to this manufacturer, but alternates shall be equal in order to be considered.

i)	Bubble Size	Coarse
ii)	Diffuser Type	Open Bottom
iii)	Diffuser Material	Stainless Steel
iv)	EDI Diffuser Model	Max Air 24-0
v)	Diffuser Length	24 inches
vi)	Total Design Airflow	20 scfm
vii)	Req'd Number of Diffusers	4
viii)	Diffuser Inlet Connection	¾ inch SS nipple
ix)	Diffuser Drop Pipe Size	1 -½ inch
x)	Total Number of Diffuser Drops	2

The diffuser assemblies shall be pre-assembled by the manufacture prior to shipment. Diffusers shall be installed in accordance with the manufacturer's recommendations; including connections and supports.

- D. Submittal Data: The equipment manufacturer shall submit to the Engineer for review and approval the following data:

1. Full scale clean water oxygen transfer efficiency test report shall be provided for each type of diffuser proposed.
2. Certificated endurance test data shall be provided verifying the minimum number of cycles the diffuser assembly is expected to undergo in its lifetime.
3. Regular difusser flexing is an in-situ method for cleaning diffusers which reduces biofouling, alleviates the need for manual cleaning, and maintains consistent process aeration efficiency. The manufacturer shall submit test data verifying that the diffuser's transfer efficiency can be maintained within 10% of a new diffuser after 1 year of service in dirty water conditions.

2.2 DROP AND MANIFOLD PIPING above water level: Drop pipe and fittings shall be fabricated from Schedule 10 304L stainless steel pipe. Fittings shall be threaded or flanged to facilitate disassembly. Each drop pipe shall be provided with a globe valve and union to permit isolation and removal of the header without shutting down the entire system.

2.3 MANIFOLD PIPING BELOW WATER LEVEL shall be Schedule 10 304L stainless steel. Manifolds shall include outlets for distribution headers along the side or bottom center lines of the manifold pipe. All connections between pipe sections shall be expansion type allowing independence rotation of sections. Supports shall be ANSI 304 stainless steel on equal spacing.



**PART 3 - EXECUTION**

- 3.1 Diffusers shall be installed as shown in conformance with the recommendations of the manufacturer. Particular care shall be taken to ensure that all diffuser air connections on a single header are installed in a single horizontal plane within a tolerance of plus or minus 3/8 inch. After the aeration system is installed, the Contractor shall partially fill the tank with clean water and test the system to ensure that there are no leaks, that each drop assembly can be isolated, and that the diffusers are operating evenly.

END OF SECTION 19100

## SECTION 19310 - BLOWERS

## PART 1 - GENERAL

- 1.1 SUMMARY: The CONTRACTOR shall provide all labor materials, equipment and services necessary for furnishing four (4) complete Positive Displacement Blower packages as outlined herein plus one (1) additional blower and motor unit to serve as spare each. Blower package shall be furnished completely packaged with all accessories, tested, and ready for operation. The proposed blower assemblies are being installed to replace existing blower assemblies that are used to supply air to the treatment plant's aeration basins, sludge digesters, and post-aeration tank.
- 1.2 RELATED DOCUMENTS: Drawings and general provisions of the Contract, including General Conditions and Supplemental General Conditions and Division 1 Specifications Sections apply to this Section.
- 1.3 QUALITY ASSURANCE
- A. Manufacturer or Packager Qualifications: Supplier shall have experience in providing similar equipment and shall show evidence of satisfactorily operating installations in the eastern region of the United States.
  - B. Blower Packagers must be an Authorized Distributor or Representative of the blower being supplied.
  - C. Blower supplier must be Factory Authorized to perform all phases of warranty work.
  - D. Blower Package Manufacturers must provide a statement in letter form from the actual blower manufacturer certifying that their package design and quality of workmanship is factory approved and in no way will affect the new machine warranty provided by the manufacturer.
- 1.4 SUBMITTALS
- A. Factory Test Report: As specified in this section.
  - B. Shop Drawings: Submit copies as required in the Specifications and per requirements of section 1300. All mechanical and electrical equipment and components specified herein must be included to be considered a complete shop drawing:
    - 1. Blower Packager Certification Letter: As specified in this section.
    - 2. Product Data: For each mechanical and electrical product include manufacturer's descriptive literature; product specifications; published details: technical bulletins; performance and capacity rating curves, charts and schedules; catalog data sheets; and other submittal materials as required to verify that the proposed products conform to the quality and functional ability of the specified products.
    - 3. Identification: Clearly indicate by an arrow on submissions covering more than one product type or style exactly which product is being submitted for approval.
    - 4. Equipment Characteristics: Provide gear and bearing ratings; complete motor data; service factors; shaft diameters; coupling type; and weights of principal parts and assembled equipment.

5. Manufacturer: Include catalog name, company name, address and phone number for each product submitted.
6. Equipment Drawings: Submit completely dimensioned drawing of a packaged blower assembly that includes foundation details, anchor bolt size and patterns, supports, installation notes, and other pertinent setting details.
7. Layout Drawing: Submit completely dimensioned drawing of a packaged blow assembly that includes foundation details, anchor bolt size and patterns, supports, installation notes, and other pertinent settling details.
8. Product List: Provide a list of equipment and components on all drawings with product identified by legend reference. Include product name, manufacturer, and model number.

#### 1.5 INSTALLATION, OPERATION, AND MAINTENANCE MANUALS

- A. Submit copies of the manufacturer's Operation and Maintenance manuals within four (4) weeks of receiving approved shop drawings. The submission and approval of this manual is considered to be an integral part of the furnishing and delivery of the blower equipment. Include the following elements in each manual.
1. Erection and installation sequence and instructions.
  2. Functional description of blower system for each mode of operation.
  3. Exploded view drawings and illustrations with sequence description for assembly and disassembly of equipment.
  4. Comprehensive parts and materials list for each equipment element indicating manufacturer and manufacturer's identification number. Include name, address, and telephone number of sales and service office nearest to job site.
  5. Schedules of recommended spare parts to be stocked, including part number, inventory quantity, and ordering information.
  6. Performance rating and nameplate data for each major system component.
  7. Procedures for starting, operating, adjusting calibrating, testing, and shutting down system equipment.
  8. Emergency operating instructions and trouble shooting guide.
  9. Schedule of routine maintenance requirements and procedures, and preventative maintenance instructions required to insure satisfactory performance and longevity.
  10. Maintenance instructions or extended out-of-service periods.
  11. Schedule of lubrication requirements including type, service interval, and lubrication points.

1.6 INSTALLATION CERTIFICATE: Submit a certificate from the manufacturer or from the qualified, factory authorized representative, stating that the installed equipment has been inspected, adjusted, approved, and certified to be satisfactory prior to initial mechanical performance testing.

1.7 WARRANTY: The manufacturer shall warrant, in writing, that all equipment supplied by them shall be free from defects in material and workmanship, for a period of twelve (12) months from the date of substantial completion, unless noted otherwise within the specifications.

## PART 2 - PRODUCTS

2.1 GENERAL: The air blowers shall be fabricated, assembled and located as shown on the drawings. The blower package shall be assembled using Roots Model URAI positive displacement blowers, Sutorbilt Legend Series, or approved equal.

## 2.2 OPERATING CONDITIONS EACH BLOWER

A.	Quantity of Complete Blower Packages	4
B.	Quantity of Spare Blower Units	1
C.	Discharge Pressure	7.0 psig
D.	Maximum Horsepower Required	5.0 BHP, 230-Volt, 1-Phase
E.	Discharge Volume, SCFM	99
F.	Elevation	1400 ft msl
G.	Inlet Air Temperature F	68° F
H.	Blower RPM, Maximum	2950
I.	Inlet Connection, Inches	2
J.	Discharge Connection, Inches	2

## 2.3 BLOWERS

- A. Each blower shall be of the horizontal, rotary positive displacement type.
- B. Casing shall be of one piece with separate head-plates and shall be rugged in construction with separate head plates made of ASTM A48 Class 30B close grained cast iron. Each head plate shall incorporate a vent to atmosphere.
- C. Fabricate drive end and gear end head plates of close grained cast iron which are precision machined for exact bearings housing fit.
- D. Impeller and shaft shall be made from high strength ASTM A395-100-70-3 cast iron. Impeller shall be of the straight, tri lobe type and shall operate without rubbing or liquid sealers lubrication and shall be positively timed by a pair of accurately machined heat-treated alloy steel, spur tooth, timing gears, timing gears shall be mounted on the impeller shafts on a tapered fit and properly secured.
- E. Each impeller/shaft shall be supported by cylindrical roller bearings sized for a minimum of 100,000 hours of B-10 life.
- F. Provide a lip type oil seal at each bearing, designed to prevent lubricant from leaking into the airstream. Further provisions shall be made to vent the lubrication system to atmosphere to eliminate any possible carryover of lubricant into the air stream.
- G. All friction parts gears, bearings and shaft seals shall be splash oil lubricated from other rotating parts dipping in the oil. Sight glasses for oil level observation shall be provided. Grease lubricated machines are not acceptable.
- H. Each Blower package shall include vibration isolators as part of the assembly.

## 2.4 ELECTRIC MOTORS

- A. Provide inverter rated, TEFC, NEMA design B with class F insulation, continuous duty 230-volt, 1 phase 60 hz, 1750 rpm, constant torque motor, 1.15 S.F. suitable for mounting on a slide base and connecting to the blower shaft by a V-belt and sheave drive assembly for the blowers. Each motor shall be equipped with a normally closed thermostatic heat protection device to protect the motor from overheating during operation. The unit shall automatically stop the aerator drive motor in the event of excessive heat build-up and send an alarm signal to the instrumentation and control system. Maximum motor size shall be 5.0 HP 230 Volt, 1-phase.
- B. Provide V-belt assembly consisting of Sheaves, quick detachable bushings, V-belts, and sliding motor base. Provide drive assembly with a 1.4 service factor based on motor nameplates horsepower.
  - 1. Sheaves: Fine grain high tensile cast iron which are bored for quick detachable tapered bushings.
  - 2. Belts: Premium grade, heat resistant, static dissipating, polyester cord constructed belts.
  - 3. Motor Base: provide spring loaded self tensioning motor base to automatically take up belt stretch
  - 4. Belt guard shall be designed into the noise enclosure and meet OSHA standards.

## 2.5 COMBINATION INTAKE FILTER/SILENCER

- A. Provide each blower with a suitably sized air filter/silencer for the flow rates listed under design criteria. Inlet filter/silencer shall have a weatherhood mounted upright for maximum watershed with a capacity equal to or greater than required conditions.
- B. The filter/silencer shall be constructed of carbon steel plate and shall incorporate two (2) shell layers.
- C. Inlet Connection: Threaded connection to air intake.
- D. Outlet Connection: Threaded connection to blower intake.
- E. Supports: Provide two (2), carbon steel, clamp type supports at each end of for rigidly mounting silencer horizontally to the blower package base.

## 2.6 COMBINATION BASE/DISCHARGE SILENCER/RELIEF VALVE

- A. The blower shall be mounted directly on the silencer base. The silencer shall be of multi-chamber design with internal tubing and porting for positive displacement blower discharge service. Construction shall be of carbon steel plate with two (2) shell layers. Flexible connectors shall be supplied between the package outlet and the process connection.
- B. The discharge silencer shall be welded to a heavy steel machinery base with anti-vibration welded reinforcements. Bolted construction is not acceptable. Fork lift access shall be provided and identified by prominent markers. The relief valve shall be mounted on the exit chamber of the silencer for longevity of the valve and reduced relieving noise.

- 2.7 EXPANSION JOINTS: Provide flanged sleeved cylindrical type, three ply bias fiberglass reinforced silicone rubber connectors for the blower inlet and discharge connections. Furnish units which are capable of withstanding 40 psi and handle operating temperatures of 350°F. Expansion joints to be equivalent to Flex-Fab Series 500; Mercer Rubber Company Style 450; General Rubber Corporation Style 1015; or Metra Flex Company Style 100 HT/711.
- 2.8 PRESSURE RELIEF VALVE: Weighted relief valves are acceptable, matched to the blower's rating.
- 2.9 CHECK VALVES: Provide wafer type, cast iron body, aluminum internals for mounting on blower discharge piping. Provide valve equivalent to Techno Model 5118; Valmatic Model GBN-SSF; or Mission "Duo Check". Threaded Valves are acceptable.
- 2.10 SOUND ENCLOSURE: Each blower shall be enclosed within a weatherproof fiberglass sound enclosure. The enclosure shall include vibration mounts designed for the blower operational speeds. The enclosures shall be equipped with lifting handles. The enclosure unit shall be acoustically engineered as a sound enclosure. Minimum performance shall be 77 dBA maximum free field noise requirement. Where shown on the plans or specified herein the enclosures shall be suitable for exterior mounting.
- 2.11 DISCHARGE BUTTERFLY VALVE: Provide wafer type, resilient seated, lever operated, tight closing butterfly valve for positively isolating the blower from the manifold system. Furnish valve with body and disc of nodular iron; Phosphate treated steel stem; Buna N seat; and position indicator. Provide valve equivalent to Keystone AR1-069; Dezurik Series 600; or Crane Model 12-TL.
- 2.12 DISCHARGE PRESSURE GAUGE
- A. Provide a flush mounted discharge pressure gauge on the sound reduction panel to be equivalent to U.S. Gauge, McDaniel Instruments or approved equal.
1. Range: 0-10 psig.
  2. Accuracy: 1 percent of full scale.
  3. Dial: 2-1/2, 270-degree scale.
  4. Case: Aluminum, front flanged.
  5. Connection: 1/4" NPT back connection.
- 2.13 ALARMS
- A. Provide the following sensors and alarms and connect to remote control panel by the contractor:
1. High motor temperature.
  2. High air temperature. Ashcroft temperature switch Model B424 or approved equal.

## 2.14 ELECTRICAL CONTROL PANEL

- A. Furnish and install (2) duplex electrical panels for automatic operation of the blower assemblies, one panel for each packaged WWTP's pair of blowers. Panel enclosures shall be stainless steel NEMA 4X construction for outdoor installation. Panels shall include:
1. Main circuit breaker with disconnect switch and branch circuit breakers for each load connection.
  2. Magnetic motor starter, rated for each blower motor.
  3. 230 Volt, Single Phase electrical power supply to the panel.
  4. H-O-A selector switch provided for each blower assembly.
  5. Running indication light and Elapsed Time Meter provided for each blower assembly.
  6. 24-hour Time Clock, adjustable in 15-minute increments to initiate time operating sequences.
  7. Alternative Relay with override control to automatically switch the operating order of the blowers after each run cycle to assure equal run time.
  8. Alarm indication lights for high motor temperature and high air temperature.
  9. 120 volt convenience electrical receptacle.

## PART 3 - EXECUTION

### 3.1 PRODUCT INSPECTION, DELIVERY AND STORAGE

- A. Prior to shipping, the equipment shall be boxed or crated by the manufacturer to prevent damage during shipment. Four (4) of the blower assemblies shall be complete units (blower, motor, mounting base, inlet filter and silencer, discharge silencer, pressure relief valve, sound enclosure, etc.) and one (1) spare blower and motor packaged for long term storage.
- B. All boxes, crates and packages shall clearly identify their contents by name or tag number using a packing slip affixed to the outside of the container.
- C. All boxes and packages shall be inspected by the contractor upon delivery to the site. Where such inspection reveals damage to any equipment or components, the contractor shall notify the engineer.
- D. Equipment stored on site shall be stored only in areas approved by the Owner. All stored equipment shall be protected against damage. All electrical and electronic components such as motors, control boxes, switches, etc. shall be protected in a manner recommended by the manufacturer.
- E. Contractor shall properly lubricate equipment prior to operation.

### 3.2 ALARMS

- A. Provide the following sensors and alarms:
1. High motor temperature.
  2. High discharge air temperature.

### 3.3 SPARE PARTS

- A. The Contractor shall deliver the following spare parts for each size blower:
  - 1. One (1) set of seals.
  - 2. One (1) set of gaskets.
  - 3. Four (4) filter elements.
- B. Spare parts shall be delivered to the owner in wooden storage crates suitable for long term storage with labels describing contents.
- C. One (1) blower and motor shall be furnished to the Owner as a spare unit for storage.

### 3.4 MANUFACTURER'S REPRESENTATIVE

- A. Provide the services of a qualified factory certified representative for the required mandays as specified hereunder. The representative shall submit a copy of their factory training certificate to the engineer prior to start-up and training sessions. A man-day is defined as eight (8), on-site, working hours.
- B. Upon notification of completion of aeration system by the contractor, provide a minimum of one (1) man day for blower equipment installation inspection, certification, start-up, and corrective adjustments.
- C. Upon notification by the Owner, provide a separate visit of one (1) man-day for training of the treatment plant personnel in the operation and maintenance of the blower system. The factory authorized representative must present their original factory training certificate to the plant manager before training can be conducted.

END OF SECTION 19310



**ADDENDUM(S)**

ADDENDUM #1

I, \_\_\_\_\_  
(SIGNATURE)

representing \_\_\_\_\_

Acknowledge receipt of Addendum #1.

ADDENDUM #2

I, \_\_\_\_\_  
(SIGNATURE)

representing \_\_\_\_\_

Acknowledge receipt of Addendum #2.

ADDENDUM #3

I, \_\_\_\_\_  
(SIGNATURE)

representing \_\_\_\_\_

Acknowledge receipt of Addendum #3.

**LISTING OF MBE/WBE SUBCONTRACTORS**

Sheet \_\_\_\_\_ of \_\_\_\_\_

Firm Name and Address	Circle One	Item No.	Item Description	* Agreed upon Unit Price	** Dollar Volume of Item
<b>Name</b>  Address	MBE  WBE				
<b>Name</b>  Address	MBE  WBE				
<b>Name</b>  Address	MBE  WBE				
<b>Name</b>  Address	MBE  WBE				
<b>Name</b>  Address	MBE  WBE				
<b>Name</b>  Address	MBE  WBE				

\* The Dollar Volume shown in this column shall be the Actual Price Agreed Upon by the Prime Contractor and the MBE/WBE subcontractor, and these prices will be used to determine the percentage of the MBE/WBE participation in the contract.

\*\* Dollar Volume of MBE/WBE Subcontractor Percentage of Total Contract Bid Price:

*If firm is a Material Supplier Only, show Dollar Volume as 60% of Agreed Upon Amount from Letter of Intent.*

*If firm is a Manufacturer, show Dollar Volume as 100% of Agreed Upon Amount from Letter of Intent.*

**LISTING OF MBE/WBE SUBCONTRACTORS**

Sheet \_\_\_\_\_ of \_\_\_\_\_

Firm Name and Address	Circle One	Item No.	Item Description	* Agreed upon Unit Price	** Dollar Volume of Item
Name  Address	MBE  WBE				
Name  Address	MBE  WBE				
Name  Address	MBE  WBE				
Name  Address	MBE  WBE				
Name  Address	MBE  WBE				

**\*\* Dollar Volume of MBE Subcontractor** \$ \_\_\_\_\_

**MBE Percentage of Total Contract Bid Price** \_\_\_\_\_%

**\*\* Dollar Volume of WBE Subcontractor** \$ \_\_\_\_\_

**WBE Percentage of Total Contract Bid Price** \_\_\_\_\_%

**\*The Dollar Volume shown in this column shall be the Actual Price Agreed Upon by the Prime Contractor and the MBE/WBE subcontractor, and these prices will be used to determine the percentage of the MBE/WBE participation in the contract.**

**\*\* Dollar Volume of MBE/WBE Subcontractor Percentage of Total Contract Bid Price.**

**If firm is a Material Supplier Only, show Dollar Volume as 60% of Agreed Upon Amount from Letter of Intent.**

**If firm is a Manufacturer, show Dollar Volume as 100% of Agreed Upon Amount from Letter of Intent.**

**EXECUTION OF BID**

**NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION**

**CORPORATION**

The prequalified bidder being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating *N.C.G.S. §133-24* within the last three years, and that the prequalified bidder intends to do the work with his own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. §133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF PREQUALIFIED BIDDER**

\_\_\_\_\_  
Full name of Corporation

\_\_\_\_\_  
Address as Prequalified

Attest \_\_\_\_\_  
Secretary/Assistant Secretary  
*(Select appropriate title)*

By \_\_\_\_\_  
President/Vice President/Assistant Vice President  
*(Select appropriate title)*

\_\_\_\_\_  
Print or type Signer's name

\_\_\_\_\_  
Print or type Signer's name

**CORPORATE SEAL**

**NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION**

**PARTNERSHIP**

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF PREQUALIFIED BIDDER**

---

Full Name of  
Partnership

---

Address as  
Prequalified

---

Signature of Witness

---

Signature of Partner

---

Print or Type Signer's Name

---

Print or Type Signer's Name

**NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN  
CERTIFICATION**

**LIMITED LIABILITY COMPANY**

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF PREQUALIFIED BIDDER**

\_\_\_\_\_ Full Name of Firm

\_\_\_\_\_ Address as Prequalified

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Signature of Member/Manager/Authorized Agent  
*(Select appropriate Title)*

\_\_\_\_\_  
Print or Type Signer's Name

\_\_\_\_\_  
Print or Type Signer's Name

**NON-COLLUSION, DEBARMENT AND GIFT BAN CERTIFICATION**

**JOINT VENTURE (2) or (3)**

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF PREQUALIFIED BIDDER**

Instructions: **2 Joint Venturers** Fill in lines (1), (2) and (3) and execute. **3 Joint Venturers** Fill in lines (1), (2), (3) and (4) and execute. On Line (1), fill in the name of the Joint Venture Company. On Line (2), fill in the name of one of the joint venturers and execute below in the appropriate manner. On Line (3), print or type the name of the other joint venturer and execute below in the appropriate manner. On Line (4), fill in the name of the third joint venturer, if applicable and execute below in the appropriate manner.

(1) \_\_\_\_\_  
Name of Joint Venture

(2) \_\_\_\_\_  
Name of Contractor

\_\_\_\_\_  
Address as Prequalified

\_\_\_\_\_  
Signature of Witness or Attest

BY

\_\_\_\_\_  
Signature of Contractor

\_\_\_\_\_  
Print or Type Signer's Name

\_\_\_\_\_  
Print or Type Signer's Name

*If Corporation, affix Corporate Seal* AND

(3) \_\_\_\_\_  
Name of Contractor

\_\_\_\_\_  
Address as Prequalified

\_\_\_\_\_  
Signature of Witness or Attest

BY

\_\_\_\_\_  
Signature of Contractor

\_\_\_\_\_  
Print or Type Signer's Name

\_\_\_\_\_  
Print or Type Signer's Name

*If Corporation, affix Corporate Seal* AND

(4) \_\_\_\_\_  
Name of Contractor

\_\_\_\_\_  
Address as Prequalified

\_\_\_\_\_  
Signature of Witness or Attest

BY

\_\_\_\_\_  
Signature of Contractor

\_\_\_\_\_  
Print or Type Signer's Name

\_\_\_\_\_  
Print or Type Signer's Name

*If Corporation, affix Corporate Seal*

**NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN  
CERTIFICATION**

**INDIVIDUAL DOING BUSINESS UNDER A FIRM NAME**

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF PREQUALIFIED BIDDER**

Name of Prequalified Bidder

\_\_\_\_\_ Individual Name

Trading and Doing Business As

\_\_\_\_\_ Full name of Firm

\_\_\_\_\_ Address as Prequalified

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Signature of Prequalified Bidder, Individual

\_\_\_\_\_  
Print or Type Signer's Name

\_\_\_\_\_  
Print or Type Signer's Name



**NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN  
CERTIFICATION**

**INDIVIDUAL DOING BUSINESS IN HIS OWN NAME**

The prequalified bidder, being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, that the prequalified bidder has not been convicted of violating *N.C.G.S. § 133-24* within the last three years, and that the prequalified bidder intends to do the work with its own bona fide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion, debarment and gift ban certification, the Contractor is attesting his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

*N.C.G.S. § 133-32* and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

**SIGNATURE OF PREQUALIFIED BIDDER**

Name of Prequalified Bidder \_\_\_\_\_  
Print or Type Name

\_\_\_\_\_  
Address as Prequalified

\_\_\_\_\_  
Signature of Prequalified Bidder, Individually

\_\_\_\_\_  
Print or type Signer's Name

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Print or type Signer's name

**DEBARMENT CERTIFICATION OF PREQUALIFIED BIDDER**

## Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation that is file with the Department, or has become erroneous because of changed circumstances.
2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded*, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.
3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.
4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273)* provided by the Department, without subsequent modification, in all lower tier covered transactions.
5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.
6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

**DEBARMENT CERTIFICATION**

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

- a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;
- c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental 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 proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

Check here if an explanation is attached to this certification.
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# NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

## BID FORM

**WBS Element:** 11RE.108638

**Contract Number:** 11-00-146

**DESCRIPTION:** I-77 Welcome Center Wastewater Treatment Plant Rehabilitation

PAGE 1 OF 1

ITEM	SECT	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT BID
1	SP	Wastewater Treatment Plant Rehabilitation	1	LS		

***TOTAL BID FOR PROJECT:*** \_\_\_\_\_

CONTRACTOR \_\_\_\_\_

ADDRESS \_\_\_\_\_

PHONE NO. \_\_\_\_\_

Federal Identification Number \_\_\_\_\_ Contractors License Number \_\_\_\_\_

Authorized Agent \_\_\_\_\_ Title \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Witness \_\_\_\_\_ Title \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

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**THIS SECTION TO BE COMPLETED BY NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**

*This bid has been reviewed in accordance with Article 103-1 of the Standard Specifications for Roads and Structures 2018.*

*Reviewed by* \_\_\_\_\_

*Date* \_\_\_\_\_

**Execution of Contract**

**Contract No: 11-00-146**

**County: Surry**

ACCEPTED BY THE DEPARTMENT

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**Proposals Engineer**

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Date

EXECUTION OF CONTRACT AND BONDS  
APPROVED AS TO FORM:

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**Division Engineer**

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Date

Signature Sheet (Bid) - ACCEPTANCE SHEET