CITY OF MARY ESTHER, FLORIDA

SPECIFICATIONS

for

Main Lift Station Replacement

HMM Project No. 332640

May 2015

Hatch Mott MacDonald

11-C West 23rd Street
Panama City, FL 32405
(850)763-9393

TABLE OF CONTENTS

CONTRACT, FORMS AND CONDITIONS OF THE CONTRACT

DOCUMENT	TITLE
	Title Page
	Table of Contents
00020	Invitation to Bid
00100	Instructions To Bidders
00300	Proposal
00310	Public Entity Crime Statement
00320	Bid Bond
00330	Standard Form of Agreement between Owner and Contractor
00340	Labor and Material Bond
00350	Performance Bond
00700	Standard General Conditions of the Construction Contract EJCDC C-700, 2007 Edition
00800	Supplementary General Conditions
00900	Special Provisions

TECHNICAL SPECIFICATIONS

01000	Measurement and Payment
01100	Erosion Control and Environmental Protection
01200	Sodding
01300	Grassing (by seeding)
02120	Demolition and Removal
02150	Bypass Pumping
02530	Technical Specifications- Trench Safety Act
02540	Earthwork for Utilities
02550	Water Distribution System
02560	Sewer Collection system
02566	Manholes, Wet Wells and Valve Chambers
02567	Concrete Protective Liner
02570	Pumps Valves, and Mechanical Equipment
02571	Site and Earthwork for Pump Station
02580	Sewage Force Main System

END OF TABLE OF CONTENTS

SECTION 00020

INVITATION TO BID

Sealed Bids, subject to the conditions contained herein, for the Mary Esther **Main Lift Station Replacement**, HMM Project No. 332640, will be received by the City Clerk, City of Mary Esther, Florida, at City Hall, 195 Christobal Road, N., Mary Esther, Florida 32569 on _____, no later than _____ PM local time. The sealed bids will then be publicly opened and read aloud at City Hall at 2:30 p.m.

Primary items of work include the following for the lift station:

1. Relocate Sewer line
2. Demolish existing pump station
3. New Gravity Line
4. New Submersible Pump

Envelope containing bids must be sealed and marked "Bids for the Construction of the Mary Esther Main Lift Station Replacement Project, HMM Project No. 332640 for the City of Mary Esther, Florida.

Any bids received after the stipulated time of bid opening shall not be accepted and shall be returned unopened.

Plans, specifications and contract documents may be inspected and/or obtained at the office of the Engineer, Hatch Mott MacDonald, 11-C West 23rd Street, Panama City, Florida 32405 (Tel. 850-763-9393), at a non-refundable cost of **$150** each (shipped regular mail). No partial sets of documents will be issued.

Questions pertaining to the project shall be submitted in writing to the Engineer.

The bid shall remain in force for sixty (60) days after the time of opening. **A non-mandatory pre-bid meeting will be held at the City of Mary Esther City Hall on _____ at _____ AM (local time).**

All bids must be submitted on the Bid Form as furnished in this Specification. The bids must be accompanied by a Public Entity Crime Statement and by a Bid Bond, CDBG forms, any Addenda issued, certified check, or cashier's check, in the amount of five percent (5%) of the Base Bid as a guarantee that the bidder will enter into an agreement with the Owner if his bid is accepted.

Attention of bidders is called to the licensing law of Florida. All bidders must comply with all applicable State and local laws concerning licensing, registration, and regulation of contractors doing business in the State of Florida.

The Owner reserves the right to reject any or all bids and to waive informalities in any bid whenever such rejection or waiver is in the best interest of the Owner. Additionally, the Owner reserves the right to award the contract to any bidder.

City of Mary Esther, Florida

SECTION 00100

INSTRUCTIONS TO BIDDERS

PART 1 – GENERAL

1.1 DEFINITIONS

A. Bidding Documents include the Instructions to Bidders and Bid Form, Invitation to Bid, and Contract Documents including any addenda issued prior to receipt of bids.

B. All definitions set forth in the General Conditions are applicable to the Bidding Documents.

C. Addenda are written or graphic instruments issued by the Engineer prior to the receipt of bids which modify or interpret the Bidding Documents by addition, deletion, clarification, or correction. Addenda will be issued only to those known to the Engineer as registered planholders.

1.2 BIDDING DOCUMENTS

A. Plans and specifications are available from the Engineer as stated in the Invitation to Bid. No partial sets of the Bidding Documents will be issued.

1.3 EXAMINATION

A. Bidders shall carefully examine the Bidding Documents and the construction site and obtain first-hand knowledge of existing conditions.

1.4 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

A. Bidders shall promptly notify the Engineer of any ambiguity, inconsistency, or error which they may discover upon examination of the Bidding or Contract Documents or of the site and local conditions.

B. Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the Engineer, to reach him at least 5 (five) business days prior to the date for receipt of bids.

C. Any interpretation, correction, or change to the Bidding Documents shall be made by Addenda. No oral clarification will be made.

D. If a substitution is acceptable, such acceptance shall be set forth in Addenda.

1.5 BASIS OF BIDS AND AWARDS:

A. Each Bid shall be submitted on the prescribed form and indicate the bid prices thereon in proper spaces, for the entire work. Any erasure or other correction in

the bid may be explained or noted over the signature of the Bidder. Bids containing any conditions, items not called for, or irregularities of any kind may be rejected by the Owner. Only one copy of the Bid Form is required.

C. Each Bid shall give the full business address of the Bidder and state whether he is an individual, corporation or partnership.

D. Bids by a corporation shall be signed with the legal name and seal of the corporation followed by the name of the state of its incorporation, and the manual signature and designation of an officer, agent, or other person authorized to bind the corporation.

E. Bids by partnerships shall show the names of all partners and must be signed in the partnership name by one of the partners. The partnership signature shall be followed by the manual signature of the partner signing.

F. In every case, the name of the person signing and his designation shall be typed or printed below his signature. A person who affixes to his signature the word "President", "Secretary", "Agent", or other designation without disclosing his principal may be held individually responsible for such bid. Satisfactory evidence of the authority of an officer, agent, attorney, or other person signing for a corporation and agent, attorney, or other person signing for a partnership or individual shall be furnished.

G. Each Bid must be submitted in a sealed envelope bearing on the outside the name of the Bidder, his address, and the name of the project for which the Bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as specified in the Bid Form.

H. The successful Bidder shall be notified by letter, mailed to the address shown on his Proposal, that his bid has been accepted and that he has been awarded the Contract. Award will be made within 60 days after bids are received unless otherwise stated in the Special Provisions. This period may be extended if mutually agreeable to Owner and Contractor.

I. The Owner reserves the right to award the Contract based on the total bid or any one or combination of the various base bids.

1.7 BID MODIFICATION

A. Bid modification shall be accepted from bidders if received prior to the opening of bids. Modification shall be in printed form. Modification will be read by Owner or Engineer prior to opening formal bids.

1.8 BID WITHDRAWAL

A. Bids may be withdrawn on written or telegraphic request received from Bidders prior to the time fixed for opening. Negligence on the part of the Bidder in

preparing the bid confers no right for the withdrawal of the Bid after it has been opened. No bidder may withdraw a bid within 60 days after the actual date of the opening.

1.9 QUALIFICATION OF BIDDER

A. The Owner may make such investigations as he deems necessary to determine the ability of the Bidder to perform the work, including bidder pre-qualification, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional Bids will not be accepted. The Bidder will be required to perform at least fifty percent (50%) of the contract work with his/her own employees. If requested by the Owner, the Bidder shall supply the name and address of the major material suppliers and subcontractors.

1.10 TIME OF COMPLETION AND LIQUIDATED DAMAGES

A. The Owner will, after executing the Contract, issue to the Contractor in writing a Notice to Proceed. The beginning of the time allotted for the Contract completion will be 10 days after the date of the Notice to Proceed, or the day on which Work is actually started, whichever occurs first. The Bidder agrees to fully complete the work within the number of consecutive calendar days as specified in the Proposal.

B. Liquidated Damages: Time is an essential element in the Contract. As the prosecution of the Work will inconvenience the public, obstruct traffic, and interfere with business, it is important that the work be pressed vigorously to completion. Also, the cost to the Owner for the administration of the Contract, inspection, and engineering for the Work under construction will be increased if the time occupied in the Work is lengthened. Therefore, for each day that the Work remains uncompleted after the time specified in the Contract, or additional time that may be allowed by the Owner for the completion of the Work when extra or additional work is ordered by the Owner, the amount specified in the Agreement shall be paid by the Contractor to the Owner as liquidated damages for the loss sustained by the Owner because of the failure of the Contractor to complete the Work within the specified time. Liquidated damages will be deducted monthly from partial payments otherwise due the Contractor. The amount of liquidated damages shall be the amount set forth in the Agreement.

C. Time Extensions for Unusually Severe Weather - The following paragraphs specify the procedure for the determination of time extensions for unusually severe weather. In order that a time extension may be awarded by the Owner, the following two conditions must be satisfied.

1. The weather experienced at the project site during the contract period

must be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month; and

2. The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.

1.11 WORKING HOURS

A. The Contractor shall be responsible for adjusting his working hours as required to meet the construction schedule. Unless noted otherwise, the Contractor may work between the hours of 7:00 a.m. and 7:00 p.m weekdays. The Owner reserves the right to limit work hours as may become necessary but will extend the Contractor's construction timeframe accordingly without subjecting the Contractor to liquidated damages due to the delay. The Contractor shall not exceed the work hour limits unless approved by the Owner in writing.

1.12 SECURITY

A. The Contractor shall be responsible for maintaining security, and the Contractor shall be responsible for the replacement or repair of items and/or equipment stolen, lost, or damaged while the security is under the care of the Contractor. The Contractor shall be responsible for having a job superintendent present whenever subcontractors are working in connection with the Contractor's basic contract.

1.13 SPECIAL POLICY AND PROCEDURES

A. Profane language or improper behavior of Contractor and subcontractor personnel will result in immediate termination of individual(s) involved.

B. Asbestos or asbestos-bearing materials shall not be used in any materials used in the execution of this project.

1.14 LICENSES

A. Contractor shall have all local, State and Federal licenses required to complete the work.

1.15 CONSTRUCTION DOCUMENTS

A. The successful Bidder will be provided with three (3) complete sets of plans, specifications, and addenda for construction purposes. Any additional sets will be furnished at cost of printing plus, if applicable, shipping charges.

1.16 BID SECURITY

A. Bids shall be accompanied by a bid guarantee of five percent (5%) of the amount

of the bid, which may be a certified check, a cashier's check, or Bid Bond made payable to the Owner. Such check or Bid Bond shall be submitted with the understanding that it shall guarantee that the Bidder will not withdraw his bid for a period of sixty (60) days after the scheduled closing time for the receipt of bids; that if his bid is accepted, he will enter into written contract with the Owner, and that the required Performance and Payment Bond will be given; and that in the event of the withdrawal of said bid within said period, or failure to enter into said contract and give said bond within ten (10) days after he has received notice of acceptance of his bid, the Bidder shall be liable to the Owner for the full amount of the bid guarantee as representing the damage to the Owner on account of the default of the bidder after the formal opening of the bids. All Bid Bonds will be returned, if requested, within 30 days following bid opening; except those of the three lowest bidders, which will be returned, if requested, after the accepted Bidder has executed the Contract and Performance Bond has been approved by the Owner. If the required contract and Bond have not been executed within sixty (60) days after the date of the opening of the bids, then the Bid Bond or check of any Bidder will be returned upon his request, provided he has not been notified of the acceptance of his bid prior to the date of such request.

1.17 PAY REQUEST FORMAT

A. The Contractor shall submit pay requests using the AIA Standard Application and Certificate for Payment, AIA Document G702 and G703. Computer generated schedule of value, in the AIA G703 format, may be submitted. The Contractor shall submit a complete schedule of values for the Engineer's approval prior to submittal of the first pay request. The schedule of values must show a complete breakdown of all work involved. Four copies of the Pay Request must be submitted prior to the 20th day of each month.

1.18 PRE-BID CONFERENCE

A. A non-mandatory pre-bid conference shall be held on _____ at City Hall. A site visit will be made. Questions arising shall be addressed in an Addendum.

1.19 QUANTITIES IN PROPOSAL

A. If the proposal form contains unit price items, the quantities stated therein are approximate only and are intended to serve as a basis for the comparison of bids and to fix the approximate amount of the cost of the project. The Owner does not expressly agree or imply that the actual amount of the work done in the performance of the contract will correspond with the quantities in the proposal form; the amount of work done may be more or less than the said quantities and may be increased or decreased by the Engineer as circumstances may require. The increase or decrease of any quantity shall not be regarded as grounds for an increase in the unit price or in the time allowed for the completion of the work, except as provided in the contract documents.

1.20 DISQUALIFICATION OF BIDDERS

A. Bidders may be disqualified for any or all of the following:

1. Reasonable grounds for believing that a bidder is interested in more than one proposal will cause the rejection of all proposals in which such bidder is believed to be interested. Any or all proposals will be rejected if there is reason for believing that collusion exists among the bidders, and no participant in such collusion will be considered in future proposals for the same work.

2. Failure to acknowledge addenda.

3. Bids which are incomplete, unbalanced, conditional, or obscure.

1.21 RIGHT TO ACCEPT OR REJECT BIDS

A. The Owner reserves the right to reject any one or all bids, or any part of any bid, to waive any informality in any bid, and to award a contract deemed to be in the best interest of the Owner. Bids which contain additions not requested, or irregularities of any kind, or which do not comply in every respect with the instructions to bidders, may be rejected at the option of the Owner.

1.22 EXECUTION OF CONTRACT

A. The bidder to whom a contract is awarded will be required to execute, in three (3) counterparts, the prescribed contract form and contract bond form within ten (10) days from the date of notice to him that such forms are ready for execution.

1.23 WAGES AND SALARIES

A. On federally-funded projects, attention of the bidders is particularly called to the requirements concerning the payment of not less that the prevailing wage and salary rates specified in the contract documents and the conditions of employment with respect to certain categories and classifications of employees. The rates of pay set forth are the minimums to be paid during the life of the Contract. It is, therefore, the responsibility of bidders to inform themselves as to local labor conditions, such as the length of the work day and work week, overtime compensation, health and welfare contributions, labor supply, and prospective changes or adjustments of rates.

B. This project is subject to the Florida Wage Rate Determination

1.24 EQUAL EMPLOYMENT OPPORTUNITY

A. On federally-funded projects, attention of bidders is particularly called to the requirement for ensuring that employees and applicants for employment are not discriminated against because of their race, color, religion, sex, or national origin.

SECTION 00100

INSTRUCTIONS TO BIDDERS

1.25 PUBLIC ENTITY CRIMES

A. The person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid or a contract to provide any goods or services to a public entity, may not submit a bid on a contract on a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, for Category Two for a period of 36 months from the date of being placed on the convicted vendor list.

1.26 PERFORMANCE AND PAYMENT BONDS

A. Performance and Payment Bonds are required as described herein and shall be submitted on Standard Form AIA Form A312.

END OF SECTION

SECTION 00300

PROPOSAL

for
City of Mary Esther
Main Lift Station Replacement
HMM Project No. 332640

Name: _____

Address: _____

Date: _____

TO: City of Mary Esther, Florida

The Bidder, having carefully examined the plans and specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials, labor, and supplies, hereby proposes to furnish all labor, materials, tools, and equipment, machinery, equipment rental, transportation, and superintendent, and to perform all work, provide all services, and to construct the project in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below. These prices cover all expenses incurred in performing the work required under the Contract Documents.

In submitting this bid, we agree:

1. To hold this bid open for 60 days from the bid due date.

2. To accept the provisions of the Instructions to Bidders regarding disposition of Bid Security.

3. To enter into and execute a Contract, if awarded, for the Work and to furnish all insurance and bonds required by the Bidding Documents.

4. To accomplish the work in accordance with the Contract Documents.

5. To begin the work with an adequate force and with sufficient equipment and facilities within ten (10) days of the date stated in the written notice to proceed issued and served upon him by the Engineer, and to complete work in 120 consecutive calendar days. If the Contractor chooses to begin work before the ten (10) days expire, then the start date becomes when work actually commences.

6. For the purpose of reimbursing the Owner for additional costs experienced by it and resulting from the failure of the Contractor to complete the work within the prescribed

time limits, it is understood that the reductions for liquidated damages will apply in the event the work is not completed within such time limits.

7. That the description of bid items are briefly stated; however the prices stated include all incidentals necessary to complete such work as described in the Specifications and shown on the Plans.

8. Contractors are required to submit bids on Base Bid and Additive Bids or Deductive (if used). Incomplete bids shall be rejected. The Owner reserves the right to reject any or all bids and to waive informalities in any bid whenever such rejection or waiver is in the best interest of the Owner.

9. The Owner reserves the right to award the contract (if awarded) based on the Base Bid and any combination of alternates and/or additive or deductive bid item(s) (if applicable), whichever combination the Owner believes is in their best interest.

10. The quantities for unit price bid items listed on the Proposal sheet are estimated quantities only for the purpose of comparing bids. Any differences between these estimated quantities and actual quantities required for construction shall not be taken as a basis for claims by the Contractor for extra compensation. Compensation will be based on the lump sum or unit prices and actual construction quantities.

11. Bids shall include sales tax and all other applicable taxes and fees.

SECTION 00300 - BID FORM

City of Mary Esther

Main Lift Station Replacement
HMM Project No. 332640

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices or lump sums. Bids shall include sales tax and all other taxes and fees.

BASE BID

ITEM NO.	DESCRIPTION	QUANTITY	UNIT OF MEASURE	UNIT PRICE	TOTAL
1	Mobilization	1	LS	$	$
2	Demolition of Existing Pump Station	1	LS	$	$
3	Traffic Maintenance	1	LS	$	$
4	Gravel Road	160	LF	$	$
5	New Pump Station	1	LS	$	$
6	Manhole	3	EA	$	$
7	Gravity Line	81	LF	$	$
8	Waterline relocation	1	LS	$	$
9	Sodding	750	SY	$	$
10	Select Backfill	500	CY	$	$

TOTAL BASE BID $

SECTION 00300

PROPOSAL

TRENCH SAFETY ACT

The Trench Safety Act requires that the Contract Bid include a separate item which identifies the cost of compliance with the Trench Safety Standards. Although Sheeting and Shoring costs are included in the Unit Price pay items, the BIDDER shall indicate below the estimated cost of compliance. There will be no payment for sheeting and shoring.

Description	Unit of Measure	Unit Cost	Total Cost
Sheeting	LF	$_____	$_____
Shoring	SF	$_____	$_____

Method of Compliance for Sheeting:

_____

Method of Compliance for Shoring:

_____

SECTION 00300

PROPOSAL

The Bidder further agrees that, in the event of his failure to execute the appropriate contract documents within ten (10) consecutive calendar days after his receipt of written notice of the award of the contract, the check or bid bond accompanying his bid, and the monies payable thereon, shall become the property of and be retained and used by the Owner as liquidated damages; otherwise, the check or bid bond shall be returned by the Owner to the undersigned.

Attached hereto is a certified check on the _____
Bank of _____ or Bid Bond for the sum of
$_____Dollars ($_____)
made payable to the **City of Mary Esther, Florida**.

(In the event the bidder is a corporation, there shall be attached hereto a certified copy of a resolution of the board of directors of the corporation authorizing the officer who signs the proposal and bid bond to do so in its behalf.)

Check accordingly:

We operate as
Individual Owner ( )
Partnership ( )
Corporation ( )

Firm:_____

By:_____

Title:_____

Date:_____

We acknowledge receipt of the following addenda (addendum number and date received):

_____

_____

_____

Contact Person:_____

Telephone No._____
Fax No.: _____

END OF SECTION

SECTION 00310

PUBLIC ENTITY CRIME STATEMENT FORM

SWORN STATEMENT UNDER SECTION 287.133(3)(a),
FLORIDA STATUTES, ON PUBLIC ENTITY CRIME**S**

(THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICER AUTHORIZED TO ADMINISTER OATHS.)

STATE OF _____

COUNTY OF: _____

Before me, the undersigned authority, personally appeared _____, who, being by me first duly sworn, made the following statement:

1. The Business address of _____(name of bidder or contractor) is _____ _____ _____

2. My relationship to _____ (name of bidder or contractor) is _____(relationship such as sole proprietor, partner, president, vice president).

3. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), **Florida Statutes,** means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

4. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), **Florida Statutes,** means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

PUBLIC ENTITY CRIME STATEMENT FORM

5. I understand that an "affiliate" is defined by the statute to mean (1) a predecessor or successor of a person or a corporation convicted of a public entity crime, or (2) an entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime, or (3) those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate, or (4) a person or corporation who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months.

6. Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, nor any affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

(Draw a line through Paragraph 6 if Paragraph 7 below applies)

7. There has been a conviction of a public entity crime by the bidder or contractor, or an officer, director, executive, partner, shareholder, employee, member or agent of the bidder or contractor or an affiliate of the bidder or contractor. A determination has been made pursuant to Section 287.133(3) by order of the Division of Administrative Hearings that it is not in the public interest for the name of the convicted person or affiliate to appear on the convicted vendor list. The name of the convicted person or affiliate is _____. A copy of the order of the Division of Administrative Hearings is attached to this statement.

(Draw a line through Paragraph 7 if Paragraph 6 above applies)

Sworn to and subscribed before me in the State and County first mentioned above on the _____day of _____ , 20 ____.

Personally known _____OR produced identification _____
(type of identification)

_____
Notary Public - State of _____

My commission expires:_____

(Printed typed or stamped Commissioned name of Notary Public)

SECTION 00320

BID BOND

STATE OF FLORIDA)
COUNTY OF OKALOOSA) ss.:

KNOW ALL MEN BY THESE PRESENTS, that we, _____, as Principal, and _____, as Surety, are held and firmly bound unto the _____(Owner), in the penal sum of _____ _____Dollars ($_____), lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the accompanying bid, dated _____, 2015, for the Mary Esther Main Lift Station Replacement, HMM Project No. 332640.

NOW THEREFORE,

(a) If said bid shall be rejected, or in the alternate

(b) If said bid shall be accepted and the Principal shall properly execute and deliver to said Owner the appropriate contract documents, including the contract form and contract bond form, and shall in all respects fulfill all terms and conditions attributable to the acceptance of said bid.

Then this obligation shall be void, otherwise, it shall remain in force and effect, it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the amount of this obligation as herein stated.

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

IN WITNESS WHEREOF, the obligated parties have executed this instrument under their several seals this _____ day of _____, _____, the name and the corporate seal of each corporate party being hereto affixed and these presents being duly signed by its undersigned representative, pursuant to the authority of the governing body.

IN PRESENCE OF:

_____
(Individual or Partnership Principal)

SEAL

_____
(Business Address)

ATTEST:

_____
(Secretary)

_____
(Corporate Principal)*

_____
(Corporate Surety)*

*Impress Corporate Seal

END OF SECTION

SECTION 00330

STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR

(This document has important legal consequences; consultation with an attorney is encouraged with respect to its completion or modification).

THIS AGREEMENT made as of the _____ day of _____ in the year 2015 by and between, the City of Mary Esther, Florida, hereinafter called OWNER) and _____, (hereinafter called CONTRACTOR),

WITNESSETH THAT OWNER and CONTRACTOR in consideration of the mutual covenants hereinafter set forth, agree as follows:

Article 1. WORK. The CONTRACTOR shall perform all Work as specified or indicated in the Contract Documents for the completion of the Project generally described as follows:

City of Mary Esther
Main Lift Station Replacement
HMM Project No. 332640

Article 2. **Hatch Mott MacDonald,** 11-C West 23rd Street, Panama City, Florida, 32405, will act as Engineer in connection with this Project in accordance with the Contract Documents.

The Project has been designed by:

HATCH MOTT MACDONALD, 11-C West 23rd Street, Panama City, FL 32405.

Article 3. CONTRACT TIME. The Work shall be completed within __120__ consecutive calendar days after the date on which the Contract time commences to run as provided in paragraph 17.02 of the General Conditions.

Article 4. CONTRACT PRICE. Owner shall pay Contractor for performance of the Work in accordance with the Contract Documents in the current funds as follows:

_____

_____

Article 5. APPLICATIONS FOR PAYMENT. Contractor may submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be reviewed and approved by Engineer as provided in the General Conditions.

Article 6. PROGRESS AND FINAL PAYMENTS. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment as approved by Engineer during construction as provided below. All progress payments will be on the basis of the progress of the Work measured by the schedule of values provided for in paragraph 14.01 of the General Conditions.

6.1 Prior to Substantial Completion progress payments will be in an amount equal to: 90% of the Work completed, and 90% of stored materials that have been paid for (10% retainage).

6.2 Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95% (5% retainage) of the Final Contract Price, less any additional retainage as Engineer shall determine in accordance with paragraph 14.02 of the General Conditions and less any liquidated damages should the Contractor fail to complete the work within the specified time.

6.3 Upon final completion of the Work, including receipt of "As Built" drawings, Contractor's Final Affidavit, Warranty and settlement of all claims, Owner shall pay the remainder of the Final Contract Price (less liquidated damages, if applicable).

Article 7. CONTRACT DOCUMENTS. The Contract Documents which comprise the Contract between Owner and Contractor are attached hereto and made a part hereof and consist of the following:

7.1 Instructions to Bidders

7.2 Contractor's Bid Proposal and Insurance Certificate

7.3 Addenda (if issued)

7.4. Sworn Statement, Florida Statutes on Public Entity Crimes

7.5 This Agreement (pages 1 through 3)

7.6 Performance Bond and Payment Bond

7.7 General Conditions

7.8 Supplementary General Conditions

7.9 Special Provisions

7.10 Technical Specifications

7.11 Drawings

Article 8. TIME FOR COMPLETION; LIQUIDATED DAMAGES.

8.1 Contractor agrees to commence work under the Contract Documents within ten (10) calendar days after written Notice to Proceed and, subject to authorized adjustments, to achieve Final Completion with the contract time as defined in Article 3.

8.2 It is mutually agreed between the Contractor and the Owner that time is the essence of this Contract, and in the event the construction of the Work is not completed within the time herein specified, it is agreed that from the compensation otherwise to be paid to the Contractor, the Owner may retain the sum of $1,500 per day for each day thereafter, Sundays and holidays included, that the Work remains uncompleted, which sum shall represent the actual damages which the Owner will have sustained per day by failure of the Contractor to

complete the Work within the time stipulated and this sum is not a penalty, being the stipulated damage the Owner will have sustained in the event of such default by the Contractor.

Article 9. MISCELLANEOUS.

9.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions shall have the meanings indicated in the General Conditions.

9.2 Neither Owner nor Contractor shall, without the prior written consent of the other, assign or sublet in whole or in part his interest under any of the Contract Documents; and, specifically, Contractor shall not assign any monies due or to become due without the prior written consent of Owner.

9.3 Owner and Contractor each binds himself, his partners, successors, assigns, and legal representatives to the other party hereto in respect to all covenants, agreements and obligations contained in the Contract Documents.

9.4 The Contract Documents constitute the entire Agreement between Owner and Contractor and may be altered, amended or repealed only by a duly executed written instrument, in the form of a Change Order.

Article 10. OTHER PROVISIONS.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first above written.

OWNER:	CONTRACTOR:
City of Mary Esther, Florida	_____
By_____	By_____
Print/Type_____ (Name and Title)	Print/Type_____ (Name and Title)
Attest_____ (SEAL)	Attest_____ (SEAL)

END OF SECTION

SECTION 00340

LABOR AND MATERIAL PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____ _____, as Principal hereinafter called Contractor, whose business address is _____, and whose telephone number is _____, and _____ _____, a corporation duly organized under the laws of the State of _____ _____, as Surety, whose business address is _____ _____, and whose telephone number is _____, are held and firmly bound unto_____, as Obligee, whose business address is , and whose telephone number is _____, hereinafter called Owner, in the sum of _____ _____ Dollars ($_____), for the payment of which sum, well and truly to be made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, HMM Project No. 332640 Mary Esther Main Lift Station Replacement, in accordance with drawings and specifications prepared by the _____, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract, for work to be performed at the following location(s):_____ _____ _____, said property owned by, _____ _____, whose business address is, _____ _____, and whose telephone number is, _____.

THE PRINCIPAL FEATURES of the work are briefly described as follows: Water, Sewer, and Stormwater Improvements.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Contractor or with a Subcontractor of the Contractor for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being constructed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Contractor and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant.
   a) Unless claimant, other than one having a direct contract with the Contractor shall have given written notice to any two of the following, the Contractor, the Owner, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed

and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid in an envelope addressed to the Contractor, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Contractor ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this Bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed on record against said improvement, whether or not claim for the amount of such lien be presented under and against this Bond.

5. The notice and time limitation provisions of Section 255.05, Florida Statutes are incorporated in this Bond by reference.

Signed, sealed and dated _____.

_____
(Seal)

_____
(Witness)

_____
(Signature)

_____
(Print/Type)

_____
(Title)

_____
(Surety)

_____

By_____

(Attach Certified Copy of Power of Attorney)

END OF SECTION

SECTION 00350

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____ _____, as Principal hereinafter called Contractor, whose business address is _____, and whose telephone number is _____, and _____ _____, a corporation duly organized under the laws of the State of _____ _____, as Surety, whose business address is _____ _____, and whose telephone number is _____, are held and firmly bound unto _____, as Obligee, whose business address is _____, and whose telephone number is _____, hereinafter called Owner, in the sum of _____ _____ Dollars ($_____ _____), for the payment of which sum, well and truly to be made, the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Contractor has entered into a written contract dated _____, _____with the Owner for Project No. 332640, Mary Esther Main Lift Station Replacement, in accordance with drawings and specifications prepared by the _____, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract, for work to be performed at the following location(s):_____

_____

_____

_____, said property owned by, _____, whose business address is, _____ _____, and whose telephone number is, _____ _____.

THE PRINCIPAL FEATURES of the work are briefly described as follows: Replacement of Main Lift Station.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and voided otherwise shall remain in full force and effect. The Surety hereby waives notice of any alteration or extension of time made by the Owner. Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligation thereunder, the Surety may promptly remedy the default, or shall promptly:

1. Complete the Contract in accordance with its terms and conditions, or,

2. Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (even though there should be default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but

3. not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price", as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this Bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

The notice and time limitation provisions of Section 255.05, Florida Statutes, are incorporated in this Bond by reference.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of Owner.

Signed, sealed and delivered _____.

_____
(Seal)

_____
(Witness)

_____
(Signature)

_____
(Print/Type)

_____
(Title)

_____
(Surety)

_____

By_____

(Attach Certified Copy of Power of Attorney)

END OF SECTION

SECTION 00700

GENERAL CONDITIONS OF THE CONTRACT

PART 1 - GENERAL

The Engineers Joint Contract Documents Committee (EJCDC), Document No., C-700, 2007 Edition "Standard General Conditions of the Construction Contract" shall govern all work of this contract, except as they may be modified by Section 00800, Supplementary General Conditions and specific provisions of the documents. Should there be a discrepancy between the General Conditions and conditions stated in the Instructions to Bidders, Agreement, or Special Provisions, the latter shall govern.

An Article or portion of an article not modified by the Supplementary Conditions shall remain in full effect.

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

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

ACEC
American Council of Engineering Companies

ASCE American Society of Civil Engineers

National Society of Professional Engineers
Professional Engineers in Private Practice

AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

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NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

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CONSTRUCTION SPECIFICATIONS INSTITUTE

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

Page

Article 1 – Definitions and Terminology 1
1.01 Defined Terms 1
1.02 Terminology 5

Article 2 – Preliminary Matters 6
2.01 Delivery of Bonds and Evidence of Insurance 6
2.02 Copies of Documents 6
2.03 Commencement of Contract Times; Notice to Proceed 6
2.04 Starting the Work 7
2.05 Before Starting Construction 7
2.06 Preconstruction Conference; Designation of Authorized Representatives 7
2.07 Initial Acceptance of Schedules 7

Article 3 – Contract Documents: Intent, Amending, Reuse 8
3.01 Intent 8
3.02 Reference Standards 8
3.03 Reporting and Resolving Discrepancies 9
3.04 Amending and Supplementing Contract Documents 9
3.05 Reuse of Documents 10
3.06 Electronic Data 10

Article 4 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions; Reference Points 11
4.01 Availability of Lands 11
4.02 Subsurface and Physical Conditions 11
4.03 Differing Subsurface or Physical Conditions 12
4.04 Underground Facilities 13
4.05 Reference Points 14
4.06 Hazardous Environmental Condition at Site 14

Article 5 – Bonds and Insurance 16
5.01 Performance, Payment, and Other Bonds 16
5.02 Licensed Sureties and Insurers 16
5.03 Certificates of Insurance 17
5.04 Contractor's Insurance 17
5.05 Owner's Liability Insurance 19
5.06 Property Insurance 19
5.07 Waiver of Rights 20
5.08 Receipt and Application of Insurance Proceeds 21

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5.09 Acceptance of Bonds and Insurance; Option to Replace 21
5.10 Partial Utilization, Acknowledgment of Property Insurer 22

Article 6 – Contractor's Responsibilities 22
6.01 Supervision and Superintendence 22
6.02 Labor; Working Hours 22
6.03 Services, Materials, and Equipment 22
6.04 Progress Schedule 23
6.05 Substitutes and "Or-Equals" 23
6.06 Concerning Subcontractors, Suppliers, and Others 25
6.07 Patent Fees and Royalties 27
6.08 Permits 27
6.09 Laws and Regulations 28
6.10 Taxes 28
6.11 Use of Site and Other Areas 28
6.12 Record Documents 29
6.13 Safety and Protection 29
6.14 Safety Representative 30
6.15 Hazard Communication Programs 30
6.16 Emergencies 30
6.17 Shop Drawings and Samples 31
6.18 Continuing the Work 32
6.19 Contractor's General Warranty and Guarantee 33
6.20 Indemnification 33
6.21 Delegation of Professional Design Services 34

Article 7 – Other Work at the Site 35
7.01 Related Work at Site 35
7.02 Coordination 35
7.03 Legal Relationships 36

Article 8 – Owner's Responsibilities 36
8.01 Communications to Contractor 36
8.02 Replacement of Engineer 36
8.03 Furnish Data 36
8.04 Pay When Due 36
8.05 Lands and Easements; Reports and Tests 36
8.06 Insurance 36
8.07 Change Orders 37
8.08 Inspections, Tests, and Approvals 37
8.09 Limitations on Owner's Responsibilities 37
8.10 Undisclosed Hazardous Environmental Condition 37
8.11 Evidence of Financial Arrangements 37
8.12 Compliance with Safety Program 37

Article 9 – Engineer's Status During Construction 37
9.01 Owner's Representative 37

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9.02 Visits to Site 37
9.03 Project Representative 38
9.04 Authorized Variations in Work 38
9.05 Rejecting Defective Work 38
9.06 Shop Drawings, Change Orders and Payments 39
9.07 Determinations for Unit Price Work 39
9.08 Decisions on Requirements of Contract Documents and Acceptability of Work 39
9.09 Limitations on Engineer's Authority and Responsibilities 39
9.10 Compliance with Safety Program 40

Article 10 – Changes in the Work; Claims 40
10.01 Authorized Changes in the Work 40
10.02 Unauthorized Changes in the Work 41
10.03 Execution of Change Orders 41
10.04 Notification to Surety 41
10.05 Claims 41

Article 11 – Cost of the Work; Allowances; Unit Price Work 42
11.01 Cost of the Work 42
11.02 Allowances 45
11.03 Unit Price Work 45

Article 12 – Change of Contract Price; Change of Contract Times 46
12.01 Change of Contract Price 46
12.02 Change of Contract Times 47
12.03 Delays 47

Article 13 – Tests and Inspections; Correction, Removal or Acceptance of Defective Work 48
13.01 Notice of Defects 48
13.02 Access to Work 48
13.03 Tests and Inspections 49
13.04 Uncovering Work 49
13.05 Owner May Stop the Work 50
13.06 Correction or Removal of Defective Work 50
13.07 Correction Period 50
13.08 Acceptance of Defective Work 51
13.09 Owner May Correct Defective Work 52

Article 14 – Payments to Contractor and Completion 52
14.01 Schedule of Values 52
14.02 Progress Payments 52
14.03 Contractor's Warranty of Title 55
14.04 Substantial Completion 55
14.05 Partial Utilization 56
14.06 Final Inspection 57
14.07 Final Payment 57
14.08 Final Completion Delayed 58

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14.09 Waiver of Claims 58

Article 15 – Suspension of Work and Termination 59
15.01 Owner May Suspend Work 59
15.02 Owner May Terminate for Cause 59
15.03 Owner May Terminate For Convenience 60
15.04 Contractor May Stop Work or Terminate 60

Article 16 – Dispute Resolution 61
16.01 Methods and Procedures 61

Article 17 – Miscellaneous 61
17.01 Giving Notice 61
17.02 Computation of Times 62
17.03 Cumulative Remedies 62
17.04 Survival of Obligations 62
17.05 Controlling Law 62
17.06 Headings 62

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

30. *PCBs*—Polychlorinated biphenyls.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

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

1.02 *Terminology*

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

B. *Intent of Certain Terms or Adjectives:*

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

C. *Day:*

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

D. *Defective:*

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

   a. does not conform to the Contract Documents; or

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

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

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

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

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

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

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

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

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

2.02 *Copies of Documents*

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

2.03 *Commencement of Contract Times; Notice to Proceed*

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

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2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

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

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

2. a preliminary Schedule of Submittals; and

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

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

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

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

2.07 *Initial Acceptance of Schedules*

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

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

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Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

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

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

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

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

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

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

3.02 *Reference Standards*

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

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

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

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3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

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

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

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

B. *Resolving Discrepancies:*

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

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

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

3.04 *Amending and Supplementing Contract Documents*

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

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

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1. A Field Order;

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

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

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

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

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

3.06 *Electronic Data*

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

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

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

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

4.01 *Availability of Lands*

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

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

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

4.02 *Subsurface and Physical Conditions*

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

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

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

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

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

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

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

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4.03 *Differing Subsurface or Physical Conditions*

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

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

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

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

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

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

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

C. *Possible Price and Times Adjustments:*

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

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

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

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

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

   b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and

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contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

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

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

4.04 *Underground Facilities*

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

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

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

a. reviewing and checking all such information and data;

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

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

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

B. *Not Shown or Indicated:*

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

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consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

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

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

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

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

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

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

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

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

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

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

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

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

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

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

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

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

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

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

5.02 *Licensed Sureties and Insurers*

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

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meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

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

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

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

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

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

5.04 *Contractor's Insurance*

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

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

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

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

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

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

b. by any other person for any other reason;

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

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

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

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

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

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

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

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

6. include completed operations coverage:

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

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

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5.05 *Owner's Liability Insurance*

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

5.06 *Property Insurance*

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

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

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

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

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

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

6. include testing and startup; and

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

B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors,

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members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

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

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

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

5.07 *Waiver of Rights*

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

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

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

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

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

5.08 *Receipt and Application of Insurance Proceeds*

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

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

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

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

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interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

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

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

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

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

6.02 *Labor; Working Hours*

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

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

6.03 *Services, Materials, and Equipment*

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

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

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

6.04 *Progress Schedule*

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

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

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

6.05 *Substitutes and "Or-Equals"*

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

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

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

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

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

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

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

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

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

2. *Substitute Items:*

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

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

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

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

1) shall certify that the proposed substitute item will:

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

b) be similar in substance to that specified, and

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

2) will state:

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

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

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

3) will identify:

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

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

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

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

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

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

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

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

6.06 *Concerning Subcontractors, Suppliers, and Others*

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

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required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

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

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

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

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

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

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

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

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner,

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Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

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

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

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

6.08 *Permits*

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

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6.09 *Laws and Regulations*

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

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

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

6.10 *Taxes*

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

6.11 *Use of Site and Other Areas*

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

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

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

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

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by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

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

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

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

6.12 *Record Documents*

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

6.13 *Safety and Protection*

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

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

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

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

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and

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shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

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

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

E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

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

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

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

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required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

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

1. *Shop Drawings:*

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

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

2. *Samples:*

a. Submit number of Samples specified in the Specifications.

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

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

C. *Submittal Procedures:*

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

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

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

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

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

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

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

D. *Engineer's Review:*

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

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

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

E. *Resubmittal Procedures:*

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

6.18 *Continuing the Work*

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

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6.19 *Contractor's General Warranty and Guarantee*

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

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

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

2. normal wear and tear under normal usage.

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

1. observations by Engineer;

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

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

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

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

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

7. any correction of defective Work by Owner.

6.20 *Indemnification*

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

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

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

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

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

6.21 *Delegation of Professional Design Services*

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

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

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

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

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

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

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

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

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

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

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

7.02 *Coordination*

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

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

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

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

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

7.03 *Legal Relationships*

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

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

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

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

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

8.03 *Furnish Data*

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

8.04 *Pay When Due*

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

8.05 *Lands and Easements; Reports and Tests*

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

8.06 *Insurance*

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

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8.07 *Change Orders*

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

8.08 *Inspections, Tests, and Approvals*

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

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements*

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

8.12 *Compliance with Safety Program*

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

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

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

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or

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continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

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

9.03 *Project Representative*

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

9.04 *Authorized Variations in Work*

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

9.05 *Rejecting Defective Work*

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

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9.06 *Shop Drawings, Change Orders and Payments*

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

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

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

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

9.07 *Determinations for Unit Price Work*

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

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

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

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

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

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not

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exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

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

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

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

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

9.10 *Compliance with Safety Program*

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

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

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

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10.02 *Unauthorized Changes in the Work*

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

10.03 *Execution of Change Orders*

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

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

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

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

10.04 *Notification to Surety*

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

10.05 *Claims*

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

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data

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shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

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

1. deny the Claim in whole or in part;

2. approve the Claim; or

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

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

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

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

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

11.01 *Cost of the Work*

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

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

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

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

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

5. Supplemental costs including the following:

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

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

    c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of

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said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

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

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

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

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

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

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

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

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

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

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not

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limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

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

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

11.02 *Allowances*

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

B. *Cash Allowances:*

1. Contractor agrees that:

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

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

C. *Contingency Allowance:*

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

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

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to

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the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

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

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

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

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

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

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

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

12.01 *Change of Contract Price*

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

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

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

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

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

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

1. a mutually acceptable fixed fee; or

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

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

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

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

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

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

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

12.02 *Change of Contract Times*

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

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

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or

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

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

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

D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

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

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

13.01 *Notice of Defects*

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

13.02 *Access to Work*

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

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13.03 *Tests and Inspections*

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

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

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

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

3. as otherwise specifically provided in the Contract Documents.

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

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

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

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

13.04 *Uncovering Work*

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

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

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

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

13.05 *Owner May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

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

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

13.07 *Correction Period*

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

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1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

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

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

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

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

13.08 *Acceptance of Defective Work*

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

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13.09 *Owner May Correct Defective Work*

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

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

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

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

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

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

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an

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Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

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

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

B. *Review of Applications:*

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

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

   a. the Work has progressed to the point indicated;

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

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

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

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or

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involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

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

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

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

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

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

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

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

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

   a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

   b. the Contract Price has been reduced by Change Orders;

   c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

   d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

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

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D. *Reduction in Payment:*

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

   a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

   b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

   c. there are other items entitling Owner to a set-off against the amount recommended; or

   d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

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

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

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

14.04 *Substantial Completion*

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

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

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before

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

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

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

14.05 *Partial Utilization*

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

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

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

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

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

14.06 *Final Inspection*

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

14.07 *Final Payment*

A. *Application for Payment:*

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

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

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

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

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

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

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

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

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying

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

C. *Payment Becomes Due:*

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

14.08 *Final Completion Delayed*

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

14.09 *Waiver of Claims*

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

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

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

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ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

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

15.02 *Owner May Terminate for Cause*

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

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

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

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

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

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when

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so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

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

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

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

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

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days

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to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or

3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

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1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

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SECTION 00800

SUPPLEMENTARY GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (the "General Conditions") of the Contract Documents as indicated below. Where an Article of the General Conditions is modified or a Paragraph, Subparagraph, or Clause thereof is modified or deleted by these supplements, the unaltered provisions of that Article, Paragraph, Subparagraph, or Clause shall remain in effect.

Refer to:

GC-1 Definitions and Terminology

The terms used in these Supplementary General Conditions which are defined in the General Conditions have the meanings assigned to them in the General Conditions.

GC-2.02.A Copies of Documents

Amend the first sentence of paragraph 2.02.A as follows: Replace "ten" with "three"

GC-2.05.A Preliminary Schedules

Add new Paragraph 2.05.B.4:

"The Contractor shall furnish schedule of values for lump sum items of which partial pay will be requested. The cost breakdowns shall be physical items, with bond, permit fees, insurance, overhead, and other general costs and profit prorated to each item. No payment will be made to the Contractor until these breakdowns are submitted in a form satisfactory to the Engineer."

GC-5.04 Contractor's Insurance

Add the following new paragraphs 5.04C through 5.04G:

"C. The Contractor shall not begin work under the contract until after he has obtained all of the insurance herein described and such insurance has been approved by the Owner, nor shall the Contractor permit any subcontractor to begin work until after similar insurance to cover the subcontract has been obtained and approved.

D. The Contractor, and any of his subcontractors, shall, throughout the life of the Contract, procure and maintain Workers' Compensation insurance, and comply in every respect with the requirements of the statutes of the State of Florida relative to Workmen's Compensation Insurance. The Contractor shall be responsible for compliance by every subcontractor with these requirements.

E. The Contractor shall procure and shall maintain during the life of the Contract:

(1) Commercial General Liability Insurance with the following limits:

i. General Aggregate Limit (other than Products/Completed Operations) $1,000,000.
ii. Products/Completed Operations Aggregate Limit $1,000,000.
iii. Personal and Advertising Injury Limit $500,000.
iv. Each Occurrence Limit $1,000,000.
v. Fire Damage Limit $50,000.
vi. Medical Expense limit $5,000.

No coverage found in the standard ISO commercial general liability form shall be excluded from insurance provided by the contractor or subcontractors.

(2) BUILDERS RISK – Contractor's Option

(3) Commercial Automobile Liability Insurance with limits of $500,000 if written on a combined single limit basis, or $250/500/100,000 if written on split limit basis.

F. Each such policy of insurance shall name the Owner, as well as the Contractor, as the insured. The Contractor shall require each subcontractor to maintain such Workers' Compensation Insurance, Commercial General Liability Insurance, Commercial Automobile Insurance, and Completed Value Builder's Risk Insurance (if required in paragraph B above) to cover the work done under a subcontract.

G. The Contractor shall furnish the Engineer with satisfactory proof of insurance herein described."

GC-6.16 Emergencies

Add the following new paragraph 6.16B:

"B. In the event of a storm or a threat of a storm, OWNER may, in its discretion require CONTRACTOR to secure the Work site and all loose materials, to stabilize all equipment at the Work site, and to suspend the Work until authorized by Owner to resume the Work. No adjustment to the Contract Price shall be made on account of such action by Owner."

GC-6.17 Shop Drawings and Samples

Insert the following at the end of Paragraph B:

Contractor shall furnish a written certification from the manufacturers that they have examined plans and specifications of the project and their equipment and material are

suitable and approved for the intended use.

Add new Paragraph 6.17.D.4:

"The Contractor shall furnish for the review and approval of the Engineer, four (4) copies of shop drawings. Two (2) copies of the drawings will be retained by the Engineer and two (2) will be returned to the Contractor.

GC-9.03 Project Representative

Amend the first sentence of paragraph 9.03.A as follows:

If Owner and Engineer agree, Engineer or Owner will furnish a resident project representative to assist Engineer or Owner in providing more extensive observation of the Work.

Add the following new paragraph 9.03.B:

B. Inspectors, employed by the Engineer or Owner, will be authorized to inspect all work and materials which are to become a part of the completed Project. Inspectors will have no authority to revoke, alter or waive any requirements of the Specifications or to make any changes in the Plans. Each Inspector will be authorized to call the attention of the Contractor to any failure of the work to conform to the Plans or the Specifications, and will have authority to suspend the work affected until any questions at issue can be referred to and decided by the Engineer. The Inspector will have no authority to delay the Contractor by failure to inspect the work and materials with reasonable promptness.

GC-12.01 Change of Contract Price

Add the following new paragraph 12.01.B.4:

4. In no event shall any adjustment in the Contract Price be made on account of damages for delay, impact claims or similar claims.

GC-14.02.A Applications for Payment

Amend the first sentence of Paragraph 1 as follows:

Replace “20 days” with “30 days.”

GC-14.02.C Payment Becomes Due

Amend the first sentence of Paragraph 1 as follows:

Replace “ten days” with “twenty days.”

SECTION 00800

SUPPLEMENTARY GENERAL CONDITIONS

GC-17 Miscellaneous

Add the following new paragraphs:

17.07 Project Documentation:

A. Prior to start of construction, photographs shall be taken at sufficient locations and angles to document job site conditions. Each photograph shall be identified on the back with the following information:

Location and direction of photo
Date of photo
Project Name

B. One color print of each photograph (approximately 5" x 7") and the negative shall be provided to the Engineer. A video tape recording shall also be submitted. Tape must be DVD format, clear full color and properly labeled and documented. There will be no separate payment made for photographic work and no progress payments will be made until acceptable photographic documentation is provided."

17.08 Property Protection

A. Buildings, sidewalks, fences, shade trees, lawns and all other improvements shall be duly protected by the Contractor. Property obstructions, such as sewers, drains, water or gas pipes, conduits, railroads, poles, walls, posts, bridges, etc., shall be carefully protected from injury and shall not be displaced if avoidable.

B. If the construction of the Project shall render it necessary to move property, including privately owned public utility facilities located in public streets, highways or other public places, and all other types of property, the removal thereof shall be at the expense and risk of the Contractor. The Contractor is to obtain the consent of the owners or others in charge, and, before commencing, shall confer with them as to the best manner of protecting the interests involved.

C. Except as specifically provided in the Specifications, the Contractor shall not do any work that would affect any railway track, pipeline, telephone, telegraph, or electric transmission line, or other structure, nor enter upon the right-of-way or other lands appurtenant thereto, until the Contractor has secured authority therefore from the proper parties.

17.09 ASSIGNMENT OF THE CONTRACT:

A. No assignment of the Contract or of any part thereof, or of any monies due or to become due thereunder, shall be made by the Contractor without the prior

written approval of the Owner, which approval will be given only after the surety on the Contract bond has informed the Owner in writing that it has no objection to such assignment being made.

B. In the event that the Contractor shall undertake to assign all or any part of any monies due or to become due under the contract, the instrument of assignment shall contain a provision substantially to the effect that it is agreed that the right of the assignee in and to any of such monies shall be subject to the prior liens or claims of all persons for services rendered or materials supplied for the performance of all work embraced by the Contract.

END OF SECTION

SECTION 00900

SPECIAL PROVISIONS

1.1 COORDINATION OF PLANS, SPECIFICATION, SPECIAL PROVISIONS, AND VARIOUS CONDITIONS

A. The Specifications, Supplemental Specifications, General Conditions, Plans, Special Provisions, and all supplemental documents are essential parts of the contract and are intended to be complementary. In case of discrepancy:

1. Figured dimensions (unless obviously incorrect) shall govern over the scaled dimensions.

2. Supplemental Conditions shall govern over General Conditions.

3. Special Provisions shall govern over Plans, Specifications, Supplemental Conditions, General Conditions, and Instructions to Bidders.

B. In the event that General Conditions and Supplementary General Conditions conflict with CDBG Supplemental Conditions (CDBGSC), and other provisions of the Bidding Documents, CDBGSC shall take precedence over other provisions for all work performed under this contract.

1.2 MANUFACTURER'S CERTIFICATION

A. The Contractor shall require the manufacturer or manufacturer's representative to place the following certification on data submittal transmittals:

"This is to certify that we have examined the Plans and Specifications for this Project and have ascertained that this equipment or material is suitable for the purpose and use intended.

_____

Authorized Signature

1.3 PAYMENT TO CONTRACTOR (RETAINAGE)

A. For all approved partial payments or progress payments, the retainage shall be an amount equal to 10% of said payment.

SECTION 00900

SPECIAL PROVISIONS

1.4 GUARANTEE AND WARRANTY

A. The Contractor, at a minimum, shall guarantee all materials and equipment furnished and works performed for a period of one (1) year from the date of acceptance of the project, unless a more stringent guarantee and warranty is required in the individual specifications, then the more stringent guarantee or warranty shall apply.

1.5 (Reserved)

1.6 PRE-CONSTRUCTION CONFERENCE

A. Engineer shall hold a Pre-Construction meeting prior to commencement of work. It shall be attended by Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules. The Contractor shall submit the pre-construction video and photographs. A schedule of values, one for each lift station shall be submitted.

1.7 LABOR WORKING HOURS

A. Contractor shall provide competent, suitably qualified personnel to survey, layout, and construct the work as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the site.

1.8 SUBSTANTIAL COMPLETION

A. Final Construction Inspection

Whenever the Engineer considers the Work provided and contemplated by the Contract is nearing completion, or within 10 days after being notified by the Contractor that the Work is completed, the Engineer will inspect all the Work included in the Contract. If the Engineer finds that the Work has not been satisfactorily completed at the time of such inspection, he shall advise the Contractor in writing as to the Work to be done or the particular defects to be remedied. When these defects have been remedied and the Work has been satisfactorily completed, the Engineer shall make the final inspection and shall notify the Contractor in writing that the Final Inspection has been made and that time charges end on the day of Final Inspection Maintenance Period shall start on the day after

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B. Final Acceptance

After the Final Inspection is made as outlined above, the Contractor shall maintain the Work for 30 days in the same manner as set forth under "Maintenance of the Work During Construction." The Work will be finally accepted at the end of the 30-day maintenance period provided all work has been satisfactorily maintained.

The Contractor, immediately after receiving the letter of Final Inspection, shall give notice of said completion of Work by an advertisement in some newspaper of general circulation published within the City or County wherein the Work has been done for a period of four successive weeks. Proof of publication of said notice shall be made by the Contractor to the Owner, by affidavit of the publisher and a printed copy of the notice published. If no newspaper is published in the county where the Work is done, the notice may be given by posting at the Court House for 30 days and proof of same shall be made by the probate judge or sheriff and the Contractor.

In no instance shall a final settlement be made upon the Contract until the expiration of the Maintenance Period and until the Contract is completed and Project accepted by the Owner.

C. Maintenance Guarantee After Acceptance

Neither the final certificate of payment nor any provisions in the Contract, nor partial or entire use or occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the Contract or relive the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the Work and pay for any damage to other work resulting there from which shall appear within a period of one year from the date of final acceptance of the Work unless a longer period is specified. The Owner will give notice of observed defects with reasonable promptness and the Contractor shall repair the defects immediately. The Contractor's Performance or Contract Bond shall remain in effect and cover this guarantee. After completion of the Project and prior to final acceptance, the Contractor shall provide a statement addressed to the Owner from his Surety acknowledging that the Contract Bonds will remain in effect during the one-year warranty period. Final payment under the Contract will not be made until this statement is received.

1.9 PROPERTY PROTECTION

A. Buildings, sidewalks, fences, shade trees, lawns and all other improvements shall be duly protected by the Contractor. Property obstructions, such as sewers, drains, water or gas pipes, conduits, railroads, poles, walls, posts, bridges, etc., shall be carefully protected from injury and shall not be displaced if avoidable.

B. If the construction of the Project shall render it necessary to move property, including privately owned public utility facilities located in public streets, highways or other public places, and all other types of property, the removal thereof shall be at the expense and risk of the Contractor. The Contractor is to obtain the consent of the owners or others in charge, and, before commencing, shall confer with them as to the best manner of protecting the interests involved.

C. Except as specifically provided in the Specifications, the Contractor shall not do any work that would affect any roadway railway track, pipeline, telephone, telegraph, or electric transmission line, or other structure, nor enter upon the right-of-way or other lands appurtenant thereto, until the Contractor has secured authority therefore from the proper parties.

1.10 ASSIGNMENT OF THE CONTRACT:

A. No assignment of the Contract or of any part thereof, or of any monies due or to become due thereunder, shall be made by the Contractor without the

prior written approval of the Owner, which approval will be given only after the surety on the Contract bond has informed the Owner in writing that it has no objection to such assignment being made.

B. In the event that the Contractor shall undertake to assign all or any part of any monies due or to become due under the contract, the instrument of assignment shall contain a provision substantially to the effect that it is agreed that the right of the assignee in and to any of such monies shall be subject to the prior liens or claims of all persons for services rendered or materials supplied for the performance of all work embraced by the Contract.

1.11 BI-WEEKLY CONSTRUCTION MEETINGS

A. During the entire course of the project there will be a bi-weekly Construction Meeting. Location, date and time will be discussed in the Pre-construction Conference. The Construction Meeting shall be attended by Contractor, Engineer and Owner representatives. The main agenda for the meeting will be to review construction issues, project progress and partial pay estimates. The Contractor shall be required to submit all pay estimates in the bi-weekly Construction Meeting; no exceptions.

1.12 PAY REQUESTS

A. Prior to the approval of the first pay request, Contractor shall be responsible for providing the following to the Owner's and Engineer's satisfaction (no exceptions):

1. Preconstruction DVD
2. Preconstruction Photo
3. Project Schedule

B. All pay requests shall, at a minimum, accompany the following (no exceptions):

1. Redline 11" x 17" As built drawings.
2. Updated project progress schedule
3. Project progress pictures

END OF SECTION

SECTION 01000

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 General

The unit price or lump sum bid items shall be compensation in full for furnishing all materials, labor, equipment and incidentals necessary to complete the item in place in every detail in accordance with the plans and specifications. There will be no direct compensation for clean-up, restoration of property, and incidentals not shown in the proposal, and such incidentals shall be included in the unit price for the related item of work.

PART 2 – BID ITEMS

2.1 Mobilization

Perform preparatory work and operations in mobilizing for beginning work on the project, including, but not limited to, those operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site and for the establishment of temporary offices, buildings, safety equipment and first aid supplies, and sanitary and other facilities.

When the proposal includes a separate pay item for mobilization, partial payments will be made therefore in accordance with the following:

Percent of Original Contract Amount Earned	Allowable Percent of the Lump Sum Price for Mobilization*
5	25
10	50
25	75
50	100

**Partial payments for any project will be limited to 10% of the original Contract amount for that project. Any remaining amount will be paid upon completion of all work on the project.*

The Contractor shall provide a breakdown of his lump sum bid for mobilization if requested by the Engineer/Owner. If the Engineer/Owner determines that the Contractor's bid for mobilization is erroneous, the entire bid will be rejected.

SECTION 01000

MEASUREMENT AND PAYMENT

2.2 Demolition of Existing Pump Station

The contract unit price shall be demolition of existing pump station including but not limited to disposal of debris and installation of concrete slab as shown in plan and specified herein.

2.3 Maintenance of Traffic

The lump sum bid for this item shall be compensation in full for furnishing all labor, equipment and materials for all maintenance of traffic required by this contract including FDOT, County, and City roadways.

2.4 Gravel Road

The contract unit price shall be compensation in full for furnishing, spreading, and compacting one (1) linear foot of gravel over the full width of trench, 6 inches thick. Gravel foundation shall be measured along the centerline of trench. (No payment will be made for this item where the Contractor elects to use it for his own convenience or to fill overcuts.)

2.5 New Pump Station

The contract unity price for this item shall be compensation in full to install new lift station complete in place. The unit price shall include, but not be limited to, all demolition cost including cost associated with demolishing existing pump station, labor, equipment, material, pumps, piping, support, control panel, civil site grading, erosion control, grassing, bypass pumping, testing, portable pumps (as shown on plans), and other miscellaneous items as necessary to complete the work.

2.6 Manhole

The contract unit price for this item shall be compensation in full for one manhole of the various sizes, types, and depths complete with watertight frames and cover, steps, inverts, connections, and stubouts in place. The depth of manhole shall be the vertical distance from the top of manhole cover to the lowest pipe invert.

2.7 Gravity Line

The contract unit price for the various sizes and types of sewer pipe shall be compensation in full for one linear foot of pipe complete in place. The length of pipe installed will be measured from center to center of manholes and no deduction in length will be made for space in the line occupied by manholes or fittings. The depth of cut to be paid for will be vertical distance from ground surface on the centerline of the pipe to the pipe invert. The contract unit price shall also include the price for bypass pumping of

sanitary sewage. The Contract unit price shall also include any clearing and grubbing, dewatering, and incidentals necessary to complete the work. There shall be no additional payment for such work.

2.8 Waterline Relocation

The contract unit price shall be compensation in full for the relocation of the existing water line as shown on plans and specified herein. Price shall include all material, labor and incidentals required for the work.

2.9 Solid Sod

The unit price for this item shall be compensation in full for one (1) square yard of solid sod complete and in place where specified. Where sod is being replaced on an established lawn, the new sod shall match the type removed.

2.10 Sand or Sand-Clay Backfill

The unit price bid for this item shall be compensation in full for one (1) contract measure cubic yard (CMCY) of sand or sand-clay used for backfill which shall include furnishing sand or sand-clay, backfilling, compacting and hauling away surplus material. All sand or sand-clay shall be approved by the Engineer before being used for backfill. If requested, the Contractor shall furnish a certificate from a commercial testing laboratory attesting to the percentage of clay in the sand or sand-clay. No material may be used if the clay content is greater than 8 percent.
This item will be measured in place. The contract measurement for a cubic yard shall be the length authorized by the Engineer to be backfilled with sand or sand-clay, multiplied by a width of the inside diameter of the pipe plus 24 inches, regardless of actual trench width, multiplied by the average depth backfilled and then converted to cubic yards. The number of cubic yards calculated by contract measure shall be the amount paid for, regardless of the amount of material removed and replaced with sand or sand-clay.

END OF SECTION 1000

SECTION 01100

EROSION CONTROL AND ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 INTENT

A. It is the intent of these specifications to provide supplemental information to the contents of the construction drawings on the quality of materials, execution, measurement, etc. These specifications are generic in nature and may contain products and requirements which are not applicable to the project. Likewise, there may be product requirements and techniques that are applicable for controlling erosion and sedimentation during construction that are not addressed herein. Discrepancies between these specifications and the construction drawings, either imagined or real, shall be brought to the attention of the Owner's Engineer for clarification.

B. Construction activities associated with this project will disturb more than 1 acre of land. The Contractor shall obtain coverage under an NPDES Stormwater Permit and implement appropriate pollution techniques to minimize erosion and sedimentation and properly manage stormwater. The Florida Department of Environmental Protection adopted under Rule 62-621.300(4), F.A.C., the General Permit for Stormwater Discharge from Large and Small Construction Activities (CGP). The CGP requires:

- A CGP Notice of Intent (NOI) (DEP Form 62-621.300(4)(b)) must be submitted to DEP. There is a $150 application fee for the NOI.
- A Notice of Termination (NOT) (DEP Form 62-621.300(6)) must be submitted to DEP to discontinue permit coverage. An NOT may be submitted only when the site meets the eligibility requirements for termination specified in the CGP.

C. The Stormwater Pollution Prevention Plan (SWPPP) must be developed and implemented to be in compliance with the permit. The Plan must include the following:

- A site evaluation of how and where pollutants may be mobilized by stormwater
- A site plan for managing stormwater runoff
- Identification of appropriate erosion and sediment controls and Stormwater Best Management Practices (BMPs) to reduce erosion, sedimentation, and stormwater pollution
- A maintenance and inspection schedule
- A record keeping process
- Identification of stormwater exit areas

D. A copy of the SWPPP must be available at the immediate site of the construction activity. Best Management Practices (BMPs) must be identified to fit the specific project. Both structural and non-structural controls will be applicable. Some of the commonly used controls are:

Structural Controls:

- Retention Ponds: Permanent structures designed to allow time for sediments to settle and water to infiltrate the ground.
- Temporary Sediment Basins: Structures designed to detain sediment-laden runoff from disturbed areas long enough for sediments to settle out and control the release of stormwater.
- Entrance/Exit Controls: Temporary controls, such as gravel, used to stabilize the entrances/exits to the site to reduce the amount of soils transported onto paved roads by vehicles (known as "track-out").
- Silt Fencing: A temporary erosion and sediment control used to prevent dirt from entering waterways before bare soil is stabilized with vegetation.
- Berms: A temporary erosion and sediment control that physically prevents polluted runoff from entering nearby storm drain inlets and waters.

Non-Structural Controls:

- Stabilization: Techniques such as sodding, seeding/mulching, and stone cover, which reduce the erosion of exposed soils and steep grades.
- Phased Construction: Scheduling construction to occur during the dry season or to minimize the amount of land cleared at any one time.
- Good Housekeeping: Techniques such as oil and fuel containment, spill prevention and clean-up, and street sweeping of "tracked-out" soils, which help prevent the contamination of stormwater runoff.

E. Detailed information and guidance for SWPPP development and for compliance inspections is available at the following web sites:

http://www.dep.state.fl.us/water/stormwater/npdes/construction3.htm

http://www.floridadep.org/water/nonpoint/erosion.htm

SECTION 01100

EROSION CONTROL AND ENVIRONMENTAL PROTECTION

1.2 DESCRIPTION OF WORK

A. The work of this section consists of the necessary erosion control and environmental protection measures required to control erosion and provide environmental protection on the project and areas outside the limits of the project, so as to prevent pollution of water, detrimental effects to public or private property adjacent to the project, damage to work on the project, and to satisfy the specific or general conditions of applicable permits and regulations. The need for temporary erosion control and environmental protection shall be considered as an anticipated condition of construction for compliance with state and federal laws and it is the Contractor's responsibility for providing the necessary solutions as part of these contract documents.

B. Erosion control work includes, but is not limited to, the following:

(1) Temporary erosion control
(2) Permanent erosion control

C. Environmental protection work includes, but is not limited to, the following:

(1) Staked hay bales
(2) Sediment control fence
(3) Sedimentation basins
(4) Turbidity barriers
(5) Temporary gravel construction entrance

1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform all work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Comply with the provisions of the following codes and standards, except as shown or specified:

1. "Standard Specifications for Road and Bridge Construction", Florida Department of Transportation, latest edition. Herein specified or shown on the plans as "Section XXX, FDOT Standard Specifications".

2. "Roadway and Traffic Design Standards", Florida Department of Transportation, latest edition. Herein specified as "FDOT Standard Index No. XXX".

3. "American Society for Testing and Materials (ASTM) Publications" as follows:

D 123-87	Standard Terminology Relating to Textiles
D 1683-81	Failure in Sewn Seams of Woven Fabrics
D 2487-83	Test Method for Classification of Soils for Engineering Purposes
D 3786-80	Standard Test Method for Mullen Burst Strength
D 3787-80	Bursting Strength of Knitted Goods - Constant-Rate-of-Traverse (CRT) Ball Burst
D 4439-87	Standard Terminology for Geotextiles
D 4533-85	Standard Test Method for Trapezoid Tearing Strength of Geotextiles
D 4632-86	Standard Test Method for Breaking Load and Elongation of Geotextiles (Grab Method)

C. Certification: The contractor shall be responsible for providing the required material certifications prior to construction. Failure to provide certification may result in rejection of the material and replacement at no cost to the Owner.

D. Testing: An independent testing and inspection service will not be required for the work of this section.

1.4 SUBMITTALS

A. Material Certificates: Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements. When test requirements are specified, the contractor shall supply results performed by a certified testing laboratory.

PART 2 – MATERIALS

2.1 TEMPORARY EROSION CONTROL (VEGETATION AND COVERINGS)

A. General: Temporary erosion control features shall consist of, but not be limited to, temporary grassing, temporary sodding, temporary mulching, sandbagging, artificial coverings, berms, and baled hay or straw.

B. Temporary Grassing: Temporary grassing shall be as specified in Section 1300 except as modified herein. Perennial grass seed may be omitted if permanent erosion control will be placed prior to death of annual grass.

C. Temporary Sod: Sod shall be as specified in Section 1200.
Temporary Mulch: Mulch shall be as specified in Section 1300.

D. Sandbagging: Sandbagging shall consist of furnishing and placing sandbags in configurations, so as to control erosion and siltation.

E. Artificial Coverings: This work shall consist of furnishing and applying fiber mats, netting, plastic sheeting, or other approved covering to the earth surfaces.

F. Baled Hay or Straw: This work shall consist of construction of baled hay or straw dams to protect against downstream accumulations of silt. The baled hay or straw dams shall be constructed in accordance with the details shown in the construction drawings or, when details are not shown, in accordance with the FDOT Standard Index No. 102.

2.2 TEMPORARY EROSION CONTROL (Silt Fences And Turbidity Barriers)

A. General: Temporary erosion control features shall consist of, but not be limited to, silt fences, floating turbidity barriers, and staked turbidity barriers. The work shall consist of furnishing, installing, maintaining, and removing temporary fences and barriers in accordance with the manufacturer's recommendations, these specifications, the details shown on the plans, or, when details are not shown, in accordance with the FDOT Standard Index No. 102 & 103. Turbidity barriers in waters of the state may be either floating or staked types or any combinations of types that will suit site conditions and meet erosion control and water quality requirements. The barrier type(s) will be at the Contractor's option unless otherwise specified in the plans.

B. Silt Fence: Silt fence or sediment control fence shall consist of a geotextile fabric attached to posts. The geotextile fabric shall be a woven or non-woven fabric as specified herein. The silt fence shall be constructed in accordance with the details shown on the plans, or, when details are not shown, in accordance with the FDOT Standard Index 102.

C. Staked Turbidity Barrier: In addition to the requirements for a temporary silt fence contained herein, the fabric used for staked turbidity barrier shall have a double stitched hem at the top of the fabric into which has been sewn a braided nylon cord with a minimum diameter of 1/8 inch running the full length of that section of fabric. Supports for staked turbidity barriers shall be a minimum length of three feet seasoned two-inch by four-inch wood, 2-1/2 inch minimum diameter wood, or steel at least 1.33 pounds per linear foot.

D. Floating Turbidity Barrier: Floating turbidity barrier shall be Type I or Type II in accordance with the details shown in the construction drawings, or, when details are not shown, with the FDOT Standard Index No. 103. The type barrier used will be such as to minimize dispersion of turbid waters from the construction site. Alternate materials may be approved provided that compliance with applicable permit conditions and State water quality standards are maintained.

2.3 GEOTEXTILES

A. Filter Fabric: The geotextile fabric shall be a woven or non-woven fabric consisting of long-chain polymeric filaments or yarns such as polypropylene, polyethylene, polyester, polyamides, or polyvinyl chloride formed into a stable network such that the filaments or yarns retain their relative position to each other. The base plastic shall contain stabilizers and/or inhibitors to make the filaments resistant to deterioration from ultraviolet light, heat exposure, and commonly encountered chemicals. The edges of the fabric shall be selvaged or otherwise finished to prevent the outer yarn from pulling away from the fabric.

B. The fabric shall conform to the following physical requirements:

PROPERTIES	TEST METHOD	ACCEPTABLE VALUES
Seam Strength (min)	ASTM D 1683	120 lbs.
Mullen Burst Strength (min)	ASTM D 3786	200 psi
Puncture Strength (min)	ASTM D 3787	60 lbs.
Trapezoidal Tear Strength (min)	ASTM D 4533	50 lbs.
Grab Tensile Strength (min)	ASTM D 4632	120 lbs.
Elongation (max)	ASTM D 4632	25%
Filtration Efficiency (min)	VTM-51-79	75%

Slurry Flow Rate (min)	VTM-51-79	0.3 gpm/sf

C. Seams: The seams of the fabric shall be sewn with thread of a material meeting the chemical requirements for the fabric. The minimum seam strength shall comply with the property requirements contained herein.

D. Shipment and Storage: During shipment and periods of storage, the geotextile shall be protected from direct sunlight, ultra-violet rays, temperatures greater than 140 degrees Fahrenheit, mud, dirt, dust, and debris. Stockpiled materials shall be kept covered at all times.

PART 3 - EXECUTION

3.1 EXECUTION

A. General

1. The installation of temporary erosion control features shall be coordinated with the construction of the permanent erosion control features to the extent necessary to assure effective and continuous control of erosion and water pollution throughout the life of the contract.

2. The Contractor shall take sufficient precautions to prevent pollution of streams, canals, lakes, reservoirs, and other water impoundments, with fuels, oils, bitumens, calcium chloride, or other harmful materials. Also, he shall conduct and schedule his operations so as to avoid pollution or siltation of such streams, etc.

3. Except as necessary for construction, excavated material shall not be deposited in rivers, streams, canals, or impoundments, or in a position close enough thereto to be washed away by high water or runoff.

4. Where de-watering methods are used, the water shall be treated by one or more of the following methods prior to discharge off-site or into environmental areas: pumping into grassed swales or appropriate vegetated areas, sediment basins, or confined by an appropriate enclosure such as siltation curtains when other methods are not considered appropriate.

5. The Contractor shall not disturb lands or waters outside the limits of

construction as staked, except as may be found necessary and authorized by the Owner's Engineer.

6. The locations of and methods of operation in all detention areas, excavation areas, stockpile areas, and disposal areas shall meet the approval of the Owner's Engineer as being such that erosion during and after completion of the work will not likely result in detrimental conditions, siltations, or water pollution.

B. Limitation of Exposure or Erodible Earth:

1. The Contractor shall limit the surface areas of unprotected erodible earth exposed by clearing and grubbing, excavation, or filling operations and shall provide immediate permanent or temporary erosion or pollution control measures to prevent contamination of any river, stream, lake, tidal water, reservoir, canal, or other impoundment or to prevent detrimental effects on property outside the project and damage to the project. The limitation of area in which excavation and filling operations may be underway shall be commensurate with the contractor's capability and progress in keeping the finish grading, grassing, sodding, and other such permanent erosion control measures current in accordance with the accepted schedule.

2. Under no conditions shall the surface area or erodible earth exposed by clearing and grubbing operations or by excavation and filling operations exceed one-half acre without specific prior approval by the Owner's Engineer. This limitation applies separately to clearing and grubbing operations and excavation and filling operations.

3. The Owner's Engineer may increase or decrease the amount of surface area allowed to be exposed at any one time, on the basis of his analysis of conditions on the project.

4. Permanent erosion control features shall be incorporated into the project at the earliest practical time. Temporary erosion control features will be used to control erosion prior to the time it is practical to construct permanent control features or to provide immediate temporary control of erosion that develops during normal construction operations, but is not associated with permanent erosion control features on the project. In no case shall exposure of erodible earth be for more than five days without erosion control features being implemented.

5. Temporary erosion control features may be authorized for use in controlling erosion in areas where stage construction or other conditions not under the control of the Contractor preclude completion of a section of work in a continuous manner and in areas where construction operations which must be performed subsequently will cause damage to permanent erosion control features constructed.

6. When the item of Topsoil or Muck Blanket is included in the contract, the rate of construction of these items may be limited by the availability of topsoil or muck from the normal grading operations. The existence of this condition will be considered as precluding completion of a section or roadway in a continuous manner, and use of temporary erosion control features will be used in areas so affected.

7. The Contractor shall schedule his operations such that the area of unprotected erodible earth exposed at any one time is not larger than the minimum area necessary for efficient construction operations, and the duration of exposed, uncompleted construction to the elements shall be as short as practicable.

8. Clearing and grubbing shall be so scheduled and performed that grading operations can follow immediately thereafter, and grading operations shall be so scheduled and performed that permanent erosion control features can follow immediate thereafter if conditions on the project permit.

3.2 TEMPORARY EROSION CONTROL (Vegetation And Coverings)

A. General: Temporary vegetative erosion control features shall be installed in accordance with Section 1300. Temporary coverings shall be installed in accordance with the manufacturer's recommendations.

3.3 TEMPORARY EROSION CONTROL (Silt Fences And Turbidity Barriers)

A. Temporary Silt Fence: Temporary silt fence shall be erected at locations as shown on the plans, as dictated by the SWPPP, or as approved by the Owner's Engineer. The filter fabric shall be reinforced with wire fence, when called for. If required, the wire reinforcement shall be installed so that the filter fabric is on the upstream side of the fence, and both the wire fence and the filter fabric are on the upstream side of the posts. Posts shall be uniformly installed with approximately 20 degrees inclination toward the potential silt load (upstream) area. The silt fence shall be maintained in an effective condition at all times while in use.

B. Filter fabric shall be secured to the post or fence by suitable staples, tie wire, or hog rings in such a manner as to prevent tearing of the fabric. The bottom of the filter fabric shall be entrenched into the ground a minimum of eight inches to prevent water from flowing under the fence. Filter fabric shall be spliced together only at support posts with a minimum of six-inch overlap and securely sealed.

C. Staked Turbidity Barrier: Staked turbidity barrier shall be securely fastened to wood or steel supports which are spaced at maximum intervals of six feet and driven a minimum of 12 inches into the ground. A minimum of three supports shall be used. The bottom of the fabric shall be entrenched into the existing ground a minimum of eight inches. The staked turbidity barrier shall be a minimum of 15 inches in height and shall not exceed 18 inches in height.

D. The support line sewn in the top hem of the filter fabric shall be used at each post location to secure the fabric to the post at an appropriate height.

E. Staked turbidity barriers shall be installed across ditch lines and at temporary locations as shown on the plans or approved by the Owner's Engineer where continuous construction activities change the natural contour and drainage runoff.

F. Posts in staked turbidity barriers shall be installed in the vertical position unless otherwise directed by the Owner's Engineer.

G. Floating Turbidity Barrier: This work shall consist of the installation and removal of floating turbidity barriers to contain silt and other deleterious materials that may occur as the result of dredging, filling, or other construction activities in waters of the State. The type barrier used will be installed in accordance with the details contained in the plans, or, when details are not shown, in accordance with the FDOT Standard Index No. 103, or as approved by the Owner's Engineer. Alternate methods may be approved provided that compliance with applicable permit conditions and State water quality standards are maintained.

H. All temporary erosion control features and devices shall be removed and disposed of by the Contractor when permanent erosion control features and devices (grassing, sodding, etc.) have reached the point of final acceptance.

3.4 INSPECTION AND MAINTENANCE

A. General: The Contractor shall, at his expense, provide routine maintenance of permanent and temporary erosion control features until

the project is completed and accepted. The Contractor shall inspect all erosion and sediment control facilities within 24 hours of a ¼" rain or greater or a minimum of once weekly. Any deficiencies shall be immediately corrected by the Contractor.

B. Silt Fences and Turbidity Barriers: The Contractor shall make a daily review of the location of silt fences and turbidity barriers to ensure that the silt fence or turbidity barriers are properly located for effectiveness and contain no breaches. Where deficiencies exist, additional silt fences or turbidity barriers shall be installed as directed.

Sediment deposits shall be removed when the deposit reaches approximately one-half of the volume capacity of the temporary silt fence or turbidity barrier as directed. Any sediment deposits remaining in place after the temporary silt fence or turbidity barrier is no longer required shall be dressed to conform with the finished grade, prepared and finished as shown on the construction plans, or seeded in accordance with Section 1300.

C. Inspections shall be made by qualified inspectors using Chapter 8 of the Florida Stormwater, Erosion and Sedimentation Control Inspection Manual. Referenced manual can be downloaded from http://www.floridadep.org/water/nonpoint/erosion.htm. All inspections shall be formally documented using the forms contained in the appendix to this section of the specifications.

3.5 MEASUREMENT AND PAYMENT

A. General: No separate payment will be made for the work covered by this section except for specific pay items shown in the proposal form, and, therefore, all costs in connection with the work of this section shall be included in the contract price for the item or structure to which it pertains. Additional materials, labor, equipment, tools, and incidentals above and beyond the separate payments contained herein and the work shown on the drawings may be required to satisfy the work of this section.

END OF SECTION

STORMWATER POLLUTION PREVENTION PLAN (SWPP)

INSPECTION AND MAINTENANCE REPORT

PROJECT NAME:_____ PROJECT NO._____

INSPECTION DATE:_____ INSPECTOR_____

INSPECTOR'S QUALIFICATIONS:_____

_____

DATE OF LAST RAINFALL:_____

AMOUNT OF LAST RAINFALL:_____ INCHES

TYPE OF INSPECTION:

Monthly (Final Stabilization Completed) _____

Weekly (Disturbed Areas Pending Final Stabilization) _____

Response to 0.25 inch event _____

INSPECTION LOCATION(S): (Check all that are applicable)

Disturbed Areas _____

Point Source Surface Waters _____

Point Source MS4 _____

Construction Operation Areas _____

Vehicle Entry/Exit Points _____

Structural Controls _____

Sediment Basin(s) _____

Other (_____) _____

INSPECTION SUMMARY

OVERALL RATING OF SWPP COMPLIANCE: (circle one)

EXCELLENT GOOD FAIR POOR

SUMMARY OF CORRECTIVE ACTIONS REQUIRED TO COMPLY WITH APPROVED SWPP:

_____

_____

_____

_____

_____

SUMMARY OF REQUIRED CHANGES TO THE SWPP: _____

_____

_____

_____

_____

_____

REASONS FOR CHANGES TO THE SWPP:

_____

_____

_____

_____

_____

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true accurate, and complete. I am aware that there are significant penalties for submitted false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____

Title: _____

Date: _____

ROUTINE MAINTENANCE INSPECTION CHECKLIST
FOR BMPS FOR EROSION AND SEDIMENT CONTROL

Control Measure	Problems to look for	Possible Remedies
Vegetation	Rills or gullies forming	Check for top-of-slope diversion and install if needed
	Bare soil patches	Fill rills and regrade gullied slopes, revegetate.
	Sediment at toe of slope	Remove sediments, revegetate using site appropriate methods
Dikes	Gully on slope below dike breach; wheel track or low spot in dike.	Add soil to breaches or low spots and compact
	Loose soil	Compact loose soil.
	Erosion of dike face	Line upslope face with riprap, or revegetate using site appropriate methods
Swales	Gully on slope below swale	Repair breaches.
	Wheel track, low point (water ponded in swale)	Build up low areas with compacted soil or sandbags or rebuild swales w/positive slope
	Sediment or debris in channel	Remove obstructions.
	Erosion of unlined channel surface	Mulch and install anchored sod or erosion control blanket; or line swale w/riprap; or install check dams; or realign swale on gentler gradient; or divert some or all stormwater to a more stable facility.
	Erosion of channel lining	Install larger riprap; or reseed, mulch and anchor w/netting; or install check dams; or pave swale.
Pipe, slope drain or flume	Blocked inlet or outlet	Remove sediment and debris
	Runoff bypassing inlet	Enlarge headwall or flare out entrance section
	Erosion at outlet	Enlarge riprap apron and use larger riprap; or convey runoff to a more stable outlet.
Grassed waterways	Bare areas	Revegetate w/anchored sod or erosion control blanket; divert flow during establishment period.
	Channel capacity reduced to tall growth	Mow grass
Riprap lined waterway	Scour beneath stones	Install proper geotextile or graded bedding. Make sure edges of geotextile are buried.
	Dislodged stones	Replace w/larger stones.
Outlet protection	Erosion below outlet	Enlarge riprap apron; or line receiving channel below outlet; or convey runoff directly to a more stable outlet; make sure discharge point is on level or nearly level grade.
	Outlet scour	Install proper geotextile or graded bedding. beneath riprap apron.
	Dislodged stones	Replace w/larger stones.
Sediment traps and basins	Sediment level near outlet elevation	In traps, remove sediment if less than 1 ft. (0.3 m) below outlet elevation; in basins,

ROUTINE MAINTENANCE INSPECTION CHECKLIST
FOR BMPS FOR EROSION AND SEDIMENT CONTROL

Control Measure	Problems to look for	Possible Remedies
		remove sediments if less than 2 ft (0.6 m) below top of riser.
	Obstructed outlet	Remove debris from trash rack.
	Basin not dewatering between storms	Clear holes. Clear or replace sediment-choked gravel surrounding dewatering hole or subsurface drain.
	Damaged embankments	Rebuild and compact damaged areas.
	Spillway erosion	Line spillway w/rock, geotextile or pavement
	Outlet erosion	Make sure outlet is flush w/ground and on level grade. Install, extend or repair riprap apron as required; or convey discharge directly to a more stable outlet.
	Riser flotation	Anchor riser in concrete footing.
	Excessive discharge to and from basin or trap	Check runoff patterns for consistency w/plans. Reroute part of volume to another basin or enlarge the basin.
	Sediment storage zone fills too quickly	Increase size of basin; or stabilize more of the contributing area.
Straw bale barrier	Bale displacement	Anchor bales securely w/proper stakes or rebar. Check drainage area, slope length and gradient behind each barrier.
	Undercutting of bales	Entrench bales to proper depth, backfill, and compact the soil.
	Gaps between bales	Restake bales. Drive first stake in each bale at an angle to force it snug against the adjacent bale.
	Baling wire broken	Retie bale or replace w/fresh bale.
	Bale disintegrating	Replace w/fresh bale.
	Runoff escaping around barrier	Extend barrier or reposition in center of flow path.
	Sediment level near top of fence	Remove sediment when level reaches half of barrier height.
Silt fence	Undercutting of fence	Entrench wire mesh and fabric to proper depth, backfill, and compact
	Fence collapsing	Check post size and spacing, gauge of wire mesh and fabric strength. Check drainage area, slope length and gradient behind barrier. Correct any substandard condition.
	Torn fabric	Replace w/continuous piece of fabric from post to post, attach w/proper staples.
	Runoff escaping around fence.	Extend fence.

ROUTINE MAINTENANCE INSPECTION CHECKLIST
FOR BMPS FOR EROSION AND SEDIMENT CONTROL

Control Measure	Problems to look for	Possible Remedies
	Sediment level near top of fence	Remove sediment after each storm.
Check dam	Sediment accumulation	Entrench wire mesh and fabric to proper depth, backfill, and compact.
	Flow escaping around sides of check dam	Build up ends of dam and provide low center area for spillway
	Displacement of sandbags, stones, or straw bales.	Check drainage areas and peak flows. Reinforce dam w/larger stones, etc.; or divert part of flow to another outlet.
Inlet protection	Flooding around or below inlet	Remove accumulated sediment; or convert sediment barrier to an excavated sediment trap; or reroute runoff to a more suitable area.
	Undercutting of bales or silt fence, bale displacement, torn fabric, etc.	See remedies for straw bale barriers and silt fences.

EROSION AND SEDIMENT CONTROL
INSPECTION SUMMARY

PROJECT: _____
DATE: _____

BMP	Included in SWPP			Compliance		Deficiencies Noted:
	Yes	No	N/A	Yes	No	
Block & Gravel						
Brush Barrier						
Check Dam / Hay Bale						
Check Dam / Rock (Gravel)						
Check Dam / Silt Fence						
Construction Road Stabilization						
Curb & Gutter Sediment Barrier						
Drainfield Pipe Inlet Protection						
Floating Turbidity Barrier						
GeoHay Curb Inlet Protection						
Gravel & Wire Mesh						
Hay Bale (Straw Bale)						
Hay Bale (Straw Bale)						
Silt Fence						
Silt Fence (Filter Fabric)						
Sod						
Temporary Diversion Dike						
Temporary Fill Diversion						
Temporary Gravel Construction Entrance						
Temporary Sediment Basin						
Temporary Sediment Trap						
Temporary Slope Drain						
Temporary Right-of-Way Diversion						
Other: ( )						

Maintenance Required: _____

Plan Revisions Required: _____

Action Agency: _____

Corrective Action Suspense Date: _____

PROJECT: _____

DATE: _____

SITE STABILIZATION
INSPECTION SUMMARY

	Yes	No
Included in SWPP	( )	( )

List Specific Area Inspected	Date Surface Disturbed	Stabilized? Yes / No	Stabilization Code (see below)	Deficiencies Noted:

Maintenance Required: _____

Plan Revisions Required _____

Action Agency _____

Corrective Action Suspense Date: _____

Stabilization Key	
Type	Code
Surface Roughening	A
Topsoiling	B
Temporary Seeding	C
Permanent Seeding	D
Mulching	E
Groundwater	F
Vegetative streambank	G

CONSTRUCTION OPERATION AREAS
INSPECTION SUMMARY

PROJECT: _____
DATE: _____

	Yes	No
Included in SWPP	( )	( )

PARAMETER	Compliance			Deficiencies Noted
	Yes	No	N/A	
Equipment Maintenance and Repair Area				
Waste Collection and Disposal Practices				
Demolition Areas				
Washing Areas				
Storage of Construction Materials, Chemicals, etc.				
Sanitary Facilities				
Dust Control				
Dewatering Control				
Other (_____)				

Corrective Action Required: _____

Plan Revisions Required: _____

Action Agency: _____

Corrective Action Suspense Date: _____

VEHICLE ENTRANCE / EXIT POINTS

INSPECTION SUMMARY

PROJECT: _____

DATE: _____

	Yes	No
Included in SWPP	( )	( )

PARAMETERS	Yes	No	N/A	Deficiencies Noted
Installed Per Plans				
Aggregate PadClean				
Traffic Using Pad				
Evidence of Corner Cutting				
Evidence of Sediment on Road				
Functional Drainage				
Wheel Washing Implemented				

Maintenance Required: _____

_____

Plan Revisions Required: _____

_____

Action Agency: _____

_____

Corrective Action Suspense Date: _____

SECTION 01200

SODDING

PART 1 – GENERAL

1.1 INTENT

A. It is the intent of these specifications to provide supplemental information to the contents of the construction drawings on the quality of materials, execution, measurement, etc. These specifications are general in nature and may contain products and requirements which are not applicable to the project. Discrepancies between these specifications and the construction drawing, either imagined or real, shall be brought to the attention of the Owner's Engineer for clarification.

1.2 DESCRIPTION OF WORK

A. Sodding includes, but is not limited to: Ground preparation, fertilization, sodding, and watering as required to promote growth.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform all work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Testing: An independent testing and inspection service will not be required for the work of this section.

PART 2 – MATERIALS

2.1 SOD

A. Grass sod shall be Bermuda, Centipede or St. Augustine as shown on the plans or as selected by Owner, and shall be well matted with grass roots. The sod shall be taken up in rectangles, preferably 12 inch by 24 inch, shall be a minimum of two inches in thickness and shall be live, fresh and uninjured at the time of planting. It shall be reasonably free of weeds and other grasses and shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. The sod shall be planted as soon as possible after being dug and shall be shaded and kept moist until it is planted. Dumping from vehicles will not be permitted. Damaged sod will be rejected. Replanting shall be done within 48 hours after time of harvesting or sod shall be kept damp until planted.

PART 3 – EXECUTION

3.1 CONSTRUCTION

A. General: The limits of sod shall be as shown on the drawings, described herein or as directed by the Engineer. Areas which are disturbed due to construction activities but which are not shown within the limits of sod shall be stabilized in accordance with this specification at no cost to the Owner. In these areas the Owner shall reserve the right to determine which method and materials shall be used for stabilization.

B. Preparation of Ground: The area over which the sod is to be planted shall be scarified or loosened to a suitable depth and then raked smooth and free from rocks or stones. Where the soil is sufficiently loose, the Engineer, at his discretion, may authorize the elimination of ground preparation. No subsequent operations shall be commenced until the Owner's Engineer has approved the condition of the prepared areas. Water the soil before planting sod.

C. Fertilization:

1. Fertilizer shall be spread at a rate per thousand square feet of area, in accordance with the following table.

5N-10P-5K: 30 LBS.	8N-8P-8K: 20 LBS.
6N-12P-2K: 25 LBS.	10N-6P-4K: 15 LBS.
7N- 7P-6K: 22 LBS.	10N-5P-5K: 15 LBS.

2. Fertilizer shall be mixed in the soil to a depth of at least two inches by discing or harrowing.

D. Sodding:

1. Soft spots and inequalities in grade shall be corrected before starting sod work.

2. Lay sod without voids, tamp or roll. Broom screen topsoil over entire area. Sod shall be thoroughly watered. The surface shall be true to finished grade lines; even and firm at all points.

3. Place sod with staggered joints closely butted, tamped or rolled to an even surface to the required finished grade. Avoid continuous seam along line of water flow in swales. Place sod in rows at right angles to slope.

4. In areas with slopes steeper than 4:1, the Contractor shall use sod staples, wooden stakes or other means approved by the Owner's Engineer, to prevent movement of the sod during rainfall events.

E. Watering: The areas on which the sod is to be placed shall contain sufficient moisture, as determined by the Engineer, for optimum results. After being placed, the sod shall be kept in a moist condition to the full depth of the rooting zone for at least two weeks. Thereafter, the Contractor shall apply water as needed until the sod roots and starts to grow.

3.2 MAINTENANCE

A. The Contractor shall at his expense maintain the sodded areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include mowing, repairing of any damaged areas and replacing areas in which the establishment of the grass stand does not appear to be developing satisfactorily.

B. Replanting or repair necessary due to the Contractor's negligence, carelessness or failure to provide routine maintenance shall be at the Contractor's expense. Replanting necessary due to factors determined to be beyond the control of the Contractor shall be paid for under the appropriate contract pay items.

3.3 GUARANTEE

A. The Contractor shall guarantee all sodding for a period of 90 days after the date of provisional acceptance. During the guarantee period, the Contractor shall replace at no cost to the Owner, any sod required under the Contract that dies or is not established 90 days after sodding if the causes for such defects are traced to negligence or poor workmanship by the Contractor.

B. Any sod missing or defective due to the Contractor's negligence shall be furnished or replaced in a manner satisfactory to the Engineer. In case of any doubt as to the condition and satisfactory establishment of the sod, the Engineer may allow the sod to remain through another 90 day establishment after which time the sod in question, if found to be dead or in an unhealthy or badly impaired condition, shall be replaced by the Contractor at no cost to the Owner.

3.4 TESTING AND INSPECTION REQUIREMENTS

A. Areas to receive sod will be subject to a visual inspection by the Owner's Engineer upon completion of ground preparation and prior to placement of sod.

B. Upon completion of sodding and prior to commencement of the guarantee period, the area will be subject to a visual inspection by the Owner's Engineer.

C. At the end of the guarantee period, final inspection of the sod will be made by the Engineer upon written notice requesting such inspection submitted by the Contractor at least three days before the anticipated inspection. All defects discovered shall be repaired or replaced by the Contractor before final acceptance.

END OF SECTION

SECTION 01300

GRASSING (BY SEEDING)

PART 1 – GENERAL

1.1 INTENT

A. It is the intent of these specifications to provide supplemental information to the contents of the construction drawings on the quality of materials, execution, measurement, etc. These specifications are general in nature and may contain products and requirements which are not applicable to the project. Discrepancies between these specifications and the construction drawings, either imagined or real, shall be brought to the attention of the Owner's Engineer for clarification.

1.2 DESCRIPTION OF WORK

A. Seeding includes, but is not limited to: Ground preparation, fertilization, seeding, erosion control, rolling, watering.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform all work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Testing and Inspection: Testing and inspection shall be performed by the Owner's Engineer.

C. It will be the responsibility of the Contractor to coordinate all testing and inspections. The Contractor shall notify the Owner's Engineer, testing service and applicable agency inspectors 48 hours in advance of testing and inspections.

1.4 SUBMITTAL

A. The following shall be submitted to the Owner's Engineer for approval:

1. Proposed seed mixes.

2. Manufacturer's data and installation procedures on erosion control blanket.

SECTION 01300

GRASSING (BY SEEDING)

PART 2 - MATERIALS

2.1 SEED

A. General:

1. All seed shall meet the requirements of State Department of Agriculture and Consumer Services and all applicable State laws and shall be approved by the Engineer before being sown. The seed shall have been harvested from the previous year's crop.

2. When a low percentage of grass seed or native seed germination causes the quality of the seed to fall below the minimum pure live seed percentage as specified below, the Contractor may elect, subject to the approval of the Engineer, to increase the rate of application sufficiently to obtain the minimum germination rate specified. No payment will be made for the added seed.

B. Grass Seed:

1. Each of the species or varieties of seed shall be furnished and delivered in separate labeled bags. During handling and storage, the seed shall be cared for in such a manner that it will be protected from damage by heat, moisture, rodents and other causes.

2. All permanent and temporary grass seed shall have been tested within a period of six months of the date of planting.

3. All permanent and temporary grass seed shall have a minimum percent of purity and germination as follows:

a. Argentine Bahia Grass Seed shall have a minimum pure seed content of 95% with a minimum germination of 80% (use only when approved in writing).

b. Pensacola Bahia Grass Seed shall have a minimum pure seed content of 95% with a minimum active germination of 40% and a total germination of 80% including firm seed (use only when approved in writing).

c. Bermuda Grass Seed shall be of common variety with a minimum pure seed content of 95% with a minimum germination of 85%.

d. Annual Type Rye Grass Seed shall have a minimum germination of 90%.

e. Millet Seed shall be of the Brown Top variety with a minimum pure seed content of 90% with a minimum germination of 85% (use only when approved in writing).

2.2 MIXTURE

A. Grass seed shall be a mixture of 15 parts of rye or millet, depending on season, and 85 parts of Bermuda or other types of grass and mixes as selected by the Owner. The separate types of seed used shall be thoroughly dry mixed immediately before sowing. Seed which has become wet shall not be used. The Contractor may submit for approval by the Owner's Engineer alternative mix designs if so desired.

2.3 MULCH

A. Dry Mulch:

1. The mulch material used shall normally be dry mulch. Dry mulch shall be straw or hay, consisting of oat, rye or wheat straw, or of pangola, peanut, coastal Bermuda or Bahia grass hay.

2. Only un-deteriorated mulch which can be readily cut into the soil shall be used.

B. Green Mulch:

1. Green mulch shall consist of live coastal Bermuda, or other approved type of grass, and shall be free from weeds and obnoxious or undesirable grasses.

2. No green mulch which, in the Engineer's opinion, has been allowed to become sufficiently dry as to lose its growth producing benefits will be allowed to be used.

C. In the event that the subsequent stand of grass is found to be contaminated with weeds or other obnoxious or undesirable growth, and it can be determined that such growth was introduced with the green mulch, then the Contractor will be required to effectively eliminate such undesirable growth at his own expense.

2.4 EROSION CONTROL BLANKET

A. Erosion control blanket shall be "Curlex" as manufactured by American Excelsior, Type SC15 as manufactured by North American Green, or approved equal, unless noted otherwise on the plans.

2.5 COMMERCIAL FERTILIZER

A. Commercial fertilizers shall comply with the state fertilizer laws.

B. The numeral designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid and (3) water soluble potash, contained in the fertilizer.

C. Type I fertilizer (as hereinafter specified) shall be used unless Type II fertilizer or another designation is specifically called for on the Drawings or authorized by the Engineer. Liquid fertilizer will not be permitted.

D. Type I Fertilizer: The chemical designation of this fertilizer shall be 12-8-8 with at least 50% of the nitrogen from a non-water-soluble organic source. The nitrogen source may be a urea-formaldehyde source provided it is not derived from a waste product of the plastic industry.

E. Type II Fertilizer: The chemical designation of this fertilizer shall be 12-12-8 with at least 50% of the nitrogen shall be from a urea-formaldehyde source and at least 50% of the phosphoric acid shall be from regular superphosphate.

2.6 WATER FOR GRASSING

A. The water used in the grassing operations may be obtained from any approved spring, pond, lake, stream or metered municipal water system. The water shall be free of excess and harmful chemicals, acids, alkalies or any substance which might be harmful to plant growth or obnoxious to traffic. Saltwater shall not be used.

2.7 EQUIPMENT

A. Fertilizer Spreader: The device for spreading fertilizer shall be capable of uniformly distributing the material at the specified rate.

B. Seed Spreader: The seed spreader shall be an approved mechanical hand spreader or other approved type of spreader.

C. Equipment for Cutting Mulch into Soil: The mulching equipment shall be capable of cutting the specified materials uniformly into the soil and to the required controlled depth. Harrows will not be allowed.

D. Rollers: A cultipacker, traffic roller or other suitable equipment will be required for rolling the grassed areas.

PART 3 – EXECUTION

3.1 CONSTRUCTION

A. General: Fertilizing, seeding or mulching operations will not be permitted when wind velocities exceed 15 miles per hour. Seed shall be sown only when the soil is moist and in proper condition to induce growth. No seeding shall be done when the ground is unduly wet or otherwise not in a tillable condition.

B. Sequence of Operations: The several operations involved in the Work shall proceed in the following sequence: Fertilizing and preparation of the ground, seeding, erosion control and rolling. Erosion control shall consist of spreading and cutting in of mulch or application of erosion control blanket.

C. Preparation of Area to be Seeded: The ground to be seeded shall be prepared by disc harrowing and thoroughly pulverizing the soil reasonably smooth. It shall be reasonably free of large clods, roots and other material which will interfere with the Work and subsequent mowing and maintenance operations. No subsequent operations shall be commenced until the Owner's Engineer has approved the condition of the prepared areas.

D. Application of Fertilizer: The fertilizer shall be spread uniformly over the area to be seeded, at the rate of 500 to 600 pounds per acre. On steep slopes or other areas where machine spreading may not be practicable, the spreading may be done by hand. Immediately after the fertilizer is spread it shall be mixed with the soil to a depth of approximately four inches.

E. Seeding:

1. While the soil is still loose and moist, the seed shall be scattered uniformly over the grassing area at a rate of 80 pounds per acre.

2. The seed shall be immediately mixed into the seed bed to a

depth of one-half inch. The contractor may mix the fertilizer and seed into the seed bed in one operation.

3. When so directed by the Engineer, seed of an approved quick growing species of grass, such as rye, Italian rye, millet or other cereal grass, shall be spread at a rate of 30 pounds per acre in conjunction with the permanent type seed mixture.

F. Mulching: Approximately two inches, loose thickness, of the mulch material shall be applied uniformly over the seeded area, and the mulch material cut into the soil with the equipment specified so as to produce a loose mulched thickness of three inches to four inches. Care shall be exercised so the materials are not cut too deeply into the soil.

When green mulch is used it shall be incorporated into the soil not later than two days after being harvested and no artificial watering of the mulch shall be done before it is applied.

G. Erosion Control Blanket: For slopes 4:1 or greater an erosion control blanket will be used in lieu of mulching unless noted otherwise on the plans or at the discretion of the Owner's Engineer. Blankets shall be laid and stapled in accordance with the manufacturer's recommendations.

H. Rolling: Immediately after completion of the seeding, the entire seeded and mulched area shall be rolled thoroughly with the equipment specified. At least two trips over the entire area will be required. For areas which will receive an erosion control blanket in lieu of mulch areas shall be rolled prior to installation of blanket.

I. Watering: The seeded areas shall be watered so as to provide optimum growth conditions for the establishment of the grass. In no case, however, shall the period of maintaining such moisture be less than two weeks after the planting.

3.2 MAINTENANCE

A. The Contractor shall at his expense maintain the planted areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include mowing, and the filling, leveling and repairing of any washed or eroded areas, as may be necessary. The Engineer, at any time, may require replanting of areas in which the establishment of the grass stand does not appear to be developing satisfactorily.

B. If a planted area must be replanted due to the Contractor's negligence, carelessness or failure to provide routine maintenance of such area, such

replacement shall be at the Contractor's expense. If replanting is necessary due to factors determined to be beyond the control of the Contractor, payment for replacement will be made under the appropriate contract pay items.

3.3 GUARANTEE

A. The Contractor shall guarantee all seeded areas for a period of 90 days after the date of provisional acceptance. During the guarantee period, the Contractor shall replace at no cost to the Owner, any grass required under the Contract that dies or is not established 90 days after seeding, if the causes for such defects are traced to negligence or poor workmanship by the Contractor.

B. Any grass missing or defective due to the Contractor's negligence shall be furnished or replaced in a manner satisfactory to the engineer. In case of any doubt as to the condition and satisfactory establishment of the grass, the Engineer may allow the seeded area to remain through another 90 day establishment period, after which time the grass in question, if found to be dead or in an unhealthy or badly impaired condition, shall be replaced by the Contractor at not cost to the Owner.

3.4 TESTING AND INSPECTION REQUIREMENTS

A. Areas to receive seed will be subject to a visual inspection by the Owner's Engineer upon completion of ground preparation and prior to placement of seed and mulch or erosion control blanket.

B. Upon completion of the grassing and prior to commencement of the guarantee period, the area will be subject to a visual inspection by the Owner's Engineer.

C. At the end of the guarantee period, final inspection of the grassed area will be made by the Engineer upon written notice requesting such inspection submitted by the Contractor at least three days before the anticipated inspection. All defects discovered shall be repaired or replaced by the Contractor before final acceptance.

END OF SECTION

Section 02120

DEMOLITION AND REMOVAL

PART 1 - GENERAL

1.1 SCOPE

A. Description of Work

1. Perform all demolition and removal work necessary and required for the construction of the project as indicated. Such work includes but is not limited to the following:

   a. Demolition and removal of existing facilities listed in Section 01010, SUMMARY OF THE WORK, and shown on the Drawings.

B. Related Work Specified Elsewhere

1. The following items of associated work are included in other sections of these specifications:

   a. Site clearing and grubbing including removal of on-grade slabs, paving and aggregate base, retaining and foundation walls, footings, and remaining debris from demolished improvements.

   b. Tree removal.

   c. Protection and trimming of existing trees.

   d. Construction barricades.

   e. Underpinning, shoring, bracing, bulkheading, and related work of permanent nature. (Temporary shoring and bracing required by demolition operations is part of Demolition work.)

   f. Demolition and removal work covered under Division 16, ELECTRICAL and/or indicated on the Drawings, which will be the responsibility of the Electrical Contractor.

1.2 REGULATIONS

A. All work shall comply with the rules and regulations of the Division of Industrial Safety and all other Local, Federal and State agencies and authorities having jurisdiction.

B. Obtain and pay for all permits required to perform the demolition work as required by all agencies and authorities having jurisdiction.

1.3 MAINTENANCE OF TRAFFIC AND ACCESS

A. Throughout progress of work, do not interfere with use of or access to adjacent buildings or property.

B. Do not close or otherwise obstruct sidewalks or streets without obtaining and paying for permits to do so.

C. Move and relocate any traffic signals, controls, power or light poles, mailboxes, and similar utility and public service items obstructed by project barricades or operations.

D. Maintain accessibility from street at all times to any fire hydrants within construction area.

1.4 HANDLING OF MATERIALS

A. When the nature of demolition work requires their use, erect and maintain dust chutes for the disposal of materials, rubbish, and debris.

B. Remove salvage and debris from the site as it accumulates. Do not store, sell, burn, or otherwise dispose of debris on the site. Remove all materials in such manner as to prevent spillage. Keep all pavements and areas adjacent to and leading from the site, clean and free of mud, dirt, and debris at all times.

1.5 PROTECTION

A. Erect and maintain temporary bracing, shoring, lights, barricades (except construction barricades for subsequent new construction), warning signs, and guards necessary to protect streets, sidewalks, and adjoining property from damage, all in accordance with applicable rules and regulations.

B. Wet down the site and areas being demolished as required to prevent dust and dirt from rising.

PART 2 - PRODUCTS

2.1 MATERIALS SHALL BE AT CONTRACTOR OPTION

PART 3 - EXECUTION

3.1 CONDITION OF ADJACENT IMPROVEMENTS

A. Prior to starting demolition work, make inspection with Engineer to determine physical condition of adjacent improvements to remain.

3.2 PREPARATION

A. Utility Lines:

1. Where such have not been terminated, arrange to have water, gas, electric, telephone, and other services to buildings being demolished, turned off by appropriate utility company. (All utility services will be terminated by the Owner prior to issuing a notice to proceed with the demolition work. Where subsequent demolition work reveals that there are utilities which are still in service, immediately notify Engineer who shall issue instructions as to procedure.)

2. Ensure that utilities serving adjacent buildings remain in service.

3. Seal or cap utility lines to or from site at property lines or service side of meters. Where they are of value, have meters picked up by utility companies. Remove all on-site lines to point where capped. Remove above grade lines to point of turning off services.

4. The Contractor is permitted to leave certain water lines in place as may be required for his work under the Contract. He shall, however, be responsible for arranging for all service, installation of meters, pipes, valves, and connections, and shall pay all costs thereof. Temporary water service shall not interfere with additional work under the Contract and shall be removed when the work is completed or as directed by Engineer.

5. Do not remove any lines or services of public utility companies. Where removal and/or relocation of such lines is required, make all arrangements with the utility company involved.

6. Where certain on-site lines are noted on the Drawings to remain, protect and maintain such lines and be responsible for all damage thereto until acceptance of the demolition work.

3.3 TRANSFER OF RESPONSIBILITY AND DISPOSITION OF MATERIALS

A. As part of all the demolition activities, the Contractor shall be responsible for the removal all mechanical equipment, materials, and accessories including pumps, valves, piping, handrails, crane systems, etc. as shown on the drawings. Salvageability of these items shall be established by the

Owner at the time of demolition on an item by item basis. Materials designated as salvageable by the Owner shall be placed in the on-site Owner designated storage area. All other materials shall become the property of the Contractor and shall be removed from the job site prior to the final payment.

3.4 WORKMANSHIP

A. Execute demolition and removal work to ensure safety of persons and adjacent property against damage by settlement, falling debris, or other causes in connection with this work.

B. Demolish concrete and masonry in small sections. Lower heavy framing members carefully.

C. Utilize bracing and shoring where necessary to prevent collapse of structure or parts thereof.

3.5 DEMOLITION AND REMOVAL SCHEDULE

A. Demolition and removal shall not be started until notice to proceed has been obtained from the Engineer. Demolition and removal shall be coordinated with other phases of construction in such an order as recommended under Sequence of Construction in Section 01010 - SUMMARY OF THE WORK.

3.6 DEMOLITION, REMOVAL AND DISPOSAL

A. Demolition

1. All units indicated to be demolished shall be removed to a point 3 feet below final grade. All equipment and piping contained within units to be demolished shall be removed. All tank bottoms and basement slabs remaining in place shall be drilled through or broken to prevent water retention.

B. Removal

1. All units indicated to be removed shall be removed in their entirety.

C. Disposal

1. Debris resulting from the demolition and removal operations shall be removed off site. Portions of the debris may be used as backfill if deemed suitable by the Engineer and if suitably reduced in size.

3.7 SAFETY REQUIREMENTS

A. Maintain and be responsible for the safety of the operations at all times.

B. Safety shall be the sole responsibility of the contractor and it's superintendent and resident supervisor.

C. Perform work in such manner to prevent damage to the Owner's equipment, properties and insure the safety of all personnel at the wastewater treatment plant site. The Contractor shall also be responsible for the safety of his personnel.

D. Safety precautions include the detection of explosive gas mixtures, the use of non-sparking tools if deemed necessary, furnishing forced air to non-ventilated spaces and using personnel safety lines and harnesses.

END OF SECTION 02120

SECTION 02150

BYPASS PUMPING

PART I – GENERAL

1.1 SUMMARY

This section presents the requirements for Bypass Pumping that will be required for all sewer line and manhole replacement, unless the Contractor can demonstrate to Engineer and Owner that the work can be accomplished without bypass pumping.

1.2 BYPASS PUMPING PLANS

Contractor shall meet with Owner, in presence of Engineer, to establish locations of pumps and equipment needed to achieve flow stoppage of adequate time to complete the work.

The Contractor shall be solely responsible for all work associated with Bypass Pumping.

Contractor shall provide Engineer at the Pre-Construction Meeting a plan detailing the anticipated start date and length of time required to perform Bypass Pumping. Contractor shall provide a minimum of one full day written notice to the Owner in advance of start of Bypass Pumping. Owner shall acknowledge such notice.

The Owner shall receive from the Contractor a map showing the location or locations at which flow will be stopped, as well as the locations at which pumping will occur, and the location at which the flow will be returned to the sanitary sewer system. The map shall show the location and length of hoses, location and capacities of pumps, and the method used to stop flow. The plan shall also detail the number of people required to perform the work, and the frequency with which checks of sewage levels in manholes will be made. Additionally, Contractor shall provide the names and phone numbers of Contractor employees who will be on-site, 24 hours/day to the Owner. Contractors employees shall carry cellular telephones with them at all times.

1.3 REGULATORY REQUIREMENTS

A. Maintenance of Traffic
Contractor shall maintain the flow of traffic in a manner consistent with the requirements of the Owner or the Manual of Uniform Traffic Control Devices such that bypass pumping does not interfere with travel, or access to houses or businesses.

B. Sanitary Sewer Spills

1. The Contractor shall establish a procedure whereby, in the event of a sewage spill, promptly notify the Department of Environmental Protection and the Owner.

2. The Contractor shall verbally report all unauthorized releases or spills of untreated or treated wastewater to the Owner and the Florida Department of Environmental Protection as soon as practical, but no later than 12 hours from the time the Contractor becomes aware of the discharge. Spills or releases in excess of 1,000 gallons per incident, or where public health of the environment may be endangered, are to be reported to the State Warning Point at (800) 320-0519, Spills or releases of any amount are to be reported to the Owner at 850-243-3566 and FDEP at 850-872-4375. The Contractor, to the extent known, will provide the following information to the Owner, State Warning Point and DEP branch office:

   A. Name, Address and Telephone Number of Person Reporting
   B. Name, Address and Telephone Number of Responsible Persons for the Discharge
   C. Date and Time of the Discharge and Status of the Discharge (Ongoing or Ceased).
   D. Characteristics of Wastewater Spilled or Released (Untreated or Treated, Industrial or Domestic)
   E. Estimated Amount of the Discharge
   F. Location or Address of the Discharge.
   G. Whether the Discharge was Contained On-Site and Cleanup Actions Taken.
   H. Description of Area Affected by the Discharge, Including Name of Any Water Body.
   I. Other Persons or Agencies Contacted.

   In addition, a written report shall be provided to the Owner, FDEP and other affected agencies on forms provided by the Owner no later than 72 hours following the discharge. All notifications shall comply with the provisions of any applicable which may apply to the project and shall be in accordance with Rule 62-604.550, F.A.C.

3. The Contractor shall be solely liable for any FDEP penalties, fines or actions resulting from any unpermitted wastewater

discharge and/or the failure to provide proper notice according to the above requirements.

1.4 MEASUREMENT AND PAYMENT

A. There shall be no separate line item payments for the task. Cost of this work shall be included in the Unit Bid price.

PART 2 – PRODUCTS

2.1 EQUIPMENT

A. Contractor shall use only materials and equipment capable of relieving the bypass pumping of raw, unscreened sewage. The material and equipment shall be in and kept in good repair throughout the work. Standby equipment as may be needed shall be ready for use in the event maintenance or repair of the equipment in service is required.

B. The bypass system shall be of sufficient capacity to handle existing flow plus additional flow that may occur during a rainstorm. The Contractor will be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing system. If pumping is required on a 24 hours basis, all engines shall be equipped to keep noise to a minimum, within local noise abatement regulation with residential-critical mufflers, sound deadening enclosures, and other means.

C. When flow is a sewer line is plugged, blocked, or bypassed, sufficient precautions must be taken to protect the sewer lines from damage that might result from sewer surcharging. Further, precaution must be taken to public or private property served by the sewers involved.

2.2 SUPPLIES

The Contractor shall be responsible for supplying any and all supplies, spare parts, material, labor, incidentals and expendables required to prosecute the work in a timely manner.

2.3 REGULATION

All work shall be in accordance with all Federal, State, and Local regulations.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verification of Conditions
   1. Contractor shall verify receipt of notice from Owner.
   2. Contractor shall verify site is ready for bypass pumping.

3.2 PREPARATION

A. Traffic Maintenance:
The Contractor shall ensure all required traffic control devices are in place.

B. Contingency Plan:
Contractor shall ensure the necessary phone numbers and procedures are posted at the bypass location to ensure rapid response.

C. Bypass Pumping Route
Contractor shall ensure adequate space is available to accommodate pumps, piping, and thrust restraint as may be needed to perform work.

D. Protection of Existing Property
Adequate examination and preparation shall be made by Contractor to assure existing property (public or private) remains undamaged during the work. Contractor shall be solely responsible for the protection from damaging public or private property.

3.3 CLOSEOUT

A. Contractor shall establish all work required during the performance of Bypass Pumping is complete to the approval of the Engineer.

B. The Contractor may then notify the Owner of the intent to stop pumping. The Contractor shall keep all equipment ready for reuse should the need arise during switch over.

C. The Contractor may, once approval is granted, begin removing equipment from site.

D. Contractor shall perform a thorough cleaning and restoration, in-kind of any areas disturbed or damaged, at no cost to Owner.

END OF SECTION

SECTION 02530

TECHNICAL SPECIFICATIONS - TRENCH SAFETY ACT

553.60 Short title.
553.61 Intent.
553.62 State standard.
553.63 Trench excavations in excess of 5 feet deep; required information.
553.64 Certain requirements for contract bids.

553.60 **Short title.**-This act may be cited as the "Trench Safety Act."

History.-s.1, ch. 90-96.

553.61 **Intent.**-The purpose and intent of this act is to provide for increased worker safety by requiring compliance with sufficient standards for trench safety.

History.-s.2, ch. 90-96.

553.62 **State Standard.**-The Occupational Safety and Health Administration's excavation safety standards, 29, C.F.R. s. 1926.650 Subpart P, are hereby incorporated as the state standard. The Department of labor and Employment Security may, by rule, adopt updated or revised versions of those standards, provided that the updated or revised versions are consistent with the intent expressed in this act and s. 553.72, and are not otherwise inconsistent with state law. Any rule adopted as provided in this section shall be complied with upon its effective date.

History.-s.3, ch. 90-96.

553.63 **Trench excavations in excess of 5 feet deep; required information.**- On all specific contracts for trench excavation in which such excavation will exceed a depth of 5 feet:

1. The contract bid submitted by the contractor who will perform such excavation shall include:

   a. A reference to the trench safety standards that will be in effect during the period of construction of the project.

   b. Written assurance by the contractor performing the trench excavation that such contractor will comply with the applicable trench safety standards.

   c. A separate item identifying the cost of compliance with the applicable trench safety standards.

2. A contractor performing trench excavation shall:

a. As a minimum, comply with the excavation safety standards which are applicable to a project.

b. Adhere to any special shoring requirements, if any, of the State or other political subdivisions which may be applicable to such a project.

c. If any geotechnical information is available from the owner, the contractor, or otherwise, the contractor performing trench excavation shall consider this information in the contractor's design of the trench safety system which it will employ on the project. This paragraph shall not require the owner to obtain geotechnical information.

History.-s.4, ch. 90-96.

553.64 **Certain requirements for contract bids.**-The separate item identifying the cost of compliance with trench safety standards shall be based on the linear feet of trench to be excavated. The separate item for special shoring requirements, if any, shall be based on the square feet of shoring used. Every separate item shall indicate the specific method of compliance as well as the cost of that method.

History.-s.5, ch. 90-96

END OF SECTION

SECTION 02540

EARTHWORK FOR UTILITIES

PART 1 – GENERAL

1.1 INTENT:

A. It is the intent of these specifications to provide supplemental information to the contents of the construction drawings on the quality of materials, execution, measurement, etc. These specifications are general in nature and may contain products and requirements which are not applicable to the project. Discrepancies between these specifications and the construction drawings, either imagined or real, shall be brought to the attention of the Owner's Engineer for clarification.

1.2 DESCRIPTION OF WORK:

A. Extent of work is indicated on drawings.

B. Excavation, trenching, and backfilling for utility systems to the points of connection or termination.

1.3 QUALITY ASSURANCE:

A. Codes and Standards: Perform all work in compliance with applicable requirements of governing authorities having jurisdiction. Contractor must employ, at Contractor's expense, an independent testing laboratory approved by the Owner.

B. Testing and Inspection:

1. Contractor will engage soil testing service for quality control testing during earth work operations.

2. It will be the responsibility of the Contractor to coordinate all testing and inspections. The Contractor shall notify the Owner's Engineer, testing service, and applicable agency inspectors 48 hours in advance of testing and inspections.

1.4 TEST REPORTS:

A. Test Reports: Submit the following reports directly to Engineer from the testing services: Test reports on borrow material; field density; optimum moisture-maximum density curves; graduation curves.

1.5 JOB CONDITIONS:

A. Site Information:

1. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil

borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn therefrom by Contractor.

2. Data is made available for convenience of Contractor.

3. Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner.

B. Underground Utilities:

1. The plans show certain features of topography and certain underground utilities, but they do not purport to show in complete detail all such lines or obstructions. Such topography and notes on the plans were inserted from records available are for the Contractor's convenience only, and shall not be used as a basis for claims of extra compensation. Whenever necessary to determine the location of existing pipes, valves, or other underground structures, the Contractor shall examine all available records and shall make all explorations and excavations for such purpose. Any damage to existing facilities resulting from the contractor's operations shall be immediately repaired by the Contractor at no cost to the owner.

C. Existing Utilities:

1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earth work operations.

2. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation.

3. Do not interrupt existing utilities serving facilities occupied and used by Owner or other during occupied hours, except when permitted, in writing, by Engineer, and then only after acceptable temporary utility services have been provided. Provide minimum of 48 hour notice to Engineer and receive written notice to proceed before interrupting a utility.

4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.

D. Protection of Persons and Property:

1. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.

2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth work operations.

3. Perform excavation by hand within drip line of large trees to remain and protect the root system from damage or dry out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with burlap.

4. Remove and relocate bushes or small trees in right-of-way that will impede construction activities. Relocation of such vegetation will be at Owner's discretion.

PART 2 – MATERIALS

2.1 SOIL MATERIALS:

A. Definitions:

1. Satisfactory soil materials are defined as those complying with AASHTO soil classification groups A-1, A-2-4, A-2-5, A-3.

2. Unsatisfactory soil materials are defined as those complying with AASHTO soil classification groups A-2-6, A-2-7, A-4, A-5, A-6, A-7, and A-8.

3. Unsatisfactory materials include but are not limited to those materials containing roots and other organic matter, trash, debris, frozen materials, and stones larger than three inches. Unsatisfactory materials also include manmade fills, refuse, or backfills from previous construction.

4. Unyielding material shall consist of rock and gravelly soils with stones greater than three inches.

5. Unstable material shall consist of material too wet to properly support the utility pipe, conduit, or appurtenance structure.

B. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock, or gravel larger than one inch in any dimension, debris, waste, vegetable, and other deleterious matter and less than 15% passing No. 200 sieve.

C. Select Granular Material: Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone or crushed slag composed of hard, tough, and durable particles and shall contain not more than 10% by weight of material passing a No. 200 mesh sieve and not less than 95% by weight passing the one inch sieve. The maximum allowable aggregate size shall be one inch or the maximum size recommended by the pipe manufacturer, whichever is smaller.

PART 3 – EXECUTION

3.1 EXCAVATION

A. Excavation includes excavation to the required subgrade elevations and includes excavation of pavements and other obstructions visible on ground surface; underground structures, utilities, and other items indicated to be demolished and removed; together with earth and other materials encountered.

B. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.

C. Unsuitable Materials: Where muck, rock, clay or other material within the limits of the roadway or other work is unsuitable (unsatisfactory soils and materials) in its original position, the Contractor shall excavate each material to the cross sections indicated on the plans or as directed by the Engineer. The unsuitable material shall be disposed of off-site in accordance with applicable codes and regulations and the excavated area backfilled with suitable material to the lines, grades, and elevations indicated on the plans or directed by the Engineer.

D. Stability of Excavations: Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

E. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross-braces, in good serviceable condition. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

F. De-Water:

1. Excavation shall be free from water before bedding, pipe, or structures are installed at Contractor's expense.

2. Provide all necessary pumps, under drains, well point systems, and other means for removing water from trenches and other parts of the work. Continue de-watering operations until the backfill has progressed to a sufficient depth over the pipe to prevent flotation or movement of the pipe in the trench and so that it is above the natural water table.

3. Water from the trenches and excavations shall be disposed of in such a manner as will not cause injury to public health, to public or private

property, to the work completed or in progress, to the surface of the streets, or cause any interference with the use of the same by the public.

4. The Contractor is responsible for obtaining any FDEP permits required for dewatering.

G. Material Storage:

1. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench sufficient to avoid overloading and to prevent slides or cave-ins.

2. Dispose of excess soil material and waste materials as herein specified.

H. Trench Excavation: The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below and above the top of the pipe shall be sloped, or made vertical, as recommended in the manufacturer's installation manual. The trench width below the top of the pipe shall not exceed that recommended in the installation manuals which are available, trench walls below the top of the pipe shall be vertical, and trench walls above the top of the pipe shall be sloped as required to properly complete work. Trench width below the top of the pipe shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter and shall not exceed 36 inches plus O.D. for larger sizes.

I. Bottom Preparation: The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of two inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

J. Removal of Unyielding Material: Where unyielding material is encountered in the bottom of the trench, such material shall be removed four inches below the required grade and replaced with suitable materials as provided in paragraph BACKFILLING.

K. Removal of Unstable Material: Where unstable material is encountered in the bottom of the trench, such material shall be removed to the proper grade as hereinbefore described. When removal of unstable material is required due to the fault or neglect of the Contractor in his performance of the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Owner.

L. Excavation for Appurtenances: Excavation for manholes, catch-basins, inlets, or similar structures shall be at least 12 inches clear between the outer structure surfaces and the face of the excavation or support members shall be sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Removal of unstable material shall

be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

3.2 BACKFILLING

A. General: Control soil compaction during backfilling operations providing minimum percentage of density specified for each area classification indicated below.

B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density determined in accordance with AASHTO T-180.

C. Backfilling: Backfill material shall consist of satisfactory material. Backfill shall be placed in layers not exceeding four inches loose thickness for compaction by hand-operated machine compactors, and eight inches loose thickness for other than hand-operated machines, unless otherwise specified. Each layer shall be compacted to at least 95% maximum density.

D. Trench Backfill: Trenches shall be backfilled to the grade shown. The trench shall be backfilled to two feet above the top of pipe prior to performing the required pressure tests.

E. Replacement of Unyielding Material: Unyielding material removed from the bottom of the trench shall be replaced with satisfactory material.

F. Replacement of Unstable Material: Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding six inches loose thickness, as specified and as directed.

G. Bedding and Initial Backfill: Bedding shall be of the type and thickness shown. Maximum stone size shall not exceed two inches or the maximum size recommended by the pipe manufacturer, whichever is smaller. Initial backfill material shall be placed in layers of a maximum of eight inches loose thickness and compacted with approved tampers to 95% maximum density and to a height of at least one foot above the utility pipe or conduit. The backfill shall be brought up evenly on both sides of pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Backfill material in this portion of the trench shall consist of satisfactory material at a moisture content that will facilitate compaction, free from stones of such size as recommended by the pipe manufacturer or larger than two inches in any dimension, whichever is smaller, except where the pipe is coated or wrapped for protection against corrosion, the backfill material shall be free of stones larger than one inch in any dimension, or as recommended by the pipe manufacturer, whichever is smaller.

H. Final Backfill: The remainder of the trench, except for special materials for roadways, shall be backfilled with satisfactory material. Backfill material shall be deposited and compacted as follows:

I. Sidewalks, Turfed or Seeded Areas, and miscellaneous Areas: Backfill shall be deposited in layers of a maximum of 12 inch loose thickness, and compacted to 90% maximum density. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.

J. Backfill for Appurtenances: After the manhole, catch-basin, inlet, or similar structure has been constructed and the concrete has been allowed to cure to three days minimum, backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill and shall be placed in such a manner as to prevent eccentric loading and excessive stress on the structure.

K. Special Requirements: Special requirements for both excavation and backfill relating to the specific utilities are as follows:

L Gas Distribution: Trenches shall be excavated to a depth that will provide not less than 30 inches of cover.

M. Water Lines: Trenches shall be of a depth to provide a minimum cover of 36 inches from the indicated finished grade to the top of the pipe and 36" beneath paved roadways.

N. Electrical Distribution System: Direct burial cable and conduit or duct line shall have a minimum cover of 30 inches from the finished grade, unless otherwise indicated.

O. Sanitary Sewers:

1. The width of the trench at and below the top of the pipe shall be such that the clear space between the barrel of the pipe and the trench wall shall not exceed eight inches on either side of the pipe. The width of the trench above that level shall be as wide as necessary for sheeting and bracing and the proper performance of the work.

2. The bottom of the trench shall be rounded such that at least the bottom quadrant of the pipe shall rest firmly on undisturbed soil for nearly the full length of the barrel as proper jointing operations will permit. This part of the excavation shall be done manually only a few feet in advance of the pipe-laying by men skilled in this type of work.

3.3 TESTING AND INSPECTION REQUIREMENTS:

A. Quality Control Testing During Construction:

1. Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.

2. Perform field density tests in accordance with AASHTO T-191/ASTM 3 1556 (sand cone method) or AASHTO T-204/ASTM D-2937 (drive Cylinder method). FDOT specifications section 120-10.1.4

3. In alternating compacted fill lifts, make one field density test for every 500 linear feet horizontally or 750 square yards, but in no case less than three tests.

   If in the opinion of the Engineer, based on testing service reports in inspection, subgrade, or fill which have been placed are below specified density, the Contractor shall provide additional compaction and testing at no additional expense to the Owner.

3.4 DISPOSAL OF EXCESS AND WASTE MATERIALS:

A. Removal to Designated Areas on Owner's Property: Transport acceptable excess excavated material to designated soil storage areas on Owner's Property. Stockpile soil or spread as directed by Engineer.

B. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, and dispose of it off Owner's Property.

3.5 MEASUREMENT AND PAYMENT

A. General: No separate payment will be made for the work covered by this section, with the exception of replacement of unsuitable materials, and all costs in connection therewith shall be included in the contract price for the related item of work.

B. Replacement of unsuitable materials (as determined by the Engineer) shall be paid for under unit price bid for sand or sand-clay backfill. No separate payment will be made for removal and disposal of unsuitable material.

END OF SECTION

SECTION 02550

WATER DISTRIBUTION SYSTEM

PART 1 – GENERAL

1.1 INTENT

A. It is the intent of these specifications to provide supplemental information to the contents of the construction drawings on the quality of materials, execution, measurement, etc. These specifications are general in nature and may contain products and requirements which are not applicable to the project. Discrepancies between these specifications and the construction drawings, either imagined or real, shall be brought to the attention of the Owner's Engineer for clarification.

1.2 DESCRIPTION OF WORK

A. Extent of work is shown on the drawings.

B. Domestic water system work includes but is not limited to: Water mains, fire hydrants, valves, service laterals, appurtenances.

C. Comply with the requirements of applicable sections for excavation and backfilling required in connection with water distribution system work.

D. Comply with requirements of applicable sections for concrete work required in connection with water distribution system work.

E. Contractor is advised that existing water mains may be of various pipe materials, including asbestos cement. The Contractor shall be responsible for protection of existing water mains during construction and shall be responsible for repairing any pipes damaged during construction. Repair sections shall be PVC or DI. The Contractor shall comply with all work site, air emission, solid waste and personal safety and protection regulations as related to the excavation, exposure, cutting, handling, containment and disposal of existing water main pipe material.

F. The removal, encapsulation or enclosure, storage and disposal of pipe materials containing asbestos shall be in accordance with Sections 455.301 through 455.309 of the Florida State Statutes, American Water Works Association Manual of Water Supply Practices No. M16 "Work Practices for Asbestos – Cement Pipe," OSHA 29CFR 1910.100, 1926.1101 Appendix F, Asbestos NESHAP; 40CFR 61-Subpart M, 40CFR 763-Appendix D and all other industry and regulatory requirements.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform all work in compliance with applicable requirements of governing authorities having jurisdiction and the applicable standards of the American Water Works Association (AWWA).

B. Testing and Inspection Service:

1. Employ, at Contractor's expense, testing laboratory to perform bacteriological testing of water mains.

2. It will be the responsibility of the Contractor to coordinate all testing and inspections. The Contractor shall notify the Owner's Engineer, testing service, and applicable agency inspectors 48 hours in advance of testing and inspections.

3. Hydrostatic test shall be completed by the Contractor in the presence of the owner's engineer.

1.4 SUBMITTALS

A. Prior to construction commencement, the Contractor shall submit for approval by the Owner's Engineer manufacturer's certifications and cut sheets for the following items: fire hydrant assemblies, valves, water main pipe, fittings, water services, water meters, tapping sleeves, appurtenances.

B. Test Reports: Submit the following applicable reports directly to the Engineer from the testing services with copy to Contractor: Bacteriological Test Reports.

PART 2 - PRODUCTS

2.1 General:

A. All materials shall be accordance with the Material Standard and shall, in no event, be less than that necessary to conform to the requirements of any applicable law, ordinances, and codes.

B. All materials shall be new, unused, and correctly designed. They shall be of standard, first grade quality and intended for the use for which they are offered. Materials or equipment which, in the opinion of the Owner's Engineer, are inferior or of a lower grade than indicated, specified, or required will not be accepted.

C. Ductile iron pipe shall have blue stripes applied to the pipe wall. Pipe striping during manufacturing of the pipe shall have continuous stripes that run parallel to the axis of the pipe, that are located at no greater than 90 degree intervals around the pipe and that will remain intact during and after pipe installation. If tape or paint is used to stripe pipe during installation of the pipe, the tape or paint shall be applied in a continuous line that runs parallel to the axis of the pipe and that is located along the top of the pipe

D. External Corrosion Protection: Where indicated on the drawings or as directed in the field by the owner's engineer, ductile iron pipe shall be encased with polyethylene for corrosion protection. Encasement shall be in accordance with AWWA/ANSI, C105/A21.5.

E. PVC pipe for water lines shall be blue.

2.2 WATER MAINS

A. DUCTILE IRON PIPE - PUSH ON JOINTS

1. Pipe: Pipe shall be of ductile iron and manufactured in accordance with AWWA Standard C151, in nominal 18 or 20 foot laying lengths having minimum metal physical properties of 60-42-10. Minimum pipe pressure class shall be 250.

2. Joints: Joints for ductile iron pipe shall be of the push-on type; "Super Bell Tite", Tyton", and "Fastite" joints are acceptable. All joints shall be in accordance with AWWA Standard C111, and all joint accessories shall be furnished with all pipe.

3. Coating: All pipe furnished shall be cement mortar lined and seal coated in accordance with AWWA Standard C104. The lining thickness shall be "standard" thickness.

B. DUCTILE IRON PIPE - MECHANICAL JOINTS

1. Pipe: All pipe shall be of ductile iron and manufactured in accordance with AWWA Standard C151, in nominal 18 or 20 foot laying lengths having minimum metal physical properties of 60-42-10. Minimum pipe pressure class shall be 250.

2. Joints: Joints shall be mechanical joints in accordance with AWWA Standard C111, with exceptions noted herein. All joint accessories shall be furnished with the pipe. Mechanical joint bolts and nuts shall be manufactured of high-strength, low-alloy steel such as "Corten", "Usalloy", or "Acipalloy".

   The gasket shall be for a standard mechanical joint, of BUNA-S (SBR Buna) in accordance with ANSI A21.4, AWWA C104. The follower gland shall be manufactured from ductile iron (at least ASTM A536, Grade 70-50-05) in accordance with ANSI, A21.11, AWWA C111, where applicable.

3. Coating: All fittings furnished shall be cement mortar lined and coated in accordance with AWWA Standard C104, latest revision. The lining thickness shall be "standard" thickness.

C. POLYVINYL CHLORIDE (PVC) PIPE

1. Smaller than 4-inch Pipe: All PVC pipe and fittings less than four inches in diameter shall be manufactured in accordance with ASTM D2241, with a standard dimension ratio (SDR) of 21, rated pressure 200 psi, and bear the National Sanitation Foundation Seal for potable water pipe.

2. 4-inch – 12-inch Pipe: PVC pipe shall be manufactured in accordance with AWWA Standard C900, latest edition. Pipe shall be pressure class 150 and must meet dimension requirements of dimension ratio (DR) 18.

3. 14-inch and Larger Pipe: PVC pipe shall be manufactured in accordance with AWWA Standard, C905, Latest Edition. Pipe shall be Pressure Class 165 and must meet dimension requirements of dimension ratio (DR) 25 and shall bear the National Sanitation Foundation seal for potable water.

4. Joints: Joints shall be "push-on" and shall meet all requirements of ASTM Standard D3139. Each bell shall be an integral wall section joint assembly using elastomeric-gasket seals. All gaskets shall meet all requirements for performance as specified by ASTM Standard F477.

5. All PVC pipe shall be marked using a solid No. 10 copper wire buried between 3 and 6 inches above the top of the pipe. Backfill shall be carefully placed to a depth of 3 inches by hand to assure that the wire is secured in place over the pipe. It is the intent of this paragraph to provide a means to locate PVC pipe using standard pipe location equipment. The wire shall be carried up through valve boxes and terminated at least 2 feet above the ground line to permit connecting of location equipment. Excess wire at valve boxes shall be neatly rolled and stored in the valve box for easy accessibility. Number 10 locating wire splice shall be heat sealed or water proof splicing connector.

6. Pipe Marking: All pipe shall be marked as prescribed in ASTM 3-2241, i.e., nominal pipe size, type of plastic pipe material, pipe dimension ratio, pressure rating, ASTM specification designation number manufacturer's name and code, and the National Sanitation Foundation Seal for potable water.

2.3 FITTINGS (3-inch and Larger)

A. General: Fittings three inches and larger shall be ductile iron manufactured in accordance with AWWA/ANSI Standard C110/A21.10 or C153/A21.53. The minimum pressure rating for fittings shall be 250 psi.

B. Coating: All fittings furnished shall be cement mortar lined and coated in accordance with AWWA Standard C104.

C. Anchoring Devices:

1. All anchoring devices shall be suitable for use with mechanical joint fittings meeting AWWA Standards C110, and/or C111.

2. All anchoring devices shall be constructed of ductile iron (at least ASTM A536 Grade 70-50-05) and manufactured in accordance with AWWA C110 and/or C111.

3. All anchoring devices shall have a sufficient number of set screws so as to properly restrain various fittings or pipes at the rated pressure without the need for additional thrust restraint.

D. Retainer Glands:

1. Mechanical joint restraint shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts 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. 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 A21.11 and ANSI/AWWA A21.53/C153 of latest revision. Twist-off nuts shall be used to insure proper actuating of the restraining devices.

2. The mechanical joint restraining device shall have a working pressure of at least 350 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., MEGALUG or equal.

3. Push-on joint restraints shall be Fast-Grip Gasket by American D. I. Pipe Co. or equal.

4. Coatings: Coatings shall be as follows:

(a) Flange adapters shall be provided with a painted "shop coat".

(b) Retainer glands shall be provided with a bituminous coat.

2.4 GATE AND TAPPING VALVES

A. General: Gate and tapping valves shall be resilient seat and shall comply with all requirements of AWWA Standard C509 and the following supplemental requirements:

B. Valves 12 inches and smaller shall be bubble-tight at 200 psi water working pressure. Test pressure shall be twice the rated working pressure and at all times zero leakage will be maintained.

C. All valves shall be Class B gray iron body, non-rising stem, water valves suitable for buried vertical mounting.

D. Non-rising stems shall be in full compliance with AWWA specifications with cast integral stem collar and furnished of bronze conforming to ASTM B132 Alloy A.

E. Stem nuts shall be independent of wedge and shall be of solid bronze conforming to ASTM B-62.

F. Stuffing boxes shall be O-ring seal type with two rings located in the stem.

G. Low friction torque reduction thrust bearings shall be located both above and below the stem collar.

H. All valves shall open by turning a two-inch square operating nut counterclockwise.

I. Joints: Joints shall be mechanical joints and shall conform to AWWA Standard C111, and all bolts and nuts for mechanical joints shall be high-strength, low-alloy steel in accordance with AWWA C111. All gaskets shall be for a standard mechanical joint of BUNA-S (SBR Buna) in accordance with ANSI A21.4 and AWWA C111. All mechanical joint accessories shall be furnished with the valves.

J. All valves shall be furnished with operating nuts.

K. One operating wrench will be provided for each five (5) valves furnished. If less than five (5) valves are furnished, only one wrench shall be supplied.

L. All tapping valves shall have flange by mechanical joint ends.

M. All tapping valves shall be interchangeable with other makes of tapping sleeves.

N. Coating: Body and cover bolts and nuts shall meet specifications ASTM A307 and be rust proof. Valve interior shall have protective coating meeting AWWA Standard C550.

O. Approved models are:

American Flow Control	Series 2500 Resilient Wedge Valve
Clow Valve Co.	Resilient Wedge Gate Valve
Mueller Company	A-2362-78 Resilient Wedge Gate Valve with Aqua Grip

<u>No substitutions will be allowed.</u>

2.5 BUTTERFLY VALVES

A. General: All butterfly valves and operators shall meet all requirements of AWWA Standard C504, for Class 150B, buried service valves and the following criteria:

B. Mechanical joint valve ends shall be in accordance with AWWA C111.

C. Accessories (bolts, gaskets, etc.) shall be supplied by the valve manufacturer, and the joint bolts and nuts shall be a high-strength, low-alloy such as "Corten", "Usalloy", "Acipalloy" or approved equal.

D. Valve Seat: The valve seat shall be located on the valve body or disc and shall provide drip-tight shutoff for pressure differential of 150 psi versus 0 psi in either direction. The seat shall be of Buna N rubber and shall be clamped, mechanically secured, bonded, or vulcanized to the valve body or disc.

E. Valve Shafts and Disc: The valve shaft shall be a one-piece unit extending completely through the valve disc or may be stub shaft construction. Shaft materials shall conform to AWWA Standard C504. No deviation will be accepted. The valve disc shall have no external ribs transverse to the flow and shall be constructed of material as specified in AWWA C504, Section 3.4, latest revision. No deviation will be accepted.

F. Valve Shaft Seals: Shaft seals shall be standard "O" ring or "V" packing seals, and all seals shall be replaceable without disassembly of the valve.

G. Operators: The operator shall be manual type opening counterclockwise and equipped with two inch operating nut. The operator shall be gear type or traveling nut type. All operators shall be totally enclosed, sealed, gasketed, and lubricated for underground service. The operator shall also be able to output torque required to operate the valve under adverse conditions without exceeding input torque as allowed under AWWA Standard C504. It shall also be capable of withstanding overload input torque as specified in AWWA Standard C504, latest revision.

H. One (1) valve key wrench shall be supplied to the Owner for each ten (10) valves furnished. If less than 10 valves furnished, one (1) wrench shall be furnished.

2.6 TAPPING SLEEVES

A. General: Tapping sleeves shall be constructed of stainless steel and in two halves. All tapping sleeves shall be Smith Blair #662 or equal.

2.7 TAPPING SADDLES

A. General: Tapping saddles shall be constructed of heavy gray cast iron or ductile iron, with the attachment straps, nuts, and washers constructed of corrosion-resistant, alloy steel in accordance with AWWA C111. All tapping saddles shall be Smith Blair #317 or equal.

2.8 DRY-BARREL FIRE HYDRANT

A. All fire hydrants shall comply fully with all provisions of AWWA C502, latest edition. Hydrants shall be the dry barrel type which prevents the operating threads from coming into contact with the service water. Hydrants shall be of the compression type, opening against the line pressure and closing with the line pressure. The hydrant shall be equipped with a weather shield to protect the operating nut. An oil or a grease reservoir and lubrication system that automatically circulates lubricant to all operating stem threads and bearing surfaces each time the hydrant is operated shall be provided. The system shall

be completely sealed from the waterway by means of "O" ring seals. The hydrant shall be the traffic breakaway type with a safety stem coupling and flangible segments that permit full 360 degree rotation of the nozzle. The main valve opening of the hydrant shall not be less than 5-1/4 inches in size. Hose and steamer connection threads shall be National Standard type. Hydrants shall have two (2) 2-1/2" hose nozzles and one (1) 4-1/2" pumper nozzle. The hydrant shall be designed to permit removal of all working parts from the hydrant up through the barrel of the hydrant without disturbing the earth around the hydrant or disassembling the barrel. An all bronze hydrant valve seat ring shall thread directly into an all bronze drain ring and shall be located between the lower hydrant barrel and base, securely retained in position, or it may be threaded into a heavy bronze bushing in the hydrant base. The valve seat ring and drain ring shall have no less than two bronze drain ports and two bronze drain outlets. The hydrant shall be designed with an anti-friction bearing located so that it will reduce the torque required to operate the hydrant. Both the operating nut and the nozzle cap wrench nut shall be National Standard type. All hydrants shall be shop tested in accordance with AWWA C502, latest edition. The interior of the hydrant foot shall be coated with a fusion-bonded epoxy coating of a minimum of at least six mils. Hydrant exterior shall be painted with two coats of high-visibility red enamel paint.

B. Approved models are American Darling B-84-B; Mueller Centurion; M&H A-929; or Clow Medallion. No substitutions will be allowed.

C. One (1) fire hydrant operating wrench shall be supplied to the Owner for each five (5) fire hydrants furnished. If less than five (5) fire hydrants are furnished, only one (1) wrench shall be supplied.

2.9 WATER SERVICES

A. Service Lines: Water service shall be polyethylene Class 200 SDR9 manufactured in accordance with AWWA C902. Contractor will terminate at the right-of-way with a curb stop. Water service separations between storm sewer and sanitary sewer shall be the same as for water mains.

B. Curb Stop: As shown on the Drawings.
Corporation Stop: As shown on the Drawings.

C. Fittings:

1. All fittings shall be manufactured of brass, cast with full port of full open valve and machined in accordance with AWWA Standard C800.

D. Service Saddles:

1. Service saddles shall be used for tapping water distribution pipes to provide a connection for service lines and type shall be as shown on Drawings.

2. Service saddles for pipe less than three inches shall be a single band which is hinged or split from the saddle body and is anchored by bolting one or more bolts between the band and saddle body.

3. Service saddles for pipe greater than three inches shall vary in bolt patterns and band numbers based on the type of pipe to be tapped.

4. Service saddles for six inch and eight inch PVC C900 pipe shall be a double-wide single flexible band, or two bands, sized exactly for six inch and eight inch PVC C900 pipe and is to be anchored by a minimum four bolt pattern on the saddle body.

5. Service saddles for AWWA C151 ductile iron pipe shall be at least a single band, two bolt pattern saddle anchoring or hinged wide single strap with one bolt assembly.

6. All other service saddles for pipe greater than three inches shall use a double wide single flexible band, or two bands, with a minimum of a four bolt pattern anchoring. These service saddles shall provide for a variable range in diameter per nominal size of pipe.

E. Water meter and box: As shown on Drawings.

PART 3 – EXECUTION

3.1 HANDLING PIPE

A. General: All material, unless otherwise directed, shall be unloaded at the job site and distributed at the site of the project by the Contractor. Materials shall be handled with care to avoid damage. In loading and unloading, pipe shall be lifted by hoists or slid or rolled on skidways in such a manner as to avoid shock. Under no circumstances shall pipe be dropped. Pipe handled on skidways must not be allowed to roll against pipe already on the ground. The Contractor shall be responsible for the safe handling of all materials. Damaged materials will not be installed.

B. Pipe shall be handled so as to avoid damage to the coating and lining. If, however, any part of the coating or lining is damaged by the Contractor, the repair shall be made by the Contractor at his expense in a manner satisfactory to the Owner's Engineer before installation.

C. Pipe shall be distributed on the site of the work parallel with and opposite or near the place it is to be laid in the trench and with bell ends facing the directions in which the installation will proceed unless otherwise directed.

3.2 INSTALLATION OF PIPE

A. General: Upon satisfactory installation of the pipe bedding, as specified in the "Earthwork for Utilities" section of these specifications, a continuous trough for the pipe barrel and recesses for the pipe joints shall be excavated by hand digging so that, when the pipe is laid in the trench true to line and grade, the pipe barrel will receive continuous, uniform support, and the joint will receive no pressure from the trench bottom.

B. The interior of all pipe shall be thoroughly cleaned of all foreign material before being lowered into the trench and shall be kept clean during laying operations by means of plugs or other approved methods.

C. All pipe, fittings, valves, and hydrants shall be carefully lowered into the trench, piece by piece, by means of derrick, ropes, or other suitable tools or equipment, in such a manner as to prevent damage to pipe, pipe coating, and pipe lining. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

D. The gasket material for the joint shall be properly positioned before the pipe is lowered into the trench. The joining of the pipe shall proceed in accordance with the manufacturer's requirements.

E. Watertight plugs shall be installed in the open ends of the pipe at all times when pipe laying is not in progress. At no time shall trench water be permitted to enter pipe.

F. Cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe. Wherever it is necessary to cut gray or ductile cast iron pipe which is equipped with a push-on joint type bell end, the cut end of the pipe shall be adequately beveled so as to prevent the edge of the cut pipe from cutting or tearing the gasket as the plain end is inserted into the bell of the adjoining pipe or fitting. All field-cut pipe shall be beveled by the Contractor, and the pipe "short" shall be used as part of the pipeline construction.

G. Whenever necessary to deflect pipe after proper homing from a straight line, either in the vertical or horizontal plane to avoid obstructions, the maximum allowable deflection shall be in accordance with the following:

Push-on Joint Pipe

Size	Maximum Deflection
4" thru 12"	3/4" per foot
16" thru 36"	1/2" per foot

Only after the pipe has been properly homed will it be allowed to deflect.

H. No pipe shall be laid in water or when the trench conditions or the weather is unsuitable for such work.

I. All water lines and services shall be located a minimum of 36 inches below grade unless noted otherwise on the drawings.

J. Any pipe which is disturbed or found to be defective after laying shall be taken up and re-laid or replaced.

K. Prior to connecting new work to existing lines or appurtenances, the Contractor shall verify location and elevation of existing connection point and notify Owner's Engineer of any conflicts or discrepancies.

L. Joints:

1. Before laying the pipe, all lumps, blisters, and excess coal-tar coating shall be removed from the bell and plain ends of each length of pipe. The pipe ends shall then be wire brushed and wiped until clean and dry. Where mechanical joints or push-on joints are specified, oil and grease also shall be removed. Pipe ends shall be kept clean until joints are made. The plain end of pipe for mechanical joints shall be lubricated with a soapy solution before installing the gaskets.

2. In making up the push-on type joint, the gasket shall be placed in the socket per manufacturer's recommendation. A thin film of lubricant (approved by the pipe manufacturer) shall then be applied to the inside surface of the gasket that will come in contact with the entering pipe. The plain end of the pipe to be entered shall be thoroughly cleaned and placed in alignment with the bell of the pipe to which it is to be joined. The joint shall be made up by exerting sufficient force on the entering pipe so that the plain end is moved past the gasket until it seats as per manufacturer's recommendation.

3. Backhoe buckets or excavation equipment are not to be applied directly to the pipe.

4. Mechanical joints shall be centered in the bells. Soapy water shall be brushed over the gasket just prior to installation. The gasket and gland shall be placed in position, the bolts inserted, and the nuts tightened finger-tight.

   Mechanical joints shall be assembled in accordance with AWWA Standards.

5. The bolts shall be tightened on opposite sides of the pipes by means of a torque wrench in such a manner that the gland shall be brought up evenly into the joint. The following range of bolt torques shall be applied:

Bolt Size (Inches)	Range of Torque
3/4" Diameter	85 to 95 ft.-lbs.
1" Diameter	95 to 100 ft.-lbs.

6. If effective seal is not obtained at a maximum torque listed above, the joint shall be disassembled and reassembled after thorough cleaning.

7. If a joint is defective, it shall be cut out and entirely replaced or, if permission is given by the Owner's Engineer, it may be repaired by a suitable clamp.

3.3 INSTALLATION OF FITTINGS, VALVES AND TAPS

A. Fittings shall be handled with care to avoid damage. All fittings shall be loaded and unloaded by lifting, and under no circumstances shall fittings be dropped, skidded, or rolled. Fittings shall not be placed, under any circumstances, against pipe or other fittings in such a manner that damage could result. Slings, hooks, or tongs used for lifting shall be padded in such a manner as to prevent damage to exterior surface or interior lining of fittings. If any part of the fittings' coating or lining is damaged by the Contractor, the repair or replacement shall be made by the Contractor, at his expense, in a manner satisfactory to the Owner's Engineer before installing. Fittings shall also be stored at all times in a safe manner to prevent damage and kept free of dirt, mud, or other foreign matter. All fitting gaskets shall be stored and placed in a cool location out of direct sunlight and out of contact with petroleum products. All gaskets shall be used on a first-in, first-out basis.

B. Fittings shall be set and joined to the pipe in a manner specified previously for joint assembly. When conditions warrant, fittings should be provided with special support trussing and blocking.

3.4 ANCHORAGE OF BENDS, TEES, AND PLUGS

A. General: Adequate precautions shall be taken to prevent the separation of joints at bends, tees, and plugged ends.

B. Details: Details of design, construction, applications, installation, and number of joints necessary for the restraint of a given thrust shall be as shown in the Construction Details. Under no circumstances will gray iron pipe be used at restrained joints. Ductile iron pipe will be used unless otherwise specified by the Owner's Engineer.

3.5 INSTALLATION OF VALVES

A. General: Valves shall be handled with care to avoid damage. All valves shall be loaded and unloaded by lifting, and under no circumstances shall valves be dropped, skidded, or rolled. Valves shall not be placed, under any circumstances, against pipe or other fittings in such a manner that damage could

result. Slings, hooks, or tongs used for lifting shall be padded in such a manner as to prevent damage. If any part of the valve's coating and lining is damaged by the Contractor, the repair or replacement shall be made by the Contractor, at his expense, in a manner satisfactory to the Owner's Engineer before installing. Valves shall also be stored at all times in a safe manner to prevent damage and kept free of dirt, mud, or other foreign matter. All valve gaskets shall be stored and placed in a cool location out of direct sunlight and out of contact with petroleum products. All gaskets shall be used on a first-in, first-out basis.

B. Gate valves and butterfly valves shall be set and joined to new pipe in the manner heretofore specified for cleaning, laying, and joining pipe.

C. Valve Boxes: Cast iron valve boxes shall be firmly supported and maintained centered and plumb over the operating nut of the valve by the Contractor with box cover flush with the surface of the finished pavement or at such other level as may be directed. All valve boxes set in non-paved areas shall have concrete pads poured around the top section of the valve box. The pad shall be 12 inches in diameter and shall be centered on the valve box. All water valve covers shall be painted safety blue as prescribed by the American Public Works Association (APWA) uniform color code for utility systems.

D. Blow-Offs: Blow-offs shall not be connected to any sewer or submerged in any stream or be installed in any other manner that will permit back-siphonage of contaminated water.

E. The valve and valve box shall be installed so water department personnel can insert a valve key through the valve box and completely open and close the valve.

3.6 INSTALLATION OF TAPS BY CONTRACTOR

A. General: All material supplied, and drilling and tapping equipment used to make taps, will be sterilized in accordance with AWWA Standards.

B. After the tapping sleeve and valve have been installed and before the tap is made, the sleeve will be tested to ensure a watertight joint. A test plug will be provided in the sleeve and after the sleeve has been installed it will be filled with water and the pressure increased between 150 psi and 190 psi. All leaking joints will be repaired to the satisfaction of the Owner's Engineer at the Contractor's expense.

3.7 INSTALLATION OF FIRE HYDRANTS

A. General: Hydrants shall be located in such a manner as to provide complete accessibility and to minimize the possibility of damage from vehicles or injury to pedestrians. Unless otherwise directed, the setting of any hydrant shall be described in the Construction Details.

B. All fire hydrants shall be thoroughly cleaned of dirt or foreign material before installation.

C. All hydrants shall stand plumb and shall have their pumper nozzle perpendicular to the curb. They shall conform to the established grade with nozzles at least 18 to 24 inches above the ground.

D. Each hydrant shall be connected to the water main with a six inch branch controlled by an independent six inch resilient wedge gate valve, hydrant shut-off valve. Line from fire hydrant to water main tee shall be Ductile Iron.

E. All hydrants shall be anchored by thrust blocks and/or restrained fittings as shown in the construction Details.

3.8 TESTING AND INSPECTION REQUIREMENTS

A. It will be the responsibility of the Contractor to coordinate all testing and inspections. The Contractor shall notify the Owner's Engineer and applicable agency inspectors 48 hours in advance of testing and inspections.

3.9 HYDROSTATIC TEST

General: All water lines shall be pressure tested in accordance with AWWA C600.

A. Test Restrictions: Test pressure shall not be less than 1.25 times the working pressure at the highest point along the test section.

Test pressure shall not exceed pipe or thrust-restraint design pressures.

The hydrostatic test shall be of at least a 2-hr duration.

Test pressure shall not vary by more than ± 5 psi (34.5 kPa) for the duration of the test.

Valves shall not be operated in either direction at a differential pressure exceeding the rated valve working pressure. Use of a test pressure greater than the rated valve pressure can result in trapped test pressure between the gates of a double-disc gate valve. For tests at these pressures, the test setup should include a provision, independent of the valve, to reduce the line pressure to the rated valve pressure on completion of the test. The valve can then be opened enough to equalize the trapped pressure with the line pressure, or fully opened if desired.

The test pressure shall not exceed the rated pressure of the valves when the pressure boundary of the test part includes closed, resilient-seated gate valves or butterfly valves.

B. Pressurization: After the pipe has been laid, all newly laid pipe or any

valved section thereof shall be subjected to a hydrostatic pressure of at least 1.5 times the working pressure at the point of testing. Each valved section of pipe shall be slowly filled with water, and the specified test pressure (based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge) shall be applied by means of a pump connected to the pipe. Valves shall not be operated in either the opening or closing direction at differential pressures above the rated pressure. It is good practice to allow the system to stabilize at the test pressure before conducting the leakage test.

C. Air Removal: Before applying the specified test pressure, air shall be expelled completely from the section of piping under test. If permanent air vents are not located at all high points, corporation cocks shall be installed at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged or left in place as required by the specifications.

D. Examination: All exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves, hydrants, or joints that are discovered following the pressure test shall be repaired or replaced with sound material, and the test shall be repeated until satisfactory results are obtained.

E. Leakage Defined: Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe or any valved section thereof to maintain pressure within 5 psi (34.5 kPa) of the specified test pressure after the pipe has been filled with water and the air has been expelled. Leakage shall not be measured by a drop in pressure in a test section over a period of time.

F. Allowable Leakage: No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD\,(P)^{1/2}}{133{,}200}$$

in which L is the allowable leakage, in gallons per hour; S is the length of pipeline tested, in feet; D is the nominal diameter of the pipe, in inches; and P is the average test pressure during the leakage test, in pounds per square inch gauge. Allowable leakage at various pressures and pipe sizes are shown in the Table below (from AWWA C600 – Table 6A) for 1000' of Pipe:

Avg	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"	42"	48"	54"
250	0.32	0.43	0.64	0.85	1.07	1.28	1.50	1.71	1.92	2.14	2.56	3.21	3.85	4.49	5.13	5.77
225	0.30	0.41	0.61	0.81	1.01	1.22	1.42	1.62	1.82	2.03	2.43	3.04	3.65	4.26	4.86	5.47
200	0.29	0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.72	1.91	2.29	2.87	3.44	4.01	4.59	5.16
175	0.27	0.36	0.54	0.72	0.89	1.07	1.25	1.43	1.61	1.79	2.15	2.68	3.22	3.75	4.29	4.83
150	0.25	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.66	1.99	2.48	2.98	3.48	3.97	4.47
125	0.23	0.30	0.45	0.60	0.76	0.91	1.06	1.21	1.36	1.51	1.81	2.27	2.72	3.17	3.63	4.08
100	0.20	0.27	0.41	0.54	0.68	0.81	0.95	1.08	1.22	1.35	1.62	2.03	2.43	2.84	3.24	3.65

*If the pipeline under test contains section of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

G. Leakage detection at mechanical joints shall be stopped by tightening the gland (not to exceed required torque) and leaking slip joints shall be cut out and entirely replaced, or, if permission is given by the Owner's Engineer, it may be repaired by a suitable clamp. Any cracked or defective pipes, fittings, valves, or hydrants discovered as a result of this pressure test shall be removed and replaced by the Contractor with sound material and then the test shall be repeated until satisfactory.

H. The Contractor is warned that pressure testing against existing "end-of-line" or blow-off valves is done at his own risk. Failure of these valves to hold test pressure will not relieve the Contractor of the pressure testing nor will it entitle him to any additional compensation for the extra work performed.

3.10 DISINFECTION

A. Disinfection: All new water lines shall be thoroughly flushed to remove all foreign material before sterilizing. The Contractor shall sterilize the water mains in accordance with the applicable section of AWWA Specification C651.

Bacteriological Testing: After disinfecting and final flushing and before the system is placed in service, samples shall be collected and tested by a laboratory, state certified in accordance with Chapter 403, Florida Statutes, at least two samples, taken one per day on consecutive days, shall be collected from the end of the main for each 1,200 foot section of main and for each branch. Copies of the test results along with a map showing sampling locations shall be provided to the owner's engineer.

B. If, during construction, trench water has entered the main, or if in the opinion of the Owner's Engineer or job superintendent, excessive quantities of dirt or debris have entered the main, bacteriological samples shall be taken at intervals of approximately 200 feet and shall be identified by location.

C. Samples shall be taken of water that has been in the main for at least 16 hours after final flushing has been completed.

D. Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate as required by "Standard Methods for the Examination of Water and Wastewater." No hose or fire hydrant shall be used in collection of samples. A corporation cock may be installed in the main with a copper tube goose neck assembly. After samples have been collected, the goose neck assembly may be removed and retained for future use.

END OF SECTION

SECTION 02560

SEWER COLLECTION SYSTEM

PART 1 – GENERAL

1.1 INTENT

A. It is the intent of these specifications to provide supplemental information to the contents of the construction drawings on the quality of materials, execution, measurement, etc. These specifications are general in nature and may contain products and requirements which are not applicable to the project. Discrepancies between these specifications and the construction drawings, either imagined or real, shall be brought to the attention of the Owner's Engineer for clarification.

1.2 DESCRIPTION OF WORK

A. Extent of sewer collection system work is shown on the drawings.

B. Sewer collection system work includes but is not limited to: sanitary sewer mains, sewer laterals (services), manholes, frames, and covers.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform all work in compliance with applicable requirements of governing authorities having jurisdiction and the applicable standards of the American Water Works Association (AWWA), American National Standards Institute (ANSI), and the American Society for Testing and Materials (ASTM), of latest edition.

B. Testing and Inspection:

1. Leakage testing and deflection shall be performed by the Contractor. General inspection and flashing lines shall be performed by the Owner's Engineer.

2. It will be the responsibility of the Contractor to coordinate all testing and inspections. The Contractor shall notify the Owner's Engineer, testing service, and applicable agency inspectors 48 hours in advance of testing and inspections.

1.4 SUBMITTALS

A. Prior to construction commencement, the Contractor shall submit for approval by the Owner's Engineer manufacturer's certifications and cut sheets for the following applicable items: Sanitary sewer pipe, fittings, service laterals, clean outs, manhole frames and covers.

PART 2 – PRODUCTS

2.1 GENERAL

A. All materials shall be accordance with the Material Standard and shall, in no event, be less than that necessary to conform to the requirements of any applicable law, ordinances, and codes.

B. All materials shall be new, unused, and correctly designed. They shall be of standard, first grade quality and intended for the use for which they are offered. Materials or equipment which, in the opinion of the Owner's Engineer, are inferior or of a lower grade than indicated, specified, or required will not be accepted.

C. Sewer pipe construction shall be as shown on the drawings. Furnish ells, tees, reducing tees, wyes, couplings, increasers, crosses, transitions, and end caps of same type and class of material as conduit, or of material having equal or superior physical and chemical properties as acceptable to the Engineer.

2.2 DUCTILE IRON PIPE

A. Pipe: All ductile iron pipe shall have a minimum tensile strength of 60,000 psi, a minimum yield strength of 42,000 psi, and a minimum elongation of 10% as specified by AWWA C151/ANSI A21.51.

B. Joints: Joints for ductile iron pipe shall be either of the slip-on type using a single rubber gasket, or mechanical joints in accordance with AWWA C110/ANSI A 21.10.

C. Coatings: The interior of all pipes and fittings shall be lined with Protecto 401 ceramic epoxy to a dry thickness of 40 miles. All pipe shall receive an exterior bituminous coating in accordance with AWWA C151 and AWWA C110.

D. All ductile iron pipes for sewer shall have a green stripe at third points around the pipe for its full length.

2.3 POLYVINYL CHLORIDE (PVC) PIPE

A. Pipe: PVC pipe shall be manufactured in accordance with ASTM D3034 and D1784. All PVC pipe shall meet the dimension requirements of standard dimension ratio (SDR) 35.

B. Joints: Joints for PVC sewer pipe shall be of the bell and spigot type conforming to ASTM D3212 using factory installed flexible elastomeric seals. The elastomeric seals shall conform to ASTM F477.

C. Pipe Marking: All pipe shall be marked as prescribed in ASTM D2241, i.e., nominal pipe size, type of plastic pipe material, pipe dimension ratio, pressure rating, ASTM specification designation number manufacturer's name and code.

D. Coatings: Not required.

E. Cutting: PVC sewer pipe may be field cut using hand or power saws in accordance with the manufacturer's recommendations. The raw spigot end thus formed shall be filed to remove gasket damaging burrs and to form a standard bevel.

F. Fittings: PVC sewer pipe fittings shall comply with ASTM D3034, ASTM 3212, and have elastomeric seals conforming to ASTM F477.

G. All PVC pipe for sewer shall be green.

PART 3 – EXECUTION

3.1 INSTALLATION OF PIPE

A. General: Upon satisfactory installation of the pipe bedding, as specified in the "Earthwork for Utilities" section of these specifications, a continuous trough for the pipe barrel and recesses for the pipe joints shall be excavated by hand digging so that, when the pipe is laid in the trench true to line and grade, the pipe barrel will receive continuous, uniform support, and the joint will receive no pressure from the trench bottom.

B. The interior of all pipe shall be thoroughly cleaned of all foreign material before being lowered into the trench and shall be kept clean during laying operations by means of plugs or other approved methods.

C. Pipe laying shall proceed up grade with spigot ends pointing in the direction of flow. Before pipe is joined, gaskets shall be cleaned of all dirt and stones and other foreign material. The spigot ends of the pipe shall be lubricated lightly with a lubricant specified by the pipe manufacturer and approved by the Owner's Engineer. Sufficient pressure shall be applied to the pipe so as to properly seat the socket in the bell of the pipe. All pipe shall be laid straight, true to the lines and grades shown on the drawings in each manhole section.

D. Under no circumstances shall pipe be laid in water or when trench conditions or the weather is unsuitable for such work, except by permission of the Owner's Engineer. At all times when work is not in progress, the exposed ends of all pipes shall be fully protected by a board or other approved stopper to prevent earth or other substances from entering the pipe.

E. Except as modified hereinafter, embedment material for PVC gravity sewer pipe shall be either Class I, II, or III material as described in ASTM D2321. The "embedment detail for PVC gravity sewer pipe" shown in the project plans illustrates the meaning and limits of the terms "haunching, foundation or bedding", and "initial backfill."

The table below shall be used in determining the material required for embedment of PVC gravity sewer pipe.

EMBEDMENT FOR PVC GRAVITY SEWER PIPES

Pipe Depth	Bedding or Foundation	Haunching	Initial Backfill
16' or less	CL. I, II or III	CL. I, II or III	CL. I, II or III
Greater than 16'	CL. I or II	CL. I	CL. I, II or III

In areas where the existing material is other than as described above, and is not acceptable for use as embedment material, gravel shall be used. Separate payment will be made for gravel used for foundation or bedding and haunching under the items of "Gravel Foundation" and "Haunching for PVC Pipe", respectively. There will be no payment for embedment material when existing material is utilized.

In areas where the pipe is below the water table or expected to be below the water table in the future, and the foundation of bedding material is Class I material, whether existing or as installed, gravel shall be used for haunchiong of the pipe. Separate payment will be made for gravel used for haunching of the pipe under the item of "Haunching for PVC Pipe."

F. Embedment materials listed here include a number of processed material plus the soil types listed under the USGS Soil Classification System *FHA Bulletin No. 373). These materials are grouped into 5 broad categories according to the suitability for this application:

1. Class I – Angular, 6 to 40 mm (1/4 to 1-1/2 inch), graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone and crushed shells.

2. Class II – Coarse sands and gravels with maximum particle size of 40 mm (1-1/2 inch), including cariously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Type GW, GP, SW, and SP are included in this class.

3. Class III – Fine sand and clayey gravels, including fine sands, sand-clay mixtures and gravel-clay mixtures. Soil Types GM, GC, SM and SC are included in this class.

4. Class IV – Silt, silty clays and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil Types MH, ML, CH and CL are included in haunching, or initial backfill.

5. Class V – This class includes the organic soils OL, OH, and PT as well as soils containing frozen earth, debris, rocks larger than 40 mm (1-1/2 inch) in diameter, and other foreign materials. These materials are not acceptable for bedding, haunching, or initial backfill.

G. All sewer lines and laterals shall be located a minimum of 36 inches below grade and at greater depths as required to provide service.

H. Any pipe which is disturbed or found to be defective after laying shall be taken up and relayed or replaced at the Contractor's expense..

I. Prior to connecting new work to existing lines or appurtenances, the Contractor shall verify location and elevations of existing connection point and notify Owner's Engineer of any conflicts or discrepancies.

J. Wyes or tees of specified diameter shall be inserted in the sewer lines wherever designated.

K. Where laterals are specified on the plans, or instructed to be installed by the Owner, they shall be laid to the edge of the right-of-way or as the Owner may direct. In sewers over eight feet in depth, or where directed, stacks shall be carried up from the wye connections at a maximum angle of 45 degrees. The ends of the stacks or laterals shall be closed with plugs or covers. Materials for stacks and laterals shall be as shown on the drawings or designated in the proposal.

L. Whenever pipe laying is stopped for the night or for any other cause, the end of the pipe shall be securely closed with a stopper to prevent the entrance of water, mud, or other obstructing matter, and shall be secured in such a manner as to prevent the end pipe from being dislodged by sliding or other movement from the backfilling.

M. Wherever house laterals are intercepted by the excavation for the new sewer, connection shall be maintained temporarily to the old sewer until the particular section of new sewer is completed, tested, and approved. The house lateral shall then be broken and reconnected to the new sewer through a wye which shall have been placed in the new sewer for that purpose.

N. The dead end of the house lateral shall be capped with a cover or plug as specified on the drawings.

The covers or plugs shall have a factory-molded joint of the same type as used in the main line and shall be of the same material as used in the main line.

O. After each pipe is laid, it shall be partly backfilled and made secure before the next joint is laid.

P. Ductile Iron Pipe: Installation shall be in accordance with the manufacturer's recommendations and the ductile iron pipe research association publication "A Guide for the Installation of Ductile Iron Pipe".

Q. Polyvinyl Chloride Pipe: Installation shall be in accordance with the recommended practices in ASTM D2321.

R. Transportation: Care shall be taken during transportation of the pipe that it is not cut, kinked, or otherwise damaged.

S. Handling Pipe Lengths: Ropes, fabric, or rubber-protected slings and straps shall be used when handling pipes.

T. Storage: Pipes shall be stored on level ground, preferable turf or sand, free of sharp objects which could damage the pipe.

U. Stacking of polyvinyl chloride pipe shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature conditions. Where necessary, due to ground conditions, the pipe shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with sleeper or between supports.

V. Handling Pipeline: The handling of joined pipeline shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. Sections of the pipe with deep cuts and gouges shall be removed.

W. Lowering Pipe Into Trench: Care shall be exercised when lowering pipe into the trench to prevent damage to, or twisting of, the pipe.

X. Special Precautions: Polyvinyl chloride pipe connected to heavy fittings, manholes, and rigid structures shall be supported in such a manner that no subsequent relative movement between the pipe and the joint with the rigid structures is possible.

Y. Joint Adaptors: Make joints between ductile iron pipe and other types of pipe with standard manufactured ductile iron adapters and fittings.

Z. Closing Abandoned Utilities: Close open ends of abandoned underground utilities which are indicated to remain in place. Provide sufficiently strong closures to withstand hydrostatic or earth pressure which may result after ends of abandoned utilities have been closed.

AA. Close open ends of concrete or masonry utilities with not less than eight inch thick brick masonry bulkheads.

BB. Close open ends of conduit with plastic plugs, or other acceptable methods suitable for size and type material being closed. Wood plugs are not acceptable.

CC. Interior Inspection: Inspect pipe to determine whether line displacement or other damage has occurred.

DD. Make inspections after lines between manholes, or manhole locations, have been installed and approximately two feet of backfill is in place and at completion of project.

EE. If inspection indicates poor alignment, debris, displaced pipe, infiltration or other defects, correct such defects to satisfaction of Engineer.

3.3 TESTING REQUIREMENTS

A. General:

1. The Contractor shall perform one or more required tests and shall furnish all apparatus and materials needed for these tests, the cost of which shall be included in the appropriate bid item.

2. After backfilling has been completed, the pipes cleaned and before permanent paving has been installed, the Contractor shall make these tests to ascertain that there are no broken pipe, leaking joints or deflected pipe sections. Pipes failing these tests shall be

repaired, or removed at once by the Contractor to the satisfaction of the Engineer.

3. The sewer lines and laterals shall be tested for leakage between manholes as the work progresses by one of the following methods as determined by the Engineer. The low pressure air test will be used unless field conditions warrant otherwise.

   a. Infiltration Test

   b. Low Pressure Air Test

4. A deflection test will be required for PVC pipe in addition to the above leakage tests.

5. The Contractor shall check alignment by flashing the lines.

6. All tests will be witnessed by the Engineer.

7. The Owner may also "flash" the lines for verification of alignment at his own expense. The pipe line will be rejected if a full diameter is not visible from manhole to manhole.

B. Infiltration Method

1. General

   a. Infiltration tests of sewers and laterals shall be as specified hereinafter. Each manhole run will be tested separately as the construction progresses, before surface restoration, and preferably with not more than four (4) manhole runs constructed ahead of testing.

2. Infiltration Test

   a. Infiltration tests will be acceptable only when the ground water can be established as imposing a minimum 6-foot head at the pipe invert.

   b. Plug the upstream manhole and make measurement of the flow at the downstream manhole. Amount of leakage from any section of the sewer shall not exceed the allowable gallonage as stated hereinafter per inch diameter of pipe per mile per 24 hours.

3. Leakage Allowance

a. Maximum allowable leakage for infiltration shall be:

Pipe Material	Leakage per inch dia. of pipe per mile per 24 hrs.
PVC	50 gallons
DI	50 gallons

C. Air Method

1. Low pressure air test of sewers and laterals shall be as specified hereinafter. Each manhole run will be tested separately as the construction progresses, before trench surface restoration, and preferably with not more than four (4) manhole runs constructed ahead of testing.

2. Equipment shall be as manufactured by Cherne Industrial, Inc. of Edina, Minnesota; N.B. Products, New Britain, PA, or equal. Equipment used shall meet the following minimum requirements:

   a. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be tested.

   b. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.

      (1) All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be used. Air shall be introduced into the plugs to 25 psig. The sealed pipe shall be pressurized to 5 psig. The plugs must hold against this pressure without having to be braced.

   c. All air used shall pass through a single control panel

   d. Three individual hoses shall be used for the following connections:

      (1) One hose from control panel to pneumatic plugs for inflation.

(2) One hose from control panel to sealed line for introducing the low-pressure air.

(3) One hose from sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

3. Procedures

a. After a manhole reach of pipe including laterals has been backfilled in accordance with the specifications, the pipe cleaned, and the pneumatic plugs have been checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psig. Low-pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psig greater than the average ground water back pressure. At least two (2) minutes shall be allowed for the air pressure to stabilize.

b. After the stabilization period with 3.5 psig minimum pressure remaining in the pipe, the air hose from the control panel to the air supply shall be disconnected. The portion of the sanitary sewer (line) being tested shall be termed "Acceptable," if the time required in minutes is greater than the times indicated on the following table for the pressure to decrease from 3.5 psig (greater than the average ground water back pressure) to 2.5 psig (greater than the average ground water back pressure).

Table 1 (from ASTM F1417-92)
Minimum Specified Time Required for a 1.0 psig Pressure Drop for Size and Length of Pipe Indicated for Q=0.0015

				Specification Time for Legnth (L) Shown, min:s							
Pipe Diameter In.	Minimum Time Min:s	Length For Min. Time, ft.	Time for Longer Lengths; s	100 ft.	150 ft.	200 ft.	250 ft.	300 ft.	350 ft.	400 ft.	450 ft.
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

c. In areas where a high ground water table (ground water back pressure) is known to exist, the Contractor shall install a 1/2 inch diameter capped pipe nipple, approximately 10 inches long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the Line Acceptance Test, the ground water shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The plastic tube shall be held vertically and a measurement of the height in feet of water over the invert of the pipe shall be taken after the water has stopped rising in this plastic tube. The height of water in the plastic tube in feet shall be divided by 2.3 to establish the pounds of ground water back pressure that will be added to all readings. (For example, if the height of water is 11-1/2 feet, then the added ground water back pressure shall be 5 psig. This increases the 3.5 psig to 8.5 psig, and the 2.5 psig to 7.5 psig. The allowable drop of one pound and the timing remain the same as defined in the table.)

D. If the ground water level is 2 ft or more above the top of the pipe at the upstream end, or if the air pressure required for the test is greater than 9-psi gage, the air test method should not be used. Before the air test method is used, the ground water level should be lowered by pumping or dewatering.

D. Deflection Test – PVC only

1. General

a. Deflection testing shall be performed on all portions of the PVC sewer system. This test shall be performed in sections between manholes at least 30 days after, but not more than 12 months after final backfilling has been completed and tested in the area, and the pipe tested for leakage.

b. Deflection testing shall be performed in accordance with the procedure outlined below.

2. Maximum Deflection

   a. The maximum allowable deflection for all installed PVC sewer pipe shall not exceed 5% of the pipe's original internal diameter.

3. Testing Apparatus

   a. All PVC sewer pipe shall be tested by the Contractor and at his expense for diametric deflection using a GO-NO-GO type mandrel or other approved method. The mandrel shall have an outside diameter of no less than 95% of the PVC pipe inside diameter. No allowances will be made for standard pipe deflections noted in the manufacturers specifications. The size of mandrel shall be determined by the following: Pipe inside diameter x 0.95. Any section not allowing passage of said mandrel shall be deemed unacceptable. The Contractor shall, at his expense, determine the location and extent of the problem and make repairs or relay the line segment as determined by the Engineer. This test procedure, in accordance with these Specifications, will be repeated after a problem has been corrected. This testing shall be accomplished prior to final acceptance, but at least 30 days after the pipe has been backfilled completely.

4. Deflection Testing Procedure

   a. Completely flush the line making sure the pipe is clean of any mud or debris that would hinder the passage of the mandrel.

   b. During the final flushing of the line, attach a floating block or ball to the end of the mandrel pull rope and float the rope through the line. (A nylon ski rope is recommended).

   c. After the rope is threaded through the line, connect the pull rope to the mandrel and place the mandrel in the entrance of the pipe.

   d. Connect a retrieval rope to the back of the mandrel to pull it back if necessary.

   e. Remove all the slack in the pull rope and place a tape marker on the rope at the ends of the pipe.

f. Draw mandrel through the sewer line. If any irregularities or obstructions are encountered in the line, corrective action shall be taken as required.

g. If a section with excessive deflection is found, it shall be located and excavated. The pipe shall be inspected for damage; if any damaged pipe is found, it shall be replaced at the Contractor's expense; if pipe is not damaged, replace and thoroughly tamp the haunching and initial backfill; replace remainder of backfill.

h. Re-test this section for deflection.

F. Flashing Lines:

1. Upon completion and in the presence of the Owner's Engineer, the sewer lines shall be flashed between manholes. In each section of the sewer, a round circle of light, full diameter, shall remain constantly in plain view throughout the entire length. The test shall be applied for each section after the sewer is completed in all respects and before it is accepted.

G. Test Failures

1. If the installation fails to meet the stated test requirements, the Contractor at his own expense shall determine the source of leakage, repair or replace all defective materials and/or workmanship failing to meet tests and shall retest same until proven acceptable to the Engineers.

2. In the event the result(s) of the test(s) does not fall within the allowable range of acceptance, the Contractor shall take whatever corrective action is necessary including replacement of the said pipe, etc., to bring the result(s) of the test(s) to within the allowable range of acceptance.

END OF SECTION

SECTION 02566

MANHOLES, WET WELLS AND VALVE CHAMBERS

PART 1 - GENERAL

1.1 SCOPE

A. Description of Work

1. Provide all labor, materials, tools and equipment necessary to furnish and install manholes, wet wells and valve chambers as indicated on the Drawings, Construction Details and as herein specified.

2. Throughout this specification section where the word "manhole" is used it shall mean "manholes, wet wells and valve chambers."

B. Coordination

1. If pumps are proposed for installation in a wet well, the Contractor shall have the manufacturer of the pumps, verify that the wet wells specified herein and detailed on the Drawings are sized to suit his equipment.

1.2 MANHOLE TYPES

A. Manholes shall be made up of precast concrete sections. Bottom section shall also be precast concrete unless used for a “doghouse” manhole, shown otherwise or approved otherwise by the engineer

B. Pumping station and valve chamber walls shall be made up of precast concrete manhole sections. Top and bottom sections shall also be precast unless shown otherwise or approved by the Engineer.

PART 2 - PRODUCTS

2.1 BRICKS

A. Bricks shall be made of clay or shale and none but whole, sound, burnt hard entirely through, straight brick, uniform in structure, with true even faces, free from stones, pebbles, masses of lime, cracks and checks extending into the body of the bricks shall be used. Brick shall not be salvaged or reclaimed.

B. Brick shall comply with "Specification For Building Brick (Solid Masonry Units Made From Clay or Shale," (ASTM C62). The bricks shall be tested by an independent laboratory for compression and absorption in accordance with "Brick, Sampling and Testing," (ASTM C67).

2.2 MORTAR

A. Composition of mortar shall conform to "Mortar For Unit Masonry," ASTM C270, Type N.

2.3 GROUT

A. Grout shall be "Masterflow 713 Grout" manufactured by Master Builders, or "Non Shrink 5 Star Grout" manufactured by U.S. Grout Corporation or equal. Grout shall be capable of meeting test requirements of ASTM C827.

2.4 MANHOLE STEPS

A. Manhole steps shall be cast into the walls of risers and conical top sections at the factory, and shall be aligned vertically and spaced so as to be on equal centers in the assembled manhole at a maximum distance apart of 15 inches and extend out of the wall a minimum of 7 inches for cast-in-place walls and minimum 6 inches for precast manholes. Steps shall be located a minimum of 6 inches from the ends of riser and top sections, and shall be securely embedded in manhole risers and tops.

B. The manhole step shall be constructed from a copolymer polypropylene plastic (CPP) with a 1/2 inch diameter, grade 60 steel reinforcing bar embedded inside. An acceptable manhole step is M.A. Industries Inc., Type PS-1, PS-2, or equal. Steps shall conform to the requirements of ASTM C478.

2.5 MANHOLE FRAMES, COVERS AND FLOOR DOORS

A. General

1. Castings shall be heavy duty gray cast iron, meeting ASTM A48 Specifications, designed for H-20 loading as designated by AASHTO.

2. Castings shall be free from cracks, holes, swells and cold shuts. All manhole castings shall be made accurately to the pattern and to the dimensions as specified, and shall be machined to secure

perfectly flat and true surfaces. All lids which "rock" and do not lie solid will not be accepted and must be replaced by perfect lids.

3. No plugging, burning in or filling will be allowed. Covers must fit the frames in any position.

4. The covers shall have non-penetrating pick holes.

B. Standard Type Manhole Frame and Cover

1. Shall be model number USF 227-AS as manufactured by U.S. Foundry and Manufacturing Corporation or equal. A label saying "SANITARY" shall be cast on the cover. Two (2) non-penetrating pick holes shall be located diametrically opposite.

C. Watertight Covers

1. Manholes at specific locations indicated on the Drawings shall each be equipped with a watertight cover. The cover shall be model 227-AS-BWT as manufactured by U.S. Foundry and Manufacturing Corporation or equal.

2. A label saying "SANITARY" shall be cast on the cover. Frame and Cover shall be watertight type with stainless steel bolts, machined bearing surfaces and flat gasket.

D. Floor Doors

1. Floor doors shall be provided for the pumping stations as specified on the drawings.

2. Floor doors, for valve chambers and in other locations that are called for on the Drawings, shall be as specified on the drawings.

2.6 PRECAST CONCRETE MANHOLES AND COMPONENTS

A. Aggregate

1. All coarse aggregate shall be made from 100 percent calcarious rocks. The contractor shall furnish manufacturer's certificate stating the type of aggregate used in the manufacture of the manhole.

B. Sections

1. The sections for manholes shall be a minimum of 4 feet in diameter for pipe sizes up to, and including 24 inches internal diameter. For pipes with an internal diameter between 24 and 36 inches, the manhole shall be 5 feet in diameter, unless otherwise noted.

2. The sections for the wet wells and valve chambers shall be of the size indicated on the Drawings.

3. The Sections shall conform to the requirements of "Specifications For Precast Reinforced Concrete Manhole Sections" (ASTM C478), except that the joints shall be of the tongue and groove joint type and sealed with a preformed flexible plastic gasket. No other type of manhole joint will be accepted. Face of tongue and groove shall be sloped and not perpendicular to manhole wall.

C. Risers and Top Sections

1. The top of base walls, the ends of reinforced concrete risers and the bottom ends of precast tops shall be so formed that when risers and tops are assembled with the base, they will make a continuous manhole. The tongue and groove joints shall be of such design as will permit effective joining and placement without irregularities in the interior wall surface of the manhole.

2. Precast barrels shall consist of riser and top sections. The top section of manholes 6 feet or greater in depth shall be an eccentric conical section with thickened upper walls with the smallest inside diameter equal to 24 inches, to receive the manhole frame and cover. Top sections of manholes less than 6 feet in depth shall be flat concrete slabs. No more than two (2) lift holes shall be cast in each riser or top section. Lift holes shall be nonpenetrating.

3. Precast riser and top sections shall be designed, manufactured, tested, finished and marked in accordance with this specification and "Specifications For Precast Reinforced Concrete Manhole Sections" (ASTM C478 Latest Revision).

D. Precast Manhole Bases

1. The bases shall be integrally cast and shall consist of a manhole bottom and a wall which shall extend a minimum of 6 inches above the top of the highest inflowing sewer. The top of the base section shall be carefully formed to receive the tongue of the barrel section.

There shall be a minimum distance of 4 inches between the invert of the lowest outflowing sewer and floor of the precast base to provide for the construction of a formed invert and bench wall within the manhole. No more than two lift holes shall be cast in the bases. Lift holes shall be non-penetrating.

a. Manholes 4 feet in diameter shall have a bottom at least 8 inches thick and a wall at least 5 inches thick.

b. Manholes 5 feet in diameter shall have a bottom at least 8 inches thick and a wall at least 6 inches thick.

E. Joint Material

1. The joint material shall be a preformed flexible plastic gasket such as Ram-Nek manufactured by the Henry Company or equal. It shall consist of hydrocarbon plastic and vulcanized rubber and shall be capable of meeting the following conditions:

a. Hydrocarbon plastic content 50-70% by weight per ASTM D297

b. Volatile matter 2.0% max. by weight per ASTM D6

c. Specific gravity, 77 deg. F-1.20 to 1.35 per ASTM D71

d. Ductility, 77 deg. F-5.0 cm min. per ASTM D113

e. Softening Point, ring and ball, 320 deg. F min. per ASTM D36

f. Penetration, cone 77 deg. F, 150 gm, 5 sec., - 50-120 per ASTM D217

g. Flash point, C.O.C., 600 deg. F min. per ASTM D92

h. Fire point, C.O.C., 625 deg. F min. per ASTM D92

i. Inert mineral filler 30-50% by weight

j. Material, when in place, shall not leak at joints while being subjected to 10 PSI test for a 24-hr. period.

k. No sagging of vertical and overhead 1 inch wide joints shall be detected while being subjected to temperature of 135 deg. F for period of 5 days.

l. No visible deterioration of compound when immersed separately in solution of acid, alkalis and saturated hydrogen sulfide, for a period of 30 days.

2. Sealing compound shall be supplied in extruded rope-form of suitable cross-section and of such sizes as to seal the joint space when the sections are set in place. The sealing compound shall be protected by a suitable removable two-piece wrapper. The two-piece wrapper shall be so designed that one-half may be removed longitudinally without disturbing the other half to facilitate application of the sealing compound.

3. Joints of manholes shall <u>not</u> be sealed with grout.

F. Non-penetrating lifting holes

1. Lifting holes shall be constructed using plastic inserts cast into the manhole, stopping short of extending all the way through the wall. Plastic inserts and lifting eyes shall be as manufactured by Press-Seal Gasket Corporation or equal.

G. Pipe Connections To Precast Manhole Bases and/or Sections

1. A flexible pipe-to-manhole connector shall be provided with the manhole. The connector shall provide a water tight seal and accommodate ground movement to prevent pipe shear. All clamps and miscellaneous metal shall be type 304 stainless steel. Connectors shall be installed in accordance with manufacturer's recommendations. No inlet or outlet piping in manholes, valve chambers or wet wells shall be at a manhole section joint. A minimum space of 6 inches from the joint shall be provided.

2.7 RECTANGULAR PRECAST MANHOLES

A. The rectangular precast manholes shall be constructed to the sizes detailed on the Drawings.

B. Manholes shall be designed in accordance with the Building Code requirements of ACI 318 and AASHTO H20 truck loading.

C. The materials shall conform to the following standards:

1. Concrete shall be 4000 psi using ASTM C150 Type 11 cement.

2. Wire mesh shall conform to ASTM A185.

3. Reinforcing rods shall be ASTM A615 grade 60.

D. Cover shall be cast with the floor door in place. Floor door shall be as specified on the drawings.

PART 3 - EXECUTION

3.1 GENERAL

A. Ground Water

1. All ground water shall be kept away from newly poured concrete, or freshly laid brickwork, until concrete has properly set, and a watertight job is obtained. Manholes which admit ground water after completion, must be repaired to the satisfaction of the Engineers.

B. Line and Grade

1. Where manholes occur in pavements, set top of frame and covers flush with finished surface. Where manholes occur in dirt roads, set top of frame and cover 6 inches below finished surface. Elsewhere set top of frame and cover 3" above final grade, unless otherwise indicated.

2. Care shall be taken to have all pipes to and from manholes laid to correct lines and grades as established for the project.

3.2 PRECAST MANHOLES

A. Handling

1. All precast manhole components shall be lifted and moved by use of lifting eyes that are slipped into the insert which are cast into the manhole. The lift system shall not damage the precast manhole.

2. All damage to precast sections shall be thoroughly repaired in the presence of the Engineer. Repair and patching of minor breaks shall be done by chipping and scarifying the defective area before

application of grout. Sufficient time shall be allowed for curing before the precast sections are put together. Concrete cast-in-place bases shall be specially formed and keyed to accommodate the bottom precast section.

B. Site Inspection of Precast Sections

1. Precast sections shall be subject to rejection on account of failure to conform to any of the specification requirements. In addition, individual sections of manhole sections may be rejected because of any of the following:

   a. Fractures or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.

   b. Defects that indicate imperfect proportioning, mixing, and molding.

   c. Surface defects indicating honey-combed or open texture.

   d. Damaged or cracked end, where such damage would prevent making a satisfactory joint.

   e. Any continuous crack having a surface width of 0.01 inch (0.25 mm) or more and extending for a length of 12 inches (305 mm) or more, regardless of position in the section wall.

C. Bitumastic Coating

1. Prior to setting the precast sections in place each section shall have the exterior concrete surface blown free of all dirt and debris and brushed clean and then coated with bitumastic. As an alternative, the bitumastic coating may be applied at the manufacturer's plant in accordance with this Specification.

2. The coating shall be Bitumastic Super Service Black as manufactured by Kop-Coat, a Division of Carboline Co., equivalent of Valspar Corp., or equal.

3. At least three (3) coats shall be applied giving a total dry film thickness of a minimum of 32.0 mils.

4. After installation, damaged surfaces including plugged lifting holes, shall be recoated in accordance with the coating manufacturer's recommendation to give the required 32.0 mils dry film thickness.

5. The Contractor shall provide a certification to the Engineer stating that he has installed the exterior manhole, wetwell and valve chamber coatings in accordance with the manufacturer's recommendations and that there is a minimum of 32.0 mils of material on all component structures.

D. Placement

1. Manhole sections shall not be set by wedging or placing shims to secure proper level and manholes shall not be backfilled without the permission of the Engineer.

E. Masonry Work

1. The top of all precast manholes may be brought to proper grade for receiving manhole frames after paving has been replaced on paved streets by using not more than two courses of brick. In lieu of brick, precast manholes may be brought to grade by the use of no more than two precast concrete extension rings. The total depth of the rings shall not exceed 6 inches. The construction shall be performed by experienced and qualified workmen only. All work shall be laid plumb, straight, square and true. Where manholes are installed in areas with sloped pavement, the manhole ring and cover shall be set flush and in the same plane as the finished surface (not level). Brick or rings shall be laid in full beds of mortar and shoved into place. All joints shall be full and not more than 1/2 inch in thickness. The Contractor shall set in place and bond in the masonry all necessary steps and miscellaneous items specified elsewhere. The masonry walls shall be parged on the outside with a one-half inch coat of Portland Cement mortar.

2. Mortar used in brickwork, setting manhole frames, and parging, shall be prepared by thoroughly mixing: One (1) volume of Type II Portland Cement with three (3) volumes of sand and sufficient clean water to produce a rich mass of uniform consistency. Mixing mortar on the ground or any paved surface shall not be permitted. Sand to be used in making mortar shall be clean, well graded, and shall pass a standard No. 4 sieve.

3. All mortar shall be a mixture of non-shrink grout.

4. Masonry shall not be constructed during cold weather (air temperature below 40 Degrees F.) unless necessary precautions are observed as permitted by the Engineer.

5. Concrete collar, to be poured around frame and cover after adjustment, shall be 3,000 psi concrete.

3.3 FLOW CHANNELS AND BENCH WALLS

A. The method of constructing flow channels and bench walls is dependent on which manhole base has been installed.

B. In precast bases, the flow channels and bench walls in each manhole shall be carefully formed of mortar and brick, or concrete. Precast inverts will not be accepted.

C. The minimum depth of flow channel shall be equal to 3/4 the diameter of the largest sewer in the manhole to which it connects. The channel shall be graded to give a smooth, uninterrupted flow through the manhole.

D. Bench walls shall be pitched a minimum of 1 inch but not more than 2 inches per foot from the inside periphery of the manhole to the edge of the flow channel.

3.4 TESTING

Manholes shall be constructed to be completely watertight. The contractor shall test the manhole by one of the following methods: (1) Infiltration Test: If the manhole is located below the groundwater table, the inverts shall be plugged and the infiltration into the manhole shall be measured after a 12-hour period. If any visible infiltration has occurred into the manhole, visible by wet walls or any accumulation on the bench, the infiltration shall be considered excessive. (2) If the manhole is above the current groundwater table, an exfiltration test will be conducted. All incoming sewer lines shall be plugged and the manhole filled with water to a level above the highest section joint and allowed to stand for three hours to compensate for potential absorption by dry concrete. After the soaking period, water shall be added as required to raise the water to a level that is above the highest joint section. If the water level drop exceeds 1/8" per vertical foot of manhole depth in 30 minutes, the manhole shall have failed the test.

END OF SECTION

SECTION 02567

CONCRETE PROTECTIVE LINER

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish and install all labor, materials, equipment, and incidentals required to supply and install High Density Polyethylene (HDPE) concrete protective liner (CPL) in the lift station/wet wells, receiving manholes, drop manholes, and manholes as required or as shown on the plans.

B. HDPE concrete protective liner (CPL) shall be designed and installed to protect concrete surfaces from corrosion and to resist pull out from back pressure up to 29 psi.

PART 2 – PRODUCT

2.1 MATERIALS

A. Liner shall be AGRU Sure Grip® HDPE (high density polyethylene) or equal with a minimum thickness of 2 mm. All HDPE liner sheets shall be extruded with a large number of anchoring studs (as required to distribute back pressure and minimize deflection of the HDPE) manufactured during the extrusion process in one piece with the sheet so there is no welding and no mechanical finishing work to attach the studs to the sheet. The liner shall have a pullout of 112.5 lbs./anchoring stud.

B. Flat liner sheet, non anchored, used for overlapping joints, shall have a minimum thickness of 3 mm. All joints shall be sealed by means of thermal welding performed by experienced welders. The shop drawings shall demonstrate that the welder has successfully completed 10 projects with the material to be welded and of similar nature.

C. The lining shall have good impact resistance, shall be flexible, and shall have an elongation sufficient to bridge up to a ¼" settling cracks. This may occur in the joint after installation, without damage to the lining. The liner shall be able to bridge any expansion cracks that may occur.

D. The lining shall be repairable at any time during the life of the structure.

E. The fabricator will custom fit the liner to the form work in order to protect the concrete surfaces from sewer gases. The interior surfaces to be protected shall include the walls, ceiling, pipe entries, and structure chimney. The shop drawings shall demonstrate that the fabricator has successfully completed 20 projects of similar nature.

2.2 PHYSICAL PROPERTIES

A. The HDPE material used to form the liner shall meet the following properties:

- Density of 945 g/cm^3 as defined by ASTM D792-86.
- Melt Flow Index of 0.07-1.0 g/10 min. (190/5) as defined by ASTM 1238-88.
- Heat reversion (Dimensional Stability) of less than 2% as defined by ASTM D1637-83.
- Yield stress equal to or greater than 2320 psi as defined by ASTM D638-89.
- Elongation yield equal to or greater than 12% as defined by ASTM D638-89.
- Maximum working temperature of 140° F/60° C.
- Fire Classification of V2 as defined by US-94.

B. Upon request, the manufacturer shall provide written certification that the liner used meets or exceeds the requirement of this specification.

PART 3 – WELDING

A. All welding shall be performed in accordance with the published directives and procedures of the manufacturer and by welders certified by the manufacturer. Completion of welding will provide a one-piece monolithic concrete protective liner system that will provide excellent resistance to hydrogen sulfide attack and will not pull off the wall in the event that infiltration occurs.

The following welding techniques are acceptable:

1. Extrusion Welding
2. Wedge Welding
3. Butt Welding
4. Hot Air Welding

B. Testing and supervision of the installation and welding shall be performed by qualified staff of the manufacturer and must be checked when completed by visually checking and by Spark Testing all welded joints.

PART 4 – WARRANTY PROVISIONS

A. The liner manufacturer shall provide a five (5) year warranty.

END OF SECTION

SECTION 02570

PUMP STATIONS

PART 1 – GENERAL

1.1 SCOPE

This Section covers the work necessary to furnish and install, complete, the pumps, gages, and valves for pumping stations. Pipe for pump stations shall be installed as shown on the Drawings and as specified herein. Electrical work shall be in accordance with Electrical Section of these Specifications.

PART 2 – PRODUCTS

2.1 PUMPS

A. Pumps shall comply with the requirements of this Section and in particular with the Pump Specification Sheets located at the end of this Section. All pumps of each pumping station shall be of the same type, frame and size and shall have interchangeable parts. All screws, bolt, nuts and washers shall be stainless steel.

B. All completed and installed operating pump units and accessories shall be suitable for the intended location and service and shall be free of operating problems, unusual vibrations, and noise throughout the entire operating range of the equipment. Undesirable operation, vibration, or noise in a pump unit or accessories shall be corrected, and if necessary the entire unit shall be replaced at no cost to the Owner.

C. Motors shall be rated as to full load horsepower values shown on the Drawings and shall have electrical characteristics corresponding to the electrical power system at the installation. The motor shall be designed for continuous as well as intermittent operation.

D. Unless otherwise specifically noted, not less than 30 feet of heavy-duty grease resistant submersible multi-conductor electrical power cable and pilot cable each with grounding conductor shall be provided connected to the motor ready for operation.

E. Provide not less than five copies of technical information and parts listing, including recommended maintenance, describing pumps and motors including pump performance curve, minimum submersion head for pumps, and range of available impeller sizes and their power requirements.

F. Provide written guarantee for replacement of pump and motor for failure of satisfactory performance and for defective parts of assembly.

G. Factory Tests:

1. Pumps

A factory test certified by the pump manufacturer's test representative shall be performed on all pumps actually furnished, and written notice of the same shall be furnished to the Engineer. Information required to be furnished at the time of test is as necessary to show conformance to specified performance. Tests shall conform to the Hydraulic Institute Standards test code.

2. Motor Tests and Test Reports

As specified in Pump Specification Sheets.

3. Balance of Vibration

The rotating parts of each pump and its driving unit shall be dynamically balanced before final assembly. The driving unit shall operate without vibration in excess of the limits stated in the latest revision of NEMA MG 1.

H. Spare parts for pumps shall be furnished to provide 12 months of full time service and special tools required for that service shall be suitably boxed and marked for shipment and storage.

I. Thermal sensors shall be used to monitor stator temperatures. The stator shall be equipped with three thermal switches, embedded in the end coils of the stator winding (one switch in each stator phase).

J. The motor shall have bearings designed for minimum B10 life of 15,000 hours and shall be equipped with moisture sensors located between two mechanical seals in an oil filled seal chamber for external seal failure alarm.

K. The motor shall be labeled by Underwriters Laboratory, Inc., or Factory Mutual as approved for use in Class I, Division I, Group D hazardous locations and rated as suitable for submergence in raw sewage.

2.2 VALVES

A. Valves shall conform to the requirement of this Section and in particular with the Valve Specification Sheets located at the end of this Section.

B. Gate or pinch valves located in the valve box shall be furnished with an operation handwheel.

2.3 HARDWARE

All miscellaneous hardware, including straps, supports, bolts, and nuts, shall be galvanized steel or iron, brass, bronze or aluminum, where such is not designated otherwise on the Plans or Specifications.

2.4 SERVICE FEATURES

A. The pumps shall be easily removable for inspection or service, requiring no bolts, nuts, or other fastenings to be disconnected.

B. The pump discharge piping design shall be such that the pump unit will be automatically and firmly connected to the discharge piping when lowered into place.

C. Hardware necessary for the inspection or removal of each pump from the wet well shall be provided. Hardware shall include, but not be limited to the following:

1. Vertical guide bar or bars
2. Guide bar brackets
3. Discharge pipe connections or elbows
4. Stainless steel lifting chain

2.5 DISCHARGE PIPE

A. Discharge piping shall be in accordance with section titled "Sewage Force Main System" with exception that all exposed pipe shall be AWWA C150 and C151 Pressure Class 250, flanged ductile iron pipe, unless noted otherwise on the drawings.

2.6 WATER SERVICE LINE TO PUMP STATION

A. General

1. A water service line shall be installed for each pump station unless noted otherwise. The water service shall include connection to existing water main, corporation stop with double strap saddle, tubing, fittings, curb stop, meter, meter box, backflow preventer, backflow preventer cover, hose bibb and "incidentals" necessary to complete the service line to the pump station. as shown on the drawings.

B. Tubing

1. Tubing shall be 3/4" polyethylene tubing with a minimum pressure rating of 160 psi. All fittings on the service line shall have plastic inserts.

C. Service Saddle

1. Service saddles shall be Rockwell Number 313 Service Saddle, double strap iron with cc tap as manufactured by Rockwell International.

D. Curb Stop

1. Curb stop shall be Ford Number B11-233W Ball Valve, as manufactured by Ford Meter Box Company, Inc. Curb stop shall have lock wings for locking the valve in the closed position.

E. Service Couplings

1. Service Couplings shall be Ford Number C84-33 as manufactured by Ford Meter Box Company, Inc.

F. Corporation Stop

1. Corporation stops shall be Mueller No. H-9971, CC thread or an approved equal.

G. Meters - Deleted

H. Meter Boxes

1. Meter Boxes shall be Brooks Meter Boxes. Boxes shall be plastic unless located near driveway. Boxes located in driveways shall be steel.

I. Service Backflow Preventer

1. Pump station service backflow preventer shall be Watts 909 reduced pressure as manufactured by Watts Regulator Company.

J. Backflow Preventer Cover

1. Backflow preventer cover shall be Hot-Box backflow prevention device cover Model Number VGEz2 as manufactured by Hot Box, a division of CDR Systems Corporation. .

K. Pump Station Service Hose Bibb

1. Pump station service hose bibb shall be Watts 8A vacuum breaker hose bibb as manufactured by Watts Regulator Company.

PART 3 – EXECUTION

3.1 PUMP

A. Pump Installation

1. Pumps shall be installed in accordance with the manufacturer's recommendations, and as approved. Where guide bars are indicated, pumps shall be mounted on guide bars as shown on the Drawings. The size of the guide bars

Shall be determined by the pump manufacturer. Anchor bolt size and material shall be as recommended by Manufacturer. Coat bolt thread projections with lubricant to facilitate future nut removal.

2. The Contractor shall provide in suitable substantial case any special tools or adjustment devices necessary for the proper maintenance and adjustment of the equipment furnished. This shall include all special or unusual items necessary for the dismantling and assembling of all furnished equipment.

3. Five instruction manuals, clean and unused, shall be delivered to the Owner for the pumps, motors, and all accessories. Each instruction manual shall carry the serial number of the piece of equipment to which it applies, design data, operating instructions, lubricating instructions, maintenance instructions, assembly drawings showing location of parts, and test curve. Each instruction manual shall be bound in a stiff back folder with the name of the plant and the unit numbers or name embossed on the outside.

4. The Contractor shall furnish and install all necessary break-in lubricants and all final lubricants as recommended by the manufacturer for all pumps, motors, and accessories.

B. Supplier's/Manufacturer's Service

A supplier's and/or manufacturer's representative for the equipment specified herein shall be present at the job site and/or classroom designated by the Owner for the minimum man-days listed for the services hereinunder, travel time excluded:

2 man days for installation assistance, inspection, and written certification of installation acceptability for each pumping system.

1 man day for functional testing.

1 man day for pre-startup classroom or job site training.

Startup services and training of Owner's personnel shall be at such times as requested by the Owner.

C. Lifting Lugs

Equipment weighing over 100 pounds shall be provided with lifting lugs.

D. Performance Test

The Contractor shall perform field tests on all pump and control assemblies <u>prior to start-up inspection</u> to ensure stations are operational and working properly. During the start-up inspection, the Contractor shall perform field tests on all

completed pump and control system assemblies to demonstrate their conformance to the Specifications to the satisfaction of the Engineer. A minimum of three different operating points per pump unit shall be acquired to assure pump is operating as designed. A test log shall be presented to the Engineer upon the completion of each test that records the following:

1. Flow, in gallons per minute.

2. Pump discharge pressures as measured by calibrated gauges, converted to feet of the liquid pumped and corrected to pump datum as defined by Hydraulic Institute Standards, calculated velocity heads at the discharge flanges, and total head, all tabulated in feet.

3. For AC motors, driving motor voltage and amperage measured for each phase and 3-phase kilowatts.

E. Functional Test

Prior to plant startup or field performance test, all equipment described in the Pump Specification Sheets following shall be inspected for proper alignment, quiet operation, proper connection, and satisfactory performance by means of a functional test.

3.2 VALVES

A. Valves shall be installed where shown on the Drawings. All valves shall be connected with flange fittings. See Valve Specification Sheets.

3.3 TAPS

Taps shall be made in pipe or fittings where designated, or as devices require, as indicated on the Plans. Unless otherwise indicated or directed, all taps shall include brass cut-off cocks or corporation stops of size consistent with the size of the line shown on the Plans.

3.4 FINAL PROJECT INSPECTION

During the final inspection of the project, the contractor will be required to demonstrate that each pump of each station can be removed from the wetwell and then replaced as specified herein.

3.5 EMERGENCY CONTACT SIGN AT PUMPING STATIONS

A sign made of durable weather resistant material shall be posted at a location visable to the public with a telephone number for a point of contact in case of an emergency. The Contractor will be responsible for coordination with the Owner regarding the phone number to be used.

END OF SECTION

SECTION 02571

SITE AND EARTHWORK FOR PUMP STATIONS

PART 1 – GENERAL

1.1 DESCRIPTION

A. The Work under this Section includes furnishing all plant, labor, materials, equipment and incidentals for clearing, excavation, shoring, backfilling, grading, removal and disposal of excess material and other site work as shown on the Plans and specified herein.

1.2. CLEARING

A. In general, clearing shall consist of the removal and disposal of all Undergrowth, brush, logs, trash and other objectionable obstructions. All materials cleared from the site shall be disposed of off the site by the Contractor. It is the intent that the entire area within the limits of the pumping stations as shown on the Plans be cleared. Clearing and grubbing will be paid for under the lump sum bid item for the various pump stations.

1.3 DISTURBED AREAS

A. All areas that are disturbed due to direct or indirect construction operations shall be restored by the Contractor to a condition equal to or better than the condition of the area prior to operations.

1.4. EXCAVATION FOR PIPES AND STRUCTURES

A. General: The Contractor shall perform excavation of every description regardless of the nature of the material encountered. Trenches or foundations for pipes or structures shall be excavated to the lines, grades and elevations shown on the Plans. Trench and structure excavations shall be of sufficient size to permit the placing of pipes and forms.

B. Overcuts: If at any point in excavating for structures, material is excavated beyond the neat lines upon or against which concrete is to be placed, the overcut shall be filled with gravel fill properly compacted, or with concrete, as directed by the Engineer. The proposed elevations and positions for the different structures are shown on the Plans; however, the Engineer reserves the right to make such modifications as in his opinion are necessary to carry out the intent of the Plans or Specifications. No payment will be made for overcuts or gravel fill in overcuts.

C. Dewatering: Should lowering of groundwater be necessary for the installation of concrete structures, piping, etc., or to prevent lateral movement of material under concrete already placed, such lowering shall be accomplished by means of a well point system or other approved means. Comprehensive plans for dewatering operations, if used, shall be submitted by the Contractor prior to installation

PART 2 – PRODUCTS

2.1 TOPSOIL

A. The final top 4 inches of soil on the pumping station sites shall be a good quality "Topsoil" which may be material from the excavation or may be furnished at the Contractor's cost from an off-site source. Topsoil shall be workable, friable, loamy soil free from hard lumps, stiff clay, gravel, noxious weeds, brush and other deleterious materials. Topsoil shall be suitable to promote vegetative growth.

2.2 FENCE

A. Fence Fabric

1. Fabric shall be woven in 2-inch mesh from No. 9 gage steel wire conforming to the "Specification for Zinc-Coated Steel Chain-Link Fence Fabric" (ASTM A392). The height of the fence fabric shall be 72 or 96 inches unless otherwise indicated on the Drawings or specified herein. The selvages shall be twisted and barbed at the top and knuckled at the bottom.

B. Bands or Clips

1. Fabric shall be connected to line posts with 6 ga. wire clips; to top rail with 9 ga. wire; to terminal, corner and gate-posts with 1/4 in. x 3/4 in. tension bars tied with 11 ga., 1 in. wide steel bands and 3/8 in. diameter bolts and nuts; to tension wire with 11 ga. hog rings.

C. Barbed Wire

1. Barbed wire shall be No. 12-1/2 steel W.G. with four round or half-round barbs spaced 5-inches apart and shall be Class 3 conforming to "Specifications For Zinc-Coated (Galvanized) Steel-Barbed Wire", (ASTM A121).

D. Posts

1. Posts shall be made of steel pipe (Schedule 40, ASTM A120) of the sizes and weights given below or of other approved equivalent section.

a. Line posts shall have a 2-3/8 inch outside diameter and weigh 3.65 lb. per linear foot.

b. End, corner and pull posts shall have a 2-7/8 inch outside diameter and weigh 5.79 lb. per linear foot.

c. Gate Post For Single-Swing Gates up to 6 ft. and Double-Swing Gate Openings up to 12 ft. - shall be 2-7/8 in. outside diameter and weigh 5.79 lb. per linear foot.

d. Gate posts for double-swing gate openings wider than 12 ft. shall be 4-in. outside diameter and weigh 9.10 lb. per linear foot.

E. Caps

1. Steel Pipe Posts shall be capped with caps of the manufacturer's standard material, as approved; post shall have arms projecting outward and formed with tongues or other approved means for attachment of the barbed wire.

F. Top Rails

1. Top Rails shall have a 1-5/8 inch outside diameter and weigh 1.80 lb. per linear foot.

G. Tension Wire

1. Tension wire shall be 7 gauge, 0.177 inch minimum diameter plus or minus .005 inches, marcelled or crimped coil spring hard-tempered carbon steel wire. Zinc coating shall be 1.2 ounces per square foot of surface or greater.

H. Fittings

1. Fittings shall be wrought iron, malleable iron, or pressed steel.

I. Gates

1. Gates shall be single or double-leaf, swing gates as indicated on the Drawings. They shall be of woven-wire fabric in suitable, amply braced frames. Hinges shall be of approved material and of ample strength. The gates shall be provided with suitable latches and provisions for locking, center bolts with center gate stop and automatic back stops to hold them in the open position.

J. Gate Locking

1. A heavy brass or bronze padlock with a shackle chain shall be furnished with each gate. The padlocks shall be as manufactured by Yale & Towne, Corbin, or equal, shall have two keys and all furnished locks shall be keyed alike.

K. Fabrication

1. All material used in the fence construction, except woven wire hereinbefore specified shall be galvanized with a heavy coating (not less than 2 oz. per square foot of surface) of pure zinc spelter using the hot-dip process. The surface area of tubular steel shall be the area of both inside and outside surfaces.

2.3 DRIVEWAY PIPE

A. Driveway pipe for the pumping station access drive shall be steel reinforced concrete pipe with side drain mitered end section each end.

PART 3 – EXECUTION

3.1 BACKFILL FOR PIPES AND STRUCTURES

A. General: Backfill over, under and around pipes and structures shall be of selected material placed and tamped and compacted in a manner and by methods that will avoid unbalanced loading, and that will not cause movement or undue strain on any pipe or structure. The fill placed against or immediately adjacent to pipes, or structures shall be built in horizontal layers not exceeding 6 inches loose and must be compacted by approved mechanical tampers. The density of each layer of material composing the backfill shall be not less than 95 percent of the relative maximum density as determined by the AASHTO compacting test (T-99). Each layer of backfill material which does not contain sufficient moisture to compact thoroughly shall be sprinkled and mixed with water as directed. Material containing excess moisture shall be permitted to dry out to proper consistency before compacting is attempted. No muck or unsuitable material shall be used in the backfill.

B. Deficiency of Backfill or Fill: In the event that existing material from the excavation is insufficient to bring the pumping station site to the lines and grades shown on the Plans, additional select material shall be provided by the Contractor from his own source. The select material shall be granular soil containing not more than 15 percent passing the 200 mesh sieve, except that the top 4 inches shall be topsoil as herein specified. No separate payment will be made for the additional backfill or fill required.

C. Excess Material: After backfilling, excess material shall be removed and disposed of by the Contractor off the site.

D. Gravel: 9" of gravel bedding shall be placed below the P.S. structure.

3.2 GRASSING

All disturbed areas shall be grassed and shall be prepared and maintained in accordance with Section 01300.

3.3 CLEAN-UP

A. After final operation tests, the interior and exterior of the station shall be cleared of all trash and debris and left in final operating condition. Final grading of the site and restoration of surfaces with grass shall be in strict accordance with the applicable Plans.

END OF SECTION

SECTION 02580

SEWAGE FORCE MAIN SYSTEM

PART 1 – GENERAL

1.1 INTENT

It is the intent of these specifications to provide supplemental information to the contents of the construction drawings on the quality of materials, execution, measurement, etc. These specifications are general in nature and may contain products and requirements which are not applicable to the project. Discrepancies between these specifications and the construction drawings, either imagined or real, shall be brought to the attention of the Owner's Engineer for clarification.

1.2 DESCRIPTION OF WORK

A. Extent of work is shown on the drawings.

B. Sewage force main system work includes, but is not limited to: Piping, valves, fittings, appurtenances.

C. Comply with the requirements of applicable sections for excavation and backfilling required in connection with sewage force main system work.

D. Comply with requirements of applicable sections for concrete work required in connection with sewage force main system work.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform all work in compliance with applicable requirements of governing authorities having jurisdiction and the applicable standards of the American Water Works Association (AWWA). American National Standards Institute (ANSI), and the American Society for Testing and Materials (ASTM), of the latest edition.

B. Testing and Inspection Service:

1. Employ, at Contractor's expense, testing laboratory to perform necessary testing.

2. It will be the responsibility of the Contractor to coordinate all testing and inspections. The Contractor shall notify the Owner's Engineer, testing service and applicable agency inspectors 48 hours in advance of testing and inspection.

3. Hydrostatic test shall be completed by the Contractor in the presence of the Owner's Engineer.

1.4 SUBMITTALS

A. Prior to construction commencement, the Contractor shall submit for approval by the Owner's Engineer, manufacturer's certifications and cut sheets for the following items: Piping, valves, fittings, appurtenances.

B. Test Reports: Submit applicable reports directly to Engineer from the testing service with copy to Contractor.

PART 2 – PRODUCTS

2.1 GENERAL

A. All materials shall be in accordance with the Material Standard and shall, in no event, be less than that necessary to conform to the requirements of any applicable law, ordinances and codes.

B. All materials shall be new, unused and correctly designed. They shall be of standard first grade quality and intended for the use for which they are offered. Materials or equipment which, in the opinion of the Owner's Engineer, are inferior or of a lower grade than indicated, specified or required, will not be accepted.

C. Ductile iron pipe for force mains shall have a green stripe at third points around the pipe for its full length.

D. PVC pipe for force mains shall be green.

2.2 DUCTILE IRON PIPE - PUSH ON JOINTS

A. Pipe: Pipe shall be of ductile iron and manufactured in accordance with AWWA C151, in nominal 18 or 20 foot laying lengths having minimum metal physical properties of 60-42-10. Minimum pipe pressure class shall be 250 Joints:

B. Joints for ductile iron pipe shall be of the push-on type: "Super Bell Tite", "Tyton" and "Fastite" joints are acceptable. All joints shall be in accordance with AWWA C111, and all joint accessories shall be furnished with pipe.

C. Coating: All pipe shall receive an interior and exterior bituminous coating in accordance with ANSI A21.6, A21.8, or A21.51, latest revision.

2.3 DUCTILE IRON PIPE - MECHANICAL JOINTS

A. Pipe: All pipe shall be of ductile iron and manufactured in accordance with AWWA C151-A21.51, in nominal 18 or 20 foot laying lengths having minimum metal physical properties of 60-42-10. Minimum pipe pressure class shall be 250.

B. Joints: Joints shall be mechanical joints in accordance with AWWA C111, with exceptions noted herein. All joint accessories shall be furnished with the pipe. Mechanical joint bolts and nuts shall be manufactured of high-strength, low-alloy steel such as "Corten", "Usalloy", or "Acipalloy". The gasket shall be for a standard mechanical joint, of BUNA-S (SBR-Buna) in accordance with ANSI A21.4, AWWA C104. The follower gland shall be manufactured from ductile iron (at least ASTM A536, Grade 70-50-05) in accordance with ANSI A21.11, AWWA C111, where applicable.

C. Coating: All pipe shall receive an interior and exterior bituminous coating in accordance with ANSI A21.6, A21.8, or A21.51, latest revision.

2.4 DUCTILE IRON PIPE - FLANGE JOINTS

A. Pipe:

1. Pipe shall be of ductile iron and manufactured in accordance with AWWA Standard and C151 in nominal 18 or 20 foot laying lengths having minimum metal physical properties of 60-42-10.

2. Minimum pipe pressure class shall be 250.

B. Joints: Joints for ductile iron pipe shall be of the flange type and shall be in accordance with AWWA C151 and C115 and shall contain taper pipe threads in accordance with ANSI B2.1. All joint accessories shall be furnished with all pipe. Retaining bolts and nuts shall be manufactured of high-strength, low-alloy steel such as "Corten", "Usalloy", or "Acipalloy". The gasket shall be for a standard mechanical joint, of BUNA-S (SBR Buna) in accordance with ANSI A21.11, AWWA C111.

C. Coating: All pipe shall receive an interior and exterior bituminous coating in accordance with ANSI A21.6, A21.8, or A21.51, latest revision.

2.5 POLYVINYL CHLORIDE (PVC) PIPE

A. Smaller than 4" Pipe: All PVC pipe and fittings less than four inches in diameter shall be manufactured in accordance with ASTM D-2241, with a standard dimension ration (SDR) of 26, rated pressure 160 psi.

B. 4" – 12" Pipe: PVC pipe shall be manufactured in accordance with AWWA Standard C900, latest edition. Pipe shall be pressure Class 150 and must meet dimension requirements of standard dimension ratio (SDR) 18 for four through twelve inch pipe.

C. 14" and Larger Pipe: PVC pipe shall be manufactured in accordance with AWWA C905, Latest Edition. Pipe shall be Pressure Class 165 and meet the dimension requirements of dimension ratio (DR) 25.

D. Joints: Joints shall be "push-on" and shall meet all requirements of ASTM Standard D3139. Each bell shall be an integral wall section joint assembly using elastomeric-gasket seals. All gaskets shall meet all requirements for performance as specified by ASTM Standard F477.

E. All PVC pipe shall be marked using a solid No. 10 copper wire buried between 3 and 6 inches above the top of the pipe. Backfill shall be carefully placed to a depth of 3 inches by hand to assure that the wire is secured in place over the pipe. It is the intent of the paragraph to provide a means to locate PVC pipe using standard pipe location equipment. The wire shall be carried up through valve boxes and terminated at least 2 feet above the ground line to permit connecting of location equipment. Excess wire at valve boxes shall be neatly rolled and stored in the valve box for easy accessibility. Number 10 locating wire splice shall be heat sealed or water proof splicing connector.

2.7 FITTINGS (3-inches and Larger)

A. Fittings: Fittings shall be ductile iron manufactured in accordance with AWWA C110 or C153. The minimum pressure rating for fitting shall be 250 psi.

B. Joints: Fitting joints shall meet the specifications of the pipe joints as specified under DUCTILE IRON PIPE for the appropriate joint, push on joints, mechanical joints or flange joints.

Coating: All fittings shall receive an interior and exterior bituminous coating in accordance with ANSI A21.6, A21.8 or A21.51.

C. Anchoring Devices:

1. All anchoring devices shall be suitable for use with mechanical joint fittings meeting AWWA C110, and/or C111.

2. All anchoring devices shall be constructed of ductile iron (at least ASTM A536 Grade 70-50-05) and manufactured in accordance with AWWA C110, and/or C111.

3. All anchoring devices shall have a sufficient number of set screws so as to properly restrain various fittings or pipes at the rated pressure without the need for additional thrust restraint.

D. Retainer Glands:

1. Mechanical joint restraint shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts 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. 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 A21.11 and ANSI/AWWA A21.53/C153 of latest revision. Twist-off nuts shall be used to insure proper actuating of the restraining devices.

2. The mechanical joint restraining device shall have a working pressure of at least 350 psi with a minimum safety factor of 2:1 and shall be EBAA Iron, Inc., MEGALUG or equal.

3 Push-on joint restraints shall be similar to EBAA iron, series 800 or approved equal.

4. Coatings: Coatings shall be as follows:

(a) Flange adapters shall be provided with a painted "shop coat".

(b) Retainer glands shall be provided with a bituminous coat.

(c) Push-on restraints shall be provided with a bituminous coat.

2.8 GATE AND TAPPING VALVES

A. General:

1. Gate and tapping valves shall be resilient seat and shall comply with all requirements of AWWA C509 and the following supplemental requirements:

2. Valves 12 inches and smaller shall be bubble-tight at 200 psi water working pressure. Test pressure shall be twice the rated working pressure and at all times zero leakage will be maintained.

3. All valves shall be Class B gray iron body, non-rising stem, suitable for buried vertical mounting.

4. Non-rising stems shall be in full compliance with AWWA specifications with cast integral stem collar and furnished of bronze conforming to ASTM B132 Alloy A. Stem nuts shall be independent of wedge and shall be of solid bronze conforming to ASTM B-62.

5. Sealing mechanism shall be either a replaceable internally reinforced, specially contoured, molded rubber discs seat ring attached to the face of the disc with self-locking stainless steel screws or a sealing surface permanently bonded with resilient material to meet ASTM D429. Replaceable seat rings shall be designed such that it cannot be installed improperly.

6. Stuffing boxes shall be O-ring seal type with two rings located in the stem.

7. Low friction torque reduction thrust bearings shall be located both above and below the stem collar.

8. All valves shall open by turning a two inch square operating nut counterclockwise.

9. All valves shall be furnished with operating nuts, unless noted otherwise

10. All tapping valves shall have flange by mechanical joint ends.

11. All tapping valves shall be interchangeable with other makes of tapping sleeves.

B. Joints: Joints shall be mechanical joints and shall conform to AWWA C111, and all bolts and nuts for mechanical joints shall be high-strength, low-alloy steel in accordance with AWWA C111. All gaskets shall be for a standard mechanical joint of BUNA-S (SBR Buna) in accordance with ANSI A21.4 and AWWA C111. All mechanical joint accessories shall be furnished with the valves.

C. Coating: Body and cover bolts and nuts shall meet specifications ASTM A307 and be rust proof. Valve interior shall have protective coating meeting AWWA C550.

D. Approved models are:

American Flow Control	Series 2500 Resilient Wedge Valve
Muller	A-2362-78 Resilient Wedge Gate Valve with Aqua Grip

Clow Valve Company Resilient Wedge Valve

No substitutions will be allowed.

2.9 BUTTERFLY VALVES

A. General:

1. All butterfly valves and operators shall meet all requirements of AWWA Standard C504, for Class 150B, buried service valves and the following criteria:

2. Mechanical joint valve ends shall be in accordance with AWWA C-111.

3. Accessories (bolts, gaskets, etc.) shall be supplied by the valve manufacturer, and the joint bolts and nuts shall be a high-strength, low-alloy such as "Corten", "Usalloy", "Acipalloy" or approved equal.

B. Valve Seat: The valve seat shall be located on the valve body or disc and shall provide drip-tight shutoff for pressure differential of 150 psi versus 0 psi in either direction. The seat shall be of Buna N rubber and shall be clamped, mechanically secured, bonded, or vulcanized to the valve body or disc.

C. Valve Shafts and Disc:

1. The valve shaft shall be a one-piece unit extending completely through the valve disc or may be stub shaft construction. Shaft materials shall conform to AWWA Standard C504. No deviation will be accepted.

2. The valve disc shall have no external ribs transverse to the flow and shall be constructed of material as specified in AWWA C-504, latest revision. No deviation will be accepted.

D. Valve Shaft Seals: Shaft seals shall be standard "O" ring or "V" packing seals, and all seals shall be replaceable without disassembly of the valve.

E. Valve Shaft Seals: Shaft seals shall be standard “O” ring or “V” packing seals, and all seals shall be replaceable without disassembly of the valve.

F. Operators: The operator shall be manual type opening counter clockwise and equipped with two inch AWWA operating nut. The operator shall be gear type or traveling nut type. All operators shall be totally enclosed, sealed, gasketed, and lubricated for underground service. The operator

shall also be able to output torque required to operate the valve under adverse conditions without exceeding input torque as allowed under AWWA Standard C504. It shall also be capable of withstanding overload input torque as specified in AWWA Standard C504.

2.10 TAPPING SLEEVES

A. General: Tapping sleeves shall be constructed of stainless steel, and in two halves. All tapping sleeves shall be Smith-Blair #662 or equal.

2.12 TAPPING SADDLES

A. General: Tapping saddles shall be constructed of heavy, ductile cast iron, with the attachment straps, nuts and washers constructed of corrosion resistant alloy steel in accordance with AWWA C111. All tapping saddles shall be Smith-Blair #317 or equal.

PART 3 – EXECUTION

3.1 General: Pipe, fittings, valves and appurtenances shall be installed in accordance with the manufacturer's recommendation and the applicable sections of the codes and standards listed in the quality and assurance section of these specifications.

3.2 HANDLING PIPE

A. General:

1. All material, unless otherwise directed, shall be unloaded at the job site and distributed at the site of the project by the Contractor. Materials shall be handled with care to avoid damage. In loading and unloading, pipe shall be lifted by hoists or slid or rolled on skidways in such a manner as to avoid shock. Under no circumstances shall pipe be dropped. Pipe handled on skidways must not be allowed to roll against pipe already on the ground. The Contractor shall be responsible for the safe handling of all materials. Damaged materials will not be installed.

2. Pipe shall be handled so as to avoid damage to the coating and lining. If, however, any part of the coating or lining is damaged by the Contractor, the repair shall be made by the Contractor at his expense in a manner satisfactory to the Owner's Engineer before installation.

3. Pipe shall be distributed on the site of the work parallel with and opposite or near the place it is to be laid in the trench and with bell

ends facing the directions in which the installation will proceed unless otherwise directed.

3.3 INSTALLATION OF PIPE

A. General:

1. Upon satisfactory installation of the pipe bedding, as specified in the "Earthwork for Utilities" section of these specifications, a continuous trough for the pipe barrel and recesses for the pipe joints shall be excavated by hand digging so that when the pipe is laid in the trench true to line and grade, the pipe barrel will receive continuous uniform support and the joint will receive no pressure from the trench bottom.

2. The interior of all pipe shall be thoroughly cleaned of all foreign material before being lowered into the trench and shall be kept clean during laying operations by means of plugs or other approved methods.

3. All pipe, fittings, and valves shall be carefully lowered into the trench by means of derrick, ropes or other suitable tools or equipment, in such a manner as to prevent damage to pipe coatings, and lining. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

4. The gasket material for the joint shall be properly positioned before the pipe is lowered into the trench. The joining of the pipe shall proceed in accordance with the manufacturer's recommendations.

5. Watertight plugs shall be installed in open ends of the pipe at all times when pipe laying is not in progress. At no time shall trench water be permitted to enter pipe.

6. Cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe. Wherever it is necessary to cut gray or ductile cast iron pipe which is equipped with a push-on joint type bell end, the cut end of the pipe shall be adequately beveled so as to prevent the edge of the cut pipe from cutting or tearing the gasket as the plain end is inserted into the bell of the adjoining pipe or fitting. All field-cut pipe shall be beveled by the Contractor and the pipe "short" shall be used as part of the pipeline construction.

7. Whenever necessary to deflect pipe after proper homing from a straight line, either in the vertical or horizontal plane to avoid obstructions, the maximum allowable deflection shall be in

accordance with the pipe manufacturer's recommendations. Only after the pipe has been properly homed will it be allowed to deflect.

8. No pipe shall be laid in water or when the trench conditions or the weather is unsuitable for such work.

9. All sewer Force Main shall be located a minimum of 30 inches below grade and 36 inches below top of pavement. Any pipe which is disturbed or found to be defective after laying shall be taken up and relayed or replaced.

10. Prior to connecting new work to existing lines or appurtenances, the Contractor shall verify location and elevation of existing connection point and notify Owner's Engineer of any conflicts or discrepancies.

B. Joints:

1. Before laying the pipe, all lumps, blisters and excess coal-tar coating shall be removed from the bell and plain ends of each length of pipe. The pipe ends shall then be wire brushed and wiped until clean and dry. Where mechanical joints or push-on joints are specified, oil and grease also shall be removed. Pipe ends shall be kept clean until joints are made. The plain end of pipe for mechanical joints shall be lubricated with a soapy solution before installing the gaskets.

2. In making up the push-on type joint, the gasket shall be placed in the socket with a large round end entering first so that the groove fits over the bend in the seat. A thin film of lubricant (approved by the pipe manufacturer) shall then be applied to the inside surface of the gasket that will come in contact with the entering pipe. The plain end of the pipe to be entered shall be thoroughly brushed with a wire brush and placed in alignment with the bell of the pipe to which it is to be joined. The joint shall be made up by exerting sufficient force on the entering pipe so that the plain end is moved past the gasket until it seats as per manufacturer's recommendation.

3. Backhoe buckets or excavation equipment are not to be applied directly to the pipe.

4. Mechanical joints shall be centered in the bells. Soapy water shall be brushed over the gasket just prior to installation. The gasket and gland shall be placed in position, the bolts inserted, and the nuts tightened finger tight. Mechanical joints shall be assembled in accordance with AWWA Standards.

5. The bolts shall be tightened on opposite sides of pipes by means of a torque wrench in such a manner that the gland shall be brought up evenly into the joint. The following range of bolt torques shall be applied:

BOLT SIZE (INCHES)	RANGE OF TORQUE
3/4" Diameter	85 to 95 ft. - lbs.
1" Diameter	95 to 100 ft. - lbs.

6. If effective sealing is not obtained at a maximum torque listed above, the joint shall be disassembled and reassembled after thorough cleaning.

7. If a joint is defective, it shall be cut out and entirely replaced or, if permission is given by the Owner's Engineer, it may be repaired by a suitable clamp.

3.4 INSTALLATION OF FITTINGS

A. Fittings:

1. Fittings shall be handled with care to avoid damage. All fittings shall be loaded and unloaded by lifting, and under no circumstances shall fittings be dropped, skidded or rolled. Fittings shall not be placed, under any circumstances, against pipe or other fittings in such a manner that damage could result. Slings, hooks or tongs used for lifting shall be padded in such a manner as to prevent damage to exterior surface or interior lining of fittings. If any part of the fittings' coating or lining is damaged by the Contractor, the repair or replacement shall be made by the Contractor at his expense in a manner satisfactory to the Owner's Engineer before installing. Fittings shall also be stored at all times in a safe manner to prevent damage and kept free of dirt, mud or other foreign matter. All fitting gaskets shall be stored and placed in a cool location out of direct sunlight and out of contact with petroleum products. All gaskets shall be used on a first-in, first-out basis.

2. Fittings shall be set and joined to the pipe in a manner specified previously for joint assembly. When conditions warrant, fittings should be provided with special support trussing and blocking.

3.5 ANCHORAGE OF BENDS, TEES AND PLUGS

A. General: Adequate precautions shall be taken to prevent the separation of joints at bends, tees and plugged ends.

B. Retainer Glands:

1. Retainer glands shall be installed in conformance with manufacturer's recommendations.

C. Anchoring Devices:

1. All anchoring devices shall be suitable for use with mechanical joint fittings meeting AWWA C110, and/or C111.

2. All anchoring devices shall be constructed of ductile iron (at least ASTM A536 Grade 70-50-05) and manufactured in accordance with AWWA C110, and/or C111.

3. All anchoring devices shall have a sufficient number of set screws so as to properly restrain various fittings or pipes at the rated pressure without the need for additional thrust restraint.

D. Thrust Blocking:

1. Where reaction or thrust blocking is required, it shall be of concrete of a mix not leaner than one cement, two and one-half sand, five stone, having a compressive strength of not less than 3,000 pounds per square inch after 28 days and shall have a minimum curing time of three days. The poured concrete shall be left exposed for a minimum of 24 hours before backfilling, but not more than 48 hours. Before concrete thrust blocks are covered, contractor will have the Owner's Engineer inspect the installation.

2. Blocking shall be placed between undisturbed earth and the fitting to be anchored; the area of bearing on pipe and on ground in each instance shall be that shown in the Construction Details. The blocking shall, unless otherwise directed, be so placed that the pipe and fitting joints will be accessible for repair.

3.6 INSTALLATION OF VALVES

A. General:

1. Valves shall be handled with care to avoid damage. All valves shall be loaded and unloaded by lifting, and under no circumstances shall valves be dropped, skidded or rolled. Valves shall not be

placed, under any circumstances, against pipe or other fittings in such a manner that damage could result. Slings, hooks or tongs used for lifting shall be padded in such a manner as to prevent damage. If any part of the valves' coating and lining is damaged by the Contractor, the repair or replacement shall be made by the Contractor at his expense in a manner satisfactory to the Owner's Engineer before installing. Valves shall also be stored at all times in a safe manner to prevent damage and kept free of dirt, mud or other foreign matter. All valve gaskets shall be stored and placed in a cool location out of direct sunlight and out of contact with petroleum products. All gaskets shall be used on a first-in, first-out basis.

2. Gate valves and butterfly valves shall be set and joined to new pipe in the manner previously specified for cleaning, laying and joining pipe.

B. Valve Boxes: Cast iron valve boxes shall be firmly supported and maintained centered and plumb over the operating nut of the valve by the Contractor with box cover flush with the surface of the finished pavement or at such other level as may directed. All valve boxes set in non-paved areas shall have concrete pads poured around the top section of the valve box. The pad shall be 12 inches in diameter and shall be centered on the valve box. All valve covers shall be cast with the word SEWER.

3.7 INSTALLATION OF TAPS

A. General: All drilling and tapping equipment used and material supplied to make taps will be in accordance with AWWA Standards. After the tapping sleeve and valve have been installed and before the tap is made, the sleeve will be tested to ensure a watertight joint. A test plug will be provided in the sleeve and after the sleeve has been installed it will be filled with water and the pressure increased between 150 psi and 190 psi. All leaking joints will be repaired to the satisfaction of the Owner's Engineer at the Contractor's expense.

3.8 TESTING AND INSPECTION REQUIREMENTS

A. It will be the responsibility of the Contractor to coordinate all testing and inspections. The Contractor shall notify the Owner's Engineer and applicable agency inspectors 48 hours in advance of testing and inspections.

3.9 HYDROSTATIC TEST

A. Hydrostatic Test: A hydrostatic test shall be performed on all mains and fittings for a minimum of two hours at 100 psi in accordance with AWWA

M-23. Test shall occur at any convenient time upon backfill of lines and after all piping has been thoroughly cleaned and flushed to clear the lines of all foreign matter. Prior to test, allow adequate curing time for reaction blocking.

B. Gages and Recorders: The Contractor shall, upon request of the Engineer, furnish certified test data for pressure gauges and recorders used on hydrostatic test equipment. At the option of the Engineer, flow meters and/or pressure gauges used for hydrostatic testing shall be equipped by the Contractor with approved strip or round chart recorders. Tests shall be made in sections not exceeding one-half mile.

C. Each valved section of pipe to be tested shall be slowly filled with water and a test pump shall be installed at the low point of the section being tested. All air in the line will be expelled before applying specified test pressure. To accomplish this, taps will be made, if necessary, at the point of highest elevation and afterward tightly stopped with tapered brass plugs, all at the Contractor's expense.

D. After installation and filling of the line as specified, the Contractor will pump the line to a pressure greater than 100 psi. At no time shall the test or line pressure exceed 140 psi. If required by the Owner's Engineer, pump test equipment shall be equipped with pressure relief valves pre-set to 140 psi.

E. Throughout the duration of the test, the Contractor is required to maintain a minimum pressure in excess of 100 psi. The Contractor is advised that, should the line pressure fall to or below 100 psi at any time during the two hour test, the test will be considered invalid and a retest in accordance with this procedure will be required. Therefore, it is advised to pump water into the line as the line pressure approaches 100 psi. The test will be conducted with a pressure variation of not more than 5 psi for the duration of the test.

F. At the end of the two hour test period, the Contractor will be required to pump the pipe lines back up to the highest pressure obtained during the duration of the test period. If chart records are required for the hydrostatic test, the Contractor shall furnish flow and/or pressure charts as a condition of concluding the test.

G. The allowable leakage, as specified below, will be defined as any volume of water required to maintain a minimum pressure in excess of 100 psi during the duration of the test period plus that volume of water required at the conclusion of the test to bring the line pressure back up to the highest pressure obtained during the duration of the test period.

Two Hour Hydrostatic Test Allowable Leakage for 100 LF or 5 Joints (in Gal.)

Allowable Leakage for AWWA PVC Pipe

Nominal pipe size in.	**Average Test Pressure**	
	100 PSI	**150 PSI**
4"	0.027	0.033
6"	0.041	0.050
8"	0.054	0.066
10"	0.068	0.083
12"	0.081	0.099

H. Leakage detection at mechanical joints shall be stopped by tightening the gland (not to exceed required torque) and leaking at slip joints shall be cut out and entirely replaced or, if permission is given by the Owner's Engineer, it may be repaired by a suitable clamp. Any cracked or defective pipes, fittings or valves discovered as a result of this pressure test shall be removed and replaced by the Contractor with sound material and then the test shall be repeated until satisfactory.

I. The Contractor is warned that pressure testing against existing "end-of-line" valves is done at his own risk. Failure of these valves to hold test pressure will not relieve the Contractor of the pressure testing nor will it entitle him to any additional compensation for the extra work performed.

END OF SECTION

ISSUED REVISED	PUMP SPECIFICATION SHEET	S-1

Location: **Main Lift Pumps 1, 2 and 3**

Service: Raw Sewage

Type of Pump: Submersible, Rail Guided, Sewage Pump

Solids Handling Capability: 3"min – (Suction and discharged connection shall not be less than 8")

Materials of Construction:

Casing:	Cast iron, Class 30
All Exposed Bolts & Nuts:	316L stainless steel
Pump Exterior:	Sprayed with PVC epoxy primer with chloric rubber paint finish
Shaft:	Stainless steel ANSI 420
Upper Bearing:	Single row deep groove ball bearing, B-10 Life of 50,000 hours minimum
Lower Bearing:	Two row angular contact ball bearing, B-10 Life of 55,000 hours minimum
Guide Rails:	316L Stainless steel
Wear Rings	Each pump shall have wear ring fitted to the volute inlet and to the eye of the impeller

Installation: The pump shall have a discharge connection elbow connected to a vertical discharge pipe. The discharge connection elbow shall be permanently installed in the wet well along with the discharge piping. The pump shall be automatically aligned and connected to the discharge connection elbow when lowered into place, and shall be easily removed for inspection or service without a need for personnel to enter the wet well.

Service Features

1. The pumps shall be easily removable for inspection or service, requiring no bolts, nuts, or other fastenings to be disconnected.

2. The pump discharge piping design shall be such that the pump unit will be automatically and firmly connected to the discharge piping when lowered into place.

3. Hardware necessary for the inspection or removal of each pump from the wet well shall be provided. Hardware shall include, but not be limited to, the following:

   a. Vertical guide bar or bars
   b. Guide bar brackets
   c. Discharge pipe connections or elbows
   d. Stainless steel lifting chain

Drive Motor:

1. 30 horsepower
2. Design - squirrel-cage, induction
3. NEMA Design - Type B
4. Windings - Copper, Class F Insulated
5. Service Factor - 1.25 continuous
6. Design Temperature - NEMA Standard MG-1
7. Non-overloading at any point on pump curve
8. Explosion Proof
9. Oil Filled Motor
10. Motor Terminal Board
11. Stator shall be heat-shrink fitted
12. Motor Winding Overtemperature Thermostats
13. Seal Failure Moisture Probe

Guaranteed Performance:

	GPM	TDH	RPM	EFF
Design	650	81	1740	58.1%
Shut off	0	120	0.000	0
Low head	1700	15	1740	20

ENGINEERING STANDARD

ISSUED REVISED	PUMP SPECIFICATION SHEET	S-1

Warranty and Guarantee:

1. The pump manufacturer shall warrant the unit being supplied to the Owner against defects in workmanship and material for a non-prorated period of five (5) years or 10,000 hours following startup.

2. The pump manufacturer shall guarantee for replacement of pump and motor for failure of satisfactory performance and for defective parts or assembly at no additional cost to the Owner.

ACCEPTABLE PUMP EQUIVALENTS

MANUFACTURER	MODEL	REMARKS
WILO	FA 15.66E	or approved equal