100% SPECS

SPECIFICATIONS & CONTRACT DOCUMENTS

FOR THE

PANAMA CITY BEACH

GARDENIA STREET DRAINAGE PIPE PROJECT

PREPARED FOR

CITY OF PANAMA CITY BEACH, FLORIDA

MARK SHELDON, MAYOR
PAUL CASTO, COUNCIL MEMBER, WARD 1/VICE MAYOR
PHIL CHESTER, COUNCIL MEMBER, WARD 2
MARY COBURN, COUNCIL MEMBER, WARD 3
MICHAEL JARMAN, COUNCIL MEMBER, WARD 4
DREW WHITMAN, CITY MANAGER
HOLLY WHITE, ASSISTANT CITY MANAGER

OCTOBER 2022

PREPARED BY:

DEWBERRY ENGINEERS INC.
203 ABERDEEN PARKWAY
PANAMA CITY, FLORIDA 32405
PHONE: 850.522.0644
EB0008794

CITY OF PANAMA CITY BEACH
GARDENIA STREET DRAINAGE PIPE PROJECT

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ADVERTISEMENT FOR BIDS

PANAMA CITY BEACH – GARDENIA STREET DRAINAGE PIPE PROJECT

This project includes the construction of drainage structures, drainage pipe, and all associated site work starting at the intersection of Gardenia Street and Agave Street and extending approximately 350 linear feet north on Gardenia Street in Panama City Beach, Florida. The Contractor shall provide all materials, equipment, and labor to complete the project.

A mandatory Pre-Bid meeting will be held **January 9th, 2023 at 10:00 AM CDT,** in the Panama City Beach Council Chambers, 17007 Panama City Beach Parkway, Panama City Beach, Florida 32413). A virtual participation option will not be offered.

BIDS must be received by City of Panama City Beach (herein called the "OWNER"), at City of Panama City Beach, City Hall 17007 Panama City Beach Parkway, Panama City Beach, FL. 32413 no later than **2:30 PM CDT, January 23rd, 2023,** then opened and read publicly promptly thereafter.

Bid Documents may be downloaded online at www.demandstar.com and on the City's website at https://www.pcbfl.gov/about-us/rfp-posts-list starting on **Monday, December 12, 2022**.

- Electronic Bids will only be accepted when submitted through the DemandStar's Bid portal. Emailed submissions will not be accepted.

- Alternately, one original and one copy along with a CD or flash drive may be delivered to the City Hall Office at the address below. Any sealed Bid submitted on paper must identify and clearly mark the Bid # **PCB23-14 ITB Gardenia Street Drainage Project** on the package**.** Receipt of a Bid by any Panama City Beach Office, receptionist, or personnel other than the City Hall's front desk does not constitute "receipt" as required by this solicitation. The time received at City Hall shall be conclusive as to the timeliness of receipt.

All paper Bids shall be sealed and delivered or mailed to:

City of Panama City Beach City Hall
ATTN: Purchasing Manager
17007 Panama City Beach Parkway
Panama City Beach, FL 32413

Each BID must be submitted electronically through DemandStar, mailed or hand-delivered to City Hall in a sealed envelope addressed to City of Panama City Beach, 17007 Panama City Beach Parkway, Panama City Beach, Florida 32413. Each sealed

envelope containing a BID must be plainly marked on the outside as "**SEALED BID PCB23-14 GARDENIA STREET DRAINAGE PIPE PROJECT.**"

A Bid Bond in the amount of 5% of the total amount of the Bid shall accompany the Bid. The City of Panama City Beach ("City") reserves the right to reject any and all Bids. All Bids shall be firm (including all labor and material prices) for a period of 30 days after opening.

All bidders shall be Florida Department of Transportation Pre-Qualified and must provide proof of pre-qualification prior to Notice of Award. Each bidder must comply with all applicable state and local laws concerning licensing, registration, and regulations of contractors doing business in Florida. All bidders shall be certified in the following FDOT work classes:

1. Asphalt
2. Concrete
3. Drainage
4. Grading
5. Grassing, Seeding, Sodding

Each bidder must comply with all applicable state and local laws concerning licensing, registration, and regulations of contractors doing business in Florida.

All work shall be in conformance with the latest edition of the FDOT Roads and Bridges Manual.

BIDDERS must submit all questions, if any, in writing at least seven (7) days prior to the BID date. If necessary, questions will be answered as ADDENDA and will be issued to the Contract Documents and posted on the City's website. It is the sole responsibility of the bidder to determine if any addenda have been issued. The due date for questions will be by the close of business on January 16th, 2023.

Any and all questions regarding the Bidding documents shall be directed to City of Panama City Beach Purchasing Manager: **Carrie Jagers, via email: Purchasing@pcbfl.gov.** Contact with any other City official or City employees for the purpose of inquiries regarding this bid or the meaning or interpretation of these specifications shall be grounds for disqualification.

The City shall award the Contract to the lowest responsive and responsible bidder; provided, however, the City reserves the right to award the Contract to a Bidder who is not the lowest responsive and responsible bidder if the City determines in its reasonable discretion that another Bid offers the City a better value based upon the reliability, quality of service, or product of such other Bidder.

Advertisement Dates December 19th, 2022, and December 26th, 2022.

Notice to Publisher – Please forward the original “Proof of Publication” and the invoice to:

City of Panama City Beach
17007 Panama City Beach Parkway
Panama City Beach, Florida 32413

[END OF SECTION 00010]

SECTION 00020

INFORMATION FOR BIDDERS

BIDS will be received by City of Panama City Beach City Hall (herein called the "OWNER"), at 17007 Panama City Beach, Panama City Beach, Florida 32413 until **2:30 PM CDT, January 23rd, 2023** then opened and read publicly promptly thereafter.

Each BID must be submitted electronically through DemandStar, or in a sealed envelope addressed to City of Panama City Beach, 17007 Panama City Beach Parkway, Panama City Beach, Florida 32413. Each sealed envelope containing a BID must be plainly marked on the outside as "SEALED BID **PCB23-14 GARDENIA STREET DRAINAGE PIPE PROJECT"** and the envelope should bear on the outside the BIDDER'S name, address, and license number if applicable, 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 to the OWNER - City of Panama City Beach, at 17007 Panama City Beach Parkway, Panama City Beach, Florida 32413.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. **Two original BID forms are required for paper responses**.

A complete BID response shall consist of:

1. An executed Bid Proposal Form – Section 00030
2. The required Bid Bond – Section 00040
3. An executed copy of the Statement Under Section 287.087, Florida Statutes, On Preference To Businesses With Drug-Free Workplace Programs – Section 0095
4. An executed copy of the Trench Safety Act Compliance Document – Section 00096
5. An executed copy of the Public Entity Crimes Statement – Section 00097
6. An executed copy of the Sales Tax Exemption Addendum – Section 000808
7. Copies of all Addenda signed by Bidder evidencing receipt

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn by the BIDDER prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered, no exceptions. No BIDDER may withdraw a BID within 30 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the apparent successful BIDDER.

This is a Lump Sum Contract. BIDDERS must satisfy themselves of the accuracy of any estimated quantities in the BID Schedules or Contract Documents by examination of the site and a review of the drawings and specifications including any ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done. **The CONTRACTOR shall visit the entire site before submitting a BID.**

The OWNER shall provide to BIDDERS prior to BIDDING, information which is pertinent to, and delineates and describes, the land upon which the WORK is to be performed, including its ownership and rights-of-way acquired or to be acquired.

If necessary, ADDENDA will be issued to the Contract Documents. The BIDDERS must submit all questions, if any, in writing at least seven (7) days prior to the BID date.

The CONTRACT DOCUMENTS contain the provisions required for construction of the WORK. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the successful BIDDER or relieve the successful BIDDER from fulfilling all of their obligations under the contract.

No Bid shall be considered or accepted unless at the time the Bid is submitted to OWNER the same shall be accompanied by a cashier's check, a cash bond posted with the City Clerk, a certified check payable to Owner on some bank or trust company located in the State of Florida insured by the Federal Deposit Insurance Corporation, or Bid Bond, in an amount not less than 5% of **the bidder's maximum possible award (base bid plus all add alternates)** (collectively referred to herein as the "Bid Deposit"). The Bid Deposit shall be retained by Owner as liquidated damages if the successful Bidder fails to execute and deliver to Owner the unaltered Agreement, or fails to deliver the required Performance and Payment Bonds or Certificates of Insurance, all within ten (10) calendar days after receipt of the Notice of Award. Bid Bonds shall be executed by a corporate surety licensed under the laws of the State of Florida to execute such bonds, with conditions that the surety will, upon demand, forthwith make payment to Owner upon said bond.

As soon as the BID prices have been compared, the OWNER will return the BID DEPOSITS (if requested) of all except the three lowest responsive and responsible (or best value as hereafter provided) BIDDERS. When the required Agreement has been executed by the successful BIDDER and delivered to OWNER, together with the required Certificate(s) of Insurance, Performance Bond and Payment Bond, the BID DEPOSITS of the successful BIDDER and two remaining unsuccessful BIDDERS will be returned (if requested).

A PERFORMANCE BOND and a PAYMENT BOND each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety approved by the OWNER, will be required for the faithful performance of the contract.

Attorneys-in-fact who sign BID BONDS or PAYMENT BONDS and PERFORMANCE BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to obtain the required insurance, PAYMENT BOND and PERFORMANCE BOND, execute the AGREEMENT and deliver to OWNER said executed AGREEMENT together with the required Certificate of Insurance and the PERFORMANCE BOND and PAYMENT BOND, within ten (10) calendar days after the date the NOTICE OF AWARD is delivered to the BIDDER; the required forms for such AGREEMENT being set forth in Section 00050, the required form for the PERFORMANCE BOND being set forth in Section 00060, the required form for the PAYMENT BOND being set forth in Section 00070 and the required form for the Certificate of Insurance being set forth in Section 00099. In case of failure of the successful BIDDER to execute and deliver to OWNER, within said ten (10) day period the required AGREEMENT, together with the required Certificates of Insurance, PERFORMANCE BOND and PAYMENT BOND, the OWNER may consider the BIDDER in default, in which case the entire amount of the BID DEPOSIT accompanying the BID shall be paid to the OWNER. The BID DEPOSIT shall be retained by Owner as liquidated damages if the successful Bidder fails to execute and deliver to Owner the unaltered Agreement, or fails to deliver the required Performance and Payment Bonds or Certificate(s) of Insurance, all within ten (10) calendar days after receipt of the Notice of Award.

If the OWNER intends to accept the successful BIDDER'S BID and enter into the contract with them, the OWNER, within thirty (30) days (or such longer period of time the OWNER and successful BIDDER may mutually agree to in writing) of receipt of an acceptable PERFORMANCE BOND, PAYMENT BOND, Certificate(s) of Insurance, and AGREEMENT signed by the successful BIDDER to whom the AGREEMENT was awarded, shall sign the AGREEMENT and return to such party an executed duplicate of the AGREEMENT. BIDDER acknowledges and agrees that unless and until the OWNER executes the AGREEMENT and returns the executed copy to the BIDDER, no contract or agreement between the OWNER and BIDDER shall exist. Should the OWNER not execute the AGREEMENT within such period, the BIDDER shall provide OWNER an additional seven days written notice of BIDDER'S intent to withdraw its signed copy of the AGREEMENT. If OWNER fails to execute the AGREEMENT within seven days, the AGREEMENT shall be deemed withdrawn and BIDDER shall be released from its BID as of the date of the written notice.

All Bidders shall be Florida Department of Transportation prequalified and must include with their bid proposal a copy of their Certification of Current Capacity (Form 375-020-22) and Status of Contracts on Hand (Form 375-020-21).

The OWNER or its agents may make such investigations as deemed necessary to determine the ability of each BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER and its agents all such information and data for this purpose as the OWNER or its agents 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 AGREEMENT and to complete the WORK contemplated therein.

A conditional or qualified BID may be rejected by OWNER. The OWNER shall award the Contract to the lowest responsive and responsible BIDDER as determined by OWNER; provided, however, OWNER reserves the right to award the Contract to a BIDDER who is not the lowest responsive and responsible BIDDER if OWNER determines in its reasonable discretion that another BID offers OWNER a better value based upon the reliability, quality of service, or product of such other BIDDER. In the event OWNER awards the Contract to a BIDDER other than the lowest responsive and responsible BIDDER, OWNER shall state the basis upon which the award is being made.

Each BIDDER may attach to its BID any information or documentation it believes is relevant to addressing the factors of reliability, quality of service and product, as such factors pertain to the WORK to be provided under the AGREEMENT to be awarded pursuant to this Information for Bidders. Any such information or documentation is to consist of no more than 20 pages, single sided, each page no larger than 8” x 11”. OWNER reserves the right, either before or after BID opening, but prior to contract award, to request from any BIDDER such information or documentation addressing the factors of reliability, quality of service or product, as OWNER may determine is reasonably necessary to assist it in deciding which bid offers OWNER the better value. Further, each BIDDER by submitting its BID is deemed to have authorized OWNER to conduct such investigations as OWNER may determine are reasonably necessary to assist it in deciding which BID offers OWNER the better value. OWNER in making any decision as to which BID offers OWNER the better value may rely upon any such information or documentation provided by a BIDDER, and by submitting any such information or documentation, upon request from OWNER, the BIDDER will be deemed to have certified and warranted to OWNER the accuracy and correctness of any such information and documentation. Further, in making any decision as to which BID offers OWNER the better value, OWNER also may rely upon its own investigations or its own records and knowledge concerning the BIDDER, including the BIDDER's personnel, work product and prior work history.

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the WORK shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the AGREEMENT, PLANS, SPECIFICATIONS, and other CONTRACT DOCUMENTS, prior to submitting their BID. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

Further, the BIDDER agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provisions of the equal opportunity clause set forth in the GENERAL CONDITIONS or any Supplemental Conditions.

The successful BIDDER of each contract shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when required to do so by the OWNER. Each BIDDER shall provide a separate line item in their BID identifying the cost of

compliance with the applicable trench safety standards set forth in the Trench Safety Act.

[END OF SECTION 00020]

SECTION 00030

BID PROPOSAL FORM

This proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of_____, doing business as_____(a corporation, a partnership or an individual), whose Florida contractor's license number is_____is hereby submitted to the CITY OF PANAMA CITY BEACH (hereinafter called "OWNER").

In compliance with the requirements of the Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the **Gardenia Street Drainage Pipe Project** in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID, each party thereto certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under the CONTRACT DOCUMENTS within ten (10) calendar days after the NOTICE TO PROCEED to be issued by Owner in writing and achieve Substantial Completion of the WORK with 270 consecutive calendar days thereafter. Final Completion of the WORK shall be achieved by BIDDER within the calendar days specified in the General Conditions after the date of Substantial Completion.

BIDDER further agrees to pay as liquidated damages, the sum of $1,600 for each consecutive calendar day that expires after the Contract Time until Substantial Completion of the WORK is achieved as provided in Section 15 of the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

Addendum No. _____

Addendum No. _____

Addendum No. _____

BASE BID

BIDDER agrees to perform all the WORK described in the CONTRACT DOCUMENTS for the following lump sum:_____.

The BIDDER proposes and agrees, if this Proposal is accepted, to contract with the OWNER in the required form of the Agreement, Section 00050, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the WORK in full and in accordance with the shown, noted, described and reasonably intended requirements of the CONTRACT DOCUMENTS according to the following schedule:

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BID SCHEDULE

A. ROADWAY – BID SCHEDULE

ITEM DESCRIPTION		UNIT	PLAN QUANTITY	ITEM COST	TOTAL
ROADWAY (INCLUDING BUT NOT LIMITED TO):					
1	MOBILIZATION (≤5% OF BASE BID)	LS	1		
2	BONDS AND INSURANCE	LS	1		
3	MAINTENANCE OF TRAFFIC	LS	1		
4	SURVEY (LAYOUT AND AS-BUILTS)	LS	1		
5	DEMOLITION	LS	1		
6	CLEARING & GRUBBING	LS	1		
7	STAKED SILT FENCE, TYPE III	LS	1		
8	INLET PROTECTION	EA	8		
9	CLEARING & GRUBBING	LS	1		
10	DEWATERING	LS	1		
11	EARTH WORK	LS	1		
12	REMOVE AND REPLACE CONCRETE PAVEMENT AS NEEDED	SY	67		
13	REMOVE AND REPLACE ASPHALT PAVEMENT AS NEEDED	SY	135		
14	INLETS, DITCH BOTTOM TYPE C	EA	2		
15	INLETS, DITCH BOTTOM TYPE E	EA	6		
16	PIPE CULVERT, RCP, ROUND 24" S/CD	LF	125		
17	PIPE CULVERT, RCP, ROUND 30" S/CD	LF	312		
18	PIPE CULVERT, RCP, ROUND 36" S/CD	LF	49		
19	PERFORMANCE TURF, SOD	SY	1,100		
20	ALL OTHER ROADWAY WORK NOT LISTED	LS	1		
ROADWAY SUB-TOTAL:					

IF AN ITEM COST IS LISTED FOR LINE ITEM 20, ALL OTHER ROADWAY WORK NOT LISTED, BIDDER SHALL PROVIDE AN ITIMIZED LIST OF WORK AND MATERAILS UNDER SEPARATE SHEET.

B. UTILITIES – POTABLE WATER – BID SCHEDULE

ITEM DESCRIPTION		UNIT	PLAN QUANTITY	ITEM COST	TOTAL
POTABLE WATER (INCLUDING BUT NOT LIMITED TO):					
1	ALL 6-INCH DIAMETER PVC PIPING	LF	55		
2	ALL 6-INCH MJ 45° BENDS	EA	8		
3	ALL 6-INCH MJ SLEEVES	EA	4		
4	ALL 2-INCH DIAMETER PVC PIPING	LF	24		
5	ALL 2-INCH MJ 45° BENDS	EA	4		
6	ALL 2-INCH MJ SLEEVES	EA	2		
7	PRESSURE TEST, FLUSH, BT TEST	LS	1		
8	ALL OTHER POTABLE WATER WORK NOT	LS	1		

	LISTED				
POTABLE WATER SUB-TOTAL:					
IF AN ITEM COST IS LISTED FOR LINE ITEM 8, ALL OTHER POTABLE WATER WORK NOT LISTED, BIDDER SHALL PROVIDE AN ITIMIZED LIST OF WORK AND MATERAILS UNDER SEPARATE SHEET.					

C. UTILITIES – RECLAIMED WATER – BID SCHEDULE

ITEM DESCRIPTION		UNIT	PLAN QUANTITY	ITEM COST	TOTAL
RECLAIMED WATER (INCLUDING BUT NOT LIMITED TO):					
1	ALL 4-INCH DIAMETER PVC PIPING	LF	40		
2	ALL 4-INCH MJ 45° BENDS	EA	8		
3	ALL 4-INCH MJ SLEEVES	EA	4		
4	PRESSURE TEST	LS	1		
5	ALL OTHER RECLAIMED WATER WORK NOT LISTED	LS	1		
RECLAIMED WATER SUB-TOTAL:					
IF AN ITEM COST IS LISTED FOR LINE ITEM 5, ALL OTHER RECLAIMED WATER WORK NOT LISTED, BIDDER SHALL PROVIDE AN ITIMIZED LIST OF WORK AND MATERAILS UNDER SEPARATE SHEET.					

SUMMARY

SUBTOTALS		
A	**ROADWAY**	
B	**UTILITIES – POTABLE WATER**	
C	**UTILITIES – RECLAIMED WATER**	
BASE BID TOTAL:		

NOTE:

1. BIDS shall include sales tax and all other applicable taxes and fees. The OWNER may elect to utilize the Sales Tax Exemption Addendum (Section 00098) for material at its sole discretion.

2. BIDS shall be on the basis of a lump sum price, as noted above, and shall be the total compensation to be paid by OWNER for the complete WORK.

3. Bid unit prices and quantities, shall be applicable for any revisions to the WORK (either additions or omissions). In addition, these unit prices and quantities shall be reflected in the Schedule of Values as specified in the General Conditions. All unit prices are understood to include all associated charges for layout, insurance, taxes, field office and supervision, overhead and profit, bonds, and miscellaneous items.

4. The OWNER reserves the right to reject any and all bids received.

5. **Failure to insert a bid amount for any item in the Bid Schedule will be considered grounds for the OWNER to determine the BID is non- responsive.**

6. By submitting this BID, the BIDDER, and the BID BOND surety, are deemed to have stipulated and agreed that any and all claims, demands, actions or suits whatsoever, arising under this BID and/or BID BONDS, shall be subjected to the sole and exclusive jurisdiction and venue of the Circuit Court of Bay County, Florida. The BIDDER and BID BOND surety do agree, by submittal of this BID, that the sole and exclusive jurisdiction and venue in said forum is proper and appropriate since performance of the underlying contract to be awarded is to be accomplished within Bay County, Florida.

Bidder's Certification BIDDER certifies that it has thoroughly familiarized itself with and inspected the site and has read and is thoroughly familiar with the CONTRACT DOCUMENTS. Additional site investigation, if deemed necessary by the BIDDER, shall be performed prior to BID submittal at the BIDDER's sole expense. Bidder certifies that the BID submitted is complete and is sufficient for the Bidder to provide a fully operational and working system in accordance with the CONTRACT DOCUMENTS. Furthermore, BIDDER certifies its understanding that neither the OWNER, PROJECT REPRESENTATIVE, nor ENGINEER shall provide any labor, equipment, or materials of any kind, which may be required for the performance of the WORK, unless otherwise specifically directed by OWNER. Likewise, BIDDER certifies that it shall provide all equipment, materials, labor, and services necessary to complete the WORK in accordance with the CONTRACT DOCUMENTS whether or not such equipment, material, labor, or service is expressly identified. Such occurrences are deemed subsidiary obligations of the contract for which complete compensation is made under the Lump Sum. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

As required, the following documents are submitted with this Bid Proposal:

1. Bid Bond – Section 00040
2. Executed Statement Under Section 287.087, Florida Statutes, On Preference To Businesses With Drug-Free Workplace Programs – Section 0095
3. Executed Trench Safety Act Compliance Document – Section 00096
4. Executed Public Entity Crimes Statement – Section 00097
5. Executed Sales Tax Exemption Addendum – Section 000808
6. All acknowledged Addenda

CONTRACTOR: _____

_____

Address

_____

Authorized Signature

_____

Phone Number

_____

Date

[END OF SECTION 00030]

SECTION 00040

BID BOND

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned,

_____, as Principal, and_____,

as Surety, are hereby held and firmly bound unto the City of Panama City Beach, as OWNER, in the penal sum of _____

for the payment of which, will and truly be made, we hereby jointly and severally bind ourselves, successors, and assigns. Signed this____day of_____, 20__.

The Condition of the above obligation is such that whereas the principal has submitted to the OWNER a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the construction of the **Gardenia Street Drainage Pipe Project.**

NOW THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver the Agreement in the form of contract as set forth in Section 00050 (properly completed in accordance with said BID) and shall furnish a BOND for faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform its obligations created by OWNER's acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in force and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

(c) NOW, THEREFORE, if the OWNER shall accept the BID of the Principal and the Principal shall execute and deliver to OWNER the required Agreement and within ten days after the date of a written Notice of Award in accordance with the terms of such BID, and within said ten days deliver to OWNER the required Certificates(s) of Insurance, together with the required Performance and Payment Bonds in an amount of 100% the total Contract Amount as specified in the Bidding Documents or Contract Documents with good and sufficient surety for the faithful performance of the Agreement and for the prompt payment of labor, materials and supplies furnished in the prosecution thereof or, in the event of the failure of the Principal to execute and deliver to OWNER such Agreement or to give such bond or bonds, and deliver to OWNER the required certificates of insurance, if the Principal shall pay to OWNER the fixed penal sum of $_____ noted above as liquidated damages, and not as a penalty, as provided in the Instructions for Bidders, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety, for value received, hereby stipulates, and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may have to accept said BID; and Surety does hereby waive notice of any such extension.

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

_____
Principal

_____
Surety

By: _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Florida.

[END OF SECTION 00040]

SECTION 00050

AGREEMENT

THIS AGREEMENT is made this_____day of_____,20 by and between THE CITY OF PANAMA CITY BEACH, FLORIDA, (hereinafter called "OWNER") and_____, doing business as a _____(an individual), or (a partnership), or (a corporation), having a business address of_____(hereinafter called "CONTRACTOR") , for the performance of the Work (as that terms is defined below) in connection with the construction of **Gardenia Street Drainage Pipe Project** ("Project"), to be located at Panama City Beach, Florida _____, in accordance with the Drawings and Specifications prepared by **Dewberry, Inc**. the Engineer of Record (hereinafter called "Engineer") and all other Contract Documents hereafter specified.

OWNER and CONTRACTOR, for the consideration herein set forth, agree as follows:

1. The CONTRACTOR shall furnish, at its sole expense, all supervision, labor, equipment, tools, material, and supplies to properly and efficiently perform all of the work required under the Contract Documents and shall be solely responsible for the payment of all taxes, permits and license fees, labor fringe benefits, insurance and bond premiums, and all other expenses and costs required to complete such work in accordance with this Agreement (collectively the "Work"). CONTRACTOR'S employees and personnel shall be qualified and experienced to perform the portions of the Work to which they have been assigned. In performing the Work hereunder, CONTRACTOR shall be an independent contractor, maintaining control over and having sole responsibility for CONTRACTOR'S employees and other

personnel. Neither CONTRACTOR, nor any of CONTRACTOR'S sub-contractors or sub-subcontractors, if any, nor any of their respective employees or personnel, shall be deemed servants, employees, or agents of OWNER.

2. The CONTRACTOR will commence the Work required by the Contract Documents within ten (10) calendar days after the date of the NOTICE TO PROCEED to be issued by OWNER in writing within thirty (30) calendar days from the date of this Agreement and will achieve Substantial Completion of the Work within 270 days of the required commencement date, except to the extent the period for Substantial Completion is extended pursuant to the terms of the Contract Documents ("Contract Time"). Final Completion of the Work shall be achieved by CONTRACTOR within the time period set forth in Section 15.2 of Section 00100, General Conditions.

3. The CONTRACTOR agrees to pay the OWNER, as liquidated damages, the sum of $1,600 for each calendar day that expires after the Contract Time for Substantial Completion as more fully set forth in Section 15 of the General Conditions.

4. The CONTRACTOR agrees to perform all of the Work described in the Contract Documents and comply with the terms therein for the sum of $_____ as shown in the BID SCHEDULE, included within the Bid Proposal Form, as said amount may be hereafter adjusted pursuant to the terms of the Contract Documents ("Contract Price").

5. The term "Contract Documents" means and includes the following documents, all of which are incorporated into this Agreement by this reference:

DRAWINGS prepared by Dewberry, Inc.

numbered _Cover Sheet_ through_D3_ and dated _October 2022_.

SPECIFICATIONS prepared or issued by Dewberry, Inc.
dated__October 2022_____.

ADDENDA
No. ____, dated_____, 20___

No. ____, dated_____, 20___

No. ____, dated_____, 20___

No. ____, dated_____, 20___

The Contract Documents also includes any written amendments to any of the above signed by the party to be bound by such amendment. The Contract Documents are sometimes referred to herein as the “Agreement.”

6. The OWNER will pay the Contract Price to the CONTRACTOR in the manner and at such times as set forth in Contract Documents.

7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

8. This Agreement shall be governed by the laws of the State of Florida.

9. All notices required or made pursuant to this Agreement shall be in writing and, unless otherwise required by the express terms of this Agreement, may be given either (i) by mailing same by United States mail with proper postage affixed thereto, certified, return receipt requested, or (ii) by sending same by

Federal Express, Express Mail, Airborne, Emery, Purolator or other expedited mail or package delivery, or (iii) by hand delivery to the appropriate address as herein provided. Notices to OWNER required hereunder shall be directed to the following address:

If to Owner:

City of Panama City Beach
17007 Panama City Beach Parkway
Panama City Beach, FL 32413
ATTENTION: Drew Whitman City Manager
Fax No.: (850) 233-5108

If to Contractor:

_____
_____
_____
ATTENTION: _____
Fax No.: _____

Either party may change its above noted address by giving written notice to the other party in accordance with the requirements of this Section.

10. CONTRACTOR recognizes that OWNER is exempt from sales tax and may wish to generate sales tax savings for the Project. Accordingly, to the extent directed by and without additional charge to OWNER, CONTRACTOR shall comply with and fully implement the sales tax savings program as more fully described in the Sales Tax Exemption Addendum. If required by OWNER, the Sales Tax Exemption Addendum shall be made a part of the Contract Documents, the form of which is set forth in Section 00808.

11. The failure of OWNER to enforce at any time or for any period of time any one or more of the provisions of the Agreement shall not be construed to be and shall not be a continuing waiver of any such provision or provisions or of its right thereafter to enforce each and every such provision.

12. Each of the parties hereto agrees and represents that the Agreement comprises the full and entire agreement between the parties affecting the Work contemplated, and no other agreement or understanding of any nature concerning the same has been entered into or will be recognized, and that all negotiations, acts, work performed, or payments made prior to the execution hereof shall be deemed merged in, integrated and superseded by this Agreement.

13. Should any provision of the Agreement be determined by a court with jurisdiction to be unenforceable, such a determination shall not affect the validity or enforceability of any other section or part thereof.

14. Unless the context of this Agreement otherwise clearly requires, references to the plural include the singular, references to the singular include the plural. The term “including” is not limiting, and the terms “hereof,” “herein,” “hereunder,” and similar terms in this Agreement refer to this Agreement as a whole and not to any particular provision of this Agreement, unless stated otherwise. Additionally, the parties hereto acknowledge that they have carefully reviewed this Agreement and have been advised by counsel of their choosing with respect thereto, and that they understand its contents and agree that this Agreement shall not be construed more strongly against any party hereto, regardless of who is responsible for its preparation.

15. For this Project, OWNER has designated a Project Representative to assist OWNER with respect to the administration of this Agreement. The Project Representative to be utilized by OWNER for this Project, shall be Dewberry, Morgan Hurst, P.E., Senior Project Manager.

16. CONTRACTOR acknowledges and agrees that no interruption, interference, inefficiency, suspension or delay in the commencement or progress of the Work

from any cause whatever, including those for which the OWNER, PROJECT REPRESENTATIVE, or ENGINEER may be responsible, in whole or in part, shall relieve CONTRACTOR of its duty to perform or give rise to any right to damages or additional compensation from OWNER. CONTRACTOR expressly acknowledges and agrees that it shall receive no damages for delay. CONTRACTOR‘s sole remedy, if any, against OWNER will be the right to seek an extension to the Contract Time; provided, however, the granting of any such time extension shall not be a condition precedent to the aforementioned “No Damage For Delay” provision. This section shall expressly apply to claims for early completion, as well as to claims based on late completion. Notwithstanding the foregoing, if the Work is delayed due to the fault or neglect of OWNER or anyone for whom OWNER is liable, and such delays have a cumulative total of more than 90 calendar days, CONTRACTOR may make a claim for its actual and direct delay damages accruing after said 90 calendar days as provided in Section 00805 Supplemental Conditions, Contract Claims and Changes. Except as expressly set forth in this section, in no event shall OWNER be liable to CONTRACTOR whether in contract, warranty, tort (including negligence or strict liability) or otherwise for any acceleration, soft costs, lost profits, special, indirect, incidental, or consequential damages of any kind or nature whatsoever.

17. INSURANCE - BASIC COVERAGES REQUIRED

The CONTRACTOR shall at its expense procure and maintain in force during the Term the insurance on policies and with insurers acceptable to the City as required by the City’s Insurance Requirements attached hereto as Exhibit “A.” These insurance requirements shall not limit the liability of the CONTRACTOR. The insurance coverages and limits required of CONTRACTOR under this Agreement are designed to meet the minimum requirements of OWNER and the OWNER does not represent these types or amounts of insurance to be sufficient or adequate to protect the CONTRACTOR'S interests or liabilities. CONTRACTOR alone shall be responsible to the sufficiency of its own insurance program.

Within thirty (30) days of the date of the Award, and thereafter upon the written request of the City, Bidder shall furnish to the City such certificates of coverage and certified copies of policies pursuant to the City's Insurance Requirements. In order to satisfy this provision, the documentation required by this part must be sent to the following address: Attn: Lori Philput, Risk Manager, 17007 Panama City Beach Parkway, Panama City Beach, FL 32413. The CONTRACTOR and the CONTRACTOR'S subcontractors and sub-subcontractors shall be solely responsible for all of their property, including but not limited to any materials, temporary facilities, equipment and vehicles, and for obtaining adequate and appropriate insurance covering any damage or loss to such property. The CONTRACTOR and the CONTRACTOR'S sub-contractors and sub-subcontractors expressly waive any claim against OWNER arising out of or relating to any damage or loss of such property, even if such damage or loss is due to the fault or neglect of the OWNER or anyone for whom the OWNER is responsible. The CONTRACTOR is obligated to include, or cause to be included, provisions similar to this paragraph in all of the CONTRACTOR'S subcontracts and its subcontractors' contracts with their sub-subcontractors.

The CONTRACTOR'S deductibles/self-insured retention's shall be disclosed to OWNER and are subject to OWNER'S approval. They may be reduced or eliminated at the option of OWNER. The CONTRACTOR is responsible for the amount of any deductible or self-insured retention. Any deductible or retention applicable to any claim or loss shall be the responsibility of CONTRACTOR and shall not be greater than $25,000, unless otherwise agreed to, in writing, by OWNER.

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in two (2) copies each of which shall be deemed an original on the date first written above.

(SEAL)

ATTEST:

_____
City Clerk

_____
City Attorney (as to form only)

OWNER:

CITY OF PANAMA CITY BEACH, FLORIDA

BY:_____

NAME:_____
(Please type)

TITLE:_____

CONTRACTOR:

ATTEST:

_____

NAME_____
(Please Type)

BY:_____

NAME:_____
(Please Type)

ADDRESS:_____

[END OF SECTION 00050]

PCB23-14 ITB GARDENIA STREET DRAINAGE PIPE PROJECT

SECTION 00060

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

_____

(Name of Contractor)

_____

(Address of Contractor)

a_____, hereinafter called Principal and
(Corporation, Partnership, or Individual)

_____

(Name of Surety)

_____

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto:

City of Panama City Beach

(Name of Owner)

17007 Panama City Beach Parkway

(Address of Owner)

hereinafter called OWNER in the total aggregate penal sum of _____ _____ Dollars ($_____) in lawful money of the United States, for payment of which, we bind ourselves, our heirs, personal representatives, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that if the Principal performs its duties, all the undertakings, covenants, terms, and conditions of that certain Contract between the Principal and the OWNER, dated the_____ day of_____, 20__, a copy of which is hereto attached and made a part hereof for the construction of:

GARDENIA STREET DRAINAGE PIPE PROJECT

"PROJECT NAME(s)"

during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the SURETY and during the guaranty period and if the PRINCIPAL shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void, otherwise to remain in full force and effect.

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

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the Contract Price more than twenty percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, or the CONTRACT DOCUMENTS, shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the PRINCIPAL shall abridge the rights of OWNER hereunder. The OWNER is the only beneficiary hereunder.

[REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK.]

IN WITNESS WHEREOF, this instrument is executed in **three (3)** counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20___.

_____
Principal

_____
(Principal) Secretary

(SEAL) BY _____

_____
(Address)

_____

_____
Witness as to Principal

_____
(Address)

_____

_____
(Surety)

ATTEST:

_____ BY _____
Witness to Surety Attorney-In-Fact

_____ _____
(Address) (Address)

_____ _____

NOTE: Date of BOND must not be prior to date of Contract.
Contractor’s Surety shall use this form along with their personal documentation.

If CONTRACTOR is partnership, all partners should execute BOND.

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

[END OF SECTION 00060]

SECTION 00070

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a_____, hereinafter called Principal and
(Corporation, Partnership, or Individual)

_____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto:

City of Panama City Beach
(Name of Owner)

17007 Panama City Beach Parkway, Panama City Beach, Florida 32413
(Address of Owner)

hereinafter called OWNER, and unto all persons, firms, and corporations who or which may furnish labor, or who furnish materials to perform as described under the Contract and to their successors and assigns in the total aggregate penal sum of _____ _____Dollars ($_____) in lawful money of the United States, for the payment of which, we bind ourselves, our heirs, personal representatives, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that if the PRINCIPAL properly makes payment to all claimants, as defined in Section 255.05(1), Florida Statutes, supplying Principal with labor, materials or supplies, used directly or indirectly by the Principal in the prosecution of the WORK provided for under that certain contract between the Principal and the OWNER, dated the _____day of_____, 20_, a copy of which is hereto attached and made a part hereof for the construction of :

GARDENIA STREET DRAINAGE PIPE PROJECT

"PROJECT NAME(s)"

and any authorized extensions or modification thereof, including all amounts due for materials, lubricants, fuel, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK including that by a SUBCONTRACTOR or SUPPLIER of any tier, and to any construction lien holder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

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

PROVIDED, FURTHER, every suit instituted upon the BOND shall be brought in a court of competent jurisdiction for the county or circuit in which the Contract was to be performed. Owner shall not be joined as a party in any such suit. The notice and time limits of Section 255.05, Florida Statutes, are incorporated herein.

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the Contract Price more than twenty percent so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, or the CONTRACT DOCUMENTS shall include any change, alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the rights of the OWNER hereunder.

[REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK.]

WITNESS WHEREOF, this instrument is executed in **three (3)** counterparts, each one of which shall be deemed an original, this the ____ day of _____, 20__.

_____
Principal

_____
(Principal) Secretary

(SEAL) BY _____

_____
(Address)

_____

_____
Witness as to Principal

_____
(Address)

_____

_____
(Surety)

ATTEST:

_____ BY _____
Witness as to Surety Attorney-In-Fact

_____ _____
(Address) (Address)

_____ _____

NOTE: Date of BOND must not be prior to date of Contract.

If CONTRACTOR is partnership, all partners should execute BOND. Contractor's Surety shall use this form along with their personal documentation.

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

[END OF SECTION 00070]

SECTION 00080

NOTICE OF AWARD

TO: _____
_____
_____

PROJECT DESCRIPTION:

GARDENIA STREET DRAINAGE PIPE PROJECT

The City of Panama City Beach ("City") has considered the BID submitted by you for the above-described Project in response to its Advertisement for Bids dated_____, 20__, and associated Information for Bidders.

You are hereby notified that your Bid in the amount of $_____ has been accepted by the City. Provided, however, nothing in this Notice or your delivery to the City of the Agreement executed by you (with the required Bonds and Certificates of Insurance) shall in any manner or way be deemed to create any contract between you and the City. No such contract shall be created unless and until the City signs the Agreement.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance Bond, Payment Bond, and Certificates of Insurance within ten (10) calendar days from the date of this Notice.

If you fail to execute said Agreement, together with the required Certificates of Insurance and Bonds, within ten (10) calendar days from the date of this Notice, City will be entitled to consider all your rights arising out of City's acceptance of your BID as abandoned and as a forfeiture of your Bid Deposit. The City will be entitled to all other rights and remedies as may be available to it at law.

You must return an acknowledged copy of this Notice of Award to the City, with the executed Agreement and required Certificates of Insurance and Bonds, within the above noted ten (10) calendar day period.

Dated this_____day of_____, 20___.

[REMIAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK.]

CITY OF PANAMA CITY BEACH
Owner

By _____

Name: Drew Whitman

Title City Manager

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged

By_____

This the_____day of_____, 20___.

Name_____

Title_____

[END OF SECTION 00080]

SECTION 00090

NOTICE TO PROCEED

TO: _____
_____
_____

PROJECT DESCRIPTION:
GARDENIA STREET PIPE PROJECT

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 20___on or before_____, 20___, and you are to substantially complete the WORK within_____consecutive calendar days thereafter. The date of Substantial Completion is therefore _____
20_. You are to achieve Final Completion within 30 days of achieving Substantial Completion. You must return and acknowledge a copy of this Notice to Proceed to the City within five (5) calendar days of your receipt of this Notice.

CITY OF PANAMA CITY BEACH

By: _____

Name: Drew Whitman

Title City Manager

ACCEPTANCE OF NOTICE
Receipt of the above Notice to Proceed is hereby acknowledged

By_____
(Company Name)

This _____day of_____, 20___

_____
(Signature)

_____
(Type or Print Name)

_____
(Title)

[END OF SECTION 00090]

SECTION 00091

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT: _____

DATE OF ISSUANCE _____

OWNER _____

OWNER'S ACCOUNT NO. _____

CONTRACTOR _____ ENGINEER _____

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following parts thereof:

TO: **CITY OF PANAMA CITY BEACH**
Owner

And TO: _____
Contractor

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR, and ENGINEER, and that the Work is hereby declared to be substantially complete in accordance with the Contract Documents on

_____
Date of Substantial Completion

A tentative list of items to be completed or corrected is to be developed within one week. This may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of the CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within 30 days of the above date of Substantial Completion.

From the date of Substantial Completion the responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees shall be as follows:

RESPONSIBILITIES:

OWNER: CITY OF PANAMA CITY BEACH

_____

_____

CONTRACTOR:_____

_____

_____

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

(For items to be attached see definition of Substantial Completion as supplemented and other specifically noted conditions precedent for achieving Substantial Completion as required by Contract Document.)

_____

Executed by ENGINEER on _____ _____
Date *Engineer*

By: _____
Authorized Signature

CONTRACTOR accepts this Certificate of Substantial Completion on _____
Date

_____
Contractor

By: _____
Authorized Signature

OWNER accepts this Certificate of Substantial Completion on _____
Date

Owner

By: _____
Authorized Signature

Prepared by the Engineers Joint Contract Documents Committee and endorsed by The Associate General Contractors of America.

[END OF SECTION 00091]

SECTION 00092

CONTRACTOR/SUB-CONTRACTOR/VENDOR WARRANTY FORM

PROJECT:_____

OWNER:_____

GENERAL CONTRACTOR:_____

We,_____, CONTRACTOR/SUB-CONTRACTOR/VENDOR for _____

as specifications Section(s)_____do herby warrant that all labor and materials furnished, and work performed in conjunction with the above referenced project are in accord with the Contract Documents and authorized modifications thereto and will be free from defects due to defective materials and workmanship for a period of **ONE YEAR** from Date of Acceptance. This warranty commences on_____and expires on_____.

Should any defect develop during the warranty period due to improper material, workmanship, or arrangement, the same shall, upon written notice by the OWNER, be made good by the undersigned at no expense to the OWNER. Nothing in the above shall be deemed to apply to work which has been abused or neglected by the OWNER.

_____
Authorized Signature

_____
Printed Named

_____
Title

_____
Name of Entity/Corporation

Sworn to and subscribed before me this_____day of_____, 20___.

_____
Notary Public

My Commission Expires: _____
NOTARY SEAL ABOVE

_____
Printed Name

[END OF SECTION 00092]

SECTION 00095

STATEMENT UNDER SECTION 287.087 FLORIDA STATUTES, ON PREFERENCE TO BUSINESSES WITH DRUG-FREE WORKPLACE PROGRAMS

IDENTICAL TIE BIDS: Preference shall be given to businesses with drug-free workplace programs. Whenever two or more BIDS which are equal with respect to price, quality and service are received by the OWNER for this PROJECT, a bid received from a BIDDER that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. In order to have a drug-free workplace program, a business shall:

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.

2. Inform employees about the dangers of drug abuse in the workplace, the business' policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.

3. Give each employee engaged in providing the commodities or contractual servicesthat are under BID a copy of the statement specified in paragraph (1).

4. In the statement specified in paragraph (1), notify the employees that, as a condition of working on the commodities or contractual services that are under BID, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of Chapter 893 or of any controlled substance law of the United States or any state, for a violation occurring in the workplace not later than five (5) days after such conviction.

5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation program is such is available in the employee's community, by an employee who is so convicted.

6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of this Section.

As the person authorized to sign this statement, I certify that this firm complies fully with the above requirements.

_____

BIDDER SIGNATURE

[END OF SECTION 00095]

SECTION 00096

CERTIFICATE OF COMPLIANCE WITH THE
FLORIDA TRENCH SAFETY ACT

Bidder acknowledges sole responsibility for complying with the Florida Trench Safety Act (Act). Section 553.60, Florida Statutes. Bidder further acknowledges that included in the various items of its BID and in its Total Lump Sum Bid are costs for complying with the Florida Trench Safety Act. The Bidder further identifies the costs to be summarized below:

	Trench Safety Method (Description)	Units of Measure (LF, SY)	Quantity	Unit Cost	Extended Cost	Unit Extended
A.						
B.						
C.						
D.						

Total $_____

Failure to complete the above may result in your BID being declared non-responsive. The costs indicated above are provided to comply with the Act and shall not constitute grounds for any additional compensation to that listed for the separate line items of the Bid Form.

Bidder_____
By:_____
Its _____

Date _____

_____
Authorized Signature

[END OF SECTION 00096]

PCB23-14 ITB GARDENIA STREET DRAINAGE PIPE PROJECT

SECTION 00097

SWORN STATEMENT UNDER SECTION 287.133(3)(a),
FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES

THIS FORM MUST BE SIGNED AND SWORN TO IN THE PRESENCE OF A NOTARY PUBLIC OR OTHER OFFICIAL AUTHORIZED TO ADMINISTER OATHS AND SUBMITTED WITH THE BID

1. This sworn statement is submitted to _____

   by _____

   For _____

   Whose business address is _____

   _____

   _____

and (if applicable) its Federal Employer Identification Number (FEIN) is _____
(if the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement): _____

2. I understand that a “public entity crime” as defined in Section 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 public entity or with an agency or political subdivision of any other state or with the United States, including, but not limited to, any bid, proposal, reply, or contract for goods or services, any lease for real property, or any contract for the construction or repair of a public building or public work, involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

   I understand that "convicted" or "conviction" as defined in Section 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.

3. I understand that "affiliate" as defined in Section 2871.33 (1)(a) , Florida Statutes, means:
   (a.) A predecessor or successor of a person convicted of a public entity crime, or

(b.) 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. The term “affiliate” includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person 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 shall be considered an affiliate.

4. I understand that a “person” as defined in Section 287.133 (1)(e), Florida Statute, means any natural person or any entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term “person” includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

5. Based on information and belief, the statement which I have marked below is true in relation to the person submitting this sworn statement. [indicate which statement applies.]

_____Neither the person submitting this sworn statement nor any affiliate of the person has been charged with and convicted of a public entity crime causing such person or affiliate to be placed on the convicted vendor list within the last thirty-six (36) months.

_____The person submitting this sworn statement or an affiliate of the person has been charged with and convicted of a public entity crime causing such person or affiliate to be placed on the convicted vendor list within the last thirty-six (36) months.

_____The person submitting this sworn statement or an affiliate of the person has been charged with and convicted of a public entity crime causing such person or affiliate to be placed on the convicted vendor list within the last thirty-six (36) months. However, it has been determined, pursuant to Section 287.133, Florida Statutes, that it was not in the public interest to place the person submitting this sworn statement or its affiliate on the convicted vender list. [Attach a copy of the final order].

6. I understand by my execution of this document, I acknowledge that the person submitting this sworn statement has been informed by the City of Panama City

Beach, of the terms of Section 287.133(2)(a) of the Florida Statutes which read as follows:

> "A 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, proposal, or reply on a contract to provide any goods or services to a public entity; may not submit a bid, proposal, or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals, or replies 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 following the date of being placed on the convicted vendor list."

7. I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THE PUBLIC ENTITY ONLY AND THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR WHICH IT IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY IMMEDIATELY OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

[REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK.]

By: _____

Print name: _____

Its: _____

Sworn to and subscribed before me this_____day of_____, 20___.

Personally known_____OR Produced identification _____

Notary Public- State of _____

My commission expires_____

_____
[printed, typed, or stamped
Commissioned Name of Notary Public]

[END OF SECTION 00097

SECTION 00100

GENERAL CONDITIONS

1. Definitions
2. Additional Instructions and Detail Drawings
3. Schedules, Reports and Records
4. Intent of the Contract Documents, Drawings and Specifications
5. Shop Drawings
6. Materials, Services, and Facilities
7. Inspection and Testing
8. Substitutions
9. Patents
10. Surveys, Permits, Regulations, and Project Layout
11. Protection of Work, Property, Persons
12. Supervision by Contractor
13. Changes in the Work
14. Changes in Contract Price
15. Time for Completion and Liquidated Damages
16. Correction of Defective Work
17. Suspension of Work, Termination, and Delay
18. Payments to Contractor
19. Acceptance of Final Payment as Release
20. Contract Security
21. Assignments
22. Indemnification
23. Separate Contracts
24. Subcontracting
25. Engineer's Authority
26. Land and Right-of-Ways
27. Guarantee
28. Claims and Disputes
29. Taxes
30. Contract Time, Schedule of the Work, and Time Extensions
31. Use of Site
32. Temporary Facilities
33. Clean Up and Disposal of Waste Materials
34. Warranty of Title
35. Ownership of Hidden Valuable Materials
36. As-Built Plans and Documents to be kept at the Site
37. Silence of Specifications
38. Gratuities
39. Audit and Access to Records
40. Equal Opportunity Requirements
41. Changed Conditions
42. Compliance with Laws
43. Public Entity Crimes
44. Insurance Requirements

1.1 Unless otherwise expressly noted, wherever used in the Contract Documents the following terms shall have the meanings indicated and shall be applicable to both the singular and plural thereof:

1.2 ADDENDA - Written or graphic instruments, issued by Owner or Engineer prior to the execution of the Agreement, which modify or interpret any of the Contract Documents by additions, deletions, clarifications, or corrections.

1.3 BID - The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

1.4 BIDDER - Any person, firm, or corporation submitting a Bid for the Work.

1.5 BONDS - Bid, Performance, and Payment Bonds and other instruments or surety, furnished by the Contractor and the Contractor's surety in accordance with the Contract Documents.

1.6 CHANGE ORDER - A written order to the Contractor issued in accordance with the procedures set forth in the Contract Documents, authorizing an addition, deletion, or revision in the Work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time.

1.7 CONSTRUCTION CHANGE DIRECTIVE – A Construction Change Directive is a written order prepared by the Engineer and signed by the Owner, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Price or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Agreement, order changes in the Work within the general scope of the Agreement consisting of additions, deletions or other revisions, the Contract Price and Contract Time being adjusted accordingly.

1.8 CONTRACT DOCUMENTS – Collectively the Agreement, Proposal Form, Payment Bond, Performance Bond, General Conditions, Supplemental Conditions, if any, Notice of Award, Notice to Proceed, Drug Free Workplace Program Statement, Trench Safety Act Certificate of Compliance, Public Entity Crimes Statement, Certificate of Insurance, Release and Affidavit from Contractor, Release and Affidavit from Subcontractor, Application and Certificate for Payment, Certificate of Substantial Completion, Contract Change Order(s), Construction Change Directives, Field Orders, Drawings, Specifications and Addenda. The Contract Documents are sometimes referred to herein as the Agreement.

1.9 CONTRACT PRICE - The total compensation payable by Owner to Contractor under the terms and conditions of the Contract Documents.

1.10 CONTRACT TIME - The total period of time beginning with the date of commencement of the Work as authorized by the City and ending on the required date for Substantial Completion of the Work. The Contract Time is set forth with more specificity in Section 2 of the Agreement.

1.11 CONTRACTOR - The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.

1.12 CITY or OWNER – The City of Panama City Beach, Florida, acting through its City Council and Charter Officers.

1.13 DRAWINGS - The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location, and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

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

1.15 FIELD ORDER - A written order effecting a clarification or change in the Work not involving an adjustment in the Contract Price or an extension of the Contract Time, issued by Engineer or Owner to Contractor during construction.

1.16 NOTICE OF AWARD - The written notice of the acceptance of the Bid from the City to the successful Bidder.

1.17 NOTICE TO PROCEED - Written communication issued by the City to the Contractor authorizing it to proceed with the Work and establishing the date for commencement of the Work.

1.18 OWNER - Same as CITY; same as City of Panama City Beach, Florida.

1.19 PROJECT – The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the City or by separate contractors, and is formally known as the Gardenia Street Drainage Pipe Project.

1.20 PROJECT ADMINISTRATION MANUAL (sometimes referred to herein as the “MANUAL”) – The City’s manual of forms and standard administrative procedures regarding project administration. Contractor acknowledges and agrees it has received a copy of the current Manual and shall incorporate any modifications or updates issued by the City into its copy of the Manual to ensure the Manual is kept up to date.

1.21 PROJECT REPRESENTATIVE -The Project Representative shall be the City’s representative with respect to the Project and may be a City employee or an

outside consultant. The Project Representative shall have authority to transmit instructions, receive information, and interpret and define the City's policies and decisions with respect to the Work. However, except as may be otherwise expressly authorized in writing by the City, the Project Representative is not authorized on behalf of the City to issue any verbal or written orders or instructions to Contractor that would have the effect, or be interpreted to have the effect, of amending or modifying the terms or conditions of the Contract Documents or modifying or amending in any way whatever the: (1) scope or quality of Work to be performed and provided by Contractor as set forth in the Contract Document; (2) the time within which Contractor is obligated to complete the Work; or (3) the amount of compensation the City is obligated or committed to pay Contractor as set forth in the Contract Documents.

1.22 SHOP DRAWINGS - All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by the Contractor, a Subcontractor, manufacturer, supplier, or distributor, which illustrate how specific portions of the Work shall be fabricated or installed.

1.23 SPECIFICATIONS - The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

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

1.25 SUBSTANTIAL COMPLETION - That date certified by the Engineer when the Work or an Owner specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Work or the Owner specified part thereof can be utilized by Owner for the purposes for which it is intended.

1.26 SUPPLEMENTAL CONDITIONS - Modifications to the General Conditions required by Owner, set forth in the Section 00800 series of documents.

1.27 SUPPLIER - Any person or organization who supplies materials or equipment for the Work for or on behalf of Contractor, including those fabricated to a special design, but who does not perform labor at the site.

1.28 WORK - The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

2.0 ADDITIONAL INSTRUCTION AND DETAIL DRAWINGS

2.1 From time to time, Contractor may be furnished additional instructions and detail drawings by the Engineer as necessary to permit Contractor to carry out the Work required by the Contract Documents.

2.2 Any such additional drawings and instructions supplied to Contractor shall be issued as a Field Order. The Contractor shall carry out the Work in accordance with the additional detailed drawings and instructions.

3.0 SCHEDULES, REPORTS AND RECORDS

3.1 The Contractor shall submit to the City such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records, and other data where applicable as are required by the Contract Documents for the Work to be performed.

3.2 Contractor shall prepare and provide its construction progress schedule ("Construction Schedule") prior to submitting is first Application for Payment, showing the order in which the Contractor proposes to carry on the Work, including dates at which the various parts of the Work will be started, estimated date of completion of each part and, as applicable, the dates at which special drawings will be required and dates for submission of Shop Drawings, the beginning of manufacture, the testing and the installation of materials, supplies and equipment. Further, the Construction Schedule shall not only include the overall progress schedule for the Work to be provided by Contractor hereunder, but also shall include reasonable time periods for Engineer's performance, as accepted by Engineer. The Construction Schedule and any other schedules required by the City hereunder shall be updated monthly. The Construction Schedule and all updates to it shall not exceed the time periods established in the Contract Documents and shall be subject to the City's and Engineer's review and comment. Contractor's submittal of a satisfactory Construction Schedule and updates thereto and the City's acceptance of same shall be a condition precedent to the City's obligation to pay Contractor; provided, however, the acceptance of any such schedule or update by Owner shall not be deemed an admission by Owner that such schedule or update is reasonable, accurate or correct.

3.3 The Contractor shall also submit a schedule of payments, for Owner's review and approval that the Contractor anticipates will be earned during the course of the Work.

4.0 INTENT OF THE CONTRACT DOCUMENTS, DRAWINGS AND SPECIFICATIONS

4.1 It is the intent of the Contract Documents to describe a functionally complete Project (or portion thereof) to be constructed in accordance with the Contract Documents. Any work, materials or equipment that may reasonably be inferred

from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for in the Contract Documents. If the Contract Documents include words or terms that have a generally accepted technical or industry meaning, then such words or terms shall be interpreted to have such standard meaning unless otherwise expressly noted in the Contract Documents. Reference to standard specifications, manuals or codes of any technical society, organization or association or to the laws or regulations of any governmental authority having jurisdiction over the Project, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, law or regulation in affect at the time the Work is performed, except as may be otherwise specifically stated herein. Provided, however, in the event the standard specification, manual, code, law or regulation is changed after the Agreement has been executed by the parties, a Change Order shall be issued equitably adjusting the Contract Price and/or Contract Time to the extent such change materially impacts the Contract Time and/or Contract Price.

4.2 Contractor shall perform the Work consistent with the intent of the Drawings, Specifications, and other Contract Documents, and Contractor shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the Work in accordance with the Contract Documents and all incidental items necessary to complete the Work in an acceptable manner, ready for use, occupancy or operation by the City.

4.3 Drawings are intended to show general arrangements, design and extent of Work and are not intended to serve as shop drawings. Specifications are separated into divisions for convenience of reference only and shall not be interpreted as establishing divisions for the Work, trades, subcontracts, or extent of any part of the Work. In the event of a discrepancy between or among the Drawings, Specifications or other Contract Document provisions, Contractor shall be required to comply with the provision which is the more restrictive or stringent requirement upon Contractor, as determined by the City.

4.4 If during the performance of the Work Contractor discovers a conflict, error, or discrepancy in the Contract Documents, including the Drawings and Specifications, Contractor immediately shall report same to Engineer and Owner in writing, and before proceeding with the Work affected thereby, shall obtain a written interpretation or clarification from Engineer. Work done by the Contractor after discovery of such conflict, error, or discrepancy without such written interpretation or clarification from Engineer, shall be done at the Contractor's risk. Prior to commencing the Work, Contractor shall first take all necessary field measurements and verify the applicable field conditions. After taking such measurements and verifying such conditions, Contractor shall carefully compare such measurements and conditions with the requirements of the Contract Documents, taking into consideration all other relevant information known to Contractor, for the purpose of identifying and bringing to Engineer’s and City’s attention all conflicts or discrepancies with the Contract Documents.

Contractor is solely responsible for verifying all field measurements and conditions.

4.5 Contractor shall comply with the City's standard forms and procedures as set forth in the City's Project Administration Manual relating to Project administration. To the extent there is no form or procedure for a particular matter, then Contractor shall comply with the form or procedure reasonably required by the City. Once a standard form has been executed by Contractor and Owner as necessary, the executed copy shall become part of the Contract Documents.

5.0 SHOP DRAWINGS

5.1 The Contractor shall provide shop drawings as may be necessary for the prosecution of the Work as required by the Contract Documents. The Engineer shall promptly review all shop drawings. The Engineer's approval of any shop drawing shall not release the Contractor from responsibility for deviations from the Contract Documents. Any shop drawing which deviates from the requirements of the Contract Documents must be first authorized by a Change Order.

5.2 When submitted for the Engineer's review, shop drawings shall bear the Contractor's certification that it has reviewed, checked, and approved the shop drawings and that they are in conformance with the requirements of the Contract Documents.

5.3 Portions of the Work requiring a shop drawing or sample submission shall not begin until the shop drawing or submission has been approved by the Engineer. A copy of each approved shop drawing and each approved sample shall be kept in good order by the Contractor at the site and shall be available to the Engineer.

6.0 MATERIALS, SERVICES AND FACILITIES

6.1 It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete and deliver the Work within the Contract Time.

6.2 Materials and equipment shall be stored by Contractor to ensure the preservation of their quality and fitness for the Work. Stored materials and equipment to be incorporated in the Work shall be located so as to facilitate prompt inspection.

6.3 Manufactured articles, materials, and equipment shall be applied, installed,

connected, erected, used cleaned and conditioned as directed by the manufacturer.

6.4 Materials, supplies, and equipment shall be in accordance with samples submitted by the Contractor and approved by the Engineer.

6.5 Materials, supplies and equipment to be incorporated into the Work shall not be purchased by the Contractor or the Subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest or lien is retained by the seller.

7.0 INSPECTION AND TESTING

7.1 All materials and equipment used in the construction of the Project shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the Contract Documents or required by applicable governmental law, rule or regulation.

7.2 The City, Engineer, their respective representatives, agents and employees and governmental agencies with jurisdiction over the Project shall have access at all times to the Work whether the Work is being performed on or off of the Project site, for their observation, inspection, and testing. Contractor shall provide proper and safe conditions for such access, and also for any inspection or testing thereof. Contractor shall provide the City and Engineer with timely prior written notice (at least 48 hours) of the readiness of the Work for all required inspections, tests, or approvals. In addition, authorized representatives, and agents of any participating Federal or State agency shall be permitted to inspect all Work, materials, payrolls, personnel records, material invoices, and other relevant data and records.

7.3 The Contractor shall provide at the Contractor's expense all testing and inspection services required by the Contract Documents or any applicable governmental law, rule, or regulation. Re-inspection and re-testing fees and costs of all testing failures shall be at the Contractor's expense.

7.4 If the Contract Documents or any applicable governmental law, rule, or regulation requires any portion of the Work to specifically be inspected, tested, or approved, Contractor shall assume full responsibility therefore, pay all costs in connection therewith and furnish the Engineer the required certificates of inspection, testing or approval. All inspections, tests or approvals shall be performed in a manner and by organizations acceptable to the City and Engineer.

7.5 Neither observations by Engineer or the City, nor inspections, tests or approvals by the Engineer or others shall relieve the Contractor from the obligations to perform the Work in accordance with the requirements of the Contract Documents.

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

7.7 If any Work that is to be inspected, tested or approved pursuant to the Contract Documents or any applicable governmental law, rule or regulation is covered without such inspection, testing or approval having been satisfactorily obtained by Contractor and without obtaining the written concurrence from Engineer, Contractor shall uncover, expose or otherwise make available the Work for such observation, inspection or testing as directed by Engineer, and Contractor shall be responsible for all such costs of uncovering, exposing, observation, inspection, testing, and reconstruction.

7.8 If the Engineer considers it necessary or advisable that covered Work be inspected or tested by others that was not otherwise required to be tested or inspected by the terms of the Contract Documents or any applicable governmental law, rule or regulation, the Contractor, at the Engineer 's request, will uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the Work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such Work is defective, the Contractor will bear all the expenses of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction. If, however, such Work is not found to be defective, the Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate Change Order shall be issued.

8.0 SUBSTITUTIONS

8.1 Whenever a material, article, or piece of equipment is identified on the Drawings or Specifications by reference to brand name or catalogue numbers, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function may be considered. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance, quality, and function for those referred to in the Contract Documents by reference to brand name or catalogue number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance, quality and function to that specified, the Engineer may allow its substitution and use by the Contractor. If the Contractor based its bid on "or equal" products and the City and/or Engineer determine that one or more of the Contractor's proposed "or equal" products included in its bid fails to meet the requirements of the Contract Documents, Contractor may be required, at City's sole discretion, to provide products conforming with the requirements of the Contract Documents at no additional cost to the City per the City's direction.

8.2 If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall certify that the proposed substitute shall perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. Contractor shall also certify that the evaluation and acceptance of the proposed substitute will not prejudice Contractor's achievement of Substantial Completion of the Work within the Contract Time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for the Project) to adapt the design to the proposed substitute and whether or not incorporation or use by the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service shall be indicated. Contractor shall also provide an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs for redesign and claims of other contractors affected by the resulting change, all of which shall be considered by Engineer in evaluating the proposed substitute. Engineer or Owner may require Contractor to furnish at Contractor's expense additional data about the proposed substitute. Further, Contractor shall reimburse Owner for the changes of Engineer and Engineer's consultants for evaluating each proposed substitute submitted after the effective date of the Agreement and all costs resulting from any delays in the Work while the substitute was undergoing review.

9.0 PATENTS

9.1 The Contractor shall pay all applicable royalties and license fees, and shall defend all suits or claims for infringement of any patent rights and save the City harmless from loss on account thereof, except that the City shall be responsible for any such loss when a particular process, design, or product of a particular manufacturer or manufacturers is specified. Provided, however, if the Contractor has reason to believe that the design, process, or product specified is an infringement of a patent, the Contractor shall be responsible for such loss or claim unless the Contractor promptly gives such information in writing to the Engineer and City.

10.0 SURVEYS, PERMITS, REGULATIONS, AND PROJECT LAYOUT

10.1 The City shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the Work together with a suitable number of benchmarks adjacent to the Work as shown in the Contract Documents. From the information provided by the City, unless otherwise specified in the Contract Documents, the Contractor shall develop and make all detail surveys needed for construction such as slope stakes, batten boards, stakes for pipe locations and other working points, lines, elevations and cut

sheets.

10.2 The Contractor shall carefully preserve benchmarks, reference points and stakes. Contractor is solely responsible for maintaining all benchmarks, reference points, and stakes, and is solely responsible for any mistake that may be caused by their loss or disturbance. The Contractor shall be held responsible for all mistakes that may be caused by the loss or disturbance of any such benchmarks, reference points or stakes.

10.3 The Contractor shall engage for the performance of Project layout and control, a Professional Land Surveyor registered in the State of Florida to practice land surveying. Said surveyor must carry Professional Liability Insurance in the amount of at least one million dollars ($1,000,000) per occurrence. The land surveyor employed for this Project must comply with the Minimum Technical Standards for Surveying and Mapping pursuant to Florida Statute 472.027.

10.4 Should the Contractor in the course of its Work find that the points, grades and levels which are shown upon the Drawings are not conformable to the physical conditions of the locality at the proposed work or structure, it shall immediately inform the Engineer of the discrepancy between actual physical conditions of the locality of the proposed work, and the points, grades and levels which are shown on the drawings. No claim shall be made by the Contractor against the City for compensation or damage by reasons of failure of the Engineer to represent upon the Drawings points, grades, and levels conformable to the actual physical conditions of the locality of the proposed work.

10.5 All permits and licenses necessary for the prosecution of the Work shall be secured and paid for by the Contractor unless otherwise expressly noted in the Contract Documents. These shall include all building permits, burn permits, debris disposal permits, etc. All licenses, easements and variances for permanent structures or permanent changes in existing facilities shall be secured and paid for by the City, unless otherwise specified in the Contract Documents. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and governmental permits and approvals bearing on the conduct of the Work as drawn and specified. If the Contractor observes that the Contract Documents are at variance therewith, the Contractor shall promptly notify the Engineer and City in writing, and any necessary changes shall be adjusted as provided in Section 13 below.

11.0 PROTECTION OF WORK, PROPERTY, AND PERSONS

11.1 The Contractor is responsible for the safety and protection of all persons and property on or about the Project site during the progress of the Work, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction. Further, it is Contractor’s responsibility to protect from damage or loss all material and equipment to be incorporated into the Work whether in storage on

or off the Project site. Contractor shall initiate, maintain, and supervise all safety precautions and programs in connection with the Work and shall develop and implement, in accordance with the requirements of the Contract Documents, a safety plan for the Work. Contractor's safety plan shall include a hurricane protection plan. Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as the Work is completed and final acceptance of same by the City has occurred.

11.2 The Contractor will comply with all applicable codes, laws, ordinances, rules, regulations and orders of the City and any public body having jurisdiction over the Work, including the Occupational Safety and Health Administration (OSHA) and any State Safety and Health agency requirements and all of their safety codes, laws, ordinances, rules, and regulations. The Contractor will erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. Contractor shall notify owners of adjacent property and of any underground structures or improvements and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, or replacement of their property. The Contractor will remedy all damage, injury or loss to any property caused by the Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them be liable.

11.3 Barricades, Guards and Safety Provisions: To protect persons from injury and to avoid property damage, adequate barricades, construction signs, torches, red lanterns, and guards shall be placed and maintained during progress of construction work and until it is safe for both pedestrians and vehicular traffic. Rules and regulations of local authorities regarding safety provisions shall be observed.

11.4 In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instructions or authorization from the Engineer or City, shall act to prevent threatened damage, injury, or loss. The Contractor will give the Engineer prompt written notice of any such emergency and to the extent the emergency was not caused by the fault or neglect of Contractor or anyone for whom Contractor is responsible, a Change Order shall be issued covering the necessary and reasonable changes and deviations involved.

11.5 At all times during the performance of the Work at the Project site, Contractor shall have designated, and located on a full-time basis at the Project site, a qualified individual whose responsibility shall be to monitor and enforce Contractor's safety program at the Project site; such individual shall be deemed to be the Contractor's Project Superintendent. However, Contractor may designate by written notice to the City another individual, reasonably acceptable to the City, who shall be Contractor's safety representative at the Project site.

11.6 Alcohol, drugs, and all illegal substances are strictly prohibited on the Project site and any City property. All employees of Contractor, as well as those of all Subcontractors and those of any other person or entity for whom Contractor is legally liable (collectively referred to herein as “Employees”), shall not possess or be under the influence of any such substances while on the Project site or any City property. Further, employees shall not bring on to the Project site or any City property any gun, rifle or other firearm, or explosives of any kind. Provided, however, to the extent explosives are reasonably required with respect to the performance of the Work, Contractor shall strictly comply with the Contract Documents and any and all rules and regulations of Owner or of any applicable governmental agency as it relates to the storage, handling, and use of such explosives.

12.0 SUPERVISION BY CONTRACTOR

12.1 The Contractor will supervise and direct the Work. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor will employ and maintain on the Project site on a full-time basis a qualified superintendent acceptable to the City. The superintendent and his or her designees shall have full authority to act on behalf of the Contractor and all communications given to the superintendent or his or her designee shall be as binding as if given to the Contractor. The superintendent or his or her designee shall be present on the site at all times when any portion of the Work is being performed to ensure adequate supervision and coordination of the Work.

13.0 CHANGES IN THE WORK

13.1 The City may at any time during the progress of the Work, as the need arises and in its sole discretion, order changes within the general scope of the Work without invalidating the Agreement. Promptly after being notified of a change, but in no event more than fourteen (14) days after its receipt of such notification (unless the City has agreed in writing to a longer period of time), Contractor shall submit an itemized estimate of any cost or time increases or savings it foresees as a result of the change. Except in an emergency endangering life or property, no addition or changes to the Work shall be made except upon a properly issued Change Order, Construction Change Directive or Field Order. No officer, employee or agent of the City is authorized to direct any extra or changed work without a properly issued Change Order, Construction Change Directive, or Field Order.

13.2 All changes to the Work must be authorized by means of a written Change Order that is mutually agreed to by the City and Contractor or a Construction Change Directive issued by the City, or a Field Order issued by the City or Engineer. If the change is to be accomplished through a Change Order, the Change Order, in the form set forth in the City’s Project Administration Manual, shall be prepared by Contractor, reviewed by Engineer and the City, and

executed promptly by the parties after an agreement is reached between Contractor and the City concerning the requested changes. Contractor shall promptly perform changes authorized by duly executed Change Orders. The Contract Price and Contract Time shall be adjusted in the Change Order in the manner as the City and Contractor shall mutually agree. The Change Order shall identify the changed work. Also, where the Contract Price is based upon unit prices, a Change Order may be used for work for which quantities have been altered from those shown in the bidding schedule, as well as decreases or increases in the quantities of installed units which are different than those shown in the bidding schedule because of final measurements. All changes must be recorded on an executed Change Order before they can be included in a monthly Application for Payment.

13.3 To the extent the Contract Price is based on unit prices, the City reserves the right to increase or decrease a unit price quantity as may be deemed reasonable or necessary in order to complete the Work contemplated by this Agreement.

13.4 If the City and Contractor are unable to agree on a Change Order for the requested change, Contractor shall, nevertheless, promptly perform the change as directed by the City in a written Construction Change Directive. In that event, the Contract Price and Contract Time shall be adjusted in the Construction Change Directive as determined by the City. If Contractor disagrees with the City's adjustment determination, Contractor must make a claim strictly in accordance with the terms of the Contract Documents or else be deemed to have waived any claim it might otherwise have had on that matter.

13.5 The City shall have the right to conduct an audit of Contractor's books and records, as well as those of its Subcontractors and Suppliers, to verify the accuracy of Contractor's estimates or claims with respect to Contractor's cost and time impacts associated with any Change Order or Construction Change Directive.

13.8 The Engineer or City at any time may direct Contractor to make changes to the Work by issuing a Field Order, so long as such changes do not require or result in any adjustment to the Contract Price or Contract Time, and are generally within the scope of the Work. Contractor shall proceed with the performance of any changes in the Work so ordered by the Engineer or City unless the Contractor believes that such Field Order entitles the Contractor to a change in the Contract Price or Contract Time, or both. In the event Contractor believes the Field Order requires a change to the Contract Price or Contract Time, it must provide written notice to the Engineer and City within five (5) business days of receipt of the Field Order and before starting with any changed Work. Failure to provide such notice waives Contractor's right to claim such work requires a change in the Contract Price or Contract Time. Once Contractor has provided timely written notice, it shall proceed as directed by City in writing, and

thereafter shall file a claim in accordance with the procedures required herein.

14.0 CHANGES IN CONTRACT PRICE

14.1 The Contract Price may be changed only by a Change Order or Construction Change Directive issued in accordance with the terms of the Contract Documents. If the Change Order or Construction Change Directive provides for an adjustment to the Contract Price, the adjustment shall be based on one of the following methods: mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation; or unit prices stated in the Contract Documents or subsequently agreed upon; or cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or on a time and material basis.

14.2 In the event the Owner elects to proceed with changed work on a time and material basis, the following provisions shall apply:

1421 For all labor, including a foreman in direct charge of the specified operations, the Contractor shall receive a sum equal to the current standard local rate of wages actually paid for every hour that the labor is actually engaged in such changed work, plus the actual cost of social security taxes, unemployment insurance, and workmen's compensation insurance based on the actual wages paid for such labor, to which cost shall be added an amount equal to ten percent (10%) thereof for all overhead and profit (including all general supervision and for furnishing and repairing small tools and ordinary equipment used in doing the changed work).

1422 For all materials used, the Contractor shall receive the actual cost of such materials, including freight charges as shown by original receipted bills, to which cost shall be added an amount equal to ten percent (10%) thereof for all overhead and profit.

1423 For any construction equipment or special equipment including fuel and lubricants therefor, required for the economical performance of the changed work, the Engineer shall allow the Contractor a rental price, to be agreed upon in writing before such work is begun, for every hour that such construction equipment or special equipment is actually operated on the work, which rental price shall include all overhead and profit. Such hourly rental price shall not exceed 1/176 part of the monthly rate stated for such equipment in the latest edition of the "Compilation of Rental Rates for Construction Equipment" by Associated Equipment Distributors.

1424 Subcontractors are subject to the above and the Contractor mark- up for overhead and profit shall not exceed five percent (5%) of the

amount due to the Subcontractor.

14.25 The Contractor shall keep and present, in such form as the Engineer may prescribe, an itemized accounting of all time and material costs, together with appropriate supporting data.

15.0 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

15.1 Time is of the essence in the performance of the Work under this Agreement. The date of beginning and the time for completion of the Work are essential conditions of the Contract Documents. The required date of commencement of the Work shall be established in the Notice to Proceed to be issued by the City. As noted in the Agreement, Contractor shall commence the Work within ten (10) calendar days after the required date of commencement. Any Work performed by Contractor prior to the required date of commencement shall be at the sole risk of Contractor. The Notice to Proceed shall be issued within thirty (30) days of the execution of the Agreement by the City. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement of the City and Contractor. If the Notice to Proceed has not been issued within the thirty (30) day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party by providing the City written notice of such termination, in which event such termination shall be deemed a termination for convenience of the City as set forth in Section 17.5 below. Provided, however, notwithstanding anything in the Contract Documents to the contrary, in the event of such termination pursuant to this Section 15.1, Contractor acknowledges and agrees that no payments will be due Contractor, nor shall the City make any payments to Contractor for any Work that would have been authorized under the Agreement once executed by both parties.

15.2 The Contractor will proceed with the Work at such rate of progress to ensure Substantial Completion within the Contract Time. It is expressly understood and agreed, by and between the Contractor and the City, that the Contract Time for Substantial Completion of the Work is a reasonable period of time. The Construction Schedule shall include the date the Work must be substantially completed by Contractor and all interim milestones required by the City. Substantial Completion of the Work shall be achieved when the Work has been completed to the point where the City can occupy or utilize the Work for its intended purpose. The Engineer shall certify the date Substantial Completion of the Work is achieved. If the City has designated portions of the Work to be turned over to the City prior to Substantial Completion of the entire Work as provided in Section 15.3 below, the Engineer shall certify the date as to when Substantial Completion of such designated portions of the Work have been achieved. The entire Work shall be fully completed and ready for final acceptance by the City within 30 calendar days after Substantial Completion of the Work or thirty (30) days after Contractor’s receipt of the punch list, whichever date occurs last.

15.21 Once the Contractor believes it has achieved Substantial Completion of the Work, it shall notify the City and Engineer in writing and request a substantial completion inspection. Concurrent with its delivery of such written notice, Contractor shall submit its initial punch list for the City's and Engineer's review. Any Work remaining to be completed or any defective work to be remedied shall be listed on the punch list. Once the substantial completion inspection has been made, Owner and Engineer shall modify the Contractor's initial punch list to include all items to be completed or repaired by Contractor in order to achieve final acceptance of the Work. Thereafter, the Engineer shall provide Contractor a copy of the final punch list. Such final punch list shall be in compliance with the Contract Documents and all applicable laws, including Section 218.735 of the Florida Statutes. Accordingly, if the Contract Price is less than $10 million, Engineer shall provide the final punch list to Contractor within 30 calendar days after Contractor has achieved Substantial Completion. If the Contract Price is $10 million or more, Engineer shall provide the final punch list to Contractor within 60 calendar days after Contractor has achieved Substantial Completion. Contractor acknowledges and agrees that the failure to include any corrective work or pending items not yet completed on the punch list does not alter the responsibility of Contractor to complete all the Work required under this Contract.

15.3 The City may take early occupancy of all or any portions of the Work, at the City's election, by designating in writing to Contractor the specific portions of the Work to be occupied and the date such occupancy shall commence. If any such specific early occupancy was not expressly identified in the bidding documents issued with respect to this Agreement (as they may have been modified by any applicable Addenda) and such early occupancy adversely impacts Contractor's cost or time of performance, Contractor shall be entitled to an equitable adjustment to the Contract Price and the Contract Time, all in accordance with the other terms and conditions of the Contract Documents.

15.4 The City and Contractor recognize that, since time is of the essence for this Agreement, the City will suffer financial loss if the Work is not substantially completed within the Contract Time, as said time may be adjusted as provided for herein. In such event, the total amount of the City's damages, will be difficult, if not impossible, to definitely ascertain and quantify, because this is a public construction project that will, when completed, benefit the public. It is hereby agreed that it is appropriate and fair that the City receive liquidated damages from Contractor if Contractor fails to achieve Substantial Completion of the Work within the required Contract Time. Should Contractor fail to substantially complete the Work within the Contract Time, the City shall be entitled to assess, as liquidated damages, but not as a penalty, the amount for liquidated damages as specified in the Agreement for each calendar day thereafter until Substantial Completion is achieved. Contractor hereby expressly waives and relinquishes any right which it may have to seek to characterize the above noted liquidated damages as a penalty, which the

parties agree represents a fair and reasonable estimate of the City's actual damages at the time of contracting if Contractor fails to achieve Substantial Completion of the Work within the Contract Time.

15.4.1 In the event the Work is not fully completed within 30 days from the date of Substantial Completion, the City reserves the right to assess against Contractor its actual damages incurred as a result of such delay by Contractor.

16.0 CORRECTION OF DEFECTIVE WORK

16.1 Work not conforming to the requirements of the Contract Documents shall be deemed defective Work. If required by the City or Engineer, the Contractor shall as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the defective Work has been rejected by the City or Engineer, remove it from the site and replace it with non-defective Work in accordance with the Contract Documents and without additional expense to the City. Further, Contractor shall bear the expense of making good all work of other contractors performing work on the Project destroyed or damaged by such removal or replacement. Contractor shall bear all direct, indirect, and consequential costs of such correction or removal (including, but not limited to fees and charges of engineers, architects, attorneys, and other professionals) made necessary thereby, and shall hold the City and Engineer harmless for same. Notwithstanding anything herein to the contrary, the City may determine, at its sole discretion, to accept defective Work. If such determination is rendered prior to final payment, a Change Order or Construction Change Directive shall be executed evidencing such acceptance of such defective Work, incorporating the necessary revisions in the Contract Documents, and reflecting an appropriate decrease in the Contract Price. If the City accepts such defective Work after final payment, Contractor shall promptly pay the City an appropriate amount determined by the City to adequately compensate the City for its acceptance of the defective Work.

16.2 If the Contractor does not take action to correct defective Work or to remove and replace rejected defective Work or if Contractor fails to comply with any of the provisions of the Contract Documents within ten (10) days after receipt of written notice from the City or Engineer, the City may correct and remedy any such deficiency at the expense of the Contractor. To the extent necessary to complete corrective and remedial action, the City may exclude Contractor from any or all of the Project site, take possession of all or any part of the Work, and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Project site and incorporate in the Work all materials and equipment stored at the Project site or for which the City has paid Contractor but which are stored elsewhere. Contractor shall allow the City, Engineer and their respective representatives, agents, and employees such access to the Project site as may be necessary to enable the City to exercise the rights and remedies under this Section. All

direct, indirect, and consequential costs of the City in exercising such rights and remedies shall be at Contractor's expense, and a Change Order or a Construction Change Directive shall be issued, incorporating the necessary revisions to the Contract Documents, including an appropriate decrease to the Contract Price. Such direct, indirect, and consequential costs shall include, but not be limited to, fees and charges of engineers, architects, attorneys and other professionals, and all costs of repair and replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work. Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by the City of the City's rights and remedies hereunder.

17.0 SUSPENSION OF WORK, TERMINATION, AND DELAY

17.1 The City shall have the right to suspend the Work or any portion thereof for a period of not more than ninety (90) days or such additional time as agreed upon by the Contractor, upon giving Contractor written notice of such suspension to the Contractor. The City or Engineer shall fix the date on which Work shall be resumed. The Contractor will resume that Work on the date so fixed unless otherwise directed by the City. Provided Contractor strictly complies with the Change Order and Claims procedures set forth in the Contract Documents, Contractor will be entitled to a Change Order adjusting the Contract Price and Contract Time, as provided in the Contract Documents, to the extent attributable to any such suspension, unless said suspension is due to the fault or neglect of Contractor or anyone for whom Contractor is responsible.

17.2 If, through no act or fault of the Contractor, the Work is suspended for a period of more than ninety (90) days by the City or under an order of court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) days after it is submitted, or the City fails to pay the Contractor any undisputed amounts within thirty (30) days of its approval, then the Contractor may after ten (10) days from delivery of a written notice to the City and the Engineer and the City's failure to cure such default (or a maximum of sixty (60) days in the event the default cannot reasonably be cured within ten (10) days provided that the City commences to cure within ten (10) days and thereafter diligently and continuously pursues said cure) terminate the Agreement and recover from the City payment for all Work properly executed and reasonable termination expenses sustained. In addition, and in lieu of terminating the Agreement, if the Engineer has failed to act on a request for payment or if the City has failed to make any payment within the aforesaid thirty (30) day periods, the Contractor may upon ten (10) days written notice to the City and the Engineer stop the Work until paid all amounts then due, in which event and upon resumption of the Work, a Change Order shall be issued adjusting the Contract Price and Contract Time as provided in the Contract Documents.

17.3 Contractor shall be considered in material default of the Agreement and such

default shall be considered cause for the City to terminate the Contractor's right to continue to perform under the Agreement, in whole or in part, as further set forth in this Section, if Contractor: (1) fails to begin the Work under the Contract Documents within the time specified herein; or (2) fails to properly and timely perform the Work as directed by the City or Engineer or as provided for in the approved Construction Schedule; or (3) performs the Work unsuitably or neglects or refuses to remove materials or to correct or replace such Work as may be rejected as unacceptable or unsuitable; or (4) discontinues the prosecution of the Work contrary to the requirements of the Agreement; or (5) fails to resume Work which has been suspended within a reasonable time after being notified to do so; or (6) becomes insolvent or is declared bankrupt, or commits any act of bankruptcy; or (7) allows any final judgment to stand against it unsatisfied for more than ten (10) days; or (8) makes an assignment for the benefit of creditors; or (9) fails to comply with any applicable codes, laws, ordinances, rules or regulations with respect to the Work; or (10) fails to supply sufficient skilled workmen or suitable materials or equipment; or (11) fails to promptly pay its Subcontractors and Suppliers; or (12) disregards the authority of the City or Engineer; or (12) materially breaches any other provision of the Contract Documents. In rendering its decision as to whether one of the causes under Section 17.3 exist which would permit the City to terminate the Agreement, the City shall be entitled to rely upon the determination of the Engineer concerning such matter.

17.3.1 In such event, and after giving the Contractor and its surety a minimum of ten (10) days from delivery of a written notice to cure any such default (or a maximum of sixty (60) days in the event the default cannot reasonably be cured within ten (10) days provided that Contractor commences to cure within ten (10) days and thereafter diligently and continuously pursues said cure), the City may at its option, and without releasing or waiving its rights and remedies against Contractor's sureties and without prejudice to any other right or remedy, terminate Contractor's right to proceed under the Agreement in whole or in part, and take possession of the Project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, take assignments of any of Contractor's subcontracts and purchase orders that the City may designate, and finish the Work by whatever method the City in its sole discretion may deem expedient.

17.3.2 If Contractor's right to proceed under the Agreement is terminated, Contractor shall not be entitled to receive any further payment until the Work is finished. All monies expended and all of the costs, losses, damages, and extra expenses, including all management, administrative and other overhead and other direct and indirect expenses (including Engineer and attorneys' fees) or damages incurred by the City incident to such completion (collectively "Completion Costs"), shall be deducted from the unpaid balance of the Contract Price. Upon the City's completion, if the unpaid balance of the Contract Price exceeds the Completion Costs, such excess shall be paid to the Contractor. If the Completion Costs exceed the unpaid balance of the Contract Price,

Contractor shall pay promptly to the City on demand the full amount of such excess and interest thereon at a rate of 6% per annum until paid.

17.3.3 The liability of Contractor hereunder for Completion Costs shall extend to and include the full amount of any and all sums paid, expenses and losses incurred, damages sustained, and obligations assumed by the City in good faith under the belief that such payments or assumptions were necessary or required, in completing the Work and providing labor, materials, equipment, supplies, and other items therefor or re-letting the Work, and in settlement, discharge or compromise of any claims, demands, suits, and judgments pertaining to or arising out of the Work hereunder. Further, in the event the City has exercised its right to terminate due to Contractor's default, Contractor shall be prohibited from bidding or otherwise seeking additional work from the City in accordance with the City's then current debarment policy.

17.3.4 The City may deduct from any payment, any sum owed by the City to Contractor, either under this Agreement or any other agreement between the City and the Contractor. Further, a default by Contractor under any other agreement with the City shall be deemed a default under this Agreement and a default under this Agreement shall be deemed a default under any other agreement between the City and Contractor.

17.4 Where the Contractor's services have been so terminated by the City, said termination shall not affect any right of the City against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies by the City due to the Contractor will not release the Contractor from compliance with the Contract Documents. Further, if after notice of termination of Contractor's right to proceed pursuant to Section 17.3, it is determined for any reason that Contractor was not in default, or that its default was excusable, or that the City is not entitled to the remedies against Contractor provided herein, then such termination shall be deemed a termination for the City's convenience and Contractor's remedies against the City shall be the same as and limited to those afforded Contractor under Section 17.5 below.

17.5 The City shall have the right to terminate this Agreement without cause upon ten (10) days from delivery of a written notice to the Contractor. In the event of such termination for convenience, Contractor's sole and exclusive recovery against the City shall be limited to that portion of the Contract Price earned through the date of termination, together with any retainage withheld and reasonable termination expenses incurred, but Contractor shall not be entitled to any other or further recovery against the City, including, but not limited to, damages or any anticipated profit on portions of the Work not performed.

18.0 PAYMENT TO CONTRACTOR

18.1 At least ten (10) days before submitting the first Application for Payment, the Contractor shall submit to the City and Engineer a schedule of values allocated

to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the City or Engineer may require. It is anticipated the schedule of values substantially will be based upon the Contractor's completed Bid Proposal Form, attached as Section 00030. This schedule, unless objected to by the City or Engineer, shall be used as a basis for reviewing the Contractor's Applications for Payment. On or before the 25th of each month, the Contractor will submit to the Engineer an Application for Payment filled out and signed by the Contractor covering the Work performed since the previous month's Application for Payment. The Application for Payment may also include the cost of such materials and equipment which are suitably stored either at or off the site to the extent such payment is approved by City as provided in Section 18.1.1 below. Invoices received after the 25th day of each month shall be considered for payment as part of the next month's Application for Payment. Contractor's Application for Payment shall be in such form and contain such detail and backup as the City reasonably may require.

18.1.1 If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at or off the site, the Application for Payment shall also be accompanied by such supporting data, satisfactory to the City, as will establish the City's title to the material and equipment free and clear of all liens, charges, security interests and encumbrances, together with evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect City's interest therein, all of which shall be subject to City's satisfaction. City has the discretion whether or not to pay for such unincorporated materials.

18.1.2 The Engineer will, within ten (10) days after receipt of each Application for Payment, indicate in writing its recommendation as to that portion of the payment being requested by Contractor in the Application for Payment which Engineer believes is due and payable. The City shall pay Contractor that portion of the Application for Payment approved by Engineer and Owner within fifteen (15) days of the City's receipt of the Engineer's payment recommendation.

18.1.3 City shall retain an amount equal to 5% of the approved amount to be paid Contractor under each monthly Application for Payment. The retainage shall be accumulated and not released to Contractor until final payment is due. Provided, however, the City reserves the right, in its sole discretion, to reduce such retainage prior to final payment; but at no time shall the retainage be reduced to less than three percent (3%) prior to Contractor achieving Substantial Completion. Provided, further however, if at any time during this Agreement, and in the City's sole discretion, the City becomes dissatisfied with Contractor's performance or if Contractor is in default, the City shall have the right to reinstate the full amount of retainage at five percent (5%).

18.1.4 Monthly payments to Contractor shall in no way imply approval or acceptance of the Work.

18.1.5 Each Application for Payment shall be accompanied by a claim release and waiver in the form set forth in the City's Project Administration Manual from Contractor for all materials, labor, equipment, services, and other bills associated with that portion of the Work payment is being requested in that Application for Payment. Further, each Application for Payment shall be accompanied by a claim release and waiver in the form set forth in the City's Project Administration Manual from all Subcontractors and Suppliers evidencing their payment in full through the previous month's Application for Payment. Also, each Application for Payment shall be accompanied by an updated Construction Schedule, a list inventorying all stored materials, a monthly progress status report, and any other document reasonably requested by City. The City shall not be required to make payment until and unless such releases, documents and information are furnished by Contractor. Further, if Contractor is withholding any portion of a payment to any Subcontractor or Supplier for any labor, services, or materials for which the City has paid Contractor, Contractor agrees to refund such money to the City upon demand by the City.

18.1.6 Engineer shall review each Application for Payment submitted by Contractor and shall make recommendations to the City as to the proper amounts, if any, which may be owed Contractor thereunder. Both Engineer and the City shall have the right to refuse to approve payment amounts, or portions thereof, requested by Contractor in an Application for Payment, or rescind any amount previously approved, and the City may withhold any payments otherwise due Contractor under this Agreement or any other agreement between the City and Contractor, to the extent it is reasonably necessary, to protect the City from any expense, cost or loss attributable to: (a) defective or deficient Work not properly remedied in accordance with the terms of the Contract Documents; (b) the filing or reasonable evidence indicating the probable filing of third party claims against the City attributable to the fault or neglect of Contractor; (c) Contractor's failure to make timely and proper payments to all Subcontractors and Suppliers; (d) reasonable evidence that the remaining Work cannot be completed for the unpaid Contract Price balance; (e) reasonable evidence indicating that the remaining Work cannot be completed within the remaining Contract Time; (f) Contractor's failure to satisfactorily prosecute the Work in accordance with the requirements of the Contract Documents; or (g) any other material breach of the requirements of the Contract Documents by Contractor. The City shall have the right, but not the obligation, to take any corrective action the City deems appropriate to cure any of the above noted items, at Contractor's expense, if such items are not cured by Contractor to the City's reasonable satisfaction within three (3) days

after Contractor's receipt of written notice from the City.

18.1.7 Engineer or City may reject an Application for Payment, in whole or in part, submitted by Contractor if such Application for Payment is not submitted in strict accordance with the requirements of this Article 18. In such event, Engineer or City shall notify Contractor in writing within twenty (20) business days after receipt of such Application for Payment that such Application for Payment, or portion thereof, has been rejected and the reasons for such rejection. If Contractor resubmits a corrected Application for Payment correcting, in Engineer's and Owner's sole determination, the deficiency specified in the rejection notice, then City shall pay Contractor the corrected portion of the Application for Payment within ten business days after the date the corrected Application for Payment is received by City.

18.2 Prior to Substantial Completion, the City, with the approval of the Engineer, may use any completed or substantially completed portions of the Work. Such use shall not constitute an acceptance of such portions of the Work.

18.3 The City shall have the right to enter the Project site for the purposes of doing work not covered by the Contract Documents. This provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the Work, or the restoration of any damaged Work except such as may be caused by agents or employees of the City.

18.4 Upon completion and acceptance of the Work, the Engineer shall issue a certificate attached to the final payment request that states the Work has been fully performed in accordance with the requirements of the Contract Documents and that Engineer recommends final payment in the amount reflected in the attached final payment request. The City shall make final payment to Contractor within thirty (30) days after the Work is finally accepted by the City, provided that Contractor first, and as an explicit condition precedent to the accrual of Contractor's right to final payment, shall have furnished the City with a properly executed and notarized final release in the form set forth in the City's Project Administration Manual, as well as, a duly executed copy of the surety's consent to final payment and such other documentation that may be required by the Contract Documents or the City.

18.5 Late payments shall accrue interest from the date payment was due until payment is received at the rate of six percent (6%) per annum.

18.6 No error or oversight in the making of payment or completion certificates shall relieve the Contractor from its obligation to do and complete the Work in accordance with the requirements of the Contract Documents.

19.0 ACCEPTANCE OF FINAL PAYMENT AS RELEASE

19.1 The acceptance by the Contractor of final payment shall be and shall operate as a full release and waiver of any and all claims by Contractor against the City arising out of this Agreement or otherwise relating to the Project, except those identified in writing by Contractor as unsettled in its final Application for Payment. Any payment, however, final, or otherwise shall not release the Contractor or its sureties from any obligations under the Contract Documents or the Performance and Payment Bonds. Neither the acceptance of the Work nor payment by the City shall be deemed to be a waiver of the City's right to enforce any obligations of Contractor hereunder or to the recovery of damages for defective Work not discovered by the City or Engineer at the time of final inspection.

20.0 CONTRACT SECURITY

20.1 The Contractor shall within ten (10) days after the receipt of the Notice of Award and prior to the start of any Work furnish the City with a Performance Bond and a Payment Bond in penal sums equal to 100% of the amount of the Contract Price and in the forms attached as Sections 00060 and 00070. Such Bonds shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the State of Florida and named on the current lists of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570 and approved by the City. The expense of these Bonds shall be borne by the Contractor. If at any time a surety on any such Bond is declared as bankrupt or loses its rights to do business in Florida or is removed from the list of Surety Companies accepted on Federal Bonds, Contractor shall within ten (10) days after notice from the City to do so, substitute an acceptable Bond (or Bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the City. The premiums on such replacement Bond shall be paid by the Contractor. No further payment shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable Bond to the City.

20.2 The Contractor and its Surety, for value received, hereby stipulate, and agree that any and all claims, demands, actions or suits whatsoever, arising under this Agreement and/or bonds, shall be subject to the sole and exclusive jurisdiction and venue of the appropriate state court in and for Bay County, Florida. The Contractor and its Surety do agree, by execution of these documents, that the sole and exclusive jurisdiction and venue in said forum is proper and appropriate since performance of the underlying contract for which these documents are executed is to be accomplished within Bay County, Florida.

21.0 ASSIGNMENTS

21.1 Contractor shall not assign this Agreement or any part thereof, without the prior consent in writing of the City, which consent shall be at City's' sole discretion. If Contractor does, with City's written approval, assign this Agreement or any part

thereof, Contractor shall not be released from any of its obligations or responsibilities under this Agreement.

22.0 INDEMNIFICATION AND HOLD HARMLESS

22.1 To the maximum extent permitted by Florida law, Contractor shall indemnify and hold harmless the City and its officers and employees from any and all liabilities, claims, damages, penalties, demands, judgments, actions, proceedings, losses or costs, including, but not limited to, reasonable attorneys' fees and paralegals' fees, whether resulting from any claimed breach of this Agreement by Contractor or from personal injury, property damage, direct or consequential damages, or economic loss, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of Contractor or anyone employed or utilized by the Contractor in the performance of this Agreement.

22.2 Contractor's obligation to indemnify and hold harmless under this Article 22 will survive the expiration or earlier termination of this Agreement until it is determined by final judgment that an action against the City or an indemnified party for the matter indemnified hereunder is fully and finally barred by the applicable statute of limitations.

22.3 The obligation of the Contractor under this Article 22 shall not extend to the liability of the Engineer, its agents or employees arising out of the preparation of approval of maps, drawings, opinions, reports, surveys, change orders, designs, or specifications.

23.0 SEPARATE CONTRACTS AND COOPERATION

23.1 The City reserves the right to perform other work related to the Project at the site by the City's own forces, have other work performed by utility owners or let other direct contracts for work to be constructed at the same time, and in connection with, the Work included in this Agreement. The Contractor shall cooperate with all other contractors in such a manner, and to such extent, as best to facilitate the completion of the entire Project in the shortest time possible, subject to, at all times, the approval of the Engineer and Owner. It shall be the duty of each contractor to work with the other contractors, render such assistance, and to arrange its work in such a manner that shall allow the entire Project to be delivered complete and in the best possible condition. The Contractor shall afford other contractors and utility owners reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate the Work with theirs. If the proper execution or results of any part of the Contractor's Work depends upon the work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results.

23.2 If the performance of additional work by other contractors, utility owners, or the

City is not noted in the Contract Documents prior to the execution of the Agreement, written notice thereof shall be given to the Contractor prior to starting any such additional work. If the Contractor believes that the performance of such undisclosed additional work by the City or others involves it in additional expense or entitles it to an extension of the Contract Time, the Contractor shall send written notice of that fact to the City and Engineer within seven (7) calendar days of being notified of the other work and the Contractor may make a claim thereof as provided in Sections 13 and 14. If Contractor fails to send the above required seven (7) calendar days' notice, Contractor will be deemed to have waived any rights it otherwise may have had to seek an extension to the Contract Time or adjustment to the Contract Price.

23.3 Contractor shall afford each utility owner and City's other contractors (or the City if the City is performing the additional work with the City's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work and shall properly connect and coordinate its Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. Contractor shall be responsible for all damage to the work of others caused by the performance of its Work. Further, Contractor shall not in any way cut or alter the work of others without first receiving the written consent of that other person and Engineer. If any part of Contractor's Work depends for proper execution or results upon the work of any other contractor or utility owner (or the City), Contractor shall inspect and promptly report to Engineer in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. Such report must be made within three (3) business days of the time Contractor first became aware of the delay, defect, or deficiency. Contractor's failure to report within the allotted time will constitute an acceptance of the other work as fit and proper for integration with Contractor's Work, except for latent defects not discovered by Contractor.

23.4 The Contractor shall keep itself fully informed at all times regarding all details of the work of other contractors working at the site, and it shall be responsible for all delays that may result from its failure to install the Work in the proper manner and at the proper time.

23.5 The Contractor shall be responsible for coordinating the relocation of existing utilities (with the respective utility companies) as needed to construct the Project. Attention is called to the fact that Contractor is responsible for contacting all utility companies to obtain locations of all existing utilities or obstructions which it may encounter during construction. After location of utilities by the appropriate utility company, it is the Contractor's liability to protect all such utility lines, including service lines and appurtenances, and to replace at its own expense any which may be damaged by the Contractor's equipment or forces during construction of the Project. The City will pay fees charged by the utility company for relocating these utilities.

24.0 SUBCONTRACTING

24.1 Contractor shall review the design and shall determine how it desires to divide the sequence of construction activities. Contractor will determine the breakdown and composition of bid packages for award of subcontracts, based on the current Construction Schedule, and shall supply a copy of that breakdown and composition to the City and Engineer for their review and approval. The Contractor may utilize the services of specialty Subcontractors on those parts of the Work which, under normal contracting practices, are performed by specialty Subcontractors. Contractor shall be solely responsible for and have control over the Subcontractors.

24.2 Prior to submitting its first Application for Payment, Contractor shall submit to the City a list of the names, addresses, licensing information and phone numbers of the Subcontractors Contractor intends to use for each portion of the Work, as well as identifying in writing those portions of the Work it intends to perform with its own employees. The Contractor shall not use a Subcontractor or Supplier against whom the Owner has a reasonable objection. The list identifying each Subcontractor cannot be modified, changed, or amended without prior written approval from the City. Contractor shall continuously update that list, so that it remains current and accurate throughout the entire performance of the Work. Any and all work to be self-performed by Contractor must be approved in writing by the City in its sole discretion prior to commencement of such Work. The Contractor shall not award work to Subcontractor(s) in excess of fifty percent (50%) of the Contract Price, without prior written approval of the City.

24.3 The Contractor shall be fully responsible for and have control over the acts and omissions of its Subcontractors, and of persons either directly or indirectly employed by them, as the Contractor is for the acts and omissions of persons directly employed by it.

24.4 The Contractor shall cause appropriate provisions to be inserted in all Subcontracts relative to the work to bind Subcontractors to the Contractor by the terms of the Contract Documents insofar as applicable to the work of Subcontractors and give the Contractor the same power to terminate any subcontract that the City may exercise over the Contractor under any provision of the Contract Documents. Further, each subcontract shall require that any claims by a Subcontractor for delay or additional cost must be submitted to Contractor within the time and in the manner in which Contractor must submit such claims to the City, and that failure to comply with such conditions for giving notice and submitting claims shall result in the waiver of such claims.

24.5 All subcontracts between Contractor and its Subcontractors shall be in writing and are subject to the City’s approval. Further, all subcontracts shall (1) require each Subcontractor to be bound to Contractor to the same extent Contractor is bound to the City by the terms of the Contract Documents, as those terms may

apply to the portion of the Work to be performed by the Subcontractor, (2) provide for the assignment of the subcontracts from Contractor to the City at the election of the City upon termination of Contractor, (3) provide that the City will be an additional indemnified party of the subcontract, (4) provide that the City will be an additional insured on all insurance policies required to be provided by the Subcontractor except workmen's' compensation, (5) assign all warranties directly to the City, and (6) identify the City as an intended third-party beneficiary of the subcontract.

24.6 Nothing contained in this Agreement shall create any contractual relation between any Subcontractor or Supplier and the City. All subcontracts and purchase orders entered into by Contractor must be in writing, and upon demand from City, Contractor shall deliver to City a full and complete copy of any or all such subcontracts and purchase orders.

24.7 Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract, copies of the Contract Documents to which the Subcontractor will be bound. Each Subcontractor shall similarly make copies of such documents available to its sub-subcontractors.

24.8 The Contractor shall not use a Subcontractor or Supplier against whom the City has a reasonable objection and Contractor shall not be required to contract with anyone it reasonably objects to.

24.8 The City and Engineer are under no duty or obligation whatsoever to any Subcontractor, Supplier, laborer, or other party to ensure that payments due and owing by the Contractor to any of them will be made. Such parties shall rely only on the Contractor's surety bonds for remedy of nonpayment by the Contractor.

25.0 ENGINEER'S AUTHORITY

25.1 The Engineer shall act as the City's representative during the construction period, shall decide questions which may arise as to quality and acceptability of materials furnished and Work performed, and shall interpret the intent of the Contract Documents in a fair and reasonable manner. The Engineer will make visits to the site and determine if the Work is proceeding in accordance with the Contract Documents.

25.2 The Contractor will be held strictly to the intent of the Contract Documents in regard to the quality of materials, workmanship, and execution of the Work. Inspections may be at the factory or fabrication plant of the source of material supply.

25.3 The Engineer and the City will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

25.4 The Engineer shall promptly make decisions relative to interpretation of the

Contract Documents.

26.0 LAND AND RIGHT-OF-WAYS

26.1 Prior to the issuance of the NOTICE TO PROCEED, the City shall obtain all land and rights-of-way necessary for carrying out and for the completion of the Work to be performed pursuant to the Contract Documents, unless otherwise noted in the Contract Documents.

26.2 The City shall provide to the Contractor information which delineates and describes the lands owned and rights-of-way acquired.

26.3 The Contractor shall provide at its own expense and without liability to the City any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.

27.0 GUARANTEE

27.1 The Contractor warrants to the City and Engineer that materials and equipment furnished under the Agreement will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Contractor further warrants to the City that all materials and equipment furnished under the Contract Documents shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable manufacturers, fabricators, suppliers, or processors except as otherwise provided for in the Contract Documents. Further, any special warranty to be provided will be in such form as is acceptable to the City and shall not include any exclusions, exceptions, or modifications except to the extent approved by the City in its sole discretion. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear from normal usage. If required by the Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

27.2 Contractor expressly warrants to the City that it shall promptly correct, upon receipt of written notice from the City, any portion of the Work which is found to be defective or otherwise not in conformance with the requirements of the Contract Documents. The City will give notice of observed defects with reasonable promptness. Provided, however, in the event that any defective or non-conforming Work is determined by the City in its sole discretion to present an immediate threat to safety or security, the City shall be entitled to correct or replace such defective or non-conforming portions of the Work, and Contractor shall reimburse the City for all costs and expenses incurred by the City in correcting or replacing such Work. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the City may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guarantee period. With respect to the correction or replacement of any defective or nonconforming Work, Contractor shall be liable for all damage to any part of the Work itself and to any adjacent property which is caused by such corrective or replacement work.

27.3 If, within one year after the date of final acceptance of the Work by the City, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the City to do so unless the City has previously given the Contractor an express written acceptance of such condition. The City shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable period of time (not to exceed 10 days) after receipt of notice from the City or Engineer, the Owner may correct or replace it in accordance with Section 27.2 above. This one-year correction period is in addition to all other rights and does not limit the time period the City can seek to have the defective Work corrected.

27.4 Contractor shall obtain and assign to the City all express warranties given to Contractor by any Subcontractors or by Suppliers.

28.0 CLAIMS AND DISPUTES

28.1 The term “Claim” as used herein shall mean any and all demands made by one party hereunder against the other party, whether such demand be for money, time, or the assertion of any right or obligation that arises out of the Contract Documents.

28.2 Initial notice of Claims by Contractor shall be made in writing to the City and Engineer within seven (7) calendar days after the first day of the event giving rise to such Claim or such other time period as may be expressly provided in the Contract Documents. If Contractor fails to give such written notice within the required time period, Contractor shall be deemed to have waived the Claim.

Written data supporting Contractor's claim shall be submitted to the City and Engineer within thirty (30) calendar days after the occurrence of the event, or such other time period as may be expressly provided in the Contract Documents, unless the City grants additional time in writing, or else Contractor shall be deemed to have waived the Claim.

28.3 Contractor shall proceed diligently with its performance as directed by the City, regardless of any pending Claim, unless otherwise agreed to by the City in writing. The City shall continue to make payments of all undisputed amounts in accordance with the Contract Documents during the pendency of any Claim.

28.4 Prior to the initiation of any action or proceeding permitted by this Agreement to resolve disputes between the parties, the parties shall make a good faith effort to resolve any such disputes by negotiation between the President or Vice- President for the Contractor and the City Manager Failing resolution, and prior to the commencement of depositions in any litigation between the parties with respect to the Project, the parties shall attempt to resolve the dispute through mediation before an agreed-upon Circuit Court Mediator certified by the State of Florida. Should either party fail to submit to mediation as required hereunder, the other party may request a court of law to order mediation under Florida Statutes Section 44.102.

28.5 Any litigation between the City and Contractor (which term for the purposes of this Section shall include Contractor's surety), whether arising out of any Claim or arising out of the Agreement or any breach thereof, shall be brought, maintained, and pursued solely and exclusively in the appropriate State courts of the State of Florida as set forth in Section 20.2. The City and Contractor each hereby waive and renounce any and all rights and options which they, or either of them, have or might have to bring or maintain any such litigation or action in the Federal Court system of the United States or in any United States Federal District Court. Venue of any such litigation between the City and Contractor shall lie and be only in the appropriate State courts in and for Bay County, Florida. Contractor consents and submits to the exclusive jurisdiction of any such court and agrees to accept service of process from the State of Florida in any matter to be submitted to any such court.

29.0 TAXES

29.1 The Contractor will pay all applicable sales, consumer, use and other similar taxes required by the laws of the place where the Work is performed.

30.0 CONTRACT TIME, SCHEDULE OF WORK AND TIME EXTENSIONS

30.1 Contractor shall diligently pursue the completion of the Work and coordinate the Work being done on the Project by its Subcontractors and Suppliers, as well as coordinating its Work with all work of others at the Project site, so that its Work or

the work of others shall not be delayed or impaired by any act or omission by Contractor or anyone for whom Contractor is liable. All Work under this Agreement shall be arranged and be carried out in such a manner as to complete the Work on or before the required date of Substantial Completion. The Contractor must notify the City at the time of bidding if the chronology of the Work as shown, or the subdivision of work will affect warranties or guarantees in any way. No such claims shall be allowed once the Work has begun.

30.2 Should Contractor be obstructed or delayed in the prosecution of or completion of the Work as a result of unforeseeable causes beyond the control of Contractor, and not due to its fault or neglect, including but not restricted to acts of God or of the public enemy, acts of government, fires, floods, epidemics, quarantine regulation, strikes, lockouts, unusually severe weather conditions by comparison with the ten-year Bay County, Florida average not reasonably anticipatable (to the extent Contractor was unable to perform any portion of the Work that was on the critical path of the approved Construction Schedule during those inclement weather days), Contractor shall notify Owner and Engineer in writing within seven (7) calendar days after the commencement of such delay, stating the cause or causes thereof, or be deemed to have waived any right which Contractor may have had to request a time extension.

30.3 The Contractor is required to furnish adequate manpower at the Project to complete the Work within the Contract Time and in accordance with the Construction Schedule. Should payment of premium time, bonuses, or the like be necessary to attract sufficient manpower for the Project, such extra labor costs shall be borne by the Contractor without additional compensation from the City. Further, should the Contractor's Work, through no fault of the Engineer, the City, or City's other contractors, fail to progress in accordance with the Construction Schedule, and if, in the opinion of the Engineer, the Work cannot be substantially completed within the Contract Time, or if deemed necessary to protect this or adjoining work from damage, the Contractor shall work such additional time over the established hours of work, but excluding Holidays, as required to meet the schedule time without additional expense to the City. In such event, Contractor shall reimburse City for any additional costs incurred by the City associated with such overtime, including any additional costs of the Engineer.

30.4 When so ordered in writing by the Engineer or City, whether to advance the date of Substantial Completion, or for any other reason for the City's benefit, the Contractor shall work overtime and or additional shifts. If the order for such acceleration is not the result of Contractor being behind the approved Construction Schedule, Contractor shall be entitled to a Change Order increasing the Contract Price by its actual net premium costs of such overtime and or shifts so ordered and so worked, including insurance and taxes applicable thereto, (without other overhead or profit). Such costs and expenses shall be subject to audit by the City.

30.5 When any period of time is referenced by days herein, it shall be computed to exclude the first day 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 recognized by the City as a legal holiday, such day shall be omitted from the computation, and the last day shall become the next succeeding day which is not a Saturday, Sunday, or legal holiday. The term “business day” as used herein shall mean all days of the week excluding Saturdays, Sundays and all legal holidays observed by the City.

31.0 USE OF SITE

31.1 The Contractor shall confine its use of the site for storage of materials, erection of temporary facilities and parking of vehicles to areas within its Agreement limits as directed by the Engineer. The Contractor shall not unnecessarily encumber the site at any time.

31.2 Contractor acknowledges that areas of the site in which Work under this Agreement may be performed may be used by other contractors for storage of materials, erection of temporary facilities and parking of vehicles. Areas used by other contractors will be vacated, as directed by the Engineer to permit Work under this Agreement, provided reasonable notice is given requesting such, all in accordance with the approved Construction Schedule.

31.3 No signs or advertisements shall be displayed on the site or building except with the written consent of the City.

32.0 TEMPORARY FACILITIES

32.1 The Contractor shall provide electric power and water as it may require for its construction purposes, and shall pay all costs incurred. At completion of the Work, all temporary facilities shall be removed from the site. Upon Substantial Completion of the Work, Contractor shall cause all permanent utilities to be utilized by the City that were in Contractor’s name during construction of the Project to be transferred over to the City’s name.

32.2 The Contractor shall provide sanitary facilities for its workers at all times. Sanitary facilities shall be of an approved chemical type with regular servicing and appropriately screened from public view, as approved by the Engineer and all applicable health authorities.

33.0 CLEAN UP AND DISPOSAL OF WASTE MATERIALS AND HAZARDOUS MATERIALS

33.1 No burial of waste materials will be permitted on the site. The Contractor shall at all times keep the site free from accumulations of waste material or debris caused by its operations and shall immediately remove same when necessary or required by the Engineer or the City. If Contractor fails to keep the Project site clean, the City has the right, after providing a twenty-four (24) hour written notice,

to perform any required clean up and to back charge Contractor for the costs of such clean up. At the completion of the Work, and before final inspection and acceptance of the Work, Contractor shall clean ditches, shape shoulders and restore all disturbed areas, including street crossings, grass plots, re-grassing if necessary, to as good condition as existed before Work started, and remove all debris, rubbish and waste materials from and about the Project site, as well as all of Contractor's (and its Subcontractors') tools, appliances, construction equipment and machinery and surface materials, and shall leave the Project site clean and ready for occupancy by the City. Any existing surface or subsurface improvements, including, but not limited to, pavements, curbs, sidewalks, pipes, utilities, footings, structures, trees, and shrubbery, not indicated in the Contract Documents to be removed or altered, shall be protected by Contractor from damage during the prosecution of the Work. Any such improvements so damaged shall be restored by Contractor to conditions at least equal to that existing at the time of Contractor's commencement of the Work

33.2 If Contractor encounters on the Project site any materials reasonably believed by Contractor to be petroleum or petroleum related products or other hazardous or toxic substances which have not been rendered harmless, Contractor immediately shall (i) stop Work in the area affected and (ii) report the condition to the City in writing. If the Work is so stopped and hazardous material is found, the Work in the affected area shall not thereafter be resumed except by Change Order. Any such Change Order shall include, but not be limited to, an equitable adjustment to the Contract Time and Contract Price as appropriate and in accordance with the terms of the Contract Documents. If no hazardous material is found after the Work is stopped, no Change Order is required to resume the Work in the affected area. Further, if the hazardous material was generated or caused by Contractor or anyone for whom Contractor is responsible, or if Contractor failed to stop Work or give the written notice required above, no Change Order will be required for an adjustment in the Contract Time or Contract Price and Contractor shall indemnify the City and hold the City harmless for any costs incurred by the City with respect to such hazardous material generated or caused by Contractor or anyone for whom it is responsible or any increased costs incurred by City as a result of Contractor's failure to stop Work or give the required written notice.

34.0 WARRANTY OF TITLE

34.1 No material, supplies or equipment for the Work shall be purchased by the Contractor subject to any chattel mortgage or under a conditional sale or other agreement by which a lien or an interest therein or any part thereof is retained by the seller or supplier. The Contractor warrants good title to all materials, supplies and equipment installed or incorporated in the Work and title to all such items shall pass to the City upon its incorporation into the Work or payment, whichever occurs first. Contractor shall, at all times, keep the site, together with all improvements and appurtenances constructed or placed thereon by it, free from any claims, liens or charges and further agrees that neither Contractor nor any

person, firm, or corporation furnishing any material or labor for any Work covered by this Agreement shall have any right to a lien upon the Work, site or any improvements or appurtenances thereon. The Contractor shall not at any time suffer or permit any lien, attachment, or other encumbrances under the law of Florida or otherwise by any person or persons whomsoever to remain on file with the City against any money due or to become due for any work done or materials furnished under the Agreement or by reason of any other claim or demand against the Contractor. Such lien, attachment, or other encumbrance, until it is removed, shall preclude any and all claims or demands for any payment to Contractor under virtue of this Agreement.

35.0 OWNERSHIP OF HIDDEN VALUABLE MATERIALS

35.1 All items having any apparent historical or archaeological interest or treasure, or valuable materials discovered during any construction activities shall be carefully preserved and reported immediately to the City for determination of appropriate actions to be taken. Any increases to Contractor's time or cost of performance due to historical or archaeological items discovered on the site shall entitle Contractor to a Change Order equitably adjusting the Contract Time and the Contract Price as appropriate and in accordance with the terms of the Contract Documents. Notwithstanding anything in the Contract Documents to the contrary, Contractor shall have no claim or entitlement to any such historical or archaeological interest or treasure, or other valuable materials discovered, and all such items shall remain the property of the City.

36.0 AS-BUILT PLANS and DOCUMENTS TO BE KEPT AT THE SITE

36.1 Before final inspection, the Contractor shall turn over to the Engineer a set of drawings showing field changes and actual installed conditions. CONTRACTOR shall provide to the ENGINEER two (2) hard copies and one electronic copy of the as-built plans in AutoCAD Civil 3D 2014. The plans shall be certified by a P.L.S. registered in the State of Florida.

Contractor shall maintain at the Project site or such other place as may be expressly approved in writing by Owner, originals or copies of, on a current basis, all Project files and records, including, but not limited to, the following administrative records: Subcontracts and Purchase Orders; Subcontractor Licenses; Shop Drawing Submittal/Approval Logs; Equipment Purchase/Delivery Logs; Contract Drawings and Specifications with Addenda; Warranties and Guarantees; Cost Accounting Records; Payment Request Records; Meeting Minutes; Insurance Certificates and Bonds; Contract Changes; Permits; Material Purchase Delivery Logs; Technical Standards; Design Handbooks; "As-Built" Marked Prints; Operating & Maintenance Instruction; Daily Progress Reports; Monthly Progress Reports; Correspondence Files; Transmittal Records; Inspection Reports; Bid/Award Information; Bid Analysis and Negotiations; Punch Lists; and a Construction Schedule (including all updates). The Project files and records shall be available at all times to the City and Engineer or their designees for reference, reviewing, or copying.

37.0 SILENCE OF SPECIFICATIONS

37.1 To the extent the Work involves road or bridge construction, the apparent silence

of the Contract Documents as to any details or the omission from them of a detailed description concerning any point shall be regarded as meaning that such portion of the Work shall be performed in accordance with the latest edition of the Florida DOT Standard Specifications for Road and Bridge Construction.

38.0 GRATUITIES

38.1 If the City finds after a notice and hearing that the Contractor, or any of the Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts or otherwise) to any official, employee, or agent of the City, the State, or other officials in an attempt to secure this Agreement or favorable treatment in awarding, amending, or making any determinations related to the performance of this Agreement, the City may, by written notice to the Contractor, terminate this Agreement for Contractor default. The City may also pursue other rights and remedies that the law or this Agreement provides.

38.2 In the event this Agreement is terminated as provided in Section 38.1, the City may pursue the same remedies against the Contractor as it could pursue in the event of a breach of the Agreement by the Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, the City may pursue exemplary damages in an amount (as determined by the City) which shall be not less than three nor more than ten times the costs the Contractor incurs in providing any such gratuities to any such official, agent or employee of the City.

39.0 AUDIT AND ACCESS TO RECORDS

Contractor shall keep all records and supporting documentation which concern or relate to the Work hereunder for a minimum of three (3) years from the date of termination of this Agreement or the date the Project is completed, whichever is later or such longer period of time as may be required by law. Contractor shall require all of its Subcontractors to likewise retain all of their Project records and supporting documentation. The City, and any duly authorized agents or representatives of the City, shall be provided access to all such records and supporting documentation at any and all times during normal business hours upon request by the City. Contractor shall make all such Project records and supporting documentation available in Bay County, Florida. Further, the City, and any duly authorized agents or representatives of the City, shall have the right to audit, inspect and copy all of Contractor’s and any Subcontractor’s Project records and documentation as often as they deem necessary and Contractor shall cooperate in any audit, inspection, or copying of the documents. These access, inspection, copying and auditing rights shall survive the termination of this Agreement.

40.0 EQUAL OPPORTUNITY REQUIREMENTS

40.1 For all contracts in excess of $10,000, the Contractor shall comply with Executive Order 11246, entitled "Equal Employment Opportunity", as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR Part 60).

40.2 The Contractor's compliance with Executive Order 11246 shall be based on its

implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographic area where the Agreement is to be performed.

41.0 CHANGED CONDITIONS

41.1 Notwithstanding anything in the Contract Documents to the contrary, if conditions are encountered at the Project site which are (i) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (ii) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, and which reasonably should not have been discovered by Contractor as part of its scope of site investigative services required pursuant to the terms of the Contract Documents, then Contractor shall provide the City with prompt written notice thereof before conditions are disturbed and in no event later than seven (7) calendar days after first observance of such conditions. the City and Engineer shall promptly investigate such conditions and, if they differ materially and cause an increase or decrease in Contractor's cost of, or time required for, performance of any part of the Work, the City will acknowledge and agree to an equitable adjustment to the Contract Price or Contract Time, or both, for such Work. If the City determines that the conditions at the site are not materially different from those indicated in the Contract Documents or not of an unusual nature or should have been discovered by Contractor as part of its investigative services, and that no change in the terms of the Agreement is justified, the City shall so notify Contractor in writing, stating its reasons. Claims by Contractor in opposition to such determination by the City must be made within seven (7) calendar days after Contractor's receipt of the City's written determination notice. If the City and Contractor cannot agree on an adjustment to the Contract Price or Contract Time, the dispute resolution procedure set forth in the Contract Documents shall be complied with by the parties.

42.0 COMPLIANCE WITH LAWS

42.1 Contractor agrees to comply, at its own expense, with all federal, state, and local laws, codes, statutes, ordinances, rules, administrative orders, regulations, and requirements applicable to the Project, including but not limited to those dealing with safety (including, but not limited to, the Trench Safety Act, Chapter 553, Florida Statutes). An executed copy of Contractor's Trench Safety Act Certificate of Compliance (the form of which is attached hereto as Section 00096) has been delivered to City with the Contractor's Bid Proposal Form. If Contractor observes that the Contract Documents are at variance therewith, it shall promptly notify the City and Engineer in writing. Contractor has provided a separate line item in its Bid identifying the cost of compliance with the applicable trench safety standards set forth in the Trench Safety Act.

43.0 PUBLIC ENTITY CRIMES

43.1 By its execution of the Agreement and the Contractor's Public Entities Crime Statement, in the form set forth in Section 00097). Contractor acknowledges that it has been informed by the City of and warrants that it is in compliance with the terms of Section 287.133(2)(a) of the Florida Statutes which reads as follows:

> "A 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 on a contract to provide any goods or services to 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 in excess of the threshold amount provided in s. 287.017 for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list."

44.0 INSURANCE

44.1 During the term of this Agreement, Contractor shall provide, pay for, and maintain, with companies satisfactory to the City, the types and limits of insurance required by the Contract Documents. All insurance shall be from responsible companies eligible to do business in the State of Florida. Simultaneously with the execution and delivery of this Agreement by Contractor, Contractor shall deliver to the City the properly completed and executed Certificate of Insurance, in the form set forth in Section 00099 along with any other properly completed and executed Certificates of Insurance that may be necessary, evidencing the fact that Contractor has acquired and put in place the insurance coverages and limits required herein. In addition, certified, true, and exact copies of all insurance policies required shall be provided to the City, on a timely basis, if requested by the City. These Certificates and policies shall contain provisions that at least thirty (30) calendar days advanced written notice by registered or certified mail shall be given the City of any cancellation, intent not to renew, or any policy change that would result in a reduction in the policies' coverages, except in the application of the Aggregate Limits Provisions. The renewal of any insurance required to be maintained by Contractor hereunder shall be by a renewal Certificate of Insurance in the same form as was required for the original Certificate of Insurance, which renewal Certificate of Insurance shall be delivered to City at least ten (10) calendar days prior to expiration of current coverages so that there shall be no interruption in the Work due to lack of proof of insurance coverages required of Contractor under this Agreement.

44.2 Contractor shall also notify the City, in the same manner required in Section 44.1 above, within two (2) calendar days after Contractor's receipt, of any notices of expiration, cancellation, non-renewal or material change in coverages or limits received by Contractor from its insurer, and nothing contained herein shall relieve

Contractor of this requirement to provide notice. In the event of a reduction in the aggregate limit of any policy to be provided by it hereunder, Contractor shall immediately take steps to have the aggregate limit reinstated to the full extent permitted under such policy. If, at any time, City requests a written statement from an insurance company as to any impairment to any aggregate limit of any policy to be provided by it hereunder, Contractor shall promptly authorize and cause to be delivered such statement to City. All insurance coverages of Contractor shall be primary to any insurance or self-insurance program carried by the City applicable to this Agreement. Any such self-insurance programs or coverages shall not be contributory with any insurance required of the Contractor under the terms of this Agreement. All insurance policies, other than the Workers Compensation policy and the Surveyor's Professional Liability policy, provided by Contractor to meet the requirements of this Agreement shall name the City as an additional insured through the use of ISO Endorsement No. CG 20.10.10.01 and No. CG 20.37.10.01 wording, as to the operations of Contractor under the Contract Documents and shall also provide the Severability of Interest provision (also referred to as the Separation of Insureds provision). Companies issuing the insurance policy or policies shall have no recourse against the City for payment of premiums or assessments for any deductibles which all are at the sole responsibility and risk of Contractor.

44.3 All insurance policies to be provided by Contractor pursuant to the terms hereof shall be performable in Bay County, Florida and must expressly state that the insurance company will accept service of process in Bay County, Florida and that the exclusive venue and exclusive jurisdiction for any action concerning any matter under those policies shall be in the appropriate state court situated in Bay County, Florida.

44.4 The acceptance by the City of any Certificate of Insurance pursuant to the terms of this Agreement evidencing the insurance coverages and limits required hereunder does not constitute approval or agreement by the City that the insurance requirements have been met or that the insurance policies shown on the Certificates of Insurance are in compliance with the requirements of this Agreement.

44.5 Before starting and until completion of all Work required hereunder, Contractor shall procure and maintain insurance of the types and to the limits specified in the Contract Documents. Contractor shall require each of its Subcontractors to procure and maintain, until the completion of that Subcontractor's work or services, insurance of the types and to the limits specified in the Contract Documents, unless such insurance requirement for the Subcontractor is expressly waived or modified in writing by the City. Contractor shall not enter or otherwise occupy the Project site or commence any Work to be performed under this Agreement at the Site or any other property of the City until all insurance required hereunder has been obtained by Contractor and such proof of insurance, as the same is required under this Agreement, has been delivered to City. Contractor shall require all property insurance policies related to the Work and secured and maintained by Contractor and its Subcontractors to include provisions providing that each of their insurance

companies shall waive all rights of recovery, under subrogation or otherwise, against the City and any of its separate contractors and the agents, employees, and subcontractors of any of them.

44.6 Should at any time Contractor or any of its Subcontractors not maintain the insurance coverages required in this Agreement, the City may terminate this Agreement for Contractor default or at its sole discretion shall be authorized to purchase such coverages and charge Contractor for such coverages purchased, to include a fifteen percent (15%) administrative fee. If Contractor fails to reimburse the City for such costs within thirty (30) calendar days after demand, the City has the right to offset those costs from any amount due Contractor under this Agreement. The City shall be under no obligation to purchase such insurance, nor shall it be responsible for the coverages purchased or the insurance company/companies used. The decision of the City to purchase such insurance coverages shall in no way be construed to be a waiver of any of its rights under this Agreement. If the City exercises its option to purchase such required coverages, the coverages shall not be cancelled by Contractor and shall stay in force until the normal expiration date according to the terms and conditions of the insurance policy.

44.7 As may be required by City from time to time, the status of any insurance aggregate limits are to be confirmed in writing by the respective insurance companies. The amounts and types of insurance Contractor shall comply with all of the requirements of this Section 44 unless otherwise agreed to, in writing, by City.

[END OF SECTION 00100]

SECTION 00800

SUPPLEMENTARY CONDITIONS

PART 1 - GENERAL

1.1 CLAIM PERIOD

A. No claim by the CONTRACTOR for an equitable adjustment hereunder shall be allowed if asserted after final payment under this Contract.

1.2 REGULAR WORKING HOURS

A. Regular working hours are defined as up to forty hours per week with a maximum of 10 hours per day, Monday through Friday, beginning no earlier than 7:00 a.m. and ending no later than 5:00 p.m., excluding holidays. Any work beyond ten hours per day or 40 hours per week shall be considered overtime. The CONTRACTOR shall not work on holidays. The Contract Time shall not be extended due to holidays falling within the Contract Time. Whenever the CONTRACTOR is performing any part of the Work, with the exception of equipment maintenance and cleanup, inspection by OWNER's representative will be required. Requests to perform the Work at times other than during regular working hours must be submitted in writing to the Project Representative, at least 48 hours prior to any proposed weekend work or scheduled extended workweeks, to give the OWNER ample time to arrange for representation and/or inspection during those periods. Periodic unscheduled overtime on weekdays will be permitted provided that two hours' notice is provided to and acknowledged in writing by the Project Representative prior to the end of the regular working day. Maintenance of the CONTRACTOR's equipment and cleanup may be performed during hours other than regular working hours.

B. CONTRACTOR shall reimburse the OWNER for additional engineering and/or inspection costs incurred as a result of overtime work in excess of the regular working hours. At OWNER's option, overtime costs may either be deducted from the CONTRACTOR's monthly payment request or deducted from the CONTRACTOR's retention prior to release of final payment.

C. ENGINEERING/Inspection costs shall be calculated at the following rates:

1.	Field Representative	$95/hour
2.	ENGINEER	$165/hour
3.	Project Manager	$210/hour

1.3 DEFECTIVE WORK

A. The CONTRACTOR shall not be entitled to an extension of the Contract Time or increase in the Contract Price for correcting or removing defective work.

1.4 CORRECTIVE WORK

A. Where defective or nonconforming Work (including damage to other work resulting therefrom) has been corrected, removed or replaced pursuant to the CONTRACTOR's obligations under the Contract Documents including Articles 16.0 and 27.0 of the General Conditions, the correction period set forth in Article 27.0 of the General Conditions 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 and accepted by the OWNER.

1.5 STORED EQUIPMENT AND MATERIALS

A. The CONTRACTOR shall furnish evidence that payment received on the basis of materials and equipment, not incorporated, and suitably stored, has in fact been paid to the respective supplier(s) within 60 days of the Application of Payment on which the material/equipment first appeared. Failure to procure said evidence of payment shall result in the withdrawal of previous approval(s) and removal of the related equipment and materials from the Application of Payment.

1.6 SUBSTANTIAL COMPLETION

A. In addition to the other terms and conditions set forth in the Contract Documents, the Work will not be considered substantially complete unless and until CONTRACTOR has completed each of the following to the satisfaction of the OWNER:

a. All components of the Work have been installed, tested, and approved.
b. All repair and coating systems have been properly cured.
c. All data specified in the Contract Documents have been delivered to the OWNER.

d. All instructions have been provided to the Project Representative in accordance with the Contract Documents.
e. All training to be provided by CONTRACTOR pursuant to the terms of the Contract Documents has been completed.

[END OF SECTION 00800]

SECTION 00801

SUBMISSION OF WORK SCHEDULE

PART 1 – GENERAL

1.01 CONSTRUCTION SCHEDULE

A. The Construction Schedule is to be submitted by the CONTRACTOR within the timeframe set forth in the Contract Documents.

B. The Construction Schedule shall be developed using the Critical Path Method (CPM) schedule format.

1. The schedule shall be developed in Precedence Diagram Method (PDM) format, consistent with Contract milestones, showing activities for each discrete Contract activity to be accomplished.

2. It shall include activities for deliverables and reviews in the schedule.

3. Sufficient liaison shall be conducted, and information provided to indicate coordination with utility owners having facilities within the project limits.

4. The Construction Schedule must reflect the utility requirements included in the Contract Documents, unless changed by mutual agreement of the utility company, the CONTRACTOR, the OWNER, and the PROJECT REPRESENTATIVE. The Construction Schedule shall assign calendar day durations to each activity.

5. Failure to include any element of work or any activity relating to utility relocation will not relieve the CONTRACTOR from completing all Work within the Contract Time at no additional contract time or cost, notwithstanding prior acceptance of the schedule.

6. The CONTRACTOR shall prepare a CPM Network Diagram in time-scale logic diagram, by week starting on Monday, grouped (banded) by work areas and sorted by early start days. The CONTRACTOR shall prominently identify the critical path activities, defined as the longest continuous path of work activities, and submit the Network Diagram on D size, 22-inch by 34-inch [559 by 864 mm] or E size, 34-inch by 44-inch [864 by 1,118 mm] paper.

C. The CONTRACTOR shall submit one copy of schedule reports containing, as a minimum: identification, activity description, estimated total duration, estimated remaining duration, computed, or specified early start date, computed, or specified late finish date, and total float. Submit all reports on 8.5-inch by 11-inch [216 by 280 mm] paper, sorted as follows:

1. Activity Report:

   a. Include activities shown on the Contract.

   b. Schedule listed in order of ascending activity number.

D. Float Report:

   1. Include activities shown on the Contract.

   2. Schedule listed in order of the ascending total float values.

E. Early Start Report:

   1. Include activities shown on the Contract.

   2. Schedule in chronological order by early start date.

F. Predecessor/Successor Report:

   1. Include activities shown on the Contract.

   2. Schedule listed in order of ascending activity numbers with the associated predecessor and successor activity numbers.

G. Narrative:

   1. Explain, in narrative form, how durations were determined and describe the proposed approach for meeting interim and final completion milestone dates specified in the Contract. Include assumptions made, restraints, critical path activities, means and methods, crews planned for each operation, equipment requirements, activities requiring overtime, additional shifts, permits, coordination requirements, long lead delivery items, or other significant requirements which would affect the ability to meet the interim and final milestone dates.

   2. Failure to include in the schedule any element of work shall not excuse the Contractor from completing all Work required to achieve completion.

H. The PROJECT REPRESENTATIVE will have 30 days to accept the Construction Schedule or to schedule a meeting with the CONTRACTOR to resolve any problems that prevent acceptance of the schedule.

I. The CONTRACTOR shall attend the meeting scheduled by the PROJECT REPRESENTATIVE, and submit a corrected Construction Schedule to the PROJECT REPRESENTATIVE within 7 days after the meeting. The process will be continued until a Construction Schedule is accepted by the PROJECT REPRESENTATIVE.

J. The Construction Schedule may indicate a completion date in advance of the Contract completion date. However, the OWNER will not be liable in any way for the CONTRACTOR's failure to complete the Project prior to the Contract completion date. Any additional costs, including extended overhead incurred between the CONTRACTOR's scheduled completion date and the completion of Contract Time, shall be the responsibility of the CONTRACTOR. The CONTRACTOR shall not be entitled to claim or recover any such cost from the OWNER.

K. On each Monday prior to the monthly estimate cutoff date, The CONTRACTOR shall submit Contract Schedule, updated to reflect actual start dates, actual finish dates, added activities, changes in sequence and days remaining, to the Projective Representative for acceptance. Include an updated Network Diagram and computer-generated reports and a narrative as herein specified. In the narrative, address changes in duration of any activity and changes to logic of activities which were performed in a sequence different from those shown in the latest accepted Construction Schedule. Also, address activities to be added to the schedule, identification of supplemental agreements and change orders, and the incorporation of accepted schedule revisions.

L. Any changes to the sequencing must be coordinated with the utility work shown in the plans. If the schedule provided indicates an actual or potential delay to the completion of the Contract include in the narrative a discussion of problems, causes, activities affected and describe the means and methods to be utilized to complete the project in the authorized time. Attend meetings scheduled by the PROJECT REPRESENTATIVE to resolve any problems that prevent acceptance of the updated Construction Schedule, and submit revised schedules as necessary for the PROJECT REPRESENTATIVE's acceptance. By acceptance of the Construction Schedule, the PROJECT REPRESENTATIVE does not endorse or otherwise certify the validity or accuracy of the activity durations or logic utilized.

M. The PROJECT REPRESENTATIVE will withhold monthly payments due for failure of the CONTRACTOR to meet the requirements for submittal and acceptance of the Construction Schedule, including the monthly updates.

1.02 WEEKLY MEETINGS

A. Attend weekly meetings scheduled by the PROJECT REPRESENTATIVE to discuss Contract progress, near-term scheduled activities, including utility relocations, problems, and their proposed solutions.

B. Submit a 2-Week Planning Schedule at each weekly meeting, showing the items of work planned for the next 2 weeks.

C. Develop the schedule in Bar Chart format, identifying current and planned activities and related Construction Schedule work activities, including subcontractor work. Designate all activities that are controlling Work items as determined by the currently accepted Construction Schedule.

1.03 FLOAT

A. Float is not for the exclusive use or benefit of either the OWNER or the CONTRACTOR.

B. The PROJECT REPRESENTATIVE will grant time extensions only to the extent that time adjustments to the affected activities exceed the total float along the affected paths of the currently accepted Construction Schedule at the time of delay.

C. Submit a network diagram, total float report, and a narrative report to support any request for additional Contract Time.

1.04 PERFORMANCE OF WORK

A. By submitting a schedule, the CONTRACTOR is making a positive assertion that the Project will be constructed in the order indicated on the Construction Schedule.

B. The CONTRACTOR shall prosecute the Work in accordance with the latest accepted Construction Schedule. Any costs associated with meeting milestones and completing the Project within the authorized Contract Time will be borne solely by the CONTRACTOR.

1.05 AS-BUILT SCHEDULE

A. As a condition for the release of any retainage, submittals of as-built schedules which describes the actual order and start and stop times for all activities by the CONTRACTOR is required.

[END OF SECTION OF 00801]

SECTION 00802

PREVENTION, CONTROL AND ABATEMENT OF EROSION AND WATER POLLUTION

PART 1 – GENERAL

1.1 PRECONSTRUCTION REQUIREMENTS

At the Preconstruction Conference, the CONTRACTOR shall provide to the PROJECT REPRESENTATIVE an Erosion Control Plan meeting the requirements or special conditions of all permits authorizing project construction and the Contract requirements.

When a Florida Department of Environmental Protection (FDEP) generic permit is issued, the CONTRACTOR's Erosion Control Plan shall be prepared to accompany the Stormwater Pollution Prevention Plan (SWPPP). The CONTRACTOR shall ensure the Erosion Control Plan includes procedures to control off-site tracking of soil by vehicles and construction equipment and a procedure for cleanup and reporting of non-stormwater discharges, such as contaminated groundwater or accidental spills. The CONTRACTOR shall not begin any soil disturbing activities until receipt of PROJECT REPRESENTATIVE's written approval of the CONTRACTOR's Erosion Control Plan, including required signed certification statements.

The CONTRACTOR's failure to sign any required documents or certification statements will be considered a default of the Contract. Any soil disturbing activities performed by the CONTRACTOR or any of its subcontractors without the required signed documents or certification statements may be considered a violation of the FDEP Generic Permit.

When the SWPPP is required, the CONTRACTOR shall prepare the Erosion Control Plan in accordance with the planned sequence of operations and present the Erosion Control Plan in a format acceptable to the PROJECT REPRESENTATIVE. The Erosion Control Plan shall include, but not be limited to, descriptions of the following items or activities:

A. For each phase of construction operations or activities, supply the following information:

   1. Locations of all erosion control devices.

   2. Types of all erosion control devices.

3. Estimated time erosion control devices will be in operation.
4. Monitoring schedules for maintenance of erosion control devices.
5. Methods of maintaining erosion control devices.
6. Containment or removal methods for pollutants or hazardous wastes.

B. The name and telephone number of the person responsible for monitoring and maintaining the erosion control devices.

C. The Erosion Control Plan submitted to the PROJECT REPRESENTATIVE for the ENGINEER's approval.

The CONTRACTOR shall not begin construction activities until the Erosion Control Plan receives written approval from the ENGINEER. The CONTRACTOR shall comply with the approved Erosion Control Plan.

1.2 BALES

A. The CONTRACTOR shall provide baled hay or straw having minimum dimensions of 14 inches by 18 inches by 36 inches [350 by 450 by 900 mm] at the time of placement.

B. The CONTRACTOR shall construct baled hay or straw dams according to details shown in the plans or as directed by the PROJECT REPRESENTATIVE to protect against downstream accumulations of sediment.

C. The CONTRACTOR shall use natural baled hay or straw or synthetic hay bales as an alternative to natural baled hay or straw. Synthetic hay bales should be interlocking, have pre-made stake holes, made of synthetic fibers (polypropylene, nylon, polyester) that meet the Environmental Protection Agency's (EPA's) Toxicity Characteristic Leaching Procedure (TCLP) standards, and be produced into a filter medium with needle- punches fibers.

D. The CONTRACTOR shall wash out and remove sediment deposits when the deposits reach ½ the height of the reusable synthetic hay bale or as directed by the PROJECT REPRESENTATIVE.

E. The CONTRACTOR shall dispose of the washout in an area approved by the PROJECT REPRESENTATIVE.

F. Synthetic hay bales that have had sediment deposits removed may be reinstalled on the Project as approved by the PROJECT REPRESENTATIVE.

1.3 ARTIFICIAL COVERINGS

A. General:

The CONTRACTOR shall install artificial coverings in locations where temporary protection from erosion is needed. Two situations occur that require artificial coverings. The two situations have differing material requirements, which are described below.

1. During temporary pauses in construction caused by inclement weather or other circumstances, use artificial coverings composed of natural or synthetic fiber mats, plastic sheeting, or netting as protection against erosion, when directed by the PROJECT REPRESENTATIVE. Remove the material when construction resumes.

2. While permanent grassing is being established, use artificial coverings as erosion control blankets, at locations shown in the plans, to facilitate plant growth, in accordance with the Florida Department of Transportation (FDOT) specification 104-6.4.13.

1.4 MAINTENANCE AND INSPECTION

A. The CONTRACTOR shall provide routine maintenance of permanent and temporary erosion control features, at no additional Contract expense, until the project is complete and accepted.

B. If reconstruction of such erosion control features is necessary due to the CONTRACTOR’s negligence or carelessness or, in the case of temporary erosion control features, failure by the CONTRACTOR to install permanent erosion control features as scheduled, the CONTRACTOR shall replace such erosion control features at no additional Contract expense.

C. The CONTRACTOR shall inspect all erosion control features at least once every 7 calendar days and within 24 hours of the end of a storm of 0.50 inches [12 mm] or greater.

D. The CONTRACTOR shall maintain all erosion control features as required in the SWPPP, CONTRACTOR’s Erosion Control Plan and as specified in the FDEP Generic Permit for Stormwater Discharge from Large and Small Construction Activities.

1.5 MOWING

A. The PROJECT REPRESENTATIVE may require mowing by the CONTRACTOR of areas within the limits of the Project as deemed necessary by the Project Manager.

B. The CONTRACTOR shall mow these designated areas within 7 days of receiving such order from the PROJECT REPRESENTATIVE.

C. The CONTRACTOR shall remove and properly dispose of all litter and debris prior to the mowing operation.

D. The CONTRACTOR shall use conventional and specialized equipment along with hand labor to mow the entire area including slopes, wet areas, intersections, and around all appurtenances.

E. The CONTRACTOR shall mow all areas to obtain a uniform height of 6 inches [150 mm], unless otherwise directed by the PROJECT REPRESENTATIVE.

[END OF SECTION 00802]

SECTION 00803

CONTRACTOR QUALITY CONTROL

GENERAL REQUIREMENTS – PERSONNEL QUALIFICATIONS

PART 1 - GENERAL

1.1 Personnel Qualifications

General: Contractor shall provide qualified personnel for sampling, testing, and inspection of materials and construction activities. Contractor shall ensure that qualifications are maintained during the course of sampling, testing, and inspection.

Quality Control Manager: Contractor shall designate a Quality Control ("QC") Manager who has full authority to act as the Contractor's agent to institute any and all actions necessary for the successful implementation of the QC Plan required by FDOT specifications. The QC Manager must speak and understand English. The QC Manager must be on-site at the project on a daily basis or always available upon four hours' notice from the Project Representative to administer the QC Plan. Successful implementation of the QC Plan includes, but is not limited to, administering, implementing, monitoring, and as necessary, adjusting the processes to ensure compliance with the Contract Documents. Contractor shall ensure that the QC Manager is qualified as such through the FDOT Construction Training/Qualification Program.

Under the direction of the QC Manager, and using FDOT standard forms, summarize the daily QC activities including testing and material sampling. Contractor shall make copies of the completed forms available daily for Project Representative review. Contractor shall maintain all Quality Control related reports and documentation for a period of three years from final acceptance of the project.

Worksite Traffic Supervisor: Contractor shall provide a Worksite Traffic Supervisor who is responsible for initiating, installing, and maintaining all traffic control devices as required in the Contract Documents. Contractor shall ensure that the Worksite Traffic Supervisor is certified in the advanced training category by an approved training Provider as posted on the FDOT's website at the following URL address: www.dot.state.fl.us/rddesign/MOT/MOT.shtm . Contractor shall use approved alternate Worksite Traffic Supervisors when necessary.

Flagger: Contractor shall provide trained flaggers to direct traffic where one-way operation in a single lane is in effect and in other situations as required. The

Worksite Traffic Supervisor or others as approved by the Department will provide training for flaggers.

Signal Installation Inspector: Contractor shall provide an inspector, trained, and certified by the International Municipal Signal Association (IMSA) as a Traffic Signal Inspector, to perform all signal installation inspections. Contractor shall use only the FDOT approved signal inspection report forms during the signal inspection activities. Contractor shall ensure all equipment, materials, and hardware is in compliance with FDOT Specifications and verify that all equipment requiring certification is listed on the FDOT's Approved Product List (APL). Contractor shall provide the completed signal inspection report form(s), certified by the IMSA Traffic Signal Inspector to the Project Representative.

The FDOT's approved inspection report forms are available at the following URL: www.dot.state.fl.us/trafficoperations/ .

[END OF SECTION 00803]

SECTION 00805

CONTRACT CLAIMS AND CHANGES

General Conditions, Section 14.0 “Changes in Contract Price” and Section 28.0, “Claims and Disputes” are hereby amended to incorporate the following FDOT Specifications:

FDOT Standard Specifications for Road and Bridge Construction, 2015 Sub article 4-0.2 is deleted and the following substituted:

4-3.2 Increase, Decrease or Alteration in the Work: The Owner reserves the right to make alterations in the character of the work which involve a substantial change in the nature of the design or in the type of construction or which materially increases or decreases the cost or time of performance. Such alteration shall not constitute a breach of Contract, shall not invalidate the Contract, or release the Surety.

Notwithstanding that the Contractor shall have no formal right whatsoever to any extra compensation or time extension deemed due by the Contractor for any cause unless and until the Contractor follows the procedures set forth in 5-12.2 for preservation, presentation and resolution of the claim, the Contractor may at any time, after having otherwise timely provided a notice of intent to claim or preliminary time extension request pursuant to 5-12.2 and 8-7.3.2, and having satisfied all other requirements of the Contract Documents, submit to the Project Representative a request for equitable adjustment of compensation or time or other dispute resolution proposal. The Contractor shall in any request for equitable adjustment of compensation, time, or other dispute resolution proposal certify under oath and in writing, in accordance with the formalities required by Florida law, that the request is made in good faith, that any supportive data provided are accurate and complete to the Contractor’s best knowledge and belief, and that the amount of the request accurately reflects what the Contractor in good faith believes to be the Owner’s responsibility pursuant to the terms of the Contract Documents. Such certification must be made by an officer or director of the Contractor with the authority to bind the Contractor. Any such certified statements of entitlement and costs shall be subject to the audit provisions set forth in 5-12.14. While the submittal or review of a duly certified request for equitable adjustment shall neither create, modify, nor activate any legal rights or obligations as to the Contractor or the Owner, the Owner will review the content of any duly certified request for equitable adjustment or other dispute resolution proposal, with any further action or inaction by the Owner thereafter being in its sole discretion. Any request for equitable adjustment that fails to fully comply with the certification requirements will not be reviewed by the Owner.

The monetary compensation provided for below constitutes full and complete payment for such additional work and the Contractor shall have no right to any

additional monetary compensation for any direct or indirect costs or profit for any such additional work beyond that expressly provided below. The Contractor shall be entitled to a time extension only to the extent that the performance of any portion of the additional work is a controlling work item and the performance of such controlling work item actually extends completion of the project due to no fault of the Contractor. All time-related costs for actual performance of such additional work are included in the compensation already provided below and any time extension entitlement hereunder will be without additional monetary compensation. The Contractor shall have no right to any monetary compensation or damages whatsoever for any direct or indirect delay to a controlling work item arising out of or in any way related to the circumstances leading up to or resulting from additional work (but not relating to the actual performance of the additional work, which is paid for as otherwise provided herein), except only as provided for under 5-12.6.2.1.

4-3.2.1 Allowable Costs for Extra Work: The Owner may direct in writing that extra work be done, and, at the Owner's sole discretion, the Contractor will be paid pursuant to an agreed contract change order or in the following manner:

(a) Labor and Burden: The Contractor will receive payment for actual costs of direct labor and burden for the additional or unforeseen work. Labor includes supervisors actually engaged in the work; and will not include project supervisory personnel nor necessary on-site clerical staff, except when the additional or unforeseen work is a controlling work item, and the performance of such controlling work item actually extends completion of the project due to no fault of the Contractor. Compensation for project supervisory personnel, but in no case higher than a Project Manager's position, shall only be for the pro-rata time such supervisory personnel spent on the contract. In no case shall an officer or director of the Company, nor those persons who own more than 1 % of the Company, be considered as project supervisory personnel, direct labor, or supervisors hereunder.

Payment for burden shall be limited solely to the following:

CONTINUED ON NEXT PAGE

Table 4-3.2.1

Item	Rate
FICA	Rate established by Law
FUTA/SUTA	Rate established by Law
Medical Insurance	Actual

Holidays, Sick & Vacation benefits	Actual
Retirement benefits	Actual
Workers Compensation	Rates based on the National Council on Compensation Insurance basic rate tables adjusted by Contractor's actual experience modification factor in effect at the time of the additional work or unforeseen work
Per Diem	Actual but not to exceed State of Florida's rate
Insurance*	Actual

*Compensation for Insurance is limited solely to General Liability Coverage and does not include any other insurance coverage (such as, but not limited to, Umbrella Coverage, Automobile Insurance, etc.).

At the Pre-construction conference, certify to the Owner the following:

(1) A listing of on-site clerical staff, supervisory personnel and their pro-rated time assigned to the contract,
(2) Actual Rate for items listed in Table 4-3.2.1,
(3) Existence of employee benefit plan for Holiday, Sick and Vacation benefits, and a Retirement Plan, and,
(4) Payment of Per Diem is a company practice for instances when compensation for Per Diem is requested.

Such certification must be made by an officer or director of the Contractor with authority to bind the Contractor. Timely certification is a condition precedent to any right of the Contractor to recover compensations for such costs, and failure to timely submit the certification will constitute a full, complete, absolute, and irrevocable waiver by the Contractor of any right to recover such costs. Any subsequent changes shall be certified to the Owner as part of the cost proposal or seven calendar days in advance of performing such extra work.

(b) Materials and Supplies: For materials accepted by the Owner and used on the project, the Contractor will receive the actual cost of such materials incorporated into the work, including Contractor paid transportation charges (exclusive of equipment as hereinafter set forth). For supplies reasonably needed for performing the work, the Contractor will receive the actual cost of such supplies.

(c) Equipment: For any machinery or special equipment (other than small tools), including fuel and lubricant, the Contractor will receive 100% of the "Rental Rate Blue Book" for the actual time that such equipment is in operation on the work, and 50% of the "Rental Rate Blue Book" for the time the equipment is directed to standby and remain on the project site, to be calculated as indicated below. The equipment rates will be based on the latest edition (as of the date the work to be performed begins) of the "Rental Rate Blue Book for Construction Equipment" or the "Rental Rate Blue Book for Older Construction Equipment,"

whichever is applicable, as published by Machinery Information Division of PRIMEDIA Information, Inc. (version current at the time of bid), using all instructions and adjustments contained therein and as modified below. On all projects, the Owner will adjust the rates using regional adjustments and Rate Adjustment Tables according to the instructions in the Blue Book.

Allowable Equipment Rates will be established as set out below:

(1) Allowable Hourly Equipment Rate = Monthly Rate/176 x Adjustment Factors x 100%.
(2) Allowable Hourly Operating Cost = Hourly Operating Cost x 100%.
(3) Allowable Rate per Hour = Allowable Hourly Equipment Rate + Allowable Hourly Operating Cost.
(4) Standby Rate = Allowable Hourly Equipment Rate x 50%.

The Monthly Rate is The Basic Machine Rate Plus Any Attachments. Standby rates will apply when equipment is not in operation and is directed by the Owner to standby at the project site when needed again to complete work and the cost of moving the equipment will exceed the accumulated standby cost. Standby rates will not apply on any day the equipment operates for eight or more hours. Standby payment will be limited to only that number of hours which, when added to the operating time for that day, equals eight hours. Standby payment will not be made on days that are not normally considered workdays on the project.

Cost will be allowed for transporting the equipment to and from the location at which it will be used. If the equipment requires assembly or disassembly for transport, time to perform this work will be allowed at the rate for standby equipment.

Equipment may include vehicles utilized only by Labor, as defined above.

(d) Indirect Costs, Expenses, and Profit: Compensation for all indirect costs, expenses, and profit of the Contractor, including but not limited to overhead of any kind, whether jobsite, field office, division office, regional office, home office, or otherwise, is expressly limited to the greater of either (1) or (2) below:

(1) Solely a mark-up of 17.5% on the payments in (a) through (c), above.

(i) Bond: The Contractor will receive compensation for any premium for acquiring a bond for such additional or unforeseen

work: provided, however, that such payment for additional bond will only be paid upon presentment of clear and convincing proof that the Contractor has actually provided and paid for separate bond premiums for such additional or unforeseen work in such amount.

(ii) The Contractor will be allowed a markup of 10% on the first $50,000 and a markup of 5% on any amount over $50,000 on any subcontract directly related to the additional or unforeseen work. Any such subcontractor mark-up will be allowed only by the prime Contractor and a first-tier subcontractor, and the Contractor must elect the markup for any eligible first tier subcontractor to do so.

(2) Solely the payments in (a) through (c) above, plus the formula set forth below and as applied solely as to such number of calendar days of entitlement that are in excess of ten cumulative calendar days as defined below

$$D = \frac{A \times C}{B}$$

Where A = Original Contract Amount
B = Original Contract Time
C = 8%
D = Average Overhead Per Day

Cumulative Calendar Days is defined as the cumulative total number of calendar days granted for time extension due to delay of a controlling work item caused solely by the Owner is, or the cumulative total number of calendar days for which entitlement to a time extension due to delay of a controlling work item caused solely by the Owner is otherwise ultimately determined in favor of the Contractor to be.

Further, in the event there are concurrent delays to one or more controlling work items, one or more being caused by the Owner and one or more being caused by the Contractor, the Contractor shall be entitled to a time extension for each day that a controlling work item is delayed by the Owner but shall have no right to nor receive any monetary compensation for any indirect costs for any days of concurrent delay. No compensation, whatsoever, will be paid to the Contractor for any jobsite overhead and other indirect impacts when the total number of calendar days granted for time extension due to delay of a controlling work item caused solely by the Owner is, or the total number of calendar days for which entitlement to a time extension due to delay of a controlling work item caused solely by the Owner is otherwise ultimately determined in favor of the

Contractor to be, equal to or less than ten calendar days and the Contractor also fully assumes all monetary risk of any and all partial or single calendar day delay periods, due to delay of a controlling work item caused solely by the Owner, that when cumulatively totaled together are equal to or less than ten calendar days and regardless of whether monetary compensation is otherwise provided for hereunder for one or more calendar days of time extension entitlement for each calendar day exceeding ten calendar days. All calculations under this provision shall exclude weather days, and days granted for performing additional work

4-3.2.2 Subcontracted Work: For work performed by a subcontractor, compensation for the additional or unforeseen work shall be solely limited to as provided for in 4- 3.2.1(d)(1), with the exception of, in the instance of subcontractor performed work only, the subcontractor may receive compensation for any premium for acquiring a bond for the additional or unforeseen work; provided, however, that such payment for additional subcontractor bond will only be paid upon presentment to the Owner through the Project Representative of clear and convincing proof that the subcontractor has actually provided and paid for separate bond premiums for such additional or unforeseen work in such amount.

The Contractor shall require the subcontractor to provide a certification, in accordance with 4-3.2.1(a), as part of the cost proposal and provide such to the Project Representative. Such certification must be made by an officer or director of the subcontractor with authority to bind the subcontractor. Timely certification is a condition precedent to any right of the Contractor to recover compensation for such subcontractor costs, and failure to timely submit the certification will constitute a full, complete, absolute, and irrevocable waiver by the Contractor of any right to recover such subcontractor costs.

FDOT Standard Specifications for Road and Bridge Construction, 2015 Sub article 5-12.6 is deleted and the following substituted:

5-12.6 Compensation for Extra Work or Delay:

5-12.6.1 Compensation for Extra Work: Notwithstanding anything to the contrary contained in the Contract Documents, the Contractor shall not be entitled to any compensation beyond that provided for in 4-3.2.

5-12.6.2 Compensation for Delay: Notwithstanding anything to the contrary contained in the Contract Documents, the additional compensation set forth in 5-12.6.2.1 shall be the Contractor's sole monetary remedy for any delay other than to perform extra work due to the fault or neglect of the Owner or anyone for whom Owner is liable and then only where such acts continue after Contractor's written notice to the Owner and Project

Representative of such interference. The parties anticipate that delays may be caused by or arise from any number of events during the term of the Contract, including, but not limited to, work performed, work deleted, change orders, supplemental agreements, disruptions, differing site conditions, utility conflicts, design changes or defects, time extensions, extra work, right-of -way issues, permitting issues, actions of suppliers, subcontractors or other contractors, actions by third parties, suspensions of work by the Owner, shop drawing approval process delays, expansion of the physical limits of the project to make it functional, weather, weekends, holidays, special events, suspension of Contract time, or other events, forces or factors sometimes experienced in construction work. Such delays or events and their potential impacts on the performance by the Contractor are specifically contemplated and acknowledged by the parties in entering into this Contract, and shall not be deemed to constitute fault or neglect on the part of the Owner.

5-12.6.2.1 Compensation for Direct Costs, Indirect Costs, Expenses, and Profit thereon, of or from Delay: For any delay claim, the Contractor shall only be entitled to monetary compensation for the actual idle labor and equipment, and indirect costs, expenses, and profit thereon, as provided for in 4-3.2(d) and solely for costs incurred beyond what reasonable mitigation thereof the Contractor could have undertaken.

[END OF SECTION 00805]

SECTION 00808

SALES TAX EXEMPTION ADDENDUM

1. Contractor and City entered into a contract dated _____, (the "Contract") for the performance of the WORK described therein, to which an executed copy of this Sales Tax Exemption Addendum ("Addendum") shall be attached thereto and incorporated therein.

2. Contractor and City desire to enter into an arrangement whereby certain purchases under the Contract can be made through the City as a means of taking advantage of the City's status of being exempt from sales and use taxes.

3. The City is exempt from sales and use taxes. As such it is exempt from the payment of sales and use tax on purchases of building materials or equipment necessary for the performance of work under construction contracts, provided the City determines it is to its best interest to do so, and provided the purchase of such building materials and equipment are handled in the manner hereinafter described.

4. The City has determined it is in its best interest to provide the opportunity to eliminate the payments of sales tax for building materials or equipment to be used in the construction of this project, and notifies the Contractor of its intent to do so.

TERMS AND CONDITIONS

1. The parties intend by this Addendum to comply with the procedures and elements described in Florida Department of Revenue Technical Assistance Advisements 01A-003 (January 8, 2001) and 00A-083 (December 21, 2000), and any conflict or ambiguity in this Addendum shall be resolved in favor of meeting the elements necessary to make tax exempt the purchases contemplated by this Addendum.

2. The City shall, at its sole discretion, have the option to purchase directly from the supplier or vendor any building materials or equipment included in the Contractor's bid for the Contract. Contractor shall, from time to time submit, update, and keep current, for consideration by the City, a list of all building materials and equipment to be purchased, organized by supplier or vendor. Such list shall include a brief description of the building materials and equipment and the name and address of the supplier or vendor. Suppliers or vendors

aggregate purchase value of less than $10,000 need not be listed. Contractor's initial list is attached hereto and incorporated herein. Building materials and equipment not required for the performance of the Contract shall not be purchased under this Addendum. The City reserves the right to delete or add items from this Addendum when it is in the City's best interest.

3. The City will be liable for the payment of all purchases properly made hereunder.

4. Contractor shall notify all suppliers or vendors not to make sales to the Contractor under this Addendum.

5. For each purchase approved by the City to be made under this Addendum, the Contractor shall furnish the City in writing information sufficient for the City to issue to the supplier its City purchase order for the requested building materials or equipment which shall include as an attachment the City's Certificate of Exemption. Suppliers and vendors will render statements for materials purchased to the City in care of the Contractor. After receiving and inspecting the materials when they arrive at the job site, verifying that all necessary documentation accompanies the delivery and conforms with the purchase order, Contractor will forward the invoices to the City's duly authorized representative for approval, processing, and delivery to the City for payment. The City will process the invoices and issue payment directly to the supplier or vendor. Contractor will keep and furnish to the City all such records, summaries, reports of purchase orders and invoices, and reports of the status and use of goods handled under this Addendum, as the City may reasonably require.

6. The Contract provides that Contractor will perform the work under the Contract for the Contract Price in the amount of $[_____], as may be amended from time to time as provided in the Contract. Said amount, as amended, due Contractor under the Contract shall be reduced by the sum of all amounts paid by the City for materials and equipment purchased under this Addendum, including any shipping, handling, insurance, or other, similar charges paid by the City, and all of the savings of sales and use tax on the purchase of such items.

7. The Contractor shall submit his proposal for base bid and proposals for each Alternate with the inclusion of all required taxes including applicable sales and use tax, the same as if tax were to be paid in the normal manner. Any sales and use tax savings will be effected during the performance of the Contract.

8. Contractor shall immediately notify all subcontractors and material and equipment suppliers of the City's intent to reduce the construction cost of the Project by the purchase of building materials and equipment in the manner herein described and the Contractor shall not withhold his consent to the arrangement.

9. Administrative costs incurred by the Contractor with this Addendum shall be considered to be included in the Total Lump Sum Bid amount for the Work. No addition shall be added to the Contract Price because of the service provided by

the Contractor in the purchase of building materials and equipment by the City.

10. All sales and use tax savings on the purchase of building materials and equipment shall be credited to the City and the amount of the Contract Price shall be reduced by the full amount of savings which result from the omission of payment of sales and use tax.

11. By virtue of its payment of material and equipment invoices, the City further intends to benefit from any discounts offered for timely payment to the extent of one-half of the discount offered, the remaining one-half to accrue to the Contractor as an incentive for the Contractor to process invoices well within the discount period. The Contractor shall pay any late penalties caused by its failure to facilitate the processing of invoices within the allotted time.

12. The Contractor, notwithstanding the terms and conditions of this Addendum, shall select, describe, obtain approvals, submit samples, coordinate, process, prepare shop drawings, pursue, receive, inspect, store, protect and guarantee the same as would have been the case if the tax saving procedures were not implemented.

13. The Contractor as bailee shall have the obligation of receiving, inspecting, storing and safekeeping all goods and materials purchased on behalf of the City pursuant to this Addendum. Further, the Contractor shall be responsible for the cost of replacing or repairing any goods or materials lost, stolen, damaged or destroyed while in the Contractor's possession or control as bailee, as well as processing all warranty claims for defective goods and materials to the same extent as if such goods had been Contractor-supplied or purchased in the name of the Contractor.

14. Contractor shall maintain separate accounting records for all transactions carried out under the authority granted to it under this Addendum. Such records shall be open to the City or its authorized agent during normal business hours of Contractor.

15. The City will take both legal and equitable title to the building materials and equipment received from the vendor when delivery is made by the vendor at the Project site. Without waiving or releasing Contractor from its obligations under paragraph 13 above, as equitable and legal owner of the materials and equipment purchased under this Addendum, the City shall bear the risk of loss thereto and shall have the insurable interest therein. Therefore, unless already provided for under the terms of the Contract Documents, Contractor shall cause the City to be insured or named as an additional insured as its interest may appear against any loss or damage to such goods to the extent of their full insurable value. All such insurance shall be in such form and through such companies as may be reasonably acceptable to City and Contractor shall provide the City certificates thereof requiring each insurer to provide the City ten (10) days written notice in advance of cancellation or modification of coverage.

Pursuant to the terms of the Contract Documents, the City will reimburse the Contractor for any additional premium amounts paid solely for such insurances against loss or damage.

16. Contractor shall be fully responsible for all matters relating to the procurement of materials and equipment covered by this Addendum, including but not limited to, overseeing that the correct materials and the correct amounts are received timely with appropriate warranties; for inspecting and receiving the goods; and for unloading, handling, and storing the materials until installed. Contractor shall inspect the materials when they arrive at the Project site, verify that all necessary documentation accompanies the delivery and conforms with the City's purchase order, and forward the invoice to the City for payment if the goods are conforming and acceptable. Contractor shall verify that the materials conform to Drawings and Specifications and determine before installation that such materials are not defective. Contractor shall manage and enforce the warranties on all materials and equipment covered by this Addendum. Contractor shall be responsible to the City for its failure to fully and timely perform its obligations under this paragraph, and this Addendum generally.

17. When title to the materials and equipment covered by this Addendum passes to the City prior to being incorporated into the Work, the Contractor's possession of the goods is a bailment until such time as each of such goods is returned to the City by being incorporated into the Work.

18. The City shall not be liable for delays in the Work caused by delays in delivery of or defects in the goods covered by this Addendum, nor shall such delays or defects excuse Contractor in whole or in part from its obligation to timely perform the Contract.

19. In the event Contractor objects to the payment of any invoice for goods covered by this Addendum, Contractor shall at no additional cost to the City, provide all assistance, records, and testimony necessary or convenient for the City to resolve the supplier's claim for payment.

20. This Addendum and the authority granted to Contractor hereunder may be revoked by the City at any time upon verbal or written notice to Contractor at its offices located at _____, during normal business hours.

[END OF SECTION 00808]

SECTION 01046

SPECIAL PROVISIONS

PART 1 – GENERAL

1.01 CONSTRUCTION AREAS

The CONTRACTOR shall:

A. Limit use of the construction areas for Work and for storage to allow for:

1. Work by other contractors.

2. Utilities use.

3. OWNER use.

4. Public use.

B. Coordinate use of Work site under direction of the PROJECT REPRESENTATIVE.

C. Assume full responsibility for the protection and safekeeping of materials and products under this Contract, stored on- or off-site.

D. Move any stored products, under CONTRACTOR's control, which interfere with operations of the OWNER, utilities, or any separate contractor.

E. Obtain and pay for the use of additional lay down areas needed for operations.

1.02 SPECIFICATIONS

All Work called for in the Specifications applicable to this Contract, but not shown on the plans in its present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the plans or the Specifications, but involved in carrying out intent or in the complete and proper execution of the work is required and shall be performed by the CONTRACTOR as though it were specifically delineated or described.

The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any Work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made on

that basis. The inclusion of the General Requirements (or work specified elsewhere) in the General part of the Specifications is only for the convenience of the CONTRACTOR, and shall not be interpreted as a complete list of related Specification sections.

1.03 WORK PROGRESS

A. The CONTRACTOR shall construct the Work as shown on the Drawings and provide equipment which will be efficient, appropriate, and large enough to secure a satisfactory quality of Work and a rate of progress which will ensure the completion of the Work within the Contract Time.

B. If at any time, Project execution appears to be inefficient, inappropriate, or insufficient for securing the quality of Work required or for producing the necessary rate of progress, the PROJECT REPRESENTATIVE may request the CONTRACTOR to increase the efficiency, change the character or increase the project equipment and the CONTRACTOR shall conform to such request. Failure of the PROJECT REPRESENTATIVE to give such request shall in no way relieve the CONTRACTOR of his/her obligations to secure the quality of the Work and rate of progress required.

1.04 PRIVATE LAND

The CONTRACTOR shall not enter or occupy private land outside of the construction site or easements, except by written permission of the landowner.

1.05 WORK LOCATIONS

Structures, pipelines, and equipment shall be substantially located as indicated on the Drawings, but the ENGINEER through the PROJECT REPRESENTATIVE reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons.

1.06 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by the CONTRACTOR by providing temporary barricades, caution signs, lights, and other appropriate means to prevent accidents to persons and damage to property. The CONTRACTOR shall, at his/her own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workers. Bridges provided for access during construction shall be removed when no longer required. The length or size of excavation will be controlled by the particular surrounding conditions. The PROJECT REPRESENTATIVE may require special construction procedures such as limiting the length of the open trench, prohibiting stacking excavated material in the street, or requiring that the trench shall not remain open overnight.

B. The CONTRACTOR shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be properly signed, appropriately barricaded, and well lit at all times.

C. The CONTRACTOR shall adhere to the requirements of Chapter 553 Part II of the Florida Statutes entitled Trench Safety Act, and O.S.H.A. Excavation Safety Standards 29 CFRs 1926.650 Subpart P.

1.07 TEST PITS

A. Test pits for the purpose of locating all known and unknown underground pipelines, utilities, or structures in advance of the construction shall be excavated and backfilled by the CONTRACTOR at the direction of the PROJECT REPRESENTATIVE.

B. Test pits shall be immediately backfilled after its purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the PROJECT REPRESENTATIVE.

C. No separate payment will be made for such test pit obligations.

1.08 CARE AND PROTECTION OF PROPERTY

A. The CONTRACTOR shall be responsible for the preservation of all public and private property and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work on the part of the CONTRACTOR, such property shall be restored by the CONTRACTOR, at his/her expense, to a condition similar or equal to that existing before the damage was done, or make good the damage in other manner acceptable to the OWNER and PROJECT REPRESENTATIVE.

B. All sidewalks, mailboxes, and driveways which are disturbed by the CONTRACTOR’s operations shall be restored to its original construction or better and in accordance with best practice and the requirements of the Contract Documents.

C. All fences, walks, bushes, trees, shrubbery, and other physical features along the location of this Work shall be protected and restored in a thoroughly workmanlike manner. Fences and other features removed by the CONTRACTOR shall be replaced in the location and by the date indicated by the PROJECT REPRESENTATIVE.

All grass areas beyond the limits of construction which have been damaged by the CONTRACTOR shall be re-graded, sodded, and re- established as before damage. All sod shall match the same type of grass in front of each private “yard” within the right of way.

D. Trees close to the Work shall be boxed or otherwise protected against injury. The CONTRACTOR shall trim all branches that are liable to be damaged because of construction operations, but in no case shall any tree be cut or removed without prior notification or written approval of the PROJECT REPRESENTATIVE. All injuries to bark, trunk, limbs, and roots of trees shall be repaired by dressing, cutting, and painting according to appropriate methods, using only appropriate tools and materials. All landscaping to be removed shall be documented and replaced with like kind or better and re-established as before removal. All palm trees shown on plans shall be spaded out, protected, temporarily stored, and replaced to its same location(s).

E. The protection, removal, and replacement of existing physical features along the line of Work shall be a part of the Work under the Contract, and all costs in connection therewith shall be included in the lump sum prices.

1.09 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

A. The CONTRACTOR shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, water pipes, hydrants, sewers, storm drains, as well as electric and telephone cables, whether or not they are shown on the Drawings. The CONTRACTOR shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the CONTRACTOR’s, or any of its subcontractors, operations shall be repaired at his/her expense.

B. The CONTRACTOR shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing water services, drain lines, and sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by the CONTRACTOR.

C. Protection and temporary removal and replacement of existing utilities and structures shall be a part of the Work under the Contract and all costs in connection therewith shall be included in the lump sum price.

D. The CONTRACTOR shall be responsible to maintain water, telephone, power, cable TV, sewer, gas, and other related utilities throughout construction at no additional cost to the OWNER.

E. The CONTRACTOR shall fully cooperate with all private and public utilities during the installation of new facilities, or relocation of existing facilities. The CONTRACTOR shall accordingly coordinate his/her work and shall have no claim except for time extension for delays associated with the proposed utility improvements.

1.10 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

A. During the course of the Work, the CONTRACTOR shall keep the construction site in a reasonably clean and neat condition. The CONTRACTOR shall dispose of all residues resulting from the construction work and, at the conclusion of the work, shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations as well as leave the entire site of the Work in a neat, orderly, and restored condition.

B. In order to prevent environmental pollution arising from the construction activities related to the performance of this Contract, the CONTRACTOR and his/her subcontractors shall comply with all applicable federal, state, and local laws and regulations concerning waste material disposal, as well as any other specific requirements stated elsewhere in the Specifications or the Contract Documents.

1.11 MAINTENANCE OF ACCESS

Portions of the Work are located in developed areas requiring access for fire, police, emergency, and other city, state, or federal agencies to be provided and at least one free lane must be available at all times for all traffic. The CONTRACTOR shall arrange operations in these areas to meet these requirements and secure approval or operating procedures from the City of Southport, Bay County, or Florida Department of Transportation (FDOT) as the case may be.

1.12 MAINTENANCE OF TRAFFIC

A. Open pits, trenches, unpaved streets, debris, or other obstructions due to construction that will prevent the normal flow of traffic during an extended construction stoppage, for any reason, shall be minimized. In the event an extended construction stoppage is found to be necessary, the CONTRACTOR shall, at his/her own expense, maintain normal traffic flow during extended construction stoppage.

C. All excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If construction operations cause traffic hazards, the CONTRACTOR shall repair the road surface, provide temporary roadways, erect wheel guards or fences, or take other satisfactory measures for safety, subject to approval by the PROJECT REPRESENTATIVE.

C. Detours around construction areas will be subject to the approval of the PROJECT REPRESENTATIVE. Where detours are permitted, the CONTRACTOR shall provide all necessary barricades and signs as required by the PROJECT REPRESENTATIVE to divert the flow of traffic.

While traffic is detoured, the CONTRACTOR shall expedite construction operations and the PROJECT REPRESENTATIVE will strictly control periods when traffic is being detoured.

1.13 CONNECTION TO WORK BY OTHERS

If construction by others occurs at the same time and in the same areas as Work being done under this Contract, the CONTRACTOR shall conduct operations as follows:

Force Mains and Water Mains:

A. If shown on the Drawings, pipelines constructed under this Contract may be connected to pipelines to be built by others.

B. Pipelines built under this Contract will be connected to pipelines constructed by others by removing the plugs at both ends of the pipeline segment and making the connection.

C. If the pipelines have not been constructed by others, the pipeline under this Contract shall be laid to the required line and grade, terminated with a plugged connection, precisely at the location of the connection indicated on the Drawings, and then backfilled and marked with a stake and the connection made later as specified in (B) above.

1.14 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly constructed work shall be carefully protected from any injury or damage. The CONTRACTOR shall not allow any wheeling or walking or placing of heavy loads on any newly constructed Work and all portions injured or damaged shall be reconstructed by the CONTRACTOR at his/her own expense.

B. All structures shall be protected in a manner approved by the PROJECT REPRESENTATIVE. If, in the final inspection of the work, any defects, faults or omissions are found, the CONTRACTOR shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation by the OWNER for the materials and labor required. Further, the CONTRACTOR shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the guarantee period described in the Contract.

C. The CONTRACTOR shall take all necessary precautions to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the OWNER.

D. The CONTRACTOR shall maintain the Work during construction and until the Project is accepted. Such maintenance shall constitute continuous and effective Work prosecuted on a daily basis, with adequate equipment and forces in order that the roads or structures are kept in satisfactory condition at all times. In the case of a contract for the placing of a previously constructed course or subgrade, the CONTRACTOR shall maintain the previous course or subgrade during all construction operations.

All costs of maintenance work during construction and before the Project is accepted shall be included in the Contract Price and the CONTRACTOR will not be paid an additional amount for such Work.

1.15 APPENDICES

The CONTRACTOR shall follow all permit conditions in the Appendices which are part of the Contract Documents.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

[END OF SECTION 01046]

SECTION 01065

PERMITS AND FEES

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

The CONTRACTOR shall:

A. Obtain and pay for any and all permits and licenses as specified in the General Conditions (Section 00100), except as otherwise provided herein, and in effect at the time of bidding.

B. Schedule all inspections and obtain all written approvals of the agencies required by the permits and licenses.

C. Comply with all construction-related conditions specified in each permit and license.

A copy of the permits obtained by the OWNER will be furnished to the CONTRACTOR.

1.02 PERMITS BY OWNER

The OWNER will acquire the following permits (when applicable):

A. Florida Department of Environmental Protection (FDEP) Permit to Construct/ Operate Water Distribution System.

B. Florida Department of Environmental Protection (FDEP) Permit to Construct/ Operate Wastewater Collection and Transmission System.

1.03 CONSTRUCTION PERMIT

A. The CONTRACTOR shall be responsible for acquiring all construction permits including local building permits and any permits necessary to comply with the Northwest Florida Water Management District (NWFWMD) dewatering plan and the National Pollutant Discharge Elimination System (NPDES) stormwater discharge from construction site.

B. The dewatering plan shall include sequence of excavation, discharge locations, sediment sump, turbidity control, erosion control, and turbidity monitoring points.

1.04 NPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION SITE

A. The CONTRACTOR shall comply with stormwater discharge regulations and Amendments to the Clean Water Act (33 U.S.C. 1251 et seq.).

On September 17, 1992, the State of Florida certified the general permit for stormwater discharges from construction sites for use in Florida. This project is governed by regulations under this general permit and the CONTRACTOR shall comply with all such regulations.

B. Under these regulations, construction projects that disturb more than 5 acres must have and comply with a stormwater pollution prevention plan (SWPPP). The CONTRACTOR shall complete and sign a SWPPP prior to initiation of any construction activities on the site.

C. The CONTRACTOR shall ensure that all employees and subcontractors implement the specified erosion control practices to properly manage stormwater.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

[END OF SECTION 01065]

SECTION 01100

SPECIAL PROJECT PROCEDURES

PART 1 – GENERAL

1.01 HURRICANE PREPAREDNESS PLAN

A. Within 20 days of the date of Notice to Proceed, the CONTRACTOR shall submit to the PROJECT REPRESENTATIVE a Hurricane Preparedness Plan. The plan shall outline the necessary measures which the CONTRACTOR proposes to perform at no additional cost to the OWNER in case of a hurricane warning. Such measures shall be in accordance with local and state requirements.

B. In the event of inclement weather, the CONTRACTOR will, and will cause Subcontractors to, protect carefully the Work and materials against damage or injury from the weather. If, in the opinion of PROJECT REPRESENTATIVE, any portion of Work or materials are damaged or injured by reason of failure on the part of the CONTRACTOR or Subcontractors to so protect the Work, such Work and materials shall be removed and replaced at the expense of CONTRACTOR.

1.02 CONSTRUCTION CONDITIONS AND SUBSURFACE INVESTIGATION

A. The CONTRACTOR shall strictly adhere to the specific requirements of the government unit(s) or agency(ies) having jurisdiction over the Work. Wherever there is a difference in the requirements of a jurisdictional body and these Specifications, the more stringent shall apply.

B. The CONTRACTOR shall be responsible for having determined, prior to bid submission, the nature and location of the Work, the conformation of the ground, the character and quality of the substrata, the types and quantity of materials to be encountered, the nature of the groundwater conditions, the character of equipment and facilities needed preliminary to and during the prosecution of the Work, the general and local conditions and all other matters which can in any way affect the Work under this Contract. The prices established for the Work to be done will reflect all costs pertaining to the Work. Any claims for extras based on substrata, groundwater table, and other such conditions will not be allowed.

1.03 PUBLIC NUISANCE

A. The CONTRACTOR shall not create a public nuisance including, but not limited to, encroachment on adjacent lands, flooding of adjacent lands, excessive noise, or odor.

B. No extra charge may be made for time lost due to work stoppage resulting from the CONTRACTOR's creation of a public nuisance.

1.04 RELOCATIONS

The CONTRACTOR shall be responsible for the relocation of structures, including, but not limited to, light poles, signs, sign poles, fences, piping, conduits, and drains that interfere with the positioning of the work as set out on the Drawings. The cost of all such relocations shall be included in the Contract Price.

1.05 PUMPING

A. The CONTRACTOR shall accomplish all pumping necessary to prevent flotation of any part of any structures, or pipe/conduit during construction operations.

B. The CONTRACTOR shall, for the duration of the contract, pump out water and wastewater which may seep or leak into the excavations or structures. Galleries and other operating areas shall be kept dry at all times. Discharges shall be in conformance with applicable regulations and permits.

1.06 WORK ON PRIVATE PROPERTY

A. The CONTRACTOR shall maintain construction operations within the presently existing road right-of-way and established easements throughout the Project. In the event that it becomes necessary or advisable to operate beyond the limits of the existing right-of-way, established easements and Right of Entry Agreements, the CONTRACTOR shall be responsible for securing written agreements with the property owners. Immediately after contract award, the CONTRACTOR shall submit to the PROJECT REPRESENTATIVE a listing of those areas in which it is deemed necessary to work outside of the road right-of-way, easements, or agreements. The listing shall be subject to the approval of the PROJECT REPRESENTATIVE and as construction areas are secured, copies of all written agreements shall be placed on file with the PROJECT REPRESENTATIVE.

B. The CONTRACTOR shall be responsible for any encroachments on rights-of-way or property of the public or adjoining property owners caused by its operations and shall indemnify, defend, and hold the OWNER, ENGINEER, and PROJECT REPRESENTATIVE harmless because of any encroachments. In this regard, the CONTRACTOR shall, without extra cost to the OWNER, move any Work or that portion of any Work that encroaches on the property of others, or that is built beyond legal building

or setback limits, and the CONTRACTOR shall rebuild the affected Work or portion of Work at the proper location and in full compliance with the Contract Documents.

C. Before final payment will be authorized, the CONTRACTOR will be required to furnish the OWNER with written releases from property owners or public agencies where side agreements or special easements have been made by the CONTRACTOR or when the CONTRACTOR'S operations, for any reason, have not been kept within the construction right-of-way, easements, or Right of Entry Agreements by the OWNER.

D. In the event written releases required in the above paragraph cannot be secured, the CONTRACTOR shall inform the PROJECT REPRESENTATIVE of the reasons for failure to do so. The PROJECT REPRESENTATIVE in conjunction with the OWNER, will then examine the Site and direct the CONTRACTOR to complete any Work that may be necessary to satisfy the terms of the permit or easement. Should the CONTRACTOR refuse to do the Work, the OWNER reserves the right to have the Work done by separate contract and deduct the cost of same from moneys due the CONTRACTOR, or require the CONTRACTOR to furnish a bond in a sum satisfactory to the OWNER to cover any legal claims for damages. When the PROJECT REPRESENTATIVE is satisfied that the Work has been completed in accordance with the Contract Documents, permits and/or agreements, the OWNER reserves the right to waive the requirement of obtaining the statement if the CONTRACTOR'S failure to obtain such statement is due to the grantor's refusal to sign and this refusal is not based upon any legitimate claims that the CONTRACTOR has failed to fulfill any contract permit or agreement requirements, or if the CONTRACTOR is unable to contact, or has undue hardship in contacting, the grantors.

1.07 EMERGENCIES

A. The CONTRACTOR shall at all times after regular working hours, including weekends and holidays, maintain a telephone where the CONTRACTOR's representative can be reached on an emergency basis. The CONTRACTOR or CONTRACTOR's representative shall be prepared to act to correct conditions on the Site deemed to constitute an emergency by either the OWNER, the PROJECT REPRESENTATIVE, or local authorities and is obligated to act to prevent threatened damage, injury, or loss without special instructions from the OWNER, PROJECT REPRESENTATIVE, or ENGINEER. The CONTRACTOR shall give the PROJECT REPRESENTATIVE prompt written notice of all significant changes in the Work or deviations from the Contract Documents caused thereby. If a condition on the Site requires attention after working hours,

either the OWNER, PROJECT REPRESENTATIVE, or local authority shall call the CONTRACTOR or representative at the emergency telephone number, identify themselves and describe the emergency condition. The CONTRACTOR is expected to dispatch personnel and equipment to adequately institute corrective measures within 2 hours. If for some reason the CONTRACTOR or representative cannot be reached at the emergency number within two hours, the OWNER shall have the right to immediately initiate corrective measures, and the cost shall be borne by the CONTRACTOR.

B. In the event that the CONTRACTOR fails to maintain safe job conditions and traffic conditions, including, but not limited to, trench settlement and hazardous storage of backfill or construction materials, the OWNER, after failure of the CONTRACTOR to commence substantial steps at the job site to rectify the situation within 2 hours of the time the CONTRACTOR has been notified of the unsafe condition, may hire guards, take such precautions, make such repairs and take any other steps which the OWNER or the PROJECT REPRESENTATIVE, in their sole discretion, consider necessary to protect the property, persons, or the OWNER. The cost of any of these precautions, guards, or steps shall be deducted from the payments due the CONTRACTOR, and the costs for such services, work and material shall be calculated at prevailing market rates.

1.09 PROPERTY DAMAGES

In the event of any indirect or direct damage to public or private property caused in whole or in part by an act, omission or negligence on the part of the CONTRACTOR, any of its Subcontractors, any of its Sub-subcontractors or anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable, the CONTRACTOR shall at no additional cost to OWNER promptly remedy and restore such property to a condition equal to or better than that existing before such damage was done. The CONTRACTOR shall perform such restoration by “underpinning,” repairing, rebuilding, replanting, or otherwise restoring as may be required by the PROJECT REPRESENTATIVE, or shall correct such damage in a satisfactory and acceptable manner to the OWNER or the PROJECT EPRESENTATIVE. In case of failure on the part of the CONTRACTOR to promptly restore such property or correct such damage, the OWNER may, upon 5 calendar days written notice, proceed to repair, rebuild or otherwise restore such property as may be necessary and the cost thereof, or a sum sufficient in the judgment of the OWNER to reimburse the owners of the property so damaged, will be deducted from any monies due or to become due the CONTRACTOR under the Contract.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

[END OF SECTION 01100]

SECTION 01110

ENVIRONMENTAL PROTECTION

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. The Work covered by this Section consists of furnishing all labor, materials and equipment and performing all Work required for the prevention of environmental pollution in conformance with applicable laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorable alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes; or violate any applicable environmental laws, rules, codes or regulations.

B. The control of environmental pollution requires consideration of air, water, and land, and involves management of noise, odor, and solid waste, as well as other pollutants.

C. These Specifications are intended to ensure that construction is achieved with a minimum of disturbance to the existing ecological balance between a water resource and surroundings. These are general guidelines. It is the CONTRACTOR'S responsibility to determine the specific construction techniques to meet these guidelines.

D. The CONTRACTOR shall secure, if required, at its own cost, a surface water management permit from the Northwest Florida Water Management District and approvals from Bay County and/or Panama City Beach for any construction dewatering activities associated with this project.

1.02 APPLICABLE REGULATIONS

The CONTRACTOR shall comply with all applicable Federal, State, and local laws and regulations concerning environmental pollution control and abatement.

1.03 NOTIFICATIONS

The OWNER through the PROJECT REPRESENTATIVE will notify the CONTRACTOR in writing immediately following identification of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and any required corrective action to be taken by CONTRACTOR. State or local agencies responsible for verification of certain aspects of the environmental protection requirements may notify the CONTRACTOR of any non-compliance

with State or local requirements. The CONTRACTOR shall, after receipt of such notice from the regulatory agency shall immediately notify the PROJECT REPRESENTATIVE in writing and immediately take correction action. If the CONTRACTOR fails or refuses to comply promptly, the OWNER may issue an order stopping all or part of the Work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the CONTRACTOR unless it is later determined that the CONTRACTOR was in compliance and subject to the other terms of the Contract Documents.

1.04 IMPLEMENTATION

A. Prior to commencement of the Work, the CONTRACTOR shall meet with the PROJECT REPRESENTATIVE to develop mutual understandings relative to compliance with this specification and administration of the environmental pollution control program.

B. The CONTRACTOR shall remove temporary environmental control features, when approved by the PROJECT REPRESENTATIVE, and incorporate permanent control features into the Project at the earliest practicable time, consistent with the approved construction schedule.

1.05 EROSION CONTROL

A. The CONTRACTOR shall ensure sufficient precautions are taken during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumen’s, calcium chloride, or other polluting materials harmful to humans, fish, or other life, into the supplies and surface waters of the State. Control measures must be adequate to assure that turbidity in the receiving water will not be increased more than 10 nephelometric turbidity units (NTU), or as otherwise required by the State or other controlling body, in water used for public water supply or fish unless limits have been established for the particular water. In surface water used for other purposes, the turbidity must not exceed 25 NTU unless otherwise permitted. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion.

Erosion evident within the limits of construction shall be the responsibility of the CONTRACTOR during the full term of the Contract and for the full (1) year guarantee period. Areas subject to erosion during this time shall be fully restored to original or design conditions (as applicable) within 10 days of notice to the CONTRACTOR.

B. The CONTRACTOR shall provide positive means of erosion control such as shallow ditches around construction to carry off surface water. Erosion control measures, such as siltation basins, hay check dams, mulching, jute netting and other equivalent techniques, shall be used as appropriate.

Flow of surface water into excavated areas shall be prevented.

Ditches around construction area shall be used to carry away water resulting from dewatering of excavated areas. At the completion of the Work, ditches shall be backfilled and the ground surface restored to original condition.

C. The CONTRACTOR shall schedule and conduct all Work in a manner that will minimize the erosion of soils in the area of the Work. Erosion control measures shall be provided such as diversion channels, sedimentation or filtration systems, berms, staked hay bales, seeding, mulching or other special surface treatments as are required by regulatory authorities to prevent silting and muddying of streams, rivers, canals, impoundments, lakes, etc. All erosion control measures shall be in place prior to any construction activity in any area of the Work.

1.06 PROTECTION OF LAND RESOURCES

A. Land resources within the Project boundaries and outside the limits of permanent Work shall be restored by CONTRACTOR to a condition, after completion of construction, that will appear to be natural and not detract from the appearance of the project.

B. Outside of areas requiring earthwork for the construction of the new facilities, the CONTRACTOR shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the PROJECT REPRESENTATIVE. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The CONTRACTOR shall in any event be responsible for any damage resulting from such use.

C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the CONTRACTOR'S equipment, dumping or other operations, CONTRACTOR shall protect such trees by placing board, planks, or poles around them. Monuments and markers shall be similarly protected by CONTRACTOR before beginning operations near them.

D. Any trees or other landscape feature scarred or damaged by the CONTRACTOR'S equipment or operations shall be restored as nearly as possible to its original condition. The PROJECT REPRESENTATIVE will decide what method of restoration shall be used and whether damaged trees shall be treated and healed or removed and disposed of.

All scars made on trees by CONTRACTOR's equipment, construction operations, or by the removal of limbs by CONTRACTOR larger than 1 inch in diameter shall be coated as soon as possible with an approved tree wound dressing.

All trimming or pruning by CONTRACTOR shall be performed in an approved manner by experienced workers with saws or pruning shears. Tree trimming with axes will not be permitted.

Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the CONTRACTOR and are beyond saving in the opinion of a certified nurseryman, shall be immediately removed and replace in kind and maintained until growth is assured.

E. The locations of the CONTRACTOR's lay-down area, storage, and other construction buildings, required temporarily in the performance of the Work, shall require written concurrence of the PROJECT REPRESENTATIVE. The preservation of the landscape and public perception shall be an imperative consideration in the selection of the lay down area and in the provision of any buildings.

F. All debris and excess material will be disposed of by CONTRACTOR outside wetland or floodplain areas in an environmentally sound and lawful manner.

1.07 PROTECTION OF AIR QUALITY

A. The use of burning for the disposal of refuse and debris will not be permitted.

B. The CONTRACTOR shall maintain all excavations, embankment, stockpiles, access roads, plant sites, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded, and which would cause a hazard or nuisance to others.

C. An approved method of stabilization consisting of sprinkling or other similar methods will be permitted to control dust. The use of petroleum products is prohibited. The use of chlorides may be permitted with concurrence from the appropriate regulatory authority.

D. Sprinkling must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the CONTRACTOR must have sufficient competent equipment on the job to accomplish needed sprinkling. Dust control shall be performed as the work proceeds and

whenever a dust nuisance or hazard occurs.

1.08 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

During the life of this Contract, CONTRACTOR shall maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created. All pollution control devices shall be inspected regularly to ensure they are operating correctly.

1.09 NOISE CONTROL

A. The CONTRACTOR shall make every effort to minimize noises caused by operations. Equipment, including dewatering systems, shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with State and Federal Regulations.

B. Sound levels measured by the PROJECT REPRESENTATIVE shall not exceed 55 dBA from 8:00 PM to 7:00 AM or 65 dBA from 7:00 AM to 8:00 PM. This sound level to be measured at the OWNER'S property line. Sound levels of equipment shall not exceed 95 dBA at any time. Sound levels in excess of these values are sufficient cause to have the Work halted until equipment can be quieted to acceptable levels. Work stoppage for excessive noise shall not relieve the CONTRACTOR of the other portions of this specification including, but not limited to Contract Time and Contract Price.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

[END OF SECTION 01110]

SECTION 01300

SUBMITTALS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. The CONTRACTOR shall submit to the ENGINEER for review such working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this Section called “Data”), and material samples (hereinafter in this Section called “Samples”) as are required for the proper control of work, including but not limited to those working drawings, shop drawings, Data and Samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.

B. The CONTRACTOR shall note that there are specific submittal requirements in other sections of these Specifications.

1.02 SHOP DRAWINGS

A. When used in the Contract Documents, the term “shop drawings” shall be considered to mean CONTRACTOR’s plans for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer’s scale drawings, bills of material, wiring and control diagrams, and inspection and test reports including performance curves and certifications as applicable to the Work.

B. All details on shop drawings submitted for approval shall show clearly the elevations of the various parts to the main members and lines of the structure and/or equipment, and where correct fabrication of the Work depends upon field measurements, such measurements shall be made and noted on the shop drawings before being submitted for approval.

C. See Shop Drawing Schedule requirements in Subparagraph 1.07 CONTRACTOR’S RESPONSIBILITY.

1.03 PRODUCT DATA

Product data as specified in individual sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer’s product specification and installation instructions, availability of colors and patterns, MANUFACTURER’S printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed

performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing storage instructions, and printed product warranties, as applicable to the Work.

1.4 WORKING DRAWINGS

A. When used in the Contract Documents, the term “working drawings” shall be considered to mean the CONTRACTOR’s plans for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and false work; for underpinning; and for such other work as may be required for construction but does not become an integral part of the Project.

B. Working drawings shall be signed and sealed by a registered Professional Engineer, currently licensed to practice in the State and shall convey, or be accompanied by, calculations or other sufficient information to completely explain the structure, machine, or system described and its in- tended manner of use. Prior to commencing such Work, working draw- ings must have been reviewed without specific exceptions by the ENGINEER. Such review will be for general conformance and will not relieve the CONTRACTOR in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the CONTRACTOR; the OWNER and ENGINEER shall have no responsibility, therefore.

1.05 SUBMITTAL REQUIREMENTS

A. The CONTRACTOR shall review, approve, and submit, with reasonable promptness and in such sequence as shown on the Shop Drawing Submittal Schedule so as to cause no delay in the Contract Work or in the Work of the OWNER or any separate contractor, all shop drawings, product data, working drawings and samples required by the Contract Documents.

B. The CONTRACTOR shall submit one digital (.pdf format) copy of all shop drawings for the ENGINEER to review and comment. PDF formatting shall allow the ENGINEER to print any portion of the submittal at the original drawing size it was developed in prior to scanning and retain original drawing quality.

C. All submittals shall be directly transmitted to the ENGINEER’s office. Submittals to the PROJECT REPRESENTATIVE will not be accepted.

D. Shop drawings, product data, working drawings and Samples shall be furnished with the following information:

1. Number and title of the drawing.

2. Date of drawing or revision.

3. Name of project building or facility.

4. Name of contractor, subcontractor, and manufacturer submitting drawing.

5. A certification by the CONTRACTOR that states the following: I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is in compliance with the Contract Drawings and Specifications, can be installed in the allocated space, will be stored in accordance with the manufacturer's recommendations and the Specifications, and is submitted for approval.

E. All items specified are not necessarily intended to be a manufacturer's standard product. Variations from specified items will be considered on an "or equal" basis. If submittals show variations from Contract requirements because of standard shop practice or for other reasons, the CONTRACTOR shall describe such variations in the letter of transmittal and on the shop drawings along with notification of intent to seek contract adjustment. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the CONTRACTOR fails to describe such variations, responsibility will not be waived for executing the Work in accordance with the Contract, even though such drawings have been reviewed. Variations submitted but not described may be cause for rejection. Any variations initiated by the CONTRACTOR will not be considered as an addition to the scope of work unless specifically noted and then approved as such in writing by the ENGINEER.

F. Data on materials and equipment shall include materials and equipment lists giving, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, material, size, finish, and all other pertinent data.

G. The CONTRACTOR shall use the color "green" to make his remarks on the Submittals. Only the ENGINEER will utilize the color "red" in marking submittals.

1.07 CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the CONTRACTOR to check, and coordinate with the work of all trades, all drawings, Data, schedules, and Samples before submitting them to the ENGINEER for review. Each and every copy of any drawing

or data sheet larger than 11”x17” shall bear CONTRACTOR’s stamp showing that they have been so checked and approved. Drawings or data sheets 11”x17” and smaller shall be grouped together in an orderly fashion and bear the CONTRACTOR’s stamp on the cover sheet. The cover sheet shall fully describe the packaged data and include a list of all sheet numbers within the package. Shop drawings submitted to the ENGINEER without the CONTRACTOR’s stamp will be returned to the CONTRACTOR, without review at the ENGINEER’s option, for conformance with this requirement.

B. The CONTRACTOR shall review shop drawings, product data, and Samples prior to submission to determine and verify the following:

1. Field measurements.

2. Field construction criteria.

3. Manufacturer’s catalog numbers and similar data.

4. Conformance with Specifications.

C. Shop drawings shall indicate any deviations in the submittal from the requirements of the Contract Documents.

D. At a time decided upon at the preconstruction meeting the CONTRACTOR shall furnish the PROJECT REPRESENTATIVE and ENGINEER a Shop Drawing schedule fixing the respective dates for the initial submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall be provided as a separate entity and indicate those submittals that are critical to the progress schedule. The CONTRACTOR shall prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections of the Specifications, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the CONTRACTOR’s failure to transmit complete and acceptable submittals sufficiently in advance of the Work.

E. The CONTRACTOR shall not begin any Work affected by a submittal returned not approved. Before starting this Work, all revisions must be corrected by the CONTRACTOR. After resubmittal they will be reviewed and returned by the ENGINEER. If approved or approved as noted, then the CONTRACTOR may begin this Work. Any corrections made to the shop drawings are to be followed without exception.

F. The CONTRACTOR shall submit to the ENGINEER all shop drawings and data sufficiently in advance of construction requirements to provide no less than 14 calendar days for review from the time the ENGINEER receives them. No less than 30 calendar days will be required for major equipment that requires review by more than one engineering discipline.

G. The CONTRACTOR shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of Work prior to the review and approval by ENGINEER of the necessary shop drawings.

H. All shop drawings, product data, working drawings and Samples submitted by subcontractors for approval shall be sent directly to the CONTRACTOR for checking. The CONTRACTOR shall be responsible for their submission according to the approved shop drawing schedule so as to prevent delays in delivery of materials and project completion.

I. The CONTRACTOR shall check all subcontractors' shop drawings, product data, working drawings and Samples regarding measurements, size of members, materials, and details to satisfy himself that they are in conformance to the Contract Documents. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission to the ENGINEER.

J. Requests for Information (RFI) shall be submitted on a standard form through the PROJECT REPRESENTATIVE. RFIs shall indicate their importance to the timely completion of the project. RFIs will be processed as a shop drawing unless there is an urgent need for immediate response.

1.08 ENGINEER'S REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

A. The ENGINEER's review is for general conformance with the design concept and contract drawings. Markings or comments shall not be construed as relieving the CONTRACTOR from compliance with the contract plans and specifications or from departures therefrom. The CONTRACTOR remains responsible for details and accuracy, for coordinating the Work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.

B. The review of shop drawings, Data, and Samples will be general. They shall not be construed:

1. as permitting any departure from the Contract requirements;

2. as relieving the CONTRACTOR of responsibility for any errors, including details, dimensions, and materials;

3. as approving departures from details furnished by the ENGINEER, except as otherwise provided herein.

C. If the shop drawings, Data or Samples as submitted describe variations per Subparagraph (1.6H),and show a departure from the Contract requirements which ENGINEER finds to be in the interest of the OWNER and to be so minor as not to involve a change in Contract Price or Contract Time for performance, the ENGINEER may return the reviewed drawings without noting an exception.

D. Submittals will be returned to the CONTRACTOR under one of the following:

"APPROVED" is assigned when there are no notations or comments on the submittal. The CONTRACTOR may release the equipment and/or material for manufacture.

"APPROVED AS NOTED" is assigned when notations or comments have been made on the submittal pointing out minor discrepancies as compared with the Contract Documents. Resubmittal or confirmation is not necessary prior to release for manufacturing.

"NOT APPROVED/RESUBMIT" The submittal is in noncompliance with the Contract Documents and must be corrected and the entire package resubmitted. This generally means that the equipment or material cannot be released for manufacture unless the CONTRACTOR takes full responsibility for providing the submitted items in accordance with Contract Documents.

"FOR YOUR INFORMATION" is assigned when the package provides information of a general nature that may or may not require a response.

E. Resubmittals will be handled in the same manner as first submittals. On resubmittals the CONTRACTOR shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the ENGINEER on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the CONTRACTOR. The CONTRACTOR shall make corrections to any Work done because of this type revision that is not in accordance to the

Contract Documents as may be required by the ENGINEER.

F. If the CONTRACTOR considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the CONTRACTOR shall give written notice thereof to the PROJECT REPRESENTATIVE at least 7 working days prior to release for manufacture.

G. The ENGINEER will review a submittal a maximum of two times, after which cost of review will be borne by the CONTRACTOR. The cost of engineering shall be equal to the ENGINEER's charges to the OWNER under the terms of the ENGINEER's agreement with the OWNER.

H. When the shop drawings have been completed to the satisfaction of the ENGINEER, the CONTRACTOR shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the ENGINEER.

I. Partial submittals may not be reviewed. The ENGINEER will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the CONTRACTOR, and will be considered "Not Approved" until resubmitted. The ENGINEER may, but is not required to, provide a list, or mark the submittal directing the CONTRACTOR to the areas that are incomplete

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

[END OF SECTION 01300]

SECTION 01380

CONSTRUCTION PHOTOGRAPHS

1.01 REQUIREMENTS

The CONTRACTOR shall employ a competent photographer to take digital construction record photographs or perform digital video recording, including providing all labor, materials, equipment, and incidentals necessary to obtain specified photographs and/or video. All photographs or video provided to the OWNER in the course of this PROJECT is considered to be in the public domain and may be freely disseminated without additional compensation to the CONTRACTOR or its photographer.

1.02 QUALIFICATIONS

A. All photography shall be accomplished by a competent camera operator who is fully experienced and qualified with the specified equipment.

B. For the video tape recording, the audio portion should be accomplished by a person qualified and knowledgeable in the specifics of the Contract, who shall speak with clarity and diction so as to be easily understood.

1.03 PROJECT PHOTOGRAPHS

A. Provide clear high resolution (1600x1200 pixel minimum, .jpg format) photographs of the entire work area prior to any construction for the purpose of records of conditions prior to construction. All service locations from tap location to meter shall be thoroughly photographed prior to construction per and post construction. All digital file names shall include actual street address of service.

B. Photographs shall be submitted each month on a project-labeled CD with the monthly Request for Payment. Provide photographs of all service locations completed or in active work areas. Payment will be withheld until the required photographs are provided.

C. The CONTRACTOR shall pay all costs associated with the required photography and producing completed CD media.

D. All project photographs shall be taken from locations to adequately illustrate conditions prior to construction, or conditions of construction and state of progress or particular construction activities or problems. The CONTRACTOR shall consult with the PROJECT REPRESENTATIVE for instructions concerning views required. A minimum of five photographs from different viewpoints, both pre and post construction, shall be provided

for each service location

1.04 VIDEO RECORDINGS

A. Video recording shall be accomplished along all routes that are scheduled for Construction in addition to required construction photographs. All video recording shall be in digital hi-resolution (720p resolution minimum) color. Video shall include full recording of both sides of all streets on which construction is to be performed. File format shall be .mpg.

B. The video shall, when viewed, show the image, ¼ of the roadway fronting all property and ¾ of the image shall be of the property. The video shall be accomplished so as to show the roadway and property in an oblique view (30 degrees).

C. A complete view, in sufficient detail, of all existing facilities shall be provided.

D. Two complete sets of video recordings shall be delivered to the PROJECT REPRESENTATIVE for the permanent and exclusive use of the PROJECT REPRESENTATIVE prior to the start of any construction on the project.

E. All video shall contain the name of the project, the date and time of the video taping, the name and address of the photographer and any other identifying information required.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

[END OF SECTION 01380]

SECTION 01410

TESTING AND TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

A. CONTRACTOR shall employ and pay for the services of an Independent Testing Laboratory to perform testing specifically indicated in the Contract Documents and The Florida Department of Transportation “Standard Specifications for Road and Bridge Construction.” These tests include soil compaction tests, concrete moisture and cylinder tests and asphalt density and materials tests.

1. CONTRACTOR shall cooperate with the laboratory to facilitate the execution of its required services.
2. Employment of the laboratory shall in no way relieve CONTRACTOR's Obligations to perform the Work of the Contract.
3. The Testing Laboratory shall be acceptable to the PROJECT REPRESENTATIVE and approved by the ENGINEER.

1.2 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on Contract requirements.
2. Approve or accept any portion of the Work.
3. Perform any duties of the CONTRACTOR.

1.3 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory and testing personnel.

B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, asphalt and other materials mixes which require control by the testing laboratory.

D. Materials and equipment used in the performance of work under this Contract are subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. The PROJECT REPRESENTATIVE may require the CONTRACTOR to provide statements or certificates from the manufacturers and fabricators that the materials and equipment

provided by them are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contract Documents. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the CONTRACTOR, and no extra Contract charge shall be allowed for of such testing and certifications.

E. Furnish incidental labor and facilities:

1. To provide access to work to be tested.
2. To obtain and handle samples at the Project site or at the source of the product to be tested.
3. To facilitate inspections and tests.
4. For storage and curing of test samples.

F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

1. When tests or inspections cannot be performed after such notice, reimburse OWNER for laboratory personnel and travel expenses incurred.

G. Employ and pay for the services of the same or a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required for the CONTRACTOR'S convenience and as approved by the PROJECT REPRESENTATIVE.

H. Additional testing or retesting shall be undertaken at CONTRACTOR's expense if required by the PROJECT REPRESENTATIVE.

I. All laboratory and testing expenses including retesting will be at the CONTRACTOR's expense with no separate Contract reimbursement.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

[END OF SECTION 01410]

SECTION 01505

MOBILIZATION/DEMOBILIZATION

PART 1 - GENERAL

1.01 DEFINITION AND SCOPE

As required for the proper performance and completion of the Work, mobilization shall include, but not be limited to, the following principal items:

A. Move onto the site all CONTRACTOR's equipment required for the first month's operation.

B. Install any necessary temporary construction power, wiring, telephone, and lighting facilities.

C. Establish a safety program.

D. Secure construction water supply.

E. Provide on-site sanitary facilities.

F. Arrange for and erect CONTRACTOR'S laydown and storage yard and employee's parking facilities.

G. Submit all required insurance certificates and bonds.

H. Obtain all required permits.

I. Post all OSHA, FDEP, Department of Labor, and all other required notices.

J. Have CONTRACTOR'S project manager and/or superintendent at the job site full time.

K. Submit a detailed construction schedule acceptable to the PROJECT REPRESENTATIVE.

L. Submit a Schedule of Values of the Work in an approved format acceptable to the PROJECT REPRESENTATIVE.

M. Submit a hurricane preparedness plan acceptable to the PROJECT REPRESENTATIVE.

1.02 PAYMENT FOR MOBILIZATION

Payment for all mobilization/demobilization work will be made at the lump sum price bid for mobilization and demobilization of all labor, equipment, materials

and appurtenances necessary for construction of the project. Mobilization shall include all items listed in the above paragraph. Also included, but not limited to, as part of this bid item is the cost for project performance indemnification's, shop drawings, working drawings, schedules, record drawings and documents, coordination, and phasing and other miscellaneous items associated with the work. Measurement and payment for this bid item will be lump sum. The lump sum price for mobilization/demobilization will be limited to 5.0 percent of the total contract amount. Seventy percent (70%) of the lump sum amount will be payable upon mobilization. The remaining 30% will be payable subject to retainage in accordance with paragraph 18.1.3 of Section 00100 General Conditions.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

[END OF SECTION 01505]

SECTION 01585

UTILITY COORDINATION AND CONSTRUCTION

PART 1 - GENERAL

1.1 Utility Coordination and Construction:

The Contractor shall provide all material, labor, supervision, and coordination to relocate, replace, and/or install water and sewer utilities, all conduits, duct banks and boxes as shown on the plans. All cable will be installed by the utility companies. The first sheet of the Utility Coordination Plans has the names and telephone numbers of all of the points of contact for the utility companies.

The Contractor shall provide all materials, labor, and supervision to convert the electrical services shown on the Gulf Power drawings from overhead to underground. The Contractor shall modify or replace the service/meter panel with an underground type, install the conduit to below grade, install conduit from the meter location to the point of service for Gulf Power (directional bores are acceptable in lieu of trenching for conduit) repairing the ground or pavement as necessary, and remove the current overhead riser. The Contractor shall patch all mounting holes and the roof penetrations to match existing surfaces. The Contractor shall obtain all necessary building and electrical permits. The contractor shall closely coordinate with the owners and Gulf Power to minimize the outage to the owner.

Since all of the utilities will be placed underground, the Contractor will develop a detailed coordination plan to sequence operations for all of the underground facilities including drainage to ensure proper placement and avoid conflicts. The existing gas lines will be field adjusted by TECO to avoid new drainage structures and lines. Special attention is required in the initial placement of the underground pipes and conduits to allow for the placement of street light foundations in the correct location. Service shall be maintained to all customers during construction. The existing buried telephone facilities will continue to provide service and will be protected in place until they are cut over to the new conduit.

It is anticipated that the water and sewer construction will be one of the first activities started in each phase. The Contractor must perform all of the required testing and flushing of the water and sewer systems in accordance with the specifications and the permits. As-built drawings must be provided with the test results so that the permit certification documents can be properly completed, reviewed by the City of Panama City Beach, and submitted to FDEP requesting authorization to place the new facilities in service before the services can be transferred and the old facilities abandoned. The City of Panama City Beach will require fourteen (14) calendar days to review/execute the forms and FDEP has thirty (30) calendar days to act upon the request to place the new facilities in service. This activity may be divided into several partial clearance requests

as determined by the Contractor and/or engineer. Time for this activity must be considered in the schedule.

The existing overhead utilities will remain in place until the new underground conduits and duct banks are completed and the utilities have completed the conversion to underground facilities.

In order to properly place the various boxes for all of the utilities, the curb and sidewalk must be installed at the correct grade and location in the area of the boxes, or the Contractor will set a grade stake and provide fill for the proper placement of the box. Once all of the power and communications conduits and duct banks are complete there will be a sixty (60) calendar day period for relocation of Gulf Power facilities to the duct bank followed by a thirty (30) calendar day period to relocate communication facilities underground. The Contractor may continue other work on the project in close coordination with the utility contractors so as not to interfere with the utility companies' completion of the work in the specified time.

[END OF SECTION 01585]

SECTION 01705

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract apply to work of this section.

1.02 DESCRIPTION OF REQUIREMENTS

Definitions:

A. Closeout is hereby defined to include general requirements near the end of Contract Time, in preparation for final acceptance, final payment, normal termination of Contract, and similar actions evidencing completion of the Work. Specific requirements for individual units of work are specified elsewhere in these Specifications.

B. Time of closeout is directly related to “Substantial Completion,” and; therefore, may be either a single time period for entire Work or a series of time periods for individual parts of the Work which have been certified as substantially complete at different dates. That time variation (if any) shall be applicable to other provisions of this section.

1.03 PREREQUISITES FOR SUBSTANTIAL COMPLETION

C. General:

Prior to requesting ENGINEER’s inspection for certification of Substantial Completion (for either entire work or portions thereof), complete the following and list known exceptions in request:

1. In progress payment request, coincident with or first following date claimed, show either 100% completion for portion of Work claimed as “substantially complete” or list incomplete items, value of incompletion, and reasons for being incomplete.

2. Include supporting documentation for completion as indicated in these Contract Documents.

3. Submit statement showing accounting of changes to the Contract Sum.

4. Advise OWNER of pending insurance change-over requirements.

5. Submit special warranties, workmanship/maintenance bonds, maintenance agreements, final certifications, and similar documents.

6. Obtain and submit releases enabling OWNER's full and unrestricted use of the work and access to services and utilities, including (where required) operating certificate, and similar releases.

7. Submit record drawings, and similar final record information.

8. Complete final cleaning up requirements, including touch-up painting of marred surfaces.

D. Inspection Procedures:

Upon receipt of CONTRACTOR's request, the ENGINEER will either proceed with inspection or advise CONTRACTOR of prerequisites not fulfilled. Following initial inspection, the ENGINEER will either prepare certificate of Substantial Completion, or advice the CONTRACTOR of work which must be performed prior to issuance of certificate; and repeat inspection when requested and assured that work has been substantially completed. Results of completed inspection will form initial "punch-list" for final acceptance.

1.04 PREREQUISITES FOR FINAL ACCEPTANCE

A. General:

Prior to requesting ENGINEER's final inspection for certification of final acceptance and final payment, as required by General Conditions (Section 00100), complete the following and list known exceptions (if any) in request:

1. Submit final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

2. Submit updated final statement, accounting for additional (final) changes to the Contract Sum.

3. Submit consent of surety.

4. Submit final liquidation damages settlement statement, acceptable to the OWNER.

5. Revise and submit evidence of final continuing insurance coverage complying with insurance requirements.

B. Reinspection Procedure:

Upon receipt of CONTRACTOR's notice that the work has been completed, including punch-list items resulting from earlier inspections, and excepting incomplete items delayed because of acceptable circumstances, the ENGINEER will reinspect the Work. Upon completion of reinspection, the ENGINEER will either prepare a certificate of final acceptance or advise the CONTRACTOR of Work not completed or obligations not fulfilled as required for final acceptance. If necessary, procedure will be repeated.

1.05 RECORD DOCUMENT SUBMITTALS

A. General:

Specific requirements for record documents are indicated in individual sections of these specifications. Other requirements are indicated in General Conditions. General submittal requirements are indicated in Section 01300 (Submittals).

Do not use record documents for construction purposes; protect from deterioration and loss in a secure fire-resistive location; provide access to record documents for ENGINEER'S reference during normal working hours.

B. Record Drawings:

1. Maintain a set of contract drawings and shop drawings in clean, undamaged condition, with mark-up of actual installations which very substantially from the work as originally shown.

2. Mark whichever drawing is most capable of showing "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross-reference at corresponding location on working drawings.

3. Mark with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work.

4. Mark-up new information which is recognized to be of importance to the OWNER, but was for some reason not shown on either the Drawings or Shop Drawings. Give particular attention to concealed work, which would be difficult to measure and record at a later date.

5. Note related Change Order numbers where applicable.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 CLOSEOUT PROCEDURES

A. General:

Special cleaning for specific units of work is specified in other sections. The following are examples, but not by way of limitation, of cleaning levels required:

1. Clean Project site of litter and foreign substances.

2. Sweep paved areas to a broom-clean condition; remove stains, petro-chemical spills and other foreign deposits.

3. Rake grounds which are neither planted nor paved, to a smooth, even-textured surface.

B. Compliances:

1. Comply with safety standards and governing regulations for cleaning operations.

2. Do not burn waste materials at site, or bury debris or excess materials on OWNER’s property, or discharge volatile or other harmful or dangerous materials into drainage systems.

3. Remove waste materials from site and dispose of in a lawful manner.

4. Dispose of extra materials of value remaining after completion of the associated Work has become the OWNER’s property, to OWNER’ best advantage as directed.

[END OF SECTION 01705]

SECTION 02230

SITE CLEARING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping, or sealing, and removing site utilities.

B. Related Sections:

1. Division 2 Section "Tree Protection and Trimming" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.

2. Division 2 Section "Earthwork" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.

1.03 DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other non-soil materials.

D. Tree and Plant-Protection Zones: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.04 MATERIAL OWNERSHIP

A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain OWNER'S property, cleared materials shall become CONTRACTOR'S property and shall be removed from Project site.

1.05 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at location chosen by OWNER (or PROJECT REPRESENTATIVE.)

1.06 SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or video media.

2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.07 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities withoutpermission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining OWNER'S property will be obtained by OWNER before award of Contract.

1. Do not proceed with ANY work on adjoining property until directed by OWNER.

C. Utility Locator Service: Notify all utility companies and municipalities according to Codes and Standards for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place if plant material to remain is noted on the plans.

E. The following practices are prohibited within protection zones if plant material to remain is noted on the plans:

1. Storage of construction materials, debris, or excavated material.

2. Parking vehicles or equipment.

3. Foot traffic.

4. Erection of sheds or structures.

5. Impoundment of water.

6. Excavation or other digging unless otherwise indicated.

7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

F. Do not direct vehicle or equipment exhaust towards protection zones.

G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

H. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Division 2 Section "Earthwork."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

B. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer complying with MPI #79, Alkyd Anticorrosive Metal Primer or SSPC-Paint 29 zinc-rich coating by Sherwin Williams Coatings, or approved equal.

PART 3 – EXECUTION

3.01 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated as noted on plans. Identify each tree trunk at 54 inches above the ground using a method approved by Owners Representative.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or tree and plant protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.03 TREE AND PLANT PROTECTION

A. General: Protect trees and plants remaining on-site according to requirements in Division 2 Section "Tree Protection and Trimming."

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by PROJECT REPRESENTATIVE and Landscape Architect.

3.04 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.

B. Locate, identify, and disconnect utilities indicated to be abandoned in place.

.

C. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify OWNER not less than two weeks in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without OWNER'S written permission.

D. Excavate for and remove underground utilities indicated to be removed.

3.05 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.

3. Use only hand methods for grubbing within protection zones.

4. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

3.06 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated on drawings and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

[END OF SECTION 02230]

SECTION 02231

TREE PROTECTION AND TRIMMING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Sections:

1. Division 2 Section "Site Clearing" for removing existing trees and shrubs.

1.03 DEFINITIONS

A. Caliper: Diameter of a measured tree trunk according to Florida Nursery Grades and Standards, Current Edition.

B. Plant and Tree-Protection Zones:

1. Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

2. Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.

C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.04 QUALITY ASSURANCE

A. For tree health-Arborist Qualifications: Certified Arborist as certified by ISA.

B. For tree trimming and protection- Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

C. Preinstallation Conference: Conduct conference at OWNER'S discretion.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.

b. Enforcing requirements for protection zones.

c. Arborist's responsibilities.

d. Field quality control.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

1. Species and size of tree.

2. Location on site plan. Include unique identifier for each.

3. Reason for pruning.

4. Description of pruning to be performed.

5. Description of maintenance following pruning.

C. Qualification Data: For qualified arborist and tree service firm.

D. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

E. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

F. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or videotape.

2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

1.06 PROJECT CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.

2. Parking vehicles or equipment.

3. Foot traffic.

4. Erection of sheds or structures.

5. Impoundment of water.

6. Excavation or other digging unless otherwise indicated.

7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Do not proceed with ANY work on adjoining property until directed by OWNER.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements.

1. Refer to construction details.

PART 3– EXECUTION

3.01 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.02 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Identify each tree trunk at 54 inches above the ground by methods approved by Owners Representative.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.

1. Apply 2-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

3.03 TREE- AND PLANT-PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Landscape Architect. Install one sign spaced approximately every 30 feet on protection-zone fencing, but no fewer than two signs, with each facing a different direction.

C. Maintain protection zones free of weeds and trash.

D. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect. Replacement values shall be based on an inch per inch basis. (i.e., a 24” tree damaged by the Contractor shall be replaced with four 6” Oaks of the same species or a species as approved by the PROJECT REPRESENTATIVE.)

E. Maintain protection-zone fencing and signage in good condition as acceptable to Landscape Architect and remove when construction operations are complete, and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.

2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.04 EXCAVATION

A. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots (2” diameter or less) that interfere with installation of utilities. Cut roots as required for root pruning.

B. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 12 inches back from new construction and as required for root pruning.

C. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.05 ROOT PRUNING

A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.

2. Cut Ends: Do not paint cut root ends.

3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.

4. Cover exposed roots with burlap and water regularly.

5. Backfill as soon as possible according to requirements in Division 2

6. Section "Earthwork."

B. Root Pruning at Edge of Protection Zone: Prune roots flush with the edge of the protection zone, by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.06 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:

1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.

2. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and the following:

a. Florida Grades and Standards for Nursery Stock, current edition.

3. Cut branches with sharp pruning instruments; do not break or chop.

4. Do not apply pruning paint to wounds.

B. Chip removed branches and dispose of off-site.

3.07 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.

1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.08 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.09 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect.

1. Submit details of proposed root cutting and tree and shrub repairs.

2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.

3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.

4. Perform repairs within 24 hours.

5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Landscape Architect.

B. Trees: Remove and replace trees indicated to remain that are more than fifty percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that PROJECT REPRESENTATIVE determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size and species as those being replaced for each tree that measures 4 inches or smaller in caliper size.

2. Provide new tree(s) of 4-inch caliper size for each tree being replaced that measures more than 4-inch caliper in caliper size based on total caliper inches (i.e., a 24” tree damaged by the CONTRACTOR shall be replaced with four 6” Oaks of the same species or a species as approved by the PROJECT REPRESENTATIVE.).

3. Plant and maintain new trees as specified in Division 2 Section "Exterior Plants."

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash, and debris, and legally dispose of them off OWNER'S property.

[END OF SECTION 02231]

SECTION 02300

EARTHWORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to This Section.

1.02 SUMMARY

A. This Section includes the following:

1. Preparing subgrades for slabs-on-grade, walks, pavements, turfs and grasses and exterior plants.

2. Drainage course for concrete slabs-on-grade.

3. Subbase course for concrete walks, pavements.

4. Subsurface drainage backfill for walls and trenches.

A. Related Sections include the following:

1. Division 2 Section "Site Clearing" for site stripping, grubbing, stripping, and stockpiling topsoil, and removal of above and below grade improvements and utilities.

2. Division 2 Section “Lawns and Grasses” for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.

3. Division 2 Section "Exterior Plants" for finish grading in planting areas and tree and shrub pit excavation and planting.

1.03 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

D. Drainage Course: Course supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.

2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.

3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- wide, maximum, short-tip radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,090 lb. and stick-crowd force of not less than 18,650 lb.; measured according to SAE J-1179.

2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 210-hp flywheel power and developing a minimum of 48,510-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate

deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency, according to ASTM D 1586.

A. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

B. Subbase Course: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

C. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

D. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.04 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

B. Pre-excavation Conference: Conduct conference at Project site.

1.05 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.

2. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.

1.06 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by OWNER or others unless permitted in writing by Landscape Architect/ OWNER and then only after arranging to provide temporary utility services according to requirements indicated.

1. Notify Landscape Architect/ OWNER not less than two days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without OWNER'S written permission.

3. Contact utility-locator service for area where Project is located before excavating.

C. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

D. Utility Locator Service: Notify regulating agency (e.g., Sunshine State One Call of Florida, Inc., utility locator service, Miss Utility, Call Before You Dig, Dig Safe System, One Call, etc.…) for area where Project is located before beginning earth moving operations.

E. Do not commence earth moving operations until temporary erosion-and sedimentation-control measures, specified in Division 2 Section- Site Clearing are in place.

F. Do not commence earth moving operations until plant protection measures specified in Division 2 Section Tree Protection and Trimming are in place.

PART 2 - PRODUCTS

2.01 SOILS MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: AASHTO M 145 Soil Classification Groups A-1, A-2-4, A-

2-5, and A-3, or a combination of these groups; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Course: Narrowly graded mixture of [washed] crushed stone or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.

J. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.02 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.

2. Yellow: Gas, oil, steam, and dangerous materials.

3. Orange: Telephone and other communications.

4. Blue: Water systems.

5. Green: Sewer systems.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing."

C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section "Site Clearing," during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.02 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.03 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

a. 24 inches outside of concrete forms other than at footings.

b. 6 inches beneath bottom of concrete slabs on grade.

3.04 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.05 SUBGRADE INSPECTION

A. Notify Landscape Architect/OWNER when excavations have reached required subgrade.

B. If Landscape Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades

1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph.

2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.

3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.06 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.07 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, damp proofing, waterproofing, and perimeter insulation.

2. Surveying locations of underground utilities for Record Documents.

3. Testing and inspecting underground utilities.

4. Removing concrete formwork.

5. Removing trash and debris.

6. Removing temporary shoring and bracing, and sheeting.

7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.08 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.

2. Under walks and pavements, use satisfactory soil material.

3. Under steps and ramps, use engineered fill.

4. Under building slabs, use engineered fill.

5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.09 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.10 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.

2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.

3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.

3.11 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.

2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 1 inch.

2. Walks: Plus or minus 1 inch.

3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straight edge.

3.12 SUBBASE AND BASE COURSES

A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase and base course under pavements and walks as follows:

1. Place base course material over subbase course under hot-mix asphalt pavement.

2. Shape subbase and base course to required crown elevations and cross-slope grades.

3. Place subbase and base course 6 inches or less in compacted thickness in a single layer.

4. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

5. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.13 DRAINAGE COURSE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place, and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.

2. Place drainage course 6 inches or less in compacted thickness in a single layer.

3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.14 FIELD QUALITY CONTROL

A. Testing Agency: OWNER will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 1000 sq. ft. or less of paved area or building slab, but in no case fewer than 3 tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify, and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.15 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Landscape Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off OWNER'S property.

B. Disposal: Transport surplus satisfactory soil to designated storage areas on OWNER'S property. Stockpile or spread soil as directed by OWNER.

1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off OWNER'S property.

[END OF SECTION 02300]

SECTION 02751

CEMENT CONCRETE PAVEMENT

PART 1-GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:

1. Standard gray concrete with broom finish

2. Integral colored concrete with Rock Salt finish

B. Related Sections include the following:

1. Division 2 Section "Earthwork" for subgrade preparation.

2. Division 2 Section "Pavement Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

3. Division 2 Section "Decorative Cement Concrete Pavement" for colored and sandblasted concrete.

1.03 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.04 SUBMITTALS

A. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

B. Qualification Data: For manufacturer.

1.05 QUALITY ASSURANCE

1.06 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required

PART 2- PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

2.02 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves with a radius of 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.03 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

D. Plain Steel Wire: ASTM A 82, galvanized.

E. Deformed-Steel Wire: ASTM A 496.

F. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

G. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.04 CONCRETE MATERIALS

A. Cementitious Material: Use cementitious materials of the same type, brand, and source throughout the Project:

B. Water: ASTM C 94/C 94M.

C. Colored Admixture for Integrally Colored Concrete: CHROMIX P® Admixture and CHROMIX ML®; L.M. SCOFIELD COMPANY or approved equal.

1. Admixture shall be a colored, water-reducing, admixture containing no calcium chloride with coloring agents that are lime proof and ultra-violet resistant.

2. Colored admixture shall conform to the requirements of ACI 303.1, ASTM C979, ASTM C494 and ASSHTO M194

D. Curing Compound for Integrally Colored Concrete: Curing compound shall comply with ASTM C309 and be of same manufacturer as colored admixture, for use with integrally colored concrete.

1. Dry Shake Color Hardener: LITHOCHROME Colorwax; L.M. Scofield Company or approved equal. Use to cure exterior flatwork that will be allowed to cure naturally.

2.05 COLORING MATERIALS

A. Concrete Colors:

1. Cement: Color shall be medium gray.

2. Sand: Color shall be locally available natural sand.

3. Aggregate: Color of concrete aggregate shall be similar to the color of the admixture used to pigment the concrete. CONTRACTOR shall supply a sample to the Landscape Architect for approval prior to construction.

2.06 CURING MATERIALS

A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

2.07 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 3000 psi.

C. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements.

2.08 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3- EXECUTION

3.01 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below sidewalks with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph.

2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons.

3. Subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch (13 mm) require correction according to requirements in Division 2 Section "Earthwork."

C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.02 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.03 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.04 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.05 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.

1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Expansion Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.

2. Provide tie bars at sides of pavement strips where indicated.

C. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/8-inch (6-mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.06 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site.

F. Do not add water to fresh concrete after testing.

G. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

1. Remove and replace concrete that has been placed for more than 15 minutes without being covered by top layer, or use bonding agent if approved by Landscape Architect.

J. Screed pavement surfaces with a straightedge and strike off.

K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

L. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

M. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.

2. Do not use frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixed designs.

N. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is CONTRACTOR'S's option.

2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.07 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared, and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area

is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.08 SPECIAL FINISHING

A. Rock Salt Finish: After initial troweling, uniformly spread rock salt over paving surface at the rate of 5 lb./100 sq. ft. Salt shall be ordinary sodium chloride, kiln dried and packaged water softener salt. It shall be delivered to the job site clean and free from dirt or other contamination. Size shall be coarse with gradation that permits 100% to pass 3/8” sieve and 85% to remain on the #8 sieve. (Note: This is Leslie Salt Company or Morton’s Kiln Dried Coarse Softener salt or equal.) Contractor shall provide a sample of the salt material for approval by the Landscape Architect/PROJECT REPRESENTATIVE before construction.

1. Embed rock salt into plastic concrete with roller.

2. Cover paving surface with 1-mil thick polyethylene sheet and remove sheet when concrete has hardened and seven-day curing period has elapsed.

3. After seven-day curing period, saturate concrete with water and broom-sweep surface to dissolve remaining rock salt, thereby leaving pits and holes.

3.09 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.10 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch.

2. Thickness: Plus 3/8-inch, minus 1/4 inch.

3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.

4. Joint Spacing: 3 inches.

5. Joint Width: Plus 1/8 inch, no minus.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: OWNER will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least 1 composite sample for each 100-cu. yd. (76 cu. m) or fraction thereof of each concrete mix placed each day.

a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.

4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.

   a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Landscape Architect/ OWNER, concrete manufacturer, and CONTRACTOR within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Landscape Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Landscape Architect/ OWNER.

G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

H. Additional testing and inspecting, at CONTRACTOR'S's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Drill test cores, where directed by Landscape Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

[END OF SECTION 02751]

SECTION 02764

CONCRETE PAVEMENT JOINT SEALANTS

PART 1- GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Expansion and contraction joints within cement concrete pavement.

2. Joints between cement concrete and asphalt pavement.

B. Related Sections include the following:

1. Division 2 Section "Cement Concrete Pavement" for constructing joints in concrete pavement.

1.03 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Verification: For each type and color of joint sealant required. Install joint-sealant samples in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

D. Qualification Data: For Installer.

E. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.

2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for sealants.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

2. Submit not fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.

3. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

4. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.

5. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

D. Product Testing: Obtain test results for "Product Test Reports" Paragraph in "Submittals" Article from a qualified testing agency based on testing of current sealant products within a 36-month period preceding the Notice to Proceed with the Work.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 for testing indicated, as documented according to ASTM E 548.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles

with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.06 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.

2. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.

3. When joint substrates are wet or covered with frost.

4. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.

5. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2- PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements. Submit product for approval to Landscape Architect.

B. Products: Subject to compliance with requirements. Submit product for approval to Landscape Architect.

2.02 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.03 COLD-APPLIED JOINT SEALANTS

A. Type NS Silicone Sealant for Concrete: Single-component, low-modulus, neutral-curing, nonsag silicone sealant complying with ASTM D 5893 for Type NS.

1. Products:

a. Crafco Inc.; RoadSaver Silicone.

b. Dow Corning Corporation; 888.

B. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.

1. Products:

a. Crafco Inc.; RoadSaver Silicone SL.

b. Dow Corning Corporation; 890-SL.

2.04 JOINT-SEALANT BACKER MATERIALS

A. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

2.05 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3- EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.03 INSTALLATION OF JOINTS SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of backer materials.

2. Do not stretch, twist, puncture, or tear backer materials.

3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses provided for each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with

sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.

2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.

G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.04 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

[END OF SECTION 02764]

SECTION 02768

DECORATIVE CEMENT CONCRETE PAVEMENT

PART 1- GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes colored and sandblasted concrete paving.

B. Related Sections:

1. Division 2 Section "Cement Concrete Pavement" for cast-in-place concrete paving with other finishes, curbs, and gutters, stamped detectable warnings, pavement markings, and wheel stops.

2. Division 2 Section "Pavement Joint Sealants" for joint sealants in expansion and contraction joints within decorative concrete paving and in joints between decorative concrete paving and asphalt paving or adjacent construction.

1.03 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Verification: For each type of exposed color, pattern, or texture indicated on drawings or approved equal.

C. Other Action Submittals:

1. Design Mixtures: For each decorative concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

D. Qualification Data: For qualified Installer and testing agency.

E. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.

2. Steel reinforcement and reinforcement accessories.

3. Admixtures.

4. Curing compounds.

5. Applied finish materials.

6. Bonding agent or epoxy adhesive.

7. Joint fillers.

8. Concrete Sealers

F. Field quality-control reports.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer with 10 years' experience in the production of specified products.

B. Installer Qualifications: An installer with 5 years' experience with work of similar scope and quality.

C. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

D. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

E. Source Limitations: Obtain decorative concrete paving products and each type or class of cementitious material of the same brand from same manufacturer's plant, and obtain each aggregate from single source.

F. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.

G. ACI Publications: Comply with ACI 301 unless otherwise indicated.

H. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups of full-thickness sections of decorative concrete paving to demonstrate typical joints; surface color, pattern, and texture; curing; and standard of workmanship.

2. Build mockups of decorative concrete paving in the location and of the size indicated or, if not indicated, build mockups where directed by Landscape Architect and not less than 96 inches by 96 inches.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

I. Preinstallation Conference: Conduct conference at Project Site, or the Offices of the OWNER, at the discretion of the OWNER.

1. Review methods and procedures related to decorative concrete paving, including but not limited to, the following:

a. Concrete mixture design.

b. Quality control of concrete materials and decorative concrete paving construction practices.

c. Specialty construction

2. Require representatives of each entity directly concerned with decorative concrete paving to attend, including the following:

a. CONTRACTOR'S superintendent.

b. Independent testing agency responsible for concrete design mixtures.

c. Ready-mix concrete manufacturer.

d. Decorative concrete paving Installer.

e. Manufacturer's representative of decorative concrete paving system.

1.06 DELIVERY, STORAGE AND HANDLING

A. Colored Admixture: Comply with manufacturer's instructions. Deliver colored admixtures in original, unopened packaging. Store in dry conditions.

B. Dry Shake Color Hardener: Comply with manufacturer's instructions. Deliver Dry Shake Color Hardener in original, unopened packaging. Store in dry conditions.

1.07 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Integrally Colored Concrete/Dry Shake Color Hardener Environmental Requirements:

1. Schedule placement to minimize exposure to wind and hot sun before curing materials are applied.

2. Avoid placing concrete if rain, snow, or frost is forecast within 24-hours. Protect fresh concrete from moisture and freezing.

3. Comply with professional practices described in ACI 305R and ACI 306R.

C. Schedule delivery of concrete to provide consistent mix times from batching until discharge. Mix times shall meet manufacturer’s written recommendations.

PART 2- PRODUCTS

2.01 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves of a radius of 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.02 STEEL REINFORCEMENT

A. Recycled Content: Provide steel reinforcement with an average recycled content of steel so postconsumer recycled content plus one-half of pre consumer recycled content is not less than 25 percent.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.

C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

D. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.

E. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.

F. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.

G. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:

   1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.03 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

   1. Portland Cement: ASTM C 150, gray and/or white Portland cement Type I or Type II, Supplement with the following:

      a. Fly Ash: ASTM C 618, Class C or F.

      b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

   2. Blended Hydraulic Cement: ASTM C 595, Type IS, Portland blast-furnace slag cement.

B. Normal-Weight Aggregates: ASTM C 33, Class 4S, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years satisfactory service in similar paving applications

and service conditions using similar aggregates and cementitious materials.

1. Maximum Aggregate Size: 3/4-inch nominal.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: Potable and complying with ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.

2. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

3. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.

F. Colored Admixture for Integrally Colored Concrete: CHROMIX P® Admixture and CHROMIX ML®; L.M. SCOFIELD COMPANY or approved equal.

1. Admixture shall be a colored, water-reducing, admixture containing no calcium chloride with coloring agents that are lime proof and ultra-violet resistant.

2. Colored admixture shall conform to the requirements of ACI 303.1, ASTM C979, ASTM C494 and ASSHTO M194

G. Dry-shake Colored Hardener: LITHOCHROME Color Hardener; L.M. SCOFIELD COMPANY OR APPROVED EQUAL, factory proportioned, mixed, and packaged, ready-to-use surface hardener.

H. Curing Compound for Integrally Colored Concrete: Curing compound shall comply with ASTM C309 and be of same manufacturer as colored admixture, for use with integrally colored concrete.

1. Dry Shake Color Hardener: LITHOCHROME Colorwax; L.M. Scofield Company or approved equal. Use to cure exterior flatwork that will be allowed to cure naturally.

SUBSTITUTIONS: The use of products other than those specified will be

considered providing that the CONTRACTOR submits samples and technical information for approval before installation.

2.04 COLORING MATERIALS

A. Concrete Colors:

1. Cement: Color shall be medium gray.

2. Sand: Color shall be locally available natural sand.

3. Aggregate: Color of concrete aggregate shall be similar to the color of the admixture used to pigment the concrete. CONTRACTOR shall supply a sample to the Landscape Architect for approval prior to construction.

2.05 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:

1. Types I and II, non-load bearing and Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

D. Polyethylene Film: ASTM D 4397, 1 mil thick, clear.

E. Caulk: L.M. Scofield Company, "Lithochrome" color caulk. Color to match concrete or as approved by OWNER/Landscape Architect.

F. Expansion Joints:

1. Pre-formed expansion joint strips, 1/2" thick, non-extruding, fibrous, bituminous, impregnated, conforming to ASTM D1751. Locations as indicated on plans; expansion joint filler required to full depth of slab thickness at joint as indicated on plans.

2. Expansion joint cap with removable cap strip as manufactured by Vinylex, Corporation or approved equal.

3. CONTRACTOR shall install expansion joints as detailed on the drawing where concrete pavement abuts all vertical surfaces including, but not limited to, all buildings, structures, curbs, inlets, columns, walls, light poles, etc.

G. Grout: Ready to use non-shrink grouting material requiring only mixing with water at the job site. Any special grouting applications shall be per instructions of the OWNER/Landscape Architect. The color for grouts must be approved prior to placement.

H. Concrete Surface Retarder:

1. All concrete flatwork designated as Rock Salt finish in the plans and specifications shall be exposed using Lithotex Top Surface Retarder manufactured by L.M. Scofield Company, Los Angeles, California or equal in accordance with Scofield's Application Instruction T-203. The Rock Salt concrete shall be cured with non-staining curing paper.

2.06 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 3000 psi.

2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.

3. Slump Limit: 4 inches, plus or minus 1 inch.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: 6 percent plus or minus 1.5 percent for 3/4-inch nominal maximum aggregate size.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15

percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture with either water-reducing and retarding admixture or water-reducing and accelerating admixture in concrete as required for placement and workability.

2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

F. Cementitious Materials: Limit percentage by weight of cementitious materials other than Portland cement according to ACI 30 requirements as follows:

1. Fly Ash or Pozzolan: 25 percent.

2. Ground Granulated Blast-Furnace Slag: 50 percent.

3. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent, with fly ash or pozzolan not exceeding 25 percent.

G. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb./cu. yd.

H. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.07 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94 and ASTM C 1116. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3- EXECUTION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below decorative concrete paving to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.

2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.

3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Division 2 Section "Earthwork."

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

B. Protect adjacent construction from discoloration and spillage during application of color hardeners, release agents, stains, curing compounds, and sealers.

3.03 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.04 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

3.05 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.

2. Butt Joints: Use bonding agent at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.

4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 50 feet unless otherwise indicated.

2. Extend joint fillers full width and depth of joint.

3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.

4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.

5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.

6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.

   a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

   a. Tolerance: Ensure that sawed joints are within 3 inches in both directions from center of dowels.

3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging tool marks on concrete surfaces.

3.06 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement dowels and joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.

2. Do not use frozen materials or materials containing ice or snow.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

K. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is CONTRACTOR'S option.

2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.07 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared, and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

3.08 CONCRETE FINISHING

A. After final floating, apply the following finish according to the pavement schedule:

1. Sandblast Finish:

a. Sandblasted Icons: Allow concrete to cure to sufficient strength so that it will not be damaged by blasting but not less than seven days. Use the level of sandblasting to remove Dry Shake Color Hardener from the surface exposing the colored concrete. CONTRACTOR supplied icon templates must be approved by Landscape Architect during placement of mock-ups.

b. At no additional cost to OWNER, and as directed by PROJECT REPRESENTATIVE, the CONTRACTOR shall provide, maintain, and remove any required protection during sandblasting operations. Correcting, replacing, or repairing any damage caused to adjacent work shall be the CONTRACTOR'S responsibility

3.09 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Colored Concrete: Apply curing compound for Dry Shake Color Hardener according to manufacturer's instructions using manufacturer's recommended application techniques. Apply curing compound at consistent time for each pour to maintain close color consistency.

D. Curing compound shall be same color as the colored concrete and supplied by same manufacturer of the dry shake color hardener.

E. Precautions shall be taken in hot weather to prevent plastic cracking resulting from excessively rapid drying at surface as described in CIP 5 Plastic Shrinkage Cracking published by the National Ready Mixed Concrete Association.

F. Do not cover concrete with plastic sheeting at any time.

G. Scoring: Score decorative jointing in paving surfaces between differing colors 1/16 inch deep per plans with diamond blades to match pattern indicated. Rinse until water is clear. Score before staining.

1. Joint Width: 1/8 inch.

3.10 SEALER

A. Clear Acrylic Sealer: Apply uniformly in two coats in continuous operations according to manufacturer's written instructions. Allow first coat to dry before applying second coat, at 90 degrees to the direction of the first coat using same application methods and rates.

1. Begin sealing dry surface as recommended by manufacturer.

2. Allow stained concrete surfaces to dry before applying sealer.

3. Thoroughly mix slip-resistance-enhancing additive into sealer before

applying sealer according to manufacturer's written instructions. Stir sealer occasionally during application to maintain even distribution of additive.

3.11 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 1/2 inch.

2. Thickness: Plus 3/8-inch, minus 1/4 inch.

3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.

4. Lateral Alignment and Spacing of Dowels: 1 inch.

5. Vertical Alignment of Dowels: 1/4 inch.

6. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.

7. Joint Spacing: 1 inch.

8. Contraction Joint Depth: Plus 1/4 inch, no minus.

9. Joint Width: Plus 1/8 inch, no minus.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 1000 sq. ft. or fraction thereof of each concrete mixture placed each day.

a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each

composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and CONTRACTOR within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by the Landscape Architect.

G. Decorative concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at CONTRACTOR'S expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.13 REPAIRS AND PREPARATION

A. Remove and replace decorative concrete paving that is broken or damaged or does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by the Landscape Architect.

B. Detailing: Grind concrete "squeeze" left from tool placement. Color ground areas with slurry of color hardener mixed with water and bonding agent. Remove excess release agent with high-velocity blower.

C. Protect decorative concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain decorative concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

[END OF SECTION 02768]

SECTION 02780

UNIT PAVERS

PART 1 – GENERAL

RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes the following:

1. Concrete pavers set in mortar course over concrete sub-slab.

B. Related Sections include the following:

1. Division 2 Section "Earthwork" for excavation and compacted subgrade.

2. Division 2 Section "Cement Concrete Pavement

1.3 SUBMITTALS

A. Product Data: For materials other than water and aggregates.

B. Sieve Analyses: For aggregate setting-bed materials, according to ASTM C 136.

C. Samples for Verification:

1. Full-size units of each type of unit paver indicated.

2. Joint materials.

3. Exposed edge restraints.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards

for materials and execution.

1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Preinstallation Conference: Conduct conference at Project site.

1.05 DELIVERY, STORAGE AND HANDLING

A. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.

1.06 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

B. Weather Limitations for Mortar and Grout:

1. Cold-Weather Requirements: Protect unit paver work against freezing when ambient temperature is 40 deg F and falling. Heat materials to provide mortar and grout temperatures between 40 and 120 deg F. Provide the following protection for completed portions of work for 24 hours after installation when the mean daily air temperature is as indicated: below 40 deg F, cover with weather-resistant membrane; below 25 deg F, cover with insulating blankets; below 20 deg F, provide enclosure and temporary heat to maintain temperature above 32 deg F.

2. Hot-Weather Requirements: Protect unit paver work when temperature and humidity conditions produce excessive evaporation of setting beds and grout. Provide artificial shade and windbreaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F and higher.

a. When ambient temperature exceeds 100 deg F, or when wind velocity exceeds 8 mph and ambient temperature exceeds 90 deg F, set pavers within 1 minute of spreading setting-bed mortar.

2.01 CONCRETE PAVERS

A. Concrete Pavers: Solid interlocking paving units complying with ASTM C 936, made from normal-weight aggregates.

B. Concrete Pavers: Solid paving units, made from normal-weight concrete with a compressive strength not less than 8000 psi, water absorption not more than 5 percent according to ASTM C 140, and no breakage and not more than 1 percent mass loss when tested for freeze-thaw resistance according to ASTM C 67.

1. Basis-of-Design Product: The design for concrete pavers is as shown on pavement schedule and drawing details or approved equal.

2. Thickness: 1-5/8 inches.

3. Face Size and Shape: As indicated on drawings.

4. Color: As indicated on drawings or approved equal.

2.02 MORTAR SETTING-BED MATERIALS

A. Portland Cement: ASTM C 150, Type I or II.

B. Hydrated Lime: ASTM C 207, Type S.

C. Sand: ASTM C 144.

D. Latex Additive: Manufacturer's standard or acrylic-resin water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed Portland cement mortar bed, and not containing a retarder.

1. Available Manufacturers: Subject to compliance with requirements. Submit to Landscape Architect for approval.

2. Manufacturer: Subject to compliance with requirements. Submit to Landscape Architect for approval.

E. Water: Potable.

F. Reinforcing Wire: Galvanized, welded, 0.062-inch- diameter wire; 2-by-2-inch mesh; comply with ASTM A 185 and ASTM A 82 except for minimum

wire size.

2.03 GROUT MATERIALS

A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement, unfading mineral pigments and white or colored sand as required to produce required color.

1. Latex Additive: Manufacturer's standard or acrylic-resin water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed sand-Portland cement grout.

a. Available Manufacturers: Subject to compliance with requirements. Submit to Landscape Architect for approval.

b. Manufacturer: Subject to compliance with requirements. Submit to Landscape Architect for approval.

B. Polymer-Modified Grout: ANSI A118.7, sanded grout; in color indicated.

1. Manufacturer: Subject to compliance with requirements. Submit to Landscape Architect for approval.

2. Product Type: Dry mix, containing ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients.

3. Product Type: Two-component mix, containing acrylic resin in liquid-latex form and prepackaged dry-grout mix complying with ANSI A118.6 and recommended by latex-additive manufacturer.

4. Product Type: Either dry mix, containing ethylene vinyl acetate, in dry, redispersible form, prepackaged with other dry ingredients, or two-component mix, containing acrylic resin or styrene-butadiene rubber in liquid-latex form and prepackaged dry-grout mix complying with ANSI A118.6 and recommended by latex-additive manufacturer.

C. Grout Color: As selected by Architect from manufacturer's full range.

D. Water: Potable.

2.04 MORTAR AND GROUT MIXES

A. General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times, and other procedures needed to produce

setting-bed and joint materials of uniform quality and with optimum performance characteristics. Discard mortars and grout if they have reached their initial set before being used.

B. Mortar-Bed Bond Coat: Mix neat cement or cement and sand with latex additive and water to a creamy consistency.

C. Packaged, Polymer-Modified Grout Mix: Proportion and mix grout ingredients according to grout manufacturer's written instructions.

PART 3- EXECUTION

3.01 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

2. Where pavers are to be installed over waterproofing, examine waterproofing installation, with waterproofing Installer present, for protection from paving operations. Examine areas where waterproofing system is turned up or flashed against vertical surfaces and horizontal waterproofing. Proceed with installation only after protection is in place.

3.02 PREPARATION

A. Remove substances from concrete substrates that could impair mortar bond, including curing and sealing compounds, form oil, and laitance.

B. Clean concrete substrates to remove dirt, dust, debris, and loose particles.

C. Proof-roll prepared subgrade according to requirements in Division 2 Section "Earthwork" to identify soft pockets and areas of excess yielding. Proceed with unit paver installation only after deficient subgrades have been corrected and are ready to receive base course for unit pavers.

3.03 INSTALLATION, GENERAL

A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.

B. Mix pavers from several pallets or cubes, as they are placed, to produce

uniform blend of colors and textures.

C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

D. Exercise care in handling coated brick pavers to prevent coated surfaces from contacting backs or edges of other units. Remove coating from bonding surfaces before setting brick.

E. Tolerances: Do not exceed 1/32-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 10 feet from level, or indicated slope, for finished surface of paving.

F. Tolerances: Do not exceed 1/16-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches and 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving.

G. Expansion and Control Joints: Provide joint filler at locations and of widths indicated. Install joint filler before setting pavers. Make top of joint filler flush with top of pavers.

H. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.

1. Install edge restraints to comply with manufacturer's written instructions. Install stakes at intervals required to hold edge restraints in place during and after unit paver installation.

2. For metal edge restraints with top edge exposed, drive stakes at least 1 inch below top edge.

3. Where pavers set in mortar bed are indicated as edge restraints for pavers set in aggregate setting bed, install pavers set in mortar and allow mortar to cure before placing aggregate setting bed and remainder of pavers. Cut off mortar bed at a steep angle so it will not interfere with aggregate setting bed.

3.04 MORTAR SETTING – BED APPLICATIONS

A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.

B. Apply mortar-bed bond coat over surface of concrete subbase about 15

minutes before placing setting bed. Limit area of bond coat to avoid its drying out before placing setting bed. Do not exceed 1/16-inch thickness for bond coat.

C. Apply mortar bed over bond coat immediately after applying bond coat. Spread and screed setting bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.

D. Place reinforcing wire over concrete subbase, lapped at joints by at least one full mesh and supported so mesh becomes embedded in the middle of setting bed. Hold edges back from vertical surfaces approximately 1/2 inch.

E. Place mortar bed with reinforcing wire fully embedded in middle of setting bed. Spread and screed setting bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.

F. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Cut back, bevel edge, remove, and discard setting-bed material that has reached initial set before placing pavers.

G. Place pavers before initial set of cement occurs. Immediately before placing pavers on setting bed, apply uniform 1/16-inch thick, slurry bond coat to bed or to back of each paver with a flat trowel.

H. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single operation before initial set of mortar; do not return to areas already set or disturb pavers for purposes of realigning finished surfaces or adjusting joints.

I. Spaced Joint Widths: Provide 3/8-inch nominal joint width with variations not exceeding plus or minus 1/16 inch.

J. Grout joints as soon as possible after initial set of setting bed.

1. Force grout into joints, taking care not to smear grout on adjoining surfaces.

2. Clean pavers as grouting progresses by dry brushing or rubbing with dry burlap to remove smears before tooling joints.

3. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

4. If tooling squeezes grout from joints, remove excess grout and

smears by dry brushing or rubbing with dry burlap and tool joints again to produce a uniform appearance.

K. Cure grout by maintaining in a damp condition for seven days, unless otherwise recommended by grout or liquid-latex manufacturer.

3.05 REPAIRING, POINTING, AND CLEANING

A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

B. Pointing: During tooling of joints, enlarge voids or holes and completely fill with grout. Point up joints at sealant joints to provide a neat, uniform appearance, properly prepared for sealant application.

C. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean.

1. Remove temporary protective coating from brick pavers as recommended by protective coating manufacturer and as acceptable to unit paver and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

[END OF SECTION 02780]

SECTION 02810

IRRIGATION SYSTEMS

PART 1- GENERAL

1.01 SCOPE OF WORK

A. The design, supply, and installation of an automatic irrigation system to landscaped areas as designated on the drawings.

1.02 STANDARDS

A. Unless recommended otherwise by the Manufacturer, all work will be carried out using equipment and installation process as outlined in the relevant Industry Standards.

1.03 QUALIFICATIONS

A. Manufacturer Qualifications: Not less than ten (10) years' continuous experience in the manufacture of the product types specified. Submit proposed manufacturer's names for approval.

B. Installer Qualifications: Installer is not to have less than five (5) years' continuous experience in the installation of specified material

1.04 DESIGN INFORMATION AND CRITERIA

A. This Specification is not project or site specific. The intent is to provide a basis on which a professional standard, fully operational and industry compliant irrigation system can be provided to the Client.

B. The equipment and installation processes described are intended to produce an irrigation system which complies with all applicable industry and local authority and Australian standards.

C. Submission of the design to the Client or their Superintendent prior to commencement of works is the responsibility of the Irrigation Contractor. The Irrigation Contractor will inspect the site and verify the available water flow and pressure, prior to designing system.

1.05 GENERAL

A. This Specification sets out the requirements for the design and supply of all materials, equipment, and labor necessary for the complete and proper

implementation of the irrigation system.

B. The Irrigation Contractor will be responsible for all materials required. Items not specifically described in this Specification, but which would normally be required to produce a fully functioning irrigation system are considered part of the required materials.

C. This Specification sets a minimum standard required for the design, works, materials and installation. It is the Irrigation Contractor's responsibility to bring to the Client or their Superintendent's attention any concerns, potential obstacles or possible improvements before construction commences.

D. The water source for the irrigation shall be to the re-use water line as per locations indicated on the Drawings.

E. All components shall meet industry standards and local codes for re-use water including but not limited to purple pipe, purple covers on all irrigation heads, purple valve boxes and re-use water signs.

F. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:

1. Irrigation Main Piping: 60psi.

2. Circuit Piping: 50psi.

1.06 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories.

B. Wiring Diagrams: For power, signal, and control wiring.

C. Delegated-Design Submittal: For irrigation systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Coordination Drawings: Irrigation systems, drawn to scale, on which components are shown and coordinated with each other, using input from Installers of the items involved. Also include adjustments necessary to avoid plantings and obstructions such as signs and light standards.

E. Qualification Data: For qualified Installer.

F. Zoning Chart: Show each irrigation zone and its control valve.

G. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.

H. Field quality-control reports.

I. Operation and Maintenance Data: For sprinklers, controllers and automatic control valves to include in operation and maintenance manuals.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers that include a certified irrigation designer qualified by The Irrigation Association or a Professional Class member of the American Society of Irrigation Consultants or a Professional Technical Class member of the American Society of Irrigation Consultants.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.08 DELIVERY, STORAGE and HANDLING

A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.09 PROJECT CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by OWNER or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Construction Manager/OWNER no fewer than two days in advance of proposed interruption of water service.

1.10 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Spray Sprinklers: Equal to 5 percent of amount installed for each type and size indicated, but no fewer than 3 units.

PART 2- PRODUCTS

2.01 PIPES, TUBES AND FITTINGS

A. Comply with industry requirements for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

B. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedule 40.

1. PVC Socket Fittings: ASTM D 2466, Schedule 40.

2. PVC Threaded Fittings: ASTM D 2464, Schedule 80.

3. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket ends.

C. PVC Pipe, Pressure Rated: ASTM D 2241, PVC 1120 compound, SDR 21 and SDR 26.

1. PVC Socket Fittings: ASTM D 2467, Schedule 80.

2. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket or threaded ends.

2.02 PIPING JOINING MATERIALS

A. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

B. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.03 MANUAL VALVES

A. Bronze Gate Valves:

1. Basis-of-Design Product: Subject to compliance with requirements.

2.04 PRESSURE-REDUCING VALVES

A. Water Regulators:

1. Basis-of-Design Product: Subject to compliance with requirements.

2.05 AUTOMATIC CONTROL VALVES

A. Plastic, Automatic Control Valves:

1. Basis-of-Design Product: Subject to compliance with requirements.

2. Description: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

2.06 TRANSITION FITTINGS

A. General Requirements: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

B. Transition Couplings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work should be submitted to Landscape Architect/ OWNER for approval.

2. Description: AWWA C219, metal sleeve-type coupling for underground pressure piping.

2.07 MISCELLANEOUS PIPING SPECIALTIES

A. Water Hammer Arresters: ASSE 1010 or PDI WH 201, with bellows or piston-type pressurized cushioning chamber and in sizes complying with PDI WH 201, Sizes A to F.

B. Pressure Gages: ASME B40.1. Include 4-1/2-inch- diameter dial, dial range of two times system operating pressure, and bottom outlet.

2.08 SPRINKLERS

A. General Requirements: Designed for uniform coverage over entire spray area at available water pressure.

B. Plastic, Pop-up Spray Sprinklers:

1. Basis-of-Design Product: Subject to compliance with requirements.

2. Description:

a. Body Material: ABS.

b. Retraction Spring: Stainless steel.

c. Internal Parts: Corrosion resistant.

d. Pattern: Fixed, with flow adjustment.

2.09 QUICK COUPLERS

A. Basis-of-Design Product: Subject to compliance with requirements.

B. Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.

1. Locking-Top Option: Vandal-resistant locking feature. Include two matching key(s).

2.10 CONTROLLERS

A. Basis-of-Design Product: Subject to compliance with requirements.

B. Description:

1. Controller Stations for Automatic Control Valves: Each station is variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each station.

2. Exterior Control Enclosures: NEMA 250, Type 4, weatherproof, with locking cover and two matching keys; include provision for grounding.

a. Body Material: Molded plastic.

b. Mounting: Pedestal mounted.

3. Interior Control Enclosures: NEMA 250, Type 12, drip-proof, with locking cover and two matching keys.

a. Body Material: Molded plastic or stainless steel.

b. Mounting: Wall mounted.

4. Control Transformer: 24-V secondary, with primary fuse.

5. Timing Device: Adjustable, 24-hour, 14-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, or to operate two or more times daily.

    a. Manual or Semiautomatic Operation: Allows this mode without disturbing preset automatic operation.

    b. Nickel-Cadmium Battery and Trickle Charger: Automatically powers timing device during power outages.

    c. Surge Protection: Metal-oxide-varistor type on each station and primary power.

6. Rain Sensor: Adjustable from 1/8” to 3/4”, to shut off water flow during rain.

7. Wiring: UL 493, Type UF multiconductor, with solid-copper conductors; insulated cable; suitable for direct burial.

    a. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.

    b. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; color-coded different from feeder-circuit-cable jacket color; with jackets of different colors for multiple-cable installation in same trench.

    c. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.

2.11 BOXES FOR AUTOMATIC VALVES

A. Plastic Boxes:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated are to be submitted to Landscape Architect/OWNER prior to installation for approval.

2. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.

    a. Size: As required for valves and service.

    b. Shape: Round.

c. Color: Green (purple for reclaim)

B. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4 inch minimum to 3 inches maximum.

PART 3- EXECUTION

3.01 EARTHWORK

A. Install warning tape directly above pressure piping, 12 inches below finished grades, except 6 inches below subgrade under pavement and slabs.

B. Drain Pockets: Excavate to sizes indicated. Backfill with cleaned gravel or crushed stone, graded from 3/4 to 3 inches to 12 inches below grade. Cover gravel or crushed stone with sheet of asphalt-saturated felt and backfill remainder with excavated material.

C. Provide minimum cover over top of underground piping according to the following:

1. Irrigation Main Piping: Minimum depth of 36 inches below finished grade, or not less than 18 inches below average local frost depth, whichever is deeper.

2. Circuit Piping: 12 inches.

3. Drain Piping: 12 inches.

4. Sleeves: 24 inches.

3.02 PREPARATION

A. Set stakes to identify locations of proposed irrigation system. Obtain Landscape Architect/ OWNER'S approval before excavation.

3.03 PIPING INSTALLATION

A. Install piping free of sags and bends.

B. Install groups of pipes parallel to each other, spaced to permit valve servicing.

C. Install fittings for changes in direction and branch connections.

D. Install unions adjacent to valves and to final connections to other components with NPS 2 or smaller pipe connection.

E. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 or larger pipe connection.

F. Install underground thermoplastic piping according to ASTM D 2774.

G. Install expansion loops in control-valve boxes for plastic piping.

H. Lay piping on solid subbase, uniformly sloped without humps or depressions.

I. Install ductile-iron piping according to AWWA C600.

J. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.

K. Install water regulators with shutoff valve and strainer on inlet and gage on outlet. Install shutoff valve on outlet. Install aboveground or in control-valve boxes.

L. Water Hammer Arresters: Install between connection to building main and circuit valves aboveground or in control-valve boxes.

M. Install piping in sleeves under parking lots, roadways, and sidewalks.

N. Install sleeves made of Class 200 PVC pipe and socket fittings, and solvent-cemented joints.

3.04 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.

2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.

2. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.

3. PVC Non-pressure Piping: Join according to ASTM D 2855.

3.05 VALVE INSTALLATION

A. Pressure-Reducing Valves: Install in boxes for automatic control valves or above ground between shutoff valves.

3.06 SPRINKLER INSTALLATION

A. Install sprinklers after hydrostatic test is completed.

B. Install sprinklers at manufacturer's recommended heights.

C. Locate part-circle sprinklers to maintain a minimum distance of 4 inches from walls and 2 inches from other boundaries unless otherwise indicated.

3.07 AUTOMATIC IRRIGATION- CONTROL SYSTEM INSTALLATION

A. Equipment Mounting: Install exterior controllers on pedestals.

1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

2. Install anchor bolts to elevations required for proper attachment to supported equipment.

B. Install control cable in same trench as irrigation piping and at least 2 inches below piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve

under paved areas.

3.08 CONNECTIONS

A. Comply with requirements for piping from exterior water service piping, water meters, protective enclosures, and backflow preventers. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment, valves, and devices to allow service and maintenance.

C. Connect wiring between controllers and automatic control valves.

3.09 IDENTIFICATION

A. Identify system components.

B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.

1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

C. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches. See Division 31 Section "Earth Moving" for warning tapes.

3.10 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.

3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Any irrigation product will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.11 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

2. Verify that controllers are installed and connected according to the Contract Documents.

3. Verify that electrical wiring installation complies with manufacturer's submittal.

3.12 ADJUSTING

A. Adjust settings of controllers.

B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.

C. Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with, or not more than 1/2 inch above, finish grade.

3.13 CLEANING

A. Flush dirt and debris from piping before installing sprinklers and other devices.

3.14 DEMONSTRATION

A. Train OWNER'S maintenance personnel to adjust, operate, and maintain automatic control valves and controllers.

3.15 PIPING SCHEDULE

A. Install components having pressure rating equal to or greater than system operating pressure.

B. Piping in control-valve boxes and aboveground may be joined with flanges or unions instead of joints indicated.

C. Underground irrigation main piping, , shall be the following:

1. Schedule 40, PVC pipe and socket fittings, and solvent-cemented joints.

D. Circuit piping shall be one of the following:

1. Class 200, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.

E. Underground Branches and Offsets at Sprinklers and Devices: Schedule 80, PVC pipe; threaded PVC fittings; and threaded joints.

1. Option: Plastic swing-joint assemblies, with offsets for flexible joints, manufactured for this application.

F. Risers to Aboveground Sprinklers and Specialties: Schedule 80, PVC pipe and socket fittings; and solvent-cemented joints.

[END OF SECTION 02810]

SECTION 02920

LAWNS AND GRASSES

PART 1- GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Sodding.

2. Turf renovation.

B. Related Sections:

1. Division 2 Section “Site Clearing” for topsoil stripping and stockpiling.

2. Division 2 Section “Earthwork” for excavation, filling and backfilling, and rough grading.

3. Division 2 Section “Irrigation Systems” for turf irrigation.

4. Division 2 Section “Exterior Plants” for border edgings.

1.03 DEFINITIONS

A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

B. Finish Grade: Elevation of finished surface of planting soil.

C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

H. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.

I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of supplier.

C. Qualification Data: For qualified landscape Installer.

D. Product Certificates: For soil amendments and fertilizers, from manufacturer.

E. Material Test Reports: For standardized ASTM D 5268 topsoil, existing native surface topsoil, existing in-place surface soil and imported or manufactured topsoil.

F. Maintenance Instructions: Recommended procedures to be established by OWNER for maintenance of turf during a calendar year. Submit before expiration of required initial maintenance periods.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.

2. Experience: Three years' experience in turf installation in addition to requirements in Division 01 Section "Quality Requirements."

3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

4. Personnel Certifications: Installer's personnel assigned to the Work shall have certification in one of the following categories from the Professional Landcare Network:

a. Certified Landscape Technician - Exterior, with installation, maintenance, and irrigation specialty area(s), designated CLT-Exterior.

b. Certified Turfgrass Professional, designated CTP.

c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL.

5. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

6. Pesticide Applicator: State licensed, commercial.

B. Preinstallation Conference: Conduct conference at Project site.

1.06 DELIVERY, STORAGE AND HANDLING

A. Sod: Harvest, deliver, store, and handle sod according to best nursery/installation practices. Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways, and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.07 PROJECT CONDITIONS

A. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.08 MAINTENANCE SERVICE

A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:

1. Seeded Turf: 60 days from date of planting completion.

a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

2. Sodded Turf: 30 days from date of planting completion.

B. Initial Meadow Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than 40 days from date of planting completion.

C. Continuing Maintenance Proposal: From Installer to OWNER, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2- PRODUCTS

2.01 TURFGRASS SOD

A. Turfgrass Sod: Certified Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with best nursery/installation practices. Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

B. Turfgrass Species:

1. Per Plans.

2.02 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.

2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.

3. Provide lime in form of ground limestone as regionally available.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.03 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.

2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb./cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb./cu. ft. of loose sawdust or ground bark.

E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.04 FERTILIZERS

A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb./1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.

2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.05 PLANTING SOILS

A. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from bogs or marshes.

1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quack grass, Johnsongrass, poison ivy, nutsedge, nimble will, Canada thistle, bindweed, bent grass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes, grubs, other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled, pore-space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.

2.06 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and

application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

PART 3- EXECUTION

3.01 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.

3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

4. Uniformly moisten excessively dry soil that is not workable, and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.02 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and

hydro mulching overspray.

2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.03 TURF AREA PREPARATION

A. Limit turf subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off OWNER'S property.

1. Apply superphosphate fertilizer directly to subgrade before loosening.

2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.

b. Mix lime with dry soil before mixing fertilizer.

3. Spread planting soil to a depth of 6 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.

b. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.

2. Loosen surface soil to a depth of at least 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.

    a. Apply superphosphate fertilizer directly to surface soil before loosening.

3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.

4. Legally dispose of waste material, including grass, vegetation, and turf.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.04 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.

2. Anchor sod on slopes exceeding 1:6 with wood pegs spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first

week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.05 TURF RENOVATION

A. Renovate existing turf.

B. Renovate existing turf damaged by CONTRACTOR'S operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish turf where settlement or washouts occur or where minor regrading is required.

2. Install new planting soil as required.

C. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.

D. Remove topsoil containing foreign materials such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from CONTRACTOR'S operations, and replace with new planting soil.

E. Mow, dethatch, core aerate, and rake existing turf.

F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off OWNER'S property.

H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.

I. Apply soil amendments and initial fertilizers required for establishing new turf and mix thoroughly into top 4 inches of existing soil. Install new planting soil to fill low spots and meet finish grades.

J. Apply sod as required for new turf.

K. Water newly planted areas and keep moist until new turf is established.

3.06 TURF MAINTENANCE

A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded

areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.

2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.

3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.

2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.

D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 1 lb./1000 sq. ft. to turf area.

3.07 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Landscape Architect:

1. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of

weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.08 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with OWNER'S operations and others in proximity to the Work. Notify OWNER before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.09 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove nondegradable erosion-control measures after grass establishment period.

[END OF SECTION 02920]

SECTION 02930

EXTERIOR PLANTS

PART 1- GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Plants.
2. Planting soils.
3. Tree stabilization.

B. Related Sections:

1. Division 2 Section "Site Clearing" for protection of existing trees and plantings, topsoil stripping and stockpiling, and site clearing.
2. Division 2 Section "Tree Protection and Trimming" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
3. Division 2 Section "Earthwork" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.
4. Division 2 Section "Lawns and Grasses" for turf (lawn) and meadow planting, hydroseeding, and erosion-control materials.

1.03 UNIT PRICES

A. Work of this Section is affected by unit prices.

1. Unit prices apply to authorized work covered by quantity allowances.
2. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

1.04 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.

D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.

E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

F. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

G. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.

H. Finish Grade: Elevation of finished surface of planting soil.

I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

J. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes

substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

K. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

L. Planting Area: Areas to be planted.

M. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

N. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

O. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

Q. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

R. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

S. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated, including soils.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.

2. Pesticides and Herbicides: Include product label and manufacturer's

application instructions specific to the Project.

3. Plant Photographs: Include color photographs in digital or 3- by 5-inch print format of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:

1. Trees and Shrubs: Three samples of each variety and size delivered to the site for review. Maintain approved samples on-site as a standard for comparison.

2. Organic Mulch: 1-quart volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.

3. Root Barrier: Width of panel by 12 inches.

C. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

D. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.

2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

E. Material Test Reports: For standardized ASTM D 5268 topsoil, existing native surface topsoil, existing in-place surface soil, and imported or manufactured topsoil.

F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

G. Warranty: Sample of special warranty.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.

2. Experience: Three years' experience in landscape installation in addition to requirements in Division 1 Section "Quality Requirements."

3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

4. Personnel Certifications: Installer's personnel assigned to the Work shall have certification in one of the following categories from the Professional Landcare Network:

a. Certified Landscape Technician - Exterior, with installation, maintenance, irrigation specialty areas, designated CLT-Exterior.

b. Certified Ornamental Landscape Professional, designated COLP.

5. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the

soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.

2. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Architect. A minimum of six representative samples shall be taken from evenly spaced locations along the entire length of the project.

3. Report suitability of tested soil for plant growth.

   a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.

   b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1. Selection of plants purchased under allowances will be made by Architect, who will tag plants at their place of growth before they are prepared for transplanting.

E. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.

2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

F. Plant Material Observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Landscape Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Landscape Architect of sources of planting materials seven days in advance of delivery to site.

G. Preinstallation Conference: Conduct conference at Project site.

1.07 DELIVERY, STORAGE AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways, and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

3. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

C. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.

D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

E. Handle planting stock by root ball.

F. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Heel-in bare-root stock. Soak roots that are in dry condition in water for two hours. Reject dried-out plants.

2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.

3. Do not remove container-grown stock from containers before time of planting.

4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.08 PROJECT CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of each service or utility.

2. Do not proceed with interruption of services or utilities without OWNER’S written permission.

C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

D. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.09 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond CONTRACTOR'S control.

b. Structural failures including plantings falling or blowing over.

c. Faulty performance of tree stabilization.

d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods from Date of Substantial Completion:

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.

b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.

c. Annuals: Three months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.

b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.

c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.

d. Provide extended warranty for period equal to original

warranty period, for replaced plant material.

1.10 MAINTENANCE SERVICE

A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 12 months from date of planting completion.

B. Initial Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 12 months from date of planting completion.

C. Continuing Maintenance Proposal: From Installer to OWNER, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2- PRODUCTS

2.01 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.

2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.

E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.02 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.

2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.

3. Provide lime in form of ground limestone regionally available.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.03 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.

2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or granular texture, with a pH range of 3.4 to 4.8.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb./cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb./cu. ft. of loose sawdust or ground bark.

E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding

materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.04 PLANTING SOILS

A. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs, or marshes.

1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quack grass, Johnsongrass, poison ivy, nutsedge, nimble will, Canada thistle, bindweed, bent grass, wild garlic, ground ivy, perennial sorrel, and bromegrass; not infested with nematodes; grubs; or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled pore space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.

2.05 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Shredded hardwood, Ground or shredded bark, Pine needles.

2. Size Range: 2 inches minimum

3. Color: Natural.

2.06 PESTICIDES

A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.07 TREE STABILIZATION MATERIALS

A. Stakes and Guys:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, softwood with specified wood pressure-preservative treatment, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.

2. Wood Deadmen: Timbers measuring 8 inches in diameter and 48 inches long, treated with specified wood pressure-preservative treatment.

3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.

4. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch in diameter.

5. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.

6. Guy Cables: Five-strand, 3/16-inch- diameter, galvanized-steel cable, with zinc-coated turnbuckles, a minimum of 3 inches long, with two 3/8-inch galvanized eyebolts.

7. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

B. Palm Bracing: Battens or blocks, struts, straps, and protective padding as indicated.

1. Battens or Blocks and Struts: Rough-sawn, sound, new hardwood, or softwood, free of knots, holes, cross grain, and other defects, 2-by-4-inch nominal by lengths indicated.

2. Straps: Adjustable steel or plastic package banding straps.

3. Padding: Burlap.

4. Proprietary Palm-Bracing Devices: Proprietary systems to secure each new planting by trunk; sized per manufacturer's written recommendations unless otherwise indicated.

2.08 MISCELLANEOUS PRODUCTS

A. Wood Pressure-Preservative Treatment: AWPA C2, with waterborne preservative for soil and freshwater use, acceptable to authorities having jurisdiction, and containing no arsenic; including ammoniacal copper arsenate, ammoniacal copper zinc arsenate, and chromated copper arsenate.

B. Root Barrier: Black, molded, modular panels manufactured with 50 percent recycled polyethylene plastic with ultraviolet inhibitors, 85 mils thick, with vertical root deflecting ribs protruding 3/4 inch out from panel, and each panel 24 inches wide. This should be used for all large canopy trees located less than 10 ft. from sidewalk or other pavements.

C. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

D. Burlap: Non-synthetic, biodegradable.

E. Planter Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.

F. Planter Filter Fabric: Woven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.

G. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb. of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb. of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

PART 3- EXECUTION

3.01 EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement,

plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.

3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.02 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

E. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.

1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.

F. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.03 PLANTING AREA ESTABLISHMENT

A. Loosen subgrade of planting areas to a minimum depth of 12 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off OWNER'S property.

1. Apply superphosphate fertilizer directly to subgrade before loosening.

2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.

b. Mix lime with dry soil before mixing fertilizer.

3. Spread planting soil to a depth of 12 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

C. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.04 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate at least 24 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.

2. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.

3. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.

4. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.

5. Maintain supervision of excavations during working hours.

6. Keep excavations covered or otherwise protected after working hours, and when unattended by Installer's personnel.

7. If drain tile is shown on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Subsoil and topsoil removed from excavations may be used as planting soil.

C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch- diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Drainage: Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.05 TREE, SHRUB AND VINE PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Use planting soil for backfill.

2. After placing some backfill around root ball to stabilize plant, carefully cut, and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.

3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.

4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.

5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Set container-grown stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Use planting soil for backfill.

2. Carefully remove root ball from container without damaging root ball or plant.

3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.

4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.

5. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.06 MECHANIZED TREE SPADE PLANTING

A. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.

B. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.

C. Cut exposed roots cleanly during transplanting operations.

D. Use the same tree spade to excavate the planting hole as was used to extract and transport the tree.

E. Plant trees as shown on Drawings, following procedures in "Tree, Shrub, and Vine Planting" Article.

F. Where possible, orient the tree in the same direction as in its original location.

3.07 TREE, SHRUB AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.

C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

3.08 TREE STABILIZATION

A. Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper as required per drawings. Use a minimum of three stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend to the dimension shown on Drawings above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.

2. Use three stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet high and up to 4 inches in caliper. Space stakes equally around trees.

3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Staking and Guying: Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated. Securely attach no fewer than three guys to stakes 30 inches long, driven to grade.

1. Site-Fabricated Staking-and-Guying Method:

a. For trees more than 6 inches in caliper, anchor guys to wood deadmen buried at least 36 inches below grade. Provide turnbuckle for each guy wire and tighten securely.

b. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.

c. Support trees with strands of cable or multiple strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.

d. Attach flags to each guy wire, 30 inches above finish grade.

e. Paint turnbuckles with luminescent white paint.

2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

C. Palm Bracing: Install bracing system at three or more places equally spaced around perimeter of trunk to secure each palm until established unless otherwise indicated.

1. Site-Fabricated Palm-Bracing Method:

a. Place battens over padding and secure battens in place around trunk perimeter with at least two straps, tightened to prevent displacement. Ensure that straps do not contact trunk.

b. Place diagonal braces and cut to length. Secure upper ends of diagonal braces with galvanized nails into battens or into nail-attached blocks on battens. Do not drive nails, screws, or other securing devices into palm trunk; do not penetrate palm trunk in any fashion. Secure lower ends of diagonal braces with stakes driven into ground to prevent outward slippage of braces.

2. Proprietary Palm-Bracing Device: Install palm-bracing system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.09 ROOT BARRIER INSTALLATION

A. Install root barrier where trees are planted within 10 feet of paving or other hardscape elements, such as walls, curbs, and walkways unless otherwise shown on Drawings.

B. Align root barrier vertically with bottom edge angled at 20 degrees away from the paving or other hardscape element and run it linearly along and adjacent to the paving or other hardscape elements to be protected from invasive roots.

C. Install root barrier continuously for a distance of 60 inches in each direction from the tree trunk, for a total distance of 10 feet per tree. If trees are spaced closer, use a single continuous piece of root barrier.

1. Position top of root barrier per manufacturer's recommendations.

2. Overlap root barrier a minimum of 12 inches at joints.

3. Do not distort or bend root barrier during construction activities.

4. Do not install root barrier surrounding the root ball of tree.

3.10 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated in even rows with triangular spacing.

B. Use planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.11 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees and Tree-like Shrubs in Turf Areas: Apply organic mulch ring of 2-inch average thickness, with 24-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.

2. Organic Mulch in Planting Areas: Apply 2-inch average thickness of organic mulch extending beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades.

3.12 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting, and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects

and disease.

B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated past management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.13 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with OWNER'S operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.14 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

C. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.15 DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off OWNER'S property.

[END OF SECTION 02930]

SECTION 15010

BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Special Conditions, apply to work of this section.

1.02 SUMMARY

This section specifies the basic requirements for mechanical installations. It expands and supplements the requirements specified in sections under “General Requirements.”

1.03 ACCESSIBILITY

A. The CONTRACTOR shall install equipment and materials to provide required access for servicing and maintenance.

B. The CONTRACTOR shall coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors.

C. The CONTRACTOR shall allow ample space for removal of all parts that require replacement or servicing.

D. The CONTRACTOR shall extend all grease fittings to an accessible location.

1.04 MECHANICAL INSTALLATIONS

A. The CONTRACTOR shall coordinate mechanical equipment and materials installation with other building components.

B. The CONTRACTOR shall verify all dimensions by field measurements.

C. The CONTRACTOR shall coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.

D. The CONTRACTOR shall sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work.

E. The CONTRACTOR shall install mechanical equipment to facilitate maintenance and repair or replacement of equipment components. As much

as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

F. The CONTRACTOR shall coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

1.05 MECHANICAL SUBMITTALS

A. Submittal of shop drawings, product data, and samples will be accepted only when submitted by the CONTRACTOR.

B. Data from subcontractors and material suppliers directly submitted to the Engineer will not be processed.

C. Five complete sets of all shop drawings and product data shall be submitted by the CONTRACTOR.

1.06 NAMEPLATE DATA

A. The CONTRACTOR shall provide permanent operational data nameplate on each item of power-operated mechanical equipment, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics labels of tested compliances, and similar essential data.

B. The CONTRACTOR shall locate nameplates in an accessible location.

PART 2 - PRODUCTS

2.01 DELIVERY, STORAGE, AND HANDLING

A. The CONTRACTOR shall deliver products to the project site that are properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications.

B. The CONTRACTOR shall adequately package and protect products to prevent damage during shipment, storage, and handling.

C. The CONTRACTOR shall store equipment and materials at the site unless off-site storage is authorized in writing.

D. The CONTRACTOR shall protect stored equipment and materials from damage.

PART 3 - EXECUTION

3.01 RECORD DOCUMENTS

The following paragraphs supplement the requirements in sections under “General Requirements.”

A. The CONTRACTOR shall mark Drawings to indicate revisions to:

1. Piping, size, and location both exterior and interior.

2. Actual equipment locations, dimensioned for column lines.

3. Actual inverts and locations of underground piping.

4. Concealed equipment, dimensioned to column lines.

5. Mains and branches of piping systems, with valves and control devices located and numbered

6. Concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.).

7. Concealed control system devices.

B. The CONTRACTOR shall mark Specifications to indicate approved substitutions, Change Orders, and actual equipment and materials used.

3.02 OPERATION AND MAINTENANCE DATA

Refer to Section 01705 (Project Closeout) for procedures and requirements for preparing and submitting operation and maintenance manuals.

A. The CONTRACTOR shall Include the following information:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.

2. Manufacturer’s printed operating procedures to include:

a. Start-up, break-in, routine, and normal operating instructions.

b. Regulation, control, stopping, shutdown, and emergency instructions.

c. Summer and winter operating instructions.

3. Maintenance procedures for:

   a. Troubleshooting and routine preventative maintenance.

   b. Disassembly, repair, and reassembly.

   c. Aligning and adjusting.

4. Servicing instructions and lubrication charts and schedules.

3.03 WARRANTIES

A. The CONTRACTOR shall compile and assemble the warranties into a separated set of vinyl covered, three-ring binders, tabulated and indexed for easy reference.

B. The CONTRACTOR shall provide for all products and equipment used on the project, complete warranty information including:

1. Date of beginning of warranty or bond.

2. Duration of warranty or bond.

3. Contact information (e.g., names, addresses, and telephone numbers) and procedures for filing a claim and obtaining warranty services.

[END OF SECTION 15010]

SECTION 15020

UNDERGROUND UTILITY PROTECTION

PART 1 -SCOPE

A. This section pertains to the protection of all existing underground utilities that exist within and adjacent to Work zones. “Paint Marks” or “Flags” as provided by Local One Call (811), or other utility locate services shall NOT be accepted as exact or definitive. It shall be the responsibility of the CONTRACTOR to physically verify all Paint Marks and/or Flags.

B. It shall be the responsibility of the CONTRACTOR to physically locate any and all existing utilities within and adjacent to the work zone prior to initiating work.

PART 2 - GENERAL

A. All utilities within 5 feet of the planned work zone MUST be found and visually located prior to the start of any excavation operations.

B. Potholing shall be performed to verify the location and depth of the existing utilities.

C. Backhoes, trenches, or other types of mechanical equipment shall not be used to find underground utilities within 5 feet of a planned installation.

D. At no time shall picks, round pointed shovels, or any other type of sharp tool be used for locating utilities.

E. Only square blunt non-sharp tools may be used for hand digging.

F. Vacuum Excavation shall be allowed with the use of high-pressure water (up to 4,000 psi) with an approved non-cutting nozzle. Zero-degree nozzles are not allowed.

G. Vacuum Excavation may also be allowed utilizing high pressure air (with dust containment system) or dry vacuum.

PART 3 - EXECUTION

A. The CONTRACTOR shall contact One Call (811) utility locate service (in writing) at least 48 hours in advance to order locates within and adjacent to the work zone.

B. The CONTRACTOR shall notify all other known utility companies (those not affiliated with One Call) at least 48 hours in advance to order locates within and adjacent to the work zone.

C. All utility crossings are to be exposed (using methods described in Part 2 above) prior to any excavation.

D. All existing utilities running parallel and within 10 feet of either side of the intended work shall be physically located.

E. CONTRACTOR shall not assume that utilities found will continue on the same line and grade.

F. Underground utility pothole spacing, and frequency shall be as follows:

1. Gas and electric lines within 25 feet of the work zone shall be potholed and marked every 25 feet to verify the line has not changed directions.
2. Gas and electric lines greater than 25 feet from the work zone shall be potholed at least once on each end of the limits of excavation.
3. Fiber-Optic lines shall be potholed every 25 feet within the work zone.
4. Telephone and cable television lines shall be potholed every 50 feet within the work zone.
5. Water, sewer, and reuse utilities (less than 8 inches in diameter) shall be potholed every 25 feet within the work zone.
6. Water, sewer, and reuse utilities (8 inches through 24 inches in diameter) shall be potholed every 50 feet within the work zone.
7. Water, sewer, and reuse utilities (greater than 24 inches in diameter) shall be potholed every 100 feet within the work zone.
8. At least two potholes shall be obtained for each utility within the work zone regardless of the size of the work zone.

G. Material returned to the inspection hole shall be compacted back in place.

H. All inspection holes shall be returned to original surface condition.

PART 3 – PERMITTING AND SAFETY

A. It shall be the responsibility of the CONTRACTOR to ensure that all applicable permits for underground work have been obtained prior to the commencement of work.

B. All work shall be performed by licensed underground Contractors.

C. The CONTRACTOR shall prepare and follow a written safety plan. This safety plan shall be provided to the permitting agency and shall be made available on-site.

D. Safety plan shall include a site map and show all known existing utilities and shut-off valves.

E. Shut-off valve handles (for all existing water, sewer, reuse, gas, and electric utilities) are to be in place through the duration of the work for immediate operation if needed.

[END OF SECTION 15020]

SECTION 15051

MECHANICAL RELATED WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Special Conditions, apply to Work of this section.

1.02 DESCRIPTION OF WORK

A. Extent of mechanical related work and work required by this section is indicated on drawings and/or specified in other sections of these Specifications.

B. The CONTRACTOR shall furnish all labor, material, and equipment, and the CONTRACTOR shall perform all operations required to satisfactorily and properly install, adjust, test and place into operation all equipment and system shown on the construction Drawings.

C. The CONTRACTOR shall submit submittal data and as-built drawings for each piece of equipment or installation.

1.03 EQUIPMENT INSTALLATION

A. The CONTRACTOR shall install all equipment and systems shown on the Drawings and/or specified herein in a workmanlike manner and in strict accordance with the Manufacturer’s recommendations.

B. The CONTRACTOR shall furnish and connect all required piping, electrical connections, and other necessary items to provide a complete operating facility.

1.04 EQUIPMENT TESTING AND ADJUSTING

A. The CONTRACTOR shall demonstrate that all equipment is operating in a satisfactory manner after installation.

B. The CONTRACTOR shall lubricate all equipment according to vendors’ recommendations and shall make all adjustments to suit anticipated operating conditions.

C. The CONTRACTOR shall test each piece of equipment to show that it operates quietly, without vibration, overheating, or signs of distress, at full specified capacity.

D. The CONTRACTOR shall make adjustments, as necessary.

E. The CONTRACTOR shall replace all defective parts of machinery, equipment, or materials.

F. The CONTRACTOR shall secure and submit to the ENGINEER, vendor's certificates detailing that the installation of equipment is in accordance with the Manufacturer's recommendations.

G. The CONTRACTOR shall submit to the ENGINEER five copies of all necessary manuals and instructions describing the proper operation and maintenance of each type of equipment furnished.

1.05 INSTALLATION SUPERVISION

A. The CONTRACTOR shall install, initially start up, and operate all equipment under the supervision of a factory-trained technical representative of the Manufacturer.

B. Manufacturer representative's services shall include instruction from the OWNER's operator in the operation, maintenance, and adjustment of the equipment.

C. The CONTRACTOR shall give the ENGINEER and OWNER's operator 48 hours' notice before start-up. Start-up shall not proceed without the presence of the ENGINEER.

1.06 EQUIPMENT REQUIREMENTS

The following requirements shall apply to equipment furnished in the Contracts:

A. Each piece of mechanical equipment and motors shall be provided with a substantial nameplate of non-corrodible metal, securely fastened in place, clearly and permanently inscribed with the Manufacturer's name, model or type designation, serial number, rated capacity, electrical or other power characteristics, and other appropriate nameplate data.

B. All equipment shall be delivered fully lubricated with oil and/or grease insofar as possible. If any point cannot be so serviced, it shall be clearly marked to the effect that it is not lubricated and requires servicing prior to operation. An adequate supply of the proper lubricant, with instructions for its application, shall be supplied with the equipment for each point not lubricated prior to shipment. The CONTRACTOR shall also provide the OWNER with a

sufficient amount of proper lubricants for one complete change of lubricant for all equipment furnished.

C. All factory-painted equipment shall be provided with 2 pints of touch up paint to match original finish along with instructions for application.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

[END OF SECTION 15051]

SECTION 15061

DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals required to install ductile-iron pipe and fittings complete, tested, and ready for use, as shown on the Drawings and/or as specified herein.

B. Omission of a specific item or component obviously necessary for the proper function of the system shall not relieve the CONTRACTOR from the responsibility of supplying that specific item or component at no additional expense to the OWNER.

1.02 SUBMITTALS

A. The CONTRACTOR shall submit to the ENGINEER, within 20 calendar days after receipt of Notice to Proceed, a list of materials to be furnished, and the names of the suppliers and the date of delivery of materials to the site.

B. The CONTRACTOR shall submit shop drawings to the ENGINEER for review in accordance with Section 01300, showing the complete laying plan of all pipes, including all fittings, adapters, valves, and specials along with the Manufacturer’s drawings and specifications indicating complete details of all items.

C. The CONTRACTOR shall include a pipe class-laying schedule with pipe details, which specifies pipe class, class coding, joints, station limits, and transition stations, and a list of abbreviated terms with their full meaning.

D. The CONTRACTOR shall provide details of fittings to be furnished.

E. The CONTRACTOR shall submit the above referenced to the ENGINEER for approval before fabrication and shipment of these items.

F. The CONTRACTOR shall verify that locations of all pipes conform to the locations indicated on the Drawings. In most cases, a certain amount of flexibility in the positioning of pipes will be allowed.

G. Horizontal and vertical deflections may require beveled, special deflection; or short pipes.

H. The deflections at joints shall not exceed 75 percent of that recommended by the Manufacturer.

I. The CONTRACTOR shall furnish in duplicate to the ENGINEER, prior to each shipment of pipe, Manufacturer certifications and certified test reports that the pipe and linings and coating for this contract was manufactured and tested in accordance with the American Society of Testing and Materials (ASTM) and American National Standards Institute (ANSI)/American Water Works Association (AWWA) Standards specified herein.

1.03 QUALIFICATIONS

A. All ductile-iron pipe and fittings shall be furnished by Manufacturer's who are fully experienced, reputable, and qualified in the manufacturing of the material to be furnished.

B. The pipe and fittings shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these specifications.

1.04 QUALITY ASSURANCE

A. The OWNER may provide an independent testing laboratory to conduct inspections at the foundry for compliance with these specifications for all ductile-iron pipe and fittings installed under this contract. All ductile-iron pipe and fittings shall be from a single Manufacturer.

B. The CONTRACTOR shall require the Manufacturer's cooperation in these inspections.

C. The OWNER will be responsible for any cost associated with the foundry inspections of all pipe approved for this contract.

D. The ENGINEER or other representatives of the OWNER will also inspect the pipe after delivery.

E. The pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job.

F. Each joint of ductile-iron pipe shall be hydrostatically tested at the point of manufacture to 500 pounds per square inch (psi) for duration of at least 10 seconds. Testing may be performed prior to machining bell and spigot.

Failure of ductile-iron pipe shall be defined as any rupture of pipe wall. Certified test certificates shall be furnished in duplicate to the ENGINEER prior to time of shipment.

1.05 CONNECTION TO EXISTING LINES

A. Lines installed under other Contracts, to which piping of this Contract must connect the following work shall be performed:

1. Removing the temporary or permanent plug provided in the pipe installed under another Contract (if any).

2. Furnishing and installing piping and accessories and making proper connections.

B. For connections to existing lines to which the piping of this Contract must connect, the following work shall be performed:

1. Expose buried lines to confirm or determine end connection, pipe material, and diameter.

2. Furnish and install appropriate piping and make proper connections.

PART 2 - PRODUCTS

2.01 MATERIALS

A. The CONTRACTOR shall use the following project specific pressure classes of ductile-iron pipe for sizes shown:

Pipe and Fitting Sizes	Pressure Class
12”	350
20”	250
24”	200
30”	150
36”	150

B. Ductile-iron pipe and fittings 3-inches through 54-inches for buried service shall meet the following requirements:

1. Ductile-iron pipe shall conform to ANSI A21.51 and AWWA C-151. Ductile-iron pipe shall have a minimum tensile strength of 60,000 psi with minimum yield strength of 42,000 psi and a minimum elongation of 10 percent. Type of bedding conditions used shall be as shown on the Drawings.

2. Unrestrained joint pipe shall be supplied in lengths not in excess of 21 feet. Unrestrained joint pipe shall be the push-on joint pipe. Unrestrained joint pipes for pipe sizes 36 inches and less shall be American Ductile Iron Fastite® or ENGINEER-approved equal.

3. Unrestrained fittings shall meet the requirements of AWWA C-110. Rubber gaskets shall conform to ANSI A21.11 for all joints. Mechanical joint fittings and restrained joint pipe shall be furnished with sufficient quantities of accessories as required for each joint.

4. Restrained joint fittings where shown or specified shall be manufactured in accordance with the requirements of ANSI/AWWA C151/A21.51, C110/A21.10, and C111/A21.11.

5. Push-on joints for such pipe shall be in accordance with ANSI/AWWA C111/A21.11.

6. Pipe thickness shall be designed in accordance with ANSI/AWWA C150/A21.50 and C151/A21.51.

7. Restrained joint fittings shall be ductile iron in accordance with applicable requirements of ANSI/AWWA C110/A21.10.

8. Mechanical joints for such fittings shall be in accordance with ANSI/AWWA C110/A21.10 and C111/A21.11.

9. Restrained joints, where shown or specified, shall be designed to withstand vertical and longitudinal forces and be capable of holding against withdrawal with no axial movement resulting from an internal hydrostatic pressure of 120 psi for the raw sewage force mains and 150 psi for reclaimed water irrigation mains and potable water mains.

10. Restrained pipe joints that achieve restraint by incorporating cut out sections in the wall of the pipe shall have a minimum wall thickness at the point of cut out that corresponds with the minimum specified wall thickness for the rest of the pipe.

11. Restrained joints shall be suitable for 120 or 150 psi working pressure for purpose as specified above and fabricated of heavy section ductile-iron casting. Gaskets shall meet the material requirements of ANSI/AWWA C111.

12. Restrained joint pipe and fittings shall be the push-on joint pipe.

13. Restrained joint pipes and fittings for pipe size 30 inches and less

shall be American Ductile Iron Fastite® with Fast-Grip Gasket® or ENGINEER- approved equal.

14. Restrained joint pipe and fittings for pipe size 36 inches and larger shall be American Ductile Iron Flex-Ring® or ENGINEER-approved equal.

15. The minimum number of restrained joints required for resisting forces at fittings and changes in direction of pipe shall be determined from the length of restrained pipe on each side of fittings and changes in direction necessary to develop adequate resisting friction with the soil as shown on the Drawings.

16. All buried service pipe and fittings 12 inches and greater shall be ductile iron. Unless specified differently on the Drawings, all buried service pipe shall have single gasket, compression push-on type line joints.

17. All buried fittings shall be mechanical joint.

18. All fittings shall be mechanically restrained with Fast-Grip®, Flex Ring®, or Megalug Series 1100 or ENGINEER-approved equal.

19. Ductile-iron fittings, valves, and other appurtenances shall not be wrapped with polyethylene film.

20. Adapters to connect ductile-iron fittings to pipe or fittings of dissimilar materials shall be supplied by the CONTRACTOR in accordance with the pipe Manufacturer recommendations and as approved by the ENGINEER.

21. Pipe outlets where shown shall be made with tees, tapping saddles, or factory welded-on bosses for aboveground piping. Bosses shall be ductile iron, factory welded on ductile-iron pipe having a minimum Pressure Class 350 for 6- to 12-inch sizes, Pressure Class 250 for 16- to 36-inch sizes, and Pressure Class 150 for 42- to 48-inch sizes.

22. The CONTRACTOR may supply short body ductile iron fittings in conformance with AWWA C153 in lieu of C110 and C111 for 3- through 36-inch sizes.

23. All fittings shall be cast and machined at one foundry location to assure quality control and test data. The standard grade of iron shall be 70-50-05. Analyses of the ductile iron shall be made with the chemical limits set in this standard (C110 and/or C153).

Results of chemical analyses shall be provided to the ENGINEER as part of the Shop Drawings.

C. Ductile iron pipe and fittings 3- through 54-inches for aboveground service or in below ground concrete pits shall meet the following requirements:

1. All aboveground ductile-iron pipes shall be flanged. Ductile-iron pipe shall conform to ANSI A21.51 and AWWA C-151.

2. Flanged ductile-iron pipe shall conform to current AWWA/ANSI Specification C115/A21.15 and C110/A21.10 with factory-applied screwed long hub flanges except as otherwise specified hereinafter. Flanges shall be fully machined faced and drilled after being screwed tight on the pipe, with flanges true to 90 degrees with the pipe axis and shall be flush with end of pipe conforming to ANSI B161.1, 125-pound standard or Class 250, for the purpose intended. No welding of flanges or accessories in the field will be acceptable.

3. Pipe for use with split-type flexible coupling joints shall have radius grooved ends.

4. Wall sleeves with integral water stops or wall pipe casings with integral thrust collars shall be continuously welded on each side of the waterstop or thrust collar and shall be of the sizes and types as shown on the Drawings.

5. Wall sleeves, where specified, shall be fabricated of Schedule 40 Type 304 stainless steel or polyvinyl chloride (PVC) and shall have integral water stops continuously welded on each side of the waterstop.

6. Seal strips for wall sleeves, where required on the Drawings, shall be Link Seal as manufactured by Thunderline Corp., Wayne, Michigan, or equal.

7. Full-face type 1/16-inch-thick red rubber ring gaskets shall conform to ANSI A21.11. Ring gaskets shall be of approved composition suitable for the required service.

8. Pipe and fittings exposed to view in the finished work and to be painted in accordance with Section 09902 shall not receive the standard tar or asphalt coat on the outside surfaces but shall be shop primed on the outside with one coat of Kop Coat No. 622 Rust Inhibitive Primer or equal. Should portions of the pipe inadvertently be given the outside bituminous coating instead of the rust inhibitive

primer as required for exposed piping, the surfaces shall be sealed with a non-bleeding sealer coat such as Kop Coat Tar Stop, Mobil Anti-Bleeding Aluminum Sealer or Aqua Lock Glidden. Sealing shall be a part of the work of this section.

9. Bolts and nuts on flanged pipe and fittings shall be low-alloy, high-strength steel equal to "Corten," conforming to ANSI A21.11 and A21.15 or 304 stainless steel and shall be drilled to match ANSI B16.1 Class 125 or 250 flanges for the purpose intended.

2.02 LINING AND COATINGS

A. All pipe and fittings for potable water service and reclaimed water irrigation reuse mains shall have a cement mortar lining and a bituminous seal coat on the inside in accordance with ANSI A21.4 and be coated on the exterior with a 1-2 mils thick bituminous coat in accordance with ANSI A21.51.

B. All ductile-iron pipe and fittings for wastewater service (including but not limited to raw sewage lines, all process lines, and reject water lines) including pressure and gravity mains, unless otherwise noted, shall have a ceramic epoxy lining on the interior and bituminous coating on the exterior except for 6 inches back from the spigot end. The bituminous coating shall not be applied to the first 6 inches of the exterior of the spigot ends. All pipe and fittings shall be delivered to the application facility without asphalt, cement lining, or any other lining on the interior surface. Because removal of old linings may not be possible, the intent of this specification is that the entire interior of the pipe and fittings shall be as cast without ever having been lined with any substance prior to the application of the specified lining. Any pipe or fittings furnished for this project must not have been lined prior to the awarding of the contract for this project.

1. Lining Material:

The material used for the lining shall be a two-component amine cured epoxy of at least 87 percent solids. Protecto 401 by Vulcan Painters, Birmingham, Alabama or Permite 9043, Type II Glass Filled Epoxy by Permite Corporation, Atlanta, Georgia are the Standards of Quality.

The following test requirements shall be certified by the material supplier, and a history of satisfactory performance for the material in the service required and upon the surface specified shall be submitted. The following are the minimum requirements to be met:

a. A permeability rating of zero permeance when a film of at

least 40 mils is tested according to ASTM D1653 or a permeability rating of 0.0 perms when measured using Method A of ASTM E66 procedure A with a test duration of 42 days.

b. The material shall contain at least 20 percent by volume of ceramic quartz pigment in the dried film.

c. The following test must be run on ductile iron panels with the results certified by the lining material supplier of the material being submitted.

Test		Rating/Method
1.	Direct Impact	ASTM D-2794
2.	3% Sulfuric Acid Immersion @ 120/F	ASTM D-714
3	25% Sodium Hydroxide Immersion @ 140/ F	ASTM D-714
4.	Deionized Water Immersion @ 160/ F	ASTM D-714
5.	Moisture and Ultraviolet Light Cycle 8 hours light 4 hours 100% humidity	ASTM G-5377

2. Application of Lining - The lining shall be applied by a competent firm with at least a 5-year history of applying linings to the interior of ductile pipe and fittings.

a. Surface Preparation:

1) Prior to abrasive blasting the entire area which will receive the protective compound shall be inspected for oil, grease, etc.

2) Any areas where oil, grease, or any substance that can be removed by solvent is present, it shall be solvent cleaned using the guidelines outlined in SSPC-SP-1 Solvent Cleaning.

3) After the surface has been made free of grease, oil, or other substances, all areas that are to receive the protective compounds shall be abrasive blasted using compressed air nozzles with sand or grit abrasive media.

4) The blast media shall strike 100 percent of the surface area at sufficient force to remove rust and oxides.

5) The entire surface to be lined shall be struck with the blast media so that all rust, loose, oxides, etc., are removed from the surface.

6) Only slight stains and specks of tightly adhering oxides may be left on the surface. Any area where rust appears before coating must be reblasted to remove all rust.

b. Lining:

1) After surface preparation and within 8 hours of surface preparation of the barrel of the pipe from the inside shoulder of the gasket groove to the end of the interior spigot shall receive a minimum coating of 40 mils dry film thickness of the protective lining.

2) If flange fittings or pipe are included in the project the linings must not be used on the face of the flange; however, full-face gaskets must be used to protect the ends of the pipe.

3) All fittings shall be lined with a minimum of 40 mils of the protective lining.

4) Push-on type fittings shall be lined from the gasket groove to the gasket groove.

5) The 40 mils system shall not be applied in the gasket grooves.

c. Coating of Gasket Groove and Spigot Ends:

1) Due to the tolerances involved, the gasket groove and spigot end up to 6 inches back from the end of the spigot end must be coated with a minimum of 10 mils dry of Protecto Joint Compound.

2) This coating shall be applied by brush to ensure coverage.

3) Care should be taken that the coating is smooth without excess buildup in the gasket groove or on the

spigot end.

4) All materials for the gasket groove and spigot end shall be applied after the application of the lining.

d. Number of Coats:

1) The number of coats of lining material applied shall be as recommended by the lining Manufacturer. However, in no case shall the material be applied above the dry thickness per coat recommended by the lining Manufacturer in printed literature.

2) The time between coats shall never exceed that time recommended by the lining material Manufacturer. If at any time the lining must be recoated beyond the lining material Manufacturer's recommended recoat time, the surface of the existing lining shall be roughened sufficiently to prevent delamination between coats.

3. Inspection:

a. All pipe shall be checked for thickness using a magnetic film thickness gauge. The thickness testing shall be done using the method outlined in SSPC-PA-2 film thickness testing.

b. The barrel of all pipe and fittings shall be pinhole detected with a nondestructive 2,500-volt pinhole test.

c. Each pipe joint and fitting shall be marked with the date of application of the lining system and with its numerical sequence of application on that date.

4. Certification: The pipe or fitting Manufacturer must supply a certificate attesting to the fact that:

a. The Applicator met the requirements of this specification.

b. The material used was as specified.

c. The material was applied as required by the specification.

5. Repair: All pinholes and damaged lined areas shall be repaired in accordance with written repair procedure furnished by the Manufacturer of the lining material so that the repaired area is equal in performance to the undamaged lined areas.

6. The exterior of the pipe shall receive a bituminous coating approximately 1-2 mils thick in accordance with ANSI A21.51.

7. Pipe and fittings exposed to view in the finished work shall not receive the standard tar or asphalt coat on the outside surfaces but shall be shop primed on the outside with one coat of Kop Coat No. 622 Rust Inhibitive Primer or equal.

8. Should portions of the pipe inadvertently be given the outside coating of coal tar enamel instead of the rust inhibitive primer as required for exposed piping, the surfaces shall be sealed with a non-bleeding sealer coat such as Kop Coat Tar Stop, Mobil Anti- Bleeding Aluminum Sealer, or equal. Sealing shall be a part of the work of this section.

2.03 IDENTIFICATION

A. Each length of pipe and each fitting shall be marked with the name of the Manufacturer, size, and class. All gaskets shall be marked with the name of the Manufacturer, size, and proper insertion directions.

B. All aboveground piping and fittings shall be completely primed and painted in accordance with the below color code.

C. All below ground ductile iron pipe and fittings shall have an identification color code.

1. Raw sewage force mains and gravity sewer pipe - Green, similar to Kop Coat, No. 0336.

2. Reclaimed water irrigation reuse mains and service tubing - Purple, similar to Pantone 522C.

3. Potable water mains and service tubing - Blue, similar to Kop Coat No. 8155.

D. All buried ductile-iron pipe shall be painted along its entire length with 2-inch stripes on at least three-quarter points for pipe sizes 12 inches and larger. For pipe sizes smaller than 12 inches, a single 2-inch-wide stripe along the top of the pipe shall be provided. Paint and marking tape colors shall be as described above.

E. The CONTRACTOR shall install, 12 inches above the ductile-iron pipe, a 3-inch-wide detector tape running the length of the pipe (color as described above).

2.04 FUTURE STRUCTURE AND MANHOLE CONNECTIONS

A. Pipe stubs for all future manhole or pipe connections shall not be less than 24 inches in length. Watertight plugs or caps shall be furnished.

PART 3 - EXECUTION

3.01 INSTALLING DUCTILE IRON PIPE AND FITTINGS

A. All water, sewer, and reclaimed water mains shall be installed in accordance with recommendations of the pipe Manufacturer and as specified herein.

B. All pipe deflection or bends deflected more than 6% shall be restrained in accordance with the Restrained Pipe Joint Table. All fittings and valves shall be restrained in accordance with the Restrained Pipe Joint Table. See detail sheet.

C. Care shall be taken in the handling, storage, and installation of pipe and fittings to prevent injury to the pipe or coatings. All pipe and fittings shall be examined before installing, and no pipe shall be installed which is found to be defective. Pipe or fittings shall not be dropped. All damage to the pipe coatings shall be repaired according to the Manufacturer's recommendations.

D. All pipe and fittings shall be kept clean and shall be thoroughly cleaned before installation.

E. Pipe shall be laid to the lines and grades shown on the Drawings with bedding and backfill as shown on the Drawings and as specified in Section 02222. Blocking under the pipe will not be permitted.

F. All pipe and fittings shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work, and when laid, shall conform to the lines and grades required.

Ductile-iron pipe and fittings shall be installed in accordance with requirements of AWWA Standard Specification C600 except as otherwise provided herein.

A firm, even bearing throughout the length of the pipe shall be constructed by tamping FDOT No. 89 stone at the sides of the pipe up to 6 inches over the top of the pipe, and then an additional 6 inches of selected material for a total of 12 inches over the top of the pipe. Blocking will not be permitted. If any defective pipe is discovered after it has been laid, it shall be removed and replaced with a sound pipe in a satisfactory manner by the CONTRACTOR, at his own expense.

G. When installation is not in progress, including lunchtime, or the potential

exists for dirt of debris to enter the pipe, the open ends of the pipe shall be closed with watertight plugs or other approved means.

H. Under no circumstances shall the pipe or accessories be dropped into the trench.

I. All plugs, caps, bends, and other locations where unbalanced forces exist shall be anchored by restrained joints. The length of pipe for which restrained joints shall be used are shown on the Drawings.

J. In all cases where ductile iron pipe is installed, a marking tape shall be located above the top of the pipe.

K. When cutting pipe is required, the cutting shall be done by machine, leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be jointed with a bell shall be beveled to conform to the manufactured spigot end. Cement lining shall be undamaged.

3.02 PUSH-ON JOINTS

A. Push-on joints shall be made in accordance with the Manufacturer's instructions.

B. Pipe shall be laid with bell ends looking ahead.

C. A rubber gasket shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated.

D. The plain end of the pipe to be laid shall then be aligned and inserted in the bell of the pipe to which it is to be joined, and pushed home with a jack or by other means.

E. After joining the pipe, a metal feeler shall be used to make certain that the rubber gasket is correctly located.

3.03 FLANGED JOINTS

A. Flanged joints shall be installed where shown on the Drawings.

B. Extreme care shall be exercised to insure that there is no restraint on opposite ends of pipe or fitting which will prevent uniform gasket compression, cause unnecessary stress, bending or torsional strains to flanges or flanged fittings.

C. Adjoining push-on joints shall not be assembled until flanged joints have been tightened. Bolts shall be tightened alternately and evenly.

D. After installation apply a bitumastic coating to bolts and nuts.

3.04 RESTRAINED JOINTS

A. Restrained joints shall be installed in accordance with the Restrained Pipe Joint Table. See detail sheet.

B. Restrained joints shall be installed at all fittings, bends deflected more than 6 degrees and valves as shown on the Drawings and specified herein.

C. The joint assemblies for pipe sizes 30 inches and smaller shall be Fastite® Joint with Fast-Grip® Gasket by American Pipe Co. or ENGINEER approved equal.

D. The joint assemblies for pipe sizes 36 inches shall be Flex-Ring® Joint by American Pipe Co. or ENGINEER approved equal.

E. Restrained joints shall be installed in accordance with the Manufacturer's recommendations.

3.05 SLEEVE TYPE COUPLINGS

A. Couplings shall be installed where shown.

B. Couplings shall not be assembled until adjoining push-on joints have been assembled.

C. After installation, apply a heavy bitumastic coating to all bolts, nuts, and accessories.

3.06 TESTING (PRESSURE PIPING)

A. All pressure mains shall be field-tested.

B. Hydrostatic pressure and leakage tests shall conform with Section 4 of AWWA C600 Specification with the exception that the CONTRACTOR shall furnish all gauges, meters, pressure pumps and other equipment needed to test the line.

C. The pressure required for the field hydrostatic pressure test shall be 100 psi for the raw sewage lift/pump stations and force mains and 150 psi for potable water mains and reclaimed water irrigation mains, unless otherwise noted.

D. The CONTRACTOR shall provide temporary plugs and blocking necessary to maintain the required test pressure. Fill line slowly with water. Maintain flow velocity of less than 2.0 feet per second.

E. Corporation cocks at least 1 inch in diameter, pipe riser and angle globe valves shall be provided at each pipe dead-end in order to bleed air from the line. Duration of pressure test shall be at least 2 hours. The cost of these items shall be included as a part of testing.

F. The leakage test shall be a separate test at the maximum operating pressure as determined by the ENGINEER following the pressure test and shall be of not less than 2 hours duration.

G. All leaks evident at the surface shall be repaired and leakage eliminated regardless of total leakage as shown by test.

H. Lines which fail to meet tests shall be repaired and retested as necessary until test requirements are complied with.

I. Defective materials, pipes, valves, and accessories shall be removed and replaced.

J. The pipe lines shall be tested in such sections as may be approved by the ENGINEER by shutting valves or installing temporary plugs as required.

K. The line shall be filled with water and all air removed and the test pressure shall be maintained in the pipe for the entire test period by means of a force pump to be furnished by the CONTRACTOR.

L. Accurate means shall be provided for measuring the water required to maintain this pressure. The amount of water required is a measure of the leakage.

M. The amount of leakage which will be permitted shall be in accordance with AWWA C600 Standards for all pressure. No pipe installation shall be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133{,}200}$$

N. In which L is the allowable leakage in gallons per hour; S is the length of pipe 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.

O. The CONTRACTOR must submit his plan for testing to the ENGINEER for review at least 10 days before starting the test.

P. The CONTRACTOR shall remove and adequately dispose of all blocking material and equipment after completion and acceptance of the field hydrostatic test, unless otherwise approved by the ENGINEER. Any damage to the pipe coating shall be repaired by the CONTRACTOR. Lines shall be totally free and clean prior to final acceptance.

3.07 CHLORINATION OF POTABLE PIPELINES

A. Before being placed in service, all new potable water pipelines and reclaimed water irrigation mains including service connections and accessories shall be chlorinated using the continuous feed method specified in AWWA C651 “Standard Procedure for Disinfecting Water Mains.” The procedure shall be approved by the ENGINEER in advance.

B. The location of the chlorination and sampling points shall be determined by the ENGINEER in the field. Taps for chlorination and sampling shall be installed by the CONTRACTOR. The CONTRACTOR shall uncover and backfill the taps as required.

C. The general procedure for chlorination shall be first to flush all dirty or discolored water from the lines, and then introduce chlorine in approved dosages through a tap at one end, while water is being withdrawn at the other end of the line. The chlorine solution shall remain in the pipeline for about 24 hours.

D. Following the chlorination period, all treated water shall be flushed from the lines at their extremities, and replaced and water from the distribution system. All treated water flushed from the lines shall be disposed of by discharging to the nearest sanitary sewer or by other approved means. No discharge to any storm sewer or natural water course will be allowed.

E. Bacteriological sampling and analysis of the replacement water shall then be made by the ENGINEER in full accordance with AWWA Specification C651.

F. The CONTRACTOR will be required to rechlorinate, if necessary. The line shall not be placed in service until the requirements of the State of Florida Department of Health (DOH) and the jurisdictional County Public Health Department are met.

G. Special disinfecting procedures shall be used in connections to existing mains and where the method outlined above is not practical.

H. The CONTRACTOR shall make all arrangements necessary with the jurisdictional County Health Department for examination of water samples from disinfected water mains.

I. These samples shall be examined for compliance with DOH requirements.

J. Sampling shall be made daily and continuously until two successive examinations are found satisfactory.

K. Should three examinations be found unsatisfactory, the line shall be flushed and disinfected again.

L. The cost of all sampling, flushing, and disinfecting shall be included in the contract price and no additional charge shall be made to the OWNER for this work.

M. The complete disinfection program and methods followed, especially if materially different from those specified, shall be in accordance with directives of the Florida Department of Environmental Protection (FDEP) and all methods employed shall have their approval.

N. Definite instructions as to the collection and shipment of the samples shall be requested from the FDEP and shall be followed in all respects.

O. Final approval of the bacterial samples shall be received from the FDEP prior to the time that the system is placed into operation.

P. The cost for all flushing, disinfecting, and testing shall be borne by the CONTRACTOR.

3.08 FLUSHING

A. After the mains have been laid and pressure tested, each run of pipe shall be thoroughly flushed so as to remove all debris and foreign matter from the lines.

B. Flushing will ordinarily be done by opening fire hydrants or blowoffs along the pipe line.

C. Where fire hydrants or blowoffs are not available or are of insufficient capacity to permit adequate flushing, the pipe line shall be opened and flumes or piping shall be provided by the CONTRACTOR to waste the water to the nearest approved disposal point.

D. A minimum volume of water equal to six times the volume of the main shall be used to flush the mains.

E. The water shall be introduced into the mains to produce a velocity of not less than 3-feet per second, and this rate of flow shall be continued until the discharge is clear and no evidence of silt or foreign matter is visible.

3.09 CLEANING

A. At the conclusion of the work the CONTRACTOR shall thoroughly clean all of the new pipelines by flushing with water and pigged to remove all dirt, stones, pieces of wood, or other material which may have entered during the construction period.

B. Debris cleaned from the lines shall be removed from the job site. If, after this cleaning, any obstructions remain, they shall be removed.

C. After the pipelines are cleaned and if the groundwater level is above the pipe, or following a heavy rain, the ENGINEER will examine the pipe for leaks.

D. If defective pipes or joints are discovered at this time, they shall be repaired or replaced by the CONTRACTOR.

[END OF SECTION 15061]

SECTION 15062

POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals required and install in the locations as shown on the Drawings.

B. The CONTRACTOR shall install the plastic piping, fittings, and appurtenances (as specified herein) as shown on the Drawings.

1.02 DESCRIPTION OF SYSTEM:

The CONTRACTOR shall install the piping in the locations as shown on the Drawings.

1.03 QUALIFICATIONS:

A. All plastic pipe, fittings and appurtenances shall be furnished by a single Manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished.

B. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these Specifications.

1.04 SUBMITTALS:

A. The CONTRACTOR shall submit Shop Drawings that include dimensions and technical specifications for all piping to the ENGINEER.

B. The CONTRACTOR shall submit samples of all materials specified herein to the ENGINEER.

C. The CONTRACTOR shall submit and shall comply with pipe Manufacturer’s recommendation for handling, storing, and installing pipe and fittings.

D. The CONTRACTOR shall submit pipe Manufacturer’s certification of compliance with these Specifications.

1.05 TOOLS:

The CONTRACTOR shall furnish special tools, solvents, lubricants, and caulking compounds required for normal installation with the pipe.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Polyvinyl Chloride (PVC) Pipe:

1. Pressure PVC pipe and accessories 3 inches and smaller in diameter, where shown or as specified in the Drawings, shall meet the requirements of American Society for Testing and Materials (ASTM) D2241 “Polyvinyl Chloride (PVC) Pressure Pipe,” and shall be SDR 21, rated pressure of 200 pounds per square inch.

2. PVC Pipe 4 to 8 inches in diameter shall meet the requirements of American Water Works Association (AWWA) Specifications C900 “Polyvinyl Chloride (PVC) Pressure Pipe,” and shall be DR18 (Pressure Class 235).

3. PVC Pipe 10 and 12 inches shall meet the requirements of AWWA C900 and shall be DR25 (Pressure Class 165).

4. AWWA C900 DR18 (Pressure Class 235) pipe shall be required for all PVC fire lines downstream of any check valve.

5. PVC Pipe greater than 12 inches shall meet the requirements of AWWA C905 and shall be DR25 (Pressure Class 165).

6. Provisions shall be made for expansion and contraction at each joint with an elastomeric ring, and shall have an integral thickened bell as part of each joint.

7. PVC pipe shall be installed as recommended by the Manufacturer.

8. Pipe shall be furnished in nominal lengths of approximately 20 feet, unless otherwise directed by the ENGINEER.

9. Pipe and accessories shall bear the NSF mark indicating pipe size, Manufacturer’s name(s), AWWA and/or ASTM Specification Number, working pressure, and production code.

10. Pipe shall be blue for potable water service, green for sewage force main service, and purple for reclaimed water mains (Pantone 522C).

11. All potable water pipe shall be NSF certified and copies of lab certification shall be submitted to the ENGINEER.

B. Joints:

1. The PVC joints for pipe shall be of the push-on type unless otherwise directed by the ENGINEER so that the pipe and fittings may be connected on the job without the use of solvent cement or any special equipment.

2. The push-on joint shall be a single rubber gasket joint designed to be assembled by the positioning of a continuous, molded rubber ring gasket in annular recess in the pipe or fitting socket and the forcing of the plain end of the entering pipe into the socket; thereby, compressing the gasket radially to the pipe to form a positive seal.

3. The gasket and annular recess shall be designed and shaped so that the gasket is locked in place against displacement as the joint is assembled.

4. The rubber ring joint shall be designed for thermal expansion or contraction with a total temperature change of at least 750 degrees Fahrenheit (F) in each joint per length of pipe.

5. The bell shall consist of an integral wall section with a solid cross section elastomeric ring which shall meet requirements of ASTM F-477.

6. The thickened bell section shall be designed to be at least as strong as the pipe wall.

7. Lubricant furnished for lubricating joints shall be nontoxic, shall not support the growth of bacteria, shall not have deteriorating effects on the gasket or pipe material, and shall not impart color, taste, or odor to the water.

C. Fittings and Specials:

1. All fittings for PVC pipe shall be cast iron/ductile iron with mechanical joints and shall conform to the specifications for cast iron/ductile iron fittings, unless otherwise directed by the ENGINEER. PVC C-900 fittings are allowable upon approval by the ENGINEER and required for sewage force main applications. DR ratio shall be the same as the pipe.

2. Fittings for Schedule 80 PVC pipe less than 3 inches in diameter

shall be threaded and be PVC as shown on the Drawings, or as directed by the ENGINEER. Threaded PVC fittings shall conform to ASTM Specification D2464-69.

3. The Manufacturer of the pipe shall supply all PVC accessories as well as any adaptors and/or specials required to perform the Work as shown on the Drawings and specified herein.

4. Standard double bell couplings will not be accepted where the pipe will slip completely through the coupling.

2.02 COPPER LOCATION WIRE:

A. The CONTRACTOR shall install all piping (including service lines) with underground 12-gauge thermoplastic high heat-resistant nylon (THHN) insulated traceable copper wire.

B. The CONTRACTOR shall lay the insulated copper wire in the pipe trench 3 to 6 inches above the sewer force mains and shall be a continuous strand from valve box to valve box, wrapped two times around each valve and extended 24 inches inside each valve box to enable location devices to be attached without digging up the valve box.

C. The CONTRACTOR shall insulate all wire splices.

D. The CONTRACTOR shall backfill the trench following placement of the traceable wire with due caution to prevent displacement or damage to wire.

E. The CONTRACTOR shall perform a detection test after insulation and backfill have been completed in the ENGINEER’s presence using a commercially available pipe detector furnished by the CONTRACTOR.

F. The CONTRACTOR shall replace any undetectable wire to the satisfaction of the ENGINEER at no additional expense to the OWNER.

PART 3 - EXECUTION

3.01 STORAGE/INSTALLATION:

A. The CONTRACTOR shall be in strict accordance with the Manufacturer’s technical data and printed instruction for the storage and installation of plastic pipe.

B. The CONTRACTOR shall cover all plastic pipe to prevent fading.

C. The OWNER reserves the right to reject any pipe not properly stored or pipe that has faded.

3.02 INSPECTION AND TESTING:

A. The CONTRACTOR shall not disturb all pipelines for 24 hours to develop complete strength at all joints.

B. General:

1. Provide temporary equipment for testing, including pump and gauges.

2. Test piping system before insulation is installed (wherever feasible) and remove control devices before testing.

3. Expel air from the pipe before applying the specified test pressure.

4. Make taps (if necessary) at points of highest elevation, and afterwards tightly plugged.

5. Test each natural section of each piping system independently but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating.

6. Fill each section with water and subject to a hydrostatic pressure equal to the pressure rating of the pipe being tested.

C. The CONTRACTOR shall test for the required 2-hour period.

D. The CONTRACTOR shall test pipe at 150 pounds per square inch (psi), except where fittings are lower class or pressure rating.

1. Pressure Sewer Permissible leakage (2.2 gallons/1,000 feet/24 hours/inch diameter):

Inches	gallons/1,000 feet/24 Hours	gallons/1,000 feet/1 Hours
2”	4.4 gal.	0.19 gal.
3”	6.6 gal.	0.28 gal.
4”	8.8 gal.	0.37 gal.
6”	13.2 gal.	0.55 gal.
8”	17.8 gal.	0.74 gal.
10”	22.0 gal.	0.92 gal.
12”	26.4 gal.	1.10 gal.
14”	30.8 gal.	1.29 gal.
16”	35.2 gal.	1.47 gal.
18”	39.6 gal.	1.66 gal.

2. Water System Permissible Leakage:

Inches	gallons/1,000 feet/24 Hours	gallons/1,000 feet/1 Hours
2”	3.6 gal.	0.15 gal.
3”	5.4 gal.	0.23 gal.
4”	7.2 gal.	0.30 gal.
6”	10.8 gal.	0.45 gal.
8”	14.4 gal.	0.60 gal.
10”	18.0 gal.	0.75 gal.
12”	21.6 gal.	1.90 gal.
14”	25.2 gal.	1.05 gal.
16”	28.8 gal.	1.66 gal.
18”	32.4 gal.	1.66 gal.

E. The CONTRACTOR shall repair piping systems sections which fail required piping tests by disassembly and re-installation using new materials to the extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

F. The CONTRACTOR shall, at his own expense, locate and repair the defective joints should any test of combined sections of pipe laid disclose leakage greater than the specified limit, until the leakage is within the specified allowance.

G. The CONTRACTOR shall provide water for testing.

H. The CONTRACTOR may subject pipe to hydrostatic pressure, inspect and test for leakage at any convenient time after partial completion of backfill.

I. The CONTRACTOR may test the system with joints exposed or backfilling complete at his/her option. The ENGINEER shall be notified at least 48 hours before beginning testing.

J. The CONTRACTOR shall drain test water from piping systems after testing and repair work has been completed.

3.03 CLEANING, FLUSHING, AND INSPECTING:

A. General:

1. Clean installed piping systems' exterior surfaces of superfluous materials and prepare for application of specified coatings (if any).

2. Flush out piping systems with clean water before proceeding with required tests.

3. Inspect each run of each system for completion of joints, supports, and accessory items.

B. The CONTRACTOR shall thoroughly flush each run of pipe after the mains have been laid and pressure tested so as to remove all debris and foreign matter from the lines.

1. Flushing will ordinarily be done by opening fire hydrants or blowoffs along the pipe line.

2. Where fire hydrants or blowoffs are not available or are of insufficient capacity to permit adequate flushing, the pipe line shall be opened and flumes or piping shall be provided by the CONTRACTOR to waste the water to the nearest approved

disposal point.

3. A minimum volume of water equal to six times the volume of the main shall be used to flush the mains.

4. The water shall be introduced into the mains to produce a velocity of not less than 3 feet per second, and this rate of flow shall be continued until the discharge is clear and no evidence of silt or foreign matter is visible.

C. The CONTRACTOR shall inspect pressure piping in accordance with American Society of Mechanical Engineers (ASME) B31 procedures.

D. The CONTRACTOR shall disinfect water mains and water service piping in accordance with AWWA C601 and the Florida Department of Environmental Protection (FDEP), Chapter 17-22 requirements.

E. The CONTRACTOR is responsible for costs (including sampling and analysis) associated with disinfecting the potable water lines.

F. The CONTRACTOR shall submit sample results documenting compliance with disinfection testing requirements to the FDEP with a duplicate copy sent to the ENGINEER.

[END OF SECTION 15062]

SECTION 15063

PVC ASTM D2241 PIPE

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals required.

B. The CONTRACTOR shall install the plastic piping, fittings and appurtenances as specified herein in the locations as shown on the Drawings.

C. The CONTRACTOR shall construe industry standards herein to be in reference to the latest edition or version.

1.02 SUBMITTALS:

The CONTRACTOR shall submit three certified copies of all required test reports to the ENGINEER with each shipment of pipe including the Quick Burst Test, American Society for Testing and Materials (ASTM) D1599.

1.03 DELIVERY AND STORAGE:

A. The CONTRACTOR shall protect and store pipe units in the same way they were protected while loaded on the truck. Pipe shall be strung out or stored flat to protect against bending.

B. The CONTRACTOR shall cover pipe with canvas or other opaque material to protect it from prolonged exposure to the sun if it is to be stored outside longer than 15 days.

PART 2 - PRODUCTS

2.01 PIPE:

A. Class-rated polyvinyl chloride (PVC) pipe and accessories, where shown or as specified on the Drawings, shall be manufactured in accordance with ASTM D2241, with a standard dimension ratio (SDR) of SDR 21, rated pressure of 200 pounds per square inch (psi) and shall have the iron pipe size (IPS) outside diameters.

B. The pressure-rated PVC pipe and accessories shall be made of one of the following pipe materials:

1. PVC 1120.

2. PVC 1220.

3. PVC 2120.

C. Each length of pipe shall be hydrotested to 150 psi for 2 hours.

D. Pipe shall be listed by Underwriters Laboratories.

E. Provisions shall be made for expansion and contraction at each joint with an elastomeric ring, and shall have an integral thickened bell as part of each joint.

F. PVC Class pipe shall be installed as recommended by the Manufacturer.

G. Pipe shall be furnished in nominal lengths of approximately 20 feet, unless otherwise directed by the ENGINEER.

H. Pipe and accessories shall bear the NSF mark indicating pipe size, Manufacturer's names, ASTM Specification Number, working pressure, and production code.

I. Pipe shall be green for sewage force main service.

2.02 JOINTS:

A. The PVC joints for pipe shall be of the push-on type unless otherwise directed by the ENGINEER so that the pipe and fittings may be connected on the job without the use of solvent cement or any special equipment.

B. The push-on joint shall be a single rubber gasket joint designed to be assembled by the positioning of a continuous, molded rubber ring gasket in annular recess in the pipe or fitting socket and the forcing of the plain end of the entering pipe into the socket; thereby, compressing the gasket radially to the pipe to form a positive seal.

C. The gasket and annular recess shall be designed and shaped so that the gasket is locked in place against displacement as the joint is assembled.

D. The rubber ring joint shall be designed for thermal expansion or contraction with a total temperature change of at least 750 degrees Fahrenheit (F) in each joint per length of pipe.

E. The bell shall consist of an integral wall section with a solid cross section elastomeric ring, which shall meet requirements of ASTM F-477.

F. The thickened bell section shall be designed to be at least as strong as the pipe wall.

G. Lubricant furnished for lubricating joints shall be nontoxic, shall not support the growth of bacteria, shall not have deteriorating effects on the gasket or pipe material, and shall not impart color, taste, or odor to the water.

2.03 FITTINGS AND SPECIALS:

A. Fittings and specials shall be ductile iron short body fittings conforming to the requirements of ANSI Standard A21.10 or ANSI A21.53/AWWA C153.

B. Joints for cast iron fittings shall be mechanical or push-on type designed in accord with ANSI Standard A21.11. Bolts and nuts shall be cast iron conforming to ANSI Standard A21.11.

C. All ductile iron fittings and specials shall be accordance with Section 15061 of these specifications, including coatings and markings.

D. Restrained joints for fittings for PVC piping shall be:

1. EBAA Iron, Inc., Megalug Series 2000 PV (4-inch through 36-inch sizes).

2. Uni-Flange, Series 1350 restrainers (2-inch through 36-inch sizes)

3. Sigma.

E. Restrained joints for PVC piping shall be:

1. EBAA Iron, Inc., Megalug Series 1600 (4-inch through 12-inch sizes)

2. EBAA Iron, Inc., Megalug Series 2800 (14-inch through 36-inch sizes).

F. After installation, apply a heavy bitumastic coating to all bolts, nuts, and accessories. Romac 600 Series pipe restraining systems can be used (4-inch through 12-inch sizes).

G. The minimum number of restrained joints required for resisting forces at fittings and changes in direction of pipe shall be determined from the length of restrained pipe on each side of fittings and changes in direction necessary to develop adequate resisting friction with the soil as shown on the Drawings.

H. All bolts and nuts for restrained joints shall be “Corten” type, low-alloy, high-strength steel.

2.04 COPPER LOCATION WIRE:

A. The CONTRACTOR shall install all sewer force mains (including service lines) with underground 12-gauge thermoplastic high heat-resistant nylon (THHN) insulated traceable copper wire.

B. The CONTRACTOR shall lay the insulated copper wire in the pipe trench 3 to 6 inches above the sewer force mains and shall be a continuous strand from valve box to valve box, wrapped two times around each valve and extended 24 inches inside each valve box to enable location devices to be attached without digging up the valve box.

C. The CONTRACTOR shall insulate all wire splices.

D. The CONTRACTOR shall backfill the trench following placement of the traceable wire with due caution to prevent displacement or damage to wire.

E. The CONTRACTOR shall perform a detection test after insulation and backfill have been completed in the ENGINEER’s presence using a commercially available pipe detector furnished by the CONTRACTOR.

F. The CONTRACTOR shall replace any undetectable wire to the satisfaction of the ENGINEER at no additional expense to the OWNER.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS:

A. The CONTRACTOR shall install all PVC pipe, fittings, specials, and appurtenances in accordance with the Manufacturer’s instructions.

B. The CONTRACTOR shall temporarily close the end of the pipe with a close-fitting stopper at the close of each day’s work and at other times when the pipe is not being laid.

C. Cleaning:

1. All necessary precautions shall be taken to prevent the entrance of mud, sand, or other obstructing material into the pipelines.

2. As the work progresses, the interior of the main shall be cleaned of all dirt, jointing material, and superfluous materials of every

description.

D. Handling:

1. Pipe must be handled in a way to ensure that it is not gouged or scratched to a depth of more than 10% of the wall thickness.

2. Pipe shall not be bent to a radius of less than 20 diameters at any time during installation.

3. Pipe shall be handled at all times with strapping that a combined width at each load area of at least half the pipe diameter to prevent point damage to the pipe. No wire rope slings shall be used.

3.02 STORAGE/INSTALLATION:

A. The CONTRACTOR shall be in strict accordance with the Manufacturer's technical data and printed instruction for the storage and installation of plastic pipe.

B. The CONTRACTOR shall cover all plastic pipe to prevent fading.

C. The OWNER reserves the right to reject any pipe not properly stored or pipe that has faded.

3.03 INSPECTION AND TESTING:

A. The CONTRACTOR shall not disturb all pipelines for 24 hours to develop complete strength at all joints.

B. General:

1. Provide temporary equipment for testing, including pump and gauges.

2. Test piping system before insulation is installed (wherever feasible) and remove control devices before testing.

3. Expel air from the pipe before applying the specified test pressure.

4. Make taps (if necessary) at points of highest elevation, and afterwards tightly plugged.

5. Test each natural section of each piping system independently but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating.

6. Fill each section with water and subject to a hydrostatic pressure equal to the pressure rating of the pipe being tested.

C. The CONTRACTOR shall test for the required 2-hour period or until the line has been completely inspected for visual leaks.

D. The CONTRACTOR shall test pipe at 160 psi, except where fittings are lower class or pressure rating.

E. Pressure Sewer Permissible leakage (2.2 gallons/1,000 feet/24 hours/inch diameter):

Inches	gallon/1,000 feet/24 Hours	gallon/1,000 feet/1 Hour
2”	4.55 gal	0.190 gal
3”	6.84 gal	0.285 gal
4”	9.12 gal	0.380 gal
6”	13.67 gal	0.570 gal
8”	18.23 gal	0.760 gal
10”	22.79 gal	0.950 gal
12”	27.35 gal	1.140 gal
14”	31.91 gal	1.329 gal
16”	36.47 gal	1.519 gal

F. The CONTRACTOR shall repair piping systems sections which fail required piping tests, by disassembly and re-installation using new materials to the extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

G. The CONTRACTOR shall, at his own expense, locate and repair the defective joints should any test of combined sections of pipe laid disclose leakage greater than the specified limit, until the leakage is within the specified allowance.

H. The CONTRACTOR shall provide water for testing.

I. The CONTRACTOR may subject pipe to hydrostatic pressure, inspect and test for leakage at any convenient time after partial completion of backfill.

J. The CONTRACTOR may test the system with joints exposed or backfilling

complete at his/her option.

K. The ENGINEER shall be notified at least 48 hours before beginning testing.

L. The CONTRACTOR shall drain test water from piping systems after testing and repair work has been completed.

3.04 CLEANING, FLUSHING, AND INSPECTING:

A. General:

1. Clean installed piping systems' exterior surfaces of superfluous materials and prepare for application of specified coatings (if any).

2. Flush out piping systems with clean water before proceeding with required tests.

3. Inspect each run of each system for completion of joints, supports, and accessory items.

B. The CONTRACTOR shall thoroughly flush each run of pipe after mains have been laid and pressure tested, so as to remove all debris and foreign matter from the lines.

1. Flushing will ordinarily be done by opening fire hydrants or blowoffs along the pipe line.

2. Where fire hydrants or blowoffs are not available or are of insufficient capacity to permit adequate flushing, the pipe line shall be opened and flumes or piping shall be provided by the CONTRACTOR to waste the water to the nearest approved disposal point.

3. A minimum volume of water equal to six times the volume of the main shall be used to flush the mains.

4. The water shall be introduced into the mains to produce a velocity of not less than 3 feet per second, and this rate of flow shall be continued until the discharge is clear and no evidence of silt or foreign matter is visible.

C. The CONTRACTOR shall inspect pressure piping in accordance with procedures of American Society of Mechanical Engineers (ASME) B31.

[END OF SECTION 15063]

SECTION 15065

PIPE AND FITTINGS FOR WASTEWATER

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. The CONTRACTOR will furnish all labor, materials, equipment, and incidentals required.

B. The CONTRCTOR shall install the plastic piping, fittings, and appurtenances as specified in the locations as shown on the Drawings.

C. The CONTRCTOR shall use American Water Works Association (AWWA) Standard C-900, Polyvinyl Chloride (PVC) pipe for all wastewater force mains with a diameter 4 through 12 inches, 14 inches and longer shall be C-905.

D. The Extent of the AWWA Standard C-900, PVC pipe is shown on the Drawings.

1.02 DESCRIPTION OF SYSTEM:

Piping shall be installed in the locations as shown on the Drawings.

1.03 QUALIFICATIONS:

A. All plastic pipe, fittings, and appurtenances shall be furnished by a single Manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished.

B. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these specifications.

1.04 SUBMITTALS:

A. The CONTRACTOR shall submit Shop Drawings to the ENGINEER and shall include dimensions and technical specifications for all piping.

B. The CONTRACTOR shall submit samples of all materials specified herein to the ENGINEER.

C. The CONTRACTOR shall submit and shall comply with pipe Manufacturer’s recommendation for handling, storing, and installing pipe and fittings.

D. The CONTRACTOR shall submit pipe Manufacturer's certification of compliance with these specifications.

1.05 TOOLS:

Special tools, solvents, lubricants, and caulking compounds required for normal installation shall be furnished with the pipe.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Class-Rated Polyvinyl Chloride (PVC) Pipe:

1. Class-rated PVC pipe and accessories 4 to 12 inches in diameter, where shown or as specified on the Drawings, shall meet the requirements of AWWA Specification C-900 "Polyvinyl Chloride (PVC) Pressure Pipe." Pipe shall be Class 150, meeting requirements of Dimension Ratio (DR) 18 and shall have the dimension of ductile iron outside diameters.

2. PVC pipe 14 through 36 inches shall meet the requirements of AWWA Standard C-905, Polyvinyl Chloride (PVC) wastewater forcemain pipe, nominal diameters 14 through 36 inches. Pipe shall be Class 150 and meet the requirements of dimension ratio (DR) 18 and shall have the dimension of ductile iron outside diameters.

3. Pipe shall be listed by Underwriters Laboratories.

4. Provisions shall be made for expansion and contraction at each joint with an elastomeric ring, and shall have an integral thickened bell as part of each joint.

5. PVC Class pipe shall be installed as recommended by the Manufacturer.

6. Pipe shall be furnished in nominal lengths of approximately 20 feet, unless otherwise directed by the ENGINEER.

7. Pipe and accessories shall bear the NSF mark indicating pipe size, Manufacturer's names, AWWA and/or American Society for Testing and Materials (ASTM) specification number, working pressure, and

production code.

8. Pipe shall be green for sewage force mains.

B. Joints:

1. The PVC joints for pipe shall be of the push-on type unless otherwise directed by the ENGINEER so that the pipe and fittings may be connected on the job without the use of solvent cement or any special equipment.

2. The push-on joint shall be a single rubber gasket joint designed to be assembled by the positioning of a continuous, molded rubber ring gasket in annular recess in the pipe or fitting socket and the forcing of the plain end of the entering pipe into the socket; thereby, compressing the gasket radially to the pipe to form a positive seal.

3. The gasket and annular recess shall be designed and shaped so that the gasket is locked in place against displacement as the joint is assembled. The rubber ring joint shall be designed for thermal expansion or contraction with a total temperature change of at least 750 degrees Fahrenheit in each joint per length of pipe.

4. The bell shall consist of an integral wall section with a solid cross section elastomeric ring which shall meet requirements of ASTM F-477. The thickened bell section shall be designed to be at least as strong as the pipe wall. Lubricant furnished for lubricating joints shall be nontoxic, shall not support the growth of bacteria, shall not have deteriorating effects on the gasket or pipe material, and shall not impart color, taste, or odor to the water.

5. PVC joints for pipe less than 3 inches in diameter shall either be threaded, push-on type, SCH. 80 PVC. Teflon thread tape or liquid Teflon thread lubricant shall be used on all threaded joints to serve as both a sealer and lubricant. Threaded joints should be made hand tight (hard). When the joint is hand tight, a strap wrench should be used to make up one to two additional full turns past the hand right point. Do not use pipe wrenches or pump pliers on plastic pipe or fittings.

C. Fittings:

All fittings for PVC pipe shall be cast iron/ductile iron with mechanical joints and shall conform to the specifications for cast iron/ductile iron fittings, unless otherwise directed. PVC C-900 fittings are allowable upon

approval by the ENGINEER and required for sewage force main applications. DR ratio shall be the same as the pipe.

1. Fittings for Schedule 80 PVC pipe less than 3 inches in diameter shall be threaded and be PVC as shown on the Drawings, or as directed by the ENGINEER. Threaded PVC fittings shall conform to ASTM Specification D2464-69).

2. The Manufacturer of the pipe shall supply all PVC accessories as well as any adaptors and/or specials required to perform the work as shown on the Drawings and specified herein. Standard double bell couplings will not be accepted where the pipe will slip completely through the coupling.

PART 3 - EXECUTION

3.01 STORAGE/INSTALLATION:

A. The CONTRACTOR shall store and install plastic pipe strictly in accordance with Manufacturer's technical data and printed instruction.

B. The CONTRACTOR shall properly cover all plastic pipe to prevent fading.

C. The OWNER reserves the right to reject any pipe not properly stored or pipe that has faded.

3.02 INSPECTION AND TESTING:

A. The CONTRACTOR shall not disturb all pipelines for 24 hours to develop complete strength at all joints.

B. General:

1. Provide temporary equipment for testing, including pump and gauges.

2. Test piping system before insulation is installed (wherever feasible) and remove control devices before testing.

3. Expel air from the pipe before applying the specified test pressure.

4. Make taps (if necessary) at points of highest elevation, and afterwards tightly plugged.

5. Test each natural section of each piping system independently but

do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating.

6. Fill each section with water and subject to a hydrostatic pressure equal to the pressure rating of the pipe being tested.

A. The CONTRACTOR shall test for the required 2-hour period or until the line has been completely inspected for visual leaks.

B. The CONTRACTOR shall test pipe at 150 psi, except where fittings are lower class or pressure rating.

C. The CONTRACTOR shall repair piping systems sections which fail required piping tests, by disassembly and re-installation using new materials to the extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

D. The CONTRACTOR shall, at his own expense, locate and repair the defective joints should any test of combined sections of pipe laid disclose leakage greater than the specified limit, until the leakage is within the specified allowance.

E. The CONTRACTOR shall provide water for testing.

F. The CONTRACTOR may subject pipe to hydrostatic pressure, inspect and test for leakage at any convenient time after partial completion of backfill.

G. The CONTRACTOR may test the system with joints exposed or backfilling complete at his/her option.

H. The ENGINEER shall be notified at least 48 hours before beginning testing.

I. The CONTRACTOR shall drain test water from piping systems after testing and repair work has been completed.

3.03 CLEANING, FLUSHING, AND INSPECTING:

A. General:

1. Clean exterior surfaces of installed piping systems of superfluous materials, prepare for application of specified coatings (if any).

2. Flush out piping systems with clean water before proceeding with required tests.

3. Inspect each run of each system for completion of joints, supports and accessory items.

B. The CONTRACTOR shall inspect pressure piping in accordance with procedures of American Society of Mechanical Engineers (ASME) B31.

[END OF SECTION 15065]

SECTION 15070

HDPE PIPE

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section includes material and installation requirements necessary for furnishing and installing high-density polyethylene (HDPE) pipe, fittings, and specials in the locations and quantities as shown on the drawings.

B. Quantities shown on the plans may not be the exact length needed for directional bores.

C. The CONTRACTOR shall investigate this before the Bid and shall inform the ENGINEER prior to the Bid if additional HDPE pipe will be needed.

D. The CONTRACTOR will be responsible for any additional HDPE pipe needed after the Bid and additional costs incurred for the pipe shall not be required from the OWNER.

1.02 QUALITY CRITERIA

A. Reference to industry standards as contained herein shall be construed as to be in reference to the latest revision or edition. All HDPE pipe shall meet all American Water Works Association (AWWA) Standards.

B. The pipe fittings and specials shall be made by a Manufacturer experienced in producing pipe, fittings, and specials of the type, size, configuration, and quality specified herein. The manufacturer shall have produced pipe, fittings and specials having a record of at least 5 years' successful performance.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit Shop Drawings showing the pipe lengths, design details, joint details, specials, etc., for the ENGINEER's approval. Pipe shall be fabricated in accordance with these plans.

B. The CONTRACTOR shall submit a notarized statement of certification from the pipe Manufacturer as to conformance with the specified American National Standards Institute (ANSI)/AWWA Specifications listed herein, and modifications thereto, at the time of submitting Shop Drawing data on the pipe and fittings.

1.04 DELIVERY, STORAGE AND HANDLING

A. The CONTRACTOR shall be responsible for the acceptability of all material furnished by him/her and shall assume responsibility for the replacement of all such material found damaged in shipping or defective in manufacture. This shall include furnishing all material and labor required for the replacement of installed material discovered to be defective prior to the final acceptance of the Work.

B. The CONTRACTOR shall keep the interior and all sealing surfaces of all pipe, fittings, and other accessories free from dirt and foreign matter. Consult the Manufacturer for specific storage recommendations.

C. The CONTRACTOR shall properly handle materials at all times to prevent damage in accordance with Manufacturer's recommendations. Pipe and fittings shall not be thrown, dropped, or dragged.

PART 2 - PRODUCTS

2.01 HDPE PIPE: 3-INCH DIAMETER AND LARGER

A. The HDPE pipe shall be manufactured in accordance with American Society for Testing and Materials (ASTM) F714 and comply with AWWA C906 specifications. All HDPE pipe used for force mains shall have an embedded green stripe on each side symbolizing wastewater and all HDPE pipe used for water mains shall have an embedded blue stripe on each side symbolizing water.

B. The HDPE pipe shall be rated for use with water at 73.4 degrees Fahrenheit (F) at a hydrostatic design stress of 800 psi and a minimum working pressure of 160 psi.

C. All HDPE pipe 3-inch diameter and larger shall be ductile iron pipe size (DIPS). Dimension Ratio (DR) shall be DR11 for the HDPE pipe shown on the drawings. Dimensions and workmanship shall be as specified by ASTM F714.

D. Polyethylene extrusion compound from which the HDPE pipe is extruded shall comply with application requirements for PE-3408 high molecular weight polyethylene plastic material. Material shall be as described in ASTM D3350 and shall comply with the following:

1. Pipe resin shall have a minimum inherent viscosity of 2.5 when run according to ASTM D1601.

2. Exceed 5,000 hours on ESC as determined by ASTM D-1248-345434C.

3. Have a specific gravity of between 0.9141 and 0.955.

4. Contain a minimum of 2% and a maximum of 3% of carbon black and shall produce a finish product that is uniformly black.

E. Marking on the HDPE pipe shall include:

1. The nominal pipe or tubing size.

2. The type of plastic material (i.e., PE-3408).

3. The standard thermoplastic pipe dimension ratio or the pressure rating in psi for water at 73.4˚F. (160 psi).

4. The ASTM designation with which the pipe complies.

5. The Manufacturer's name or trademark and code.

2.02 HDPE PIPE: 2-INCH DIAMETER AND SMALLER

A. The HDPE tubing shall be manufactured in accordance with American Society for Testing and Materials (ASTM) D2737 and comply with AWWA C901 specifications. All HDPE PE-4710 tubing used for force mains shall be green symbolizing wastewater and all HDPE PE-4710 tubing used for water mains shall be blue symbolizing water.

B. The HDPE tubing shall be rated for use with water at 73.4 degrees Fahrenheit (F) at a hydrostatic design stress of 800 psi and a minimum working pressure of 160 psi.

C. All HDPE tubing 2-inch diameter and smaller shall be copper tube size (CTS). Standard Dimension Ratio (SDR) shall be SDR9 for the HDPE pipe shown on the drawings. Dimensions and workmanship shall be as specified by ASTM D2737.

D. Polyethylene extrusion compound from which the HDPE pipe is extruded shall comply with application requirements for PE-4710 high molecular weight polyethylene plastic material.

2.03 FITTINGS AND JOINTS

A. Fittings shall be fabricated to the same standards as the pipe from the same raw materials by thermal fusion.

B. Jointing shall be by the thermal butt fusion method as recommended by the Manufacturer.

C. Fittings and joints shall have a pressure rating equal to the pipe and shall have machined fusion ends matched to pipe wall.

D. The CONTRACTOR shall use mechanical joint fusion welded adapters with ductile iron mechanical joint sleeves for transition connections as shown on the plans.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. The CONTRACTOR shall install all HDPE pipe, fittings, specials, and appurtenances in accordance with the Manufacturer's instructions.

B. The CONTRACTOR shall securely close openings such as stubs, tees, and other services along the lines with an approved stopper that fits into the pipe and is recommended by the pipe Manufacturer. This stopper shall be jointed in such a manner that it may be removed at some future time without injury to the pipe itself.

C. The CONTRACTOR shall temporarily close the end of the pipe with a close-fitting stopper at the close of each day's work and at other times when the pipe is not being laid.

D. Cleaning:

1. All necessary precautions shall be taken to prevent the entrance of mud, sand, or other obstructing material into the pipelines.

2. As the work progresses, the interior of the main shall be cleaned of all dirt, jointing material, and superfluous materials of every description.

E. Experienced fusion technicians with a minimum of 5 years or more experience in field application involving large diameter (over 12 inches) HDPE pipe shall join piping. Experience record shall be submitted for review 15 days prior to directional boring activities.

F. If the CONTRACTOR feels that the length of HDPE pipe shown on the plans is not adequate, then the CONTRACTOR shall notify the ENGINEER prior to the Bid. The CONTRACTOR shall not ask for additional directional boring cost after the Bid.

G. Handling:

1. Pipe must be handled in a way to ensure that it is not gouged or scratched to a depth of more than 10% of the wall thickness.

2. Pipe shall not be bent to a radius of less than the Manufacturer's recommendation at any time during installation.

3. Pipe shall be handled at all times with strapping that a combined width at each load area of at least half the pipe diameter to prevent point damage to the pipe. No wire rope slings shall be used.

PART 4 – TESTING

4.01 TESTING IN THE TRENCH

A. The CONTRACTOR shall fill the pipeline with water after it has been laid; bleed off any trapped air.

B. The CONTRACTOR shall subject the lowest element in the system to a test pressure that is 1.5 times the design pressure and check for any leakage.

C. The CONTRACTOR shall apply the pressure test after backfilling has been completed but not sooner than a time which will allow sufficient curing of any concrete that may have been used, when in the opinion of the ENGINEER, local conditions require that the trenches be backfilled immediately after the pipe has been laid. Typical minimum concrete curing times are 36 hours for early strengths and 7 days for normal strengths.

1. The test procedures consist of two steps: the initial expansion and the test phase.

2. When test pressure is applied to a water-filled pipe, the pipe expands. During the initial expansion of the pipe under test sufficient make-up water must be added to the system at hourly intervals for 3 hours to maintain the test pressure.

3. After about 4 hours, initial expansion should be complete, and the actual test can start.

4. When the test is to begin, the pipe is full of water and is subjected to a constant test pressure of 1.5 times the system design pressure.

5. The test phase should not exceed 3 hours, after which time any water deficiency must be replaced and measured. Add and

measure the amount of make-up water required to return to the test pressure and compare this to the maximum allowance in Figure 4.1.

6. An alternate leakage test consists of maintaining the test pressure (described above) over a period of 4 hours, and then dropping the pressure by 10 psi (0.069 Mpa). If the pressure that remains is within 5% of the target value for 1 hour, then that is an indication that there is no leakage in the system.

NOTE: Under no circumstances shall the total time under test exceed 8 hours at 1 ½ times the system pressure rating. If the test is not complete within this time limit (due to leakage, equipment failure, etc.), the test section shall be permitted to "relax" for 8 hours prior to the next test sequence. Air testing is not recommended. Additional safety precautions may be required.

FIGURE 4.1
ALLOWANCE FOR EXPANSION UNDER TEST PRESSURE

Nominal Pipe Size Inches (1)	U.S. Gals/100 feet of Pipe (2)			Nominal Pipe Size Inches (1)	U.S. Gals/100 feet of Pipe (2)		
	1-Hour	2-Hour	3-Hour		1-Hour	2-Hour	3-Hour
2	0.08	0.12	0.15	20	2.80	5.50	8.00
3	0.10	0.15	0.25	22	3.50	7.00	10.50
4	0.13	0.25	0.40	24	4.50	8.90	13.30
5	0.21	0.41	0.63	28	5.50	11.10	16.80
6	0.30	0.60	0.90	30	6.20	12.60	19.10
8	0.50	1.00	1.50	32	7.00	14.30	21.50
10	0.75	1.30	2.10	36	9.00	18.00	27.00
12	1.10	2.30	3.40	42	12.00	24.00	36.00
14	1.40	2.80	4.20	48	15.00	27.00	43.00
16	1.70	3.30	5.00	54	18.00	30.00	50.00
18	2.20	4.30	6.50				

(1) mm* 0.03937
(2) multiply by 11.53 to convert to liter/100 meters of pipe

[END OF SECTION 15070]

SECTION 15075

FUSIBLE POLYVINYL CHLORIDE PIPE FOR INSTALLATION BY HORIZONTAL DIRECTIONAL DRILL (HDD)

PART 1 - GENERAL

1.01 DESCRIPTION

A. SCOPE:

1. This section specifies fusible PVC pipe, including standards for dimensionality, testing, quality, acceptable fusion practice, safe handling, storage, and installation of the pipe by horizontal directional drilling, directional boring, or guided boring.

2. Quantities shown on the plans may not be the exact length needed for directional bores.

3. The CONTRACTOR shall investigate this before the Bid and shall inform the ENGINEER prior to the bid if additional Fusible PVC pipe will be needed. If any additional Fusible PVC pipe is needed after the Bid it will be the responsibility of the CONTRACTOR and shall not require any additional costs to the OWNER.

B. REQUIREMENTS:

1. CONTRACTOR shall provide fusible PVC pipe conforming to all standards and procedures, and meeting all testing and material properties as described in this specification for installation by horizontal directional drilling.

2. CONTRACTOR shall be responsible for all installation processes and procedures associated with the installation by horizontal directional drilling in accordance with this specification.

C. PIPE DESCRIPTION:

1. Pipe Supplier shall furnish fusible PVC pipe conforming to all standards and procedures, and meeting all testing and material properties as described in this specification.

2. Pipe shall conform to the dimensions specified in the plans.

1.02 QUALITY ASSURANCE

A. References:

Reference	Title
ANSI/AWWA C110/A21.10	American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids
ANSI/AWWA C111/A21.11	American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C605-94	Standard for Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water
AWWA C651	Standard for Disinfecting Water Mains
AWWA C900-97	Standard for Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 in. through 12 in. (100mm through 300mm), for Water Distribution
AWWA C905-97	Standard for Polyvinyl Chloride (PVC Pressure Pipe and Fabricated Fittings, 14 in. through 48 in. (350mm-1200mm), for Water Distribution
AWWA M23	AWWA Manual of Supply Practices PVC Pipe—Design and Installation, Second Edition
ASTM C923	Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
ASTM D1784	Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D1785	Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

Reference	Title
ASTM D2152	Test Method for Degree of Fusion of Extruded Poly(Vinyl Chloride) (PVC) Pipe and Molded Fittings by Acetone Immersion
ASTM D2241	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)
ASTM D2665	Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
ASTM D3034	Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM F477	Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F679	Standard Specification for Poly(Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F1057	Standard Practice for Estimating the Quality of Extruded Poly (Vinyl Chloride) (PVC) Pipe by the Heat Reversion Technique
ASTM F1417	Standard Test Method for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air
UNI-B-6	Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe
UNI-PUB-08	Tapping Guide for PVC Pressure Pipe
NSF-14	Plastics Piping System Components and Related Materials
NSF-61	Drinking Water System Components--Health Effects
PPI TR-2	PVC Range Composition Listing of Qualified Ingredients

B. Manufacturer Requirements:

1. Fusible PVC pipe shall be tested at the extrusion facility for properties required to meet all applicable parameters as outlined in either AWWA C900, AWWA C905, applicable sections of ASTM D2241, ASTM D3034, or ASTM F679. Testing priority shall be in conformance with AWWA C900 and AWWA C905, except for pipe made to the ASTM D3034 or ASTM F679 standards, which shall be tested to those standards.

2. All piping shall be made from a PVC compound conforming to cell classification 12454 per ASTM D1784.

D. Fusion Technician Requirements:

1. Fusion Technician shall be fully qualified by the pipe supplier to install fusible PVC pipe of the type(s) and size(s) being used.

2. Qualification shall be current as of the actual date of fusion performance on the project.

E. Specified Pipe Suppliers:

1. Fusible PVC pipe shall be used as manufactured under the trade names Fusible C-900®, Fusible C-905®, and FPVC™, for Underground Solutions, Inc., Poway, CA, (858) 679-9551.

2. Fusion process shall be as patented by Underground Solutions, Inc., Poway, CA, Patent No. 6,982,051.

3. OWNER and ENGINEER are aware of no other supplier or fusible PVC pipe that is an equal to this specified pipe supplier and product.

F. Warranty:

1. The pipe shall be warranted for 1 year from the date of substantial completion.

2. In addition to the standard pipe warranty, the fusion services shall be warranted for 1 year from the date of substantial completion.

G. Pre-Construction Submittals:

1. The following PRODUCT DATA is required from the pipe supplier and/or fusion provider:

a. Pipe Size.

b. Dimensionality.

c. Pressure Class per applicable standard.

d. Color.

e. Recommended Minimum Bending Radius.

f. Recommended Maximum Safe Pull Force.

g. Pipe and fusion services warranty information.

h. Written procedural documentation for piping products including proper handling and storage, installation, tapping, and testing.

i. Fusion technician qualification indicating conformance with this specification.

2. The following Work Plan and Information is required from the contractor and/or horizontal directional drilling CONTRACTOR. This Work Plan and Information shall also be supplied to the pipe supplier, should it be requested:

a. Work plan shall include for each HDD installation any excavation locations and dimensions, interfering utilities, bore dimensions and locations including bend radii used, and traffic control schematics.

b. A project safety and contingency plan which shall include but shall not be limited to drilling fluid containment and cleanup procedures, equipment and plan for compromised utility installations including electrical and power lines, water, wastewater, and any other subsurface utility in the area.

c. An HDD schedule identifying daily work hours and working dates for each installation.

H. Post-Construction Submittals:

1. The following As-Recorded Data is required from the contractor and/or fusion provider to the OWNER or pipe supplier upon request:

a. Fusion report for each fusion joint performed on the project,

including joints that were rejected. Specific requirements of the Fusion Technician's joint report shall include:

1) Pipe Size and Thickness

2) Machine Size

3) Fusion Technician Identification

4) Job Identification

5) Fusion Joint Number

6) Fusion, Heating, and Drag Pressure Settings

7) Heat Plate Temperature

8) Time Stamp

9) Heating and Cool Down Time of Fusion

10) Ambient Temperature

b. As-recorded Information:

The as-recorded plan and profile will reflect the actual installed alignment, and reflect the horizontal offset from the baseline and depth of cover.

c. All fittings, valves, or other appurtenances will also be referenced and shown.

A daily project log, along with tracking log sheets, should they be used, shall be provided. Tracking log sheet data, should it be employed, shall include any and all that apply, including inclination, depth, azimuth, and hydraulic pull-back and rotational force measured.

PART 2 – PRODUCTS

2.01 CLASS-RATED POLYVINYL CHLORIDE (PVC) PIPE

A. SCOPE:

1. This section specifies fusible PVC pipe, including standards for dimensionality, testing, quality, acceptable fusion practice, safe handling, storage, and installation of the pipe by horizontal directional

drilling, directional boring, or guided boring.

2.02 FUSIBLE POLYVINYL CHLORIDE PRESSURE PIPE FOR POTABLE WATER

A. Fusible PVC pipe shall conform to AWWA C900 or AWWA C905. Testing shall be in accordance with AWWA standards for all pipe types. FPVC pipe rating shall be as follows:

1. Fusible PVC pipe shall conform to AWWA C900 or AWWA C905. Testing shall be in accordance with AWWA standards for all pipe types. FPVC pipe rating shall be as follows:
    - to 8 inches, AWWA C900, DR 18, Pressure Class 235 psi
    - to 12 inches, AWWA C900, DR 25, Pressure Class 165 psi
    - Greater than 12 inches, AWWA C905, DR 25, Pressure Class 165 psi
2. Rework material shall be allowed per AWWA C900 and AWWA C905 standards.

3. Fusible PVC pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

4. Fusible PVC pipe shall be manufactured in a standard 20’, 30’ or 40’ nominal length.

5. Fusible PVC pipe shall be blue in color for potable water use.

6. Pipe generally shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:

    - Nominal pipe size
    - PVC
    - Dimension Ratio, Standard Dimension Ratio or Schedule
    - AWWA pressure class or standard pressure rating for non-AWWA pipe
    - AWWA Standard designation number or pipe type for non-AWWA pipe
    - NSF-61 mark verifying suitability for potable water service
    - Extrusion production-record code
    - Trademark or trade name
    - Cell Classification 12454 and/or PVC material code 1120 may also be included

7. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

B.

2.03 FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR NON-POTABLE WATER

A. Fusible PVC pipe shall conform to AWWA C900 or AWWA C905. Testing shall be in accordance with AWWA standards for all pipe types. FPVC pipe rating shall be as follows:

1. 4 to 8 inches, AWWA C900, DR 18, Pressure Class 235 psi

2. 10 to 12 inches, AWWA C900, DR 25, Pressure Class 165 psi

3. Greater than 12 inches, AWWA C905, DR 25, Pressure Class 165 psi

4. Rework material shall be allowed per AWWA C900 and AWWA C905 standards.

5. Fusible PVC pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

6. Fusible PVC pipe shall be manufactured in a standard 20', 30' or 40' nominal length.

7. Fusible PVC pipe shall be purple in color for reclaim, reuse, or other non-potable distribution or conveyance. Fusible PVC pipe shall be white in color for raw water collection and transmission, or other non-potable resource or irrigation water uses.

8. Pipe generally shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:

- Nominal pipe size
- PVC
- Dimension Ratio, Standard Dimension Ratio or Schedule
- AWWA pressure class or standard pressure rating for non-AWWA pipe
- AWWA Standard designation number or pipe type for non-AWWA pipe
- Extrusion production-record code
- Trademark or trade name
- Cell Classification 12454 and/or PVC material code 1120 may also be included
- For reclaim water service, the wording: "Reclaimed Water, NOT for Potable Use"

9. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.04 FUSIBLE POLYVINYLCHLORIDE PRESSURE PIPE FOR WASTEWATER

A. Fusible PVC pipe shall conform to AWWA C900 or AWWA C905. Testing shall be in accordance with AWWA standards for all pipe types. FPVC pipe rating shall be as follows:

1. 4 to 8 inches, AWWA C900, DR 18, Pressure Class 235 psi

2. 10 to 12 inches, AWWA C900, DR 25, Pressure Class 165 psi

3. Greater than 12 inches, AWWA C905, DR 25, Pressure Class 165 psi

4. Rework material shall be allowed per AWWA C900 and AWWA C905 standards.

5. Fusible PVC pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

6. Fusible PVC pipe shall be manufactured in a standard 20', 30' or 40' nominal length.

7. Fusible PVC pipe shall be purple in color for reclaim, reuse, or other non-potable distribution or conveyance. Fusible PVC pipe shall be white in color for raw water collection and transmission, or other non-potable resource or irrigation water uses.

8. Pipe generally shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:

    - Nominal pipe size
    - PVC
    - Dimension Ratio, Standard Dimension Ratio or Schedule
    - AWWA pressure class or standard pressure rating for non-AWWA pipe
    - AWWA Standard designation number or pipe type for non-AWWA pipe
    - Extrusion production-record code
    - Trademark or trade name
    - Cell Classification 12454 and/or PVC material code 1120 may also be included
    - For reclaim water service, the wording: "Reclaimed Water, NOT for Potable Use"

9. Pipe shall be homogeneous throughout and be free of visible cracks,

holes, foreign material, blisters, or other visible deleterious faults.

2.05 FUSIBLE POLYVINYLCHLORIDE NON-PRESSURE PIPE FOR WASTEWATER OR SURFACE WATER

A. Fusible PVC pipe shall conform to ASTM D3034 or ASTM F679.

B. Fusible PVC pipe may instead conform to AWWA C900 or AWWA C905, and/or ASTM D2241 or ASTM D1785 for IPS standard dimensionality, if applicable. Testing shall be in accordance with AWWA standards for any of these pipe types.

C. Rework material shall be allowed per ASTM D3034, ASTM F679, AWWA C900 or AWWA C905 standards.

D. Fusible PVC pipe shall be extruded with plain ends. The ends shall be square to the pipe and free of any bevel or chamfer. There shall be no bell or gasket of any kind incorporated into the pipe.

E. Fusible PVC pipe shall be manufactured in a standard 20', 30' or 40' nominal length.

F. Fusible PVC pipe shall be green in color for wastewater use. Fusible PVC pipe shall be white in color for surface or storm water use.

G. Pipe generally shall be marked per AWWA C900 or AWWA C905, and shall include as a minimum:

1. Nominal pipe size

2. PVC

3. Dimension Ratio, Standard Dimension Ratio or Schedule (omit for ASTM D3034 or ASTM F679 pipe)

4. Pipe legend or stiffness designation, or AWWA pressure class, or standard pressure rating for non-AWWA pipe

5. AWWA Standard designation number or pipe type for non-AWWA pipe (omit for ASTM D3034 or ASTM F679 pipe)

6. Extrusion production-record code

7. Trademark or trade name

8. Cell Classification 12454 and/or PVC Material Code 1120 may also

be included.

H. Pipe shall be homogeneous throughout and be free of visible cracks, holes, foreign material, blisters, or other visible deleterious faults.

2.06 FUSION JOINTS

A. Unless otherwise specified, fusible PVC pipe lengths shall be assembled in the field with butt-fused joints. The CONTRACTOR shall follow the pipe supplier's guidelines for this procedure. All fusion joints shall be completed as described in this specification.

2.07 CONNECTIONS AND FITTINGS FOR PRESSURE APPLICATIONS

A. Connections shall be defined in conjunction with the coupling of project piping, as well as the tie-ins to other piping systems.

B. Ductile Iron Mechanical and Flanged Fittings:

1. Acceptable fittings for use with fusible PVC pipe shall include standard ductile iron fittings conforming to AWWA/ANSI C110/A21.10 and AWWA/ANSI C111/A21.11.

2. Connections to fusible PVC pipe may be made using a restrained or non-restrained retainer gland product for PVC pipe, as well as for MJ or flanged fittings.

3. Bends, tees, and other ductile iron fittings shall be restrained with the use of thrust blocking or other means as indicated in the construction documents.

4. Ductile iron fittings and glands must be installed per the manufacturer's guidelines.

C. PVC Gasketed, Push-On Fittings:

1. Acceptable fittings for use with fusible PVC pipe shall include standard PVC pressure fittings conforming to AWWA C900 or AWWA C905.

2. Acceptable fittings for use joining fusible PVC pipe other sections of fusible PVC pipe or other sections of PVC pipe shall include gasketed PVC, push-on type couplings and fittings, including bends, tees, and couplings as shown in the drawings.

3. Bends, tees, and other PVC fittings shall be restrained with the use of thrust blocking or other restraint products as indicated in the construction documents.

4. PVC gasketed, push-on fittings and mechanical restraints, if used, must be installed per the manufacturer's guidelines.

D. Fusible Polyvinyl Chloride Sweeps or Bends:

1. Fusible PVC sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances, and pressure class of the pipe that they are joining together.

2. Fusible PVC sweeps or bends shall be manufactured from the same fusible PVC pipe being used for the installation, and shall have at least 2 feet of straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation.

3. Standard fusible PVC sweep or bend angles shall not be greater than 22.5 degrees, and shall be used in nominal diameters ranging from 4 inch through 16 inch.

E. Sleeve-Type Couplings:

1. Sleeve-type mechanical couplings shall be manufactured for use with PVC pressure pipe, and may be restrained or unrestrained as indicated in the construction documents. Sleeve-type couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

F. Expansion and Flexible Couplings:

1. Expansion-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.

2. Expansion-type mechanical couplings shall be rated at the same or greater pressure carrying capacity as the pipe itself.

G. Connection Hardware:

1. Bolts and nuts for buried service shall be made of non-corrosive, high-strength, low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11, regardless of any other protective coating.

2.08 CONNECTIONS FOR GRAVITY SANITARY SEWER AND NON-PRESSURE APPLICATIONS

A. The following connections are to be used in conjunction with tie-ins to other non-pressure, gravity sewer piping and/or structures, and shall be as indicated in the construction documents.

B. PVC Gasketed, Push-On Couplings:

1. Acceptable couplings for joining fusible PVC pipe to other sections of fusible PVC pipe or other sections of PVC pipe shall include gasketed PVC, push-on type couplings as indicated in the construction documents.

2. PVC gasketed, push-on fittings and/or restraint hardware must be installed per the manufacturer's guidelines.

C. Fusible Polyvinyl Chloride Sweeps or Bends:

1. Fusible PVC sweeps or bends shall conform to the same sizing convention, diameter, dimensional tolerances, and pressure class of the pipe that they are joining together.

2. Fusible PVC sweeps or bends shall be manufactured from the same fusible PVC pipe being used for the installation, and shall have at least 2 feet of straight section on either end of the sweep or bend to allow for fusion of the sweep to the pipe installation.

3. Standard fusible PVC sweep or bend angles shall not be greater than 22.5 degrees, and shall be used in nominal diameters ranging from 4 inch through 16 inch.

D. Sleeve-Type Couplings:

1. Sleeve-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.

E. Expansion And Flexible Couplings:

1. Expansion-type mechanical couplings shall be manufactured for use with PVC pipe, and may be restrained or unrestrained as indicated in the construction documents.

F. Connection Hardware:

1. Bolts and nuts for buried service shall be made of non-corrosive, high- strength, low-alloy steel having the characteristics specified in ANSI/AWWA C111/A21.11, regardless of any other protective coating.

G. Connection to Sanitary Sewer Manholes and Structures:

1. Fusible PVC pipe shall be connected to manholes and other structures to provide a leak-free, properly graded flow into or out of the manhole or structure.

2. Connections to existing manholes and structures shall be as indicated in the construction documents.

a. For a cored or drilled opening provide a flexible, watertight connection that meets and/or exceeds ASTM C923.

b. For a knock out opening, provide a watertight connection (waterstop or other method) meeting the material requirements of ASTM C923 that is securely attached to the pipe with stainless steel bands or other means.

c. Grout opening in manhole wall with non-shrink grout. Pour concrete collar around pipe and outside manhole opening. Provide flexible pipe joint or flexible connector within 2' of collar.

3. Connections to a new manhole or structure shall be as indicated in the construction documents.

a. A flexible, watertight gasket per ASTM C 923 shall be cast integrally with riser section(s) for all precast manhole and structures.

b. Drop connections shall be required where shown on drawings.

c. Grout internal joint space with non-shrink grout

2.09 DRILLING SYSTEM EQUIPMENT

A. General:

1. The directional drilling equipment, as a minimum, shall consist of a directional drilling rig of sufficient capacity to perform the bore(s) and pull-back of the pipe(s), a drilling fluid mixing & delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations, and trained and competent personnel to operate the system.

2. All equipment shall be in good, safe operating condition with sufficient supplies, materials, and spare parts on hand to maintain the system in good working order for the duration of this project.

3. All required equipment shall be included in the emergency and contingency plan as submitted per these specifications.

B. Drilling Rig:

1. The directional drilling machine shall consist of a hydraulically powered system to rotate, push, and pull drill pipe while delivering a pressurized fluid mixture to

a drill head.

2. The machine shall be anchored to withstand the pulling, pushing and rotating forces required to complete the project.

3. The drilling rig hydraulic system shall be of sufficient pressure and volume to power drilling operations. The hydraulic system shall be free from leaks.

4. The drilling rig shall have a system to monitor pull-back hydraulic pressure during pull-back operations.

C. Drill Head:

1. The horizontal directional drilling equipment shall produce a stable fluid lined tunnel with the use of a steer-able drill head and any subsequent pre-reaming heads.

2. The system must be able to control the depth and direction of the drilling operation.

3. Drill head shall contain all necessary cutters and fluid jets for the operation, and shall be of the appropriate design for the ground medium being drilled.

D. Drilling Fluid System:

a. Drilling Fluid (Drilling Mud):

i. Drilling fluid shall be composed of clean water and the appropriate additive(s) for the fluid to be used.

ii. Water shall be from a clean source and shall meet the mixing requirements of the mixture manufacturer(s).

iii. The water and additives shall be mixed thoroughly to assure the absence of any clumps or clods. No hazardous additives may be used.

iv. Drilling fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of bore wall(s).

v. Drilling fluid shall be disposed of off-site in accordance with local, state, and federal requirements and/or permit conditions.

vi. No additional chemicals or polymer surfactants shall be

allowed to be added to the drilling fluid unless they have been submitted per this specification.

b. Mixing System:

i. A drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid for the project.

ii. The mixing system shall be able to ensure thorough mixing of the drilling fluid. The drilling fluid reservoir tank shall be sized for adequate storage of the fluid.

iii. The mixing system shall continually agitate the drilling fluid during drilling operations.

c. Drilling Fluid Delivery and Recovery System

i. The drilling fluid pumping system shall have a minimum capacity to supply drilling fluid in accordance with the drilling equipment pull-back rating at a constant required pressure.

ii. The delivery system shall have filters or other appropriate in- line equipment to prevent solids from being pumped into the drill pipe.

iii. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and properly disposed of.

iv. The use of spill containment measures shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system (if used) to prevent spills into the surrounding environment. Pumps, vacuum truck(s), and/or storage of sufficient size shall be in place to contain excess drilling fluid.

v. A closed-loop drilling fluid system and a drilling fluid cleaning system should be used to whatever extent practical, depending upon project size and conditions.

vi. Under no circumstances shall drilling fluid that has escaped containment be reused in the drilling system.

d. Drilling Control System:

i. Calibration of the electronic detection and control system shall be verified prior to the start of the bore.

ii. The drilling head shall be remotely steer-able by means of an electronic or magnetic detection system.

iii. The drilling head location shall be monitored in three dimensions:

iv. Offset from the baseline,

v. Distance along the baseline, and

vi. Depth of cover.

Point of rotation of the head shall also be monitored.

For gravity application and on-grade drilling, sonde/beacon, or approved equipment applicable for grade increments of $1/10^{th}$ of one percent shall be used.

2.10 PIPE PULL HEADS

A. Pipe pull heads shall be utilized that employ a positive through-bolt design assuring a smooth wall against the pipe cross-section at all times.

B. Pipe pull heads shall be specifically designed for use with fusible PVC pipe, and shall be as recommended by the pipe supplier.

2.11 PIPE ROLLERS

A. Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe during handling and pullback operations.

B. A sufficient quantity of rollers and spacing, per the pipe supplier's guidelines shall be used to assure adequate support and excessive sagging of the product pipe.

PART 3 - EXECUTION

3.01 DELIVERY AND OFF-LOADING

A. All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the OWNER or ENGINEER.

B. Each pipe shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify OWNER or ENGINEER immediately if more than immaterial damage is found. Each pipe shipment should be checked for quantity and proper pipe size, color and type.

C. Pipe should be loaded, off-loaded, and otherwise handled in accordance with AWWA

M23, and all of the pipe supplier's guidelines shall be followed.

D. Off-loading devices such as chains, wire rope, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.

E. During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.

F. If appropriate unloading equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to ensure that pipe is not dropped or damaged. Pipe should be carefully lowered, not dropped, from trucks.

3.02 HANDLING AND STORAGE

A. Any length of pipe showing a crack, or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the OWNER or ENGINEER.

B. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the OWNER or ENGINEER.

C. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. The interior of the pipe, as well as all end surfaces, should be kept free from dirt and foreign matter.

D. Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way.

E. If pipe is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build-up is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.

F. Pipe shall be stored and stacked per the pipe supplier's guidelines.

3.03 FUSION PROCCESS

A. General:

1. Fusible PVC pipe will be handled in a safe and non-destructive manner

before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines.

2. Fusible PVC pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.

3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine.

4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following properties, including the following elements:

B. Heat Plate:

1. Heat plates shall be in good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination.

2. Heater controls shall function properly; cord and plug shall be in good condition.

3. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's guidelines.

C. Carriage:

1. Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

D. General Machine:

1. Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

E. Data Logging Device:

1. The current version of the pipe supplier's recommended and compatible software shall be used.

2. Datalogging device operations and maintenance manual shall be with the unit at all times.

3. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

F. Pipe rollers Pipe rollers shall be used for support of pipe to either side of the machine

G. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement and /or windy weather.

H. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.

I. Facing blades specifically designed for cutting fusible PVC pipe shall be used.

J. Joint Recording:

1. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine.

2. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of thermoplastic pipe.

3. The software shall register and/or record the parameters required by the pipe supplier and these specifications.

4. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician’s joint report.

3.04 DRILLING OPERATIONS

A. General:

1. Bore path and alignment are as indicated in the contract documents.

2. The path of the bore may be modified based on field and equipment conditions.

3. Entry and exit locations and control-point elevations shall be maintained as indicated in the contract documents.

4. Bend radii shown in the contract documents are minimum allowable radii and shall not be reduced.

B. Location and Protection of Underground Utilities:

1. Correct location of all underground utilities that may impact the HDD installation is the responsibility of the CONTRACTOR, regardless of any locations shown on the drawings or previous surveys completed.

2. Utility location and notification services shall be contacted by the CONTRACTOR prior to the start of construction.

3. All existing lines and underground utilities shall be positively identified, including exposing those facilities that are located within an envelope of possible impact of HDD installation as determined for the project specific site conditions. It is the CONTRACTOR and HDD system operator's responsibility to determine this envelope of safe offset from existing utilities. This will include, but is not limited to, soil conditions and layering, utility proximity and material, HDD system and equipment, and foreign subsurface material.

C. Site Location Preparation:

1. Work site as indicated on drawings shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made

2. CONTRACTOR shall confine all activities to designated work areas.

D. Drilling Layout and Tolerances:

1. The drill path shall be accurately surveyed with entry and exit areas placed in the appropriate locations within the areas indicated on drawings. If using a magnetic guidance system, drill path will be surveyed for any surface geomagnetic variations or anomalies.

2. Instrumentation shall be provided and maintained at all times that accurately locates the pilot hole, measures drill-string axial and torsional loads and measures drilling fluid discharge rate and pressure

3. Entry and exit areas shall be drilled so as not to exceed the bending limitations of the pipe as recommended by the pipe supplier.

E. Pilot Hole Bore:

1. Pilot hole shall be drilled along bore path. In the event that the pilot bore does deviate from the bore path, it may require contractor to pull-back and re-drill from the location along bore path before the deviation.

2. The CONTRACTOR shall limit curvature in any direction to reduce force on the pipe during pull-back. The minimum radius of curvature shall be no less than that specified by the pipe supplier and as indicated on the drawings.

F. Reaming:

1. After successfully completing the pilot hole, the bore hole shall be reamed to a diameter which meets the requirements of the pipe being installed. The following table is offered as an estimated guide:

Nominal Pipe Diameter	Bore Hole Diameter
< 8 inches	Pipe Dia. + 4 inches
8 inches to 24 inches	Pipe Dia. X 1.5
> 24 inches	Pipe Dia. + 12 inches

2. Multiple reaming passes shall be used at the discretion of the CONTRACTOR and shall conform to this specification.

3. In the event of a drilling fluid fracture, returns loss or other loss of drilling fluid, the CONTRACTOR shall be responsible for restoring any damaged property to original condition and cleaning up the area in the vicinity of the damage or loss. PIPE PULL-BACK AND INSERTION

G. Pipe shall be fused prior to insertion, if the site and conditions allow, into one continuous length.

H. CONTRACTOR shall handle the pipe in a manner that will not over-stress the pipe prior to insertion. Vertical and horizontal curves shall be limited so that the pipe does not bend past the pipe supplier's minimum allowable bend radius, buckle, or otherwise become damaged. Damaged portions of the pipe shall be removed and replaced.

I. The pipe entry area shall be graded as needed to provide support for the pipe and to allow free movement into the bore hole.

1. The pipe shall be guided into the bore hole to avoid deformation of, or damage to, the pipe.

2. The fusible PVC pipe may be continuously or partially supported on rollers or other OWNER and ENGINEER approved friction decreasing implement during joining and insertion, as long as the pipe is not over-stressed or critically abraded prior to, or during installation.

3. A swivel shall be used between the reaming head and the fusible PVC pipe to minimize torsion stress on the pipe assembly.

Buoyancy modification shall be at the sole discretion of the CONTRACTOR, and shall not exceed the pipe supplier's guidelines in regards to maximum pull force or minimum bend radius of the pipe. Damage caused by buoyancy modifications shall be the responsibility of the CONTRACTOR.

J. Once pull-back operations have commenced, the operation shall continue without interruption until the pipe is completely pulled through the bore hole.

K. The pipe shall be installed in a manner that does not cause upheaval, settlement, cracking, or movement and distortion of surface features. Any damages caused by the CONTRACTOR's operations shall be corrected by the CONTRACTOR.

3.05 INSTALLATION CLEANUP

A. Following the installation, the project site shall be returned to a condition equal to or better than the pre-construction condition of the site. All excavations will be backfilled and compacted per the construction documents and jurisdictional standards. All pavement and hardscape shall be repaired per applicable jurisdictional standards, excess materials shall be removed from the site, and disturbed areas shall be re- landscaped. All drilling fluid shall be properly disposed of per these specifications and all applicable jurisdictional laws.

B. CONTRACTOR shall verify that all utilities, structures, and surface features in the project area are sound.

3.06 PREPARATION PRIOR TO MAKING CONNECTIONS INTO EXISTING PIPING SYSTEMS

A. Approximate locations for existing piping systems are shown in the construction documents. Prior to making connections into existing piping systems, the CONTRACTOR shall:

1. Field verify location, size, piping material and piping system of the existing pipe.

2. Obtain all required fittings, which may include saddles, sleeve type couplings, flanges, tees, or others as shown in the construction documents.

3. Have installed all temporary pumps and/or pipes in accordance with established connection plans.

B. Unless otherwise approved, new piping systems shall be completely assembled and successfully tested prior to making connections into existing pipe systems.

3.07 PIPE SYSTEM CONNECTIONS

A. Pipe connections shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines and as indicated in the construction documents. Pipe connections to structures shall be installed per applicable standards and regulations, as well as per the connection manufacturer's guidelines.

3.08 TAPPING FOR POTABLE AND NON-POTABLE WATER APPLICATIONS

A. Tapping shall be performed using standard tapping saddles designed for use on PVC piping in accordance with AWWA C605. Tapping shall be performed only with use of tap saddles or sleeves. NO DIRECT TAPPING WILL BE PERMITTED. Tapping shall be performed in accordance with the applicable sections for Saddle Tapping per Uni-Pub-8.

B. All connections requiring a larger diameter than that recommended by the pipe supplier, shall be made with a pipe connection as specified and indicated on the drawings.

C. Equipment used for tapping shall be made specifically for tapping PVC pipe:

1. Tapping bits shall be slotted "shell" style cutters, specifically made for PVC pipe. 'Hole saws' made for cutting wood, steel, ductile iron, or other materials are strictly prohibited.

2. Manually operated or power operated drilling machines may be used.

3. Taps may be performed while the pipeline is filled with water and under pressure ('wet' tap), or when the pipeline is not filled with water and not under pressure ('dry' tap).

3.09 TESTING

A. Testing shall comply with all applicable jurisdictional building codes, statutes, standards, regulations, and laws.

B. Hydrostatic Testing and Leakage Testing for Pressure Piping:

1. Hydrostatic and leakage testing for piping systems that contain mechanical jointing as well as fused PVC jointing shall comply with AWWA C605.

2. Unless agreed to or otherwise designated by the owner or engineer, for a simultaneous hydrostatic and leakage test following installation, a pressure equal to 150% of working pressure at point of test, but not less than 125% of normal working pressure at highest elevation shall be applied. The duration of the pressure test shall be for two (2) hours.

3. If hydrostatic testing and leakage testing are performed at separate times, follow procedures as outlined in AWWA C605.

4. In preparation for pressure testing the following parameters must be followed:

   a. All air must be vented from the pipeline prior to pressurization.
   b. This may be accomplished with the use of the air relief valves or corporation stop valves, vent piping in the testing hardware or end caps, or any other method which adequately allows air to escape the pipeline at all high points.
   c. Venting may also be accomplished by 'flushing' the pipeline in accordance with the parameters and procedures as described in AWWA C605.
   d. The pipeline must be fully restrained prior to pressurization.

      1) This includes complete installation of all mechanical restraints per the restraint manufacturer's guidelines, whether permanent or temporary to the final installation.
      2) This also includes the installation and curing of any and all required thrust blocking.
      3) All appurtenances included in the pressure test, including valves, blow-offs, and air-relief valves shall be checked for proper installation and restraint prior to the beginning of the test.

   e. Temporary pipeline alignments that are being tested, such as those that are partially installed in their permanent location shall be configured to minimize the amount of potentially trapped air in the pipeline.

3.10 LEAKAGE TESTING FOR NON-PRESSURE PIPING

A. Gravity sanitary sewers that contain mechanical jointing in addition to fused PVC joints may need to be tested for excessive leakage.

1. Gravity sanitary sewer leakage testing may include appropriate water or low-pressure air testing. The leakage outward or inward (exfiltration or infiltration) shall not exceed 25 gallons per inch of pipe diameter per mile per day for any section of the system. An exfiltration or infiltration test shall be performed with a minimum positive head of two feet. The air test, if used, shall be conducted in accordance with one of the following Standards:
   - ASTM F1417
   - UNI-B-6
2. The testing method selected shall properly consider the existing

groundwater elevations during the test.

B. Deflection Testing for Non-Pressure Piping:

1. After completion of the backfill, the ENGINEER or OWNER may require that a deflection test be performed.

2. Deflection tests should be conducted using a go/no-go mandrel.

3. The mandrel's outside dimension shall be sized to permit no more than 7.5 percent deflection.

4. The percent deflection shall be established from the base inside diameter of the pipe.

5. If the internal beading of the joints for the pipe is not required to be removed, the mandrel shall account for this clearance as well.

6. The mandrel shall be approved by the OWNER or ENGINEER prior to use.

C. Lines that permit safe entry may allow other deflection test options, such as direct measurements.

D. Disinfection of the Pipeline for Potable Water Piping:

1. After installation, the pipeline, having passed all required testing, shall be disinfected prior to being put into service.

2. Unless otherwise directed by the OWNER or ENGINEER, the pipeline will be disinfected per AWWA C651.

E. Partial Testing:

1. Segments of the pipe may be tested separately in accordance with standard testing procedure, as approved by the OWNER and ENGINEER.

[END OF SECTION 15075]

SECTION 15101

VALVES AND ACCESSORIES

PART 1 - GENERAL

1.01 SCOPE OF WORK

The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals required and install complete and ready for operation and test all buried and non-buried valves as shown on the Drawings and as specified herein.

1.02 SUBMITTALS

A. Submit materials required to establish compliance with these Specifications in accordance with Section 01300. Submittals shall include the following:

1. Certified drawings showing all important details of construction and dimensions.

2. Descriptive literature, bulletins and/or catalogs of the equipment.

3. The total weight of each item.

4. A complete bill of materials.

5. Additional submittal data, where noted with individual pieces of equipment.

B. Test Reports: Provide certified hydrostatic test data, per Manufacturers standard procedure or MSS-SP-61 for all valves.

C. Certificates: For each valve specified to be manufactured, tested and/or installed in accordance with AWWA and other standards, submit an affidavit of compliance with the appropriate standards, including certified results of required tests and certification of proper installation.

D. Manufacturer’s Installation and Application Data

E. Operating and Maintenance Data: Operating and maintenance instructions shall be furnished to the ENGINEER. The instructions shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions and other information required to instruct operating and maintenance personnel unfamiliar with such equipment.

1.03 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM):

1. ASTM A48 - Specification for Gray Iron Castings.

2. ASTM A126 - Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.

3. ASTM A159 - Specification for Automotive Gray Iron Castings.

4. ASTM A240 - Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels.

5. ASTM A276 - Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.

6. ASTM A436 - Specification for Austenitic Gray Iron Castings.

7. ASTM A536 - Specification for Ductile Iron Castings.

8. ASTM B30 - Specification for Copper-Base Alloys in Ingot Form.

9. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings

B. American Water Works Association (AWWA):

1. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.

2. AWWA C500 - Gate Valves, 3-in Through 48-in NPS, for Water and Sewage Systems

3. AWWA C504 - Rubber-Seated Butterfly Valves

4. AWWA C507 - Ball Valves 6-in Through 48-in

5. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-in Through 24-in NPS

6. AWWA C509 - Resilient-Seated Gate Valves, 3-in Through 12-in NPS, for Water and Sewage Systems

7. AWWA C511 - Reduced Pressure Principle Backflow Prevention Assembly

8. AWWA C540 - Power-Actuating Devices for Valves and Sluice Gates

9. AWWA C550 - Protective Interior Coatings for Valves and Hydrants

10. AWWA C800 - Underground Service Line Valves and Fittings

11. AWWA C515 – Resilient Seated Valves for 14” and Larger

C. American National Standards Institute (ANSI):

1. ANSI B2.1 - Specifications, Dimensions, Gauging for Taper and Straight Pipe Threads (except dry seals).

2. ANSI B16.1 - Cast Iron Pipe Flange and Flanged Fittings Class 25, 125, 250 and 800

3. ANSI B16.10 - Face-to-Face and End-to-End Dimensions of Valves

4. ANSI B16.104 - Butterfly Valves

D. American Iron and Steel Institute (AISI).

E. Manufacturer’s Standardization Society of the Valve and Fittings Industry (MSS):

1. MSS-SP-61 - Pressure Testing of Steel Valves.

2. MSS-SP-67 - Butterfly Valves.

3. MSS-SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends.

4. MSS-SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.

5. MSS-SP-72 - Ball Valves with Flanged or Butt-Welding Ends for General Services.

6. MSS-SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends.

7. MSS-SP-80 - Bronze Gate, Globe, Angle and Check Valves.

8. MSS-SP-82 - Valve Pressure Testing Methods

9. MSS-SP-98 - Protective Epoxy Coatings for Interior of Valves and Hydrants.

F. National Electrical Manufacturers Association (NEMA).

G. Underwriters Laboratories (UL).

H. Factory Mutual Insurance (FM).

I. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Valves and appurtenances shall be products of well established firms who are fully experienced, minimum 10 years, reputable and qualified in the manufacture of the particular equipment to be furnished.

2. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

3. All units of the same type shall be the product of one Manufacturer.

B. Certifications:

1. The Manufacturer’s shall furnish an affidavit of compliance with Standards referred to herein as specified in paragraph 1.03C.

2. Refer to Part 3 for testing required for certain items in addition to that required by referenced standards.

C. Provide the services of a qualified and factory-trained service representative of the Manufacturer to provide operational and maintenance instruction, for a one-day, eight-hour period for:

1. Valve motor operators.

2. Valve hydraulic operators.

3. Valve pneumatic operators.

4. Pressure regulating valves.

5. Air release, air, and vacuum valves.

D. Inspection of the units may also be made by the ENGINEER or other representative of the OWNER after delivery. The equipment shall be subject to rejection at any time due to failure to meet any of the Specification requirements, even though submittal data may have been accepted previously. Equipment rejected after delivery shall be marked for identification and shall be removed from the job site at once.

1.05 SYSTEM DESCRIPTION

A. All of the equipment and materials specified herein is intended to be standard for use in controlling the flow of wastewater, sludges, reclaimed water, potable water, air, or chemicals, depending on the individual systems, as noted on the Drawings.

B. Valves, appurtenances, and miscellaneous items shall be installed as shown on the Drawings and as specified, so as to form complete workable systems.

C. Unless otherwise noted all powered valve operators shall have:

1. Valves smaller than 8 inches: electric operators 120V, single phase, 60 Hz.

2. Valves larger than 8 inches: electric operators 480 volt, 3 phase, 60 Hz.

3. Solenoid valves: 120-volt, single phase, 60 hz, NEMA 4 enclosure, continuous duty Class F coils and manual operator.

4. See other paragraphs for additional requirements.

D. Packing and Shipping:

1. Care shall be taken in loading, transporting, and unloading to prevent injury to the valves, appurtenances, or coatings. Equipment shall not be dropped. All valves and appurtenances shall be examined before installation and no piece shall be installed which is found to be defective. Any damage to the coatings shall be repaired as acceptable to the ENGINEER.

2. Prior to shipping, the ends of all valves shall be acceptably covered to prevent entry of foreign material. Covers shall remain in place until after installation and connecting piping is completed.

a. All valves 3-in and larger shall be shipped and stored on site until time of use with wood or plywood covers on each valve end.

b. Valves smaller than 3-in shall be shipped and stored as above except that heavy cardboard covers may be used on the openings.

c. Rising stems and exposed stem valves shall be coated with a protective oil film which shall be maintained until the valve is installed and put into use.

d. Any corrosion in evidence at the time of acceptance by the OWNER shall be removed, or the valve shall be removed and replaced.

E. Storage and Protection:

Special care shall be taken to prevent plastic and similar brittle items from being directly exposed to the sun, or exposed to extremes in temperature, to prevent deformation. See the individual piping specifications and Manufacturer's information for further requirements.

1.06 MAINTENANCE

A. Special tools and the Manufacturer's standard spare parts, if required for normal operation and maintenance, shall be supplied with equipment.

B. Provide all special tools required for normal maintenance.

C. Tools shall be packaged in a steel case, clearly and indelibly marked on the exterior to indicate equipment for which tools are intended.

D. Provide to the OWNER a list of all spare and replacement parts with individual prices and location where they are available.

E. Prices shall remain in effect for a period of not less than one year after start-up and final acceptance.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT - GENERAL

A. Reference is made to Division 1 for additional requirements, including nameplates, provisions for temporary pressure gages, protection against electrolysis and anchor bolts.

B. The use of a Manufacturer's name and/or model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

C. Valves and appurtenances shall be of the size shown on the Drawings or as noted and as far as possible equipment of the same type shall be identical and from one Manufacturer.

D. Valves and appurtenances shall have the name of the maker, nominal size, flow directional arrows, working pressure for which they are designed and standard referenced, cast in raised letters or indelibly marked upon some appropriate part of the body.

E. Unless otherwise noted, items shall have a minimum working pressure of 150 psi or be of the same working pressure as the pipe they connect to, whichever is higher and suitable for the pressures noted where they are installed.

F. Joints, size, and material - unless otherwise noted or required by the ENGINEER:

1. Except where noted, all joints referred to herein shall be of the same type, nominal diameter, material and with a minimum rating equal to the pipe or fittings they are connected to.

2. Valves and appurtenances shall be of the same nominal diameter as the pipe or fittings they are connected to.

3. All valves exposed to view, or in vaults.

a. 3-in and smaller - threaded ends

b. 4-in and larger flanged ends.

G. Provide all special adaptors as required to ensure compatibility between valves, appurtenances, and adjacent pipe.

H. Valves and actuators located outdoors but not within a building; within maximum 2-ft above liquid; in vaults; or where otherwise noted shall be especially designed for submerged service where water may completely submerge the valve and operator. All other units shall be as a minimum weather tight.

2.02 VALVE ACTUATORS - GENERAL

A. The valve Manufacturer shall supply and integrally, rigidly mount all

actuators, including any type of manual or powered actuators, on valves at the factory. The valves and their individual actuators shall be shipped as a unit.

B. Unless otherwise noted, valves shall be manually actuated; nonburied valves shall have an operating wheel, handle or lever mounted on the operator; buried valves and those with operating nuts shall have a non-rising stem with an AWWA 2-in nut. At least two tee handles shall be provided for all operating nuts.

C. Except as otherwise shown on the Drawings or specified herein, all valves 3-in diameter or larger, with the valve center line located 7-ft or more above the operating floor, shall be provided with chain wheel operators complete with chain guides and hot dipped galvanized steel chain, which loop within 4-ft of the operating floor.

D. All actuators shall be capable of moving the valve from the full open to full close position and in reverse and holding the valve at any position part way between full open or closed.

E. Each operating device shall have cast on it the word “OPEN” and an arrow indicating the direction of operation.

F. Floor boxes for operating nuts recessed in concrete shall be standard cast iron type, cast-in-place, with fastening top by Clow or equal.

G. Stem guides shall be of the adjustable wall bracket type, bronze bushed, with maximum spacing of 10-ft as manufactured by Clow; Rodney Hunt or equal. Extended operating nuts and/or stems shall have universal joints and pin couplings, if longer than 10-ft and a rating of at least five times the maximum operating torque. Stem adaptors shall be provided.

H. Where required by the installation, or as specified, provide the following: extended stem; floor stand and handwheel; position indicator and etched or cast arrow to show direction of rotation to open the valve; resilient seal around stem penetration of slab.

2.03 BUTTERFLY VALVES FOR FLUID SERVICE (METAL BODY)

A. Butterfly valves and operators up to 72 inches diameter shall conform to AWWA C504, Class 150B, except as hereinafter specified. The Manufacturer shall submit an affidavit of compliance stating that the valves have been manufactured and tested in accordance with AWWA C504 and specifically listing all exceptions. Valves shall have a minimum 150 psi pressure rating or higher as noted on the Drawings or in the Specifications

and be manufactured by Val-Matic Pratt, Dezurik or equal.

B. Butterfly valves for above grade shall be flanged end with face-to-face dimensions in accordance with Table 2 of AWWA C504 Standard for short-body valve. All valves for dead end shut off service shall be flanged type. Butterfly valves for buried service shall be mechanical joint ends conforming to ANSI/AWWA C111/A21.11 and shall be mechanically restrained with Megalug Series 1100 or ENGINEER approved equal.

C. Valve seats shall be full resilient seats retained in the body or on the disc edge in accordance with AWWA C504. Valve discs shall be constructed of cast iron, ASTM A48, Class 40; Ni-resist, ASTM A126, Class B; or ductile iron, ASTM A536, Grade 65-45-12.

1. For valves 24-inch in diameter and larger, when the resilient seats are attached to the body, discs shall have Type 316 stainless steel seating edges. When the resilient seat is attached to the disc, it shall be fastened with a one-piece Type 316 stainless steel retaining ring, Type 316 stainless steel Nylock set screws and a mating Type 316 stainless steel ring shall be installed in the valve body.

2. Resilient seats shall be Hycar or equal. Seats shall be fully adjustable and replaceable with the valves in place for all valves.

D. The valve body shall be constructed of close grain cast iron per ASTM A126, Class B with integrally cast hubs for shaft bearing housings of the through boss-type. Permanently self-lubricating body bushings shall be provided and shall be sized to withstand bearing loads. Stuffing box of liberal dimensions shall be provided at the operator end of the vane shaft.

1. Packing shall be of the self-compensating v-type. A sealing element utilizing O-rings shall also be acceptable for up to and including 24-in valves. Over 24-in, pull down seals using a square braid of graphited asbestos is an acceptable alternate.

2. Packing shall be held in place by a bolted corrosion resistant retainer plate or gland; retainer clips are not acceptable. For 30-in or larger, use a stuffing box with follower gland.

3. Replacement of seals, for all size butterfly valves, shall not require removal of the valve from the line. In addition adjustment or replacement of seals on valves of 30-in or larger shall not require disturbing any part of the valve or operator assembly, except any packing follower gland.

E. The valve shaft shall be of Type 316 stainless steel and designed for both torsional and shearing stresses when the valve is operated under its greatest dynamic or seating torque. No reductions of shaft diameter will be allowed except at the operator connection. Any reduction shall have a full radius fillet.

F. In general, the butterfly valve actuator shall conform to the requirements of AWWA C504, insofar as applicable and as herein specified.

G. Gearing for the actuators where required shall be totally enclosed in a gear case in accordance with AWWA C504.

H. The manual actuators shall conform to AWWA C504, insofar as applicable. Actuators shall have permanent indicators with raised or engraved marks to show position of the valve disc.

2.04 GATE VALVES (2-1/2-IN AND SMALLER)

A. Gate valves 2-1/2-in diameter and smaller shall have flanged, screwed, or solder ends as required and shall be brass, or bronze, or Type 304 stainless steel solid wedge, union bonnet, rising-stem gate valves such as Figures 47 and 48 as manufactured by Jenkins Brothers or equal products as manufactured by Crane; Fairbanks; Lukenhiemer or equal.

B. All water valves 2-1/2-in and 3-in unless noted otherwise, shall be brass body gates and shall be Jenkins No. 1240, or Hammond 1B-647.

2.05 GATE VALVES (3-IN AND LARGER)

A. General Requirements:

1. Unless otherwise specified below, these requirements shall apply to all gate valves.

2. Gate valves shall meet the requirements of AWWA C500 and AWWA C509 as applicable to the type of valve specified.

3. Buried and submerged valves shall be furnished with mechanical joints and stainless-steel hardware, non-rising stem design.

4. Exposed valves shall be furnished with Class 125 flanged ends and hand wheel; provide valves with outside screw and yoke.

5. All-metal valves shall be manufactured of ASTM A536, Ductile Iron, with bronze mounting design.

6. Rising stem valves shall be sealed with adjustable and replaceable packing; valve design must permit packing replacement under operating system pressures with only moderate leakage.

7. Non-rising stem valves shall use a double O-ring stem seal, except that packing shall be used where geared operators are required.

8. Except as otherwise specified, valves shall be rated for the following working water pressures:

Valve Size	Pressure (psig)
3-in to 12-in	250
14-in to 20-in	250
24-in and greater	250

All valve bodies shall be hydrostatically tested to at least twice the rated working water pressure. In addition, valves shall be seat-tested, bi-directional at the rated working pressure, with seat leakage not to exceed one fluid ounce per inch of valve diameter per hour. Provide certificates of testing.

9. Flanged valves to have face-to-face dimensions per ANSI B16.1 and flanges per ANAI B16.10.

10. Exposed valves 16-in and larger to have valve bypass.

11. All bonnet and packing gland bolts shall be zinc or cadmium electroplated steel; packing gland bolts shall have bronze nuts.

12. Exposed valves 16-in and greater indicated for horizontal stem installation shall be furnished with rollers, tracks and scrapers and enclosed bevel gear grease case.

13. Provide geared operator and chain wheel, chain, and chain guides for valves with handwheel centerline more than 7-ft above operating level.

14. All valves shall be marked per AWWA Standards, including name of Manufacturer, valve size and working pressure and year of manufacture.

15. Unless otherwise indicated, valves 12-in and smaller shall be capable of installation in the vertical or horizontal position, sealing

in both directions at the rated pressure.

16. Valve operation shall be counterclockwise for potable water, clockwise for wastewater and other non-potable waters. Provide permanent label showing “OPEN” and arrows.

17. Metal-seated valves shall be coated internally and externally with an asphaltic varnish, per AWWA C500. Resilient seated valves shall be coated, interior and exterior, with fusion bonded epoxy per AWWA C550.

B. Valve Applications:

1. Valves for Non-Potable Water Service:

a. Resilient seat gate valves shall be ductile iron bodied, bronze mounted, with wedge type disk, hand wheel and rubber seat. Valves shall be manufactured in accordance with AWWA C509. Valves shall be suitable for above ground service, be designed for 150 psi working pressure, shall be of O-ring type, with non-rising stem, and opening counterclockwise. Valves shall have flanged ends. Valves shall be coated in accordance with AWWA C550.

b. Resilient seated design manufactured by American R-B Clow, Mueller, M&H Valve Company or equal.

2. Valves for Wastewater Service (NOT USED)

3. At the CONTRACTOR’s option and unless otherwise indicated, any of the listed valve styles may be used, at no additional cost to the OWNER.

C. Valve Requirements:

1. Double Disc (NOT USED)

2. Double Revolving Disc (NOT USED)

3. Solid Wedge (NOT USED)

4. Resilient Seated:

a. Conform to AWWA C509. Also UL and FM approved.

b. Internal and external epoxy coating of valve body, including

bonnet, per AWWA C550.

c. Gate shall be encapsulated with synthetic rubber. It shall be bonded and vulcanized in accordance with ASTM B429 Method B.

d. No recesses in valve body.

D. Buried Valves:

1. Conform to the requirements above, except mechanical joint bell ends per AWWA C111. The valve shall be mechanically restrained with Megalug Series 1100 or ENGINEER approved equal. All exposed valve hardware (nuts, bolts, washers, etc.) including bonnet, bonnet cover, stuffing box, gear adaptor and joints shall be Type 304 stainless steel.

2. Non-rising stem design, double o-ring seals for non-geared valves and shall incorporate packing for geared valves.

3. Provide valve box, 2-in operating nut and extension stem and stem cover.

E. Tapping Valves and Sleeves:

1. Tapping valves shall comply with the same requirements as resilient seated gate valves or double revolving disc gate valves except they shall have the flanged end and port opening modified for tapping service. Valves shall be capable of passing a full nominal sized cutter without damage to the valve. The tapping sleeve shall be gray cast iron or ductile iron mechanical joint type with the outlet flange conforming to MSS-SP-60.

2. All water valves, 4-in and larger, shall be iron body gates, bronze trim, flanged ends, O.S. & Y. pattern, solid wedge, rising spindle, Jenkins No. 651, or Hammond 1R-1140.

2.06 PLUG VALVES

A. Plug valves shall be of the offset disc type, ¼ turn, non-lubricated, serviceable (able to be repacked) under full line pressure and capable of sealing in both directions at the rated pressure. The disc shall be completely out of the flow path when open. Plug valves specified herein shall be by DeZurik, Clow, M&H, Val-Matic, or equal. All Manufacturers, named or otherwise, must comply completely with the specification.

1. For clean liquid or screened sewage, all size plug valves shall have a minimum port area of 80 percent.

2. On sludge and scum lines, all valves 24-in and larger shall have a minimum 100 percent open port area; for all other valves, a minimum port area shall be 80 percent when measured by the percent cross-sectional area of equivalent size (nominal same diameter) pipe.

3. All plug valves for whatever service, shall be capable of passing “pigging” cleaning equipment (using a Girard or similar cleaning pig of full nominal pipeline diameter) in either direction and Manufacturer shall so certify that this may be done without the use of special equipment.

B. Valves shall be rated at minimum 175 psi W.O.G. (Water, Oil, and Gas) working pressure for sizes 4-in to 12-in inclusive and at minimum 150 psi W.O.G. working pressure for sizes 14-in and larger.

1. All plug valves under this paragraph shall be performance, leakage and hydrostatically tested in accordance with AWW A C504, except as herein modified. ‘

2. At the above rated minimum working pressures, the valves shall be certified by the Manufacturer as permitting zero leakage for a period of at least one-half hour with pressure applied to the seating face.

3. At the request of the ENGINEER, the valve Manufacturer may have to perform a valve seat leakage test, witnessed by the ENGINEER to prove compliance with these Specifications.

C. Valve bodies shall be of cast iron, 30,000 psi tensile strength, ASTM A 126, Grade B, or of ductile iron, ASTM A536 and of the top entry, bolted bonnet design, cast with integral flanges conforming to the connecting piping. All exposed bolts, nuts and washers shall be zinc or cadmium- plated, except for buried or submerged valves, which shall have Type 316 stainless steel hardware.

The valve disc shall:

1. Be cast iron ASTM A 126, Grade B, or ductile iron, ASTM A536, Grade 65-45-12.

2. Be removable without removing the valve from the line.

3. Have an integral upper and lower shaft which shall have seals on the upper and lower journals to prevent entrance of solids into the journals.

4. Be one piece for valves up to 14-in and maximum two piece for larger valves.

D. Shaft bearings shall be permanently lubricated, rigidly backed TFE, stainless steel or bronze at both upper and lower stem journals. The operator shaft shall have easily replaceable seals, which shall be externally adjustable and repackable without removing the bonnet from the valve, or shall have self-adjusting packing.

E. The valve seating surface shall provide full 360-degree seating by contact of a resilient seating material on the disc mating with welded-in high nickel content overlay seating surface in the body.

1. The seating design shall be resilient and of the continuous interface type having consistent opening and closing torques and shall be non-jamming in the closed position. Screw-in seats shall not be acceptable.

2. Discs shall have a full resilient facing of neoprene or Buna-N.

F. The methods of mounting the actuator to the valve shall provide an air gap between the two. Actuator shall clearly indicate valve position and an adjustable stop shall be provided. Construction of actuator housing shall be semi-steel. Hardware on actuators shall be of the same materials as the valves.

G. Unless otherwise required, due to location or operation, each valve 6-in and smaller shall be provided with its own securely attached lever. Provide adjustable limit stops for both opening and closing and a clearly marked position indicator.

H. Plug valves shall be installed so that the direction of flow through the valve and the shaft orientation is in accordance with the Manufacturer's recommendations. Unless otherwise noted, shaft shall be horizontal, with plug opening up.

2.07 BALL VALVES

A. Ferrous Ball Valves:

1. Ball valves for mainline or water service shall be either ductile iron or carbon steel body, full bore, fire-safe, rated for a line pressure of

150 psig. Except as noted, ball valves shall comply with AWWA C507.

2. The design of the valve shall be such that it shall provide suitable seating in both directions. In order to determine the position of the ball within the valve (open or closed), there shall be an easily visible, permanent, indicator located conspicuously on the valve. Ball valves shall have Type 316 stainless steel seating surfaces. Seats shall be Type 304 stainless steel. The fully open port area shall be approximately 100 percent of the nominal pipe area.

3. Valve shafts shall be ground and polished and shall be Type 304 stainless steel. Teflon-lined bearings shall be supplied in both trunnions of the valve body.

4. The valves shall be constructed so that the seals, seats, and balls are accessible for replacement without dismantling the piping. The valves shall not require lubrication but shall have stuffing boxes which can be packed with the valve in service without undue leakage. Ball valves shall be as manufactured by Henry Pratt Co., Aurora, IL; Williamette, Portland, or equal.

5. Valve actuators shall conform to AWWA C507 and as specified herein.

B. Ball valves for water piping shall be manual or electric actuated (as shown on the Drawings), bronze, resilient seated, regular port, threaded two-piece bolted body type valves. The body and cap shall be of brass, ASTM B30, the ball and stem of Type 316 stainless steel and the seats and seals of TFE. The valves shall have full floating ball and shall be non-lubricated. Valve seats shall be easily accessible and replaceable. Valves shall be rated to 250 psi and shall be as manufactured by Neles-Jamesbury; WKM or equal.

2.08 CHECK VALVES

A. Swing check valves, sizes 2-1/2 inches through 12 inches shall be spring and lever operated with bronze disc facing and flanged ends with a maximum working pressure of 175 psig and test pressure of 350 psig.

B. Swing check valves, sizes 14 inches through 24 inches shall be spring and lever operated with bronze disc facing and flanged ends with a maximum working pressure of 150 psig and test pressure of 300 psig.

C. Swing check valves, sizes 4 inches and smaller shall use bronze disc ASTM B584.

D. Valves shall meet all applicable parts of ANSI/AWWA C508 Standard.

E. Valves for above grade shall be flanged end. Flanged end dimensions and drilling shall comply with ANSI B16.1, Class 125. Swing check valves for buried service shall be mechanical joint ends.

F. The valve body shall be constructed of ductile or cast iron per ASTM A126, Class B, or ASTM A536, bronze mounted (IBBM).

G. Valves shall be located above grade unless otherwise noted in the Drawings and Specifications.

H. Valves shall have an O-ring sealed stuffing box.

I. Valves shall have adjustable spring tension to control opening and closing of the clapper.

J. Valves shall be installed so that the direction of flow through the valve and the shaft orientation is in accordance with the Manufacturer's recommendations.

K. Swing check valves specified herein shall be by Mueller Company, Model No. 2600 for above grade installations, or ENGINEER approved equal. All Manufacturers, named or otherwise, must comply completely with the specification.

2.09 AIR RELEASE VALVES

A. Air release valve assembly shall be furnished and installed on the reuse water transmission main as shown on the drawings.

B. Air release or valve assembly shall consist of a combination short body, air release-vacuum breaker valves, installed in a manhole with vented manhole cover, gate valve, fittings, tapping saddle and connecting piping to the main.

C. Air release valves shall be installed to release any small accumulations of air, which may collect while pipe is in operation and under pressure.

D. Air release valves on a HDPE pipe shall utilize an electrofusion corp saddle with stainless steel outlet as manufactured by Central Plastics or equal.

E. The air release valves shall be Val-Matic Model 42 or engineer approved equal.

F. The small orifice assembly air release valve shall automatically release air

accumulations from the pipe while under positive pressure.

G. When the valve body fills with air, the float ball shall fall to open the small orifice and exhaust the air to atmosphere.

H. When the air has been exhausted, the float ball shall be buoyed up and tightly close the small orifice.

I. The small orifice assembly shall be furnished with cast iron body and cover (ASTM A126-B).

J. The float ball shall be constructed of stainless steel and attached to a stainless-steel lever mechanism.

K. A resilient, Buna-N seat shall be attached to the lever mechanism for drop-tight closure.

L. Valves shall be corrosion resistant, suitable for reuse water transmission main application, and shall automatically function to release to the atmosphere both large and small amounts of air that accumulate in the pipeline.

M. Once the air has been exhausted, both valves shall seal tightly to prevent liquid leakage.

N. The valve shall also function to admit air into a line, tank, or chamber under emergency conditions or when it is being drained.

O. The capacity and pressure rating of the valve is dependent on the diameter of the precision orifice in the cover.

P. The Orifice Size shall be 5/32-inch. A large inlet connection is required for proper air and water exchange.

Q. The reuse water air release valves inlet size shall be 2-inch NPT for reuse water mains.

R. The reuse water air release valves outlet size shall be 1/2-inch NPT for reuse water mains.

S. The Air Release Valves shall be automatic float operated valves designed to release accumulated air from a piping system while the system is in operation and under pressure and installed in a concrete box as shown on the drawings.

T. Box and like shall be of the necessary size to the valve.

U. To connect the air valve, a corporation stop shall be tapped into the main using the procedures as recommended by the ductile iron pipe manufacturer.

V. The corporation stop shall be Mueller H-10045 or approved equal.

W. The valve body shall be threaded with NPT inlets and outlets.

X. The body inlet connection shall be hexagonal for a wrench connection.

Y. The valve shall have two additional NPT connections for the addition of gauges, testing and draining.

Z. The valve body and cover shall be constructed of ASTM A126 Class B cast iron working pressures of 300 psig, with resilient seats, rubber covered floats and no levers.

AA. The cover shall be bolted to the valve body and sealed with a flat gasket.

BB. Resilient seats shall be replaceable and provide drop tight shut off to the full valve pressure rating.

CC. Floats shall be unconditionally guaranteed against failure including pressure surges.

DD. Mechanical linkage shall provide sufficient mechanical advantage so that the valve will open under full operating pressure.

EE. The orifice, float and linkage mechanisms shall be constructed of Type 304 stainless steel.

FF. Non-metallic floats or linkage mechanisms are not acceptable.

GG. The manufacturer shall demonstrate a minimum of five (5) years' experience in the manufacture of air valves.

HH. The valves shall be manufactured and tested in accordance with American Water Works Association Standard (AWWA) C512.

II. The manufacturer shall provide test certificates, dimensional drawings; parts list drawings, and operation and maintenance manuals.

JJ. The exterior of the valve shall be coated with a universal alkyd primer.

KK. Air Release Valves shall be as manufactured by Val-Matic Valve & Mfg. Corporation Model No. 38.6, Elmhurst, IL. USA or approved equal.

2.10 AIR/VACUUM VALVES (NORMAL OPERATION)

A. The large orifice assembly air and vacuum valve shall automatically exhaust air from a pipeline during the initial filling of the pipeline.

B. The large orifice assembly shall not blow shut while exhausting air, even while venting air at sonic velocity.

C. When all air has been exhausted from the pipeline, the large orifice float ball shall be buoyed up to seat tightly against a resilient seat ring.

D. The large orifice float ball shall remain tightly closed while the pipeline is under positive pressure.

E. Should the pipeline pressure fall below atmospheric pressure (such as during draining or a line break), the large orifice float ball shall automatically fall away from the seat ring and permit air to enter the pipeline.

F. The large orifice assembly shall be furnished with cast iron body and cover (ASTM A126-B).

G. A resilient, Buna-N seat ring shall be affixed to the valve cover.

H. The float ball shall be constructed of stainless steel with a minimum pressure rating of 1,000 psi. [The float ball shall be free floating within the valve body; guide stems, linkages or levers attached to the float are not acceptable.]

I. Unit shall be manufactured by GA; APCO; Val-Matic or equal. Special type for use with non-clean fluids shall be provided.

2.11 COMBINATION AIR AND AIR/VACUUM OR VACUUM RELIEF VALVES

A. Valves shall be corrosion resistant, suitable for reuse water application. Combination air valve assembly shall be furnished and installed on the reuse water transmission main as shown on the drawings.

B. Combination air valve assembly shall consist of a single body, combination air release and air/vacuum valves, installed in a manhole with vented manhole cover, gate valve, fittings, tapping saddle and connecting piping to the reuse water main. Manhole and like shall be of the necessary size to the valve.

C. Combination air valves shall be automatic float operated valves and installed to release large accumulations of air during the filing of the piping

system and close upon liquid entry.

D. The valve shall open during draining or if a negative pressure occurs.

E. The valve shall also release accumulated from a piping system while the system is in operation and under pressure.

F. The capacity and pressure rating of the valve is dependent on the diameter of the precision orifice in the cover.

G. The large orifice diameter shall be 2-inch and the air release orifice shall be 3/32."

H. A large inlet connection is required for proper air and water exchange.

I. The reuse water combination air valves inlet and outlet size shall be 2-inch NPT.

J. To connect the air valve, a corporation stop shall be tapped into the main using the procedures as recommended by the ductile iron pipe manufacturer.

K. The corporation stop shall be Mueller H-10045 or approved equal.

L. The single body valve shall be threaded with NPT inlets and outlets. The NPT inlets and outlets shall be equal to the nominal valve size.

M. The body inlet connection shall be hexagonal for a wrench connection.

N. The valve shall have two additional NPT connections for the addition of gauges, testing and draining.

O. The combination air valve shall be furnished with cast iron body and cover (ASTM A126-B).

P. The float ball, guide shafts, and bushings shall be constructed of type 304 stainless steel and attached to a stainless-steel lever mechanism.

Q. A resilient, Buna-N seat shall be attached to the lever mechanism for drop-tight closure. Non-metallic floats or linkage mechanisms are not acceptable.

R. Single body combination valves shall have an expanded outlet to provide full are around the guide mechanism.

S. The valve shall have a double guided plug and an adjustable threaded

orifice.

T. The plug shall be protected against direct water impact by an internal baffle.

U. The plug shall have a precision orifice drilled through the center stem.

V. The cover shall be bolted to the valve body and sealed with a flat gasket.

W. Resilient seats shall be replaceable and provide drop tight shut off to the full valve pressure rating.

X. Floats shall be unconditionally guaranteed against failure including pressure surges.

Y. Mechanical linkage shall provide sufficient mechanical advantage so that the valve will open under full operating pressure.

Z. The exterior of the valve shall be coated with a universal alkyd primer.

AA. The manufacturer shall demonstrate a minimum of five- (5) years' experience in the manufacture of air valves.

BB. The valves shall be manufactured and tested in accordance with American Water Works Association Standard (AWWA) C512.

CC. The manufacturer shall provide test certificates, dimensional drawings; parts list drawings, and operation and maintenance manuals.

DD. Air Valves shall be as manufactured by Val-Matic Valve & Mfg. Corporation engineer approved equal.

2.12 PRESSURE RELIEF VALVES FOR AIR

A. Pressure relief valves shall be designed for air and built to ASME standards and shall be National Board Certified.

B. The Valve shall have a one-piece brass body, chrome steel ball on brass seat, silicone rubber seal, and stainless-steel spring.

C. The Preset pressure limit of 100 psi shall be tested and sealed by the manufacturer.

D. The pressure relief valve shall have a bubble tight seal within 10% of set pressure.

E. The pressure relief valve shall be manufactured by Control Devices, Inc. or ENGINEER-approved equal.

2.13 INSULATING FITTINGS

Fittings shall be of type to provide control of electrolysis and equal to “Dielectric” as manufactured by Watts Regulator Co., or equal.

2.14 SURFACE PREPARATION AND SHOP COATINGS

A. Not withstanding any of these Specifications, all coatings, and lubricants in contact with non-potable water shall be certified as acceptable for use with that fluid.

B. In case of a conflict, the requirements of this Section govern.

C. If the Manufacturer’s requirement is not to require finished coating on any interior surfaces, then Manufacturer shall so state and no interior finish coating will be required, if acceptable to the ENGINEER.

D. The exterior surface of various parts of valves, operators, floor-stands, and miscellaneous piping shall be thoroughly cleaned of all scale, dirt, grease, or other foreign matter and thereafter one shop coat of an approved rust-inhibitive primer such as Inertol Primer No. 621 shall be applied in accordance with the instructions of the paint Manufacturer or other primer compatible with the finish coat provided.

E. Unless otherwise noted, interior ferrous surfaces of all valves shall be given a shop finish of an asphalt varnish conforming to AWWA C509, (except mounting faces/surfaces) or epoxy AWWA C550 with a minimum thickness of 4 mil.

F. Ferrous surfaces obviously not to be painted shall be given a shop coat of grease or other suitable rust-resistant coating.

G. Mounting surfaces shall be especially coated with a rust preventative.

H. Special care shall be taken to protect uncoated items and plastic items, especially from environmental damage.

2.15 FACTORY INSPECTION, TESTING AND CORRECTION OF DEFICIENCIES

A. Factory inspection, testing and correction of deficiencies shall be done in accordance with the referenced Standards and as noted herein.

B. See Division 1 for additional requirements. Also refer to Part 1 of this

Section, especially for required submission of test data to the ENGINEER.

C. In addition to all tests required by the referenced Standards, the following shall also be factory tested:

1. Pressure regulating valves shall be factory tested at the specified pressures and flows.

2. The non-cavitating butterfly valves, to demonstrate its non-cavitating capabilities.

3. All types of air and vacuum valves.

2.16 VALVE BOXES

A. Valve boxes shall be provided for all buried valves.

B. Valve boxes shall consist of cast iron base and adjustable top section with cover, which shall be marked “Water, Sewer, or Reuse.”

C. Cast iron extensions shall be provided as required to meet grade.

PART 3 - EXECUTION

3.01 INSTALLATION - GENERAL

A. All valves and appurtenances shall be installed per the Manufacturer’s instructions in the locations shown, true to alignment and rigidly supported.

B. Any damage to the above items shall be repaired to the satisfaction of the ENGINEER before they are installed.

C. Install all brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings, or otherwise required.

D. Before setting these items, the CONTRACTOR shall check all Drawings and figures which have a direct bearing on their location.

E. The CONTRACTOR shall be responsible for the proper location of valves and appurtenances during the construction of the Work.

F. All materials shall be carefully inspected for defects in construction and materials. All debris and foreign material shall be cleaned out of openings, etc.

G. All valve flange covers shall remain in place until connected piping is in place.

H. All operating mechanisms shall be operated to check their proper functioning and all nuts and bolts checked for tightness.

I. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced at no additional cost to the OWNER.

J. Where installation is covered by a Referenced Standard, installation shall be in accordance with that Standard, except as herein modified, and the CONTRACTOR shall certify such. Also note additional requirements in other parts of this Specification.

K. Unless otherwise noted, joints for valves and appurtenances shall be made up utilizing the same procedures as specified under the applicable type connecting pipe joint and all valves and other items shall be installed in the proper position as recommended by the Manufacturer.

L. CONTRACTOR shall be responsible for verifying Manufacturer's torquing requirements for all valves.

3.02 INSTALLATION OF MANUAL OPERATIONAL DEVICES

A. Unless otherwise noted, all operational devices shall be installed with the units of the factory, as shown on the Drawings or as acceptable to the ENGINEER to allow accessibility to operate and maintain the item and to prevent interference with other piping, valves and appurtenances.

B. For manually operated valves 3-inch in diameter and smaller, valve operators and indicators shall be rotated to display toward normal operation locations.

C. Floor boxes, valve boxes, extension stems, and low floor stands shall be installed vertically centered over the operating nut, with couplings as required and the elevation of the box top shall be adjusted to conform with the elevation of the finished floor surface or grade at the completion of the Contract.

D. Boxes and stem guides shall be adequately supported during concrete pouring to maintain vertical alignment.

3.03 INSPECTION, TESTING AND CORRECTION OF DEFICIENCIES

A. See also Division 1. Take care not to over pressure valves or

appurtenances during pipe testing.

B. If any unit proves to be defective, it shall be replaced or repaired to the satisfaction of the ENGINEER.

C. Functional Test:

1. Prior to plant start-up, all items shall be inspected for proper alignment, quite operation, proper connection, and satisfactory performance.

2. All units shall be operated continuously while connected to the attached piping for at least 8 hours, without vibration, jamming, leakage, or overheating and perform the specified function.

D. The various pipe lines in which the valves and appurtenances are to be installed are specified to be field tested.

E. During these tests, any defective valve or appurtenance shall be adjusted, removed, and replaced, or otherwise made acceptable to the ENGINEER.

F. Various regulating valves, strainers, or other appurtenances shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected or the device replaced or otherwise made acceptable to the ENGINEER.

3.04 IDENTIFICATION OF VALVES

A. All valves shall be designated by distinguishing numbers and/or letters on required chart(s) and/or diagram(s).

B. The CONTRACTOR shall install approved brass tags for all designated items with numbers and/or letters on the tags corresponding to those on the chart(s) and/or diagram(s).

C. Each valve identification tag to be minimum 19-gauge polished brass: 2-inch diameter.

D. Each tag to designate appropriate service (1/4 inch stamped black-filled letters) and appropriate valve number (1/2 inch stamped black-filled number).

E. Tags shall be securely fastened to valves with approved stainless-steel screws or rivets, or brass jack chain, in a manner to permit easy reading.

F. CONTRACTOR shall prepare piping flow diagrams (or re-use those on the

contract plans) indicating valve numbers, service, normal position, etc., of each valve.

G. Diagrams shall be mounted on an ornamental iron frame with hinged plexiglass face for wall mounting. Four (4) frames with plexiglass are required.

H. The requirements for valve identification specified above applies equally to all valves installed under this and under other sections of these specifications.

3.05 CLEANING

All items (including valve interiors) shall be cleaned prior to installation, testing, disinfection, and final acceptance.

3.06 DISINFECTION

Disinfection of valves and appurtenances shall be in accordance with AWWA Requirements.

3.07 SETTING VALVES AND BOXES

A. Valves and valve boxes as specified in the preceding paragraphs shall be installed where shown on the drawings unless otherwise directed.

B. Valves shall be set plumb with the base of the valve box centered over the valve and resting on compacted backfill.

C. The top section of the box shall be set to allow equal movement above and below finished grade.

D. After being correctly positioned, fill shall be carefully tamped around the valve box for a distance of 4-feet on all sides of the box.

E. In paved areas, top of the cover shall be flush with the finished paving.

F. In off-street areas, the cover shall be set 1-inch above existing grade unless otherwise directed by the ENGINEER and a concrete pad shall be poured around the top of the box as shown in the standard details.

[END OF SECTION 15101]

SECTION 15110

DIRECTIONAL BORES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The extent of directional boring is shown on the Drawings.

B. The work included in this section covers the installation of carrier pipe by the directional boring (trenchless installation) method as described herein, within the limits indicated on the Drawings. In general, include the following:

1. Bore pit.
2. Pilot hole (as required).
3. Drilling fluids.
4. Carrier pipe.
5. Removal and disposal of drilling fluids and soil cuttings.
6. Soil reports as required by jurisdictional agencies beyond those already provided by the OWNER.
7. Siltation and sediment control.
8. All other work required to install the carrier pipe as specified herein and as shown on the drawings.

C. The CONTRACTOR will furnish all labor, equipment, materials, and supplies as well as will perform all work necessary to provide the OWNER with complete, finished reclaimed water and sewer force main crossing via horizontal directional drilling.

D. The proposed alignment length, profile, and grade to which the sewer force main shall be installed are noted on the applicable Drawings. This profile indicates the minimum grade to which the pipe will be installed.

1.02 DESIGN/PERFORMANCE REQUIREMENTS

A. Provide design engineering for the work as described in Paragraph 1.2 and as described herein and on the Drawings, including, but not limited to, the following elements:

1. Bore hole diameter and length.

2. Location of borehole entry and exit points.

3. Drilling procedures.

4. Pipeline pulling operations.

5. Method of drilling fluid disposal.

6. Area required for drilling operations and storage of pipe.

7. Drilling fluids management plan.

8. Review of plan and profile drawings and proposed horizontal and vertical alignment of the pipeline, with written certification of agreement with them, or recommended departure from them.

B. The CONTRACTOR's submitted design shall be signed and sealed by a Professional Engineer whose specialty includes design of horizontal drilling operations. The cost of these engineering services will be included in the Bid Price.

C. The CONTRACTOR shall be responsible for conducting the job in accordance with all applicable federal, state, and local permits, codes, and statutes.

1.03 SUBMITTALS

A. Drawings:

1. Working drawings showing in detail the size and location of boring pits together with all sheeting and shoring to be used in supporting embankments and trench walls, and any other details of the proposed methods of installation required to allow adequate review by the ENGINEER.

2. The CONTRACTOR shall prepare a drilling plan indicating equipment proposed for each location, pull-back forces anticipated and shall verify that the DR of the pipe specified is adequate to withstand the anticipated pull-back forces in addition to the earth, line, and groundwater loads.

B. Shop Drawings:

1. Complete layout and details for fabrication and installation of pipeline; including design data and calculations.

2. Submittal shall include, but not be limited to, elements listed in Paragraph 1.02 - Design/Performance Requirements above.

C. Task Schedule:

1. Detailed schedule of tasks for each stage or operation involved in the work of this section.

2. Include as a minimum the following major tasks:

a) Preparatory earthwork operations.

b) Drilling rig mobilization and set-up.

c) Pipe delivery and on-site pipe joining operations.

d) Pilot hole drilling and reaming operations.

e) Pipeline pulling operations.

f) Pipeline hydrostatic testing.

g) Drilling fluid disposal.

h) Restoration and demobilization.

3. Task Schedule shall conform to contract schedule as outlined in the General Provisions.

D. As-Builts:

1. On completion of the pilot-hole phase of each drill site, a complete set of “as-built” records shall be submitted in duplicate to the ENGINEER.

2. These records shall include copies of the plan and profile drawing, as well as directional survey reports as recorded during the drilling operation.

3. Upon completion drawings shall be submitted to the ENGINEER in AutoCAD® 2000 file format.

E. Technical Data:

1. Equipment to be utilized on the project

2. Prior to approval, submit the names of supervisory field personnel and historical information of directional boring experience.

F. Material Safety Data Sheets (MSDS):

1. MSDS information for the drilling slurry compounds.

G. Disposal Plan:

1. The plan shall describe the CONTRACTOR's plans for disposal of the drilling fluid and the names, addresses, and telephone numbers of any and all subcontractors who will be performing any portion of the disposal activities.

2. At a minimum, the plan shall include:

a) Disposal method.

b) Disposal hauler(s).

c) Disposal locations.

d) Estimated quantity to be disposed.

e) Type of vehicle hauling drilling fluids

f) Signed statement that all hauling equipment (i.e., vehicle, tanker, dump truck, trailer, etc.) meets all requirements of state agencies.

g) Letter from proposed disposal site(s) accepting material.

H. Erosion Control Plan:

1. The erosion control plan shall be submitted for approval 10 days prior to commencement.

2. It shall be a written, detailed plan for the accomplishment of acceptable erosion control on the project.

3. The plan shall describe all necessary temporary measures to be implemented for preventing soil erosion from the construction site until permanent erosion control and finished surfaces are installed.

4. The plan shall comply with all state and local requirements.

I. Pipe Connection Procedures:

1. The CONTRACTOR shall submit pipe connection procedures to the ENGINEER prior to connecting any pipe.

1.04 For plastic (HDPE) pipe, the CONTRACTOR shall submit the pipe manufacturer's representative's written approval of his procedures.

1.05 PERMITS

A. The OWNER shall obtain Army Corps of Engineer (ACOE) and Florida

Department of Environmental Protection (FDEP) wetland impact permits.

B. Copies of permits shall be kept on site during construction operations.

1.06 QUALITY ASSURANCE

A. Crossings must conform to applicable requirements of all utility companies affected, State of Florida Department of Highway Safety and Motor Vehicles, and environmental agencies.

B. Qualifications:

1. The CONTRACTOR shall be thoroughly experienced in the type of construction contemplated herein.

C. Mandrel Testing:

1. Upon completion of carrier pipe installation, the CONTRACTOR shall pass a mandrel through the entire length of the bore in the presence of the OWNER's representative to inspect for roughness and necking.

2. Mandrel shall not be more than 2 inches in diameter smaller than the ID of the carrier pipe installed.

3. Mandrel and towrope shall be constructed of materials that will not scar or harm the carrier pipe in any manner.

D. Pipe Manufacturer's Quality Control:

1. The pipe manufacturer shall have an on-going Quality Control program for incoming and outgoing materials.

2. High-density polyethylene (HDPE) resins for manufacturing of pipe shall be checked for density, melt flow rate, and contamination.

3. These incoming resins shall be approved by NSF before being converted to pipe.

4. Pipe shall be checked for outside diameter, wall thickness, length, roundness, and surface finish on the inside and outside and end cut.

E. Fittings Manufacturer's Quality Control:

1. The fitting manufacturer shall have an on-going quality control program for incoming and outgoing materials.

2. Molded fittings shall be inspected for voids and knit lines.

3. All fabricated fittings shall be inspected for joint quality and alignment.

4. All fabricated fitting welds shall be made using a Data Logger.

5. A record of the temperature, pressure and graph of the fusion cycle shall be maintained by the fitting manufacturer.

1.07 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. The pipe and fitting manufacturer shall package products for shipment in a manner suitable for safe transport on commercial carriers.

B. When delivered, a receiving inspection shall be performed, and any shipping damage reported to the pipe and fittings manufacturer.

C. Pipe and fittings shall be handled, installed, and tested in accordance with manufacturer's recommendations and the requirements of this specification.

D. Deliver and store materials within limits of rights-of-way and/or property lines as shown on the Drawings or as directed by the OWNER.

E. The CONTRACTOR shall be responsible for securing all project materials and shall bear the cost of replacing any materials which may become misplaced or stolen.

1.08 JOB CONDITIONS

A. The CONTRACTOR shall be held fully responsible for protecting against surface subsidence, damage, or disturbance of adjacent property and facilities from his construction methods.

B. Each directional boring crew shall have a reasonable proportion of experienced men.

C. A superintendent and/or engineer experienced in directional boring methods and techniques, and who represents the boring contractor, shall be present at all times while work is proceeding. He shall also be responsible for the frequent checking of line and grade, if needed. Tolerances should be agreed to in the light gradient and easement requirements.

D. The CONTRACTOR shall be held responsible for the coordination and scheduling of all construction work.

1.09 SAFETY

A. All drilling equipment must have a permanent, inherent alarm system capable of detecting an electrical current.

B. The ground system shall be equipped with an audible alarm to warn the operator when the drill head nears electrified cable.

C. All crews shall be provided with grounded safety mats, heavy gauge ground cables with connectors, and hot boots and gloves.

D. All supervisory personnel must be adequately trained and have direct supervisory experience in directional boring.

PART 2 - PRODUCTS

2.9 MATERIALS

A. Drilling fluid shall be a gel-forming colloidal fluid consisting of at least 10% of high-grade bentonite, which is totally inert and contains no environmental risk, or equal.

B. Carrier Pipe:

1. Pipe and fittings shall be HDPE manufactured from NSF approved PLEXCO P34CH compound, PE 3408, or equal.

2. HDPE Pipe shall meet American Water Works Association (AWWA) C-906, PE Pressure.

3. Pipe and Fittings shall be 4 inches through 52 inches for Water Distribution and shall be marked with the NSF-pw logo.

4. Hydrostatic design stress (HDS) shall be 800 pounds per square inch (psi) at 73.4°Farenheit (F) with a minimum pipe DR of 11 and operating pressure of 200 psi at 73.4°F.

5. Pipe and fittings shall be produced by the same manufacturer from identical materials meeting the requirements of this specification.

6. Molded fittings shall meet the requirements of American Society of Testing Materials (ASTM) D-3261 and this specification.

   At the point of fusion, the outside diameter and minimum wall thickness of fitting butt fusion outlets shall meet the outside diameter and minimum wall thickness specifications of ASTM F-714 for the same size of pipe.

7. Pipe shall be manufactured in accordance with ASTM F-714, ASTM D-3035, or the applicable dedicated service specification.

a. Print line markings shall include a production code from which the location and date of manufacture can be identified.

b. Upon request, the manufacturer shall provide an explanation of his/her production code.

C. Pipe Marking:

HDPE color coding shall be in accordance with the marking requirements specified herein.

D. Acceptable Pipe Manufacturer:

Performance Pipe, Driscoplex 4000, PE 3408, AWWA C-906, DIPS sizing, Richardson TX, (800) 527-0662; Supplier: ISCO Industries, Grand Bay, AL, 1-800-345-4726, or ENGINEER approved equal.

E. Pipe and Tubing:

HDPE pipe shall meet AWWA C-901, Pre-pressure pipe and tubing ½ inch through 3 inches for water service.

F. Butt fusion Fittings:

1. HDPE fittings shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99, and approved for AWWA use.

2. Butt fusion fittings shall have a manufacturing standard of ASTM D3261.

3. Molded and fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified in the plans.

4. Fabricated fittings are to be manufactured using Data Loggers.

5. Temperature, fusion pressure, and a graphic representation of the fusion cycle shall be part of the Quality Control records.

6. All fittings shall be suitable for use as pressure conduits, and per AWWA C-906 or AWWA C-901, have nominal burst values of three and one-half times the working pressure rating of the fitting.

G. Transition Fittings:

1. Terminate all HDPE pipe with fusion welded flanges (125-pound bolt pattern).

2. See paragraph above for alternate fusion procedures.

2.10 EQUIPMENT

A. Directional Drilling Equipment:

1. General:

The directional drilling equipment shall consist of:

a. Directional drilling rig of sufficient capacity to perform the bore and pull back the pipe.

b. Drilling fluid mixing.

c. Delivery and recovery system of sufficient capacity to successfully complete the installation.

d. Drilling fluid recycling system to remove solids from the drilling fluid so that the fluid can be reused (if required).

e. Magnetic guidance system or walk over system to accurately guide boring operations.

f. Vacuum truck of sufficient capacity to handle the drilling fluid volume.

g. Trained and competent personnel to operate the system.

h. All equipment shall be in good, safe condition with sufficient supplies, materials, and spare parts on hand to maintain the system in good working order for the duration of this project.

2. Drilling Rig:

a. The directional drilling machine shall consist of a hydraulically powered system to rotate and push hollow drilling pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head.

b. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the installation.

c. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations.

d. The hydraulic system shall be free of leaks.

e. The rig shall have a system to monitor and record maximum pullback pressure during pullback operations.

f. A system should be in place to detect electrical current from the drill string and an audible alarm which automatically sounds when an electrical current is detected.

3. Drill Head:

The drill head shall be steerable by changing its rotation and shall provide necessary cutting surfaces and drilling fluid jets.

4. Guidance System:

a. General:

1) An electronic walkover tracking system or a Magnetic Guidance System (MGS) probe or proven gyroscopic probe and interface shall be used to provide a continuous and accurate determination of the location of the drill head during the drilling operation.

2) The guidance system shall be capable of tracking at all depths up to fifty feet and in any soil condition, including hard rock.

3) The guidance system shall enable the driller to guide the drill head by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction).

4) The guidance system shall be accurate and calibrated to manufacturer's specifications of the vertical depth of the borehole at sensing position at depths up to 50 feet and accurate to 2 feet horizontally.

b. Components:

The CONTRACTOR shall supply all components and materials to install, operate, and maintain the guidance system.

c. Operation:

1) The guidance system shall be of a proven type, and shall be set up and operated by personnel trained and experienced with the system.

2) The operator shall be aware of any geo-magnetic anomalies and shall consider such influences in the operation of the guidance system.

2.11 JOINING METHODS

A. Butt fusion joining:

1. Plain end pipe and fittings shall be made using butt fusion.

2. The butt fusion procedures shall be in accordance with the manufacturer or the PPI.

3. The fusion equipment operator shall receive training using the recommended procedure.

4. The CONTRACTOR shall be responsible for verifying that the fusion equipment is in good operating condition and that the operator has been trained within the past 12 months.

5. The fusion equipment shall be equipped with a Data Logger.

6. Records of the welds (heater temperature, fusion pressure, and a graph of the fusion cycle) shall be maintained for 5 years.

7. Fusion beads shall not be removed.

B. Mechanical Joining:

1. Polyethylene pipe and fittings may be joined together using flanges or mechanical joint adapters.

2. These fittings shall be made from PE 3048 HDPE, with a Cell Classification of 345464C as determined by ASTM D3350-99.

3. Flanged and MJ adapters shall have a manufacturing standard of ASTM D3261 and shall have a pressure rating equal to the pipe unless otherwise specified on the plans.

C. Electrofusion couplings:

1. Polyethylene pipe and fittings may be joined using approved electrofusion couplings. Fittings shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99.

2. Electrofusion fittings shall have a manufacturing standard of ASTM F1055.

3. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans.

4. All electrofusion fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half

times the working pressure rating of the fitting.

PART 3 - EXECUTION

3.01 EXECUTION

A. The CONTRACTOR shall be responsible for setting all grade stakes, lines, and levels. The utility bore depth will equal or exceed 10 times the bore size.

B. The CONTRACTOR will coordinate locations of underground utilities with appropriate companies.

C. The CONTRACTOR will advise the ENGINEER immediately if conflict exists.

D. The CONTRACTOR shall operate and maintain all equipment as required to keep the work free from excessive spoil and environmental risks.

E. The CONTRACTOR shall install siltation fences, sediment barriers, etc., as required or shown on the CONTRACTOR’s Erosion Control Plan Drawings.

F. The CONTRACTOR shall perform the necessary general earthwork operations as required for the directional drilling and pipe pulling operations.

G. The CONTRACTOR shall be responsible for restoring all areas impacted by the CONTRACTOR’s work effort to pre-work conditions.

H. The CONTRACTOR shall be responsible for constructing all means of temporary access to the designated work sites and shall be liable for all damages caused as a result of the work.

3.02 INSTALLATION

A. Installation shall be in a trenchless manner producing continuous bores.

B. The entry point shall be where shown on the plan submitted as required in 1.2 above. No exception to this requirement will be allowed.

C. The exit point for the drilled hole shall be within 10 feet laterally and within 20 feet longitudinally of where shown on the plan submitted as required in 1.2 above. No exception to this requirement will be allowed.

D. Tunneling System:

1. The tunneling system shall be remotely steerable and permit electronic monitoring of tunnel depth and location.

2. Tunneling must be performed by a fluid-cutting process (high pressure-low volume) utilizing a liquid clay, i.e., bentonite.

3. The clay lining will maintain tunnel stability and provide lubrication in order to reduce frictional drag while the pipe is being installed.

4. In addition, the clay fluid must be totally inert and contain no environmental risk.

E. Vacuum Spoils Recovery:

1. The CONTRACTOR must also have a mobile vacuum spoils recovery vehicle on site to remove the drilling spoils from the access pits.

2. The spoils must then be transported from the job site and be properly disposed of.

3. Under no circumstances will the drilling spoils be permitted to be disposed of into sanitary, storm, or other public or private drainage systems.

F. Mechanical, pneumatic, or water-jetting methods will be considered unacceptable due to the possibility of surface subsidence.

G. Reamer:

1. After an initial bore has been completed, a reamer will be installed at the termination pit and the pipe will be pulled back to the starting pit.

2. The reamer must also be capable of discharging liquid clay to facilitate the installation of the pipe into a stabilized and lubricated tunnel.

H. The CONTRACTOR shall provide all material, equipment, and facilities required for directional drilling. Proper alignment and elevation of the borehole shall be consistently maintained throughout the directional drilling operation. The method used to complete the directional drill shall conform to the requirements of all applicable permits.

I. The entire drill path shall be accurately surveyed with entry and exit stakes placed in the appropriate locations within the areas indicated on drawings. If the CONTRACTOR is using a magnetic guidance system, drill path will be surveyed for any surface geo-magnetic variations or anomalies.

J. Environmental Protection:

1. The CONTRACTOR shall place a silt fence between all drilling operations and any drainage, well-fields, wetland, waterway, or other area designated for such protection necessary by documents, state, federal and local regulations.

2. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity

curtains and other measures.

3. Fuel may not be stored in bulk containers within 200 feet of any water body or wetland.

K. Recorded Readings:

1. Readings shall be recorded after advancement of each successive drill pipe, (no more than 15 feet) and the readings plotted on a scaled drawing of 1inch equals 5 feet (1" = 5'), both vertical and horizontal.

2. Access to all recorded readings and plan and profile information shall be made available to the ENGINEER, or his representative, at all times.

3. At no time shall the deflection radius of the drill pipe exceed the deflection limits of the carrier pipe as specified herein.

L. Drilling Fluid Additives and Mixtures:

1. A complete list of all drilling fluid additives and mixtures to be used in the directional operation will be submitted to the ENGINEER, along with their respective MSDS.

2. All drilling fluids and loose cuttings shall be contained in pits or holding tanks for recycling or disposal, no fluids shall be allowed to enter any unapproved areas or natural waterways.

3. Upon completion of the directional drill project, the drilling mud and cuttings shall be disposed of by the CONTRACTOR at an approved dumpsite.

M. Pilot Hole Drilling Operations:

1. The pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100 feet.

2. In the event that pilot does deviate from the bore path more than 5 feet of depth in 100 feet, the CONTRACTOR will notify the ENGINEER and the ENGINEER may require the CONTRACTOR to pullback and re-drill from the location along bore path before the deviation.

3. In the event that a drilling fluid fractures, inadvertent returns or returns loss occurs during pilot hole drilling operations, the CONTRACTOR shall cease drilling, wait at least 30 minutes, inject a quantity of drilling fluid with a viscosity exceeding 120 seconds as measured by a March funnel and wait another 30 minutes.

4. If mud fracture or returns loss continues, the CONTRACTOR will discuss additional options with the ENGINEER and work will then proceed

accordingly.

N. Flange/MJ Adapter Installation:

1. Flanges/MJ Adapters shall be attached to pipe and fittings using butt fusion.

2. Flanges/MJ adapters shall be aligned and centered relative to the pipe.

3. Flanges/MJ adapters should be square with the valve or other flange before tightening of bolts.

4. Bolts should not be used to draw flanges into alignment.

5. Bolt threads shall be lubricated, and flat washers shall be used under flange nuts.

6. Bolts shall be tightened using a “star tightening pattern.” See manufacturers recommendations.

7. Twenty-four hours after first tightening the flange bolts, re-tighten the flange bolts using the same “star tightening patter” used above.

8. The final tightening torque shall be as indicated by the manufacturer.

O. Trial Butt Fusions:

1. On each day butt fusions are to be made; the first fusion of the day shall be a trial fusion.

2. The trial fusion shall be allowed to cool completely, and then fusion test straps shall be cut out.

3. The test strap shall be 12 inches or 30 times the wall thickness in length (minimum) and 1 inch or 1.5 times the wall thickness in width (minimum).

4. The test strap should be bent until the ends of the strap touch.

5. If the fusion fails at the joint, a new trial fusion shall be made, cooled completely, and tested.

6. Butt fusion of pipe to be installed shall not commence until a trial fusion has passed the bent strap test.

P. Socket and saddle fusions shall be tested by a bent strap test as described by the pipe manufacturer. The pipe manufacturer shall provide visual guidelines for inspecting the butt, saddle, and socket fusions joints.

Q. The CONTRACTOR shall be liable for retrieving or sealing any pipe that

becomes lodged in the drill hole.

3.03 PIPE PULLING OPERATIONS

A. The full length of the pipe to be installed shall be laid out, welded, and tested in one complete unit before being pulled back through the drilled hole. Once started, pipeline pullback shall be continuous unless approved otherwise in writing by the OWNER or the OWNER's designated representative.

B. The pulling head shall be designed by the CONTRACTOR to withstand the continuous tensile pull stresses with intermittent sudden occasional surges. The CONTRACTOR shall be responsible for determining the pulling loads.

C. The pipe shall be continuously lubricated with bentonite slurry and the assembled pipeline shall be laid on rollers, or other apparatus, to facilitate pullback and prevent damage to pipe.

D. The CONTRACTOR shall continue pull back until 10 linear feet (minimum) of pipe is above ground for the purpose of pipe inspection.

E. A blind flange shall be bolted to the fusion welded flange and the pipe shall be marked and buried with a minimum cover of 36 inches.

1. Connections, which will be made under another contract, will require the removal of the blind flange and a flanged ductile iron adapter shall be bolted to the fusion welded flange suitable for the transitional material.

2. The CONTRACTOR shall provide restrained joints or megalug joint restraint as required.

3.04 TESTING

A. In addition to the water system testing requirements specified for the entire system, the CONTRACTOR shall conduct a low-pressure air test of the HDPE sewer force main above ground prior to pullback as follows:

1. Secure and brace ends of pipe to be tested.

2. Provide calibrated low range air pressure gauge on high end of pipe.

3. Fill pipe to maximum pressure of 20.0 psig.

4. Add air as necessary to compensate for internal/external pipe temperature and initial pipe expansion.

5. Check all pipe joints and test fittings with mild soap solution.

6. Repair or replace all leaking joints, pipe and/or fittings.

7. Once air pressure has stabilized, pipe should hold constant air pressure for two hours. If pipe does not hold pressure, check all joints, and test fittings with soap solution.

8. Repair or replace sources of leakage and completely retest entire section.

B. In addition to the water system testing requirements specified for the entire system, the CONTRACTOR shall conduct a hydrostatic test of the HDPE sewer force main in-ground after pullback as follows:

1. The HDPE main shall be flushed with potable water to remove any sediment, solids and/or foreign material prior to any in place testing. .

2. Fill the pipe with potable water and after all free air is removed from the test section.

3. Raise the pressure at a steady rate to the required pressure.

4. Measure the pressure in the section with calibrated pressure gauges at each end of the pipe section.

5. Test pressure shall be 150 psi. The initial pressure test shall be applied and allowed to stand without makeup water for a sufficient time to allow for diametric expansion or pipe stretching for stabilization. This usually occurs within 2 to 3 hours. After this equilibrium period, the test section can be returned to 150 psi operating pressure, the pump turned off, and a final test pressure held for 3 hours.

6. Furnish the ENGINEER or Inspector the results immediately following the pressure test.

7. Remove, fill with concrete, or otherwise place out of service all leaking pipes that cannot be repaired to meet pressure test.

3.05 DAMAGED OR IMPROPERLY INSTALLED PIPE

A. If the pipe is damaged before installation, or does not meet the specifications, it shall be replaced at no expense to the OWNER.

B. If the pipe is damaged during installation by the CONTRACTOR’s operations, placed at the improper grade or line, or cannot be advanced because of an unseen obstruction or any other reason, it shall, at the discretion of the ENGINEER, be retrieved or abandoned in place and the void filled with concrete by pressure grouting as soon as possible.

C. If it becomes necessary to drill another hole, an alternate installation shall be

made as directed by the ENGINEER.

D. The CONTRACTOR shall re-drill the hole and furnish all additional labor and materials required to complete the job as indicated on the plans and specifications at no additional cost to the OWNER.

E. The cost for retrieval or abandonment of pipe shall be at the expense of the CONTRACTOR. No additional payment shall be made for pipe which is retrieved, abandoned, or damaged beyond use, including dewatering, excavation, drilling, backfilling, etc.

F. Sections of pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed.

G. The undamaged portions of the pipe shall be rejoined using one of the joining methods allowed in the Section.

[END OF SECTION 15110]

SECTION 15120

PIPING SPECIALTIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Special Conditions, apply to work of this section.

1.02 QUALITY ASSURANCE

Manufacturer's Qualifications: Firms regularly engaged in manufacture of piping specialties, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 3 years.

PART 2 - PRODUCTS

2.01 FIRE HYDRANTS

A. All fire hydrants shall be 5-1/4 inch hydrants with two 2-1/2 inch connection and one pumper connection designed for 150 psi working pressure, and shall conform to the requirements of AWWA C-502-73 (Latest Revision).

B. Hydrants shall have mechanical joint inlets, shall be for a 3-foot bury, and shall have a compression type main valve which opens against pressures.

C. The hydrant main valve operating parts, including valve seal, valve seal insert, cross arm, and upper valve washer shall be all bronze, meeting either of the following ASTM B-61, or B-150 per C-502.

D. The inside of hydrants shall be coated in accordance with AWWA standards except for bronze and threaded machine parts.

E. Hydrant upper barrel shall be provided with an e-coat primer and top coated with a Hydrant Red 2-component polyurethane finish or fusion bonded epoxy coated and Fire Hydrant Red in color.

F. The barrel section of the hydrant shall be made in two or more sections, with a flange located at least two inches above the finished grade line, and provided with a break flange, flange clips or lugs at ground line.

G. Undercut bolts for the break connection are not acceptable.

H. The hydrants shall open left (counterclockwise).

I. The hydrants shall have pentagon shaped operating nuts and cap nuts measuring 1-1/2 inch from pint to flat.

J. The bonnet shall be of dry type top design, shall be weatherproof and utilize a cast or ductile iron weather shield integral with the external wrench operating nut.

K. The weather shield nut shall be pentagon in shape.

L. The hydrants stem shall have “O” ring seals, and stem threads and bearing shall be protected with automatic self-oiling or grease case lubricant systems.

M. The nozzle threads shall be coated with anti-seize compound to facilitate removal of caps.

N. Hydrants having stem thread (upper or lower) that are constantly exposed or immersed in water are not acceptable.

O. All exposed or external nuts and bolts (bonnet, break flange, and shoe bolts and nuts) shall be stainless steel, no exceptions.

P. All fire hydrants shall be American Darling, AVK, or approved equal.

Q. The external color shall be red, and the primer color shall not be yellow.

R. After installation, the fire hydrants shall be free of scratches and paint chipping.

S. All fire hydrants shall be painted after installation if in the opinion of the ENGINEER the coating is not satisfactory.

T. Two fire hydrant wrenches shall be supplied for this project.

U. All fire hydrants shall be covered with plastic when installed and removed when the line is placed into service.

2.02 CORPORATION STOPS

A. Corporation stops 1 inch and smaller shall be Ford Model No. F-1000 or approved equal.

B. Inlets shall have iron pipe threads and outlets shall have compression connections.

2.03 CURB STOPS

A. Curb stops/meter coupling shall be Ford Model B43-342W-G, B43-444W-G, or approved equal.

B. Inlets shall have compression connection and outlets shall have iron pipe threads.

2.04 SERVICE SADDLES

All service saddles shall be Ford F202 double strap saddle or approved equal.

2.05 HOSE BIBBS AND SAMPLE TAPS

Hose bibbs and sample taps shall be Crane No. 58 or approved equal.

PART 3 - EXECUTION (Not Applicable)

[END OF SECTION 15120]

SECTION 20000

MINIMUM TECHNICAL STANDARDS CHECKLIST FOR UTILITY AS-BUILTS

CITY OF PANAMA CITY BEACH
DATED SEPTEMBER 2022

PART 1 - GENERAL

1.1 Surveyors and mappers must meet the following minimum standards of accuracy, completeness, and quality for the City of Panama City Beach to accept as-builts:

1. Must identify the responsible surveyor and mapper.

2. Shall state the type of survey it depicts and the purpose of the survey.

3. Must bear the name, certificate of authorization number, and street and mailing address of the business entity issuing the as-built survey, along with the name and license number of the surveyor in responsible charge.

4. Must reflect a survey date, which is the date of acquisition. When the graphics of the as-built survey are revised, but the survey date stays the same, the as-built survey must list dates for all revisions.

5. Must be signed and sealed by the surveyor in responsible charge.

6. A designated "north arrow" and either a stated scale or graphic scale shall be shown.

7. Appropriate line types, line weights, and line widths shall be used on the as-built drawing to differentiate existing from proposed and water from sewer, reclaim, and storm. All physical items (i.e. Pipes, valves, etc.), surveyed boundaries, and easements should be clearly marked, and dimensioned, and identified by size and material.

8. All utilities in the public right of way and within easements or to the end of the publicly owned portion of the utility (i.e. Meter and backflow preventer, cleanout, etc.) Shall be shown with associated sizes labeled. This includes, but is not limited to, stub-outs/laterals, meters, BFP's, water mains, force mains, gravity sewer mains, manholes, storm water piping and associated structures, valves, fire hydrants, lift stations, etc. All pipeline work must be connected within the site as well as the connection to existing utilities adjacent to the site (it is the surveyor's responsibility to coordinate with all

contractors for locations and sizing). All utility connections to the buildings must be shown.

9. All proposed utility/ingress/egress easements must be shown on the drawing and must have the associated legal description written.

10. Edge of pavement, roads (asphalt shaded), curbs, driveway connections, buildings, parking lots, right-of-way, and street names must be shown in all applications. All items mentioned above must be field located.

11. If a lift station is to be dedicated to the city the plan must show a detail scaled at 1"=10' showing all improvements including: water and sewer services, manholes, inverts, rims, BFP's, yard hydrants, control panels, fencing, parcel boundary, legal description of parcel boundary, wet well, valve box, force main, flow meter (if applicable), driveway, gate.

12. Property boundary must be clearly labeled and dimensioned.

13. Inverts, grates, tops, rims must be shown for all storm water drainage structures. Inverts (pipes and cleanouts) and rims must be shown for all gravity sewer manholes. Slopes must be shown on each run of pipe for review and approval.

14. "as-built" profile of all directional bores and jack-and-bores indicating grade and pipe elevations at 10-foot intervals shall be provided on as-built plan sheets based on bore logs developed by boring contractor during installation. Profiles shall use horizontal stationing which ties to stationing on plans. Profiles shall also show existing surface elevations as well as any proposed surface elevations on the profile. Surface profiles must show any pavement, sidewalks, ditches, swales etc. Note that profiles locating pipe solely by "depth below existing ground" will not be accepted.

15. Coastal setback line or coastal construction control line should be designated.

16. Elevations and location of any flood zones along the flood hazard boundaries shall be delineated.

17. Nearby wetlands and other environmentally significant resources clearly labeled.

18. Storm water management system features including dimensions of : wet and dry swales, wet and dry ponds, conveyance systems, easements, along with all associated M.E.S. Structures and inverts, outfall structures and

inverts, skimmers, discharge structures and inverts and slot elevations, top of bank, slope of bank and bottom of all ponds, swales, closed and open conveyances. For FEMA LOMR submittals also provide: finished floor elevations, spot elevations and/or contours showing lowest lot elevations.

19. The engineer of record shall review and approve the as-built prior to submission to the city for final approval. Written approval by the engineer of record shall be noted on a transmittal with a statement of no exceptions to minimum standards provided herein.

20. Storm water requirements for the as-built surveys only apply to parcels within city limits. Contractor shall submit three (3) hard copies and one (1) digital (AutoCAD format & PDF) for review and approval.

[END OF SECTION 20000]

CITY OF PANAMA CITY BEACH

PCB23-14 GARDENIA STREET DRAINGE PIPE PROJECT

APPENDIX A
CONTRACT CHANGE ORDER FORM

PCB23-14 ITB GARDENIA STREET DRAINAGE PIPE PROJECT

CONTRACT CHANGE ORDER

	ORDER NO.
	DATE
	STATE FLORIDA
CONTRACT FOR **CITY OF PANAMA CITY BEACH – GARDENIA STREET DRAINAGE PIPE PROJECT- PROJECT NO. 50134687**	COUNTY BAY

OWNER
CITY OF PANAMA CITY BEACH

To _____
(Contractor)

You are hereby requested to comply with the following changes from the contract plans and specifications:

Description of Changes (Supplemental Plans and Specifications Attached)	DECREASE in Contract Price	INCREASE in Contract Price
TOTALS		
NET CHANGE IN CONTRACT PRICE	$	
	$	$

JUSTIFICATION: Additional days due to unforeseen conditions and rain days.

The amount of the Contract will be **Increased/Decreased** by the Sum of: _____
_____Dollars ($_____).

The Contract Total including this, and previous Change Orders will be: _____
_____Dollars ($_____).

The Contract Period provided for Completion will be **changed/unchanged**.

This Document will become a supplement to the contract and all provisions will apply hereto.

_____ (Contractor) _____ (Date)

James Morgan Hurst, P.E. (Owner's Engineer) _____ (Date)
Dewberry, Inc

Drew Whitman, City Manager (Owner) _____ (Date)
City of Panama City Beach

CITY OF PANAMA CITY BEACH

PCB23-14 GARDENIA STREET DRAINGE PIPE PROJECT

APPENDIX B
PAY REQUEST FORM

PCB23-14 ITB GARDENIA STREET DRAINAGE PIPE PROJECT

APPLICATION AND CERTIFICATE FOR PAYMENT

Date:

TO (OWNER):
CITY OF PANAMA CITY BEACH
ATTN: Kathy Younce, E.I. CFM

FROM (CONTRACTOR):

PROJECT: City of Panama City Beach - Gardenia Street **Dra**
PROJECT NO.: 50134687
VIA (ENGINEER): CITY OF PANAMA CITY BEACH
17007 Panama City Beach Parkway
PANAMA CITY BEACH, FLORIDA 32413
ATTN: Kathy Younce, E.I. CFM

APPLICATION NO:
PERIOD TO:
APPLICATION DATE:
CONTRACT DATE:

CONTRACTOR'S APPLICATION FOR PAYMENT

CHANGE ORDER SUMMARY			
Change Orders approved in previous months by Owner		ADDITIONS	DEDUCTIONS
TOTAL			
Number	Date Approved		
1			
2			-
TOTALS		$0.00	$0.00

1.	ORIGINAL CONTRACT SUM		
2.	NET CHANGE BY CHANGE ORDERS		$0.00
3.	CONTRACT SUM TO DATE (Line 1 + Line 2)		$0.00
4.	EARNED TO DATE		
	a. Work Completed (See Attached)		
	b. Stored Materials Including Owner Issued POs (See Attached)		
	TOTAL COMPLETED & STORED TO DATE		$0.00
5.	TAX SAVINGS AGREEMENT: (Through Summary No.)		
	a. Total Purchase Orders Issued by Owner (To Date)		
	b. Anticipated Tax Savings on Owner Issued POs		
	c. Vendor Invoices Paid @ Contractors Request (To Date)		
	d. Vendor Retainages Unpaid @ Contractors Request (To Date)		
6.	Total Tax Savings Agreement Deduction (Sum of Line 5a and 5b)		$0.00
7.	TOTAL EARNED LESS TAX AGREEMENT DEDUCTIONS (Line 4 less Line 6 Total)		$0.00
8.	RETAINAGE: (10% of Line 7)		$0.00
9.	TOTAL EARNED LESS RETAINAGE (Line 7 less Line 8)		$0.00
10.	LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 9 from prior Certificate)		
11.	CURRENT PAYMENT DUE		$0.00
12.	BALANCE TO FINISH, PLUS RETAINAGE (Line 3 - Line 6 - Line 9)		$0.00

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information, and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for for which previous Certificates for Payment were issued and payments received from the Owner, and that the current payment shown herein is now due.

CONTRACTOR
TYPE COMPANY NAME HERE

By: Date:
TYPE NAME HERE

State of: Florida County of: Bay
Subscribed and sworn to before me this day of
Notary Public:

ENGINEER'S CERTIFICATE FOR PAYMENT
In accordance with the Contract Documents, based on on-site observations and the data comprising the above application, the Engineer certifies to the Owner that to the best of the Engineer's knowledge, information, and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

ENGINEER:
AMOUNT CERTIFIED $
(Attach explanation if amount certified differs from the amount applied for.)
By: Date:
This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein.

CITY OF PANAMA CITY BEACH

PCB23-14 GARDENIA STREET DRAINGE PIPE PROJECT

APPENDIX C

FORMS

QUESTIONNAIRE

(Submit with necessary attachments along with your bid documents)

The undersigned warrants the truth and accuracy of all statements and answers herein contained. Include additional sheets if necessary.

1. Do you have a current Florida General Contractor License? State your license number:_____
   Do you have a current Florida Underground Utility Contractor License? State your license number:_____.

2. How many years has your organization been in business as a General Contractor?

   _____

3. Describe and give the date and owner and engineer of record with reference information of the last project that you have completed similar in type, size, and nature as the one proposed? Must be a stormwater improvements project.

   _____
   _____
   _____
   _____

4. List five (5) projects completed in the last five years that you have completed similar in type, size, and nature as the one proposed **(Attached spreadsheets will not be accepted).**

   a. Name of Project:_____

      Owner:_____ Telephone No._____

      Engineer:_____ Telephone No._____

      Date Started:_____ Date Completed:_____

      Value of Contract:_____

      Description of Project:_____

b. Name of Project:_____

Owner:_____ Telephone No._____

Engineer:_____ Telephone No._____

Date Started:_____ Date Completed:_____

Value of Contract:_____

Description of Project:_____

c. Name of Project:_____

Owner:_____ Telephone No._____

Engineer:_____ Telephone No._____

Date Started:_____ Date Completed:_____

Value of Contract:_____

Description of Project:_____

d. Name of Project:_____

Owner:_____ Telephone No._____

Engineer:_____ Telephone No._____

Date Started:_____ Date Completed:_____

Value of Contract:_____

Description of Project:_____

e. Name of Project: _____

Owner:_____ Telephone No._____

Engineer:_____ Telephone No._____

Date Started:_____ Date Completed:_____

Value of Contract:_____

Description of Project:_____

_____

_____

5. Have you ever failed to complete work awarded to you? If so, where, and why?

_____

_____

6. Name engineers with phone numbers for which you have performed work and to which you refer:

_____

_____

_____

7. Have you personally inspected the site of the proposed work? Describe any anticipated problems with the site and your proposed solutions:

_____

_____

_____

_____

8. Will you Subcontract any part of this Work? If so, describe which portions:

_____

_____

9. Please list the names and addresses of the subcontractors to be used for the portions of the work listed above.

Sub-Contractor	Type of Work
_____	_____

_____	_____
_____	_____
_____	_____
_____	_____

10. State the true and exact, correct, and complete name under which you do business. BIDDER IS:

SOLE PROPRIETORSHIP

_____(SEAL)
(Individuals Signature)

_____
(Individuals Name)

Business address: _____

Phone No.: _____

A PARTNERSHIP

_____(SEAL)
(Partnership Name)

_____
(General Partner's Signature)

_____
(General Partner's Name)

Business address: _____

Phone No.: _____

A CORPORATION

_____(SEAL)
(Corporation Name)

_____
(State of Incorporation)

By _____
(Name of person authorized to sign)

_____
(Title)

_____
(Authorized Signature)

(Corporate Seal)

Attest _____
(Secretary)

Business address: _____

Phone No.: _____

THE INFORMATION PROVIDED HEREIN IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE:

FIRM: _____

BY: _____
(Please Type)

SIGNATURE: _____

TITLE: _____
(Owner, President, etc.)

DATE: _____

END OF SECTION 00045

CONFLICT OF INTEREST STATEMENT

Check one:

[ ] To the best of our knowledge, the undersigned Respondent has no potential conflict of interest due to any other clients, contracts, or property interest for this project.

or

[ ] The undersigned Respondent, by attachment to this form, submits information which may be a potential conflict of interest due to other clients, contracts, or property interest for this project. This includes and requires disclosure of any officer, director, partner, proprietor, associate, or agent of the Respondent who is also an officer or employee of the City or of its boards or committees.

LITIGATION STATEMENT

Check One:

[ ] The undersigned Respondent has had no litigation and/or judgments entered against it by any local, state, or federal entity and has had no litigation and/or judgments entered against such entities during the past ten (10) years.

[ ] The undersigned Respondent, **by attachment to this form**, submits a summary and disposition of individual cases of litigation and/or judgments entered by or against any local, state, or federal entity, by any state or federal court, during the past ten (10) years.

COMPANY: _____

SIGNATURE: _____

NAME: _____

TITLE: _____

DATE: _____

Failure to check the appropriate blocks above may result in disqualification of your proposal. Likewise, failure to provide documentation of a possible conflict of interest, or a summary of past litigation and/or judgments, may result in disqualification of your proposal.

CONTRACTOR E-VERIFY FORM

PER FLORIDA STATUTE 448.095, CONTRACTORS AND SUBCONTRACTORS MUST REGISTER WITH AND USE THE E-VERIFY SYSTEM TO VERIFY THE WORK AUTHORIZATION STATUS OF ALL NEWLY HIRED EMPLOYEES.

THIS FORM MUST BE COMPLETED AND SUBMITTED WITH THE BID/ PROPOSAL. FAILURE TO SUBMIT THIS FORM AS REQUIRED MAY DEEM YOUR SUBMITTAL NONRESPONSIVE.

The affiant, by virtue of the signature below, certifies that:

1. The Contractor and its Subcontractors are aware of the requirements of Florida Statute 448.095.
2. The Contractor and its Subcontractors are registered with and using the E-Verify system to verify the work authorization status of newly hired employees.
3. The Contractor will not enter into a contract with any Subcontractor unless each party to the contract registers with and uses the E-Verify system.
4. The Subcontractor will provide the Contractor with an affidavit stating that the Subcontractor does not employ, contract with, or subcontract with unauthorized alien.
5. All employees hired by Contractor on or after January 1, 2021, have had their work authorization status verified through the E-Verify system.
6. The City may terminate this contract on the good faith belief that the Contract or its Subcontractors knowingly violated Florida Statutes 448.09(1) or 448.095(2)(c).
7. If this Contract is terminated pursuant to Florida Statute 448.095(2)(c), the Contractor may not be awarded a public contract for at least 1 year after the date on which this Contract was terminated.
8. The Contractor is liable for any additional cost incurred by the City as a result of the termination of this Contract.

_____
Authorized Signature

_____
Printed Name

_____
Title

_____
Name of Entity/Corporation

STATE OF FLORIDA_____
COUNTY OF _____

The foregoing instrument was acknowledged before me by means of ☐ physical presence or ☐ online notarization on, this _____ day of _____, 20____, by _____(name of person whose signature is being notarized) as the_____(title) of_____ _____(name of corporation/entity), personally known_____, or produced_____(type of identification) as identification, and who did/did not take an oath.

_____
Notary Public

My Commission Expires: _____
NOTARY SEAL ABOVE

_____
Printed Name

NON-COLLUSION
AFFIDAVIT

STATE OF FLORIDA
COUNTY OF_____

_____being, first duly sworn, deposes and says that he is of_____, the party making the foregoing Proposal or Bid; that such Bid is genuine and not collusive or sham: that said bidder is not financially interested in or otherwise affiliated in a business way with any other bidder on the same contract; that said bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any bidders or person, to put in a sham bid or that such other person shall refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price or affiant or any other bidder, or to fix any overhead, profit or cost element of said bid price, or that of any other bidder, or to secure any advantage against the City of Panama City Beach, Florida, or any person or persons interested in the proposed contract; and that all statements contained in said proposal or bid are true; and further, that such bidder has not directly or indirectly submitted this bid, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof.

_____
Affiant

Sworn to and subscribed before me this_____day of_____, 2022.

_____
Notary Public

_____
Printed Name

CITY OF PANAMA CITY BEACH

PCB23-14 GARDENIA STREET DRAINGE PIPE PROJECT

APPENDIX D

ADDENDA

Initial Page: _____Owner_____ Contractor

Exhibit A

INSURANCE REQUIREMENTS

SECTION 1: DEFINITIONS

"Location" means the location subject of the Subcontract/Purchase Order.

"Project" means the project subject of the Subcontract/Purchase Order.

"Scope" means the scope of work to be provided by the Subcontractor under the Contract or the Goods and Services to be supplied and performed by Seller under the Purchase Order, as applicable.

"State" means a state of the United States or the District of Columbia or the Commonwealth of Puerto Rico, as applicable

"Alternate/ Leased Employer Endorsement" is an endorsement added to a workers compensation policy that provides an entity scheduled as an alternate employer with primary workers compensation and employers liability coverage as if it were an insured under the policy. This endorsement is commonly used when a temporary help agency (the insured) is required by its customer (the alternate employer) to protect the alternate employer from claims brought by the insured's employees.

SECTION 2: STANDARD INSURANCE COVERAGES

Successful Bidder shall comply with the following:

1. Unless higher limits or additional coverages are required by the Contract/Purchase Order or Owner Contract, the Successful Bidder shall secure and maintain the minimum from the earlier commencement of work or the effective date of the Contract/Purchase Order insurance coverages and limits required by this Exhibit A.
2. Failure of the Contractor/Buyer to identify deficiencies in any insurance provided by Successful Bidder shall not relieve Successful Bidder from any insurance obligations. Required coverages are as follows:

2.1. Commercial General Liability Insurance Coverages:

Commercial General Liability insurance using ISO's CG 00 01 or its substantial equivalent with City of Panama City Beach as an additional insured using ISO's CG 20 10 or its substantial equivalent for ongoing operations and ISO's CG 20 37 or its substantial equivalent for completed operations with the following minimum limits:

- $1,000,000 Each Occurrence
- $1,000,000 Personal and Advertising Injury
- $2,000,000 General Aggregate
- $2,000,000 Products-Completed Operations Limit
- $500,000 Damage to Rented Premises

Per Project using ISO's CG 25 04 or its substantial equivalent

The Successful Bidder must disclose to City of Panama City Beach any endorsements that limit or exclude coverage customarily provided by ISO's CG 00 01.

The Successful Bidder's Commercial General Liability policy shall not contain an exclusion or restriction of coverage for the following:

1. Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
2. Claims for property damage to the Successful Bidder's Work arising out of the products-completed operations hazard where a Subcontractor performed the damaged Work or the Work out of which the damage occurs.
3. Claims for bodily injury other than to employees of the insured.
4. Claims for indemnity arising out of injury to employees of the insured.
5. Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
6. Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
7. Claims related to residential, multi-family, or other habitational projects if the work is to be performed on such a project.
8. Claims related to roofing, if the work involves roofing.
9. Claims related to exterior insulation finish systems (EIFS), synthetic stucco, or similar exterior coatings or surfaces if the work involves such coatings or surfaces.
10. Claims related to earth subsidence or movement, where the work involves such hazards.
11. Claims related to explosion, collapse, and underground hazards, where the work involves such hazards.

The Successful Bidders Commercial General Liability insurance will remain in force with annual policy periods for the period of the statute of repose applicable to this project. *Alternatively, suppose a "project-specific" General Liability policy is used to satisfy these requirements. In that case, it must be endorsed to provide extended completed operations for the period of the statute of repose applicable to this project.*

2.2. Workers Compensation

Worker's Compensation Insurance and Employer's Liability Insurance (including occupational disease) to cover statutory benefits and limits under the Worker's Compensation laws of any applicable jurisdiction in which the Scope is to be performed and minimum limits.

- Bodily Injury by Accident - $100,000 Each Accident
- Bodily Injury by Disease - $500,000 Policy Limit
- Bodily Injury by Disease - $100,000 Each Employee

Policy coverage terms and conditions to include:

- USL&H – where applicable.
- Jones Act – where applicable.
- All State's endorsement – where applicable.
- Employers Liability/Stop Gap Liability if work is performed in Washington, Wyoming, Ohio, North Dakota, or the Commonwealth of Puerto Rico.

- For the attainment of Workers Compensation in monopolistic states and Puerto Rico, coverage must be secured through the state fund of that State.
- The certificate must identify that coverage applies in the State where the Project is located.

2.3. Automobile Liability

Commercial Automobile Liability insurance covers all owned, leased, and non-owned vehicles used in connection with the Scope. Business Auto Coverage Form using ISO's CA 00 01 or its substantial equivalent including liability coverage for all autos owned (Symbol 1), rented, hired, or borrowed by the contractors, as well as liability coverage for mobile equipment subject to compulsory insurance or financial responsibility laws or other motor vehicle insurance laws with the following minimum limit:

- $1,000,000 – Any One Accident – Combined Single Limit

Suppose the Contractor/Sub-Contractor/Vendor is responsible for removing any pollutants from a site. In that case, the Successful Bidder will need to cover its automobile exposure for transporting the pollutants from the site to an approved disposal site. Therefore, auto liability coverage should be endorsed to include the required auto pollution endorsements and Motor Carrier Act Endorsement, MCS 90, and the ISO Form CA 9948 (Pollution Liability Broadened Coverage for Business Automobile).

2.4. Umbrella or Excess Liability Required: Yes

Also, the Successful Bidder shall provide an umbrella or excess liability insurance providing in excess of the underlying Commercial General Liability, Business Automobile Liability, Pollution Liability (if required), and Employers' Liability insurance above, with the following minimum limits:

- $1,000,000 Each Occurrence
- $1,000,000 Annual Aggregate (where applicable in the underlying)

Such umbrella or excess liability policy shall provide substantially the same coverage as the underlying Commercial General Liability (including City of Panama City Beach as additional insured), Business Automobile Liability, Pollution Liability, and Employers' Liability insurance. In addition, it shall expressly provide that the umbrella or excess policy will drop down over the underlying insurance's reduced or exhausted aggregate limit. The umbrella or excess policy shall also be primary insurance to City of Panama City Beach(including primary insurance to City of Panama City Beach's own Commercial General Liability and Umbrella policies), and Successful Bidder s umbrella insurer agrees not to seek contribution from City of Panama City Beach insurance.

2.5. Professional Liability Required: No

Professional Liability Insurance is required to cover liability for claims that arise from the errors, omissions, or acts of the Successful Bidder or any entity the Successful Bidder is legally responsible in the provision of professional services. The policy shall be primary and non-contributory, with the insuring agreement to read: "to pay on behalf of" and shall be effective (retroactively, if applicable) from the commencement date of all professional activities in connection with the Scope. The coverage shall be maintained for three years following the final acceptance of the Project.

Initial Page: _____Owner_____ Contractor

Minimum limits are:

- Prime Design Professional: Choose limits when required per claim/annual aggregate;
- Sub-Design Professional: Choose limits when required per claim/annual aggregate.

Upon request, a copy of the policy shall be provided to City of Panama City Beach. Coverages shall not include any exclusions or other limitations related to the scope of the services, delays in project completion, or cost overruns.

For Professional Liability Insurance, the term "Prime Design Professional" means the architect and/or engineer providing architectural, engineering, and/or other professional services under a contract directly with our company. The term "Sub-Design Professional" means any architect and/or engineer providing architectural, engineering, and/or other professional services directly or indirectly to a Prime Design Professional in connection with the project. A Prime Design Professional is also a Contractor/Subcontractor, and a Sub-Design Professional is also a Sub-subcontractor.

2.6 Riggers Liability Required: No

If marked as required, the Scope involves the rigging, hoisting, lowering, raising, or moving of property or equipment belonging to others. Riggers Liability Insurance is required to insure against physical loss or damage to the property or equipment.

2.8 Aircraft/Watercraft: Required: No

If marked as required, the Scope involves using any owned, leased, chartered, or hired aircraft or watercraft of any type. As applicable, Aircraft Liability Insurance or Watercraft Liability Insurances required in an amount of not less than Choose limits when required per occurrence, including Passenger Liability for bodily injury and property damage.

2.9 Property Insurance:

Property Insurance coverage for tools and equipment owned, leased, or used by the Subcontractor/Seller in the performance of the Scope. The Property Insurance shall extend to equipment, materials, and supplies stored off the Project site or in transit to the Project site to be furnished as part of the Scope and incorporated into the Project.

2.9.1 Pollution Liability Insurance: Required: No

Successful Bidder shall secure and maintain the minimum Pollution Liability Insurance coverage and limits required by this Exhibit A from the effective date of the Contract/Purchase Order until the end of the applicable warranty period. The policy shall be submitted to the Contractor/Buyer for review and approval before commencement of the Scope. Failure of the Contractor/Buyer to identify deficiencies in the Pollution Liability Insurance provided by Subcontractor/Vendor shall not relieve Subcontractor/Vendor from any obligations.

Minimum limits are: Including Cleanup Cost

- Choose limits when required per occurrence or claim
- Choose limits when required policy aggregate.

Initial Page: _____Owner_____ Contractor

The coverage shall be as follows: Subcontractor shall provide Pollution Liability Insurance covering all asbestos, lead, and any other pollution operations. If the policy contains a general aggregate, this aggregate must apply on a per-project basis and shall be evidenced on Subcontractor's/Vendors Certificate of Insurance. The limits shall not be subject to reduction as to the Contractor/Buyer or Owner because of any claim asserted against the Subcontractor/Vendor other than in connection with the Scope. Instead of indemnifying, the policy must read "to pay on behalf of." In addition, the following coverages must be included: (1) Completed Operations (five (5) year continuation beyond completion of the Scope); (2) Broad Form Contractual and Independent Contractors (including coverage for third party over claims); (3) On-Site, Off-Site and In-Transit exposures; and (4) Loading and Unloading. Exclusions or restrictions pertaining to mold and EIFS are not permitted. The coverage may be written on an "occurrence" or "claims made" basis. If written on a "claims made" basis, the retroactive date must be included to coincide with the effective date of the Subcontract/Purchase Order, and an extended reporting period (three (3) years minimum) must be included.

The coverage may be written on an "occurrence" or "claims made" basis. If written on a "claims made" basis, the retroactive date must be included to coincide with the effective date of the Subcontract/Purchase Order, and an extended reporting period (three (3) years minimum) must be included.

Deductibles/Denial of Claims:

Contractor/Vendor shall be responsible, at no additional cost to Contractor/Buyer, for the payment of any deductibles or self-insured retention in connection with the insurance coverages required by this Exhibit A both for itself and all Additional Insureds. Any self-insured retention or deductible in excess of $25,000 must be declared when Subcontractor/Seller submits its bid and must be approved explicitly by Contractor/Buyer before executing the Subcontract/Purchase Order. Subcontractor/Seller shall be responsible for any loss arising from coverage denial by its insurance carrier.

Leased Successful Bidder Employee Liability

If the leases one or more employees through the use of a payroll, employee management, or other company, the Successful Bidder must directly procure workers compensation/employer's liability insurance. The insurance shall be written on a "Minimum Premium" or "If Any" policy form.

In addition, the worker's compensation/employer's liability coverage provided to and for the leased employees by the payroll, employee management, or other company must be evidenced and include an Alternate / Leased Employer Endorsement or its substantial equivalent WC endorsement for that State, naming Successful Bidder as the alternate employer.

Insurer Requirements

Each insurer providing insurance coverage as required by this contract shall be a licensed admitted insurer authorized to issue such coverages in each State in which any part of the Scope is performed. The insurer shall be acceptable to City of Panama City Beach and have an AM Best rating of "A-" or better.

Before accepting the Contractor/Sub-Contractor/Vendor's bid, City of Panama City Beach reserves the right to require more significant limits based on the nature of the operations performed by the Successful Bidder.

Initial Page: _____Owner_____ Contractor

Certificate of Insurance

Before commencing its performance and throughout the warranty period under the Contract /Purchase Order, the Successful Bidder shall provide City of Panama City Beach a current certificate of insurance evidencing the coverages required by this contract (a sample Certificate of Insurance is attached for reference purposes).

Sub-subcontractor/Sub-Vendor

Before permitting any lower tier Sub-subcontractor/Sub-vendor to perform Scope under the Contract/Purchase Order, the Successful Bidder shall require its sub-subcontractor/Sub-vendor to maintain insurance in like form and amounts to that required herein. Successful Bidder shall be responsible for ensuring that it's sub-subcontractor/Sub-vendor maintains insurance in like form and amounts and shall provide evidence of same to City of Panama City Beach if requested.

Any subcontractors engaged by the Contractor shall comply with the above requirements. Consideration for specific trades can be made with prior approval.

Notice of Cancellation

All insurance coverages required by this contract shall contain a provision that the coverage afforded hereunder cannot be canceled, non-renewed, allowed to lapse, or have any restricted modifications added unless at least thirty 45) days prior written notice has been given to City of Panama City Beach

Additional Insureds

All insurance required by this contract (excluding only Workers Compensation Insurance and Professional Liability Insurance) shall name Indemnified Parties as Additional Insureds and any other parties as required by the Owner Contract, and shall be primary and non-contributory to any insurance maintained by Indemnified Parties and Additional Insureds and any other parties as required by Owner Contract, all of which shall be stated on the Certificate of Insurance provided by the Successful Bidder.

The General Liability Additional Insured Endorsement shall use ISO's or CG 2010 or its substantial equivalent for ongoing operations and ISO's CG 20 37 or its substantial equivalent for completed operations. By endorsement or policy language, evidence of Additional Insured and Primary and Non-Contributory coverage must be provided with the certificate of insurance for General Liability. The Successful Bidder's insurers will provide insurance to City of Panama City Beach , on a primary basis and agree not to seek contribution from insurance by using ISO's CG 20 01 or its substantial equivalent. Successful Bidders insurers also agree to waive rights of subrogation against City of Panama City Beach using ISO's CG 24 04 or its substantial equivalent.

Waiver of Subrogation

All insurance coverages maintained by Successful Bidder shall include a waiver of any right of subrogation of the insurers thereunder against Indemnified Parties and Additional Insureds and all of their respective assigns, subsidiaries, affiliates, employees, insurers, and underwriters, and of any right of the insurers to any set-off or counterclaim or any other deduction, whether by attachment or otherwise, in respect of any liability of any person insured under any such policy (Workers Compensation – where permitted).

The Successful Bidder further waives all claims and all rights of subrogation against Indemnified Parties' and Additional Insureds' other contractors and all of their respective assigns, subsidiaries, affiliates, employees, insurers, and underwriters for loss of, or damage to, contractors Scope, tools, machinery, equipment, material, supplies, or any other losses within the scope of any insurance maintained by City of Panama City Beach. If any of the Indemnified Parties and Additional Insureds are partially or wholly self-insured, then the waiver of subrogation shall apply as if their insurance covered them.

Initial Page: _____Owner_____ Contractor

Insurance Policy Review/Exclusions/Copies

City of Panama City Beach , can receive copies of all insurance policies upon request. Policies shall not contain any exclusions that are unacceptable to City of Panama City Beach. If requested by City of Panama City Beach, all insurance carriers must certify all policies as accurate and complete. At their sole discretion, policies shall not contain any unacceptable exclusions to City of Panama City Beach. City of Panama City Beach 's right to review and approve all insurance policies will not constitute a waiver of any rights created by or provisions contained in this contract should they differ from those contained in such policies.

Claims-Made Policies

Except for Professional Liability Insurance, claims-made policies are not acceptable.

Effect of Specified Coverages

The Insurance obligations under this agreement shall be 1—all the Insurance coverage and/or limits carried by or available to the Contractor; or 2—the minimum Insurance coverage requirements and/or limits shown in this agreement, whichever is greater. Any insurance proceeds in excess of or broader than the minimum required coverage and/or minimum required limits, which apply to a given loss, shall be available to City of Panama City Beach. No representation is made that this agreement's minimum insurance requirements are sufficient to cover the Contractor's obligations under this agreement.

Breach of Insurance Requirements

Successful Bidder's failure to obtain and maintain insurance coverages as required by this Exhibit A or any other Exhibit or attachment shall constitute a material breach of the Contract/Purchase Order. In such event, in addition to any other rights and remedies contained in the Contract/Purchase Order, (i) City of Panama City Beach may, at its option, terminate the contract for default; (ii) City of Panama City Beach may, at its option, purchase such coverage and back charge the premium and associated costs to Successful Bidder; and/or (iii) any of the Indemnified Parties, or Additional Insureds can require, that contractor and/or its subcontractors to pay for all attorney's fees, expenses, and liability as a result of any claim or lawsuit for which coverage would have been provided to the Indemnified Parties or Additional Insureds under contractors insurance program but for a breach by Contractor or any of its subcontractors.

Furthermore, to the extent of their respective interests, the Insurers of those entities that were to be included as Additional Insureds are deemed third-party beneficiaries of the insurance procurement obligation and have the same rights against the breaching party as the Indemnified Parties or Additional Insureds.

If any of the preceding insurance coverages are required to remain in force after final payment and are reasonably available, an additional certificate evidencing continuation of such coverage shall be submitted with the final application for payment as required. If the insurer does not furnish any information concerning the reduction of coverage, it shall be furnished by the contract with reasonable promptness according to the Successful Bidder 's information and belief. Suppose Successful Bidder fails to maintain insurance.City of Panama City Beach may (at its sole option) terminate the Successful Bidder or place such insurance and deduct any cost, fees, and related expenses from Successful Bidder pay request.

Any Successful Bidder *engaged by the Contractor shall comply with the above requirements. Consideration for specific trades can be made with prior approval.*

Initial Page: _____Owner_____ Contractor

City of Panama City Beach

Endorsements to be attached:

General Liability	Endorsement #	Edition Dates	Carrier	Policy #'s to be listed
Added Insured - Ongoing Operations	CG 20 10	All	ISO Standard or Equal	Yes
Added Insured – Completed Operations	CG 20 37	All	ISO Standard	Yes
Waiver of Subrogation	CG 24 04		ISO Standard	
Primary & Non-Contributory	CG 20 01		ISO Standard	
Automobile Liability				
No Endorsements Required				
Umbrella or Excess Liability				
List all lines this policy applies.				
Workers Compensation				
Waivers of Subrogation	WC 00 03 13		ISO Standard	Yes
Alternate Employer Endorsement	WC 00 03 01 A		ISO Standard	Yes

* State Waiver of Subrogation Provisions Overview: Kansas, Kentucky, Missouri, New Hampshire, and New Jersey disallow waivers of subrogation by statute. However, only Kansas and Missouri bar waivers of subrogation in the construction industry. (Note that Kansas does not prohibit the use of waivers of subrogation for consolidated or wrap-up insurance programs.) The monopolistic states either disallow waivers of subrogation or allow the state fund to make that decision. The remaining states allow for waivers of subrogation through judicial interpretation or administrative rules.

*Stop Gap endorsement required in monopolistic states such as ND, OH, WA WY, or Puerto Rico

*Coverage must apply in the State where the work is being performed if the vendor is from a state other than the one where the project is located.

We accept endorsements that are equal to those requested. Most insurance company forms are manuscript; therefore, they might not be compliant (most are not). We review all forms during the review process. Forms that are compliant today may not be compliant tomorrow. Our decisions are based on case law and claim history. Additional Insured or Organization Name to be listed on all endorsements along with policy numbers as applicable. Blank endorsements will not be excepted. Sample Endorsements Attached

Blanket Certificates of Insurance

For ease of paperwork, subcontractors may submit insurance documentation on a blanket basis to work on multiple projects under just one insurance certificate. (View sample certificate above or in compliance database)

Subcontractor performing work on multiple projects in the same State

Each of our projects requires a project-specific certificate of insurance (COI) for EACH project they work on; however, a lot of our Subcontractors are doing multiple projects in one State, which creates an opportunity to reduce paperwork by providing a blanket certificate of insurance and allowing the Subcontractor to work on all projects (Non-OCIP or CCIP) under one COI. If providing a blanket certificate, the following guidelines will be in addition:

1. On the COI, instead of stating an individual project name, replace with the following verbiage in the Description of Operations section of the certificate: **"All projects performed for City of Panama City Beach**
2. When stating the additional insureds, state the following along with the other required Description of Operations wording: "All insurance (excluding Workers Compensation and Professional Liability) include Owner, City of Panama City Beach, Indemnified Parties, any other parties as required by Owner Contract and their respective directors, officers, employees, and affiliates as Additional Insureds, and shall be primary and non-contributory to any insurance maintained by Additional Insureds."
3. All endorsements and waivers must be blanket-based, either per form or blanket wording. For example, a contract requires endorsements/waivers in such schedules instead of listing each entity.

Initial Page: _____Owner_____ Contractor

Commercial General Liability

CG 20 10 10 01

POLICY NUMBER: Required

COMMERCIAL GENERAL LIABILITY
CG 20 10 10 01

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – SCHEDULED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name of Person or Organization:
Certificate Holders Name

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

A. **Section II – Who Is An Insured** is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of your ongoing operations performed for that insured.

B. With respect to the insurance afforded to these additional insureds, the following exclusion is added:

2. Exclusions

This insurance does not apply to "bodily injury" or "property damage" occurring after:

(1) All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the site of the covered operations has been completed; or

(2) That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

CG 20 37 10 01

POLICY NUMBER: Required

COMMERCIAL GENERAL LIABILITY
CG 20 37 10 01

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – COMPLETED OPERATIONS

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name of Person or Organization:
Certificate Holders Name
Location And Description of Completed Operations:
All locations required by contract
Additional Premium:

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to this endorsement.)

Section II – Who Is An Insured is amended to include as an insured the person or organization shown in the Schedule, but only with respect to liability arising out of "your work" at the location designated and described in the schedule of this endorsement performed for that insured and included in the "products-completed operations hazard".

CG 24 04 05 09

POLICY NUMBER: Required

COMMERCIAL GENERAL LIABILITY
CG 24 04 05 09

WAIVER OF TRANSFER OF RIGHTS OF RECOVERY AGAINST OTHERS TO US

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

SCHEDULE

Name Of Person Or Organization:
Certificate Holders Name
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.

The following is added to Paragraph **8. Transfer Of Rights Of Recovery Against Others To Us** of **Section IV – Conditions:**

We waive any right of recovery we may have against the person or organization shown in the Schedule above because of payments we make for injury or damage arising out of your ongoing operations or "your work" done under a contract with that person or organization and included in the "products-completed operations hazard". This waiver applies only to the person or organization shown in the Schedule above.

CG 20 01 04 13

COMMERCIAL GENERAL LIABILITY
CG 20 01 04 13

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

PRIMARY AND NONCONTRIBUTORY – OTHER INSURANCE CONDITION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

The following is added to the **Other Insurance** Condition and supersedes any provision to the contrary:

Primary And Noncontributory Insurance

This insurance is primary to and will not seek contribution from any other insurance available to an additional insured under your policy provided that:

(1) The additional insured is a Named Insured under such other insurance; and

(2) You have agreed in writing in a contract or agreement that this insurance would be primary and would not seek contribution from any other insurance available to the additional insured.

Initial Page: _____Owner_____ Contractor

Workers Compensation

WC 00 03 13

WORKERS COMPENSATION AND EMPLOYERS LIABILITY INSURANCE POLICY **WC 00 03 13**

(Ed. 4-84)

WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.)

This agreement shall not operate directly or indirectly to benefit anyone not named in the Schedule.

Schedule

In Favor of:

Certificate Holders Name and Project Owner

Work Performed by:

Client (Our Subcontractor)

Client Address

On the Following Project or Location

All Projects or Locations as Required by Contract

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.

(The information below is required only when this endorsement is issued subsequent to preparation of the policy.)

Endorsement Effective Policy No. Required Endorsement No.
Insured Required Premium

Insurance Company Countersigned by_____
Required

WC 00 03 13
(Ed. 4-84)

WC 00 03 01 A

WORKERS COMPENSATION AND EMPLOYERS LIABILITY INSURANCE POLICY **WC 00 03 01 A**

(Ed. 2-89)

ALTERNATE EMPLOYER ENDORSEMENT

This endorsement applies only with respect to bodily injury to your employees while in the course of special or temporary employment by the alternate employer in the state named in Item 2 of the Schedule. Part One (Workers Compensation Insurance) and Part Two (Employers Liability Insurance) will apply as though the alternate employer is insured. If an entry is shown in Item 3 of the Schedule the insurance afforded by this endorsement applies only to work you perform under the contract or at the project named in the Schedule.

Under Part One (Workers Compensation Insurance) we will reimburse the alternate employer for the benefits required by the workers compensation law if we are not permitted to pay the benefits directly to the persons entitled to them.

The insurance afforded by this endorsement is not intended to satisfy the alternate employer's duty to secure its obligations under the workers compensation law. We will not file evidence of this insurance on behalf of the alternate employer with any government agency.

We will not ask any other insurer of the alternate employer to share with us a loss covered by this endorsement.

Premium will be charged for your employees while in the course of special or temporary employment by the alternate employer.

The policy may be canceled according to its terms without sending notice to the alternate employer.

Part Four (Your Duties If Injury Occurs) applies to you and the alternate employer. The alternate employer will recognize our right to defend under Parts One and Two and our right to inspect under Part Six.

Schedule

1. **Alternate Employer** — **Address**
   Our Subcontractor - *Not the PEO* — Our Subcontractors Address
2. **State of Special or Temporary Employment**
   All Applicable States
3. **Contract or Project**
   All Locations or Projects Required by Contract

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated.

(The information below is required only when this endorsement is issued subsequent to preparation of the policy.)

Endorsement Effective Date Here is Required Policy No. Endorsement No.
Policy Number Required Premium $

Insured
Required
Insurance Company
Required

Countersigned by_____

WC 00 03 01 A
(Ed 2-89)