SEEPAGE STORMWATER PUMP STATION

INVITATION FOR BID # PSPW-25-12

Issuance of Solicitation: Tuesday, April 7, 2026

Questions Due Date: Tuesday, April 28, 2026

Bid Submission Deadline: Tuesday, May 12, 2026

THE CITY OF PEMBROKE PINES
PROCUREMENT DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025
(954) 518-9020

For more information, please visit our online supplier portal, located at
https://procurement.opengov.com/portal/pembrokepines

DRAFT DOCUMENT FOR COMMISSION REVIEW

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SECTION 1 - NOTICE

Notice is hereby given that the City Commission of the City of Pembroke Pines is seeking sealed proposals for:

IFB # PSPW-25-12

Seepage Stormwater Pump Station

Solicitations may be found on the City of Pembroke Pines website under the Procurement Department at http://www.ppines.com/index.aspx?NID=667, and may be downloaded directly from the OpenGov platform at https://procurement.opengov.com/portal/pembrokepines.

For Technical Support, proposers can reach the OpenGov Service Desk between 7:00 am to 10:00 pm from Monday through Friday via the following methods:

- Chat (preferred method): Click the button in the lower right-hand corner of the portal.
- E-mail: procurement-support@opengov.com
- Phone: 1 (650) 336-7167

If additional help is needed with downloading the solicitation package please contact the Procurement Department at (954) 518-9020 or by email at purchasing@ppines.com. The Procurement Department hours are between 7:00 am to 6:00 pm on Monday through Thursday and is located at 8300 South Palm Drive, Pembroke Pines, FL 33025.

Bidders shall submit all questions regarding this bid via the City's e-Procurement Portal, located at https://procurement.opengov.com/portal/pembrokepines. Please note the deadline for submitting questions. All answers will be posted on the City's e-Procurement Portal. Bidders may also click "Follow" on this bid to receive an email notification when answers are posted. It is the bidder's responsibility to check the portal for updates. Only written responses issued through the OpenGov platform will be considered official for interpretations or clarifications.

Proposals will be accepted until 2:00 pm on Tuesday, May 12, 2026, electronically at https://procurement.opengov.com/portal/pembrokepines/projects/244462.

Bid Opening: The sealed electronic proposals will be publicly opened at 2:30 pm, on the bid due date, by the City Clerk's Office, in the **City Clerk's Office Conference Room located on the 4th Floor in the Charles F. Dodge City Center/**City Hall Administration Building, located at 601 City Center Way, Pembroke Pines, Florida, 33025.

Virtual Bid Opening: In light of public health concerns and to ensure accessibility for all, the City encourages interested parties and the public to participate virtually via live streaming instead of attending the meeting in person. As a result, meetings may be a combination of in-person and virtual, all as provided by law. To virtually attend the bid opening, please use the Cisco Webex Meetings platform.

Virtual Meeting Details:

- WebEx Meeting Link: https://ppines.webex.com/meet/purchasing
- Cisco Webex Meeting Number: 717 019 586
- Join by Phone Number: +1-408-418-9388

The public may download the **Cisco Webex Meetings app** from https://www.webex.com/downloads.html/.

To ensure an efficient meeting process, participants are requested to mute their audio and camera during the meeting. While the public is welcome to attend the virtual bid opening, **please note that active participation and commenting will not be allowed during the proceedings.**

For further information about the bid opening or assistance in accessing the virtual meeting, please contact:

Jamie Chen or other Procurement Staff in the Procurement Department
City of Pembroke Pines
8300 South Palm Drive,
Pembroke Pines, FL 33025
(954) 518-9061 or 954-518-9020
purchasing@ppines.com

SECTION 2 - GENERAL PROJECT INFORMATION & TIMELINE

2.1 Project Timeline

The work shall be completed within **270** calendar days from issuance of the City's Notice to Proceed (NTP), with an estimated start date of **TBD**.

2.2 Tentative Schedule of Events

Issuance of Solicitation (Posting Date):	April 7, 2026
Pre-Bid Meeting (Mandatory):	April 16, 2026, 10:00am TAFT STREET AND NW 209 AVENUE, PEMBROKE PINES, FL 33029
Question Due Date:	April 28, 2026, 11:00pm
Issuance of Final Answers to Questions:	May 4, 2026
Bid Submission Deadline:	May 12, 2026, 2:00pm
Bid Opening:	Will be held at 2:30 pm on the day of bid submissions are due.
Evaluations by Staff:	To Be Determined (TBD)

2.3 Mandatory Pre-Bid Meeting/Site Visit

There will be a **MANDATORY** scheduled pre-bid meeting on **Thursday, April 16, 2026 at 10:00 am.** Meeting location will be at the **TAFT STREET AND NW 209 AVENUE, PEMBROKE PINES, FL 33029**

A. **Proof of Attendance: Contractors** may be required to sign in at any of the meetings to show proof of attendance. It is the **Contractor's** responsibility to make sure that they sign in at the meeting.

2.4 Follow-Up Pre-Bid Meeting(s)

Follow-Up Meetings: In the event that a **Contractor** cannot attend the scheduled pre-bid meeting, or if a **Contractor** would like a follow up visit to the site, they may request a site visit by contacting **Jamie Chen** at **(954) 518-9061**. We urge all **Contractors** to attend the scheduled meeting, as a separate or follow-up meeting may not be afforded to the requester due to scheduling and availability of staff to assist with any additional meetings. In addition, if making a request for a separate or follow-up meeting, **Contractors** are urged to make these requests as early as possible.

2.5 Estimated Project Cost

Staff estimates this project to cost approximately $5,588,742.50

2.6 Liquidated Damages

Liquidated damages for this project shall be **TWO HUNDRED FIFTY DOLLARS AND NO CENTS ($250.00)** per day.

2.7 Grant/Federal Funding

Yes, the City plans to utilize the following grant(s)/federal fund(s) for this project:

FEMA's Hazard Mitigation Grant Program (HMGP)

2.8 Proposal Security/Bid Bond

A Proposal Security shall be required for every bidder, regardless of proposal amount. Proposal Security shall be in the amount of 5% of the total cumulative base amount proposed.

2.9 Payment and Performance Bonds

Regardless of the awarded contract amount, two (2) separate bonds (Payment and Performance Bonds) are required, and both must be approved by the City. The penal sum stated in each bond shall be 100% of the contract price.

2.10 Permit, License, Impact or Inspection Fees

With the exception of the City related permit, license, impact or inspection fees (including the Building Department and Engineering Department Permit Fees), which will be waived for this project, the City does not anticipate any additional permit, license, impact or inspection fees for this project. Any related State or County fees, for the aforementioned permits, will be paid by the City.

In addition, the City shall cover the cost for any other permit fees related to external entities through the City's Owner's Contingency for this project**, therefore proposers should not include permit costs in their total proposal price.**

Furthermore, please note the City's average time for a **Contractor** to apply for and receive an approved permit is 30 days; delays in this timeline caused by the **Contractor**'s failure to actively monitor the permit process and submit all required documentation in a timely manner, will count against the project's contractual completion period.

SECTION 3 - PURPOSE AND BACKGROUND

3.1 Purpose

The City of Pembroke Pines is seeking bids from qualified firms, hereinafter referred to as the Contractor, to construct a stormwater pump station and associated utility improvements, including all labor, materials, equipment, permitting, and coordination necessary to complete the work, in accordance with the terms, conditions, and specifications contained in this solicitation.

3.2 Background

Pembroke Pines, Florida, ranked as the eleventh largest city among the state's four hundred plus municipalities and the second largest in Broward County, maintains a welcoming small-town ambiance that resonates with its residents. Located conveniently in southwest Broward County, the city provides seamless access to major highways, employment centers, entertainment venues, parks, golf courses, and a diverse array of dining and shopping options.

With a population of approximately 170,000 residents spread across 32.68 square miles, Pembroke Pines is renowned as one of the best cities to live in America. The city boasts 28 superior parks, lush landscaping, and a distinctive South Florida charm that contributes to its natural beauty. Notably recognized as 2024's Best Place to Raise a Family in Florida, and 2024's Best City of Hispanic Entrepreneurs by WalletHub, Pembroke Pines also earned a place as the on Money Magazine's esteemed Best Places to Live list in 2014, as the sole Florida representative, ranking in at #32 in the nation.

Incorporated in 1960, Pembroke Pines is celebrated as a safe and desirable community, having received accolades such as the All-America City designation. The city's commitment to arts and culture, exceptional schools, diverse population, numerous parks, and forward-thinking approach in an ever-evolving world make it a standout destination.

Pembroke Pines is also the home to the largest municipal-run charter school system in the nation, serving over 6,000 students across five separate campuses. The City’s award-winning charter school system is located in the Broward County School District, which is the sixth largest school district in the nation.

SECTION 4 - SCOPE OF WORK

4.1 SUMMARY OF WORK

A. The utility work shown on the drawings includes the design and construction of a stormwater pump station located near the western limits of the City of Pembroke Pines. The project includes the installation of a duplex submersible pump system to re-channel seepage from Conservation Area 3A into the Everglades via the SFWMD S-9A Pump Station. Work includes site grading, construction of a pump station wet well, installation of electric pumps, control panel, automatic transfer switch (ATS), permanent backup generator, associated electrical improvements, hydraulic piping, SCADA accommodations, and discharge connections. Additional work includes permitting, environmental coordination, paving, restoration, and coordination with multiple regulatory agencies including SFWMD, SBDD, FDOT, and FDEP.

B. The work associated with this project involves active force mains that are within the Rights-Of-Way (ROW) or property owned by the City. All work activities shall be required to be in accordance with the permits issued by the respective agencies. All work performed will be required to be done while maintaining the functional operation of the utility lines.

C. All materials, equipment, skills, tools, and labor which is reasonably and properly inferable and necessary for the proper completion of the Work and in compliance with the requirements stated or implied by these Specifications or Drawings shall be furnished and installed by the CONTRACTOR without additional compensation, whether specifically indicated in the Contract Documents or not.

D. Repair, replace, or otherwise settle with the OWNER or OWNER'S Representative, if damage to property or existing facilities occurs, including damage to pavements, utilities, lawns, structures, etc.

E. Construct the Project under a Unit Price Contract.

F. The CONTRACTOR shall perform the work complete, in place, and ready for continuous service, and shall include repairs, testing, permits, clean up, replacements, and restoration required because of disruptions caused during this construction.

G. Any damage that occurs through the fault of the CONTRACTOR, shall be completely restored at the expense of the CONTRACTOR, based upon current City standards.

H. Pipe Manufacturer shall provide training for CONTRACTOR'S personnel on the proper methods of handling, installing, joining and backfilling of all mains.

I. Contractor shall verify location and depth of existing utilities to determine actual need for utility line transitions. If existing mains are not in conflict with proposed force main, then the transitions will not be required.

Please refer to Attachment A - Specifications - SECTION 01010 "SUMMARY OF WORK" for further details.

4.2 WORK SEQUENCE

The CONTRACTOR'S sequence of work may be of his choosing in order to complete the work in the allowed time frame and in conjunction with all Work Activities. The CONTRACTOR shall submit a schedule and work sequence to the OWNER at least five (5) days prior to the Notice to

Proceed. Due to the critical nature of the utilities systems in this area, shutdowns of any existing City utility systems will not be allowed. Contractor shall be responsible for keeping all utility services to customers active throughout the duration of the project. See Special Project Procedures in this section for Suggested Sequence of Construction.

SECTION 5 - PRICE PROPOSAL / BID TABLE

The vendor must provide their pricing electronically through the designated line items listed on the Bid Sheet/Pricing Table via the City's e-Procurement portal on OpenGov.

Vendor Notes: The bid tables includes a "Vendor Notes" column for any additional comments regarding the requested line item(s). A comment is preferred in the "Vendor Notes" column. If the vendor does not need to submit any comments, they may leave it blank or enter N/A or similar.

Payment & Performance Bonds: The table includes a section for the vendor to submit pricing for Payment & Performance Bonds. If the total cumulative base proposal amount does not exceed $200,000 and a Payment and Performance Bond is not required, please enter "0" on the "If Applicable, Cost for Payment and Performance Bond" column for each line item.

Primary Responses: The initial Bid Table is for the primary responses so that the vendors can submit the requested goods and/or services.

Additional Responses: The second Bid Table allows for bidders to submit alternative options. Substitutions of brands or products must be submitted as an alternative for the City's review and approval.

A. To submit an alternative, please clearly identify any brand or product substitutions in the **"Vendor Notes"** column for the respective part.

B. In addition, please upload any pertinent information relating to the alternative in the "Alternatives" section of the SUBMITTAL DOCUMENTS.

C. Refer to Attachment A: Section 1.08 "SUBSTITUTIONS" for additional details.

GENERAL

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
1	MOBILIZATION/DEMOBILIZATION	1	LS		
2	GENERAL REQUIREMENTS	1	LS		
3	EROSION AND SEDIMENTATION CONTROL	1	LS		
4	MAINTENANCE OF TRAFFIC	1	LS		
TOTAL					

EARTHWORK

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
5	SITE DEMOLITION/CLEARING	1	LS		
6	TREE REMOVAL	12	EA		
7	CHANNEL EXCAVATION	250	CY		
8	FILL DIRT	115	CY		
9	FABRIC GEOMEMBRANE	200	SY		
10	RIP RAP INFLOW/OUTFLOW	100	TN		
11	SOD RESTORATION	700	SY		
TOTAL					

UTILITIES

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
12	48" OUTFALL FLAPGATE	1	EA		
13	PIPE CULVERT, OPTIONAL MATERIAL, ROUND, JACK & BORE, 48"	210	LF		
14	36" C900 PVC DR18 & D.I. FITTINGS	1,150	LF		
15	30" DI CHECK VALVE	2	EA		
16	24" DI CHECK VALVE	1	EA		
17	24" BY-PASS CONNECTION ASSEMBLY	1	LS		
TOTAL					

ROADWORK

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
18	GUARDRAIL - ROADWAY, GENERAL TL-3	90	LF		
19	GUARDRAIL - ROADWAY, END TREATMENT, MASH TL-3	2	EA		
20	TYPE D CURB AND GUTTER	85	LF		
21	MANHOLE ADJUSTMENT	1	EA		
22	ASPHALT PAVEMENT DRIVEWAY	1	LS		
23	HEAVY DUTY CONCRETE SLAB	2,710	SF		
24	ALUMINUM SIGN POLE RELOCATION	9	EA		
25	CURB AND GUTTER RESTORATION	620	LF		
26	SIDEWALK RESTORATION	300	SY		
27	FULL LANE WIDTH ASPHALT PAVEMENT RESTORATION - SUBSOIL EXCAVATION	305	CY		
28	FULL LANE WIDTH ASPHALT PAVEMENT RESTORATION - TYPE B STABILIZATION - STABILIZED SUBGRADE (LBR 40 MIN.), COMPACTED AT 95% MAX DENSITY PER AASHTO T-180	910	SY		
29	FULL LANE WIDTH ASPHALT PAVEMENT RESTORATION - LIMEROCK BASE LBR 100 - OPTIONAL BASE, BASE GROUP 11 (12")	910	SY		
30	FULL LANE WIDTH ASPHALT PAVEMENT RESTORATION - ASPHALTIC CONCRETE, SP-9.5 (2")	115	TN		

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
31	PAVEMENT PAINTED MARKINGS	1	LS		
TOTAL					

PUMP STATION SYSTEM

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
32	INTAKE CONCRETE STRUCTURE	1	LS		
33	SHEET PILE SYSTEM	1	LS		
34	HORIZONTAL 30" SUBMERSIBLE PUMPS W/ DRIVE UNITS	2	EA		
35	DRIVE UNIT CANOPY AND CONCRETE SLABS	2	EA		
36	ELECTRICAL SERVICE, CONTROLS, AND SCADA	1	LS		
37	WATER SERVICE - METER, BFP, AND HOSE BIBB ASSEMBLY	1	LS		
38	OUTFALL HEADWALL STRUCTURE	1	LS		
TOTAL					

OTHER

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
39	TRACK-MOUNTED SLIDING GATE ASSEMBLY	1	LS		
40	FDOT TYPE A CHAIN LINKED FENCE W/ BARBED WIRE	240	LF		

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
41	MANUAL TRASH SCREEN & OSHA-COMPLIANT GALVANIZED STEEL GUARDRAIL PLATFORM SYSTEM	1	LS		
42	ABOVE GROUND HEAVY DUTY GALVANIZED PERFORATED CABLE TRAY	55	LF		
43	ALUMINUM HANDRAILING	120	LF		
44	CONCRETE WHEEL STOP	4	EA		
45	SAFETY ACCESS LADDER	1	EA		
TOTAL					

PAYMENT & PERFORMANCE BOND

Line Item	Description	Unit of Measure	Percentage
45	PAYMENT & PERFORMANCE BOND AS A PERCENT	%	

GENERAL (ALTERNATIVES)

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
1	MOBILIZATION/DEMOBILIZATION	1	LS		
2	GENERAL REQUIREMENTS	1	LS		
3	EROSION AND SEDIMENTATION CONTROL	1	LS		
4	MAINTENANCE OF TRAFFIC	1	LS		
TOTAL					

EARTHWORK (ALTERNATIVES)

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
5	SITE DEMOLITION/CLEARING	1	LS		
6	TREE REMOVAL	12	EA		
7	CHANNEL EXCAVATION	250	CY		
8	FILL DIRT	115	CY		
9	FABRIC GEOMEMBRANE	200	SY		
10	RIP RAP INFLOW/OUTFLOW	100	TN		
11	SOD RESTORATION	700	SY		
TOTAL					

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14	36" C900 PVC DR18 & D.I. FITTINGS	1,150	LF		
15	30" DI CHECK VALVE	2	EA		
16	24" DI CHECK VALVE	1	EA		
17	24" BY-PASS CONNECTION ASSEMBLY	1	LS		
TOTAL					

ROADWORK (ALTERNATIVES)

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
18	GUARDRAIL - ROADWAY, GENERAL TL-3	90	LF		
19	GUARDRAIL - ROADWAY, END TREATMENT, MASH TL-3	2	EA		
20	TYPE D CURB AND GUTTER	85	LF		
21	MANHOLE ADJUSTMENT	1	EA		
22	ASPHALT PAVEMENT DRIVEWAY	1	LS		
23	HEAVY DUTY CONCRETE SLAB	2,710	SF		
24	ALUMINUM SIGN POLE RELOCATION	9	EA		
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27	FULL LANE WIDTH ASPHALT PAVEMENT RESTORATION - SUBSOIL EXCAVATION	305	CY		
28	FULL LANE WIDTH ASPHALT PAVEMENT RESTORATION - TYPE B STABILIZATION - STABILIZED SUBGRADE (LBR 40 MIN.), COMPACTED AT 95% MAX DENSITY PER AASHTO T-180	910	SY		
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Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
31	PAVEMENT PAINTED MARKINGS	1	LS		
TOTAL					

PUMP STATION SYSTEM (ALTERNATIVES)

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
32	INTAKE CONCRETE STRUCTURE	1	LS		
33	SHEET PILE SYSTEM	1	LS		
34	HORIZONTAL 30" SUBMERSIBLE PUMPS W/ DRIVE UNITS	2	EA		
35	DRIVE UNIT CANOPY AND CONCRETE SLABS	2	EA		
36	ELECTRICAL SERVICE, CONTROLS, AND SCADA	1	LS		
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38	OUTFALL HEADWALL STRUCTURE	1	LS		
TOTAL					

OTHER (ALTERNATIVES)

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
39	TRACK-MOUNTED SLIDING GATE ASSEMBLY	1	LS		
40	FDOT TYPE A CHAIN LINKED FENCE W/ BARBED WIRE	240	LF		

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43	ALUMINUM HANDRAILING	120	LF		
44	CONCRETE WHEEL STOP	4	EA		
45	SAFETY ACCESS LADDER	1	EA		
TOTAL					

PAYMENT & PERFORMANCE BOND (ALTERNATIVES)

Line Item	Description	Unit of Measure	Percentage
45	PAYMENT & PERFORMANCE BOND AS A PERCENT	%	

SECTION 6 - SUBMITTAL DOCUMENTS

Bids must be submitted electronically at https://procurement.opengov.com/portal/pembrokepines on or before **2:00 pm on Tuesday, May 12, 2026.** Please note vendors should be registered on OpenGov under the name of the organization that they are operating as and it should match the organization name on the documents that they are submitting and utilizing when responding to the solicitation. In addition, the vendor must complete the required documents in this section and provide any additional information requested throughout this solicitation. Any additional information requested in the solicitation should be scanned and uploaded. The City recommends for proposers to submit their proposals as soon as they are ready to do so. Please allow ample time to submit your proposals on the https://procurement.opengov.com/portal/pembrokepines website. Proposals may be modified or withdrawn prior to the deadline for submitting Proposals.

PLEASE DO NOT SUBMIT ANY PROPOSALS VIA MAIL, E-MAIL OR FAX.

Prospective proposers interested in responding to this solicitation are requested to provide all of the applicable information listed in this section. Submittals that do not respond completely to all of the requirements specified herein may be considered non-responsive and eliminated from the process. Brevity and clarity are encouraged.

1 CONFIRMATION TO BIND

1.1 I certify that I have read, understood and agree to the terms in this solicitation, and that I am authorized to submit this response on behalf of my company.*

☐ Please confirm

*Response required

2 CERTIFICATION OF INSURANCE COMPLIANCE AND INTENT TO PROCURE REQUIRED COVERAGE

NOTE: Vendors are not required to purchase any additional insurance in order to submit a bid. However, they must certify that they either currently hold, or are able and willing to obtain, all required insurance coverages, endorsements, and limits prior to award and execution of the contract.

2.1 I certify that, if awarded this contract, I will be required to obtain and maintain all insurance policies as detailed in the INSURANCE REQUIREMENTS Section of this solicitation before any work may commence, and throughout the life of the contract.*

☐ Please confirm

*Response required

2.2 Do you confirm that you will only use insurance carriers licensed to do business in the State of Florida and rated no less than "A" as to management, and no less than "Class VI" as to financial strength by A.M. Best, and that you understand all endorsements required (e.g., Additional Insured, Waiver of Subrogation, etc.) must be included?*

☐ Yes

☐ No

*Response required

2.3 Do you currently carry insurance policies that meet or exceed the minimum requirements outlined in the INSURANCE REQUIREMENTS section of this solicitation?*

☐ Yes

☐ No

*Response required

When equals "Yes"

2.3.1 Please upload your current certificate(s) of insurance that demonstrate compliance with the insurance requirements outlined in this solicitation.*
*Response required

When equals "No"

2.3.2 Please upload documentation showing that you have obtained a letter from your insurance broker or carrier, such as a Letter of Intent to Insure, Evidence of Insurability, or a Conditional Certificate of Insurance.*
Documentation should show that:

- You can obtain the required insurance.
- The limits and types of coverage will meet the INSURANCE REQUIREMENTS outlined in the solicitation.
- You will provide a COI upon contract award.

*Response required

When equals "No"

2.3.3 Please upload your current certificate(s) of insurance.*
*Response required

2.4 Do you believe you are exempt from one or more insurance requirements (e.g., Workers' Compensation)?*

☐ Yes

☐ No

*Response required

When equals "Yes"

2.4.1 Please upload written documentation requesting an exemption on your company letterhead, subject to City approval.*
*Response required

2.5 Do you plan on using subcontractors for this project?*

☐ Yes

☐ No

*Response required

When equals "Yes"

2.5.1 Do you acknowledge that all subcontractors must also carry the same insurance or be covered under your policy, and that proof of such coverage must be provided to the City?*

☐ Yes

☐ No

*Response required

3 REFERENCE # 1

The minimum experience for this project is **five (5) years**. Provide specific examples of similar experience conducting licensed work of equal or similar scope of work, preferably delivered by the proposed team members. A **minimum of 3** references should be from the last **five years** and should be capable of explaining and confirming your firm's capacity to successfully complete the scope of work outlined herein. As part of the proposal evaluation process, the City may conduct an investigation of references, including a record check or consumer affairs complaints. Proposers' submission of a proposal constitutes acknowledgment of the process and consent to investigate. The City is the sole judge in determining Proposers qualifications. In this section you will have the ability to enter information for 5 different references including their contact details and specific project information.

Please note that the City prefers references who are not current employees of the City of Pembroke Pines, as we generally do not contact our own employees for reference checks.

Proposers are advised to confirm that:

A. Each reference provided by the Respondent has up to date contact persons and contact information;

B. The contact person provided for each reference is someone who has personal knowledge of the Proposer's performance during the referenced project; and

C. The contact person for each reference has been contacted by the Proposer regarding this specific bid submittal and such person confirmed their willingness to serve as a reference.

3.1 Reference Contact Information - Name of Firm, City, County or Agency*
*Response required

3.2 Reference Contact Information - Reference's Business Address*
*Response required

3.3 Reference Contact Information - Reference's Contact Name & Title*
*Response required

3.4 Reference Contact Information - Reference's E-mail Address*
*Response required

3.5 Reference Contact Information - Reference's Phone Number*
*Response required

3.6 Project Information - Was your firm the prime contractor for the listed project?*
☐ Yes
☐ No

*Response required

3.7 Project Information - Name of Contactor Performing the Work*
*Response required

3.8 Project Information - Name and location of the project*
*Response required

3.9 Project Information - Nature of the firm's responsibility on the project and work for which staff was responsible for*
*Response required

3.10 Project Information - Project Duration*
*Response required

3.11 Project Information - Completion (Anticipated) Date*
*Response required

3.12 Project Information - Size of Project*
*Response required

3.13 Project Information - Cost of Project*
*Response required

4 REFERENCE # 2

4.1 Reference Contact Information - Name of Firm, City, County or Agency*
*Response required

4.2 Reference Contact Information - Reference's Business Address*
*Response required

4.3 Reference Contact Information - Reference's Contact Name & Title*
*Response required

4.4 Reference Contact Information - Reference's E-mail Address*
*Response required

4.5 Reference Contact Information - Reference's Phone Number*
*Response required

4.6 Project Information - Was your firm the prime contractor for the listed project?*
☐ Yes
☐ No

*Response required

4.7 Project Information - Name of Contactor Performing the Work*
*Response required

4.8 Project Information - Name and location of the project*
*Response required

4.9 Project Information - Nature of the firm's responsibility on the project and work for which staff was responsible for*
*Response required

4.10 Project Information - Project Duration*
*Response required

4.11 Project Information - Completion (Anticipated) Date*
*Response required

4.12 Project Information - Size of Project*
*Response required

4.13 Project Information - Cost of Project*
*Response required

5 REFERENCE # 3

5.1 Reference Contact Information - Name of Firm, City, County or Agency*
*Response required

5.2 Reference Contact Information - Reference's Business Address*
*Response required

5.3 Reference Contact Information - Reference's Contact Name & Title*
*Response required

5.4 Reference Contact Information - Reference's E-mail Address*
*Response required

5.5 Reference Contact Information - Reference's Phone Number*
*Response required

5.6 Project Information - Was your firm the prime contractor for the listed project?*
☐ Yes
☐ No

*Response required

5.7 Project Information - Name of Contactor Performing the Work*
*Response required

5.8 Project Information - Name and location of the project*
*Response required

5.9 Project Information - Nature of the firm's responsibility on the project and work for which staff was responsible for*
*Response required

5.10 Project Information - Project Duration*
*Response required

5.11 Project Information - Completion (Anticipated) Date*
*Response required

5.12 Project Information - Size of Project*
*Response required

5.13 Project Information - Cost of Project*
*Response required

6 REFERENCE # 4

6.1 Reference Contact Information - Name of Firm, City, County or Agency
6.2 Reference Contact Information - Reference's Business Address
6.3 Reference Contact Information - Reference's Contact Name & Title
6.4 Reference Contact Information - Reference's E-mail Address
6.5 Reference Contact Information - Reference's Phone Number
6.6 Project Information - Was your firm the prime contractor for the listed project?
☐ Yes
☐ No

6.7 Project Information - Name of Contactor Performing the Work
6.8 Project Information - Name and location of the project
6.9 Project Information - Nature of the firm's responsibility on the project and work for which staff was responsible for
6.10 Project Information - Project Duration
6.11 Project Information - Completion (Anticipated) Date
6.12 Project Information - Size of Project
6.13 Project Information - Cost of Project

7 REFERENCE # 5

7.1 Reference Contact Information - Name of Firm, City, County or Agency
7.2 Reference Contact Information - Reference's Business Address
7.3 Reference Contact Information - Reference's Contact Name & Title
7.4 Reference Contact Information - Reference's E-mail Address
7.5 Reference Contact Information - Reference's Phone Number
7.6 Project Information - Was your firm the prime contractor for the listed project?

☐ Yes
☐ No

7.7 Project Information - Name of Contactor Performing the Work
7.8 Project Information - Name and location of the project
7.9 Project Information - Nature of the firm's responsibility on the project and work for which staff was responsible for
7.10 Project Information - Project Duration
7.11 Project Information - Completion (Anticipated) Date
7.12 Project Information - Size of Project
7.13 Project Information - Cost of Project

8 PROJECT DOCUMENTS

8.1 PROPOSERS BACKGROUND INFORMATION FORM*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Proposers_Background_Inform...

*Response required

8.2 PROPOSAL SECURITY (BID BOND FORM OR CASHIER'S CHECK)*

a. A Proposal Security shall be in an amount not less than of 5% of the total cumulative base amount proposed.

b. Therefore, proposal should be accompanied by a certified or cashier's check or by a Bid Bond made payable to the City of Pembroke Pines on an approved form, duly executed by the Proposer as principal and having as surety thereon a surety company acceptable to CITY and authorized to write such Bond under the laws of the State of Florida.

c. Contingency is not to be counted in the total amount the proposal security is based on.

d. Proposers must submit a scanned copy of their bid security (bid bond form or cashier's check) with their bid submittal through OpenGov.

e. Proposers should also submit their original bid security (bid bond form or cashier's check) at time of the bid due date, or they may be deemed as non-responsive.

f. The original Bid Bond or Cashier's Check should be in a sealed envelope, plainly marked "**BID SECURITY - PSPW-25-12 Seepage Stormwater Pump Station** and sent to the City of Pembroke Pines, City Clerk's Office, 4th Floor, 601 City Center Way, Pembroke Pines, Florida, 33025.

g. Please see SPECIAL TERMS & CONDITIONS of this document for additional information.

*Response required

9 SWORN STATEMENT ON PUBLIC ENTITY CRIMES UNDER FLORIDA STATUTES CHAPTER 287.133(3)(a)

9.1 SWORN STATEMENT ON PUBLIC ENTITY CRIMES FORM*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Sworn_Statement_on_Public_E...

*Response required

9.2 Public Entity Crimes Status*

- Which option did you select on the Sworn Statement on Public Entity Crimes Form:
  - A) Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, nor any affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.
  - B1) The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND There has been a proceeding concerning the conviction before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer did not place the person or affiliate on the convicted vendor list. (Please attach a copy of the final order.)
  - B2) The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND The person or affiliate was placed on the convicted vendor list. There has been a subsequent proceeding before a hearing officer of the State of Florida, Division of Administrative Hear¬ings. The final order entered by the hearing

officer determined that it was in the public interest to remove the person or affiliate from the convicted vendor list. (Please attach a copy of the final order.)

- B3) The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND The person or affiliate has not been placed on the convicted vendor list. (Please describe any action taken by or pending with the Department of General Services.)

☐ A) No convictions.
☐ B1) Convicted, final order did not place on the convicted vendor list.
☐ B2) Convicted, listed, then removed.
☐ B3) Convicted, not listed, action pending.
*Response required

9.3 Did you select option B1 or B2 above?*
☐ Yes
☐ No

*Response required

When equals "Yes"

9.3.1 Please upload a copy of the final order issued by the hearing officer of the State of Florida, Division of Administrative Hearings.*
*Response required

9.4 Did you select option B3 above?*
☐ Yes
☐ No

*Response required

When equals "Yes"

9.4.1 Please describe any action taken by or pending with the Department of General Services.*
*Response required

10 DRUG-FREE WORKPLACE CERTIFICATION

10.1 VENDOR DRUG FREE WORKPLACE CERTIFICATION FORM*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Vendor_Drug-Free_Workplace_...

*Response required

10.2 Drug-Free Status*

☐ Complies fully.

☐ Does not comply.

*Response required

11 STANDARD DOCUMENTS

The following documents are standard documents that the City generally requires for every solicitation. As a result, we recommend vendors to keep these documents updated and readily available so that they can be easily uploaded for each project that the vendor would like to participate in. In the event that the City does not have one of the forms or documents listed below for your company, the City may reach out to your company after the bid has closed to obtain the document(s).

11.1 NON-COLLUSIVE AFFIDAVIT*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Non-Collusive_Affidavit.pdf

*Response required

11.2 SCRUTINIZED COMPANY CERTIFICATION*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Scrutinized_Company_Certifi...

*Response required

11.3 E-VERIFY SYSTEM CERTIFICATION*

a. Please download the attached document, complete all required fields, and upload the completed form here.

b. Effective January 1, 2021, pursuant to Section 448.095. Florida Statues, the City may not enter into a contract with a vendor/contractor/subcontractor unless that vendor/contractor/subcontractor is registered with and uses the E- Verify system administered by the U.S. Department of Homeland Security (“DHS”).

c. Contractor shall also require all subcontractors to provide an affidavit attesting that the subcontractor does not employ, contract with, or subcontract with, an unauthorized alien. The Contractor shall maintain a copy of such affidavit for the duration of the contract.

- E-Verify_System_Certificati...

*Response required

11.4 HUMAN TRAFFICKING AFFIDAVIT*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Human_Trafficking_Affidavit...

*Response required

12 VENDOR REGISTRATION

12.1 Do you currently have a City of Pembroke Pines Vendor Number registered in the PaymentWorks System?*

- The City of Pembroke Pines utilizes OpenGov as its e-Procurement platform for solicitation and bid submission purposes. However, please be advised that **vendor registration for onboarding and processing payments is handled separately** through the City's Accounts Payable Division using **PaymentWorks**, a secure online vendor management platform.
- All vendors that will be submitting invoices and requiring payments from the City are required to register on the PaymentWorks platform. If the vendor is not currently registered with the City via PaymentWorks and does not have a Vendor Number, the City will have to invite the vendor to register.
- For formal solicitations such as this project, the Procurement Department will send PaymentWorks registration invitations to vendor(s) who are under active consideration for award. Please be aware that not all vendors who submit proposals will receive an invitation, in order to manage system usage and avoid onboarding vendors who are unlikely to receive payments from the City.
- Invitations will typically be sent to the contact listed on the submitted Vendor Information Form.

☐ Yes
☐ No

*Response required

When equals "Yes"

12.1.1 What is your Vendor Number?*
*Response required

12.2 VENDOR INFORMATION FORM*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Vendor_Information_Form.pdf

*Response required

12.3 FORM W-9 (REVISED MARCH 2024)*

a. Please download the attached document, complete all required fields, and upload the completed form here.

b. Note - Please use the March 2024 version of the form as previously dated versions of this form may delay the processing of any payments to the selected vendor.

- Form_W-9_(Rev_March_2024).pdf

*Response required

13 OPTIONAL DOCUMENTATION

13.1 TRADE SECRETS

a. The Proposer's response to this solicitation is a public record pursuant to Florida law, which is subject to disclosure by the City under the State of Florida Public Records Law, Florida Statutes Chapter 119.07 ("Public Records Law"). The City shall permit public access to all documents, papers, letters or other material submitted in connection with this solicitation and the Contract to be executed for this solicitation, subject to the provisions of Chapter 119.07 of the Florida Statutes.

b. Any language contained in the Proposer's response to the solicitation purporting to require confidentiality of any portion of the Proposer's response to the solicitation, except to the extent that certain information is in the City's opinion a Trade Secret pursuant to Florida law, shall be void. If a Proposer submits any documents or other information to the City which the Proposer claims is Trade Secret information and exempt from Florida Statutes Chapter 119.07 ("Public Records Laws"), the Proposer shall clearly designate that it is a Trade Secret and that it is asserting that the document or information is exempt. The Proposer must specifically identify the exemption being claimed under Florida Statutes 119.07. The City shall be the final arbiter of whether any information contained in the Proposer's response to the solicitation constitutes a Trade Secret.

c. EXCEPT FOR CLEARLY MARKED PORTIONS THAT ARE BONA FIDE TRADE SECRETS PURSUANT TO FLORIDA LAW, DO NOT MARK YOUR RESPONSE TO THE SOLICITATION AS PROPRIETARY OR CONFIDENTIAL. DO NOT MARK YOUR RESPONSE TO THE SOLICITATION OR ANY PART THEREOF AS COPYRIGHTED. ALL DOCUMENTS THAT THE FIRM PURPORTS TO BE CONFIDENTIAL, PROPRIETARY OR A TRADE SECRET SHALL BE UPLOADED TO THE OPENGOV WEBSITE AS A

SEPARATE ATTACHMENT, IN THIS SECTION, CLEARLY IDENTIFYING THE EXEMPTION BEING CLAIMED UNDER FLORIDA STATUTES 119.07.

d. The city's determination of whether an exemption applies shall be final, and the proposer agrees to defend, indemnify, and hold harmless the city and the city's officers, employees, and agent, against any loss or damages incurred by any person or entity as a result of the city's treatment of records as public records.

13.2 FINANCIAL STATEMENTS

a. The City is **NOT** requesting the vendor to submit any financial statements for this project and prefers if the vendor does not submit financial statements. In addition, if the City needs a copy of the vendor's financial statements, the City can contact the vendor after the bid due date to request those documents. However, if the vendor does submit the financial statements, they should be uploaded in this section.

b. Any claim of confidentiality on financial statements must be asserted at the time of submittal. The firm must identify the specific statute that authorizes the exemption from the Public Records Law. Please note that the financial statement exemption provided for in Section 119.071(1)c, Florida Statutes only applies to submittals in response to a solicitation for a "public works" project.

13.3 ADDITIONAL INFORMATION

a. Please provide any additional information that you deem necessary to complete your proposal in this section, if it has not been requested in another section.

13.4 PROFESSIONAL LICENSES

a. If applicable, please upload any professional licenses that may be required to perform the services outlined in the solicitation. The following licensing requirements shall apply when the applicable Florida statute mandates specific licensing for Contractors engaged in the type of work covered by this solicitation.

1. State of Florida, Department of Professional Regulation, Construction Industries Licensing Board and licensed by other federal, state, regional, county or municipal agencies having jurisdiction over the specified construction work.

2. Said licenses shall be in the Firm's name as it appears on the OpenGov registration and as appropriately registered with the applicable licensing entity. Proposer shall supply appropriate license numbers, with expiration dates, as part of their bid. Failure to hold and provide proof of proper licensing, certification and registration may be grounds for rejection of the bid.

3. Subcontractors contracted by the Prime Contractor shall be licensed in their respective fields to obtain construction permits as necessary. Said licenses must be in the name of the subcontractor.

14 VENDOR CLASSIFICATION

14.1 Is your firm a Veteran Owned Small Business (VOSB)?*

a. The evaluation of competitive bids is subject to section 35.37 of the City's Procurement Procedures which, except where contrary to federal and state law, or any other funding source requirements, provides that preference be given to veteran owned small businesses. To satisfy this requirement, the vendor shall affirm in writing its compliance with the following objective criteria as of the bid or proposal submission date stated in the solicitation.

b. A preference of two and a half percent (2.5%) of the total evaluation point, or two and a half percent (2.5%) of the total price, shall be given to the Veteran Owned Small Business (VOSB).

☐ Yes
☐ No

*Response required

When equals "Yes"

14.1.1 Upload the "Determination Letter" from the United States Department of Veteran Affairs Center notifying the business that they have been approved as a Veteran Owned Small Business (VOSB)

When equals "Yes"

14.1.2 Upload Veteran Owned Small Business Certification(s) from any relevant agency(ies)

14.2 Is your firm a Minority-Owned Business Enterprise (MBE)?*

☐ Yes
☐ No

*Response required

When equals "Yes"

14.2.1 Please indicate the classification of your Minority-Owned Business Enterprise (MBE)*
Select all that apply

☐ African-American MBE
☐ Asian-American MBE
☐ Hispanic-American MBE
☐ Native-American MBE

☐ Other option not listed above
*Response required

When equals "Yes"
14.2.2 MBE Certification Documentation*
1. Upload your MBE Certification Documentation here, preferably with the State of Florida's Office of Supplier Diversity. If you have multiple MBE certifications, please combine them into one (1) document and upload.

*Response required

14.3 ALTERNATIVES
A. If you are submitting an alternative product, please upload any related information in this section (such as specification sheets, etc.).

B. In addition, pursuant to the **"Brand Names"** Section included in the GENERAL TERMS AND CONDITIONS Section if and wherever in the specifications a brand name, make, name of manufacturer, trade name, or vendor catalog number is mentioned, it is for the purpose of establishing a grade or quality of material only. Since the City does not wish to rule out other competition and equal brands or makes, the phrase "OR EQUAL" is added. However, if a product other than that specified is bid, Proposers shall indicate on their proposal and clearly state the proposed substitution and deviation. It is the vendor's responsibility to provide any necessary documentation and samples within their bid submittal to prove that the product is equal to that specified. Such samples are to be furnished before the date of bid opening, unless otherwise specified. Additional evidence in the form of documentation and samples may be requested if the proposed brand is other than that specified. The City retains the right to determine if the proposed brand shall be considered as an approved equivalent or not.

14.4 Is your firm a Woman-Owned Business Enterprise (WBE)?*
☐ Yes
☐ No

*Response required

When equals "Yes"
14.4.1 WMBE Certification Documentation*
1. Upload your WMBE Certification Documentation here, preferably with the State of Florida's Office of Supplier Diversity. If you have multiple WMBE certifications, please combine them into one (1) document and upload.

*Response required

14.5 Is your firm a HubZone Business / Labor Surplus Area Firm?*

☐ Yes

☐ No

*Response required

When equals "Yes"

14.5.1 HubZone Business / Labor Surplus Area Firm Certification Documentation*

1. Upload your HubZone Business / Labor Surplus Area Firm Certification Documentation, preferably with the U.S. Small Business Administration (SBA). If you have multiple certifications, please combine them into one (1) document and upload.

*Response required

14.6 Is your firm a Broward County Small Business Enterprise (SBE)?*

☐ Yes

☐ No

*Response required

When equals "Yes"

14.6.1 SBE Cerification Documentation*

1. Upload your SBE Certification Documentation from Broward County's Office of Economic and Small Business Development (OESBD). If you have multiple certifications, please combine them into one (1) document and upload.

*Response required

14.7 Is your firm a Broward County Business Enterprise (CBE)?*

☐ Yes

☐ No

*Response required

When equals "Yes"

14.7.1 CBE Certification Documentation*

1. Upload your CBE Certification Documentation from Broward County's Office of Economic and Small Business Development (OESBD). If you have multiple certifications, please combine them into one (1) document and upload.

*Response required

14.8 Is your firm a Broward County Disadvantaged Business Enterprise (DBE)?*

☐ Yes

☐ No

*Response required

When equals "Yes"

14.8.1 DBE Certification Documentation*

1. Upload your DBE Certification Documentation from Broward County's Office of Economic and Small Business Development (OESBD). If you have multiple certifications, please combine them into one (1) document and upload.

*Response required

14.9 Does your firm have a Vendor Classification that was not listed above?*

☐ Yes

☐ No

*Response required

When equals "Yes"

14.9.1 Other Vendor Classification Certification Documentation*

1. Upload your other Certification Documentation here. If you have multiple certifications, please combine them into one (1) document and upload.

*Response required

15 FEDERAL DOCUMENTS

15.1 Certification Regarding Lobbying; Debarment, Suspension and Other Responsibility Matters for Expenditure of Federal Funds*

a. **Lobbying:**

1. As required by 7 CFR Part 3018, for persons entering into a contract, grant or cooperative agreement over **$100,000** involving the expenditure of Federal funds, the Contractor must complete the **Certification Regarding Lobbying**.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress or an employee of a Member of Congress, in connection with this Federal contract, grant, loan, or cooperative agreement, the Contractor shall also complete and submit the **Standard Form - LLL, "Disclosure Form to Report Lobbying,"** in accordance with its instructions.

b. **Debarment, Suspension and Other Responsibility Matters:**

1. Where the Contractor is unable to certify to any of the statements in the certification for **Debarment, Suspension and Other Responsibility Matters**, he or she shall **provide an explanation**.

- Please download the below documents, complete, and upload.

- Federal_Certification_for_L...

*Response required

15.2 Are you currently registered as an active entity on SAM.gov (System for Award Management)?*

a. All vendors submitting bids for this project must be registered and active in the System for Award Management (SAM.gov) at the time of bid award. This is a federal requirement for entities receiving federal funds, including contracts, grants, or other financial assistance. Registration on SAM.gov ensures that vendors are eligible to do business with the U.S. government and are not suspended, debarred, or otherwise excluded from participation in federal programs. SAM registration is free and can be completed at https://sam.gov. Bidders must provide their Unique Entity ID (UEI) and proof of active registration as part of their proposal.

☐ Yes
☐ No

*Response required

When equals "Yes"

15.2.1 If yes, please provide your Unique Entity ID (UEI)*
*Response required

When equals "Yes"

15.2.2 What is the expiration date of your current SAM.gov registration? (MM/DD/YYYY)*
*Response required

When equals "Yes"

15.2.3 Proof of Registration Upload*

1. Please upload a PDF copy or screenshot of your entity's active registration status from SAM.gov that includes:

   A. Entity Name

   B. Unique Entity ID (UEI)

   C. DUNS (if applicable)

   D. Registration Status ("Active")

   E. Expiration Date

2. *This document must be downloaded from https://sam.gov and must show the current status at the time of bid submission.*

*Response required

15.3 Debarment Status - Is your entity currently debarred, suspended, or otherwise excluded from receiving federal contracts or financial assistance?*

☐ Yes

☐ No

*Response required

When equals "Yes"

15.3.1 If yes, please provide an explanation.*

*Response required

When equals "Yes"

15.3.2 If yes, please upload any relevant documentation, if applicable.

15.4 I certify that the information provided above is true and correct to the best of my knowledge. I understand that false or misleading statements may disqualify this bid and subject the entity to federal penalties.*

☐ Please confirm

*Response required

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 7 - EVALUATION & SELECTION PROCESS

7.1 Qualifying & Selecting Firms

A. Staff will evaluate all responsive proposals received from proposers who meet or exceed the bid requirements contained in the solicitation. Evaluations shall be based upon the information and references contained in the proposals as submitted.

B. Staff will make a recommendation to the City Commission for award of contract.

C. The contract shall be awarded to the most responsive/responsible bidder whose bid is determined to be the most advantageous to the City taking into consideration the evaluation criteria.

DRAFT DOCUMENT FOR COMMISSION REVIEW

CITY OF PEMBROKE PINES
SEEPAGE STORMWATER PUMP STATION

PROJECT SPECIFICATIONS

VOLUME I

Prepared for:

City of Pembroke Pines

8300 S. Palm Drive

Pembroke Pines, FL 33025

&

South Broward Drainage District

6591 SW 160th Ave

Southwest Ranches, FL 33331

Prepared by:

CPH Consulting, LLC.

1992 SW 1st St.

Miami FL, 33135

October 2025

DRAFT DOCUMENT FOR COMMISSION REVIEW

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CITY OF PEMBROKE PINES

SEEPAGE STORMWATER PUMP STATION

October 2025

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DRAFT DOCUMENT FOR COMMISSION REVIEW

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SECTION 01001

GENERAL WORK REQUIREMENTS

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SECTION 01001
GENERAL WORK REQUIREMENTS

PART 1 - GENERAL

1.01 NOTICES

A. All notices or other papers required to be delivered by the Contractor to the City shall be delivered to the office of Utilities, 8300 South Palm Drive, Pembroke Pines FL 33025.

1.02 WORK TO BE DONE

A. The Contractor shall furnish all labor, materials, equipment, tools, services, and incidentals to complete all work required by these specifications and as shown on the Drawings, at a rate of progress which will ensure completion of the Work within the Contract Time stipulated.

B. The Contractor shall perform the Work complete, in place, and ready for continuous service, and shall include repairs, testing, permits, clean up, replacements, and restoration required because of damages caused during this construction.

C. The Contractor shall comply with all City, County, State, Federal, and other codes, which are applicable to the proposed Work.

D. All newly constructed Work shall be carefully protected from injury in any way. No wheeling, walking, or placing of heavy loads on it shall be allowed and all portions damaged shall be reconstructed by the Contractor at his own expense.

E. Scope of Work: See Section 01010 "Summary of Work" and the Bid Schedule for details.

1.03 DRAWINGS AND PROJECT MANUAL

A. The Work shall be performed in accordance with the Drawings and Specifications prepared by the City/Professional. All work and materials shall conform to the City Utilities Standards and Construction Specifications Manual, latest edition or as indicated in these Specifications or Drawings.

B. The Contractor shall verify all dimensions, quantities and details shown on the Drawings, Supplementary Drawings, Schedules, Specifications or other data received from the City/Professional, and shall notify same, in writing, of all errors, omissions, conflicts and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory Work, faulty construction or improper operation resulting there from, nor from rectifying such conditions at his own expense.

C. All schedules are given for the convenience of the City and the Contractor and are not

guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quantity of materials and equipment included in the Work to be done under this Contract.

D. Intent:

1. All Work called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified either in the Drawings or in the Specifications but involved in carrying out their 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.
2. Items of material, equipment, machinery, and the like may be specified on the Drawings and not in the Specifications. Such items shall be provided by the Contractor in accordance with the specification on the Drawings.
3. 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 upon that basis.

E. Refer to the Contract for the order of precedence of items and documents.

1.04 PROTECTION AND RESTORATION

A. The Contractor shall be responsible for the preservation of all public and private property and shall use every means of protection 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 expense, to a condition similar or equal to that existing before the damage was done, or the Contractor shall make good the damage in other manner acceptable to the City/Professional.

B. Protection of Trees and Shrubs

1. Protect with boxes or other barricades.
2. Do not place excavated material so as to injure trees or shrubs.
3. Install pipelines in short tunnels between and under root systems.
4. Support trees to prevent root disturbance during nearby excavation.

C. Tree and Limb Removal

1. Tree limbs, which interfere with equipment operation and are approved for pruning, shall be neatly trimmed and the tree cut coated with tree paint.
2. The city may order the Contractor, for the convenience of the City, to remove trees along the line or trench excavation. The Contractor shall obtain any permits required for removal of trees. Ordered tree removal shall be paid for under the appropriate Contract Items.

D. Trees or shrubs destroyed by negligence of the Contractor or his employees shall be replaced by the Contractor with new stock of similar size and age, at the proper season and at the sole expense of the Contractor.

E. Lawn Areas: All lawn areas disturbed by construction shall be replaced with like kind to a condition similar or equal to that existing before construction. Where sod is to be removed, it shall be carefully removed, and the same re-sodded, or the area where sod has been removed shall be restored with new sod in the manner described in the applicable section.

F. Where fencing, walls, shrubbery, grass strips or area must be removed or damaged incident to the construction operation, the Contractor shall, after completion of the work, replace or restore to the original condition.

G. The cost of all labor, materials, equipment, and work for restoration shall be deemed included in the appropriate Contract Item or items, or if no specific item is provided therefore, as part of the overhead cost of the Work, and no additional payment will be made therefore.

1.05 PUBLIC NUISANCE

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

B. . It shall be unlawful between the hours of 6:00 p.m. of one day and 7:30 a.m. of the next day for any person to perform any construction or repair work on buildings, structures, or projects, at a noise level of more than ten dBA in excess of the ambient noise level, when measured at the property line of such project, except to perform emergency work. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance. This shall not apply in cases of urgent necessity in the interest of the public health and safety, if a permit is granted by the Director of the Building and Zoning Department. Such a permit may be granted for a period not to exceed three days or less while the emergency continues, and may be renewed for periods of three days or less while the emergency continues; however, dewatering pumps and other equipment which is required to be operated 24 hours per day may be granted a permit to operate for a period of time in excess of three days if the operation of such equipment does not create a noise in excess of 80 dBA when measured at the property line.

1.06 MAINTENANCE OF SERVICE

A. Unless noted otherwise on the plans, the operation of the existing water, reclaimed water or wastewater facility on each of the respective locations shall remain in service until the transfer of service has been completed. The Contractor shall, prior to interrupting any utility service (water, sewer, etc.) for the purpose of making cut-ins to the existing lines or for any other purposes, contact the City and make arrangements for the interruption which will be satisfactory to the City.

B. Utility lines that are damaged during construction shall be repaired by the Contractor

and service restored within 4-hours of the breakage. The City retains the option of repairing any damage to utility pipes in order to expedite service to the customers. The Contractor will remain responsible for all costs associated with the repair.

1.07 TRANSFER OF SERVICE

A. When the City has accepted a proposed facility and placed it into operation, the transfer of service is complete. The Contractor may begin the work of removing the existing or temporary facilities.

1.08 LABOR

A. Supervision: The Contractor shall supervise and direct the Work efficiently and with his best skills and attention. The Contractor shall have a competent, English-speaking superintendent or representative, who shall be on the site of the Project at all working hours, and who shall have full authority by the Contractor to direct the performance of the Work and make arrangements for all necessary materials, equipment, and labor without delay.

B. Jurisdictional Disputes: It shall be the responsibility of the Contractor to pay all costs that may be required to perform any of the Work shown on the Drawings or specified herein to avoid any work stoppages due to jurisdictional disputes. The basis for subletting work in question, if any, shall conform to precedent agreements and decisions on record with the Building and Construction Trades Department, AFL-CIO, dated June 1973, including any amendments thereto.

C. Apprenticeship: The Contractor shall comply with all of the requirements of Section 446, Florida Statutes, for all contracts in excess of $25,000 excluding roadway, highway or bridge contracts and the Contractor agrees to insert in any subcontract under this Contract the requirements of this Article.

1.09 MATERIALS AND EQUIPMENT

A. MANUFACTURER

1. All transactions with the manufacturers or Subcontractors shall be through the Contractor, unless the Contractor and the City/Professional request that the manufacturer or Subcontractor communicate directly with the City/Professional. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.
2. All workmanship and materials shall be of the highest quality. The equipment shall be the product of manufacturers who are experienced and skilled in the field with an established record of research and development. No equipment will be considered unless the manufacturer has designed and manufactured equipment of comparable type and size and have demonstrated sufficient experience in such design and manufacture.
3. No material shall be delivered to the Site without prior approval of the City/Professional.

4. All apparatus, mechanisms, equipment, machinery, and manufactured articles for incorporation into the Project shall be the new (most current production at time of bid) and unused standard products of recognized reputable manufacturers.
5. Manufactured and fabricated products:
   a. Design, fabricate and assemble in accord with the best engineering and shop practices.
   b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
   c. Any two or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.
   d. Products shall be suitable for service conditions as specified and as stated by manufacturer.
   e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
   f. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

1.10 MANUFACTURER'S SERVICE

A. Where service by the manufacturer is specified to be furnished as part of the cost of the item of equipment, the Work shall be at the Contractor's expense.

B. The services provided shall be by a qualified manufacturer's service representative to check and verify the completed installation, place the equipment in operation, and instruct the City's operators in the operation and maintenance procedures. Such services are to be for period of time and for the number of trips specified. A working day is defined as a normal 8-hour working day on the job and does not include travel time.

C. The services shall further demonstrate to the City/Professional's complete satisfaction that the equipment will satisfactorily perform the functions for which it has been installed.

1.11 INSPECTION AND TESTING

A. General

1. All materials and equipment furnished by the Contractor shall be subject to the inspection, review and acceptance of the City and meet the requirements as outlined in the City Utilities Standards and Construction Specifications Manual. If in the testing of any material or equipment it is ascertained by the City/Professional that the material or equipment does not comply with the Contract, the Contractor shall be notified thereof, and the Contractor will be directed to refrain from delivering said material or equipment, or to remove it promptly from the Site or from the Work and not accepted by the City shall be replaced with acceptable material, without cost to the City.
2. Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEE, except as may otherwise be stated herein.
3. The Contractor shall give notice in writing to the City sufficiently in advance of his

intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the City shall arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials; or the City will notify the Contractor that the inspection will be made at a point other than the point of manufacture; or the City will notify the Contractor that inspection will be waived.

4. When inspection is waived or when the City/Professional so requires, the Contractor shall furnish to the City authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the Work have been manufactured and tested in conformity with the Contract Documents. These certificates shall be notarized and shall include five (5) copies of the results of physical tests and chemical analysis, where necessary, that have been made directly on the product or on similar products of the manufacturer.
5. The Contractor must comply with these provisions before shipping any material. Such inspections by the City shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

B. Cost

1. City shall employ and pay for the services of an independent testing laboratory to perform testing indicated on the Contract Documents, or at the City's discretion to ensure conformity with the Contract Documents.
2. The cost of field leakage and pressure tests and shop tests of materials and equipment specifically called for in the Contract Documents shall be borne by the Contractor. Such costs shall be deemed to be included in the Contract price.
3. The Contractor shall notify the City laboratory a minimum of 48-hours in advance of operations for scheduling of tests. When tests or inspections cannot be performed after such notice, the Contractor shall reimburse City for expenses incurred.
4. The Contractor shall pay for all work required to uncover, remove, replace, retest, etc., any work not tested due to the Contractor's failure to provide the 48-hours advance notice or due to failed tests. The Contractor shall also provide compensation for the City/Professional's personnel for required re-testing due to failed or rescheduled testing.

C. Shop Testing

1. Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function or special requirements are specified shall be tested in the shop of the manufacturer in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. No such equipment shall be shipped to the worksite until the City/Professional notifies the Contractor, in writing, that the results of such tests are acceptable.
2. The manufacturing company shall provide five (5) copies of the manufacturer's actual shop test data and interpreted results signed by a responsible official of the manufacturing company and notarized, showing conformity with the Contract Documents as a prerequisite for the acceptance of any equipment. The cost of shop

tests (excluding cost of City's representative) and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor and shall be included in the Contract price.

D. Field Testing:

1. The City shall employ and pay for services of an independent testing laboratory to perform testing specifically indicated in the Contract Documents. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract. The Contractor shall provide compensation for retesting of all failed tests.
2. The City may at any time during the progress of the Work, request additional testing beyond that which is specified in the Contract. This testing will be at the City's expense. Contractor shall:
   a. Cooperate with laboratory personnel, provide access to the Project.
   b. Secure and deliver to the laboratory adequate quantities of representative 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, and other material mixes, which require control by the testing laboratory.

E. Demonstration Tests: Upon completion of the Work and prior to final payment, all equipment and piping installed under this Contract shall be subjected to acceptance or demonstration tests as specified or required to provide compliance with the Contract Documents. The Contractor shall furnish all labor, fuel, energy, water and all other equipment necessary for the demonstration tests at no additional cost to the City.

F. Final Inspection: Prior to preparation of the final payment application, a final inspection will be performed by the City to determine if the Work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents. See also Section 01700 "Project Closeout."

G. Inspection by existing utility owners: The Contractor shall pay for all inspections during the progress of the work required and provided by the owner of all existing public utilities paralleling or crossing the Work, as shown on the Drawings. All such inspection fees shall be deemed included in the appropriate Contract Item or items, or if no specific item is provided therefore, as part of the overhead cost of the Work, and no additional payment will be made therefore.

H. Inspection by Other Agencies: The Florida Department of Transportation, the Florida Department of Environmental Protection, and other authorized governmental agencies shall have free access to the site for inspecting materials and work, and the Contractor shall afford them all necessary facilities and assistance for doing so. Any instructions to the Contractor resulting from these inspections shall be given through the City. These rights of inspections shall not be construed to create any contractual relationship between the Contractor and these agencies.

1.12 PROJECT SITE AND ACCESS

A. RIGHT-OF-WAY AND EASEMENTS

1. The use of public streets and alleys shall be such as to provide a minimum of inconvenience to the public and to other traffic. Any earth or other excavated material shall be removed by the Contractor and the streets cleaned to the satisfaction of the City.
2. The Contractor shall not enter or occupy private land outside of easements, except by written permission of the property owner.
3. At the time of the Pre-Construction meetings, the Contractor shall become fully acquainted with the status of all easements. Should easements not be acquired by the City in specific areas of the Work, the Contractor shall sequence and schedule his work therein so as not to interfere with the progress of work in other areas of the Project. Any rescheduling of work due to easement acquisitions shall be performed by the Contractor at no additional cost to the City. The City agrees that it will make every effort to acquire all remaining easements with all speed and diligence possible so as to allow the completion of the Work within the Contract time.

B. ACCESS

1. Neither the material excavated, nor the materials or equipment used in the construction of the Work shall be so placed as to prevent free access to all fire hydrants, valves or manholes.
2. Access to businesses located adjacent to the project site must be maintained at all times. Contractor may prearrange the closing of business access with the business Owner. Such prearranged access closing shall not exceed two (2) hours. Property drainage and grading shall be restored, and all construction debris removed within 48- hours of backfilling trench.
3. Contractor agrees that representatives of the City and any governmental agents will have access to the Work wherever it is in preparation or progress and that the Contractor shall provide facilities for such access and inspection.

1.13 UTILITIES

A. UTILITY CONSTRUCTION

1. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes and all other appurtenances and facilities pertaining thereto, whether owned or controlled by governmental bodies or privately owned by individuals, firms or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage or water. Other public or private property, which may be affected by the Work, shall be deemed included hereunder.
2. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access to private property during construction shall be removed when no longer required.
3. The length of open trench will be controlled by the particular surrounding conditions but shall always be confined to the limits described by the City. If any excavation becomes a hazard, or if it excessively restricts traffic at any point, the city may require special construction procedures. As a minimum, the Contractor shall conform

to the following restoration procedures:

a. Interim Restoration: All excavations shall be backfilled and compacted as specified by the end of each working day. For excavations within existing paved areas; limerock base or soil cement base (match existing) shall be spread and compacted to provide a relatively smooth surface free of loose aggregate material. At the end of each workweek, the S-I asphaltic surface course shall be completed and opened to traffic. Contractor shall coordinate his construction activity including density tests and inspections to allow sufficient time to achieve this requirement. All driveway cuts shall be backfilled, compacted, and limerock base spread and compacted immediately after installation. Contractor shall coordinate with the individual property owners prior to removing the driveway section. Any utility crossing an existing roadway, parking lot or other paved area shall be patched by the end of the working day.

b. All pipe and fittings shall be neatly stored in a location, which will cause the least disturbance to the public. All debris shall be removed and properly disposed of by the end of each working day.

c. Final Restoration Overlay: After completing all installations, and after testing of the pipe (but no sooner than 30-days after applying the S-I asphaltic surface), final restoration shall be performed. In no event shall final restoration begin after substantial completion. Final restoration shall provide an S-III asphaltic overlay as specified in an uninterrupted continuous operation until completion. Any additional restoration required after testing shall be repaired in a timely manner at no additional cost to the City.

d. Maintenance of all restored facilities shall be the Contractor's responsibility. This maintenance shall be performed on an on-going basis during the course of construction. The Contractor's Progress Schedule shall reflect the above restoration requirements.

e. Additional Restoration for Work in Business or Commercial Districts: The Contractor shall restore all private property, damaged by construction, to its original condition. Access to businesses located adjacent to the project site must be maintained at all times. Contractor may prearrange the closing of business accesses with the business owner. Such prearranged access closing shall not exceed two (2) hours. Property drainage and grading shall be restored within 24-hours of backfilling trench.

B. EXISTING UTILITIES

1. The locations of all existing underground piping, structures and other facilities are shown based on information received from the respective owner. The locations are shown without express or implied representation, assurance, or guarantee that they are complete or correct or that they represent a true picture of underground piping, conduit and cables to be encountered. It is the Contractor's responsibility to verify all existing underground piping, structures and other facilities.
2. The Contractor shall, at all times, employ acceptable methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage or destruction of existing utility installations and structures; and shall, at all times in the performance of the Work, avoid unnecessary interference with, or interruption of, utility services; and shall cooperate fully with the owners thereof to that end.
3. When existing facilities are found to be in conflict with the Work, the City reserves

the right to modify alignments to avoid interference with existing facilities.

4. All utilities, which do not interfere with the work, shall be carefully protected against damage. Any existing utilities damaged in any way by the Contractor shall be restored or replaced by the Contractor at his expense as directed by the City. Any existing facilities, which require operation to facilitate repairs, shall be operated only by the owner of the respective utility.
5. It is the responsibility of the Contractor to ensure that all utility and/or poles, the stability of which may be endangered by the proximity of excavation, be temporarily stayed and/or shored in position while work proceeds in the vicinity of the pole and that the utility or other companies concerned be given reasonable advance notice of any such excavation.

C. NOTICES

1. All governmental utility departments and other owners of public utilities, which may be affected by the Work, will be informed in writing by the Contractor two (2) weeks after the execution of the Contract or Contracts covering the Work. Such notice will be sent out in general, and directed to the attention of the governmental utility departments and other owners of public utilities for such installations and structures as may be affected by the Work.
2. The Contractor shall comply with Florida Statute 553.851 regarding protection of underground gas pipelines. Evidence of notification to the gas pipeline owner shall be furnished to the City within two (2) weeks after the execution of the Contract.
3. It shall be the Contractor's responsibility to contact utility companies at least 72-hours in advance of breaking ground in any area or on any unit of the work so maintenance personnel can locate and protect facilities, if required by the utility company.
4. The Contractor shall give a minimum five (5) working day notice to utility personnel prior to interrupting a utility service (water, sewer, etc.).

D. EXPLORATORY EXCAVATIONS

1. Exploratory excavations shall be conducted by the Contractor for the purpose of locating underground pipelines or structures in advance of the construction. Test pits shall be excavated in areas of potential conflicts between existing and proposed facilities and at piping connections to existing facilities a minimum of 48-hours or 1,000-feet in advance of work. If there is a potential conflict, the Contractor shall notify the City/Professional immediately. Information on the obstruction to be furnished by the Contractor shall include Location, Elevation, Utility Type, Material and Size. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the City.

E. UTILITY CROSSINGS

1. It is intended that wherever existing utilities must be crossed, deflection of the pipe within specified limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the Drawings. However, when in the opinion of the city this procedure is not feasible, the City may direct the use of fittings for a utility crossing or conflict transition as detailed on the Drawings.

F. RELOCATIONS

1. Relocations shown on the Drawings: Public utility installations or structures,

including but not limited to poles, signs, fences, piping, conduits and drains that interfere with the positioning of the work which are shown on the Drawings to be removed, relocated, replaced or rebuilt by the Contractor shall be considered as part of the general cost of doing the Work and shall be included in the prices bid for the various contract items. No separate payment shall be made, therefore.

2. Relocations not shown on the Drawings
   a. Where public utility installations or structures are encountered during the course of the work, and are not indicated on the Drawings or in the Specifications, and when, in the opinion of the City, removal, relocation, replacement or rebuilding is necessary to complete the Work, such work shall be accomplished by the utility having jurisdiction, or such work may be ordered, in writing by the City, for the Contractor to accomplish.
   b. If such work is accomplished by the utility having jurisdiction, it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required.
   c. If such work is accomplished by the Contractor, it will be paid for as a Change Order.
3. All existing castings, including valve boxes, junction boxes, manholes, hand holes, pull boxes, inlets and similar structures in the areas of construction that are to remain in service and in areas of trench restoration and pavement replacement, shall be adjusted by the Contractor to bring them flush with the surface of the finished work.
4. All existing utility systems which conflict with the construction of the work herein, which can be temporarily removed and replaced, shall be accomplished at the expense of the Contractor. Work shall be done by the utility unless the utility approves in writing that the Work may be done by the Contractor.

1.14 RELATED CONSTRUCTION REQUIREMENTS

A. TRAFFIC MAINTENANCE

1. Refer to Section 01570 – Maintenance of Traffic

B. BARRIER AND LIGHTS

1. The Contractor shall exercise extreme care in the conduct of the Work to protect health and safety of the workmen and the public. The Contractor shall provide all protective measures and devices necessary, in conformance with applicable local, state and federal regulations. Protective measures shall include but are not limited to barricades, warning lights/flashers and safety ropes.
2. All equipment and vehicles operating within 10-feet of the roadway shall have flashing strobe lights attached.

C. DEWATERING AND FLOTATION

1. The Contractor, with his own equipment, shall do all pumping necessary to dewater any part of the work area during construction operations to insure dry working conditions. The Contractor shall take the necessary steps to protect on-site and off- site structures. Damage to any structures due to dewatering shall be repaired or the structures replaced at the Contractor's expense.
2. The Contractor shall be completely responsible for any tanks, wetwells or similar

structures that may become buoyant during the construction and modification operations due to the ground water or floods and before the structure is put into operation. The proposed final structures have been designed to account for buoyancy; however, the Contractor may employ methods, means and techniques during construction which may affect the buoyancy of structures. The Contractor shall take the necessary steps to protect structures. Damage to any structures due to floating or flooding shall be repaired or the structures replaced at the Contractor's expense.

3. Contractor shall be responsible for any required permits for the discharge of ground water.

D. DUST AND EROSION CONTROL

1. The Contractor shall prevent dust nuisance from his operations or from traffic.
2. Contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.
3. Temporary erosion controls include, but are not limited to, grassing, mulching, netting, watering and reseeding on-site surfaces and soil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the City, FDEP and any other agency having jurisdiction.
4. Temporary sedimentation controls include, but are not limited to; silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the City, FDEP and any other agency having jurisdiction.
5. The construction of temporary erosion and sedimentation control facilities shall be in accordance with the technical provision of section 104 “Prevention, Control, and Abatement of Erosion and Water Pollution” of the FDOT Standard Specifications for Road and Bridge Construction, latest edition.

E. LINES AND GRADES

1. All Work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings, or as given by the City/Professional.
2. When the location of the Work is dimensioned on the Drawings, it shall be installed in that location; when the location of the Work is shown on a scaled drawing, without dimensions, the Work shall be installed in the scaled location unless the City approves an alternate location for the piping. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve the Contractor from laying and jointing different or additional items where required. The City/Professional may require detailed pipe laying drawings and schedules for project control.
3. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the project control points set by the City, and shall be solely responsible for the accuracy thereof.
4. Water main and forcemain shall be installed to provide long uniform gradient or slope to pipe to minimize air pockets and air release valves. The stationing shown on the Drawings for air and vacuum release valve assemblies are approximate and the Contractor shall field adjust these locations to locate these valves at the highest point

in the pipeline installed. All locations must be accepted by the city.

5. To insure a uniform gradient for gravity pipe and pressure pipe, all lines shall be installed using the following control techniques as a minimum:
   a. Gravity lines; continuous control, using laser beam technology.
   b. Pressure lines; control stakes set at 50-foot intervals using surveyors' level instrument.

F. TEMPORARY CONSTRUCTION

1. Temporary fences: If, during the course of the Work, it is necessary to remove or disturb any fencing, the Contractor shall at his own expense, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced.
2. Responsibility for Temporary Structures: In accepting the Contract, the Contractor assumes full responsibility for the sufficiency and safety of all temporary structures or work and for any damage which may result from their failure or their improper construction, maintenance or operation.

G. DAILY REPORTS

1. The Contractor shall submit to the City's Representative daily reports of construction activities including non-workdays. The reports shall be complete in detail and shall include the following information:
   a. Days from Notice to Proceed; Days remaining to substantial and final completion.
   b. Weather information
   c. Work activities with reference to the Critical Path Method (CPM) schedule activity numbers (including manpower, equipment and daily production quantities for each individual activity).
   d. Major deliveries
   e. Visitors to site
   f. Test records
   g. New problems, and
   h. Other pertinent information
2. A similar report shall be submitted for/by each Subcontractor.
3. The report(s) shall be submitted to the City Representative within 2 days of the respective report date. Each report shall be signed by the Contractor's Superintendent or Project Manager. Pay request will not be processed unless daily reports are current.
4. If a report is incomplete, in error, or contains misinformation, a copy of the report shall be returned by the City Representative to the Contractor's Superintendent or Project Manager with corrections noted. When chronic errors or omissions occur, the Contractor shall correct the procedures by which the reports are produced.

H. CLEANING

1. During Construction
   a. During construction of the Work, the Contractor shall, at all times, keep the Site free from material, debris and rubbish as practicable and shall remove the same from any portion of the Site if, in the opinion of the City, such material, debris, or rubbish constitutes a nuisance or is objectionable.

b. Provide on-site containers for the collection of waste materials, debris and rubbish and remove such from the Site periodically by disposal at a legal disposal area away from the Site.

c. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished. Use cleaning materials which will not create hazards to health or property and which will not damage surfaces. Use only those cleaning materials and methods recommended by the manufacturer of the surface material. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.

d. The Contractor shall remove from the site all surplus materials and temporary structures when no longer necessary to the Work at the direction of the City.

2. Final Cleaning

a. At the conclusion of the Work, all equipment, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and the Contractor shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances. Employ skilled workmen for final cleaning. Thoroughly clean all installed equipment and materials to a bright, clean, polished and new appearing condition. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.

b. The Work shall be left in a condition as shown on the Drawings and the remainder of the site shall be restored to a condition equal or better than what existed before the Work.

c. Prior to final completion, or City occupancy, Contractor shall conduct an inspection of interior and exterior surfaces, and all work areas to verify that the entire Work is clean. The City will determine if the final cleaning is acceptable.

1.15 CONSTRUCTION NOT PERMITTED

A. USE OF EXPLOSIVES

1. No blasting shall be done except as approved by the *City* and the governmental agency or political subdivision having jurisdiction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01010
SUMMARY OF WORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Summary of work, other contracts, work sequence, working hours, operation of existing facilities, use of premises, OWNER furnished products, coordination, cutting and patching.

1.02 SUMMARY OF WORK

A. The utility work shown on the drawings includes the design and construction of a stormwater pump station located near the western limits of the City of Pembroke Pines. The project includes the installation of a duplex submersible pump system to re-channel seepage from Conservation Area 3A into the Everglades via the SFWMD S-9A Pump Station. Work includes site grading, construction of a pump station wet well, installation of electric pumps, control panel, automatic transfer switch (ATS), permanent backup generator, associated electrical improvements, hydraulic piping, SCADA accommodations, and discharge connections. Additional work includes permitting, environmental coordination, paving, restoration, and coordination with multiple regulatory agencies including SFWMD, SBDD, FDOT, and FDEP.

B. The work associated with this project involves active force mains that are within the Rights-Of-Way (ROW) or property owned by the City. All work activities shall be required to be in accordance with the permits issued by the respective agencies. All work performed will be required to be done while maintaining the functional operation of the utility lines.

C. All materials, equipment, skills, tools, and labor which is reasonably and properly inferable and necessary for the proper completion of the Work and in compliance with the requirements stated or implied by these Specifications or Drawings shall be furnished and installed by the CONTRACTOR without additional compensation, whether specifically indicated in the Contract Documents or not.

D. Repair, replace, or otherwise settle with the OWNER or OWNER'S Representative, if damage to property or existing facilities occurs, including damage to pavements, utilities, lawns, structures, etc.

E. Construct the Project under a Unit Price Contract.

F. The CONTRACTOR shall perform the work complete, in place, and ready for continuous service, and shall include repairs, testing, permits, clean up,

replacements, and restoration required because of disruptions caused during this construction.

F. Any damage that occurs through the fault of the CONTRACTOR, shall be completely restored at the expense of the CONTRACTOR, based upon current City standards.

G. Pipe Manufacturer shall provide training for CONTRACTOR's personnel on the proper methods of handling, installing, joining and backfilling of all mains.

H. Contractor shall verify location and depth of existing utilities to determine actual need for utility line transitions. If existing mains are not in conflict with proposed force main, then the transitions will not be required.

1.03 WORK SEQUENCE

A. The CONTRACTOR's sequence of work may be of his choosing in order to complete the work in the allowed time frame and in conjunction with all Work Activities. The CONTRACTOR shall submit a schedule and work sequence to the OWNER at least five (5) days prior to the Notice to Proceed. Due to the critical nature of the utilities systems in this area, shutdowns of any existing City utility systems will not be allowed. Contractor shall be responsible for keeping all utility services to customers active throughout the duration of the project. See Special Project Procedures in this section for Suggested Sequence of Construction.

1.04 CITY WORKING HOURS

A. Normal working hours for the project shall be an eight (8) hour period between the hours of 7:00 a.m. – 7:00 p.m., Monday through Friday. Should the CONTRACTOR request, and the City approve the CONTRACTOR to work periods greater than 8 hours a day, he shall make such requests in writing a minimum of 48 hours prior to such work periods. The CONTRACTOR shall pay the cost of $50.00 per hour for inspection by the City's inspection representatives for any hours worked more than 8 hours per day or 40 hours per week worked outside the normal work hours for the project.

B. The CONTRACTOR may be required to perform certain work at times of the day or night when system flows, vehicular traffic and pedestrian traffic are at diminished levels and at times appropriate to other activities which are occurring that may affect the project. The CONTRACTOR shall comply with requirements to alter his schedule of work as requested or required by City without change to the contract price or time.

1.05 OPERATION OF EXISTING FACILITIES

A. The proposed work for this project involves the installation of new force main as well as the removal/abandonment and replacement of operating force mains in Rights-Of-Way with both vehicular and pedestrian traffic. The CONTRACTOR

shall perform their work taking all proper precautions and safety measures to insure a safe work area. The work shall be so conducted to maintain existing utility systems in operation. All utilities that occupy or are adjacent to the subject construction site are to remain in operation. The CONTRACTOR shall coordinate all construction activities with the City Resident Inspectors.

1.06 CONTRACTOR USE OF PREMISES

A. Confine operations at the site to areas permitted by applicable laws, ordinances, permits, and by the Contract Documents. Do not unreasonably encumber the site with materials or equipment. The CONTRACTOR shall assume full responsibility for protection and safekeeping of products stored on the job site.

1.07 COORDINATION

A. The CONTRACTOR shall be fully responsible for the coordination of his work and the work of his employees, subcontractors, and suppliers and to assure compliance with schedules.

B. The coordination requirements of this Section are in addition to the requirements of this Specification Document.

C. It is the CONTRACTOR's responsibility to coordinate with all the utilities regarding locates, protection of existing facilities, testing, or relocations.

1.08 CUTTING AND PATCHING

A. Cutting and patching for inspection and testing and the payment therefore shall be as specified in the General Conditions and Supplementary Conditions.

B. The CONTRACTOR shall, at no additional expense to the OWNER, perform cutting and patching necessary for the completion of the Project. Perform cutting and patching in a manner to prevent damage to the facilities or previously completed work.

C. Refinish surfaces as necessary to provide an even finish. Refinish continuous surfaces to the nearest intersection.

1.09 DRAWINGS AND PROJECT MANUAL

A. The Utility Work associated with the new force main along Taft St.& NW 209th Ave, and US Hwy 27, shall be performed in accordance with the Drawings and Specifications prepared by CPH, Inc.

B. The CONTRACTOR shall verify all dimensions, quantities and details shown on the Utility Drawings and Roadway Drawings, Supplementary Drawings, Schedules, Specifications or other data received from the ENGINEER, and shall notify the same, in writing, of all errors, omissions, conflicts and discrepancies found therein with adequate notice. Failure to discover or correct errors, conflicts

or discrepancies shall not relieve the CONTRACTOR of full responsibility for unsatisfactory Work, faulty construction or improper operation resulting there from, nor from rectifying such conditions at his own expense.

C. All schedules are given for the convenience of the ENGINEER and the CONTRACTOR and are not guaranteed to be complete. The CONTRACTOR shall assume all responsibility for the making of estimates of the size, kind, and quantity of materials and equipment included in the Work to be done under this Contract.

D. Intent:

1. All work called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Drawings or in the Specifications, but involved in carrying out their implied 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.

2. Items of material, equipment, machinery, and the like may be specified on the Drawings and not in the Specifications. Such items shall be provided by the CONTRACTOR in accordance with the specification on the Drawings.

3. The apparent silence of the Specifications 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 upon that basis.

1.11 WEATHER

A. During inclement weather, all work which might be damaged or rendered inferior by such weather conditions shall be suspended. The orders and decisions of the ENGINEER as to suspensions shall be final and binding. During suspension of the Work from any cause, the Work shall be suitably covered and protected so as to preserve it from injury by the weather or otherwise; and, if the ENGINEER will so direct, the rubbish and surplus materials shall be removed.

1.12 PROTECTION AND RESTORATION

A. The CONTRACTOR shall be responsible for the preservation of all public and private property and shall use every means of protection 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 expense, to a condition equal to or better

than that existing before the damage was done, or he shall make good the damage in other manner acceptable to the ENGINEER.

B. Protection of Trees and Shrubs

1. Protect with boxes or other barricades.
2. Do not place excavated material so as to injure trees or shrubs.
3. Support trees to prevent root disturbances during nearby excavation.

C. Tree and Limb Removal

1. Tree limbs that interfere with equipment operation and are approved for pruning shall be neatly trimmed and the tree cut coated with tree paint. Trimming and removal of tree limbs shall be incidental.

2. The OWNER may order the CONTRACTOR, for the convenience of the OWNER, to remove trees along the line or trench excavation. The CONTRACTOR shall obtain any permits required for removal of trees. Ordered tree removal shall be paid for under the appropriate Contract Items.

D. Trees or shrubs destroyed by negligence of the CONTRACTOR, or his employees shall be replaced by him with new stock of similar size and age, at the proper season and at the sole expense of the CONTRACTOR.

E. Lawn Areas – All lawn areas disturbed by construction shall be replaced with like kind to a condition similar or equal to that existing before construction. Where sod is to be removed, it shall be carefully removed, and the same re-sodded, or the area where sod has been removed shall be restored with new sod in the manner described in the applicable section.

F. The CONTRACTOR shall be responsible for locating and protecting and/or relocating all utilities lines, including irrigation lines, in the areas of the construction activities. If any existing lines are broken or damaged as a result of construction activities, the CONTRACTOR shall be responsible for repairing the lines at no additional cost to the OWNER.

1.13 DELIVERY AND STORAGE

A. General

1. The CONTRACTOR shall be responsible for all material, equipment and supplies sold and delivered to the OWNER under this Contract until final inspection of the Work and acceptance thereof by the OWNER.

2. All materials and equipment to be incorporated in the Work shall be handled and stored by the CONTRACTOR before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft or damage of any kind whatsoever

to the material or equipment.

3. Any materials that, in the opinion of the ENGINEER, become damaged to a point where they are unfit for their intended or specified use shall be promptly removed from the site of the Work, and the CONTRACTOR shall receive no compensation for the damaged material or its removal.

4. In the event any such material, equipment or supplies are lost, stolen, damaged or destroyed prior to final inspection and acceptance, the CONTRACTOR shall replace the same without additional cost to the OWNER.

B. Delivery – The CONTRACTOR shall

1. Deliver materials in ample quantities to ensure the most speedy and uninterrupted progress of the Work so as to complete the Work within the allotted time.

2. Coordinate deliveries in order to avoid delay in or impediment of, the progress of the Work of any related CONTRACTOR.

3. Schedule deliveries to the site not more than one month prior to scheduled installation without written authorization from the ENGINEER.

4. Arrange deliveries of products in accordance with construction schedules coordinated to avoid conflict with work and conditions at the site.

5. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

6. Immediately upon delivery, inspect shipments with the OWNER'S field representative to ensure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.

7. Provide equipment and personnel to handle products by methods recommended by the manufacturer to prevent soiling or damage to products or packaging.

8. Submit operation and maintenance data to the ENGINEER for review prior to shipment of equipment.

C. Storage

1. The CONTRACTOR shall be responsible for securing a location for on- site storage of all material and equipment necessary for completion of this project.

2. All material delivered to the job site shall be protected from dirt, dust,

dampness, water and any other condition detrimental to the life of the material from the date of delivery to the time of installation of the material and acceptance by the OWNER.

3. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.

4. When required or recommended by the manufacturer, the CONTRACTOR shall furnish a covered, weather protected storage structure providing a clean, dry, non-corrosive environment for all mechanical equipment, valves, architectural items, electrical and instrumentation equipment, and special equipment to be incorporated into this project.

5. The CONTRACTOR shall arrange the storage area in a manner to provide easy access for inspection. Periodic inspections of stored products shall be done to assure that products are maintained under specified conditions and free from damage or deterioration.

6. The CONTRACTOR shall carefully review and comply with the manufacturer's storage instructions. These instructions shall be carefully followed and a written record of this kept by the CONTRACTOR.

7. Moving parts shall be rotated a minimum of once weekly to ensure proper lubrication and to avoid metal-to-metal "welding".

8. Mechanical equipment to be used in the Work, if stored for longer than ninety (90) days, shall have the bearings cleaned, flushed and lubricated prior to testing and start-up, at no extra cost to the OWNER.

D. Specific Material Storage Requirements

1. Loose Granular Materials: Store in a well-drained area on solid surfaces to prevent mixing with foreign matter.

2. Cement, Sand and Lime: Stored under a roof and off the ground and kept completely dry at all times.

3. Brick, Block and Similar Masonry Products: Handle and store in a manner to reduce breakage, chipping, cracking and spilling to a minimum.

4. All structural and miscellaneous steel and reinforcing steel: Store off the ground or otherwise to prevent accumulations of dirt or grease, and in a position to prevent accumulations of standing water and to minimize rusting.

Should the CONTRACTOR fail to take proper action on storage and handling of equipment supplied under this Contract, within seven days after written notice to correct the deficiencies, the OWNER retains the right to correct all deficiencies

noted in previously transmitted written notice and deduct the cost associated with these corrections from the CONTRACTOR's Contract. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, and Engineering and any other costs associated with making the necessary corrections. In any event, equipment and materials not properly stored will not be included in a payment estimate. Any materials not suitable for use will be removed from the site and replaced with new materials.

1.14 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

A. Comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to all parties involved in the installation, including two copies for the ENGINEER's use. Maintain one set of complete instructions at the job site during installation and until completion. Copies of all instructions shall also be included in the Operation and Maintenance Manuals, which are provided to the OWNER at the close of the contract.

B. Contractor shall install all pipes per manufacturer's requirements. The pipe manufacturer will provide at no cost to the Contractor a preconstruction meeting to go over the general assembly requirements and provide certification of training to Contractor's personnel. The Contractor must provide proof of the workers certification to the City that all crews installing pipe have been trained and that all pipe has been installed as instructed by the manufacturer.

C. Handle, install, connect, clean, condition and adjust products in strict accordance with such instructions and in conformity with specified requirements. Should job conditions or specified requirements conflict with the manufacturer's instructions, consult with the ENGINEER for further instructions. Do not proceed with Work without clear instructions.

D. Perform Work in strict accordance with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

E. The CONTRACTOR shall have on hand sufficient proper equipment and machinery of ample capacity to facilitate the installation of the Work and to handle all emergencies normally encountered in Work of this character.

F. Equipment shall be installed in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Plans, unless directed otherwise in writing by the ENGINEER during installation.

G. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between the various units.

H. The CONTRACTOR shall furnish, install and protect all necessary anchor and attachment bolts and all other appurtenances needed for the installation of the

devices included in the equipment specified. Anchor bolts shall be as approved by the ENGINEER and made of ample size and strength for the purposes intended. The manufacturer shall furnish substantial templates and working drawings for installation.

1.15 CONSTRUCTION FIELD ENGINEERING

A. Registered Land Surveyor: The CONTRACTOR shall retain the services of a registered land surveyor licensed in the State of Florida for the following specific services as applicable to the Work:

1. Identify existing rights-of-ways and property lines along or adjacent to the Work.

2. Locate all existing utilities and structures as may be affected by the Work.

3. Locate control points prior to starting the Work.

4. Replace control points or reference points which may be lost or destroyed.

5. CONTRACTOR is to provide a preliminary set of Record Drawings that reflect any changes to the alignment or connections to existing facilities for the purpose of Certification of Construction Completion to FDEP for clearance of the lines. This As-built information is to be provided to the City prior to the pressure testing of the new line.

6. Prepare a certified survey of the constructed facilities based on information concurrent with the construction progress. This site survey shall be in accordance with Section 01720.

B. CONTRACTOR shall protect control points prior to starting the Work and shall preserve all permanent reference points during construction. Report to the OWNER when any reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

The CONTRACTOR shall bear the cost of re-establishing project control points if disturbed and bear the entire expense of rectifying Work improperly installed due to not maintaining or protecting and removing without authorization such established points, stakes, and marks.

C. Submittals

1. Certificate signed by a Registered Surveyor certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.

2. Certified, signed and sealed drawings, including a PDF file of the signed drawings, showing locations of all structures, piping conduits and other improvements. These drawings are referenced as the Project Record

Drawings and shall be included with the Project Record Documents.

3. Completed Record Drawing Tables.

4. Documentation to verify accuracy of field engineering work when requested by the ENGINEER.

5. Electronic version of record drawing survey in the latest version of AutoCAD.

1.16 UTILITIES

A. Utility Construction

1. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes and all other appurtenances and facilities pertaining thereto, whether owned or controlled by governmental bodies or privately owned by individuals, firms or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage or water. Other public or private property, which may be affected by the work shall be deemed included hereunder.

2. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The CONTRACTOR shall, at their own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access to private property during construction shall be removed when no longer required.

3. The length of open trench will be controlled by the particular surrounding conditions but shall always be no more than 300 feet. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the OWNER may require special construction procedures. As a minimum, the CONTRACTOR shall conform to the following restoration procedures:

   a. Interim Restoration: All excavations shall be backfilled and compacted as specified by the end of each working day. For excavations within existing paved areas, concrete base or soil cement base shall be spread and compacted to provide a relatively smooth surface free of loose aggregate material.

      All pipe and fittings shall be stored in a location inside the easement area, which will cause the least disturbance to the public. All debris shall be removed and properly disposed of by the end of each working day.

b. Maintenance of all restored facilities shall be the CONTRACTOR's responsibility. This maintenance shall be performed on an on-going basis during construction.

The CONTRACTOR's Progress Schedule shall reflect the above restoration requirements.

B. Existing Utilities

1. The locations of all existing underground piping, structures and utilities have been taken from information received from the respective OWNER. The locations are shown without express or implied representation, assurance, or guarantee that they are complete or correct or that they represent a true picture of underground piping to be encountered.

2. The CONTRACTOR shall, at all times in performance of the Work, employ approved methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage or destruction of existing public utility installations and structures; and shall, at all times in the performance of the Work, avoid unnecessary interference with, or interruption of, public utility services; and shall cooperate fully with the Owners thereof to that end.

3. Pipelines shall be located substantially as indicated on the Drawings, but the OWNER reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons. When the location of piping is dimensioned on the Drawings, it shall be installed in that location; when the location of piping is shown on a scaled drawing, without dimensions, the piping shall be installed in the scaled location unless the OWNER approves an alternate location for the piping. Where fittings are noted on the Drawings, such notation is for the CONTRACTOR's convenience and does not relieve him from laying and jointing different or additional items where required. The ENGINEER may require detailed pipe laying drawings and schedules for project control.

4. The CONTRACTOR shall exercise care in any excavation to locate all existing piping and utilities. All utilities, which do not interfere with the completed work shall be carefully protected against damage. Any existing utilities damaged in any way by the CONTRACTOR shall be restored or replaced by the CONTRACTOR at his expense as directed by the OWNER. Any existing facilities that require operation to facilitate repairs shall be performed only by the OWNER of the respective utility.

5. It is the responsibility of the CONTRACTOR to ensure that all utility or other poles, the stability of which may be endangered by the proximity of excavation, be temporarily stayed and/or shored in position while Work

proceeds in the vicinity of the pole and that the utility or other companies concerned be given reasonable advance notice of any such excavation by the CONTRACTOR.

C. Notices

1. All governmental utility departments and other owners of public utilities which, may be affected by the Work will be informed in writing by the CONTRACTOR within two weeks after the execution of the Contract or Contracts covering the Work. Such notice will be sent out in general, and directed to the attention of the governmental utility departments and other owners of public utilities for such installations and structures as may be affected by the Work.

2. The CONTRACTOR shall also comply with Florida Statute 553.851 regarding notification of existing gas and oil pipeline company owners. Evidence of such notice shall be furnished to the OWNER within two weeks after the execution of the Contract.

3. It shall be the CONTRACTOR's responsibility to contact utility companies at least 48 hours in advance of breaking ground in any area or on any unit of the Work so maintenance personnel can locate and protect facilities, if required by the utility company.

4. The CONTRACTOR shall, not be allowed to interrupt a utility service (water, sewer, etc.) for the purpose of making cut-ins to the existing lines or for any other purposes.

D. Exploratory Excavations

Exploratory excavations shall be conducted by the CONTRACTOR for the purpose of locating underground pipelines, other utilities or structures in advance of the construction. Test pits shall be excavated in areas of potential conflicts between existing and proposed facilities and at piping connections to existing facilities a minimum of 48 hours or 1,000 feet in advance of Work. If there is a potential conflict, the CONTRACTOR is to notify the ENGINEER immediately. Information on the obstruction to be furnished by the CONTRACTOR shall include Location, Elevation, Utility Type, Material and Size. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the ENGINEER.

E. Utility Crossings

It is intended that whatever existing utilities must be crossed, deflection of the pipe within specified limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the Drawings. However, when in the opinion of the OWNER this procedure is not feasible, he may direct the use of

fittings for a utility crossing or conflict transition as detailed on the Drawings.

F. Relocations

1. Relocations shown on the Drawings – Public utility installations or structures, including but not limited to light poles, signs, fences, piping, conduits and drains that interfere with the positioning of the Work which are shown on the Drawings to be removed, relocated, replaced or rebuilt by the CONTRACTOR shall be considered as part of the general cost of doing the Work and shall be included in the prices bid for the various contract items. No separate payment shall be made therefore.

2. Relocation not shown on the Drawings

   a. Where public utility installations or structures are encountered during the course of the Work, and are not indicated on the Drawings or in the Specifications, and when, in the opinion of the OWNER, removal, relocation, replacement or rebuilding is necessary to complete the Work under this contract, such Work shall be accomplished by the utility having jurisdiction, or such Work may be ordered, in writing by the OWNER, for the CONTRACTOR to accomplish.

   b. If such Work is accomplished by the utility having jurisdiction, it will be carried out expeditiously and the CONTRACTOR shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such Work is accomplished by the CONTRACTOR, it will be paid for as a Change Order.

3. All existing utility castings, including valve boxes, junction boxes, manholes, hand holes, pull boxes, inlets and similar structures in the areas of construction that are to remain in service and in areas of trench restoration and pavement replacement, shall be adjusted by the CONTRACTOR to bring them flush with the surface of the finished Work.

4. All existing utility systems which conflict with the construction of the Work herein, which can be temporarily removed and replaced, shall be accomplished at the expense of the CONTRACTOR. Work shall be done by the utility unless the utility approves in writing that the Work may be done by the CONTRACTOR.

G. Lines and Grades

1. All Work under this Contract shall be constructed in accordance with the line and grades shown on the Drawings, or as given by the ENGINEER.

The full responsibility for keeping alignment and grade shall rest upon the CONTRACTOR.

2. The CONTRACTOR shall, at his own expense, establish all working or construction lines and grades as required from the project control points set by the OWNER, and shall be solely responsible for the accuracy thereof.

3. The 36" PVC force main shall have a minimum of 36-inches of cover over the top of the pipe and 60" of cover over the jack and bore sections. Cover shall vary to provide long uniform gradient or slope to pipe to minimize air pockets.

4. To ensure a uniform gradient for gravity pipe and pressure pipe, all lines shall be installed using the following control techniques as a minimum:

   a. Gravity Lines: continuous control, using laser beam technology.

   b. Pressure Lines: control stakes set at 50 ft intervals using surveyors level instrument.

1.17 SPECIAL PROJECT PROCEDURES

A. Maintenance of Traffic

1. CONTRACTOR shall provide MOT in accordance with FDOT Standards. CONTRACTOR shall adjust the schedule and/or MOT to provide for utility installations at no additional cost to City.

2. Fourteen (14) days prior to closing a lane, the permittee shall notify the respective City, City of Pembroke Pines PM, and EOR.

B. Operation of existing Utility Systems

Due to the utility systems providing service to residents and businesses, all City Utility systems shall be required to remain in service and not be shut down to accommodate construction activities. Contractor to sequence all work so that water and sewer service is maintained at all times.

DRAFT DOCUMENT FOR COMMISSION REVIEW

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01021
SOILS REPORT AND OTHER INFORMATION

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Identification of reports of existing conditions.

Bidder's/Contractor's responsibilities for investigating and working with existing conditions.

1.02 LAND IN-ADDITION TO THE SITE

A. Contractor is responsible for obtaining any lands, areas, properties, facilities and easements, in addition to those furnished by the City, that the Contractor considers necessary for temporary facilities, storage, disposal of spoil or waste material or other purposes the Contractor determines necessary to complete the Work. Contractor shall provide written documentation from owner to use such land or facilities. The City/ Professional and the Geotech do not assume any responsibility for existing conditions at such lands, areas, properties, facilities and /or easements obtained by the Contractor.

1.03 SUBSURFACE CONDITIONS AND OTHER PHYSICAL CONDITIONS

A. This Section identifies reports of explorations and tests of subsurface conditions, and drawings of physical conditions of existing surface and subsurface structures that have been used in the preparation of the Contract Documents. Contractor may rely upon any technical information and data in those reports found in Appendix A, "Geotechnical Report (includes geotechnical investigation and dewatering ground water quality values per Chapter 62-621, paragraph 62-621.300(2), F.A.C.)." The Report(s) in Appendix A is designated as Authorized Technical Data, but those reports and drawings are not part of the Contract Documents.

B. Any conclusions or interpretations made by the Contractor based on any Authorized Technical Data will be at the Contractor's own risk. Contractor's reliance on any non-technical information, data, interpretations or opinions also will also be at Contractor's own risk. The City/Professional assume no responsibility for any understanding reached or representation made about subsurface conditions and physical conditions of existing structures, except as otherwise expressly shown in or represented by the Authorized Technical Data provided.

C. The only information or data contained in the geotechnical report and used in the preparation of the Contract Documents that may be properly considered authorized technical data concerning subsurface conditions is found in Appendix A "Geotechnical Report". Such technical data are made available to allow the Contractor to have access to the same information available to the City. The City/Professional do not warrant the accuracy or completeness of any such information or that the Contract Documents identify all the existing relevant reports and/or documents.

1.04 UNDERGROUND UTILITIES

A. Information or data about physical conditions of Underground Utilities, which have been used in the preparation of the Contract Documents, is shown or indicated in the Drawings and technical specifications. Such information and data are based on information and data obtained from record documents or furnished to the City by the owners of those Underground Utilities or by others.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXISTING GROUND SURFACE AND UNDERGROUND CONDITIONS; GENERALLY

A. Where existing ground conditions are shown on the plans hereto attached, the elevations are believed to be reasonably correct but are not guaranteed to be absolutely so, and, together with any schedule of quantities, are presented only as an approximation. The Contractor shall satisfy itself, however, by actual examination of the site of the Work, as to the existing elevations and the amount of work required under the Contract.

B. Where test pits and borings have been dug, the results supplied to the City/ Professional by the soils Engineer may be given on the plans or are on file in the City/Professional's office and available for review. The City does not guarantee the accuracy or correctness of this information. If the Contractor desires any additional information relating to the soil's investigation, contact the City/Professional to obtain such information. City does not guarantee the accuracy or correctness of any such information supplied to the Contractor.

C. If, upon notice of a differing subsurface or latent physical condition from the Contractor, the City determines there was no unforeseen condition and unnecessary tests and investigations were conducted solely at the Contractor's request, any unnecessary expenses may be deducted from the Final Payment for the Contract. No increase in Contract Amount or Contract Time will be made if the differing site conditions were known or could have been discovered by the types of examinations that the Contractor, as Bidder, was responsible for. Claims based on groundwater table conditions will not be considered unforeseen subsurface conditions and will not be allowed. Any information indicated in the Contract Documents as to the groundwater table conditions has been provided for general information purposes only and is not intended to represent that the same conditions will exist during the execution of the Work. Further, no increase in Contract Amount or Contract Time will be made for costs incurred prior to the Contractor's written notice as required by the Contract Documents. The City will be allowed at least 10-days to investigate any alleged differing site conditions and to take appropriate action, before the Contractor is entitled to any adjustment in Contract Amount or Contract Time for Delay.

3.02 UNDERGROUND UTILITIES:

A. The Contractor will be responsible for the safety and protection of and providing for the repair of any damage done to the Work and existing surface and subsurface structures. The Contractor will be responsible for any damages and injury resulting from the failure to excavate in a careful and prudent manner.

B. Contractor shall have full responsibility for locating all underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, stormwater, other liquids or chemicals, or traffic or other control systems, shown or indicated in the Contract Documents, in advance of construction, coordinating the Work with the actual locations found and making note of the actual locations on the record Drawings. Contractor shall exercise extreme caution when locating underground facilities to minimize the risk of damage from Contractor's activities. The Contractor will immediately notify the City and the owner of any Underground Utilities that are inaccurately identified or located on the Drawings.

C. The Contractor will be responsible for any delay and all costs relating to the obligations set forth in this Section, except as provided by allowances specific to Underground Utilities.

D. The Contractor will promptly notify the City, in writing, whenever the Contractor discovers that actual physical conditions of Underground Utilities differ materially from those indicated by the Contract Documents or Authorized Technical Data provided with the Contract Documents. Further, the Contractor promptly will notify the City, in writing, whenever the Contractor encounters Underground Utilities not shown or indicated in/through the Contract Documents, and which could not reasonably have been foreseen.

E. The City and Contractor will follow the provisions of the General Conditions with respect to any conclusions reached by the City after the City compares the actual underground utility conditions with those included in the information provided to the Contractor.

3.03 ENVIRONMENTAL PROCEDURES FOR HAZARDOUS MATERIALS

A. The Contractor will not, at any time, cause or permit any Hazardous Materials to be brought upon, stored, manufactured, blended, handled, or used in, on, or about the Project or the Site for any purpose except as lawful and necessary and in accordance with the Contract Documents. The Contractor will not cause or permit Hazardous Materials to be brought on Site unless they have been specifically pre-identified by the Contractor and approved in writing in advance by the City.

B. The Contractor will defend, save, indemnify and hold harmless the City, their agents and employees from and against all liabilities, claims, damages, losses and expenses including attorneys' fees, which arise at any time during or after completion of the Work as a result of or in connection with:
   1. The Contractor's breach of any prohibition or requirement set forth in this Section or,
   2. Any Hazardous Materials discharged, released, deposited or introduced in the soil or surface or groundwater in, on, under, or about the Work, the Site or other properties as a result of the activities of the Contractor, the Subcontractors and their respective agents and employees in connection with the Work.

C. This Contractor's indemnity obligation includes without limitation, costs incurred in connection with any investigation of site conditions, or any cleanup, remediation, removal, or restoration required by the City or any federal, State, or local Public Agency because of:
   1. The occurrence of any Hazardous Materials present in the soil or surface or groundwater in, on, under, or about the Work or the Site.
   2. The diminution in value of the Work or the Site.
   3. Damages for the loss or restriction on use of the Work or of any amenity of the Work or the Property; and/or
   4. Amounts paid in settlement of claims, penalties, attorneys' fees, court costs, consultant and laboratory fees and experts' fees.

D. The Contractor will immediately notify the City in writing of any significant release of Hazardous Materials at the Project or the Site, specifying the nature and quantity of the release, the location of the release, and the measures taken to contain and clean up the release and ensure that future releases do not occur.

E. The Contractor agrees that insulation and any other construction materials containing asbestos, or urea formaldehyde will not be used on the Work, and that all Sub-agreements will prohibit the use of construction materials (including, but not limited to, insulation) containing asbestos or urea formaldehyde.

3.04 DIFFERING HAZARDOUS MATERIAL CONDITIONS:

A. If the Contractor unexpectedly encounters material reasonably believed to be Hazardous Material, the Contractor will immediately stop all affected Work, give written notice to the City and take appropriate health and safety precautions. Unless the Contract Documents require otherwise, the Contractor will conduct an investigation. If upon due investigation, the Contractor determines the material a Hazardous Material that may present a danger to persons or the surroundings, the Contractor will recommend a solution to the City. In any such case, the affected Work will be considered to have been under a suspension of Work.

B. If the Hazardous Material is not required Work under the Drawings and/or Specifications, the City will proceed to have the Hazardous Material removed or rendered harmless through a Change Order or by means of another contract or as the City otherwise deems expedient. Alternatively, the City will terminate the affected Work or Contract for the City's convenience.

C. If the City did not elect termination, once the Hazardous Material has been removed or rendered harmless, the affected Work will be resumed as directed in writing by the City. Any determination by the Florida Department of Community Health or the Department of Environmental Quality that the Hazardous Material has been removed or rendered harmless will be binding upon the City and Contractor for the purposes of resuming the affected Work.

D. If the Contractor is responsible for the Hazardous Material, the Contractor will bear its proportionate share of the delay and costs involved in cleaning up the Site and removing and rendering it harmless to the satisfaction of the City and all Political Subdivisions with jurisdiction. The Contractor will be solely responsible if the Hazardous Material was brought to the Site by the Contractor, or results in whole or in part from any violation by the Contractor of any applicable Laws.

E. If the Contractor is responsible, but fails to take appropriate action, and the City acts accordingly, the Contractor will defend, save, indemnify and hold harmless the City from and against all claims arising from the City's exercise of appropriate action.

F. If the Contractor is not responsible, the City will issue a Change Order with the necessary changes. The Change Order will adjust Contract Amount and/or Contract Time as made necessary by the changes and resulting unreasonable delay under the circumstances attributable to the City /Professional.

3.05 INCIDENTS WITH ARCHAEOLOGICAL FEATURES:

A. The Contractor will immediately notify in writing, the City and all Federal, State and local agencies with jurisdiction of any Archaeological Feature deposits encountered or unearthed. The Contractor will protect such Archaeological Features in a proper and satisfactory manner. No further disturbance of the Archaeological Features will take place until work is allowed to resume in the affected areas.

B. If the City concludes that the Contract Documents require changes because of Archaeological Feature deposits encountered, the City will issue a Change Order with the necessary changes in the Work. The Change Order also will adjust Contract Amount and/or Contract Time as made necessary by those changes and by any resulting unreasonable delay under the circumstances attributable to the City/Professional.

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01025
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. This Section specifies administrative and procedural requirements to define pay items and determine payable amounts, and includes but is not limited to:
   1. General Provisions
   2. Cash Allowances
   3. Work Not Paid for Separately
   4. Measurement for Payment
   5. Partial Payment for Stored Materials and Equipment

1.02 GENERAL PROVISIONS

A. This specification includes standard descriptions for all bid items. This Contract's specific bid items are listed in the Bid Schedule.

B. The total Contract Amount shall cover the Work required by the Contract Documents. All costs in connection with the successful completion of the Work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction, equipment, and tools; and performing all necessary labor and supervision to fully complete the Work, shall be included in the unit and lump sum prices bid. All Work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of the Contractor and all costs in connection therewith shall be included in the prices bid.

C. If used, all estimated quantities stipulated in the Bid Schedule or other Contract Documents are approximate and are to be used only (a) for the purpose of comparing the bids submitted for the Work, and (b) as a basis for determining an initial Contract Amount. The actual amounts of Work completed, and materials furnished under unit price items may differ from the estimated quantities. The City does not expressly or by implication represent that the actual quantities involved will correspond exactly to the quantities stated in the Bid Schedule; nor shall the Contractor plead misunderstanding or deception because of such estimate or quantities or of the character, location or other conditions pertaining to the Work. Payment to the Contractor will be made only for the actual quantities of work performed or material furnished in accordance with the Drawings and other Contract Documents, and it is understood that the quantities may be increased or decreased as provided in the General Conditions.

D. If used, the unit prices listed in the Bid Schedule shall include all services, obligations, responsibilities, labor, materials, devices, equipment, royalties and license fees, supervision, temporary facilities, construction equipment, bonds, insurance, taxes, clean up, traffic control, control surveys, field offices, close out, overhead and profit and all connections, appurtenances and any other incidental items of any kind or nature, as are necessary to complete the Work in accordance with the Contract Documents.

E. Except for mobilization/demobilization and project record documents, payment for Work will be based on the percent of completed work of each item in the Schedule of Values, including stored materials, as determined by the City. Progress of work in each item of the Schedule of Values will be determined separately by the City. However, the City will issue a single payment certificate for progress on the Contract.

F. The Contractor agrees that it will make no claim for damages, anticipated profits, or otherwise because of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts, therefore.

G. Where payment by scale weight is specified under certain items, the Contractor shall provide suitable weighing equipment which shall be kept in accurate adjustment at all times and certified. The weighing of all material shall be performed by the Contractor in the presence and under the supervision of the City.

H. All schedules included in the Contract Documents are given for convenience and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quantity of materials and equipment included in work to be done under this Contract.

I. Where pipe fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve the Contractor from laying and jointing different or additional items where required.

J. All contracts shall be subject to 10% minimum retainage as defined in the General Conditions and the Agreement.

1.03 CASH ALLOWANCES

A. The Contractor shall include in the Total Bid Amount, all cash allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by such persons as the City may direct.

B. The Contractor will obtain the City’s written acceptance before providing equipment, materials or other Work under a cash allowance. Payments under a cash allowance will be made based on actual costs, excluding costs of general conditions, handling, unloading, storage, installation, testing, etc., which will be considered to be included within the Contract Price. Payments within the limits of any Allowance will exclude overhead and profit and bond and insurance premiums, since those costs will be considered to be included within the Contract Amount. The Contractor shall submit appropriate documentation to validate the actual cost of the item.

C. The amount of the allowance shall be adjusted accordingly by Change Order to recognize the allowable cost incurred by the Contractor.

1.04 WORK NOT PAID FOR SEPARATELY

A. Delivery: Payment for equipment delivery, storage or freight shall be included in the pay items including their installation and no other separate payment will be made therefore.

B. Bonds: Payment for bonds required by the Contract shall be included in the bid line item for bonds and no separate payment will be made.

C. Preparation of Site: Payment for preparation of site shall be included in pay items proposed for the various items of Work and no separate payment will be made therefore. Preparation of site includes setting up construction plant, offices, shops, storage areas, sanitary and other facilities required by the specifications or state law or regulations; providing access to the site; obtaining necessary permits and licenses; payments of fees; general protection, temporary heat and utilities including electrical power; providing shop and working drawings, certificates and schedules; providing required insurance; preconstruction photographs and videos; clearing and grubbing; removal of existing pavements, sidewalks and curbs; trench excavation, sheeting, shoring and bracing; dewatering and disposal of surplus water; structural fill, backfill, compaction and grading; testing materials and apparatus; maintenance of drainage systems; appurtenant work; record drawing and close-out documentation; cleaning up; and all other work regardless of its nature which may not be specifically referred to in a Bid Item but is necessary for the complete construction of the project set forth by the Contract.

D. Permitting & Permit Fees.
City will waive all City related permit, license, impact or inspection fees (including the Building Department and Engineering Department Permit Fees) related to this project. Any related State or County fees, for the aforementioned permits, will be paid by the City. In addition, the City shall cover the cost for any other permit fees related to external entities through the City's Owner's Contingency for this project**, therefore proposers should not include permit costs in their total proposal price.**

E. The City reserves the right to delete any item included in the Schedule of Values and decrease the Contract Price by the scheduled amount for the item deleted.

1.05 MEASUREMENT FOR PAYMENT

A. Methods of Measurement - Generally:
   1. Units of measurement shall be defined in general terms as follows:
      a. Linear Feet (LF)
      b. Square Feet (SF)
      c. Square Yards (SY)
      d. Cubic Yards (CY)
      e. Each (EA)
      f. Sacks (SK)

g. Lump Sum (LS)

2. Unit Price Contracts/Items:
   a. Linear Feet (LF) shall be measured along the horizontal length of the centerline of the installed material, unless otherwise specified. Pipe shall be measured along the length of the completed pipeline, regardless of the type of joint required, without deduction for the length of valves or fittings. Pipe included within the limits of lump sum items will not be measured.
   b. Square Feet (SF), Square Yards (SY), Cubic Yards (CY), Each (EA) and Sacks (SK) shall be measured as the amount of the unit of measure installed and compacted within the limits specified and shown in the Specifications and Drawings. Slope angles and elevations shall be measured using land-surveying equipment. Contractor shall provide supporting documentation (i.e. drawings, delivery tickets, invoices, survey calculations, etc.) to verify actual installed quantities.

B. Lump Sum Contracts/Items - Generally:
1. Quantities provided in the Schedule of Values are for the purpose of estimating the completion status for progress payments. Payment will be made for each individual item on a percentage of completion basis as estimated by the Contractor and approved by the City.
2. Adjustments to costs provided in the accepted Schedule of Values may be made only by Change Order.
3. The City reserves the right to delete any item included in the Schedule of Values and decrease the Contract Price by the scheduled amount for the item deleted.

1.06 MEASUREMENT AND PAYMENT ITEMS

A. Measurement: Measurement for all items shall be based on units outlined in the bid tabulation and on satisfactory progress of the Contractor to provide Project Record Documents in accordance with the City requirements.

B. Payment: Payment of the applicable sum expressed as lump sum or unit price as stated in the proposal will be full compensation for furnishing all labor, materials, and equipment necessary to create the Project Record Drawings, including the certified as-built survey, in accordance with the City requirements and specifications. Payment will be made monthly upon submittal and acceptance of pay application and relevant backup materials.

Table A

BID ITEM	MEASUREMENT AND PAYMENT ITEMS
1.	**Mobilization/Demobilization**
	a. Measurement: Measurement of various items for Mobilization and Demobilization shall not be made for payment and all items shall be included in the lump sum price. This lump sum price shall not exceed 5% of

	the total of all bid items except bid items 2 and 3. b. Payment: Payment of 75 percent of the applicable lump sum price for the item shall be full compensation for the Work consisting of the preparatory Work and operations in mobilizing for beginning Work on the Contract, including, but not limited to, movement of those personnel, equipment, supplies and incidentals to the project site, preparation of submittals, and for the establishment of temporary offices and buildings, safety equipment and first aid supplies, project signs, field surveys, sanitary and other facilities required by these specifications, and State and local laws and regulations. The costs of General Requirements (Section 01001), permits, project signs, and any other preconstruction expense necessary for the start of the work, excluding the cost of construction materials, shall also be included. This Work also consist of the general project management of the Work including, but not limited to, field supervision and office management, as well as other incidental cost for management of the Work during the duration of the Contract. This Work also includes maintenance of the field offices for the duration of the Contract. Payment of the remaining 25 percent of the applicable lump sum price for this item also consists of demobilization or the operations normally involved in ending Work on the project including, but not limited to, termination and removal of temporary utility service and field offices; demolition and removal of temporary structures and facilities; restoration of Contractor storage areas; disposal of trash and rubbish, and any other post-construction work necessary for the proper conclusion of the Work.
2.	**General Requirements**
	a. Measurement: Measurement for various items covered under General Requirements will not be made for payment, and all items shall be included in the lump sum. b. Payment: Payment for the General Requirements shall include all Insurance requirements costs, the costs of all bonds, Indemnification, and all administrative costs associated with acquiring and maintaining the necessary coverage as described in the Contract Documents. The payment for General Requirements also includes the cost of all preconstruction videos, site layout and survey, permits, City/County/SBDD coordination, and furnishing of record drawings. This item will be paid upon each payment request made by the Contractor as mutually agreed to by the contractor and City's Construction Manager. The Contractor shall attach with the payment request documentation to substantiate that appropriate insurance and bonds have been obtained by the Contractor. Payment will be based

	on percentage of work completed during the pay period at time of pay application to thenearest 10% complete, as mutually agreed to by the contractor and City's Construction Manager. The cumulative total shall not exceed the Lump Sum Bid Pay Item Amount. c. Payment for As-Built Drawings will be made at the Contract lump sum price for the item, which price and payment shall be full compensation for City Surveyor approved progressive As- Built surveys during all phases of the work and Final City Surveyor approved As-Built drawings at completion to be submitted to the City for approval. Payment will be based on percent completion of the lump sum bid item as follows: i. Payment for progressive as-builts, approved by the City Surveyor, will be based on a maximum of 70% of the lump sum bid item multiplied by the percentage of the overall construction completion of the relevant lift station, as mutually agreed to by the Contractor and the City's Construction Manager. ii. 30% payment when Final As-Builts of the relevant lift station have been submitted and approved by the City's Construction Manager and City Surveyor. The cumulative total shall not exceed the Lump Sum Bid Pay Item Amount.
3.	**Erosion and Sedimentation Control**
	a. Measurement: Measurement for various items covered under Erosion and Sedimentation Control throughout the site will not be made for payment, and all items shall be included in the lump sum price. b. Payment: Payment for Erosion Control throughout the site will be made at the Contract lump sum price for the item. All erosion control measures shall be in accordance with FDEP, FDOT, SFWMD, ACOE, local jurisdictional regulations, laws and ordinances. CONTRACTOR shall be responsible to maintain flowage of the local drainage system during the contract period. All costs associated with placement and removal of the various erosion control devices and maintaining drainage flow within the project limits shall be included in Bid Item.
4.	**Maintenance of Traffic**
	a. Measurement: Measurement for various items covered under General Requirements will not be made for payment, and all items shall be included in the lump sum. b. Payment: Payment for Maintenance of Traffic shall include full compensation for compensation for signed and sealed MOT Plans,

	pedestrian MOT plans, MOT permitting, construction, and maintenance of any necessary detour facilities; the providing of necessary facilities for access to residences, businesses, etc., along the project; the furnishing, installing and maintaining of traffic control, barricades, railings, message boards, warning lights, flag men, barricades, warning lights/flashers, and safety ropes, and other safety devices during construction, the control of dust, providing the services of uniformed off-duty police officers, and other special requirements for the safe and expeditious movements of traffic as called for in the Specifications and shown on the Drawings. Also included is furnishing, installing and maintaining a Traffic Control Plan, control and safety devices, control of dust, temporary crossing structures over trenches, any necessary detour facilities, and other special requirements for the safe and expeditious movements of traffic.
5.	**Site Demolition / Clearing**
	a. Measurement: Measurement of various items for Demolition will not be made for payment and all items shall be included in the lump sum price. b. Payment for Site Demolition and Clearing shall include full compensation for all labor, materials, equipment, services, testing, backfill, compaction, removal of debris from site, transportation, and appropriate legal disposal of all items not retained by the Owner. This generally includes but is not limited to: control panels, electrical wiring and equipment, fuel tanks and piping, antennae, pumps, valves, fittings, appurtenances, water service backflow preventer, sanitary sewer piping, force main piping, irrigation systems, hose bibs, pavement, sidewalks, curbing, concrete slabs, fencing, sign posts, light poles, foundations, and any additional demolition or clearing shown on the Drawings but not specifically mentioned herein, including hazardous materials. All clearing and grubbing of grass, brush, shrubs, and undergrowth within the project limits shall also be included. c. Tree removal and stump removal are specifically excluded from this item and are covered under a separate line item.
6.	**Tree Removal**
	a. Measurement: Measurement will be made by each (EA) tree satisfactorily removed in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include the complete removal of the tree, including the trunk, branches, and stump, as well as root systems as necessary to prevent regrowth. **b.** Payment: Payment shall be made at the contract unit price per each (EA), which shall include full compensation for all labor, equipment, materials, and incidental work required to remove the tree and restore the area. This includes cutting and felling of the tree, grinding or removing the stump and major roots, hauling and legal disposal of all debris, backfilling and

	compacting holes or depressions left by stump removal, and restoring disturbed areas to match adjacent conditions with sod, seed, mulch, or pavement as required. No separate payment will be made for traffic control, saw cutting, surface restoration, or disposal, as all such costs shall be included in the unit price per each tree removed.
7.	**Channel Excavation**
	a. Measurement: Measurement will be made by the cubic yard (CY) of material acceptably excavated, transported, and disposed of in accordance with the Contract Documents and as approved by the Engineer. Quantities shall be determined based on pre- and post-excavation surveys reviewed and confirmed by the City of Pembroke Pines and the Engineer. Over-excavation beyond the approved design limits, unless specifically authorized in writing by the Engineer, will not be measured for payment. b. Payment shall be made at the contract unit price per cubic yard (CY), which shall include full compensation for all labor, equipment, materials, and incidental work necessary to complete the channel excavation. This includes excavation of sediment or soil, handling and transportation of excavated material, dewatering if required, off-site disposal at a legally permitted facility, and implementation and maintenance of erosion control measures, turbidity barriers, and all applicable Best Management Practices. BMPs shall be implemented and maintained throughout all phases of the work to minimize erosion, protect adjacent properties, and prevent sediment-laden discharges into receiving waters. All work shall be performed in compliance with regulatory conditions established by the Florida Department of Environmental Protection (FDEP), South Florida Water Management District (SFWMD), and the City of Pembroke Pines. The Contractor shall be responsible for ensuring that excavated areas conform to the lines, grades, and contours shown on the Drawings, and for maintaining all required permits and regulatory compliance throughout the duration of the work. No separate payment shall be made for over-excavation, corrective grading, permit delays, or enforcement-related remediation. Work shall also conform to the applicable provisions of Section 02220 Excavating, Backfilling, and Compacting and Section 02140 Dewatering, where relevant to means and methods used during excavation.
8.	**Fill Dirt**
	a. Measurement: Measurement will be made by the number of cubic yards (CY) of compacted fill dirt satisfactorily furnished, placed, and compacted in accordance with the Contract Documents and as approved by the Engineer. Measurement shall be based on the in-place compacted volume required to fill low areas, trenches, or disturbed surfaces to the lines and grades shown on the Drawings. No measurement will be made for shrinkage, swell, or

	waste material. b. Payment: Payment shall be made at the contract unit price per cubic yard (CY), which shall include full compensation for all labor, materials, equipment, and incidental work necessary to complete the filling operation. This includes furnishing approved fill material, hauling, placement in uniform lifts, spreading, moisture conditioning, and compaction to the specified density. Payment shall also include grading, shaping to match adjacent surfaces, disposal of unsuitable material displaced by the work, and restoration of disturbed areas. No separate payment will be made for hauling, compaction, testing, trimming, or surface restoration, as all such costs shall be included in the unit price per cubic yard.
9.	**Fabric Geomembrane**
	a. Measurement: Measurement will be made by the number of square yards (SY) of Fabric Geomembrane satisfactorily furnished and installed in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include the actual surface area covered, including slopes, base, and anchorage zones where fabric is placed. No deduction will be made for areas occupied by structures or penetrations through the geomembrane. b. Payment: Payment shall be made at the contract unit price per square yard (SY), which shall include full compensation for all labor, materials, equipment, and incidental work necessary to complete the geomembrane installation. This includes surface preparation, grading, and compaction of subgrade; furnishing and placing geomembrane sheets; field seaming or overlapping; anchoring in trenches; and protecting the liner from damage or displacement during construction. All work shall conform to the applicable requirements of Section 02100 Temporary Erosion, Sedimentation, and Turbidity Controls and Section 02220 Excavating, Backfilling, and Compacting, as well as the manufacturer's recommendations for proper handling and installation. No separate payment will be made for seam welding, overlaps, anchor trenches, protective covering, or other incidental work, as all such costs shall be included in the unit price per square yard.
10.	**Riprap Inflow/Outflow**
	a. Measurement: Measurement will be made by the number of tons (TN) of Riprap satisfactorily furnished and installed in accordance with the Contract Documents and as approved by the Engineer. Measurement shall be based on certified weigh tickets from an approved scale for the actual weight of material placed. No separate measurement will be made for geotextile fabric, excavation, grading, or shaping of the placement area unless otherwise specified. b. Payment: Payment shall be made at the contract unit price per ton (TN), which shall include full compensation for all labor, materials, equipment, and incidental work necessary to complete the riprap installation. This

	includes surface preparation, excavation, subgrade grading and compaction, furnishing and placing geotextile fabric beneath the riprap, furnishing, transporting, stockpiling, and placing riprap stone, interlocking and keying stone to achieve stability, and shaping to the required thickness and limits shown on the Drawings. Payment shall also include replacing displaced stone prior to acceptance and restoring adjacent areas disturbed by placement. No separate payment will be made for geotextile, handling, grading, or cleanup, as all such costs shall be included in the unit price per ton.
11.	**Sod Restoration**
	a. Measurement: Measurement will be made by the number of square yards (SY) of sod satisfactorily furnished and installed for restoration in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include the actual restored surface area, including areas disturbed by construction, grading, or utility installation, verified in the field by the Engineer. b. Payment: Payment will be made at the contract unit price per square yard (SY) for Sod Restoration, as stated in the Bid Proposal. This payment shall be full compensation for furnishing all labor, materials, equipment, and incidentals necessary to restore sod to match the type and condition of the pre-existing vegetation. Work includes but is not limited to: furnishing and installing sod, fertilizer, topsoil, and water; performing grading and subgrade preparation; cutting and placing the sod; site cleanup; and protection of existing structures, utilities, trees, shrubs, and lawns. The Contractor shall replace, at their own expense, any sod that fails to establish or is not accepted by the Engineer. Prior to bidding, the Contractor shall assess the site to evaluate potential impacts to existing landscaping and shall be responsible for restoring all disturbed areas to equal or better conditions. Final payment will not be made until healthy, uniform sod growth is established to the satisfaction of the Engineer. c. All disturbed sodded areas must be restored to like or better conditions.
12.	**48” Outfall Flap Gate**
	a. Measurement: Measurement will be made by each (EA) satisfactorily furnished and installed flap gate, complete in place, in accordance with the Contract Documents and as approved by the Engineer. The measurement shall include furnishing, assembling, and securely mounting the flap gate to its structure or end wall, and ensuring proper operation under backflow conditions. b. Payment: Payment shall be made at the contract unit price per each (EA), which shall include full compensation for all labor, materials, equipment, hardware, and incidentals necessary to furnish and install the flap gate. This

	includes furnishing the 48-inch flap gate fabricated from corrosion-resistant material; stainless steel mounting hardware and frames; factory-applied coatings; installation onto concrete or structure face; adjustment and alignment to ensure watertight seal and free-swinging operation; and coordination with adjoining piping, wall, or headwall components. All work shall conform to the manufacturer's recommendations and shall meet the performance requirements for backflow prevention under submerged or pressurized flow conditions. If mounted on a structure cast in place, the cost of forming, setting, and embedding connection plates or frame anchors shall be included in this item. No separate payment will be made for appurtenant materials, mounting hardware, lifting hooks, or access accommodations required to facilitate proper operation.
13.	**Pipe Culvert, Optional Material, Round, Jack & Bore, 48"**
	a. Measurement: Measurement will be made by the linear foot (LF) of 48-inch steel casing pipe satisfactorily installed using the jack and bore method, complete and in place, as shown on the Drawings or as directed by the Engineer. The measured length shall be the horizontal distance between the beginning and end of the casing, based on the centerline of the installed pipe. No separate measurement will be made for bore pits, casing spacers, or end seals. b. Payment: Payment shall be made at the contract unit price per linear foot (LF), which shall include full compensation for all labor, equipment, materials, and incidental work required to complete the trenchless casing installation. This includes construction, maintenance, and restoration of bore and receiving pits; excavation and dewatering; shoring or sheeting; boring operations; installation of 48-inch steel casing pipe to receive the 36-inch carrier pipe; placement of casing spacers and end seals; spoil removal and disposal; and protection of adjacent utilities and structures. The Contractor shall be responsible for line and grade control, utility coordination, compliance with permitting agency requirements, and any testing or documentation required for acceptance. All work shall be performed in accordance with the Contract Documents and shall follow applicable practices like those described in Section 02665 Horizontal Directional Drilling of Pressure Mains where trenchless construction methods are discussed. No separate payment will be made for exploratory excavation, site restoration, or casing alignment adjustments unless specified otherwise.
14.	**36" C900 PVC DR18 and D.I. Fittings**
	a. Measurement: Measurement for this item shall be based per Linear Feet (LF) of furnished and installed C900 PVC pipe per Specification Section 02535 – Sanitary Sewer Force Main System, Section 15065 – Polyvinyl Chloride

(PVC) Pipe and Fittings.

b. Payment: Payment will be made at the contract unit price bid per Linear Feet (LF) as stated in the proposal for all C900 PVC pipe. Payment is full compensation for all labor, equipment, and materials for the completed pipeline, ready for service, and shall include, but not limited to: exploratory excavation; excavation; sheeting and shoring, if necessary; complying with Florida Statutes "Trench Safety Act"; dewatering; transporting and unloading the pipe, and all other materials not specified in other bid items from delivery trucks at the job site and placing them into position in the trench; installation C900 PVC pipe (varied diameter); solid sleeves and specials; installing joint materials; installing joint restraints; installing tie rods and eyebolts; cutting and installing nipples; making all connections within the lines themselves; tapping the main for corporation stops for testing and chlorination; cleaning, testing and disinfecting the pipe and fittings; sheeting and shoring as required; dewatering; placing and compacting backfill material; for removal, salvage, cleaning, transport, unloading and storage of valve boxes and covers, manhole frames and covers, and castings, on existing mains that are to be placed out of service; saw cutting pavement; demolition and modification work, and legal disposal of debris; for 12" Type B Stabilization (LBR 40), bedding, backfilling, compacting, and restoration of area (not included in another bid item) where existing valve boxes, manhole frames, and castings have been removed, if required; removal and disposal of excess or unsuitable fill material, where required; protecting existing utilities along the route of the main; making temporary paving repairs; complying with work hour restrictions by the city and other governmental agencies; satisfying permit requirements and conditions; preparation and submittal of the Contractor's Daily Reports, Contractor's PSM survey field book notes and monthly partial as-built record drawings of the work that has been performed to date; moving and replacing utilities, fences, trees (including trimming), landscaping, shrubs, mailboxes, sprinkler systems, shoulders, asphalt paths (not included in another bid item), curb and gutter, traffic separators and all other similar items, to original locations and to equal or better than original conditions; fully restrained bedding and backfilling materials; temporary pavement materials; transportation and handling costs; and all other appurtenant and miscellaneous items and work (not included in another bid item) including final cleanup for a complete, satisfactory and functional installation. Removal of existing pipe within the same trench shall be included in this bid item.

c. The quantity for payment shall be the horizontal projection of the center line

	of the permanently installed and accepted pipe (of the particular bid item), including the length of fittings along the run, measured to the nearest one-tenth of a foot from P.I. to P.I. of bends and to the seat of the bell at the end of any particular line. d. Submittal of monthly partial as-built record drawings shall be condition for approval of monthly progress payment requests for all required trench excavation. e. Payment shall also include full compensation for furnishing all labor, materials, equipment, and incidental work required for the installation of ductile iron fittings, including bends, tees, reducers, sleeves, plugs, caps, and all other special fittings shown or required. Work shall include furnishing and installing fittings, gaskets, glands, bolts, nuts, thrust blocks, joint restraints, polyethylene encasement (where specified), cutting and beveling pipe for proper fit, handling, cleaning, and disinfecting in accordance with applicable standards. No separate payment will be made for excavation, backfill, compaction, thrust restraint, concrete, or restoration of surfaces, as such costs shall be included in the price for ductile iron fittings.
15. 16.	**30" DI Check Valve** **24" DI Check Valve**
	a. Measurement: Measurement will be made by each (EA) check valve satisfactorily furnished and installed in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include the complete valve assembly, installed in place and ready for operation, including all accessories and appurtenances shown or required. b. Payment: Payment shall be made at the contract unit price per each (EA), which shall include full compensation for all labor, materials, equipment, and incidental work necessary to furnish and install the check valve. This includes unloading, handling, storage, installation, jointing, gaskets, bolts, nuts, thrust restraint, supports, anchorage, and protective coatings. Payment shall also include concrete pads, blocking, or encasements where detailed; fittings or adaptors required for connection; and coordination with adjacent piping. Work shall conform to the applicable requirements of Section 15100 Valves and Appurtenances and the manufacturer's recommendations. No separate payment will be made for excavation, backfilling, compaction, dewatering, testing, disinfecting, or restoration of surfaces, as all such costs shall be included in the unit price per each check valve.
17.	**24" By-Pass Connection Assembly**
	a. Measurement: Measurement for the 24" Bypass Connection Assembly will not be made for payment and all items shall be included in the lump sum price. Measurement shall include the complete bypass connection, including

	the tee, reducer, 24-inch pipe section, 24-inch bends, and connection to the existing 36-inch main, furnished and installed in accordance with the Contract Documents and as approved by the Engineer. b. Payment: Payment shall be made at the contract lump sum price, which shall include full compensation for all labor, materials, equipment, services, and incidental work required to complete the bypass connection to the 36-inch pipe. This includes furnishing and installing the ductile iron tee, 24-inch ductile iron pipe, bends, fittings, and joint restraints; performing the connection to the existing 36-inch main including cutting, beveling, fittings, sleeves, gaskets, bolts, nuts, and thrust blocks; providing temporary support and shoring as necessary; furnishing and installing reducers or adaptors; dewatering, excavation, bedding, and backfilling; coordination with adjacent utilities; hydrostatic testing, flushing, and disinfection; and restoration of disturbed areas. No separate payment will be made for thrust restraint, concrete, testing, dewatering, fittings, or hardware, as all such costs shall be included in the lump sum price for this item.
18.	**Guardrail – Roadway, General TL-3**
	c. Measurement: Measurement will be made by the linear foot (LF) of FDOT MGS Guardrail, Test Level 3 (TL-3), satisfactorily furnished and installed in accordance with the Contract Documents, FDOT Standard Plans, and Specifications. The measured length shall be the horizontal distance along the face of the rail, excluding terminal end assemblies unless bid separately. Only completed and accepted guardrail will be included for payment. d. Payment: Payment shall be made at the contract unit price per linear foot (LF), which shall include full compensation for all labor, materials, equipment, and incidental work necessary to complete the guardrail installation. This includes furnishing and installing galvanized steel W-beam rail sections, steel posts, blockouts, splice connections, fasteners, and hardware; excavation or grading as required for post installation; compaction and backfill around posts; transitions to structures or other barrier systems; and restoration of disturbed areas. Guardrail shall conform to FDOT Specification Section 536 and FDOT Standard Plans Index 536-001 for MGS, meeting MASH TL-3 crash performance standards. No separate payment shall be made for post excavation, bracing, tie-ins, hardware, or alignment adjustments. End treatments, if required, shall be paid under separate bid items.
19.	**Guardrail – Roadway, End Treatment, MASH TL-3**
	a. Measurement: Measurement will be made by each (EA) MASH TL-3 guardrail end treatment satisfactorily furnished and installed in accordance

	with the Contract Documents, FDOT Standard Plans, and Specifications. Measurement shall include the complete end treatment assembly, from the beginning anchor to the point of connection with the guardrail, installed at the designated location and accepted by the Engineer. b. Payment: Payment shall be made at the contract unit price per each (EA), which shall include full compensation for all labor, materials, equipment, and incidental work required to install a complete MASH TL-3 compliant guardrail end treatment. This includes furnishing and installing the terminal assembly, impact head, energy-absorbing components, posts, foundations, hardware, connections, grading or regrading around the terminal, compaction, tie-in to the guardrail, and restoration of adjacent surfaces. All work shall conform to FDOT Specification Section 536 and the applicable FDOT Standard Plans Index for guardrail end treatments. No separate payment shall be made for excavation, grading, backfilling, alignment, hardware, or connection to the guardrail, as all such costs shall be included in the unit price per each end treatment.
20.	**Type D Curb and Gutter**
	a. Measurement: Measurement will be made by the linear foot (LF) of Type D curb and gutter satisfactorily furnished and installed in accordance with the Contract Documents and as approved by the Engineer. The measured length shall be along the front face of the curb and shall include all transitions, returns, and radii unless otherwise specified. b. Payment: Payment shall be made at the contract unit price per linear foot (LF), which shall include full compensation for all labor, materials, equipment, and incidental work required to complete the installation. This includes saw cutting and removal of existing curb and gutter if applicable, subgrade preparation and compaction, forming, furnishing and placing concrete, jointing, finishing, curing, and restoration of adjacent surfaces. All work shall conform to the requirements of Section 02576 Concrete Sidewalks and Driveways, and the curb and gutter shall be installed in accordance with FDOT Design Standards for Type F curb. No separate payment will be made for forming curved sections, expansion joints, or for cleanup and protection of newly installed curb and gutter.
21.	**Manhole Adjustment**
	a. Measurement: Measurement will be made by each (EA) manhole satisfactorily adjusted in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include installation of precast or cast-in-place riser sections, resetting the frame and cover, and regrading of the surrounding surface to match finished grade.

	b. Payment: Payment shall be made at the contract unit price per each (EA), which shall include full compensation for all labor, materials, equipment, and incidental work required to adjust the manhole. This includes excavation around the existing structure, furnishing and installing riser rings or precast sections, resetting or replacing the frame and cover, grouting and sealing joints, adjusting to proper alignment and elevation, and regrading and restoring the surrounding pavement, base, curb, sidewalk, or landscaped surfaces. Payment shall also include compaction, patching, finishing, cleanup, and disposal of surplus materials. No separate payment will be made for saw cutting, dewatering, backfilling, compaction, or surface restoration, as all such costs shall be included in the unit price per each.
22.	**Asphalt Pavement Driveway**
	a. Measurement: Measurement will be made by the ton (TN) of asphalt pavement satisfactorily furnished, placed, and compacted in accordance with the Contract Documents and as approved by the Engineer. Quantities shall be determined based on certified delivery tickets for asphalt material placed and accepted in the field, verified by the Engineer. No additional measurement will be made for temporary pavement, material waste, or asphalt rejected due to noncompliance. b. Payment: Payment shall be made at the contract unit price per ton (TN), which shall include full compensation for all labor, materials, equipment, and incidental work required to complete the asphalt paving. This includes hauling and placing hot mix asphalt; prime and tack coats; rolling and compaction; edge shaping; joint construction; traffic control for paving operations; cleanup; and compliance with all mix design and placement requirements. Asphalt shall conform to the material and placement requirements described in Section 02573 Asphalt Pavement Removal and Replacement, including applicable density, thickness, and temperature controls. No separate payment shall be made for asphalt wasted, segregated, or otherwise rejected; for joint correction; or for coordination with milling, curb, utility, or adjacent restoration work unless specified under a separate bid item.
23.	**Heavy Duty Concrete Slab**
	a. Measurement: Measurement will be made by the square foot (SF) of heavy-duty concrete slab satisfactorily constructed in accordance with the Contract Documents and as approved by the Engineer. The measured area shall be the surface area of the completed slab, including edges, transitions, and jointed sections, as verified in the field. b. Payment: Payment shall be made at the contract unit price per square foot

	(SF), which shall include full compensation for all labor, materials, equipment, and incidental work necessary to complete the work. This includes demolition and removal of any existing surface (if applicable), subgrade preparation, base placement and compaction, forming, furnishing and placing reinforced concrete, dowels and joint assemblies, finishing, curing, and protection. All concrete shall be placed in accordance with Section 02576 Concrete Sidewalks and Driveways and shall meet a minimum compressive strength of 4,000 psi. No separate payment shall be made for reinforcement, edge forming, saw cutting, surface restoration, or embedded features unless included under a separate bid item.
24.	**Aluminum Sign Pole Relocation**
	a. Measurement: Measurement will be made by each (EA) aluminum sign pole satisfactorily relocated in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include the complete removal of the existing sign pole and foundation, transport, and reinstallation at the new designated location as a functional unit. b. Payment: Payment shall be made at the contract unit price per each (EA), which shall include full compensation for all labor, equipment, materials, and incidental work required to relocate the aluminum sign pole. This includes disconnecting and reconnecting any electrical connections where applicable; removal of the existing pole, anchors, and foundation components; transporting and resetting the pole at the new location; constructing new foundations and anchors as required; furnishing and installing any new hardware necessary to complete the relocation; and restoration of both the original and new installation areas to match surrounding conditions. All work shall conform to the applicable requirements of Section 02050 Demolition of Existing Structures and FDOT Design Standards for sign supports. No separate payment will be made for excavation, backfilling, compaction, saw cutting, surface restoration, or utility coordination, as all such costs shall be included in the unit price per each.
25.	**Curb and Gutter Restoration**
	a. Measurement: Measurement for Curb and Gutter Restoration will be made by the number of linear feet (LF) of curb and gutter satisfactorily removed and replaced in accordance with the Contract Documents and as approved by the Engineer. The measured length shall be along the front face of the curb and shall include all transitions, returns, and radii restored, unless otherwise specified. b. Payment: Payment shall be made at the contract unit price per linear foot (LF), which shall include full compensation for all labor, materials, equipment, and incidental work required to restore curb and gutter. This

	includes sawcutting and removal of existing curb and gutter; hauling and legal disposal of removed materials; excavation; subgrade preparation and compaction; forming, furnishing, and placing concrete; jointing, finishing, curing, and backfilling behind the curb; and restoration of adjacent pavements, driveways, sidewalks, sod, or landscaping disturbed by the work. All work shall conform to the requirements of Section 02576 Concrete Sidewalks and Driveways and the curb and gutter shall be restored in accordance with FDOT Design Standards for Type F curb. No separate payment will be made for curved sections, expansion joints, surface cleanup, or protection of newly installed curb and gutter, as all such costs shall be included in the unit price per linear foot.
26.	**Sidewalk Restoration**
	a. Measurement: Measurement will be made by the square yard (SY) of sidewalk area satisfactorily restored in accordance with the Contract Documents and as approved by the Engineer. The measured area shall include only that portion of sidewalk designated for removal and replacement or disturbance due to construction activity. b. Payment: Payment shall be made at the contract unit price per square yard (SY), which shall include full compensation for all labor, materials, equipment, and incidental work necessary to complete the restoration. This includes saw cutting and removal of existing sidewalk; subgrade preparation and compaction; forming; furnishing and placing concrete with appropriate mix and finish to match adjacent surfaces; curing; jointing; backfilling; and surface cleanup. All sidewalk restoration shall conform to the requirements of Section 02576 Concrete Sidewalks and Driveways, including all applicable tolerances, finishes, and alignment. Restoration shall match the thickness, width, slope, and surface treatment of adjacent sidewalk sections unless otherwise directed. No separate payment shall be made for traffic control, testing, or site cleanup associated with sidewalk restoration.
27.	**Full Lane Width Asphalt Pavement Restoration – Subsoil Excavation**
	a. Measurement: Measurement for Full Lane Width Asphalt Pavement Restoration – Subsoil Excavation will be made by the number of cubic yards (CY) of unsuitable subsoil excavated, removed, and replaced in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include the volume of subsoil removed to the lines and grades shown on the Drawings, based on field survey or cross-section calculations. b. Payment: Payment shall be made at the contract unit price per cubic yard (CY), which shall include full compensation for all labor, materials, equipment, and incidental work required to excavate, haul, and properly dispose of unsuitable subsoil material. This includes excavation to the required depth, handling and loading, transportation to an approved disposal site, backfilling with approved material, moisture conditioning, compaction,

	grading, and preparation of the subgrade for stabilization or base placement. Payment shall also include trench safety, dewatering if necessary, protection of adjacent structures and pavements, and restoration of disturbed areas. No separate payment will be made for hauling, compaction, testing, or disposal, as all such costs shall be included in the unit price per cubic yard for this item.
28.	**Full Lane Width Asphalt Pavement Restoration – Type B Stabilization – Stabilized Subgrade (LBR 40 Min.), Compacted at 95% Max Density per AASHTO T-180**
	a. Measurement: Measurement for Full Lane Width Asphalt Pavement Restoration – Type B Stabilization – Stabilized Subgrade (LBR 40 Min.) will be made by the number of square yards (SY) of stabilized subgrade satisfactorily constructed in place in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include the full lane width and thickness of stabilized material compacted to a minimum of 95% of maximum density per AASHTO T-180, as shown on the Drawings. b. Payment: Payment shall be made at the contract unit price per square yard (SY), which shall include full compensation for all labor, materials, equipment, and incidental work necessary to complete the stabilized subgrade restoration. This includes excavation and removal of unsuitable materials, spreading, mixing, grading, and compacting base soils with additives as required to achieve LBR 40 minimum, moisture conditioning, finishing to line and grade, trimming, and protection until base placement. Payment shall also include sawcutting, edge preparation, sweeping, and surface restoration adjacent to the stabilized area. No separate payment will be made for additives, compaction, density testing, sawcutting, or cleanup, as all such costs shall be included in the unit price per square yard for this item.
29.	**Full Lane Width Asphalt Pavement Restoration – Lime rock Base LBR 100 – Optional Base, Base Group (12”)**
	a. Measurement: Measurement for Full Lane Width Asphalt Pavement Restoration – Limerock Base LBR 100 – Optional Base, Base Group (12”) will be made by the number of square yards (SY) of base course satisfactorily constructed in place in accordance with the Contract Documents and as approved by the Engineer. Measurement shall be based on the surface area restored to the full lane width and compacted to a 12-inch thickness, as shown on the Drawings. b. Payment: Payment shall be made at the contract unit price per square yard (SY), which shall include full compensation for all labor, materials,

	equipment, and incidental work required to complete the limerock base course restoration. This includes excavation, removal and disposal of unsuitable material, subgrade preparation, furnishing and placing limerock base material meeting LBR 100 requirements, spreading in uniform lifts, moisture conditioning, grading, compaction to required density, trimming to line and grade, and finishing of the base surface for asphalt placement. Payment shall also include sawcutting, edge preparation, joint construction, sweeping, and surface protection until asphalt is placed. No separate payment will be made for subgrade preparation, compaction, sawcutting, trimming, or cleanup, as all such costs shall be included in the unit price per square yard for this item.
30.	**Full Lane Width Asphalt Pavement Restoration – Asphaltic Concrete, SP-9.5 (2")**
	a. Measurement: Measurement for Full Lane Width Asphalt Pavement Restoration – Asphaltic Concrete, SP-9.5 (2") will be made by the number of tons (TN) of asphaltic concrete satisfactorily furnished, placed, and compacted in accordance with the Contract Documents and as approved by the Engineer. Measurement shall be based on certified weigh tickets from an approved scale, less any rejected or unused material. The measured quantity shall include only the in-place material required to restore the full lane width and thickness shown on the Drawings. b. Payment: Payment shall be made at the contract unit price per ton (TN), which shall include full compensation for all labor, materials, equipment, and incidental work required to complete the asphalt pavement restoration. This includes surface preparation, tack coat, furnishing and placing SP-9.5 asphaltic concrete to a compacted thickness of 2 inches, rolling and compaction to specified densities, trimming and cleaning of edges, and joint construction for tie-in to existing pavement. Payment shall also include sawcutting, removal and disposal of existing pavement, sweeping, hauling, traffic control during placement, and restoration of disturbed areas adjacent to the paving limits. No separate payment will be made for tack coat, compaction, sawcutting, traffic control, or cleanup, as all such costs shall be included in the unit price per ton for this item.
31.	**Pavement Painted Markings**
	a. Measurement: Measurement for Pavement Painted Markings will not be made for payment and all items shall be included in the lump sum price. Measurement shall include all pavement striping and markings required to restore roadway surfaces disturbed by construction activities, furnished and installed in accordance with the Contract Documents and as approved by the Engineer. b. Payment: Payment shall be made at the contract lump sum price, which shall

	include full compensation for all labor, materials, equipment, and incidental work necessary to furnish and install pavement painted markings for restoration. This includes layout and alignment, furnishing and applying paint or thermoplastic pavement markings of the specified color and width, symbols, crosswalks, stop bars, arrows, lane lines, and any other striping or markings required to restore traffic patterns to their original condition. Work shall include surface preparation, cleaning, priming, application of reflective glass beads where specified, and protection of the markings until cured. Payment shall also include traffic control, coordination with local agencies, and replacement of any temporary markings as needed prior to final installation. No separate payment will be made for layout, surface preparation, temporary markings, traffic control, or cleanup, as all such costs shall be included in the lump sum price for this item.
32.	**Intake Concrete Structure**
	a. Measurement: Measurement for the Intake Concrete Structure will not be made for payment and all items shall be included in the lump sum price. Measurement shall include the entire cast-in-place reinforced concrete intake structure as a complete and functional unit ready to receive the submersible pump assembly, constructed in accordance with the Contract Documents and as approved by the Engineer. b. Payment: Payment shall be made at the contract lump sum price, which shall include full compensation for all labor, materials, equipment, and incidental work necessary to furnish and install the complete intake structure. This includes layout and survey, excavation, dewatering, subgrade preparation, formwork, reinforcing steel, furnishing and placing cast-in-place concrete, finishing, curing, and all joint sealants. Payment shall also include embedded items for pump mounting, bar screen support framing, structural coordination for the trash rack and OSHA guardrail platform, pipe or reducer penetrations with waterstops, grout, and sleeves, as well as integration with the permanent sheet pile wall where detailed. Work shall further include placement of base slabs, pump recess, toe walls, structural anchors, concrete encasements, and any other features required for stability and hydraulic performance. All coatings, protective treatments, and patching of formwork or construction defects shall be considered incidental. The work shall conform to the applicable requirements of Section 03300 Cast-in-Place Concrete, Section 11210 Submersible Well Pumps, and other referenced sections in the Contract Documents. No separate payment will be made for dewatering, spoil disposal, reinforcing steel, formwork, embedded hardware, concrete testing, structural coordination, or restoration of adjacent areas, as all such costs shall be included in the lump sum price for this item.
33.	**Sheet Pile System**
	a. Measurement: Measurement for the Sheet Pile System will not be made for

	payment and all items shall be included in the lump sum price. Measurement shall include the full sheet pile installation as a complete structural system, furnished and installed in accordance with the Contract Documents and as approved by the Engineer. b. Payment: Payment shall be made at the contract lump sum price, which shall include full compensation for all labor, materials, equipment, and incidental work necessary to furnish and install the permanent sheet pile wall system. This includes furnishing and driving hot-rolled steel sheet piles of the specified profile and length; splicing, welding, cutting, and alignment of sheet pile sections; installation of pile caps, wales, anchors, tie rods, and structural hardware as detailed; placement of cast-in-place concrete caps, slabs, or encasements associated with the wall; application of coatings, corrosion protection, and field touch-ups; excavation, dewatering, backfilling, and compaction adjacent to the wall; and integration with the intake structure and other appurtenances shown on the Drawings. Payment shall also include all QA/QC, inspection, testing, and restoration of adjacent areas. No separate payment will be made for splicing, bracing, welding, cutting, hardware, coatings, or any other appurtenant structural features, as all such costs shall be included in the lump sum price for this item.
34.	**Horizontal 30" Submersible Pumps W/ Drive Units**
	a. Measurement: Measurement will be made by each (EA) horizontal submersible pump assembly, including drive unit, satisfactorily furnished, installed, and tested in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include the complete integration of the pump system, including mounting, connection of hydraulic lines, and commissioning. b. Payment: Payment shall be made at the contract unit price per each (EA), which shall include full compensation for all labor, materials, equipment, services, and incidental work necessary to furnish and install a fully operational horizontal submersible pump system. This includes furnishing the submersible pump with hydraulically driven axial flow propeller, diesel/electric hydraulic drive unit, pump mounting frame, suction bell, discharge piping connection, hydraulic hoses and quick-connect fittings, control panel, fuel system, and all accessories required for continuous submerged operation. All components shall be furnished as factory-assembled, pre-tested systems by the pump manufacturer. Installation shall include proper seating and anchoring in the wet well, hydraulic hose routing, startup and testing in accordance with manufacturer's recommendations and applicable standards, and training for City personnel. No separate payment

	will be made for lifting equipment, on-site assembly, test reports, or other services required for final acceptance.
35.	**Drive Unit Canopy and Concrete Slabs**
	a. Measurement: Measurement will be made by each (EA) Drive Unit Canopy and Concrete Slab assembly satisfactorily furnished and installed in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include the full overhead canopy structure, support columns, anchorage, protective coatings, and the associated reinforced concrete slab and foundation as shown on the Drawings. b. Payment: Payment shall be made at the contract unit price per each (EA), which shall include full compensation for all labor, materials, equipment, and incidental work necessary to complete the installation. This includes furnishing and erecting the canopy structure; installation of prefabricated or site-built steel or aluminum framing; anchorage to reinforced concrete slabs and foundations; sheet metal roofing or prefinished metal panel systems; protective coatings; louvers, ventilation grilles, or removable hatches where shown; and coordination with mechanical and electrical systems located beneath the canopy. Payment shall also include all work for the reinforced concrete slabs, including excavation, formwork, reinforcing steel, placement of cast-in-place concrete, finishing, curing, joints, and surface preparation. The canopy shall be designed and installed to withstand applicable wind loads in accordance with the Florida Building Code and shall provide safe, weather-resistant access for maintenance personnel. No separate payment shall be made for footings, hardware, coatings, testing, or restoration of adjacent surfaces, as all such costs shall be included in the unit price per each.
36.	**Electrical Service, Controls, and SCADA**
	a. Measurement: Measurement for Electrical Service, Controls, and SCADA will not be made for payment and all items shall be included in the lump sum price. Measurement shall include the complete electrical and controls system as a fully functional installation in accordance with the Contract Documents and as approved by the Engineer. b. Payment: Payment shall be made at the contract lump sum price, which shall include full compensation for all labor, materials, equipment, programming, testing, and incidental work required to provide a complete and functional electrical and SCADA system. This includes the electrical service rack, conduits, feeders, grounding, utility coordination, control enclosures, master control panels, internal hardware, PLCs, power supplies, relays,

	transformers, surge protection, wiring, labeling, and SCADA interface points. Payment shall also include programming of PLCs and communication modules, Modbus or other SCADA-compatible interfaces, Ethernet or telemetry modules, diagnostic tools, real-time monitoring, alarm reporting, and full integration with field devices, actuators, and instrumentation as shown in the Drawings. All conduit routing, wiring, terminations, labeling, testing, start-up, shop drawings, as-builts, and coordination with the City's SCADA integrator shall be included. No separate payment will be made for software licensing, shop drawings, programming, testing, labeling, coordination, or restoration of surfaces, as all such costs shall be included in the lump sum price for this item.
37.	**Water Service – Meter, BFP, and Hose Bibb Assembly**
	a. Measurement: Measurement for the Water Service – Meter, Backflow Preventer, and Hose Bibb Assembly will not be made for payment and all items shall be included in the lump sum price. Measurement shall include the entire water service installation as a complete functional unit from the tap at the existing water main through to the hose bibb assembly, including all appurtenances and features shown on the Drawings. b. Payment: Payment shall be made at the contract lump sum price, which shall include full compensation for all labor, materials, equipment, services, permits, coordination with the utility provider, and incidental work required to install the complete water service as shown on the Drawings. This includes, but is not limited to: tapping the existing water main; furnishing and installing service piping, fittings, valves, and thrust restraint; furnishing and installing the meter box and water meter; furnishing and installing a reduced pressure zone (RPZ) backflow preventer assembly with test cocks, valves, and concrete support slab; furnishing and installing the hose bibb and hose rack with hose, nozzle, and post mount; and all associated appurtenances. Payment shall also include excavation, trench safety, bedding, backfill, compaction, thrust blocks, testing, disinfection, coordination with the City for inspection, and restoration of disturbed surfaces including pavement, sidewalk, and landscaping. All work shall conform to the applicable requirements of Section 02510 Water Distribution Systems, Section 02140 Dewatering, and local utility standards. No separate payment shall be made for tapping fees, concrete, hardware, testing, disinfection, or surface restoration, as all such costs shall be included in the lump sum price for this item.
38.	**Outfall Headwall Structure**
	a. Measurement: Measurement for the Outfall Headwall Structure will not be made for payment and all items shall be included in the lump sum price.

	Measurement shall include the entire structure as a complete unit, including connection to the reducer and all associated components such as toe walls, aprons, wing walls, mounting features for flap gates, and any structural or hydraulic features shown in the Drawings. b. Payment: Payment shall be made at the contract lump sum price, which shall include full compensation for all labor, materials, equipment, and incidental work required to construct the outfall headwall. This includes layout and excavation, subgrade preparation, formwork, reinforcing steel, furnishing and placing cast-in-place concrete, toe walls or aprons (if applicable), mounting hardware, and connection to the reducer. The installation shall accommodate hydraulic transition and structural stability at the outfall location and shall include provisions for mounting a flap gate if required. All work shall conform to the applicable requirements of Section 03300 Cast-in-Place Concrete and Section 02140 Dewatering. No separate payment shall be made for reinforcing steel, dewatering, formwork, concrete testing, or restoration of adjacent surfaces, as all such costs shall be included in the lump sum price.
39.	**Track-Mounted Sliding Gate Assembly**
	a. Measurement: Measurement for the Track-Mounted Sliding Gate Assembly will not be made for payment and all items shall be included in the lump sum price. b. Payment: Payment shall be made at the contract lump sum price, which shall include full compensation for all labor, materials, equipment, and incidental work required to furnish and install the complete sliding gate system as shown on the Drawings and specified herein. This includes fabrication and delivery of the galvanized steel gate frame, chain link infill fabric, barbed wire extension arms with three strands of barbed wire, heavy-duty track and track supports, ground track foundation and concrete footing, rollers, guide assemblies, end stops, latch hardware, locking provisions, and all mounting hardware. Payment shall also include excavation, concrete, reinforcing steel, installation of posts and bracing, alignment and adjustment of the gate to ensure smooth rolling operation, welding or bolted connections, galvanizing of all steel components per ASTM A123, and coating repairs as needed. The installation shall conform to Section 02840 Chain Link Fences and Gates and shall meet the layout, clear opening, and finish requirements shown on the Drawings. No separate payment will be made for anchorage, track adjustment, barbed wire installation, or restoration of disturbed areas, as all such costs shall be included in the lump sum price for this item.
40.	**FDOT Type A Chain Linked Fence with Barbed Wire**
	a. Measurement: Measurement will be made by the linear foot (LF) of FDOT Type A chain link fence with barbed wire satisfactorily furnished and installed in accordance with the Contract Documents and as approved by the

	Engineer. Measurement shall include all line posts, corner posts, top rail, bottom tension wire, chain link fabric, and barbed wire assembly from end to end, measured along the centerline of the fence. b. Payment: Payment shall be made at the contract unit price per linear foot (LF), which shall include full compensation for all labor, materials, equipment, and incidental work required to install the complete fence system. This includes excavation for post holes; concrete footings; installation of end, corner, and pull posts; intermediate posts; top rail; bottom tension wire; aluminum-coated steel chain link fabric with UV-stable black PVC coating; three strands of barbed wire mounted on galvanized arm extensions angled outward from the top of the fence; No. 9 tie wires; stretcher bars; bracing; grounding; and all required hardware. The installation shall conform to Section 02840 Chain Link Fences and Gates (FDOT Type A) and shall meet the layout, height, and finish requirements shown on the Drawings. No separate payment shall be made for concrete, tie wires, barbed wire installation, staking, coating repairs, or restoration of disturbed areas, as all such costs shall be included in the unit price per linear foot.
41.	**Manual Treash Screen & OSHA-Compliant Galvanized Steel Guardrail Platform System**
	a. Measurement: Measurement for the Manual Trash Screen and OSHA-Compliant Galvanized Steel Guardrail Platform System will not be made for payment and all items shall be included in the lump sum price. b. Payment: Payment shall include full compensation for all labor, materials, equipment, services, and incidental work necessary to furnish, fabricate, and install a complete trash screen and guardrail platform system as shown on the Drawings and specified. This includes fabrication and installation of a hot-dip galvanized steel manual bar screen with a minimum 1-inch vertical bar spacing, installed at an inclination of 60 to 75 degrees from horizontal, with embedment into cast-in-place concrete or fabricated frames, alignment with hydraulic flow conditions, and provisions for manual cleaning access. Payment shall also include coordination and integration of the trash screen with the intake structure, toe wall, access platform, and any flap gate framing. In addition, payment shall cover fabrication and installation of an OSHA-compliant galvanized steel guardrail system on platforms, walkways, or exposed edges, including posts, top and intermediate rails, toe plates, splice connections, anchors, and all associated mounting hardware. The system shall be securely anchored to concrete slabs, steel grating, or other designated structural surfaces and shall meet OSHA fall protection requirements for concentrated and uniform loads. All steel components shall be hot-dip

	galvanized in accordance with ASTM A123, including field coating touch-ups for any damaged areas. No separate payment will be made for anchorage hardware, mounting accessories, protective coatings, transition joints, or coordination with other structural or mechanical elements, as all such costs shall be included in the lump sum price.
42.	**Above Ground Heavy Duty Galvanized Perforated Cable Tray**
	a. Measurement for Above Ground Heavy Duty Galvanized Perforated Cable Tray will be made by the total number of linear feet (LF) of cable tray installed and accepted in place, measured along the tray centerline, complete in accordance with the Contract Drawings and Specifications. Measurement shall include all fittings, supports, hangers, brackets, connectors, expansion joints, covers, bonding jumpers, grounding, and hardware necessary to provide a continuous and functional system. b. Payment for Above Ground Heavy Duty Galvanized Perforated Cable Tray will be made at the Contract unit price per linear foot (LF) and shall constitute full compensation for furnishing all labor, materials, equipment, services, and incidentals required for a complete installation. This includes, but is not limited to: fabrication, delivery, storage, handling, field cutting, assembly, installation of tray sections, fittings (elbows, tees, reducers), splice plates, bolting, supports, brackets, anchors, expansion devices, grounding/bonding, protective coatings, and restoration of any surfaces impacted by installation. All accessories, hardware, and incidental materials necessary to provide a complete and operable cable tray system shall be included in the unit price per LF.
43.	**Aluminum Handrailing**
	c. Measurement for Aluminum Handrailing will be made by the total number of linear feet (LF) of handrail installed and accepted in place, measured along the top rail centerline, complete in accordance with the Contract Drawings and Specifications. Measurement shall include all posts, top rails, mid-rails, kick plates, gates, connections, fasteners, sleeves, anchors, and base plates required to provide a complete and functional system. d. Payment for Aluminum Handrailing will be made at the Contract unit price per linear foot (LF) and shall constitute full compensation for furnishing all labor, materials, equipment, services, and incidentals required for a complete installation. This includes, but is not limited to: fabrication, delivery, storage, handling, setting of posts, installation of rails, intermediate members, kick plates, gates, expansion joints, welding, bolting, drilling, anchoring, sleeves, grout or epoxy anchorage, coatings/finishes, field adjustments, cleaning, and protection of installed work. Payment shall also include cutting, fitting, patching, and restoration of surrounding surfaces impacted by the railing installation. No separate payment will be made for fasteners, hardware, finishes, or accessories; all such costs shall be included in the unit price bid per linear foot.
44.	**Concrete Wheel Stops**
	a. Measurement: Measurement for Concrete Wheel Stops will be made by the

	number of precast reinforced concrete wheel stops installed and accepted in the field, measured in each (EA), in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include the full assembly including embedded post, concrete encasement, and surface finish. b. Payment: Payment for Concrete Wheel Stops will be made at the Contract unit price per each (EA) and shall be full compensation for furnishing, transporting, storing, handling, placing, anchoring, and aligning the wheel stops as shown on the Drawings and specified herein. Payment shall also include all labor, materials, equipment, drilling and securing anchors into pavement, patching or backfilling around anchors, cleanup of the work area, and disposal of surplus or waste materials. No separate payment will be made for incidentals, and all such costs shall be included in the unit price bid per each.
45.	**Safety Access Ladder**
	a. Measurement: Measurement will be made by each (EA) safety access ladder satisfactorily furnished and installed in accordance with the Contract Documents and as approved by the Engineer. Measurement shall include the full ladder system, including mounting brackets, handholds, and safety features as required by code. b. Payment: Payment shall be made at the contract unit price per each (EA), which shall include full compensation for all labor, materials, equipment, and incidental work necessary to complete the installation. This includes furnishing and installing a galvanized steel or aluminum fixed vertical ladder, OSHA-compliant handhold extensions, base supports, intermediate brackets, anchorage hardware, safety feet, and protective coatings. The ladder shall be mounted to a concrete wall, access platform, or other structure as shown on the Drawings and shall conform to OSHA standards for rung spacing, clearance, and load capacity. All work shall be coordinated with adjacent features, and no separate payment shall be made for mounting hardware, wall sleeves, toe holds, safety cages (if required), or coordination with surrounding elements unless specified under a separate bid item.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01027
APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 REQUIREMENT

A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.

1.02 FORMAT

A. Format and Content: Use the accepted Schedule of Values.
   1. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
      a. Generic name
      b. Related specification section
      c. Name of subcontractor
      d. Name of manufacturer or fabricator
      e. Name of supplier
      f. Dollar value
   2. Round amounts off to the nearest whole dollar. The total shall equal the Contract Amount.

1.03 PREPARATION OF APPLICATION

A. Each Application for Payment shall be consistent with previous applications for payments as certified and paid for by the City.

B. Payment Application Times: As stated in the General Conditions, Payment Applications shall be submitted monthly on a day of the month established by the City at the Pre-Construction Conference.

C. Application Preparation: Contractor shall complete every entry on the Pay Application form. The form shall be executed by a person authorized to sign legal documents on behalf of the Contractor and the signature notarized. Incomplete applications will be returned without action. The following procedure shall be followed by the Contractor:
   1. Submit applications typed on forms provided by the City.
   2. Use data on Bid Form and approved Schedule of Values. Provide dollar value in each column for each line item for portion of Work performed and for stored products.
   3. List each authorized Change Order and use additional sheets if necessary, list Change Order number and dollar amount for the original item of work.
   4. Each item shall have an assigned dollar value for the current pay period and a cumulative value for the project to-date.

5. Submit stored material log, partial waivers of claims and mechanic liens, and Consent of Surety with each application, as further explained below.

D. Contractor shall submit a stored material log with each application for payment that identifies the type, quantity, and value of all stored material that tracks when the stored materials were installed and deducts the installed material from the stored quantity at that time. Include original invoices for all stored materials for which payment is requested.

E. Waivers of Claims and Mechanics Lien (Waivers): With each Application for Payment the Contactor shall submit waivers of claims and mechanic liens from Subcontractors, Sub-subcontractors, and suppliers for the construction period covered by the previous application.
   1. The Contractor shall submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
   2. When an application shows completion of an item, the Contractor shall submit final or full waivers.
   3. The Contractor shall submit the final Application for Payment with, if not already submitted, the final waivers from every entity involved with performance of work covered by the Application that could lawfully be entitled to a payment claim or lien.
   4. Format of Waiver Forms: The Contractor shall submit executed waivers of claims and liens on forms acceptable to the City.
   5. The City reserves the right to designate which entities involved in the Work must submit waivers.

F. Transmittal of Pay Applications: Contractor shall submit four (4) executed copies of each Application for Payment to the City. One (1) copy shall include all waivers of lien and similar attachments.
   1. The Contractor shall transmit each Pay Application package with a transmittal form that lists attachments and all appropriate information related to the application. The transmittal form shall be acceptable to the City.
   2. The Contractor shall include a certification with each application stating that all previous payments received from the City under the Contract have been applied by the Contractor to discharge, in full, all obligations of the Contractor in connection with the Work covered by prior applications for payment. The Contractor shall also certify that all materials and equipment incorporated into the Work are free and clear of all liens, claims, security interest, and encumbrances.

G. Initial Application for Payment Submittal: Administrative actions and submittals that must precede or coincide with submittal of the initial Application for Payment include the following:
   1. List of Subcontractors
   2. List of principal suppliers and fabricators
   3. Schedule of Values
   4. Contractor's Construction Progress Schedule (accepted)
   5. List of Contractor's staff assignments
   6. Copies of building permits

7. Copies of authorizations and licenses from governing authorities for performance of the Work
8. Certificates of insurance and insurance polices
9. Performance and Payment bonds (if required)
10. Data needed to acquire City's insurance

H. Monthly Application for Partial Payment Submittals: Administrative actions and submittals that must precede or coincide with submittal of Monthly Applications for Partial Payment include the following, as applicable:
1. Relevant tests
2. Progressive As-builts (one (1) paper copy and electronic copy)
3. Table 01050-2 Asset Attribute Data Form Examples (one (1) paper copy and electronic copy)
4. Table 01050-3 Pipe Deflection Table (one (1) paper copy and electronic copy)
5. Table 01050-4 Gravity Main Table (one (1) paper copy and electronic copy)
6. An electronic copy of all survey field notes
7. Partial Release of Lien
8. Partial Consent of Surety
9. Site photographs
10. Updated Progress Schedule: submit one (1) electronic copy and five (5) copies
11. Summary of Values
12. Pay Request
13. On-Site Storage of materials

I. Substantial Completion Application for Payment Submittal: Following issuance of the Certificate of Substantial Completion, Contractor shall submit an Application for Payment. This Application shall reflect any Certificates of Partial Substantial Completion issued previously for the City’s occupancy of designated portions of the Work.
1. Administrative actions and submittals that shall precede or coincide with this application include:
   a. Occupancy permits and similar approvals
   b. Warranties (guarantees) and maintenance agreements
   c. Test/adjust/balance records
   d. Maintenance instructions
   e. Meter readings
   f. Start-up performance reports
   g. Change-over information related to the City's occupancy, use, operation and maintenance
   h. Final Cleaning
   i. Application for reduction of retainage and consent of surety
   j. Advice on shifting insurance coverage
   k. List of incomplete Work, recognized as exceptions to City’s Certificate of Substantial Completion

J. Final Completion Application for Payment Submittal: Administrative actions and

submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:

1. Prior to submitting a request for final payment or the City issuing a Certificate of Completion for the Work, the Contractor shall submit the final Record Documents to the City for approval. Retainage funds will be withheld at the City's discretion based on the quality and accuracy of the final Record Documents.
2. Written signed statements by the Contractor
   a. Completion of project close-out requirements
   b. Completion of items specified for completion after Substantial Completion
   c. Assurance that unsettled claims are settled
   d. Assurance that work not complete and accepted is now completed
3. Transmittal of Record Documents to the City
4. Proof that taxes, fees, and similar obligations have been paid
5. Removal of temporary facilities and services has been completed
6. Removal of surplus materials, rubbish, and similar elements
7. Prepare Application for Final Payment as required in General Conditions

1.04 PAY APPLICATION SUBSTANTIATING DATA

A. When the City requires substantiating data for a Pay Application, submit data justifying Pay Application line-item amounts in question.

B. Provide one (1) copy of data with a transmittal letter for each copy of Pay Application submittal. The Pay Application number, date, and line item by number and description shall be clearly stated.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01050
SURVEYING AND FIELD ENGINEERING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Professional Surveyor: Provide professional surveying and mapping work required for the execution of the Contract, including verification of existing survey data, construction layout, and production of the As-Built Drawings. This Work shall be performed by a Surveyor that is licensed by the State of Florida as a Professional Surveyor and Mapper pursuant to Chapter 472, F.S.

B. Professional Engineer: The Contractor shall provide the services of a Registered Professional Engineer currently licensed in the State of Florida for the required field engineering services as applicable to the work.

1.02 REQUIREMENTS

A. Survey Services
   1. The Contractor shall retain the services of a registered Surveyor and Mapper licensed in the State of Florida to provide professional surveying and mapping services necessary for the construction including a control survey and an as-built survey during construction. The Surveyor will identify control points (monuments and benchmarks noted on the Drawings). The construction layout survey shall be established from the control points shown on the Construction Drawings. The control points shall be confirmed by the contractor prior to start of construction. The accuracy of any method of staking shall be the responsibility of Surveyor. All staking shall be done to provide for easy verification of the work by the City.

B. Field Engineering Services
   1. The Engineer shall be of the discipline required for the work.
   2. The Engineer shall be responsible for duties during Construction to include, but not limited to:
      a. Inspections, testing, witnessing requiring a licensed Professional Engineer.
      b. Design of temporary shoring, bridging, scaffolding or other temporary construction, formwork and protection of existing structures.
      c. Other requirements as specified herein.
   3. Engineering related designs and inspections shall be signed by the licensed Professional Engineer as required by the City.

1.03 SUBMITTALS

A. Provide qualifications of the Surveyor or Engineer.
   1. A Florida Registered Professional Engineer or Registered Surveyor and Mapper, who is proposed by the Contractor to provide services for the work, shall be acceptable to

the City prior to field services being performed.

2. Submit name, address and telephone number of the Surveyor and/or Engineer, as appropriate to the City for acceptance before starting survey or engineering work.
3. Submit written acknowledgement from the Surveyor stating that he has the hardware, software and adequate scope of services in his agreement with the Contractor to fully comply with the requirements of this specification.

B. On request, submit documentation verifying accuracy of survey work.

C. Surveyor shall submit certified Tables 01050 – 2, 3 and 4.

PART 2 - PRODUCTS

2.01 SURVEY DOCUMENTS

A. Survey documents shall comply with the Minimum Technical Standards of Chapter 5J-17 of the Florida Administrative Code (FAC) and Table 01050-1 Minimum Survey Accuracies, whichever are more stringent. All coordinates shall be geographically registered in the Florida State Plane Coordinate System using the contract Drawings control points for horizontal and vertical controls.

B. The Surveyor shall not copyright any of their work related to this project.

C. For ease of calculating pipe deflections in Table 01050-3, begin by providing a unique asset ID for each utility (water, wastewater or reclaimed water) type, numbered sequentially along the pipe run (including changes in direction) from start to finish of the pipe in Table 01050-2 (Pipe Worksheet). Then branches and services of the same utility type can be numbered. It is recommended that each utility numbering format be distinguishable from the other. This will allow organization and convenient sorting after the individual asset table worksheet tabs are combined in the spreadsheet program prior to copying and pasting to the deflection table spreadsheet. The Microsoft Excel spreadsheet template shall be provided by the City. The numbering system shall be approved by the City before commencing with production of the spreadsheet.

DRAFT DOCUMENT FOR COMMISSION REVIEW

Table 01050-1
Minimum Survey Accuracies

Type	Horizontal Accuracy (feet)	Elevation Accuracy (feet)	Location: Horizontal Center and Vertical Top, unless otherwise specified
Bench Marks	0.01	0.01	Point
Baseline Control Locational Accuracy	0.01	N/A	Point
Tract and Easement Corners	*	N/A	Survey Monuments
Pipe, at 100-feet maximum intervals	0.1	0.1	Pipe, Pipe at Valves, Pipe at Bore & Jack Casing
Pipe, (PVC) >16-inch at every pipe joint	0.1	0.1	Pipe, Pipe at Valves, Pipe at Bore & Jack Casing
Fittings, Sleeves, Tapping Saddle, Service Saddles, Cap or Plugs.	0.1	0.1	
Pipe, Restrained	0.1	0.1	Restrained Joint Limits
Connections	0.1	0.1	Pipe
Bore & Jack Casing	0.1	0.1	Top of Casing at the Casing Limits
Directional Drill	0.1	0.1	10-foot intervals during the directional drill operation or intervals not to exceed the drilling rod length
Hydrants	0.1	0.1	Operating Nut
Valves (Operating Nut)	0.1	0.1	Operating Nut
Valve (Pipe Location)	0.1	0.1	Top of Pipe at Valve location
Air Release, Blow off, and Backflow Valves	0.1	0.1	Valve Enclosure
Master Meters, Deduct Meters & Wastewater Meters	0.1	0.1	Register
Meter Box	0.1	0.1	
Clean out -	0.1	0.1	
Manhole Rim	0.1	0.1	Manhole – top of rim
Manhole Inverts	N/A	0.01	Pipe Inverts
Pump Station (Public & Private)	0.1	0.01	Wetwell top of slab and Pipe Inverts
Production Well or Monitoring Well	0.1	0.1	Well – top of casing
Grease Interceptor	0.1	0.1	
Oil / Water Separators	0.1	0.1	
Pipe, abandoned in place or removed	0.1	0.1	Limits of Abandoned or Removed Pipe
Existing Utilities and appurtenant structures**	0.1	0.1	underground feature or structure

* Shall conform to the requirements of the "Chapter 5J-17, 'Minimum Technical Standards', FAC", certified by a SURVEYOR.

** Existing utilities including but not limited to water, wastewater, reclaimed water, stormwater, fiber optic cable, electric, gas and structures within the limits of construction.

*** Fittings rotated in X,Y,Z plane or vertical shall be shot to maintain flowline for the horizontal and vertical locations of the coordinate

Note: All survey values to be reported to second decimal point (x.xx)

DRAFT DOCUMENT FOR COMMISSION REVIEW

TABLE 01050-2
Asset Attribute Data Examples

Valves Worksheet

Asset Attribute Table Examples

ID Number	Plan Sheet #	Easting	Northing	Elevation	Valve Type	Main Type	Valve Size	Valve Manufacturer	Valve Model #	# of Turns to Close	Gear Actuator	Gear Ratio	Side Actuator	Actuator Manufacturer	Comments
ARV-1	C300	518060.09	1483231.33	81.72	ARV - Combination	Water Main	2	Brand H	100XT						
ARV-1	C303	518083.55	1483280.50	81.15	ARV - Vacuum	Force Main	4	Brand G	1000						
BFP-1	C303	518086.00	1483282.88	78.21	Backflow Preventer	Reclaimed Water Main	8	Brand F	2000 fgs						
BO-9	C405	518088.83	1483289.43	78.20	Blowoff	Water Main	2	Brand E	14 turbo						
BFV-1	C405	518088.11	1483295.00	81.95	Butterfly	Water Main	30	Brand D	230 xls	200	Yes	3 to 1	Yes	Brand C	
GV-3	C405	518132.54	1483372.75	81.23	Gate	Water Main	16	Brand C	2225846	300	Yes	3 to 1	NO		
LS-W1	C405	576779.36	1539706.97	64.30	Line Stop	Water Main	16	Brand B	7r6r44						
PV-22	C405	576880.60	1539718.32	64.52		Force Main	12	Brand A	Z100	200	Yes	3 to 1	Yes	Brand A	

General Info / Hydrant / **Valve** / Manhole / Meter / Fitting / Cleanout / Pipe / Pumpstation / Well / Property of

Fitting Worksheet

Asset Attribute Table Examples

ID Number	Plan Sheet #	Easting	Northing	Elevation	Main Type	Fitting Type	Comments
FM-1	C-3	572399.28	1539339.13	46.27	Force Main	Bend 11 1/4°	
FM-2	C-3	574840.74	1539856.91	51.73	Force Main	Bend 22-1/2°	
RW-1	C-4	574887.22	1539849.64	51.75	Reclaimed Water Main	Cross	
RW-2	C-4	574904.30	1539849.56	48.98	Reclaimed Water Main	Reducer	
WM-1	C-5	572532.38	1539848.16	54.42	Water Main	Tapping Saddle	
WM-2	C-5	572631.00	1539337.10	45.27	Water Main	Tee	

General Info / Hydrant / Valve / Manhole / Meter / **Fitting** / Cleanout / Pipe / Pumpstation / Well / Property or Easeme

Pipes Worksheet

Asset Attribute Table Examples

ID Number	Plan Sheet #	Easting	Northing	Elevation	Main Type	Type of Shot	Construction Method	Material	Pressure Class	Manufacturer	Comments
CSNG-1	C-4	517827.57	1482195.46	78.83	Force Main	Bore & Jack (Casing)		PVC	DR18	Brand A	
CSNG-2	C-4	517848.20	1482195.31	78.38	Force Main	Bore & Jack (Casing)		PVC	DR18	Brand A	
RW-1	C-7	517731.98	1482237.24	80.42	Reclaimed Water Main	Restraint Joint Limit	Open Cut	DIP	Class 250	Brand B	
RW-2	C-7	517732.85	1482338.10	80.94	Reclaimed Water Main	Restraint Joint Limit	Open Cut	DIP	Class 250	Brand B	
WM-1	C-9	573309.07	1539372.90	56.10	Water main	Shot on Pipe	Open Cut	PVC	DR18	Brand C	
WM-2	C-9	573308.75	1539375.00	54.66	Water main	Shot on Pipe	Open Cut	PVC	DR18	Brand C	
FMDD-1	C-4	504345.94	1488969.20	114.14	Force Main	Shot on Pipe	Directional Drill	HDPE	DR17	Brand X	
FMDD-2	C-4	504360.86	1488970.50	112.74	Force Main	Shot on Pipe	Directional Drill	HDPE	DR17	Brand X	
FMDD-3	C-4	504377.19	1488971.20	106.14	Force Main	Shot on Pipe	Directional Drill	HDPE	DR17	Brand X	
FM-9	C-4	504480.47	1488952.90	105.24	Force Main	Shot on Pipe	Open Cut	PVC	DR18	Brand C	

General Info / Hydrant / Valve / Manhole / Meter / Fitting / Cleanout / **Pipe** / Pumpstation / Well / Property or Easemen

Easements Worksheet

Asset Attribute Table Examples

ID Number	Plan Sheet #	Easting	Northing	Elevation	Boundary Corner Type	Comments
Corner-1	C-8	463484.59	1511029.72		Pump Station Tract	N.W. CORNER
Corner-2	C-8	463523.24	1511040.01		Pump Station Tract	N.E. CORNER
Corner-3	C-8	463480.45	1511015.23		Pump Station Tract	S.W. CORNER
Corner-4	C-8	463526.97	1511025.49		Pump Station Tract	S.E. CORNER
					Easement	
					Property	

Meter / Fitting / Cleanout / Pipe / Pumpstation / Well / **Property or Easement Corner** / Existing OC Utility Crossing / Grease Interceptor

Existing Utility Crossing

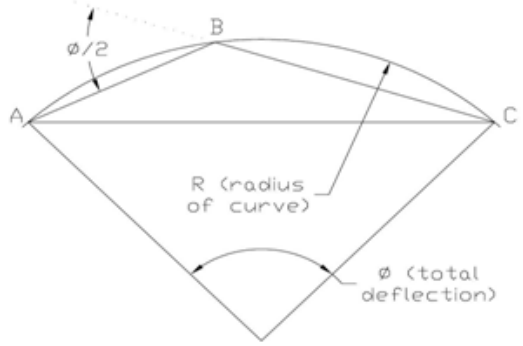
Asset Attribute Table Examples

	A	C	D	E	F	G	H	I
1	ID Number	Plan Sheet #	Easting	Northing	Existing Pipe Elevation	Proposed Crossing Elevation	Existing Main Type	Comments
2								
3	CR-02	AT-1	474767.95	1500585.09	98.20	106.20	Force Main	
4	CR-03	AT-1	475239.63	1500596.35	99.10	113.88	Force Main	
5	CR-04	AT-1	475239.61	1500588.49	94.30	112.45	Reclaimed Water Main	
6	Conf-1	C-750	463464.47	1511013.75	100.54	104.88	Water main	
7	Conf-2	C-750	463163.91	1510693.49	98.32	103.57	Storm Main	
8								

Pipe / Pumpstation / Well / Property or Easement Corner / **Existing OC Utility Crossing** / Grease Interceptor

TABLE 01050-3
Pipe Deflection Data EXAMPLE

Project:			
Contractor:			
Progress Mtg Date:			
Contract #			
Dwg Sheet #			
Utility Type		FM	
Pipe Manufacturer		National Pipe	
Pipe size & material		16" PVC C905	
PVC Manufacturer Deflection		6	inches
County Allowable Deflection	75%	4.5	inches
Allowable Angle of Offset		1.5	degrees
Allowable Radius of Curvature		764	feet
Laying Length of Pipe		20	feet



ID	Size and Type	Northing	Easting	Elev.	Calculations Including Elevation (XYZ)						
					Distance between points AB	Distance between points BC	Distance between points AC	Total Deflection Ø*	Radius of Curve**	Average Offset Angle***	Average Offset****
					Length AB	Length BC	Length AC	XYZ (w/ elevation)	XYZ (w/ elevation)	per laying length	per laying length
					ft	ft	ft	degrees	ft	degrees	inches
14041	16" FM	1505131.50	468948.53	107.68	-	-	-	-	-	-	-
7000	16" FM	1505059.60	468932.08	108.15	73.76	38.93	112.66	5.48	1,178.35	0.97	4.07
2128	16" FM	1505022.11	468921.60	108.55	38.93	39.61	78.54	2.29	1,961.65	0.58	2.45
2127	16" FM	1504983.85	468911.35	108.29	39.61	38.35	77.96	1.78	2,505.50	0.46	1.92
2126	16" FM	1504946.67	468901.96	107.81	38.35	39.13	77.42	8.79	505.16	2.27	9.51
2125	16" FM	1504908.11	468895.31	107.48							

Data that has be inputted

Values in yelloware over spec

*Uses lawof cosines to determine angle ABC and Ø.
angle ABC = arccos((AB²+BC²-AC²)/(2*AB*BC))
180-Ø/2 = angle ABC
Calculate the total deflection Ø.
to the outer point (A or C) is equal in angle to
the approach from the next point along the

** Uses lawof sines, using the chord length AC and radius R.
Since sin((Ø/2)*(PI/180))=(Chord/2)/R and length AC=Chord
R=AC/(2*sin(Ø*PI/360)
This calculation assumes an average radius over the bend between three points.

*** Adds the lengths of AB + BC / 20ft to get an approximate number of bends over the span.
This value is divided by the total deflection
angle to calculate the average bend angle of
This assumes that the bend angle consistent across the entire length.

**** Uses average offset angle and laying length of pipe.

PART 3 - EXECUTION

3.01 SURVEY FIELD WORK

A. Locate, reference, and preserve existing horizontal and vertical control points and property corners shown on the Drawings prior to starting any construction. If the Surveyor performing the work discovers any discrepancies that will affect the Project, the Contractor must immediately report these findings to the City. All survey work shall meet the requirements as defined in Florida Administrative Code 5J-17. Reference and preserve all survey pins/monuments during Construction. If survey pins/monuments are disturbed, it is the responsibility of the Surveyor to reset the pins/monuments at the Contractor's expense. If the monuments are disturbed, any Work that is governed by these monuments shall be held in abeyance until the monuments are reestablished by the Surveyor and approved by the City. The accuracy of all the Contractor's stakes, alignments and grades is the responsibility of the Contractor. However, the City has the discretionary right to check the Contractor's stakes, alignments, and grades at any time. Copies of the Surveyor's field notes and/or electronic files for point replacement shall be provided to the City.

B. The construction layout shall be established from the reference points shown or listed on the Drawings. The accuracy of any method of staking shall be the responsibility of the Contractor. All construction layout staking shall be done such as to provide for easy verification of the Work.

C. The Surveyor shall locate all improvements for the project As-Built Asset Attribute Data using State Plane Coordinates as the horizontal datum and the benchmark referenced on the Drawings as the vertical datum. The City will provide electronic files of the Drawings to be used by the Surveyor.

D. Use survey control points to layout such work tasks including but not limited to:
   1. Clearing, grubbing, work limits, right-of-way lines and easements
   2. Locations for pipelines and all associated structures and appurtenances

E. The Surveyor shall reference and replace any project control points, boundary corners, benchmarks, section corners, and right-of-way monuments that may be lost or destroyed, at no additional cost to the City based on the original survey control.

3.02 SURVEY DOCUMENTS DELIVERABLES

A. All survey documents required under Section 01720 Project Record Documents, Part 2 – Products, paragraphs 2.01 and 2.02.

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01070
ABBREVIATIONS AND SYMBOLS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. Reference to the following standards of any technical society, organization or body shall be construed to mean the latest standard, code or specification or tentative specification adopted and published at the date of advertisement for bids, even though reference has been made to an earlier standard. Such reference is hereby made a part of the Contract the same as if herein repeated in full and in the event of any conflict between any of these specifications, standard codes or tentative specifications and the Contract Documents, the most stringent shall govern.

AA	Aluminum Association
AASHTO	American Association of State Highway and Transportation Officials
ABPA	Acoustical and Board Products Association
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturer's Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	American Moving and Conditioning Association
ANSI	American National Standards Institute
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASA	American Standards Association (now ANSI)
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSCBC	American Standard Safety Code for Building Construction
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWBP	American Wood Preservers Board
AWS	American Welding Society
AWWA	American Water Works Association
CRSI	Concrete Reinforcing Steel Institute

CS	Commercial Standard
DOT Spec	Standard Specification for Road and Bridge Construction –
FDOT	Florida Department of Transportation
FAC	Florida Administrative Code
FS	Federal Standard
IEEE	Institute of Electrical and Electronic Engineers
IPCEA	Insulated Power Cable Engineers Association
NACE	National Association of Corrosion Engineers
NASSCO	National Association of Sewer Service Companies
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NEC	National Electrical Code
NECA	National Electrical Contractor's Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPT	National Pipe Threads
NSF	National Science Foundation
OSHA	U.S. Department of Labor, Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PS	United States Products Standards
SAE	Society of Automotive Engineers
SDI	Steel Decks Institute
SJI	Steel Joists Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Structural Steel Painting Council
UL	Underwriter's Laboratories, Inc.
USASI	United States of American Standards Institute (Now ANSI)

UNITS OF MEASUREMENT

CU FT	cubic feet
CU IN	cubic inch(es)
CY	cubic yard(s)
DegC	degree(s) Centigrade
DegF	degree(s) Fahrenheit
F	Fahrenheit
FT	feet, foot
G	gram(s)
GA	gage
GAL	gallon(s)
GPH	gallon(s) per hour
GPM	gallon(s) per minute
GPS	gallon(s) per second

HR	hour(s)
IN	inch(es)
IPS	iron pipe size
KG	kilogram(s)
L	liter(s)
LB	pound(s)
LBF-IN	pound (force) inch
LF	linear foot, linear feet
MIN. min.	minute(s), minimum
ml	milliliter
MO	month(s)
OZ	ounce(s)
QT	quart
RH	relative humidity
SF	square foot, square feet
SQ IN	square inch(es)
YD	yard(s)
YR	year(s)

TERMINOLOGY

@	at
AB	anchor bolt
ADJ	adjust, adjustable
ADMIN	administration
AFG	above finished grade
AGGR	aggregate
AL	aluminum
ALT	alternate
APPX	appendix
APX	approximate
ART	article
ASPH	asphalt
ASSY	assembly
AUTO	automatic
AUX	auxiliary
AVE	avenue
AVG	average
AWG	American Wire Gauge
BAR	barrier
BCCMP	bituminous coated corrugated metal pipe
BL	base line
BLDG	building
BLKG	blocking
BM	beam

C to C	center to center
CCB	concrete block, masonry
CEM	cement
CIP	cast iron pipe, cast in place
CJ	construction joint
CL	center line, clearance
CM	Construction Manager
CMP	corrugated metal pipe
CO	cleanout
CONC	concrete
CONN	connection
CONST	construction
CONT	continuous
CONTR	contractor
CU, COP	copper
ORR	corridor
CRIT	critical
CTD	coated
CTR	center
CULV	culvert
d	delta
DBL	double
DEM	demolition, demolish
DEPT	department
DET	detail
DIA, D	diameter
DIAG	diagonal
DIM	dimension
DWG	drawing
FEM	female
FUT	future
FV	field verify
FM	force main
FH, HYD	fire hydrant
ID	inside diameter
MAS	masonry
MATL	material
MAX	maximum
MFD	manufactured
MFG	manufacturing
MFR	manufacturer
MH	manhole, metal hallide
MIN	minimum
MISC	miscellaneous
MTL	material

NAT	natural
NATL	national
NOM	nominal
NTS	not to scale
OD	outside diameter
PP	power pole
R	radius
Rd	road
REIN	reinforce
REL A	relief air
REQD	required
REV	revision
RR	railroad
R/W	right-of-way
RWM	reclaimed water main
RY	railway
SAN	sanitary
SCH	schedule
SECT	section
SLV	sleeve
SQ	square
SST	stainless steel
ST	street
STA	station
STD	standard
SURF	surface
SUSP	suspend(ed)
SYM	Symbol, symmetrical
SYS	system
TEMP	Temperature, temporary
TYP	typical
UTIL	utility
W	West
WLD	welded
WM	water main
W/O	without
WT	weight
YD	yard
YR	year
Y W	wye

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01091
REFERENCE SPECIFICATIONS

PART 1 - GENERAL

1.01 GENERAL

A. Applicable Publications: Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of or omission from said standards or requirements.

B. Assignment of Specialists: In certain instances, specification test requires (or implies) that specific work is to be assigned to specialist or expert entities who must be engaged for the performance of the Work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work. They are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of Work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of Contract requirements remains with the Contractor.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of the Specifications, all Work specified herein shall conform to or exceed the requirements of such referenced documents which are not in conflict with the requirements of these Specifications or applicable codes.

B. References herein to "Building Code" shall mean the Florida Building Code. The latest edition of the code shall apply to the Work herein, including all addenda, modifications, amendments, or other lawful changes thereto.

C. In case of conflict between codes, reference standards, Drawings, and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarification and directions prior to ordering or providing any materials or labor. The Contractor shall bid the most stringent requirements.

D. Applicable Standard Specifications: The Contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01200
PROJECT MEETINGS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor participation in pre-construction conferences, progress meetings and specially called meetings.

1.02 MEETINGS CALLED BY THE CITY

A. The City will schedule and administer a pre-construction conference, periodic progress meetings and specific topic meetings throughout the progress of the Work. The City will:
   1. Prepare and distribute a notification of the meeting to required attendees.
   2. Establish, prepare and distribute an agenda with the notification.
   3. Make physical arrangements for the meetings.
   4. Preside at meetings.
   5. Prepare and distribute minutes of meetings including significant proceedings and decisions, within 15 working days after each meeting. Minutes will be forwarded to all participants and to parties affected by decisions made at the meeting.

B. Representatives of the Contractor, Subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

C. The meeting location will generally be a central site, convenient for all parties, designated by the City.

D. All meetings shall be digitally recorded with files provided to all requesting parties.

1.03 PRE-CONSTRUCTION CONFERENCE

A. Attendance:
   1. City
   2. Contractor and superintendent
   3. Subcontractors as appropriate to the agenda
   4. Representatives of suppliers and manufacturers as appropriate to the agenda
   5. City MBE/WBE representative
   6. Other agency representatives (FDEP, EPA, City, etc.)
   7. Surveyor – recommended but required if Surveyor has not previously performed work for the City
   8. Others as requested by the City or Contractor

B. Suggested Agenda:
   1. Distribution and discussion of:
      a. List of major Subcontractors and suppliers
      b. Construction schedules
      c. Contact information
   2. Organizational arrangement of Contractor's forces and personnel, and those of Subcontractors, material and equipment suppliers, and the City
   3. Critical work sequencing
   4. Major equipment deliveries
   5. Project coordination
      a. Designation of responsible personnel
      b. Channels and procedures for communication
   6. Procedures and processing of:
      a. Field decisions
      b. Proposal requests
      c. Submittals
      d. Change orders
      e. Applications for payment/Schedule of Values
      f. Contractor quality control
      g. Submittal of Shop Drawings, project data and samples
   7. Adequacy of distribution of Contract Documents
   8. Procedures for maintaining as built and record documents
   9. Use of premises:
      a. Office, work and storage areas
      b. City's requirements
      c. Housekeeping
   10. Temporary construction facilities
   11. Temporary utilities
   12. Safety and first aid procedures
   13. Rules and regulations
   14. Security procedures
   15. Place, date and time for regular progress meetings
   16. Completion time for Contract and liquidated damages

1.04 PROGRESS MEETINGS

A. The City shall schedule progress meetings at least once per month as required by progress of the Work with the first meeting approximately one (1) month after the pre-construction meeting.

B. Attendance:
   1. City
   2. Contractor
   3. Subcontractors as appropriate to the agenda
   4. Suppliers as appropriate to the agenda
   5. Others as appropriate

C. The Contractor's representative is to attend the project meetings and have the authority to act on behalf of the entity represented on field related matters. Contractor's representative is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics and provide specific information including but not limited to:
   1. Status of submittals and actions necessary to expedite them
   2. Status of activities behind schedule and actions necessary to regain the approved schedule
   3. Status of materials and equipment deliveries and action necessary to expedite materials and equipment and maintain the approved schedule
   4. Status of open RFI's and actions necessary to address them

D. To the maximum extent practicable, the Contractor is to assign the same personnel to represent the Contractor at Progress Meetings throughout the progress of the work.

E. The Contractor is to provide a current Shop Drawing submittal log at each progress meeting.

F. The Contractor is to provide copies of the updated Progress Schedule at each project meeting in accordance with the General Conditions including a 3 week look ahead schedule for upcoming events.

G. Suggested Agenda:
   1. Review and approve minutes from previous meeting
   2. Review of work progress since previous meeting to include current As-Builts
   3. Contractor's/Subcontractor's workforce and equipment
   4. Progressive As-Built Drawings
   5. Surveyor's submittals
   6. Field observations, problems and conflicts
   7. Construction progress and problems which impede construction schedule
   8. Shop Drawing submittal status
   9. Requests for Information (RFI) status
   10. Change Order status
   11. Review of off-site fabrication and delivery schedules
   12. Corrective measures and procedures to regain approved schedule
   13. Revisions to construction schedule
   14. Job progress and schedule for succeeding work period
   15. Coordination of schedules
   16. Maintenance of quality standards
   17. Review submittal schedule; expedite as required
   18. Pending requests for information, changes and substitutions
   19. Review proposed changes for effect on construction schedule and completion date
   20. Pay application status
   21. Other business

H. Revision to Minutes:
   1. Unless minutes are challenged, in writing, prior to the next regularly scheduled Progress Meeting, they will be accepted as properly summarizing the discussions and decisions of the meeting.
   2. Persons challenging minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the set of minutes.
   3. Challenge to minutes shall be settled as priority portion of "old business" at next regularly scheduled meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION MEETING

A. Pre-construction Meeting: At the pre-construction meeting the Contractor shall be provided with a blank electronic version of the spreadsheets for: Asset Attribute Data and Pipe Deflection tables. The Contractor's Surveyor shall use these tables to input the data and shall not alter the table format or formulas.

3.02 CONSTRUCTION PROGRESS MEETINGS

A. Contractor shall provide the following, as applicable:
   1. Progressive As-Built Drawings
   2. Surveyor submittals
      a. As-Built Asset Attribute Data Table (see Specification Section 01050 "Surveying and Field Engineering" Table 01050-2)
      b. Pipe Deflection Table (see Specification Section 01050 "Surveying and Field Engineering" Table 01050-3)
      c. Gravity Main Table (see Specification Section 01050 "Surveying and Field Engineering" Table 01050-4)
      d. Boundary Surveys of fee simple and permanent easements for pump stations, treatment facilities, and constructed pipe in easements
   3. Construction Contract, As-Built Drawings, Specifications, General Conditions, Supplemental Conditions, Bid Proposal, Instruction to Bidders, Addenda, and all other Contract Documents
   4. Specifications and Addenda: Record manufacturer, trade name, catalog number and supplier of each product and item of equipment installed as well as any changes made by Field Order, Change Order or other
   5. Change orders, verbal orders, and other modifications to Contract
   6. Written instructions by the City as well as correspondence related to Requests for Information (RFIs).
   7. Accepted Shop Drawings, samples, product data, substitution and "or-equal" requests.
   8. Field test records, inspection certificates, manufacturer certificates and construction photographs.

9. As-Built Asset Attribute Data: Surveyor shall obtain field measurements of vertical and horizontal dimensions of constructed improvements. The monthly submittal shall include the Surveyor's certified statement regarding the constructed improvements being within the specified accuracies as described in Specification Section 01050 "Surveying and Field Engineering", Table 01050-1 Minimum Survey Accuracies or if not, indicating the variances.
10. Gravity Main Table: Surveyor shall prepare and update a Gravity Main Table to include as a minimum the pipe segment identification, pipe lengths, manhole inverts and tops, and slopes for gravity mains. Surveyor shall certify the data entered are correct and indicate if the minimum slopes have not been met.
11. Pipe Deflection Table: Surveyor shall input the type of pipe, pipe manufacturer, PVC manufacturer deflection allowance, allowable angle of offset and radius of curvature, laying length of pipe, and coordinates. Surveyor shall certify the data entered are correct and indicate if the deflection allowance, offset or radius of curvature exceeds the manufacturer's recommendations.

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01300
SUBMITTALS

PART 1 - GENERAL

Work completed without approved Shop Drawings and/or samples shall be considered installed at the Contractor's risk.

1.01 SHOP DRAWINGS AND DATA

A. Shop Drawings defined in the General Conditions, shall complement design and construction Drawings, and shall contain sufficient detail to clearly define all aspects of the Construction. These Drawings shall be complete and detailed.

B. Contractor and Supplier's catalog sheets, brochures, diagrams, illustrations, and other standard descriptive data shall be clearly marked with specification title and numbers to identify pertinent materials, product or models. Delete information which is not applicable to the Work by striking or cross-hatching.

C. If Shop Drawings 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. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations, the Contractor shall not be relieved of the responsibility for executing the Work in accordance with the Contract, even though such Drawings have been reviewed.

D. Data on materials and equipment shall include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, verification of conformance with applicable standards or codes, materials of construction and similar descriptive material. Materials and equipment list shall, for each item, give the name and location of the Supplier or manufacturer, trade name, catalog reference, size, finish, and all other pertinent data.

E. For all equipment furnished, the Contractor shall provide a list including the equipment name and address and telephone number of the Supplier's representative and service company so that service and/or spare parts can be readily obtained.

F. The Contractor will obtain an installation list from suppliers and equipment suppliers who propose to furnish equipment or products for submittal to City/Professional along with the required Shop Drawings. The installation list shall include at least 5 installations where identical equipment has been installed and has been in operation for a period of at least 1-year.

1.02 REVIEW OF SHOP DRAWINGS AND SAMPLES

A. The City /Professional's review of Shop Drawings, Data, and Samples as submitted by the Contractor will be to determine if the items(s) generally conform(s) to the information in the Contract Documents and is/are compatible with the design concept. The City/Professional's review and exceptions, if any, will not constitute an approval of dimensions, connections, quantities, and details of the material, equipment, device, or item shown.

B. The review of drawings and schedules will be general, and shall not be construed:
   1. As permitting any departure from the Contract Documents
   2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials
   3. As approving departures from details furnished by the City/Professional, except as otherwise provided herein

C. If the drawings or schedules as submitted describe variations and show a departure from the Contract Documents which the City/Professional finds to be in the interest of the City and to be so minor as not to involve a change in Contract Price or Contract Time, the City/Professional may return the reviewed drawings without noting an exception.

D. "Approved As Noted": Contractor shall incorporate City/Professional's comments into the submittal before release to manufacturer. The Contractor shall send a letter to the City/Professional acknowledging the comments and their incorporation into the Shop Drawing.

E. "Amend and Resubmit": Contractor shall resubmit the Shop Drawing to the City/Professional. The resubmittal shall incorporate the City/Professional's comments highlighted on the Shop Drawing.

F. "Rejected": Contractor shall correct, revise and resubmit Shop Drawing for review by City/Professional.

G. Resubmittals will be handled in the same manner as first submittals. For resubmittals the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by City/Professional on previous submissions. The Contractor shall make any corrections required by the City/Professional.

H. If the Contractor considers any correction indicated on the Drawings to constitute a change to the Drawings or Specifications, the Contractor shall give written notice thereof to the City/Professional.

I. When the Shop Drawings have been completed to the satisfaction of the City/Professional, the Contractor shall carry out the Construction in accordance therewith and shall make no further changes therein except upon written instructions from the City/Professional.

J. No partial submittals will be reviewed. Submittals not deemed complete will be stamped "Rejected" and returned to the Contractor for resubmittal. Unless otherwise specifically permitted by the City/Professional, make all submittals in groups containing all associated items for:
   1. Systems
   2. Processes
   3. As indicated in specific Specifications Sections
      All drawings, schematics, manufacturer's product data, certifications, and other Shop Drawing submittals required by a system specification shall be submitted at one time as a package to facilitate interfaces checking.

K. Only the City/Professional shall utilize the color "red" in marking Shop Drawing submittals.

L. Failure to comply with any of the above may result in the rejection of Shop Drawings.

1.03 PRODUCT DATA

A. Submit not less than 6-copies, unless approved by the City/Professional. Mark each copy to identify applicable products, models, options and other data. Supplement manufacturers' standard data to provide information unique to the Work.

1.04 MANUFACTURERS' INSTRUCTIONS

A. When required in an individual Specification Section, submit manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting and finishing, in quantities specified for product data.

1.05 SAMPLES

A. Submit full range of manufacturers' standard colors, textures and patterns for the City's selection. Submit samples for selection of finishes within 30-days after Award of Contract. All color and finish selections must be submitted by the Contractor in a single submission, properly labeled and identified.

B. Submit samples to illustrate functional characteristics of the product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.

C. Submit the number of samples specified in the respective Specification section, but no less than two (2). After review one (1) will be retained by the City. Reviewed samples that may be used in the Work are indicated in the Specification Section.

D. Samples shall be delivered to the City as directed. The Contractor shall prepay shipping charges on samples. Materials or equipment for which samples are required shall not be used in the Work until approved by the City/Professional.

E. Samples shall be of sufficient size to clearly illustrate:
   1. Functional characteristics of the product, with integrally related parts and attachment devices
   2. Full range of color, texture and pattern
   3. Each sample shall have a label indicating:
      a. Name of Project
      b. Name of Contractor and Subcontractor
      c. Material or equipment represented
      d. Place of origin
      e. Name of product and brand (if any)
      f. Location in Project
      g. Specification title and number
      h. Submittal number
      i. Note: Samples of finished materials shall have additional marking that will identify them under the finished schedules.

F. The Contractor shall prepare a transmittal letter, in triplicate (3) for each shipment of samples containing the information required in paragraph herein. The Contractor shall enclose a copy of this letter with the shipment and send a copy of this letter to the City/Professional. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.

G. Approved samples not destroyed in testing shall be sent to the City or stored at the site of the Work. Approved samples of the hardware in good condition may be incorporated in the Work if requested in writing by the Contractor and approved in writing by the City/Professional. Samples that failed testing or were not approved will be returned to the Contractor at the Contractor's expense, if so requested at time of submission.

1.06 FIELD SAMPLES

A. Provide field samples of finishes as required by individual Specifications sections. Install the sample completely and finished. Acceptable samples in place may be retained in completed Work.

1.07 DRAWINGS, PRODUCT DATA AND CERTIFICATES

A. Each letter of transmittal shall identify each and every item transmitted by title, drawing number, revision number and date.

B. The City generally will not check dimensions, quantities or schedules, except in cases where the information is lacking in the Specifications.

C. The following is applicable to submitted drawings, data and certificates:
   1. Show relation to adjacent structures or materials.
   2. Clearly identify field dimensions.
   3. Show required dimensions and clearances.
   4. Performance characteristic and capabilities shall accompany original Shop Drawing submittals.
   5. Wiring diagrams and controls shall accompany original Shop Drawing submittals.
   6. Installation instructions shall accompany original Shop Drawing submittals.
   7. Each submittal shall identify applicable Standards, such as ASTM number or Federal Specification number.
   8. All information not pertinent shall be removed from the submittal, or shall be crossed out.

D. When resubmission is required, the City/Professional will return only two (2) marked up copies. A third submission from the same manufacturer will not be accepted.

1.08 SUBSTITUTIONS

A. The substitution requirements of this Section are in addition to the requirements of the General Conditions and Supplementary Conditions.

B. When a particular product is specified or called for, it is intended and shall be understood that the proposal tendered by the Bidder includes those products in his Bid. Substitutions will only be considered in cases where original materials are unavailable or in an instance where substitute can be proven superior in its planned application

C. The intent of these specifications is to provide the City with a quality facility without discouraging competitive bidding. For products specified only by reference standards, performance and descriptive methods, without naming manufacturer's products, the Contractor may provide the products of any manufacturer complying with the Contract Documents, subject to the review of product data by the City/Professional as specified herein.

D. The City/Professional's approval is required for substitutions.

E. The Contract is based on the materials, equipment and methods described in the Contract Documents.

F. The City/Professional will consider proposals for substitution of materials equipment and methods only when such proposals are accompanied by full and complete technical data and all other information required by the City/Professional to evaluate the proposed substitution.

G. Do not substitute materials, equipment or methods unless such substitution has been specifically approved for this Work by the City/Professional in writing. The Contractor must provide a submittal per this Section specifically requesting approval of the substitution. Failure to specifically identify the requested substitution may invalidate approval of a submittal.

1.09 AVAILABILITY OF SPECIFIED ITEMS

A. Verify prior to bidding that all specified items will be available in time for installation during Construction for orderly and timely progress of the Work.

B. If specified items will not be available, notify the City/Professional prior to receipt of proposals.

1.10 OPERATING MANUALS

A. Submit all manuals in accordance with requirements of Divisions 2 through 16 of the Contract Specifications and Section 01700 "Project Closeout."

1.11 WARRANTIES, GUARANTEES AND BONDS

A. Provide as required by Technical Sections of the Specifications and Sections 01700 "Project Closeout" and Section 01740 "Warranties and Bonds."

1.12 CADD FILES

A. The Professional's CADD files will be available on a limited basis to qualified firms at the City’s prerogative. The procedure for requesting such files is noted elsewhere in these documents and there is a cost associated with handling and reproduction. Recipients are cautioned that these files may not accurately show actual conditions as constructed. Users are responsible to verify actual field conditions.

B. The Professional’s Drawings are to be used only for background information. If the Professional’s Drawings are just reproduced and resubmitted (e.g. for ductwork drawings) they will be rejected.

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

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

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

1.13 PROGRESS PHOTOGRAPHS

A. Photographs and digital pictures shall be in color. Provide 1 copy of each digital picture on each of three (3) CDs and provide 1 print of each photograph in two (2) separate albums.

B. Photographs shall be from locations to illustrate the condition of Construction and state of progress adequately.

C. Provide up to 12 digital photographs of views randomly selected by the City, taken prior to any construction and prior to each scheduled Application for Payment.

D. Deliver electronic images, prints, and negatives to the City.

E. Each print shall be single weight paper with glossy finish and the overall dimension shall be 7-1/2-inch x 10-inches (19.05 x 25.4 cm). The print shall be clear, sharp and free of distortion after the enlargement from the negative.

F. Provide loose-leaf albums for each set of photographs to hold prints with a maximum of 50-leaves per binder.

G. Each print shall be protected by flexible, transparent acetate or plastic sheet protector leaves with metal reinforced holes. Two (2) extra leaves shall be provided in each binder.

H. Capture and provide digital, ortho-rectified, true-color, aerial photographs of the complete project site prior to start of Construction and at final completion. A final 6-inch or less ground pixel resolution is required. If using traditional photography, the photos will need to be captured at an appropriate scale and scanned at a high enough dpi to yield a final ground pixel size of 6-inches or less. If captured digitally, a final 6-inches or less ground sample distance is required. The final orthorectified photos shall use a projection of NAD 27, State Plane West and all vertical reference shall be NAVD 88, US feet. All orthophoto mosaics shall meet a final accuracy of plus or minus 5-feet.

I. Provide a total of four (4) true-color, color balanced orthophoto mosaic prints. Three (3) prints each of the pre and post construction (final completion) orthophoto mosaics, for a total of six (6). Each orthophoto mosaic print shall be on double-weight paper with glossy finish and shall have overall dimensions of 36-inches x 58-inches. Two (2) copies of each of the digital orthophoto mosaics shall be supplied in Geotiff format on disk for each time period (pre and post construction). The final color balanced, true-color orthophoto mosaics will be projected in NAD 27, State Plane West and all vertical reference shall be NAVD 88, US feet and shall meet a final accuracy of plus or minus 5- feet.

J. The Contractor shall provide before and after photographs of each portion of the site. The below ground facilities shall include all equipment, walls, floor, piping, supports and entrance. At major locations, photographs shall include before, during, and after prints and all prints shall be placed in binders in ascending date order to show the Work as it progresses.

K. Descriptive Information:
   1. Each photograph shall have a permanent title block on the back and shall contain the typed information and arrangement as follows:
      a. CITY, FLORIDA
      b. (ENTER PROJECT NAME)
      c. BID No. (Enter Bid Number)
      d. CONTRACTOR: (Name of Contractor)
      e. DATE: (When photo was taken)
      f. PHOTO NO.: (Consecutive Numbers)
      g. PHOTO BY: (Firm Name of Photographer)
      h. LOCATION: (Description of Location and View)
   2. The Contractor shall provide the Professional with a written description of each photograph. This description shall be included in the binders and a copy shall be submitted with the CDs.

1.14 PROJECT RECORD DOCUMENTS

Project Record Documents shall be submitted in accordance with Section 01720 "Project Record Documents" of these specifications.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SUBMITTAL PROCEDURES

A. Article 9 of the General Conditions contains additional provisions regarding submittals.

B. Preliminary Shop Drawing Data: Within 20-days after the Award of the Contract or before the Pre-Construction Meeting, the Contractor shall submit to the City/Professional a complete listing of manufacturers for all items for which Shop Drawings are to be submitted.

C. Shop Drawing Submittal Schedule: Within 30-days after the Notice to Proceed, the Contractor shall submit to the City/Professional a complete schedule of Shop Drawings submittals with the respective dates for submission, the beginning of manufacture, testing and installation of materials, supplies and equipment, noting those submittals critical to the progress schedule.

D. Submittal Log: An accurate updated log of submittals will be maintained by the Contractor and subject to review by the City/Professional at each scheduled progress meeting.

E. If the Contractor considers any correction indicated on the Drawings to constitute a change to the Contract Drawings or specifications, the Contractor shall give written notice thereof to the City/Professional. This does not constitute a change order until accepted by the City.

F. Shop Drawing and submittal data shall be reviewed by the City/Professional for each original submittal and first resubmittal; thereafter review time for subsequent resubmittals shall be charged to the Contractor. The Contractor shall reimburse the City for services rendered by the City/Professional at the rate multiplied by the City's Professional multiplier based on the fee schedule provided to the City for this Project. If a City engineer is performing any portion of the review, this fee is based upon the hourly rate of the engineer times the City's multiplier for overhead, benefits, and expenses. The Contractor agrees that the City shall deduct such charges from the Contract Amount by a deductive Change Order.

G. Contractor Shop Drawing and Sample submittals shall include 5 copies in addition to any other copies that the Contractor wants returned. The City will retain 5 copies of approved submittals.

H. Identify Project, Project Number, date, dates of previous submittals, Contractor, Sub-Contractors, suppliers with their addresses, pertinent Drawings by sheet and detail number, and Specification Section number, as appropriate. Identify all deviations from the Contract Documents. Provide space for Contractor and Professional review stamps.

I. Contractor's delivery of Shop Drawings for review shall follow a reasonable sequence, as is necessary to support the dates on the Progress Schedule and avoid an overload of Shop Drawings awaiting review at any one time. Coordinate submittal of related items.

J. Submit Shop Drawings per the schedule of Shop Drawing submittals, inserted in 1 loose-leaf binder, with tabs and index to the City/Professional. All individual submittal sheets inserted in said binder must be clearly marked and referenced to proper paragraph and subparagraph of specifications. Cross out any items on sheets which constitute information not pertaining to equipment specified. Clearly mark all components that are provided as "optional" by manufacturer. Shop Drawings shall be approved by the Contractor prior to submittal to the City/Professional. Shop Drawings will be reviewed by the City/Professional. After City/Professional approval, reproduce and distribute in accordance with requirements herein.

K. All submissions of Shop Drawings, brochures and catalog cuts shall be accompanied by a transmittal letter listing the Drawings submitted by number and title.

L. When engineering calculations and/or professional certification of performance criteria of materials, systems, and/or equipment are required, the City is entitled to rely upon the accuracy and completeness of such calculations and certifications submitted by the Contractor. Calculations, when required, shall be submitted in a neat, clear and in an easy-to-follow format. Such calculations and/or certifications shall be signed and sealed by a Professional Engineer registered in the State of Florida.

M. Distribute copies of reviewed submittals to concerned parties. Instruct recipients to promptly report any inability to comply with provisions.

N. Prior to submission of Shop Drawings and samples, the Contractor shall stamp and sign the submittals. Any submission which, upon examination by the City, shows evidence of not having been thoroughly checked, or is not in compliance with the provisions of this Section will be returned to the Contractor for completion before it will be considered for review.

O. Notify the City of the need for making any changes in the arrangement of piping, connections, wiring, manner of installation, etc., which may be required by the material or equipment Contactor proposes to supply.

P. On resubmittals, direct specific attention in writing or on the revised Drawings or sample to revisions other than the corrections required by City on previous submissions.

Q. All drawings, schematics, manufacturer’s product data, certifications and other drawing submittals required for a system specification shall be submitted at one time as a package to facilitate interface checking.

R. The City will distribute Shop Drawings as follows for the indicated action taken:

SHOP DRAWING SUBMITTAL DISTRIBUTION

Representative Party	No Exception Taken or Make Correction Noted			Rejected or Revise & Resubmit		
	Submittal Transmittal	Shop Drawing	Review Comment Sheet	Submittal Transmittal	Shop Drawing	Review Comment Sheet
Engineer	2 Copies	File Copy	1 Copy	Original	File Copy	1 Copy
Contractor (see Note 1)	2 Copies	1 Copy Each Submittal	1 Copy	1 Copy	All Copies Except Engineers	1 Copy
City	1 Copy	1 Copy Each Submittal	1 Copy	1 Copy	None	1 Copy
Inspector	2 Copies	1 Copy Each Submittal	1 Copy	1 Copy	None	1 Copy
Project Record Data (see Note 2)	1 Copy	1 Copy Each Submittal	1 Copy	1 Copy	None	1 Copy

NOTES:
1. Contractor shall distribute additional copies to Subcontractors as required.
2. Stored by Contractor to be furnished to City upon closeout.

S. All Shop Drawings shall be accompanied with a transmittal letter providing the following information:
   1. Project Title and Contract Number
   2. Date
   3. Contractor's name and address
   4. The number of each Shop Drawing, project data, and sample required
   5. Notification of Deviations from Contract Documents
   6. Submittal Log Number conforming to specification section numbers
      a. Submit each specification section separately.
      b. Identify each Shop Drawing item required under respective specification section.
      c. Identify resubmittal using specification section followed by A (first resubmittal), B (second resubmittal) …etc.

3.02 CONTRACTOR'S REVIEW

A. Contractor's Responsibility for Coordination: Where the dimension, size, shape, location, capacity or other characteristic affects another item, and where the Contractor selects, fabricates or installs related or adjacent products to be used, the Contractor shall be responsible for coordination of related items. The Contractor shall insure that a proper exchange of information takes place prior to or during preparation of each submittal and that submittals reflect such coordination. The notation "verify" or "coordinate" on the Drawings indicates the necessity for Contractor coordination in the particular instances used.

B. Contractor's Checking: When checking submittals from Subcontractors and suppliers, the Contractor shall mark all sets, indicating his corrections and comments in blue or green. Copies marked in red may be returned for revision.

C. The Contractor is responsible to deliver and pick-up all submittals in a timely manner at the City/Professional's designated office. The Contractor is responsible for all related costs and expenses for the transmittal of such submittals.

3.03 CITY'S / PROFESSIONAL'S REVIEW

A. Corrections or comments made on Shop Drawings during review do not relieve the Contractor from compliance with the requirements of Drawings and Specifications. This check is only for review of general conformance with the design concept of this Project and general compliance with information given in Contract Documents. Any substitutions or changes shall be properly noted.

B. No action will be taken on "rough-in" Shop Drawings for plumbing and electrical connections when the items of equipment are not included in the same submittal.

C. Review Time:
   1. On a normal basis, each submittal will be returned to the Contractor within 15 working days of the date it is received. Some submittals may require additional time.
   2. If, for any reason, the above schedule cannot be met, the Contractor will be so informed within a reasonable period and the Schedule of Submittals revised. If the specific submittal affects the critical path, the Contractor shall immediately notify the City/Professional in writing. In the event of separate submittals of individual components of a system, these submittals may be held until all components of the system are submitted, and the Contractor will be so notified.

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01301
PRODUCT SUBSTITUTIONS

PART 1 - GENERAL

1.01 SUMMARY

A. General
   1. Base all bids on materials and equipment specified in the Appendix D City Utilities List of Approved Products.
   2. Certain types of equipment and kinds of material are described in specifications by means of references to names of manufacturers and vendors, trade names, or catalog numbers.
      a. When this method of specifying is used, it is not intended to exclude from consideration other products bearing other manufacturer's or vendor's names, trade names, or catalog numbers, provided said products are "or-equals," as determined by City/Professional.
   3. Other types of equipment and kinds of material may be acceptable substitutions under the following conditions:
      a. Or-equals are unavailable due to strike, discontinued production of products meeting specified requirements, or other factors beyond control of Contractor; or,
      b. Contractor proposes a cost and/or time reduction incentive to the Owner.

1.02 QUALITY ASSURANCE

A. In making request for substitution or in using an approved product, Contractor:
   1. Has investigated proposed product and has determined that it is adequate or superior in all respects to that specified, and that it will perform the function for which it is intended.
   2. Will provide same guarantee for substitute item as for product specified.
   3. Waives all claims for additional costs related to substitution which subsequently arise.

1.03 DEFINITIONS

A. Product: Manufactured material or equipment.

1.04 PROCEDURE FOR REQUESTING SUBSTITUTION

A. Substitution shall be considered only:
   1. After award of Contract
   2. Under the conditions stated herein

B. Written request through Contractor only.

C. Transmittal Mechanics
   1. Follow the transmittal mechanics prescribed for Shop Drawings in Specification Section 01300 "Submittals."
      a. Product substitution will include in the transmittal letter, either directly or as a clearly marked attachment, the items listed in Paragraph D below.

D. Transmittal Contents
   1. Product identification:
      a. Manufacturer's name
      b. Telephone number and representative contact name
      c. Specification Section or Drawing reference of originally specified product, including discrete name or tag number assigned to original product in the Contract Documents.
   2. Manufacturer's literature clearly marked to show compliance of proposed product with Contract Documents.
   3. Itemized comparison of original and proposed product addressing product characteristics including but not necessarily limited to:
      a. Size
      b. Composition or materials of construction
      c. Weight
      d. Electrical or mechanical requirements
   4. Product experience
      a. Location of past projects utilizing product.
      b. Name and telephone number of persons associated with referenced projects knowledgeable concerning proposed product.
      c. Available field data and reports associated with proposed product.
   5. Data relating to changes in construction schedule.
   6. Data relating to changes in cost.
   7. Samples
      a. At request of City/Professional.
      b. Full size if requested by City/Professional.
      c. Held until substantial completion.
      d. City/Professional is not responsible for loss or damage to samples.

1.05 APPROVAL OR REJECTION

A. Written approval or rejection of substitution to be given by the Engineer.

B. Engineer reserves the right to require proposed product to comply with color and pattern of specified product if necessary to secure design intent.

C. In the event the substitution is approved, the resulting cost and/or time reduction will be documented by Change Order in accordance with the General Conditions.

D. Substitution will be rejected if:
   1. Submittal is not through the Contractor with his stamp of approval.
   2. Request is not made in accordance with this Specification Section.

3. In the City/Professional's opinion, acceptance will require substantial revision of the original design.
4. In the City/Professional's opinion, substitution will not perform adequately the function consistent with the design intent.

E. Contractor shall reimburse the City for the cost of the evaluation whether or not substitution is approved.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01310
PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 REQUIREMENT

A. The Contractor will submit precedence method cost loaded Critical Path Method (CPM) Progress Schedules to the City depicting the approach to prosecution and completion of the Work. This requirement includes but is not limited to the Contractor's approach to Activity cost loading, recovering schedule and managing the effect of changes, substitutions and Delays on Work sequencing.

B. The Progress Schedule shall show how the Contractor's priorities and sequencing for the Work (or Work remaining) conform to the Contract requirements and the sequences of Work indicated in or required by the Contract Documents; reflect how the Contractor anticipates foreseeable events, site conditions and all other general, local and prevailing conditions that may affect cost, progress, schedule, furnishing and performance of the Work; and show how the Contractor's Means and Methods translate into Activities and logic.

C. The Progress Schedule will consist of the Initial Submittal, Payment Submittals and Revision Submittals. Upon acceptance by the City, the Initial submittal will become the As-Planned Schedule for the Work. Revision submittals upon acceptance will become the As-Planned Schedule for the Work remaining to be completed as of the submittal date for that Revision.

D. References to the Critical Path Method (CPM) are to CPM construction industry standards that are consistent with the requirements of this Section.

1.02 GLOSSARY OF TERMS

A. The following terms, whether already defined elsewhere in the Contract Documents, have the following intent and meanings within this Section:
   1. Activity Value (Value): That portion of the Contract Price representing an appropriate level of payment for the part of the Work designated by the Activity.
   2. As-Planned Schedule: The first, complete Initial Progress Schedule submitted by the Contractor with the intent to depict the entire Work as awarded and accepted by the City or returned as no resubmittal required.
   3. Contract Float: Days between the Contractors anticipated date for completion of the Work, or of a specified portion of the Work, if any, and the corresponding Contract Time.

4. CPM Schedule: The Progress Schedule based on the Critical Path Method (CPM) of scheduling. The term Critical Path means any continuous sequence of Activities in the Progress Schedule controlling, because of their sum duration, the Early Date of a pertinent, specified Contract Time.
5. Early/Late Dates: Early/late times of performance, based on CPM calculations, for an Activity in the Progress Schedule. Early Dates will be based on proceeding with all or part of the Work on the date when the corresponding Contract Time commences to run. Late Dates will be based on completing all or part of the Work on the corresponding Contract Time, even if the Contractor plans early completion.
6. Milestones: Key, pre-determined points of progress in the completion of a facility, denoting interim targets in support of the Contract Times. Milestones may pinpoint targets for key excavation and substructure events, significant deliveries, critical path transition from superstructure to piping and electrical rough in and building enclosure. Also, hook-up of mechanical and electrical equipment, availability of power for testing, equipment shakedown, training of City personnel, start□-up, Substantial Completion and other events of like import.
7. Official Schedule: The Initial or most recent Revision Submittal accepted by the City or returned as no resubmittal required and the basis for Payment Submittals until another Revision Submittal is submitted and accepted. The accepted Initial Submittal is also the As-Planned Schedule.
8. Payment Submittal: A monthly Progress Schedule update reflecting progress and minor adjustments on the Activities, sequencing and restraints for Work remaining.
9. Total Float: Days by which an activity may slip from its Early Dates without necessarily extending a pertinent Contract Time. Total Float at least equals Contract Float. Total Float may also be calculated and reported in working Days. When an activity is delayed beyond Early Dates by its Total Float it becomes a Critical Path activity and if delayed further will impact a Contract Time.

1.03 QUALITY ASSURANCE

A. The Contractor may self-perform the Work covered by this Section or employ a Subcontractor, subject to the City's consent. Employment of a scheduling Subcontractor shall not in any way alter or reduce the Contractor's obligations under the Contract Documents.

B. The Contractor will obtain a written interpretation from the City, if the Contractor believes that the selection of activities, logic ties and/or restraints requires a written interpretation of the Contract Documents. With each submission, the Contractor will point out by specific, written notation, any Progress Schedule feature that may reflect variations from any requirements of the Contract Documents.

C. It is the Contractor's responsibility to obtain information directly from each Subcontractor and Supplier when scoping their respective Activities, Values, logic ties and restraints.

D. Neither Acceptance nor Review of any Progress Schedule will relieve the Contractor from the obligation to comply with the Contract Times and any sequence of Work indicated in or required by the Contract Documents and to complete, within the Contract Times, any Work omitted from that Progress Schedule.

E. Neither Acceptance nor Review of any Progress Schedule will imply approval of any interpretation of or variation from the Contract Documents, unless expressly approved by the City through a written interpretation or by a separate, written notation on the returned Progress Schedule Submittal.

1.04 MILESTONES AND SCHEDULE RECOVERY

A. The City will select Milestones and Milestone Dates on the basis of the As-Planned Schedule. As the Official Schedule is revised, Milestone Dates will be revised accordingly. Milestone Dates will serve as target dates.

B. Whenever any Activity slips by 14 or more Days from the Late Date for an activity in the Official Schedule, Milestone Dates selected by the City, or a pertinent Contract Time, the Contractor will deliver a Revision Submittal documenting the Contractor's schedule recovery plan and/or a properly supported request for an extension in the Contract Time. The narrative will identify the Delay and actions taken by the Contractor to recover schedule, whether by adding labor, Subcontractors or construction equipment, activity re-sequencing, expediting of submittals and/or deliveries, overtime or shift Work, and so forth. Activity shortening and overlapping shall be explained as to their basis (and be supported by increases in resources).

C. Upon evaluation of that Revision Submittal, if the City determines there is sufficient cause, the City may withhold liquidated damages or provide a notice of intent to do so, if schedule is indeed not recovered, and/or may give a notice of default.

1.05 PROGRESS SCHEDULE SOFTWARE

A. The scheduling software employed by the Contractor to process the Progress Schedule will be the current version of Primavera P6.0®, or Primavera® Contractor 5.0 CPM scheduling software.

B. If the Contractor intends to use companion schedule reporting, analysis or graphics software tools, the Contractor will furnish to the City descriptive materials and samples describing such software tools.

1.06 NON-PERFORMANCE

A. The City may refuse to recommend all or any part of any payment, if the Contractor fails, refuses or neglects to provide the required Progress Schedule information on a timely basis. Partial payments without a properly updated Progress Schedule shall be returned to the Contractor as non-conforming.

B. If justified under the circumstances, the City also may prepare alternate Progress Schedules, as appropriate, and deduct from the Contract Amount all related costs by Change Order and/or take other action commensurate with the breach.

1.07 REPORTS, SCHEDULES AND PLOTS

A. Schedule Reports will include Activity (ID) code and description, duration, calendar, Early Dates, Late Dates and Total Float. Separate Schedule Reports will tabulate, for each Activity, all preceding and succeeding logic types and lead times, whether CPM Plots displaying logic ties are appended or not.

B. CPM Schedule Plots will be plotted on a suitable time scale and identify the Contract Times, Critical Paths, phases and work areas on 24-inch x 36-inch or smaller sheets. Activities will be shown on the Early Dates with Total Floats noted by Late Date flags. For Payment and Revision Submittals plot a target comparison based on the current Official Schedule.

C. The Activity Value report will tabulate Activity code and description and Activity Value, percent complete and earned value as calculated by the scheduling software. Cash flow plots shall be provided showing the monthly and cumulative actual and planned earned values with curves shown for Early and Late Dates in the schedules. For Payment and Revision Schedule submittals, the cash flow curves shall also plot the most current Official Schedule planned earnings curves.

D. Each submittal shall include listings of all added and deleted activities, logic, constraints, Activity Value changes and update information vs. the previous Progress Schedule submittal. This list may be manually prepared or generated by accessory software that will generate such listings.

1.08 NARRATIVE REQUIREMENTS

A. The Initial Submittal narrative will describe the Contractor’s approach to prosecution of the Work and the basis for determination of activity durations, sequence and logic, including the Contractor's management of the site, e.g., lay down, staging, parking, etc.; Contractor’s phasing of the Work; use of crewing and construction equipment; identification of non-work City/Professional’s, shifts, weekend Work and multiple calendars applied to activities and an explanation of the basis for restraint dates.

B. Revision and Payment Submittal narratives will explain any changes to the approach or planning referred to in Paragraph A above on account of any change, delay, schedule recovery, substitution and/or Contractor-initiated revision occurring since the previous submittal.

C. Each narrative will list the Critical Path Activities and compare Early and Late Dates against Contract Times and Milestone Dates. Narratives shall also recap progress and Days gained or lost vs. the current Official Schedule, and identify delays, their extent and causes.

D. The Initial Submittal narrative will describe all delays occurring since Contract Award and all pending and anticipated "or equal" and substitution proposals. Payment and Revision Submittal narratives will describe any new delays and shall certify that the Contractor has not been delayed, as of the cut off date, by any acts or omissions of the City, except as otherwise specifically stated.

1.09 ACTIVITY REQUIREMENTS

A. Separate activities will identify permits, design when included in the Work, construction, Submittal preparation and review (and resubmission and re-review), deliveries (site or storage), testing, start-up, commissioning and Punch List.

B. Activities will be detailed to the extent required to show the transition of trade Work. Activities will delineate the progression of the Work.

C. Activities will not combine separate or non-concurrent items of Unit Price or lump sum Work.

D. Activity durations will equal the Work Days required to sufficiently complete the Work designated by the Activity, (i.e., when finish-to-start successors could start, even if the Activity is not quite 100% complete). Installation Activities will last from 10 to 40 workdays. Submittal review activity durations shall conform to specified timeframes.

E. Activities will be assigned consistent descriptions and identification codes. Sort codes will group Activities by meaningful schemes.

F. Activities will be assigned Activity Values as appropriate and needed to reasonably allocate the Contract Amount to the time periods that they will be earned and eligible for payment based on the Progress Schedule and Schedule of Values. Separate pay activities may be used to simplify cost loading of the Progress Schedule. When used, pay activities shall be loaded with the cost of Work that is included, at no cost, in related (generally, concurrent) CPM activities. Pay activities shall not control the rate of progress; however, their start and finish dates shall be consistent with those of their related CPM activities to ensure accurate Early Date and Late Date cash-flow plots.

1.10 FLOAT TOLERANCES AND FLOAT OWNERSHIP

A. Any Progress Schedule with Early Dates after a Contract Time will yield negative Total and Contract Floats, whether shown/calculated or not. Any Revision Submittal with less than negative 20-days of Float will be returned as "Revise and Resubmit," unless a time extension is requested or the City assesses liquidated damages or gives notice of intent to do so, in the event schedule is not recovered.

B. Float calculated from the definitions given in this Section supersede any conflicting Float values in any early completion Progress Schedule.

C. Neither the City nor the Contractor own the Float time, the Project owns the Float time. Neither the City nor the Contractor use of positive Total Float will impact a Contract Completion Date or justify an extension of Contract Time.

1.11 SUBMITTALS

A. Each Progress Schedule Submittal will consist of a narrative, 5 copies of the required reports and plots and an optical ROM data disk with the Contractor's corresponding schedule and schedule layout files in Primavera ".XER" format.

B. The City will review Progress Schedule Submittals and return a review copy within 14-days after receipt and the Contractor shall, if required, resubmit within 7-days after return of the review copy.

C. Requirements for the Initial Submittal:
   1. Within 20-days after receipt of Notice to Proceed and prior to commencing Work on the Project, prepare and submit to the City the Initial Submittal of the Progress Schedule for the Work. The Initial Submittal will show the Work as awarded, without delays, Change Orders or substitutions.
      a. Activity Values will prorate Schedule of Values costs and/or pay items through to Activities. Provide a cross-reference listing with two parts; a part that will list each activity with the respective amounts allocated from each Schedule of Values and Unit Price Item making up the total value of each activity and a second part that will list the Schedule of Values and Unit Price Items with the respective amounts allocated from each activity that make up the total value of each item.
   2. After the As-Planned Schedule is established, the City will select Milestones and record the Milestone Early and Late Dates. As the Official Schedule evolves, Milestone Dates will be revised accordingly.
   3. If the City refuses to endorse the Initial Submittal (or a resubmission) as "Resubmittal Not Required," the As-Planned Schedule will not be established. In that event, the Contractor will continue to submit Payment and Revision Submittals reflecting progress and the Contractor's approach to remaining Work. The City will rely on the available Payment and Revision Submittals, subject to whatever adjustments it determines appropriate.

D. Requirements for Payment Submittals:
   1. Payment Submittals with progress up to the closing date and updated Early Dates and Late Dates for progress and remaining Activities will be due with each Progress Payment. As-built data will consist of actual dates, percent complete, earned payment, changes, Delays and other significant events occurring before the closing date.
   2. Activity percent complete and earned value should indicate a level of completion that corresponds to the Application for Progress Payment for the same period. The earned value should be calculated by the scheduling software as Activity Value times percent complete. Explanation should be provided whenever the cumulative earned value of activities in a Payment Submittal is not within 10% of the value of Work completed as represented in the corresponding Application for Progress for Payment.

3. At the Contractor's option, a Payment Submittal may overlay minor adjustments on activities and sequencing for Work remaining. This excludes Activity re-scoping to reflect Delays, changes, schedule recovery or substitutions.

E. Requirements for Revision Submittals:
   1. Revision Submittals will be submitted when necessary because of major changes or delays affecting activities, sequencing or restraints for Work remaining and/or to put forth a schedule recovery plan. Revision Submittals may also be required because of Contractor-initiated re-planning, or when Contractor plans to perform Work ahead or out-of-sequence that will require additional testing or inspection personnel, or when requested by the City when Work is performed out-of-sequence from the current Official Schedule such that the number of Days gained or lost can not be determined or the scheduled dates of completion of the Work in a Payment Submittal are not viewed as reliable.
   2. If requesting a time extension, the Revision Submittal should show the impact of the delay after incorporating reasonable mitigation to minimize the impact and illustrate how the number of Days requested time extension was determined. The delay should be determined as the change in the forecast Contract Completion Date(s) resulting solely from delays that entitle the Contractor to a time extension as provided in the General Conditions. Any and all Contractor slippage and delay occurring prior to and concurrent with the delay potentially entitling the Contractor to a time extension shall be incorporated in the Revision and explained such that the concurrent and non-concurrent periods of delay are indicated. If the Contractor does not follow the procedures contained in this Section or, if the Contractor's analysis is not verifiable by an independent, objective evaluation by the City using the electronic files and data furnished by the Contractor, any such extension in Contract Time will not be granted.

F. Retrospective Delay Analysis.
   1. If the City/Professional refuses to endorse any Revision Submittal as "Resubmittal Not Required," the Contractor and City will use the latest Official Schedule when evaluating the effect of Delays on Contract Time and/or Contract Price. The procedure to be used will consist of progressively updating the latest Official Schedule at key closing dates corresponding to starting and finishing dates of the delays and/or dates the delays became critical or dates the Critical Path may have changed for other reasons. For each Progress Schedule iteration, slippage between actual Milestone Dates and Initial Milestone Dates will be correlated to Delays occurring solely in that iteration.
   2. For each iteration, revisions in Activities, logic ties and restraints affecting Work after the closing date will be included in that Progress Schedule only if they meet any of the following conditions. First, they are Progress Schedule revisions that the City consented to contemporaneously (i.e., before the closing date) in writing. Second, they reflect comments or objections raised by or on behalf of the City and that were actually confirmed by the as-built progress. Lastly, they represent Contractor's schedule recovery plans or other Progress Schedule revisions that were actually confirmed by the as-built progress.

DRAFT DOCUMENT FOR COMMISSION REVIEW

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01370
SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DEFINITION

A. Schedule of Values: Schedule that divides the Contract Amount into pay items, such that the sum of all pay items equals the Contract Amount for the Work, or for any portion of the Work having a separate specified Contract Amount.

1.02 REQUIREMENT

A. The Schedule of Values established as provided in the General Conditions will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the City. Progress payments on account of Unit Price Work will be based on the number of units completed and shall be prorated by the percent complete on the number of units installed not meeting all requirements of the Contract including testing.

B. No payment will be made for Work performed on a lump sum contract or a lump sum item until the appropriate Schedule of Values is approved by the City.

C. The equitable value of Work deleted from a lump sum contract or lump sum item shall be determined from the approved Schedule of Values.

1.03 SUBMITTALS

A. Submit 3 copies of a Preliminary Schedule of Values within 15-days after the recommended award of the Contract.

B. Submit 3 copies of a proposed final Schedule of Values within 20-days after receipt of Notice to Proceed as per the General Conditions.

C. Submit the Schedule of Values, typed, on EJCDC 1910-8-E form or City forms or spreadsheets provided by City. The Contractor's standard form or electronic media printout will be considered for acceptability by the City.

D. List installed value of each major item of Work and each subcontracted item of Work as a separate line item to serve as a basis for computing values for Progress Payments. Round off values to nearest dollar.

E. Coordinate listings with the Progress Schedule.

F. For items on which payments will be requested for stored materials or equipment, list sub-values for cost of stored products with taxes paid and provide corresponding schedule of value item number. Stored materials quantities shall not exceed installed quantities on bid tab or as required by the Contract Documents.

G. Submit a sub-schedule for each separate stage of Work specified in Section 01010 "Summary of Work."

H. The sum of values listed shall equal the total Contract Amount for the Work or the Contract Amount for a part of the Work with a separate Contract Amount provided for by the Contract Documents.

I. When the City requires substantiating information, submit data justifying line item amounts in question.

1.04 UNIT PRICE CONTRACTS

A. For unit price contracts, the bid item prices on the Project Bid Schedule shall be used as the basis for the schedule of values. The Contractor shall resubmit the bid item prices in the format described herein, and may, at its option, or if requested by the City, divide the items in the Project Bid Schedule into sub-items to provide a more detailed basis of payment. Break principal subcontract amounts down into these items; The unit price cost for each facility shall be submitted individually and split into the schedule of values listed in items 1 through 17.
   1. Mobilization and Demobilization (10%)
   2. Insurance and Bonds (5%)
   3. Erosion and Sedimentation Control (3%)
   4. Maintenance of Traffic (15%)
   5. Roadway, Driveway, and Sod Restoration
   6. Abandon-in-place, Abandon and grout fill
   7. C900 PVC Piping (various diameters)
   8. DIPS HDPE (various diameters)
   9. Fittings (including but not limited to bends, tees, reducers, adapters, and restrained plugs)
   10. Plug and Check Valves
   11. Tapping Sleeve and Valve
   12. Air Release Valve Assemblies
   13. Precast Concrete Vaults

1.05 LUMP SUM CONTRACTS

A. For lump sum contracts, if the Work involves separate facilities, e.g. multiple pump stations, the cost of the Work shall be separated by each facility and into schedule of value items.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01380
AUDIO – VISUAL DOCUMENTATION

PART 1 - GENERAL

1.01 PURPOSE AND DESCRIPTION OF WORK

A. The purpose of the audio - visual documentation is to provide the City with regularly documented audio - visual records of the Construction process from the existing conditions through final completion.

1.02 PRE-CONSTRUCTION VIDEO REQUIREMENTS INCLUDED

A. The Contractor shall employ a professional videographer to take a Pre-Construction video of the entire site including the areas of adjacent properties within 100-feet of the limits of Work and shall be made within 30-days of Work beginning. Special attention shall be made to show the existing paved roads, shoulders, signs, and other existing features.

B. The Contractor shall submit a quality audio-video recording documenting Pre-Construction field conditions for the entire project. When the Work includes construction of water, wastewater, reuse, or other lines in the vicinity of any street or road, the Contractor shall take digital audio-video recordings of existing conditions along both sides of the street or road. The Pre-Construction video shall be submitted to the City and accepted prior to commencing any Work or using any Contractor laydown areas.

C. Electronic digital photography shall also be used as necessary to record and facilitate resolution of on-site issues through the transmission of electronic photographs by e-mail from the site to the Professional's and City's offices.

PART 2 - PRODUCTS

2.01 AUDIO-VIDEO RECORDING

A. Each audio-video recording shall be saved on appropriate DVD media viewable on standard DVD players or computer.

B. Each DVD shall contain the following information and arrangement at the beginning as a title screen:

City, Florida
PROJECT NAME
PROJECT NUMBER
CONTRACTOR: (Name of Contractor)
DATE: (When photo was taken)
VIDEO BY: (Firm Name of Videographer)
LOCATION: (Description of Location(s) and View(s))

C. Each DVD recording section shall begin with an audio description of the City's name, Contract name and number, Contractor's name, date and location information such as street name, direction of travel, viewing side, etc.

D. Information appearing on the video recording must be continuous and run simultaneously by computer generated transparent digital information. No editing or overlaying of information at a later date will be acceptable.

E. Digital information to appear in the upper left corner shall be as follows:
1. Name of Contractor
2. Day, date and time
3. Name of Project & Specification Number

F. Time must be accurate and continuously displayed on the video record

G. Written documentation must coincide with the information on the DVD so as to make easy retrieval of locations at a later date.

H. The video system shall have the capability to transfer individual frames of video electronically into hard copy prints or photographic negatives.

I. Audio shall be recorded at the same time as the video recording and shall have the same information as on the viewing screen. Special commentary shall be given for unusual conditions of buildings, sidewalks and curbing, foundations, trees and shrubbery, structures, equipment, pavement, etc.

J. All DVDs and boxes shall bear labels with the following information:
1. DVD Number
2. City's Name
3. Date of Recording
4. Project Name and Number
5. Location and Standing Limit of Video

2.02 CONSTRUCTION PHOTOGRAPHS

A. The Contractor shall employ a competent photographer to take construction record photographs periodically during the course of the Work.

B. Prints: Date imprinted 8-inch x 10-inch-high resolution glossy single weight color print paper; 5 sets, bound in 3-ring binders to be provided to the City with each respective Application for Payment and distributed by the City as follows:
   1. City (2 sets)
   2. Engineer (1 set)
   3. Contractor (1 set)
   4. Project Record Data (1 set stored by Contractor to be furnished to City upon Closeout)

PART 3 - EXECUTION

3.01 VIDEO VIEWS REQUIRED

A. Complete coverage shall include all surface features within 100-feet of the Work area to be used by the Contractor and shall be supported by appropriate audio description made simultaneously with video coverage. Such coverage shall include, but not be limited to, all existing driveways, sidewalks, curbs, ditches, roadways, landscaping, trees, culverts, headwalls, and retaining walls, equipment, structures, pavements, manholes, vaults, handrails, etc. located within the work zone. Video coverage shall extend to the maximum height of all structures within this zone.

B. The video recorder shall take special efforts to point out and provide audio commentary on cracking, breakage, damage, and other defects in existing features.

C. All video recording shall be done during times of good visibility. No video recording shall be done during periods of visible precipitation, or when more than 10% of the ground area is covered with standing water, unless otherwise authorized by City.

D. Prior to commencement of audio-video recording, the Contractor shall notify the City in writing within 48-hours of the audio-video recording. The City may provide a designated representative to accompany and observe all video recording operations. Audio-video recording completed without a City Representative present will be unacceptable unless specifically authorized by the City.

3.02 AUDIO-VIDEO REQUIREMENTS

A. Major Locations:
   1. The Contractor shall provide color digital video of each major facility and structures and facilities adjacent to the Construction before construction starts.
   2. All videos shall be recorded with character generator operating with date, time, and location on screen. During video recording, the Contractor shall narrate video explaining what is being shown. All master videos shall be delivered to the City.

3. The audio and video portions of the recording shall maintain viewer orientation. To this end, overall establishing views of all visible house and business addresses shall be used. In areas where the proposed construction location will not be readily apparent to the video recording viewer, highly visible yellow flags shall be placed, by the Contractor, in such a fashion as to clearly indicate the proposed centerline of Construction. When conventional wheeled vehicles are used as conveyances for the recording system, the vertical distance between the camera lens and the ground shall not exceed 10-feet. The camera shall be firmly mounted such that transport of the camera during the recording process will not cause an unsteady picture.
4. All video recording shall be done during time of good visibility. No video recording shall be done during precipitation, mist or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subjects of recording and to produce bright, sharp video recordings of those subjects.
5. The average rate of travel during a particular segment of coverage shall be directly proportional to the number, size and value of the surface features within that construction area's zone of influence. The rate of speed in the general direction of travel of the vehicle used during taping shall not exceed 44-feet per minute.

3.03 PHOTOGRAPHS

A. A minimum of 3 views (top, upstream, and downstream) each shall generally be taken prior to backfilling pipelines or structures. Photographs shall be provided for:
   1. Utility conflicts/relocations
   2. Manholes
   3. Pump stations
   4. Boring and jacking
   5. Directional drilling pipe entrance and exit
   6. Valve installation
   7. Air release valve installation
   8. Fire hydrant assembly

B. Photo Identification
   1. Name of Project
   2. Name of Structure
   3. Orientation of View
   4. Date & Time of Exposure
   5. Film numbered identification of exposure

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01400
QUALITY CONTROL

PART 1 - GENERAL

1.01 SITE INVESTIGATION AND CONTROL

A. Contractor shall verify all dimensions in the field and check field conditions continuously during construction. Contractor shall be solely responsible for any inaccuracies built into the Work due to Contractor's failure to comply with this requirement.

B. Contractor shall inspect related and appurtenant Work and report in writing to City any conditions which will prevent proper completion of the Work. Failure to report any such conditions shall constitute acceptance of all site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor at Contractor's sole cost and expense.

1.02 INSPECTION OF THE WORK

A. The Work shall be conducted under the general observation of representatives of the City acting on behalf of the City to ensure strict compliance with the requirements of the Contract Documents. Such inspection may include mill, plant, shop, or field inspection, as required. The City shall be permitted access to all parts of the Work, including plants where materials or equipment are manufactured or fabricated. Inspection by the City are in addition to the inspections required of Contractor by his QC Representatives.

B. The presence of the City, however, shall not relieve the Contractor of the responsibility for the proper execution of the Work in accordance with all requirements of the Contract Documents. Compliance is a duty of the Contractor, and said duty shall not be avoided by any act or omission on the part of the City. Further, no requirement of this Contract may be waived or modified except by change order or formal (written) substitution approval.

C. All materials and articles furnished by the Contractor shall be subject to rigid inspection, and no materials or articles shall be used in the Work until they have been inspected and accepted by the City. No Work shall be backfilled, buried, cast in concrete, hidden, or otherwise covered until it has been inspected. Any Work so covered in the absence of inspection shall be subject to uncovering. Where uninspected Work cannot be uncovered, such as in concrete cast over reinforcing steel, all such Work shall be subject to demolition, removal, and reconstruction under proper inspection and no additional payment will be allowed therefore.

D. The Contractor is responsible for the Quality of his own work and shall designate a qualified individual, to be approved by the City, who will ensure that all work is performed in strict accordance with the Contract Documents. This quality representative shall inspect the work for the Contractor and provide to the City and the Contractor a report outlining all work accomplished, all inspections, and all testing performed for all days when work is performed. The objective of this report is to provide "Objective Evidence of Compliance" by the Contractor with the requirements of the Contract.

1.03 TIME OF INSPECTION AND TESTS

A. Samples and testing required under these Specifications shall be furnished and prepared in ample time for the completion of the necessary tests and analyses before said articles or materials are to be used. Except as otherwise provided in the Contract Documents, performance of the required tests will be by the Contractor and all costs therefore will be borne by the Contractor at no cost to the City. Whenever the Contractor is ready to backfill, bury, cast in concrete, hide, or otherwise cover any Work under this Contract, the City shall be notified not less than 24-hours in advance to request inspection before beginning any such Work of covering. Failure of the Contractor to notify the City at least 24-hours in advance of any such inspections shall be reasonable cause for the City to order a sufficient delay in the Contractor's schedule to allow time for such inspection, any remedial, or corrective work required, and all costs of such delays, including its impact on other portions of the Work, shall be borne by the Contractor.

1.04 SAMPLING AND TESTING

A. When not otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered. However, the City reserves the right to use any generally accepted system of inspection which, in the opinion of the City, will ensure the City that the quality of the workmanship is in full accord with the Contract Documents.

B. Any waiver of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief form the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial work, shall not be construed as a waiver of any technical or qualitative requirements of the Contract Documents.

C. Notwithstanding the existence of such waiver, the City shall reserve the right to make independent investigations and tests as specified in the following paragraph and, upon failure of any portion of the Work to meet any of the qualitative requirements of the Contract Documents, shall be reasonable cause for the City to require the removal or correction and reconstruction of any such Work.

D. In addition to any other inspection or quality assurance provisions that may be specified, the City shall have the right to independently select, test, and analyze, at the expense of the City, additional test specimens of any or all of the materials to be used. Results of such tests and analyses shall be considered along with the tests or analyses made by the Contractor to determine compliance with the applicable specifications for the materials so tested or analyzed provided that wherever any portion of the Work is discovered, as a result of such independent testing or investigation by the City which fails to meet the requirements of the Contract Documents, all costs of such independent inspection and investigation and all costs of removal, correction, reconstruction, or repair of any such Work shall be borne by the Contractor.

1.05 RIGHT OF REJECTION

A. The City shall have the right at all times and places to reject any articles or materials to be furnished hereunder which, in any respect, fail to meet the requirements of the Contract Documents, regardless of whether the defects in such articles or materials are detected at the point of manufacture or after completion of the Work at the site. If the City or inspector, through an oversight or otherwise, has accepted materials or Work which is defective or which is contrary to the Contract Documents, such material, no matter in what stage or condition of manufacture, delivery, or erection, may be rejected by City.

B. Contractor shall promptly remove rejected articles or materials from the site of the Work after notification or rejection.

C. All costs of removal and replacement of rejected articles or materials, as specified herein, shall be borne by the Contractor.

D. If the Contractor fails to remove or replace defective work after notification to do so, the City may have the work removed and replaced by others and deduct all costs from the Contractor's pay requests.

1.06 TESTING LABS

A. All geotechnical testing laboratory services for field testing will be paid by the City. The lab(s) shall function as independent lab(s) and report independently to the City and the Contractor. The test lab(s) may not approve or allow any deviation from the Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01410

TESTING AND TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:
   1. City will employ and pay for services of an Independent Testing Laboratory to perform Testing specifically indicated on the Contract Documents or specified in the Specifications and may at any other time elect to have materials and equipment tested for conformity with the Contract Documents.
   2. Contractor shall cooperate with the laboratory to facilitate the execution of its required services.
   3. Employment of laboratory by City shall in no way relieve Contractor's obligations to perform the Work.

B. Related Requirements Described Elsewhere:
   1. Conditions of the Contract.
   2. Respective section of Specifications: Certification of products.
   3. Each Specification section listed: Laboratory tests required and standards for testing.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with City's personnel; provide access to work and manufacturer's operations.

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

C. Provide to the City the preliminary design mix proposed to be used for concrete, 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. The City 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 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 charge to the City shall be allowed on account of such testing and certification.

E. Contractor shall not have direct contact with laboratory or laboratory personnel. All testing shall be coordinated through City.

F. 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.

G. Notify City sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests. When tests or inspections cannot be performed after such notice, reimburse City for laboratory personnel and travel expenses incurred.. The following field-testing schedule summarizes the responsibilities of various tests that may be required by the Contract Documents.

TEST	NOTES	PAID FOR
Soil Compaction	A. Pipe Work: Every 300 ft. at each lift of compaction B. Structures: As a minimum one test per 2000 SF of fill area per lift, or at least 2 tests per structure, per lift. As specified in material specifications sections	City
Low Pressure Air Exfiltration	Each section of gravity sewer pipe between manholes or lift station	Contractor
Hydrostatic Pressure	All segments of pressure piping (24-hour test).	Contractor
Hydrostatic Leakage	All segments of pressure piping (2-hour test).	Contractor
Bacteriological	As required by local and state agencies	City
Asphaltic Concrete Paving	As required by City	City
LBR	Each 600 SY of pavement	City
Concrete	Slump test each delivery, cylinders every 20 CY	City
Asbestos	Environmental testing of materials	City
All Other Testing	As specified in various sections of the Project Manual	As Indicated

H. 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.

I. If the test results indicate the material or equipment complies with the Contract Documents, the City shall pay for the cost of the testing laboratory. If the tests and any subsequent retests indicate the materials and equipment fail to meet the requirements of the Contract Documents, the Contractor shall pay for the laboratory costs directly to the City or the total costs shall be deducted from any payments due to the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

CSECTION 01415

STORMWATER POLLUTION PREVENTION / NPDES REQUIREMENTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

Stormwater Pollution Prevention Plan requirements and recommendations under the NPDES program for construction projects located in Florida.

1.02 PURPOSE

The purpose of this section is to outline minimum requirements for stormwater pollution prevention as required under the NPDES program. There may be more stringent local government or Owner requirements for Erosion and Sediment Control, which would be located in the Specifications or on the Drawings. The more stringent requirement governs.

1.03 RELATED SECTIONS

A. Section 01410 – Testing and Testing Laboratory Services

B. Section 02100 – Temporary Erosion and Sedimentation Control

1.04 ABBREVIATIONS

A. NPDES – National Pollution Discharge Elimination System

B. SWPPP – Stormwater Pollution Prevention Plan

C. NOI – Notice of Intent

D. NOT – Notice of Termination

1.05 DEFINITIONS

The term “NPDES Generic Permit” means the State of Florida Department of Environmental Protection (FDEP) Generic Permit For Stormwater Discharge from Large and Small Construction Activities. The NPDES Generic Permit is also known as the NPDES) Construction Generic Permit (CGP).

1.06 CONSTRUCTION PROJECTS REQUIRING COMPLIANCE WITH NPDES GENERIC PERMIT

A. All projects 1 or more acres in size that discharge to offsite areas.

B. Smaller projects that are in the same construction corridor as larger construction projects where the larger project is 1 or more acre in size and is required to comply with NPDES Generic Permit. In this case, even if the smaller project is less than 1 acre in size, the smaller project must comply with the NPDES Generic Permit.

1.07 GENERAL REQUIREMENTS

A. Construction of this project is required to comply with the requirements of the National Pollutant Discharge Elimination System (NPDES) Generic Permit for Stormwater Discharge from Small and Large Construction Activities.

B. In order to meet NPDES requirements, the Contractor is responsible for preparing a Stormwater Pollution Prevention Plan (SWPPP), implementing, inspecting, maintaining, and reporting on all elements of the SWPPP, completing and submitting the required Notice of Intent (NOI) and Notice of Termination (NOT) forms as the Operator, and paying all associated fees. Copies of the NPDES Generic Permit, NOI, and NOT forms, and permit application fee information are available for download at dep.state.fl.us/water/stormwater/npdes/

C. The SWPPP shall list all the contractors or subcontractors who will be conducting construction activities at the site, and identify the areas of the site in which they will be working. All contractors and subcontractors identified in the SWPPP must sign a copy of the certification statement contained at the end of this specification section before conducting any construction activities at the site. The certifications must have the name and title of the person signing the certification; the name, address, and telephone number of the contracting firm; and the signature date. These statements must be maintained in the SWPPP file on site.

D. The SWPPP shall describe and ensure the implementation of best management practices which will be used to reduce the pollutants in stormwater discharge associated with construction activity and to assure compliance with the terms and conditions of the NPDES Generic Permit. The erosion and sediment control measures shown on these Drawings are the minimum required and are to be installed prior to construction. The Contractor is responsible for complying with all applicable rules, regulations and water quality standards and may need to install additional controls to meet these requirements.

1.08 SWPPP IMPLEMENTATION AND SUBMITTAL REQUIREMENTS

A. The SWPPP shall be completed prior to submittal of the NOI and shall include the elements necessary to comply with the NPDES Generic Permit for construction activities administered by the FDEP and shall also include all local governing agency and Owner requirements. There may be more stringent local government or Owner requirements for Erosion and Sediment Control, which would be located in the Specifications or elsewhere on these Drawings.

B. The Contractor must file the NOI with FDEP and the Owner at least two (2) business days prior to the start of construction. The Contractor shall also submit a copy of the NOI to the MS4 operator for all projects that discharge stormwater associated with construction activity to a municipal separate stormwater system (MS4). A copy of the NOI and a

description of the project must be posted in a prominent place for public viewing at the construction site.

C. The SWPPP must be implemented at the start of construction. A complete copy of the SWPPP, including copies of all inspection reports, plan revisions, etc., must be retained at the project site at all times during working hours and kept in the permanent project records for at least three years following submission of the NOT.

D. Final Stabilization means that all soil disturbing activities at the site have been completed, and that a uniform perennial vegetative cover (evenly distributed, without large bare areas) with a density of at least 70% for all unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures (such as geotextiles) have been employed. Once construction is completed and final stabilization has been achieved, the Contractor must file the NOT to FDEP, the Owner, and the MS4 operator within 14 days.

1.09 INSPECTIONS

A. It is the responsibility of the Contractor to assure the adequacy of site pollutant discharge controls. Between the time the SWPPP is implemented and final site stabilization is achieved, all disturbed areas and pollutant controls must be inspected at least once every seven calendar days and within 24 hours following a rainfall of 0.5 inches or greater. The inspections are to be conducted by the Contractor's qualified designated representative.

B. All inspections shall be documented in an inspection report that summarizes the scope of the inspection, the names and qualifications of personnel making the inspection; the date of the inspection; rainfall data; major observations relating to the implementation of the SWPPP, and actions taken in order to ensure compliance with NPDES requirements and the SWPPP. Such reports shall identify any incidents of non-compliance and actions taken to bring the project into compliance. Where a report does not identify any incidents of non-compliance, the report shall contain a certification that the facility is in compliance with the NPDES requirements and the SWPPP. Each inspection report shall be signed and certified by each qualified inspector.

1.10 UPDATING AND MODIFYING THE SWPPP

A. Based on inspection results, any modifications necessary to increase effectiveness of the SWPPP to an acceptable level must be made within seven calendar days of the inspection.

B. The SWPPP must be updated each time there are significant modifications to the pollutant prevention system or a change of contractors working on the project who disturbs site soil. For construction activities where the operator changes, the new operator shall file an NOI for coverage under this permit at least two (2) days before assuming control of the project and the previous operator shall file an NOT to terminate permit coverage in accordance with the NPDES Generic Permit. Amendments to the plan shall be prepared, signed, dated, and kept as attachments to the original SWPPP.

DRAFT DOCUMENT FOR COMMISSION REVIEW

1.11 MINIMUM SWPPP PROVISIONS

A. The following list contains the items that must be included in the SWPPP. The SWPPP must clearly identify the contractor(s) or subcontractor(s) that will implement each item.

1. Stormwater Team: Identify the personnel (by name or position) that are part of the stormwater team responsible for implementing the SWPPP, including the qualified inspector. List their individual responsibilities in developing or implementing the SWPPP.
2. Contractors /Subcontractors: List all the contractors or subcontractors who will be conducting construction activities at the site, and identify the areas of the site in which they will be working. All listed contractors and subcontractors must sign the certification contained at the end of this specification section.
3. Site/Construction Activities Description:
   a. Describe the nature of the construction activity.
   b. Describe the intended sequence and time table of major activities that will disturb soils.
   c. Include the scheduled starting and ending date for each major activity such as land clearing, grubbing, grading, cut and fill, dewatering operations, installation of erosion and sediment controls, installation of stormwater management systems, paving, final or temporary stabilization of exposed soil, and removal of construction equipment and vehicles.
   d. Estimate the total area of the site and the total area that is expected to be disturbed by excavation, grading, or other construction activity.
   e. Include existing data on soil types and the quality of any existing discharge from the site.
4. For each proposed discharge point provide the following:
   a. Latitude and Longitude
   b. Drainage Area
   c. Surface Waters or MS4
   d. Estimate the amount of land that will be cleared during the construction activity for each drainage area.
5. Include a site map showing all of the following:
   a. Boundaries of the property.
   b. Entrance/Exit Points
   c. Locations where construction activities will occur.
   d. Locations where dewatering operation will occur.
   e. Drainage patterns and approximate slopes and elevations anticipated after major grading activities.
   f. Areas of soil disturbance.
   g. Areas which will not be disturbed.
   h. Location of major structural and nonstructural controls.
   i. Location of areas where stabilization practices are expected to occur.
   j. Location of surface waters and wetlands.
   k. Location where stormwater is proposed to be discharged during construction to a surface water or MS4.
6. List all non-stormwater discharges covered under the CGP and the pollution prevention procedures that will be implemented. The following types of non-

stormwater discharges, if they are listed in the SWPPP and the SWPPP includes appropriate pollution prevention procedures as to not cause or contribute to a violation of water quality standards are to be considered to be covered (allowed) by the CGP:

a. Discharges from firefighting activities.
b. Fire hydrant flushings.
c. Waters without detergents used to spray off loose solids from vehicles.
d. Waters used to control dust.
e. Potable water sources such as waterline flushings.
f. Landscape irrigation water and drainage.
g. Routine external building washdown provided no detergents are used.
h. Pavement washwaters that do not contain detergents, leaks, spills of toxic or hazardous materials.
i. Air conditioning condensate.
j. Spring water.
k. Foundation or footing drain flows that are not contaminated with process material such as solvents.
l. Non-contaminated ground water associated with dewatering activities as described in Part 3.4 of the CGP.

7. The following non-stormwater discharges are prohibited by the CGP:
   a. Wastewater from concrete washout.
   b. Wastewater from washout or cleanout of stucco, paint, form release oils, curing compounds, and other construction materials.
   c. Fuels, oils, or other pollutants from vehicle and equipment operation and maintenance.
   d. Soaps, detergents, solvents, or other cleaners.
   e. Hazardous substances or oil resulting from an on-site spill.
   f. Solid materials, including building materials.
   g. Any other non-stormwater discharge not specifically allowed by the CGP as identified above.
8. Dewatering Controls (If Applicable): Include a description of the BMPs that will be used to ensure that discharges of noncontaminated ground water from dewatering operations do not cause or contribute to violations of state water quality standards.
9. BMPs: Describe the BMPs that will be implemented for each major activity and the timing during the construction process that they will be implemented.
10. Permanent stormwater management controls: Describe the stormwater management controls or BMPs (e.g., stormwater detention or retention systems, vegetated swales, or velocity dissipation devices at discharge points) that will be installed during the construction process to control pollutants in stormwater discharges.
11. Inspections: Inspections must be at least once every seven calendar days and within 24-hours of the end of a storm event that is 0.50 inches or greater (even if it rains on the weekend or a holiday).
12. Maintenance: Describe the maintenance activities and schedules that will be followed to keep BMPs in good and effective operating condition.
13. Signed Certifications: Include all the signed contractors and subcontractors certifications in the SWPPP (Contained at the end of this specification is an example certification form).

1.12 SITE DATA

A. The following site data is provided to the Contractor for use in preparing the SWPPP and completing the NOI:

Total Site Area:	Roughly 1.67 Acres (Project Limits)
Total Area Impacted by Construction:	Roughly 1.67 Acres (Project Limits)
Existing Site Soils:	Refer to Appendix A – Geotechnical Report prepared by UES
Drainage Area Contributing to Each Discharge Point:	On-site runoff throughout the project is conveyed by a combination of inlets, storm sewer pipes, and overland sheet flow
Latitude and Longitude of Project Location:	Refer to Plans (varies)
MS4 Operator Name:	Broward County and Co Permitees
Receiving Waters:	Runoff from Drainage Basins within project area to existing storm water system

1.13 MINIMUM EROSION AND SEDIMENT CONTROL CONSTRUCTION REQUIREMENTS

A. Stabilize all construction site exits with coarse aggregate or other approved materials, in accordance with details on the Drawings. Other minimum construction requirements that need to be implemented in order to comply with the NPDES Generic permit include installation of sediment barriers down slope from construction activities that disturb site soil; constructing rock surface temporary parking areas; installation of sediment barriers down slope prior to clearing and grubbing; installation of sediment barriers on the down slope side of utility construction and soil stockpiles; and the installation of sediment barriers on the down slope side of grading activities.

B. Stabilization measures shall be initiated as soon as practicable, but in no case more than 7 days, in portions of the site where construction activities have temporarily or permanently ceased.

C. The Owner has the authority to limit surface area of erodible earth material exposed by clearing and grubbing, excavation, trenching, borrow and embankment operations. The Owner also has authority to direct Contractor to provide immediate permanent or temporary erosion and sediment control measures.

D. The Contractor shall respond to erosion and sediment control maintenance requirements or implement additional measures to control erosion ordered by Owner or governing authorities within 48 hours or sooner if required at no additional cost to the Owner.

E. The Contractor shall incorporate permanent erosion control features into project at earliest

practical time to minimize need for temporary controls.

F. For drainage basins with 10 or more disturbed acres at one time, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, shall be provided where attainable until final stabilization of the site. The 3,600 cubic feet of storage area per acre drained does not apply to flows from offsite areas and flows from onsite areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin. For drainage basins with 10 or more disturbed acres at one time and where a temporary sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent controls is not attainable, a combination of smaller sediment basins and/or sediment traps and other BMPs should be used. At a minimum, silt fences, or equivalent sediment controls are required for all sideslope and downslope boundaries of the construction area.

G. Water trucks shall be used as needed during construction to reduce dust generated on the site. Dust control must be provided by the Contractor and shall be in compliance with applicable local and state dust control regulations.

1.14 MAINTENANCE REQUIREMENTS

A. Maintain all erosion and sediment control measures throughout construction. Repair or replace all damaged sediment barriers. Remove accumulated sediment along all silt fences where the height of the sediment exceeds one-third of the height of the silt fence. Inspect all temporary and permanent grassing areas and re-grass where there are bare spots, washouts, or unhealthy growth.

B. At the completion of construction, once final stabilization has been achieved, clean all accumulated sediment from all storm structures, pipelines, and stormwater ponds. Remove all temporary sediment controls upon receipt of authorization to remove has been received from the Owner or Engineer. Note that this may not occur for some time after construction activities have been completed, in order to ensure their removal has not occurred until final stabilization has been achieved to the satisfaction of the Owner and Engineer.

1.15 STORMWATER DISCHARGE PROVISIONS

A. Substances that have the potential for polluting surface and/or groundwater must be controlled by whatever means necessary in order to ensure that they do not discharge from the site. As an example, special care must be exercised during equipment fueling and servicing operations. If a spill occurs, it must be contained and disposed so that it will not flow from the site or enter groundwater, even if this requires removal, treatment, and disposal of soil in accordance with local and state regulations.

B. All personnel involved with construction activities must comply with state and local sanitary or septic system regulations. Temporary sanitary facilities shall be provided at the site throughout the construction phase for use by all construction personnel and shall be serviced by a commercial operator at least once a week.

C. Discharges resulting from groundwater dewatering activities at construction sites are permitted provided the groundwater is free of sediments, is not contaminated, and dewatering occurs in accordance with state and local governing agency regulations.

D. Chemicals, paints, solvents, fertilizers, and other toxic material must be stored in waterproof containers. Except during application, the contents must be kept in trucks or within storage facilities. Runoff containing such material must be collected, removed from the site, treated, and disposed at an approved solid waste or chemical disposal facility.

E. The discharge of hazardous substances or oil in the stormwater discharge(s) from a facility or activity shall be prevented. This does not relieve the operator of the reporting requirements of 40 CFR part 117 and 40 CFR part 302. The operator shall submit within 14 calendar days of knowledge of the release a written description of: the release (including the type and estimate of the amount of material released), the date that such release occurred, the circumstances leading to the release, and remedial steps to be taken. The SWPPP must be modified within 14 calendar days of knowledge of the release to: provide a description of the release, the circumstances leading to the release, and the date of the release. In addition, the plan must be reviewed to identify measures to prevent the reoccurrence of such releases and to respond to such releases, and the plan must be modified where appropriate.

CONTRACTOR / SUBCONTRACTOR CERTIFICATION

The SWPPP shall list all the contractors or subcontractors who will be conducting construction activities at the site, and identify the areas of the site in which they will be working.

All contractors and subcontractors identified in the SWPPP must sign a copy of the following certification statement before conducting any construction activities at the site. The certifications must have the name and title of the person signing the certification; the name, address, and telephone number of the contracting firm; and the signature date.

These statements must be maintained in the SWPPP file on site.

Name of Contractor / Subcontractor Conducting Construction at the site:

_____

Business Name

_____

Business Address

_____

Business Telephone Number

CERTIFICATION:

> **"I certify under penalty of law that I understand, and shall comply with, the terms and conditions of the State of Florida Generic Permit for Stormwater Discharge from Large and Small Construction Activities and this Stormwater Pollution Prevention Plan."**

_____ _____

Signature Date

_____ _____

Printed Name Title

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CONTRACTOR
CERTIFICATION

The SWPPP has been prepared by:

_____
Business Name

_____
Business Address

_____
Business Telephone Number

The Contractor who has prepared the SWPPP shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

_____ _____
Signature Date

_____
Printed Name

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01570
MAINTENANCE OF TRAFFIC

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes identifying safety hazards and then furnishing all necessary labor, materials, tools, and equipment including, but not limited, to signs, barricades, traffic drums, cones, flashers, construction fencing, flag persons, variable message boards, uniformed police officers, warning devices, temporary pavement markings, temporary sidewalk, delineators, etc., to maintain vehicular and pedestrian traffic through and adjacent to the project area. These measures and actions shall be taken to safely maintain the accessibility of public and construction traffic by preventing potential construction hazards. All materials, work and incidental costs related to Maintenance of Traffic will be paid for at the contract lump sum price.

1.02 REQUIREMENTS

A. The Traffic Control Plan shall conform to the following standards:
   1. Standard Specifications for Road and Bridge Construction, latest edition including all subsequent supplements issued by the Florida Department of Transportation, (FDOT).
   2. Manual on Uniform Traffic Control Devices for Streets and Highways by U.S. Department of Transportation, Federal Highway Administration.
   3. Right-of-Way Utilization Regulations, Pembroke Pines, Florida, latest edition.

B. All references to the respective agencies in the above referenced standards shall be construed to also include the municipality as applicable for this Work.

C. Sequence the Work in a manner that will minimize disruption of vehicular and pedestrian access through and around the construction area.

D. Traffic planning and control for the maintenance and protection of pedestrian and vehicular traffic affected by the Contractor's Work includes, but is not limited to:
   1. Construction and maintenance of any necessary detour equipment and facilities.
   2. Providing necessary facilities for access to residences and businesses.
   3. Furnishing, installing, and maintenance of traffic control and safety devices (e.g. signage, barricades, barriers, message boards, etc.), and flag persons as appropriate during Construction.
   4. Control of water runoff, dust and any other special requirements for safe and expeditious movement of traffic.

E. Planning, maintenance and control of traffic shall be provided at the Contractor's expense. The Contractor will bear all expense of maintaining the vehicle and pedestrian traffic throughout the work area.

F. The Contractor will ensure all personnel involved in traffic control are and capable of communicating with the public. The Contractor may be required to hire off-duty uniformed police officers, in addition to flag persons, to direct and maintain traffic. Locations and conditions requiring such uniformed police officers shall be as directed by the City. The Contractor shall be required to utilize uniformed police officers for work within FDOT maintained ROW, road closures affecting school traffic and during all night work involving a road closure or crossing on nonresidential roads.

G. The Contractor will remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.

1.03 SUBMITTALS

A. Submit at Contractor's own expense a Traffic Control Plan for approval by the controlling roadway agency (FDOT, City Public Works or other local government) having jurisdiction over the road for approval.
   1. The Traffic Control Plan will detail procedures and protective measures proposed by the Contractor to provide for protection and control of traffic affected by the Work consistent with the following applicable standards:
      a. Standard Specifications for Road and Bridge Construction, latest edition including all subsequent supplements issued by the Florida Department of Transportation, (FDOT Spec.).
      b. Manual of Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and Utility Operations, FDOT.
      c. Right-of-Way Utilization Regulations, City, Florida, latest edition.

B. All references to the respective agencies in the above referenced standards shall be construed to also include the municipality as applicable for this Work.

C. The Traffic Control Plan will be signed and sealed by a Professional Engineer registered in the state of Florida and shall include proposed locations and time durations of the following, as applicable:
   1. Pedestrian and public vehicular traffic routing.
   2. Lane and sidewalk closures, other traffic blockage and lane restrictions and reductions anticipated to be caused by construction operations. Show and describe the proposed location, dates, hours and duration of closure, vehicular and pedestrian traffic routing and management, traffic control devices for implementing pedestrian and vehicular movement around the closures, and details of barricades.
   3. Location, type and method of shoring to provide lateral support to the side of an excavation or embankment parallel to an open travel-way.
   4. Allowable on-street parking within the immediate vicinity of worksite.
   5. Access to buildings immediately adjacent to worksite.
   6. Driveways blocked by construction operations.

7. Temporary traffic control devices, temporary pavement striping and marking of streets and sidewalks affected by construction
8. Temporary commercial and industrial loading and unloading zones.
9. Construction vehicle reroutes, travel times, staging locations, and number and size of vehicles involved.

D. Obtain and submit prior to erection, or otherwise impacting traffic, all required permits from all authorities having jurisdiction, including City Public Works, if applicable.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. The Contractor shall furnish, erect, and maintain all necessary traffic control devices, including flag person, in accordance with the Manual of Uniform Traffic Control Devices for Streets and Highways published by the U.S. Department of Transportation, Federal Highway Administration.
   1. FLAG PERSONS
      a. All flag persons used on this Project will adhere to the following requirements:
      b. Any person acting as a flag person on this Project will have attended a training session taught by a Contractor's qualified trainer before the start date of this Contract.
      c. The Contractor's qualified trainer will have completed a "Flag person Train the Trainer Session" in the 5-years previous or before the start date of this Contract and will be on file as a qualified flag person trainer.
      d. The flag person trainer's name and Qualification Number will be furnished by the Contractor at the Pre-Construction meeting. The Contractor will provide all flag persons with the Flag Person Handbook and will observe the rules and regulations contained therein. This handbook will be in the possession of all flag person while flagging on the Project.
      e. Flag persons will not be assigned other duties while working as authorized flag persons.
      f. Any person replacing flag person for break shall have the same training.

PART 3 - EXECUTION

3.01 NOTIFICATIONS

A. The Contractor will notify individual owners, owner's agents, and tenants of buildings affected by the construction, with copies to the City, 72-hours in advance of any construction activities.

B. The Contractor shall notify residents and pedestrians via variable message boards no later than 10 days prior to the closure of any road, lane or pedestrian thoroughfare.

C. The Contractor shall notify Emergency Management Services agencies, and local transit

agency no less than 7 days prior to such closures or whenever roads are impassable.

D. Implement closing of vehicle or pedestrian thoroughfare in accordance with the construction drawings and the approved Traffic Control Plan.

E. The Contractor will immediately notify the City of any vehicular or pedestrian safety or efficiency problems incurred as a result of the construction of the Project.

3.02 GENERAL TRAFFIC CONTROL

A. The Contractor will sequence and plan construction operations and will generally conduct Work in such a manner as not to unduly or unnecessarily restrict or impede normal traffic.

B. Unless otherwise provided, all roads within the limits of the Work will be kept open to all traffic by the Contractor. The Contractor will keep the portion of the project being used by public traffic, whether it is through or local traffic, in such condition that traffic will be adequately accommodated.

C. The Contractor will be responsible for installation and maintenance of all traffic control devices and requirements for the duration of the construction period. Necessary precautions for traffic control will include, but not be limited to, warning signs, signals, lighting devices, markings, barricades, canalizations, and hand signaling devices.

D. The Contractor will provide and maintain in a safe condition temporary approaches or crossings and intersections with trails, roads, streets, businesses, parking lots, residences, garages and farms.

E. The Contractor will always provide emergency access to all residences and businesses. Residential and business access will be restored and always maintained outside of the Contractor’s normal working hours.

F. Traffic is to be maintained on one section of existing pavement, proposed pavement, or a combination thereof. Alternating one-way traffic may be utilized and limited to a maximum length of 500-feet during construction hours. Lane width for alternating one-way traffic will be kept to a minimum width of 10-feet, or as directed by the City.

G. Travel lanes and pedestrian access will be kept reasonably smooth, dry, and in a suitable condition at all times.

H. The Contractor will make provisions at all "open cut" street crossings to allow for free passage of vehicles and pedestrians, either by bridging or other temporary crossing structures. Such structures will be of adequate strength and proper construction and will be maintained by the Contractor in such a manner as not to constitute an undue traffic hazard.

I. The Contractor will keep all signs in proper position, clean, and legible at all times. Care will be taken so that weeds, shrubbery, construction materials, equipment, and soil are not allowed to obscure any sign, light, or barricade. Signs that do not apply to construction conditions should be removed or adjusted so that the legend is not visible to approaching traffic.

J. The City may determine the need for, and extent of, additional striping removal and restriping.

K. Excavated material, spoil banks, construction materials, equipment and supplies will not be located in such a manner as to obstruct traffic, as practicable. The Contractor will immediately remove from the site all demolition material, exercising such precaution as may be directed by the City. All material excavated shall be disposed of to minimize traffic and pedestrian inconvenience and to prevent damage to adjacent property.

L. During any suspension, the Contractor will make passable and open to traffic such portions of the Project and/or temporally roadways as directed by the City for accommodation of traffic during the anticipated period of suspension. Passable conditions will be maintained until issuance of an order for the resumption of construction operations. When Work is resumed, the Contractor will replace or renew any Work or materials lost or damaged because of such temporary use in every respect as though its prosecution had been continuous and without interferences.

3.03 TEMPORARY SHORING

A. Use shoring to maintain traffic when it is necessary to provide lateral support to the side of an excavation or embankment parallel to an open travel-way. Provide shoring when a theoretical 2:1 or steeper slope from the bottom of the excavation or embankment intersects the existing ground line closer than 5-feet (1.5 m) from the edge of pavement of the open travel-way.

B. The Contractor will furnish, install, and remove sheeting, shoring, and bracing necessary to maintain traffic at locations shown on the Traffic Control Plan and other locations determined during construction.

END OF SECTION

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SECTION 01580
PROJECT IDENTIFICATION AND SIGNS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall furnish, install, and maintain all sign materials including sign posts, weighted stands, brackets, any required mounting hardware, and miscellaneous materials required for temporary signs for the purpose of:
   1. Project Identification.
   2. Informational signs to direct traffic
   3. On-site safety signs as appropriate for the Work

B. Remove temporary signs on completion of Construction prior to obtaining Certificate of Occupancy and Substantial Completion.

C. Allow no other signs to be displayed without written approval of the City.

1.02 SUBMITTALS

A. Submit complete Shop Drawings identifying locations, material, layout, sign content, font type and size, and sample colors. Make sign and lettering to scale, clearly indicating condensed lettering if used. The sign details will be submitted to the City for approval prior to fabrication.

B. Submit method of erection to include materials, fasteners, and other items to assure compliance with the requirements for wind pressures as required by the authorities having jurisdiction.

C. Submit signs in accordance with any details provided in the Drawings.

D. Prior to erection obtain and submit all required permits from the authorities having jurisdiction.

1.03 PROJECT IDENTIFICATION SIGN

A. Provide 1 painted sign at the site, or at each end of the Work if a linear project, or at each of the separate sites of Work, if applicable. The sign will be not less than 32-square feet area, with a minimum dimension of 4-feet and painted graphics with content to include:
   1. Title of Project
   2. City Government name and logo
   3. Names and titles of the Board of City Commissioners, City Administrator, Director of City Utilities Department, the Consulting Engineer, and the Contractor

B. Erect on the site at a lighted location of high public visibility, adjacent to main entrance to site, as approved by the City. The sign must be located 5-feet from all rights-of-way and 20-feet from all property lines.

1.04 INFORMATIONAL SIGNS

A. All signs and other traffic control devices shall conform to the requirements for shape, color, size, and location as specified in the latest Manual on Uniform Traffic Control and Safe Streets and Highways and the Florida Manual of Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and Utility Operations. Information as to the above may be obtained from FDOT Division engineers.

PART 2 - PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: New construction grade lumber, structurally adequate and suitable for exterior application and specified finish.

B. Sign Panels: New A-B Grade, exterior type, APA DF plywood with inset hardwood edges and mitered corners, standard large sizes to minimize joints.
   1. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles, minimum 3/4-inch.

C. Rough Hardware: Galvanized steel, of sizes and types to enable sign assemblies to resist wind pressures as required by the authorities having jurisdiction but not less than a wind velocity of 50-mph.
   1. Use minimum 1/2-inch diameter button head carriage bolts to fasten sign panels to supporting structures. Bolt heads to be painted to match sign face.

D. Paint: Exterior quality, as specified in Division 9 or as a minimum as specified herein.
   1. Primer and finish coat: exterior, semi-gloss, alkyd enamel.
   2. Colors for structure, framing, sign surfaces, and graphics: As shown on the Drawings or as selected by the City.

E. Safety Sign Number Tags
   1. Removable aluminum or galvanized steel, with 4-inch high, blue numerals and steel tag hooks.

PART 3 - EXECUTION

3.01 PROJECT IDENTIFICATION SIGN

A. Install project identification signs within 10-days of the Notice to Proceed date. Failure to erect the signs may be reason to delay approval of the initial Application for Payment.

B. Paint exposed surfaces of supports, framing, and surface material; one (1) coat of primer and two (2) coats of finish paint.

C. Set signs plumb and level and solidly brace as required to prevent displacement during the Construction period. If mounted on posts, sink posts 3-feet to 4-feet below grade, leaving a minimum of 8-feet of each post above grade for mounting the sign.

D. Install informational signs at a height for optimum visibility, on ground mounted poles or attached to temporary structural surfaces.

3.02 MAINTENANCE

A. Maintain signs and supports in a neat, clean condition, repair damages to structure, framing, or sign.

B. Relocate informational signs as required by the progress of the Work.

C. Poorly maintained, defaced, damaged, or dirty signs shall be replaced, repaired, or cleaned without delay.

D. Special care must be taken to ensure that construction materials and dust are not allowed to obscure the face of a sign.

E. Signs not in effect shall be covered or removed.

3.03 REMOVAL

A. Remove signs, framing, supports, and foundations at Substantial Completion of the Work.

B. Leave areas clean and patch as required to remove any traces of temporary signs.

END OF SECTION

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SECTION 01610
DELIVERY, STORAGE AND HANDLING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the general requirements for the delivery, handling, storage and protection for all items required in the construction of the Work.

B. Deliver, handle and store products in accordance with manufacturer's recommendations and by methods and means that will prevent damage, deterioration, and loss including theft and protect against damage from climatic conditions. Control delivery schedules to minimize long-term storage of products at the site and overcrowding of construction spaces. In particular, provide delivery/installation coordination to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other sources of loss. Damaged or defective items, in the opinion of the City, will be replaced at no cost to the City.

1.02 REQUIREMENTS

A. The Contractor is responsible for all material, equipment and supplies sold and delivered to the City under this Contract until final inspection of the Work and acceptance thereof by the City.

B. All materials and equipment to be incorporated in the Work will be handled and stored by the Contractor before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft or damage of any kind whatsoever to the material or equipment.

C. All materials and equipment, which in the opinion of the City, have become so damaged as to be unfit for the use intended or specified, will be promptly removed from the site of the Work, and the Contractor will receive no compensation for the damaged materials or equipment or for its removal.

D. In the event any such material, equipment and supplies are lost, stolen, damaged or destroyed prior to final inspection and acceptance, the Contractor will replace same without additional cost to the City.

1.03 DELIVERY

A. Transport and handle items in accordance with manufacturer's instructions.

B. The City and the Contractor's project superintendent must be on-site to accept all deliveries shipped directly to the job site. If the project superintendent is not present for a delivery, that delivery may be rejected by the City. If any delivery is rejected due to non- availability of the Contractor's project superintendent, delivery shall be rescheduled at no additional cost to the City.

C. Schedule delivery to reduce long-term on-site storage prior to installation and/or operation. Under no circumstances will materials or equipment be delivered to the site more than 1-month prior to installation without written authorization from the City.

D. Coordinate deliveries in order to avoid delay in, or impediment of, the progress of the Work.

E. Schedule deliveries to the site not more than 1-month prior to scheduled installation without written authorization from the City.

F. Coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged or sensitive to deterioration.

G. All items delivered to the site will be unloaded and placed in a manner that will not hamper the Contractor's normal construction operation or those of Subcontractors and other Contractors and will not interfere with the flow of necessary traffic.

H. Deliver products in undamaged condition, in manufacturer’s original containers or packaging, with identifying labels intact and legible. Maintain packaged materials with seals unbroken and labels intact until time of use.

I. Immediately on delivery, inspect shipments with the City to ensure compliance with requirements of Contract Documents and accepted submittals, and that products are properly protected and undamaged. If the Contractor does not notify the City regarding the delivery and the City rejects any part of the delivery, there will be no additional cost to the City for the material to be returned. For items furnished by others (i.e. City), perform inspection in the presence of the City. Provide written notification to the City of any problems.

J. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the City.

1.04 STORAGE AND HANDLING

A. Provide equipment and personnel to handle products by methods recommended by the manufacturer to prevent soiling or damage to products or packaging, with seals and labels intact and legible.

B. The Contractor is responsible for securing a location for on-site storage of all material and equipment necessary for completion of the Work. The location and storage layout will be submitted to the City at the Pre-Construction conference.

C. Manufacturer's storage instructions will be carefully studied by the Contractor and reviewed with the City. These instructions will be carefully followed and a written record of this kept by the Contractor.

D. All material delivered to the job site will be protected from dirt, dust, dampness, water, and any other condition detrimental to the life of the material from the date of delivery to the time of installation of the material and acceptance by the City.

E. When required or recommended by the manufacturer, the Contractor will furnish a covered, weather protected storage structure providing a clean, dry, non-corrosive environment for all mechanical equipment valves, architectural items, electrical and instrumentation equipment, and special equipment to be incorporated into this Project.

F. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions and free from damage or deterioration.

G. Should the Contractor fail to take proper action on storage and handling of equipment supplied under this Contract within 7-days after written notice to do so has been given, the City retains the right to correct all deficiencies noted in previously transmitted written notice and deduct the cost associated with these corrections from the Contract Amount. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, engineering, and any other costs associated with making the necessary corrections.

1.05 SPECIFIC STORAGE AND HANDLING

(Additional specific storage and handling requirements may be found in the specification sections addressing the material requirements.)

A. All mechanical and electrical equipment and instruments subject to corrosive damage by the atmosphere if stored outdoors (even though covered by canvas) will be stored in a weather tight building to prevent damage. The building may be a temporary structure on the site or elsewhere, but it must be satisfactory to the City. The building will be provided with adequate ventilation to prevent condensation. Maintain temperature and humidity within range required by manufacturer.
   1. All equipment will be stored fully lubricated with oil, grease and other lubricants unless otherwise instructed by the manufacturer. Mechanical equipment to be used in the Work, if stored for longer than 90-days, will have the bearings cleaned, flushed and lubricated prior to testing and startup, at no extra cost to the City.
   2. Moving parts will be rotated a minimum of once weekly to ensure proper lubrication and to avoid metal-to-metal "welding." Upon installation of the equipment, the Contractor will start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.

3. Lubricants will be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants will be put into the equipment at the time of acceptance. Prior to acceptance of the equipment, the Contractor will have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer will be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment will be judged to be defective. It will be removed and replaced at the Contractor's expense.
4. Electric motors provided with heaters will be temporarily wired for continuous heating during storage. Upon installation of the equipment, the Contractor will start the equipment, at least half load, and once weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.

B. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

C. Cement and lime will be stored under a roof and off the ground and will be kept completely dry at all times.

D. Brick, block and similar masonry products will be handled and stored in a manner to minimize breakage, chipping, cracking and spilling to a minimum.

E. Precast Concrete will be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking.

F. All structural and miscellaneous steel and reinforcing steel will be stored off the ground or otherwise to prevent accumulations of dirt or grease, and in a position to prevent accumulations of standing water and to minimize rusting. Beams will be stored with the webs vertical.

G. Metals will be stored dry, all under cover and vented to prevent build-up of humidity, all off ground to provide air circulation.

H. Lumber will be stacked to provide air circulation. Store materials for which maximum moisture content is specified in an area where moisture content can be maintained.

I. Gypsum wallboard systems will be stored to protect all metal studs, furring, insulation boards, batts, accessories and gypsum board to prevent any type of damage to these materials. Rusted material components, damp or wet insulation or gypsum boards will not be accepted.

J. Acoustical materials will be delivered to the job site in unbroken containers labeled and clearly marked. Materials will not be removed from containers until ready to install, but will be stored in dry area with cartons neatly stacked. Before installation, acoustical board will be stored for not less than 24-hours in the Work area at the same temperature and relative humidity.

K. Linear items will be stored in dry area with spacers to provide ventilation. Stack linear items to prevent warping, complying with manufacturer's instructions.

L. Paints and other volatile materials will be stored within approved safety containers. No glass jugs will be permitted. Storage areas will be equipped with not less than 2 fire extinguishers (C02 type) sufficient to discharge a distance of 25-feet when fully charged and have current tags. No other building materials will be stored in this area. Used rags will be removed daily. Clean rags will be stored in metal closed containers.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01700
PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

The term "Project Closeout" is defined to include requirements near the end of the Contract Time, in preparation for Substantial Completion acceptance, occupancy by the City, release of retainage, final acceptance, final payment, and similar actions evidencing completion of the Work. Time of closeout is directly related to "Substantial Completion"; therefore, the time of closeout may be either a single period for the entire Work or a series of time periods for individual elements of Work that has been certified as substantially complete at different dates. This time variation, if any, will be applicable to the other provisions of this section.

1.02 SCOPE OF WORK

A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
   1. Final Cleaning
   2. Substantial Completion
   3. Final Acceptance

1.03 RELATED WORK

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

B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16.

C. Section 01720 "Project Record Documents"

D. Section 01740 "Warranties and Bonds"

1.04 PREREQUISITES FOR SUBSTANTIAL COMPLETION.

When the Contractor considers the Work as substantially complete, submit to the City a written notice stating so and requesting an inspection to determine the status of completion. The Contractor will attach to the notice a list of items known to be incomplete or yet to be corrected. Complete the following before requesting the City’s inspection for certification of substantial completion.

A. In the progress payment request that coincides with or is the first request following, the date substantial completion is claimed, show 100% completion or list incomplete items, the value of incomplete Work, and reasons for the Work being incomplete. Inspection procedures include supporting documentation for completion as indicated in these Contract Documents.

B. Submit a statement showing an accounting of changes to the Contract Sum.

C. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents in accordance with Section 01740 "Warranties and Bonds."

D. Obtain and submit lien releases enabling the City's full, unrestricted use of the Work and access to services and utilities.

E. Consult with City before submitting Record Documents in accordance with Section 01720 "Project Record Documents."

F. Submit Operation and Maintenance Manuals.

G. Make final changeover of permanent locks. Submit keys and keying schedule.

H. Deliver tools, spare parts, extra stock, and similar items.

I. Complete final cleaning requirements necessary for Substantial Completion.

1.05 FINAL CLEANING.

Complete the following cleaning operations prior to Substantial Completion or Owner occupancy.

A. Remove from job site all tools, surplus materials, construction equipment, storage sheds, debris, waste and temporary services.

B. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

C. Structures:
   1. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges and other foreign matter.
   2. Remove all traces of splashed materials from adjacent surfaces.
   3. Ensure exterior surfaces have a uniform degree of cleanliness.
   4. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges and other foreign matter.
   5. Remove paint droppings, spots, stains and dirt from finished surfaces.
   6. Remove labels that are not permanent labels.
   7. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

8. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Leave concrete floors broom clean.
9. Wipe surface of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
10. Clean permanent filters of ventilating systems and replace disposable filters if units were operated during construction. Clean ducts, blowers and coils if units were operated without filters during construction.

1.06 OPERATION AND MAINTENANCE MANUALS

A. The Contractor will submit the proposed format, content and tab structure for all Operating and Maintenance Manuals for the City's review and approval. The tab structure for Operating and Maintenance Manuals will follow specification division format as accepted by the Construction Specification Institute. After the City approves the proposed format, content, and tab structure for the Operating and Maintenance Manuals, the Contractor will create and deliver 5 complete sets.

B. Operation and Maintenance documentation is required for each piece of mechanical, electrical, communications, instrumentation and controls, pneumatic, hydraulic, conveyance, and special construction. If required by the technical specifications, provide Operation and Maintenance documentation for any other product not listed in the foregoing.

C. The requirements of this Section are separate, distinct and in addition to product submittal requirements that may be established by other Sections of the Specifications. Owner's manuals, manufacturer's printed instructions, parts lists, test data and other submittals required by other Sections of the Specifications may be included in the Operating and Maintenance Manuals provided that they are approved and are formatted in a manner consistent with the requirements of this Section.

D. Deliver Operation and Maintenance Manuals directly to the City.

E. Operating and Maintenance Manual documents must include, but are not limited to, table of contents, approved submittals, manufacturer's operating and maintenance instructions, brochures, Shop Drawings, performance curves and data sheets annotated to indicate equipment actually furnished (e.g. identifying impeller size, model, horsepower, etc), procedures, wiring and control diagrams, records of factory and field tests and device/controller settings and calibration, program lists or data compact discs, maintenance and warranty terms and contact information, spare parts listings, inspection procedures, emergency instructions, and other Operating and Maintenance documentation that may be useful to the City. The material and equipment data required by this Section must include all data necessary for the proper installation, removal, normal operation, emergency operation, startup, shutdown, maintenance, cleaning, adjustment, calibration, lubrication, assembly, disassembly, repair, inspection, troubleshooting, and warranty service of the equipment or materials.

F. The Contractor must bind the Operating and Maintenance Manual documents in heavy-duty, 3-ring vinyl-covered binders including pocket folders for folded sheet information. Mark binder identification on both the front and spine of each binder. Binder information must list the project title, identify separate structures or locations as applicable, identify the general subject matter covered in the manual and must include the words "OPERATING AND MAINTENANCE INSTRUCTIONS".
   1. The Contractor must submit the Operating and Maintenance documents on three-hole punched, 8-1/2-inch x 11-inch sheets or on three-hole punched sheets that are foldable in multiples of 8-1/2-inch x 11-inch. The three-hole punched edge will be the left 11-inch edge.
   2. The Contractor may request waivers to the size requirement for specific instances. The Contractor's waiver request must be in writing to the City. The Contractor's waiver request must include a justification for seeking the waiver.

G. The Contractor must provide an electronic version of the complete and final Operating and Maintenance Manuals in original electronic file format on compact disc or DVD. The Contractor must also provide one (1) electronic pdf file of each bound Operating and Maintenance Manual that represents each Manual's content. The electronic pdf file must match the Operating and Maintenance Manual content and organizational structure.

1.07 SUBSTANTIAL COMPLETION INSPECTION PROCEDURES

A. Upon receipt of the Contractor's request for inspection, the City will either proceed with inspection or advise the Contractor of incomplete prerequisites.

B. Following the initial inspection, the City will either prepare the certificate of Substantial Completion or advise the Contractor of Work which must be performed before the certificate will be issued. The City will repeat the inspection when requested in writing and when assured that the Work has been substantially completed.

C. Results of the completed inspection will form the initial "punch list" for final acceptance.

1.08 PREREQUISITES FOR FINAL ACCEPTANCE.

Complete the following before requesting the City's final inspection for certification of final acceptance, and final payment. List known exceptions, if any, in the request.

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

B. Submit written certification that:
   1. The City's final punch list of itemized Work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
   2. The Contract Documents have been reviewed and Work has been completed in accordance with Contract Documents.

3. Equipment and systems have been tested in the presence of the City and are operational.
4. Work is completed and ready for final inspection.

C. Submit consent of surety.

D. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

1.09 FINAL ACCEPTANCE INSPECTION PROCEDURES

A. The City will re-inspect the Work upon receipt of the Contractor's written notice that the Work, including punch list items resulting from earlier inspections, has been completed, except for those items for which completion has been delayed because of circumstances that are acceptable to the City.

B. Upon completion of re-inspection, the City will either prepare a certificate of final acceptance or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled, which are required for final acceptance.

C. If necessary, the re-inspection procedure will be repeated.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01720
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The purpose of the Project Record Documents is to provide the City with factual information regarding all aspects of the Work, both concealed and visible.

B. To ensure the Work was constructed in conformance with the Contract Drawings, the following survey documents are required to be prepared and certified by a Surveyor as per Spec Section 01050 Surveying and Field Engineering, as applicable:
   1. Asset Attribute Data Form
   2. Pipe Deflection Table
   3. Gravity Main Data
   4. Boundary Survey and Survey Map Report for pump stations and easements with constructed improvements

   The Asset Attribute Data and Pipe Deflection Table forms can be found on the City's web site.

1.02 DEFINITIONS

A. Boundary Survey: Boundary survey, map and report certified by a Surveyor shall be provided that meets the requirements of Chapter 5J-17 'Minimum Technical Standards', FAC.

B. Surveyor: Contractor's Surveyor that is licensed by the State of Florida as a Professional Surveyor and Mapper pursuant to Chapter 472, F.S.

1.03 QUALITY ASSURANCE

A. Delegate the responsibility for maintenance of the Record Documents to one person on the Contractor's staff as approved by the City.

B. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of specifications and each sheet of Drawings and other documents where such entry is required to show progress and changes properly.

C. Make entries within 24-hours after receipt of information has occurred.

1.04 RECORD DOCUMENTS AT SITE

A. Maintain at the site and always available for City's use one (1) record copy of:
   1. Construction Contract, Drawings, Specifications, General Conditions, Supplemental Conditions, Bid Proposal, Instruction to Bidders, Addenda, and all other Contract Documents
   2. Change Orders, Verbal Orders, and other modifications to Contract
   3. Written instructions by the City as well as correspondence related to Requests for Information (RFIs)
   4. Accepted Shop Drawings, Samples, product data, substitution and "or-equal" requests
   5. Field test records, inspection certificates, manufacturer certificates and construction photographs
   6. Paper copies of the Progressive As-Built Drawings
   7. Current Surveyor's tables for the Assets Attribute Data, Pipe Deflection Data, and Gravity Main Data

B. Maintain the documents in an organized, clean, dry, legible condition and protected from deterioration, loss and damage until completion of the Work, transfer of all record data to the final As-built Drawings for submittal to the City.

C. Store As-Built Documents and samples in Contractor's office apart from documents used for construction. Do not use As-Built document for construction purposes. Label each document "AS BUILT" in neat large printed letters. File documents and samples in accordance with CSI/CSC format.

D. Record information concurrently with construction progress. Do not conceal any Work until required information is recorded.

PART 2 - PRODUCTS

2.01 AS-BUILT SURVEY DRAWINGS

A. Maintain the electronic As-Built Drawings to accurately record progress of Work and change orders throughout the duration of the Contract.

B. Date all entries. Enter RFI No., Change Order No., etc. when applicable.

C. Call attention to the entry by highlighting with a "cloud" drawn around the area affected or other means. In the event of overlapping changes, use different colors for entries of the overlapping changes.

D. Design callouts shall have a thin strike line through the design call-out and all As-Built information must be labeled (or abbreviated "AB") and be shown in a bolder text that is completely legible.

E. Entries shall consist of graphical representations, plan view and profiles, written comments, dimensions, State Plane Coordinates, details and any other information as required to document field and other changes of the actual Work completed. As a

minimum, make entries to also record:

1. Depths of various elements of foundation in relation to finish floor datum and State Plane Coordinates and elevations.
2. As-Built Asset Attribute Data tables shall be completed in the Drawings.
3. When electrical boxes, or underground conduits and plumbing are involved as part of the Work, record true elevations and locations, dimensions between boxes.
4. Actually, installed pipe or other work materials, class, pressure-rating, diameter, size, specifications, etc. Similar information for other encountered underground utilities, not installed by Contractor, their owner and actual location if different than shown in the Contract Documents.
5. Details, not on original Contract Drawings, as needed to show the actual location of the Work completed in a manner that allows the City to find it in the future.
6. The Contractor shall mark all arrangements of conduits, circuits, piping, ducts and similar items shown schematically on the construction documents and show on the As-Built Drawings the actual horizontal and vertical alignments and locations.
7. Major architectural and structural changes including relocation of doors, windows, etc. Architectural schedule changes according to Contractor's records and Shop Drawings.

2.02 RECORD DOCUMENTS

A. Three (3) paper copy sets and three (3) digital media sets of the following final Record Documents below.
   1. The following documents shall be signed and sealed by the Surveyor:
      a. As-built survey drawings as previously described in paragraph 2.01.
      b. As-built Asset Attribute Data (see Specification Section 01050 "Surveying and Field Engineering," Table 01050-2 for an example)
      c. Boundary Survey on a 81/2"x11" format of fee simple and/or permanent easement sites for pump stations, treatment facilities, etc. As a minimum the Boundary Survey shall show all above ground and underground structures or equipment, pipe, and conduit. All property or easement corners and the center of wetwell shall be shown with GPS coordinates. The Boundary Survey field work shall be dated after the Work has been completed.
      d. Boundary Survey on a 81/2"x11" format for Work related to constructed pipes within any permanent easements. As a minimum the Boundary Survey shall show the location of the pipe centerline and property corners with GPS coordinates. The Boundary Survey field work shall be dated after the Work has been completed within the easements.
      e. Gravity Main Table (see Specification Section 01050 "Surveying and Field Engineering", Table 01050-4 for an example)
      f. Pipe Deflection Table (see Specification Section 01050 "Surveying and Field Engineering" Table 01050-3 for an example). An electronic blank table will be supplied by the City.
   2. Provide an encompassing digital AutoCAD file in the Engineer's current version of AutoCAD and the file shall be saved under in the format dwg. The file includes all the information of the As-Built Survey and any other graphical information in the As- Built Drawings. It shall include the overall Work, utility system layout and

associated parcel boundaries and easements. Feature point, line and polygon information for new or altered Work and all accompanying geodetic control and survey data shall be included. The Surveyor's certified As-Built Asset Attribute Data shall be added to the As-Built Drawings.

3. Provide Scanned "As-Built" Drawing sets complete and include the title sheet, plan/profile sheets, cross-sections, and details. Each individual sheet contained in the printed set of the As-Built Drawings shall be included in the electronic drawings, with each sheet being converted into an individual tif (tagged image file). The plan sheets shall be scanned in tif format Group 4 at minimum of 400 dpi resolution to maintain legibility of each drawing. Then, the tif images shall be embedded into a single pdf (Adobe Acrobat) file representing the complete plan set.
4. Provide Scanned Record Documents reflecting changes from the Contract Documents.

PART 3 - EXECUTION

3.01 FINAL RECORD DOCUMENTS SUBMITTAL

A. Submit the Final Record Documents within 20-days after Substantial Completion.
   1. Participate in review meetings as required and make required changes and promptly deliver the Final Record Documents to the City.

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 01740
WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1.02 RELATED WORK

A. Refer to Conditions of Contract for the general requirements relating to warranties and bonds.

B. General closeout requirements are included in Section 01700 "Project Closeout."

C. Specific requirements for warranties for the Work and products and installations that are specified to be warranted are included in the individual Sections of Division 2 through 16.

1.03 DEFINITIONS

A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the City.

B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the City.

1.04 SUBMITTALS

A. Submit written warranties to the City prior to requesting a Substantial Completion Inspection as outlined in Section 01700 "Project Closeout." If the Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the City.

B. When a designated portion of the Work is completed and occupied or used by the City, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the City within 15-days of completion of that designated portion of the Work.

C. When a special warranty is required to be executed by the Contractor, or the Contractor and a Subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the City for approval prior to final execution.

D. Refer to individual Sections of Divisions 2 through 16 for specific content requirements, and particular requirements for submittal of special warranties.

E. Prior to Substantial Completion Inspection, submit to the City two (2) copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, Subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
   1. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents and sized to receive 8-1/2-inch by 11-inch three-hole punched paper.
   2. Table of Contents will be neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification Section in which specified and the name of the product or work item.
   3. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address and telephone number of the installer, supplier and manufacturer.
   4. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS", the project title or name and the name, address and telephone number of the Contractor.
   5. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

1.05 WARRANTY REQUIREMENT

A. The Contractor will warrant all equipment in the Contractor's one-year warranty period even though certificates of warranty may not be required. For all major pieces of equipment, the Contractor shall submit a warranty from the equipment manufacturer. "Major" equipment is defined as a device having a 5 HP or larger motor or which lists for more than $1,000.00.

B. In the event that an equipment manufacturer or supplier is unwilling to provide a one- year warranty commencing at Substantial Completion, the Contractor will obtain from the manufacturer a warranty of sufficient length commencing at the time of equipment delivery to the job site, such that the warranty will extend to at least 1-year past substantial completion.

C. If an individual specification section requires a particular warranty more stringent than that required by this Section or the General Conditions, the more stringent requirements will govern for the applicable portion of the Work.

D. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

E. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty will be equal to the original warranty with an equitable adjustment for depreciation.

F. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the City has benefited from use of the Work through a portion of its anticipated useful service life.

G. City's Recourse: Written warranties made to the City are in addition to implied warranties, and will not limit the duties, obligations, rights and remedies otherwise available under the law, nor will warranty periods be interpreted as limitations on time in which the City can enforce such other duties, obligations, rights, or remedies.

H. Rejection of Warranties: The City reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

I. The City reserves the right to refuse to accept Work for the project where a special warranty, certification, or similar commitment is required on such work or part of the Work, until evidence is presented that entities required to counter-sign such commitments are willing to do so.

J. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and Subcontractors required to countersign special warranties with the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 DELIVERABLES

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and Subcontractors, and bind into a commercial quality standard 3-ring binder; submit 5 copies of the warranties and bonds to the City for review.
   1. The warranties and bonds shall include:
      a. Equipment or product description
      b. Manufacturer's name, principal, address and telephone number

c. Contractor, name of responsible principal, address and telephone number
d. Local supplier's or representatives name and address
e. Scope of warranty or bond
f. Proper procedure in case of failure
g. Instances which might affect the validity of warranty or bond
h. Date of beginning of warranty, bond or service and maintenance contract
i. Duration of warranty, bond or service maintenance contract

B. Warranties
1. Furnish an extended warranty for sanitary sewer main liner certified by the manufacturer for specified material properties for a particular job. The manufacturer warrants the liner to be free from defects in raw materials for 1-year from the date of acceptance. During the warranty period, any defects which affect the integrity or strength of the pipe shall be repaired at the Contractor's expense in a manner acceptable to the City.
2. Furnish an extended warranty for sanitary lateral liner certified by the manufacturer for specified material properties for a particular job. The manufacturer warrants the liner to be free from defects in raw materials for 1-year from the date of acceptance. During the warranty period, any defects which affect the integrity or strength of the pipe shall be repaired at the Contractor's expense in a manner acceptable to the City.

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 02050
DEMOLITION OF EXISTING STRUCTURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work
   1. This Section specifies the labor, materials, equipment, and incidentals required for the demolition, relocation, and/or disposal of all structures, building materials, equipment, and accessories to be removed as shown on the Drawings and as specified herein.
   2. There may be existing and active stormwater, wastewater, water, and other facilities on site as indicated on the Drawings. It is essential that these facilities, when encountered, remain intact and in service during the proposed demolition. Consequently, the Contractor shall be responsible for the protection of these facilities and shall diligently direct all his activities toward maintaining continuous operation of the existing facilities and minimizing operational inconvenience.
   3. Demolition may include:
      a. Complete demolition and removal of piping and associated infrastructure. Sod, concrete sidewalk, trees, curb.
      b. Complete demolition and removal of all above and below ground structures, concrete slabs and foundations, vaults, and underground utilities (water, wastewater, electrical, etc.) needed to complete the Work, as encountered in the field.
      c. All material, equipment, rubble, debris, and other products of the demolition shall become the property of the Contractor for his disposal off-site in accordance with all applicable laws and ordinances at the Contractor's expense. The sale of salvageable materials by the Contractor shall only be conducted off-site. The sale of removed items on the site is prohibited by the City.
   4. The Contractor shall examine the various drawings, visit the site, determine the extent of the work, the extent of work affected therein, and all conditions under which he is required to perform the various operations.
   5. The Contractor shall fill and compact all voids left by the removal of pipe, structures, etc. with materials described herein to a grade that will provide for positive drainage of the disturbed area to drain run-off in direction consistent with the surrounding area. The Contractor shall provide all fill materials to the site as needed. Compaction of fill shall match the compaction of adjacent undisturbed material.

1.02 QUALITY ASSURANCE

A. Permits and Licenses: Contractor shall obtain all necessary permits and licenses for performing the work and shall furnish a copy of same to the City prior to commencing

the Work. The Contractor shall comply with the requirements of the permits.

B. Notices: Contractor shall issue written notices of planned demolition to companies or local authorities owning utility conduit, wires, or pipes running to or through the project site. Copies of said notices shall be submitted to the City.

C. Utility Services: Contractor shall notify utility companies or local authorities furnishing gas, water, electrical, telephone, or sewer service to remove any equipment in the structures way to be demolished and to remove, disconnect, cap, or plug their services to facilitate demolition.

1.03 SHOP DRAWINGS AND SUBMITTALS

A. Submittals shall be submitted to the City for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."

B. Submit to the City for their approval, 2 copies of proposed methods and operations of demolition or relocation of the structures specified below prior to the start of Work. Include in the schedule the coordination of shut-off, capping, and continuation of utility service as required.

C. Provide a detailed sequence of demolition and removal work to ensure the uninterrupted progress of the City's operations.

D. Before commencing demolition work, all structure relocation, bypassing, capping, or modifications necessary will be completed. Actual work will not begin until the City has inspected and approved the prerequisite work and authorized commencement of the demolition work.

E. The above procedure must be followed for each individual demolition operation.

1.04 SITE CONDITIONS

A. Prior to demolition, the Contractor shall obtain written verification from the utility owner(s) that the existing utilities, including stormwater, wastewater, and/or water facilities, are not operational and are ready for demolition.

B. The City assumes no responsibility for the actual condition of the structures to be demolished or relocated.

C. Conditions existing at the time of inspection for bidding purposes will be maintained by the City insofar as practicable. However, variations within each site may occur prior to the start of demolition work.

D. No additional payment will be made for pumping or other difficulties encountered due to water.

E. Certain information regarding the reputed presence, size, character and location of existing underground structures, pipes and conduit has been shown on the drawings. There is no certainty of the accuracy of this information, and the location of underground structures shown may be inaccurate and other obstructions than those shown may be encountered. The Contractor hereby distinctly agrees that the City is not responsible for the correctness or sufficiency of the information given; that in no event is this information to be considered as a part of the Contract; that he shall have no claim for delay or extra compensation on account of incorrectness of information regarding obstructions either revealed or not revealed by the drawings; and that he shall have no claim for relief from any obligation or responsibility under this Contract in case the location, size, or character of any pipe or other underground structure is not as indicated on the drawings, or in case any pipe or other underground structure is encountered that is not shown on the drawings.

1.05 RESTRICTIONS

A. No building, tank or structure, or any part thereof, shall be demolished until an application has been filed by the Contractor with the Building Department Inspector and a permit issued if a permit is required. The fee for this permit shall be the Contractor's responsibility. Demolition shall be in accordance with applicable provisions of the Building Code of the State of Florida.

B. No explosives shall be used at any time during the demolition. No burning of combustible material will be allowed.

1.06 DISPOSAL OF MATERIAL

A. All salvageable or useable material or equipment to be retained by the City shall be shown on drawings and shall be moved to a designated area by Contractor for pick up by City. The Contractor shall promptly remove all other materials from the site as indicated or shown on the drawings.

B. All materials not retained by the City shall become the Contractor's property and shall be removed off-site.

C. The on-site storage of removed items is prohibited by the City. Off-site sale of salvageable material by the Contractor is acceptable.

1.07 TRAFFIC AND ACCESS

A. Conduct work to ensure minimum interference with on-site and off-site roads, streets, sidewalks, and occupied or used facilities.

B. Special attention is directed towards maintaining safe and convenient access to the existing facilities in the area. remaining in operation by plant personnel and plant associated vehicles, including trucks and delivery vehicles.

C. Do not close or obstruct streets, sidewalks, or other occupied or used facilities without permission from the city. Provide alternate routes around closed or obstructed traffic in access ways.

1.08 PROTECTION

A. Conduct operations to minimize damage by falling debris or other causes to adjacent buildings, structures, roadways, other facilities, and persons. Provide interior and exterior shoring, bracing, or support to prevent movement or settlement or collapse of structures to be demolished and adjacent facilities to remain.

1.09 DAMAGE

A. Promptly repair damage caused to adjacent facilities by demolition operations as directed by the City at no cost to the City.

1.10 UTILITIES

A. Maintain existing utilities as directed by the City to remain in service and protect against damage during demolition operations.

B. Do not interrupt existing utilities serving occupied or operational facilities, except when authorized by City. Provide temporary services during interruptions to existing utilities as acceptable to the City.

C. The Contractor shall cooperate with the City to shut off utilities serving structures of the existing facilities as required by demolition operations.

D. The Contractor shall be solely responsible for making all necessary arrangements and for performing any necessary work involved in connection with the interruption of all public and private utilities or services.

E. All utilities being abandoned shall be terminated at the service mains in conformance with the requirement of the utility companies or the municipality owning or controlling them.

1.11 EXTERMINATION

A. If required, before starting demolition, the Contractor shall employ a certified rodent and vermin exterminator and treat the facilities in accordance with governing health laws and regulations. Any rodents, insects, or other vermin appearing before or during the demolition shall be killed or otherwise prevented from leaving the immediate vicinity of

the demolition work.

1.12 POLLUTION CONTROL

A. For pollution control, use water sprinkling, temporary enclosures, and other suitable methods as necessary to limit the amount of dust rising and scattering in the air to the lowest level of air pollution practical for the conditions of work. The Contractor shall comply with the governing regulations.

B. Clean adjacent structures and improvements of all dust and debris caused by demolition operations as directed by the City. Return areas to conditions existing prior to the start of Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SEQUENCE OF WORK

A. The sequence of demolition and relocation of existing facilities shall be in accordance with the approved critical path schedule as specified in paragraph 1.03 above.

3.02 REMOVAL OF EXISTING PROCESS EQUIPMENT, PIPING, AND APPURTENANCES

A. Equipment to be retained by the City will be designated for retention by the City prior to bidding as specified in Paragraph 1.06 above. Subject to the constraints of maintaining existing facilities in operation as shown on the Drawings, all other process equipment, non-buried valving and piping, and appurtenances shall be removed from the site.

3.03 DEMOLITION PROCEDURES

The Contractor shall adhere to the following demolition procedures as referenced on the Drawings:

A. TO BE DEMOLISHED: Demolition shall be the breaking up, cutting, filling of any holes resulting, final grading of the area, performing any other operations required, and the removal from the site of all structures and equipment (structures, substructures, floor slabs, equipment, tanks, pipes, fittings, electrical systems, light poles, trees, wiring, underground conduits and wiring, isolated slabs, and sidewalks) as indicated on the Drawings. All pieces of concrete, metal, and any other demolished material shall be removed to a depth of at least 5-feet below existing grade. Broken pieces of concrete may be size reduced by an on-site crusher, but in any event must be removed from the project site.

Before commencing structural demolition, remove all mechanical, electrical, piping, and

miscellaneous appurtenances. Completely remove the structure by thoroughly breaking up concrete into pieces no more than 2-feet across the largest dimension.

B. TO BE REMOVED: Where indicated on the Drawings, the structures and equipment shall be completely removed from the site with all associated connecting piping or electrical service. The item shall be taken whole or in parts to be salvaged or disposed of by the Contractor.

C. TO BE ABANDONED: Where indicated on the Drawings, the structures and equipment shall be left in place, drained, and the contents properly disposed. The upper 4-feet of the structure shall be cut and removed, including the cover slab and access port, frame, and cover. All structures to be abandoned with bottom slabs shall be drilled (2 holes minimum, 2.0-inch diameter each) or hole punched to prevent flotation and filled with common fill.

D. PIPING TO BE REMOVED: Where indicated on the Drawings, pipe (and conduit) shall be drained and the contents properly disposed. The pipe (or conduit) shall then be completely removed from the site, including fittings, valves, and other in-line devices. Connections to existing piping to remain shall be plugged by mechanical means (M.J. plugs, tie-rods, or thrust blocks). Piping shall be removed in accordance with Specification Section 02080 "Abandonment, Removal and Salvage or Disposal of Existing Pipe."

E. PIPING TO BE ABANDONED: Where indicated on the Drawings, piping (or conduit) shall be left in place. All such piping shall be drained and the contents properly disposed. The pipe (or conduit) shall then be filled with grout (flowable fill) and each end of the pipe (or conduit) shall be plugged using a concrete plug in a manner acceptable to the City. Piping shall be abandoned in accordance with Specification Section 02080 "Abandonment, Removal and Salvage or Disposal of Existing Pipe."

F. TO BE PROTECTED: Where indicated on the Drawings, the utility service, fence, structure, tree, or device so designated shall be temporarily protected during the prosecution of the demolition work as specified in Division 1.

G. TO REMAIN: Where indicated on the Drawings, the designated facilities shall remain intact and in service during the prosecution of the demolition work.

3.04 DEWATERING OF EXISTING PROCESS UNITS AND DISPOSAL OF RESIDUE

The Contractor shall notify the City prior to beginning the dewatering work on any existing process units which contain wastewater, grit, or sludge. The Contractor, at his own expense, shall remove the entire contents of each structure and dispose off site. The proper transport and disposal of all residues shall remain the responsibility of the Contractor.

END OF SECTION

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SECTION 02100
TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work
   1. The Work specified in this Section consists of designing, providing, maintaining and removing temporary erosion, sedimentation and turbidity controls as necessary.
   2. Temporary erosion controls include, but are not limited to, grassing, mulching, setting, watering and reseeding on-site surfaces and soil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by federal, state and local requirements and by the City.
   3. Temporary sedimentation controls include, but are not limited to; silt fence, silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by federal, state and local requirements and by the City.
   4. Temporary turbidity controls include, but are not limited to, floating or staked turbidity barriers which will ensure that turbidity pollution will be either eliminated or maintained within acceptable limits as established by Federal, state, and local requirements and by the City.
   5. Contractor is responsible for providing effective temporary erosion, sediment, and turbidity control measures during construction or until permanent controls become effective.

B. Related Work Described Elsewhere: South Florida Building Code and Standard Building Code, FDOT Standard Specifications and FDOT Design Standards.

PART 2 - PRODUCTS

2.01 EROSION CONTROL

A. Netting Fence: fabricated of material acceptable to the City.

B. Sod is specified in Section 02578, "Solid Sodding."

2.02 SEDIMENTATION CONTROL

A. Bales: clean, seed-free cereal hay type.

B. Netting: fabricated of material acceptable to the City.

C. Filter stone: crushed stone conforming to Florida Department of Transportation

specifications.

D. Concrete block: hollow, non-load bearing type.

E. Concrete: exterior grade not less than 1-inch thick.

F. Rock Bags: conforming to FDOT Specifications.

2.03 TURBIDITY CONTROL

A. Conforming to FDOT Design Standards Index 103 - Turbidity Barriers.

PART 3 - EXECUTION

3.01 EROSION CONTROL

A. Minimum Procedures for Grassing Are:
   1. Scarify slopes to a depth of not less than 6-inches and remove large clods, rock, stumps and roots larger than 1/2-inch in diameter and debris.
   2. Sow seed within 24-hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.
   3. Apply mulch loosely and to a thickness of between 3/4-inch and 1-1/2-inches.
   4. Apply netting over mulched areas on sloped surfaces.
   5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

3.02 SEDIMENTATION CONTROL

A. Install and maintain silt fence, silt dams, traps, barriers and appurtenances as shown on the approved descriptions and working Drawings. Hay bales which deteriorate and filter stone which is dislodged shall be replaced.

3.03 TURBIDITY CONTROL

A. Install and maintain turbidity barriers daily and as described in FDOT Index #103.

3.04 PERFORMANCE

A. Should any of the temporary erosion and sediment control measures employed by the Contractor fail to produce results which comply with the requirements of the State of Florida, the Contractor shall immediately take whatever steps are necessary to correct the deficiency at his own expense.

END OF SECTION

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SECTION 02140
DEWATERING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: This Section specifies the furnishing of equipment; labor and materials necessary to remove storm or subsurface waters from excavation areas in accordance with the requirements set forth, as shown on the Drawings, and/or geotechnical report.

1.02 QUALITY ASSURANCE

A. Qualifications: The Contractor shall engage a Geotechnical Engineer registered in the State of Florida, to design the temporary dewatering system. The Contractor shall submit conceptual plan for the dewatering system prior to commencing work. The dewatering system installed shall be in conformity with the overall construction plan and certification of this shall be provided by the Geotechnical Engineer. The dewatering system shall be designed by a firm who regularly engages in the design of dewatering systems and who is fully experienced, reputable and qualified in the design of such dewatering systems.

B. The dewatering of any excavation areas and the disposal of the water shall be in strict accordance with the latest revision of all local and state government rules and regulations.

C. Permits: The Contractor shall obtain and pay respective fees for all local, state, and federal permits (including the City, SFWMD, and/or SBDD) required for the withdrawal, treatment and disposal/discharge of water from the dewatering operation, prior to start of work.

D. Comply with Florida Administrative Code, Chapter 62-621.300 (2).

1.03 SHOP DRAWINGS AND SUBMITTALS

A. Submittals shall be submitted to the City for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."

B. In accordance with FAC 62-621.300(2), submit analytical test results from a certified laboratory for the parameters listed in the FDEP "Generic Permit for the Discharge of Produced Ground Water from Any Non-Contaminated Site Activity" to the FDEP and the City. The submitted information shall show the location of the work, where the water will be going to, as well as an estimate for the amount, rate and duration of discharge being proposed.

C. Provide notification to all jurisdictional permitting agencies in accordance with the requirements of the respective agency.

D. Provide a detailed plan and operation schedule for dewatering of excavations.
   1. Provide descriptive literature of the dewatering system.
   2. Provide a plan for erosion and sedimentation control during dewatering.
   3. Provide copies of all permits/approvals for disposal/discharge of water during dewatering.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall have on-site and available the analytical test results performed in accordance with the FDEP "Generic Permit for the Discharge of Produced Ground Water from Any Non-Contaminated Site Activity" (FAC 62-621.300(2)).

B. The Contractor shall provide adequate equipment for the removal of storm or subsurface waters which may accumulate within the excavation.

C. The Contractor's attention is directed to the water surface elevations discussed in the report(s) on subsurface investigations. Water levels will normally vary from season to season.

D. The Contractor shall be required to monitor the performance of the dewatering system during the progress of the Work and make such modifications as may be required to assure that the systems will perform satisfactorily. The dewatering system shall be designed in such a manner as to preserve the undisturbed bearing capacity of the sub- grade soils at the bottom of the trench or excavation.

E. Prior to excavation, the Contractor shall submit his proposed method of dewatering and maintaining dry conditions to the City. Approval of the dewatering plan shall not relieve the Contractor of the responsibility for the satisfactory performance of the system. The Contractor shall be responsible for correcting any disturbance of natural bearing soils or damage to structures caused by an inadequate dewatering system or by interruption of the continuous operation of the system as specified.

F. If subsurface water is encountered, the Contractor shall utilize suitable equipment to adequately dewater the excavation. A wellpoint system or other City acceptable dewatering method shall be utilized if necessary to maintain the excavation in a dry condition for preparation of the trench bottom and for pipe laying. Within and adjacent to residential areas and other areas as required by the City, engines driving dewatering pumps shall be equipped with residential type mufflers and the noise shall not exceed 55 decibels within 50-feet.

3.02 DEWATERING AND DISPOSAL

A. The Contractor shall construct and place all pipelines, structures, concrete work, structural fill, backfill and bedding material in-the-dry. In addition, the Contractor shall make the final 24-inches of excavation in-the-dry and not until the water level is a minimum of 2-foot below proposed bottom of excavation. For purposes of this Contract, in-the-dry is defined as ±2% of the optimum moisture content of the soil.

B. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of all water entering excavations. Contractor shall keep excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill, structure, or pipes have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.

C. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.

D. It is expected that dewatering will be required for pre-drainage of the soils prior to final excavation for most of the in-ground structures or piping and for maintaining the lowered groundwater level until construction has been completed so that the structure, pipeline or fill will not be floated or otherwise damaged.

E. If wellpoints are used, Contractor shall adequately space wellpoints to maintain the necessary dewatering. Provide suitable filter sand and/or other means to prevent pumping of fine sands and silts. A continual check shall be maintained by the Contractor to ensure that the subsurface soil is not being removed by the dewatering operations. Pumping from wellpoints shall be continuous and standby pumps shall be provided.

F. The Contractor's proposed method of dewatering shall include groundwater observation wells to determine the water level during construction. Observation wells shall be installed along pipelines as required to verify depth to water level and at locations approved by the City.

G. At all times, site grading shall promote drainage. Surface runoff shall be diverted from excavations. Water entering the excavation from the surface shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped or drained by gravity to maintain an excavation bottom free from standing water.

H. Flotation shall be prevented by the Contractor by maintaining a positive and continuous removal of water. The Contractor shall be fully responsible for all damages which may result from failure to adequately keep excavations dewatered.

I. The Contractor shall dispose of water from the Work in a suitable manner without damage to adjacent properties or facilities. No water shall be discharged without appropriate treatment for adverse contaminants. No water shall be drained in work built or under construction without prior consent from the City. Water shall be filtered to remove sand and fine soil particles before disposal into any drainage system.

J. Dewatering of excavations shall be considered incidental to the construction of the Work and all costs shall be included in the various Contract prices in the Bid Form, unless a separate bid item has been established for dewatering.

3.03 GROUNDWATER TREATMENT (IF REQUIRED)

A. If concentrations of tested groundwater quality parameters exceed those allowable in the FDEP Generic Permit for the Discharge of Produced Groundwater from any Non-Contaminated Site Activity (62-621.300(2), F.A.C.), the Contractor shall treat the effluent.

B. The Contractor shall immediately notify the City and discuss the parameters that exceed allowable limits.

C. The Contractor shall meet with the FDEP to determine alternatives that are acceptable to the FDEP.

D. The Contractor shall apply for and obtain any and all permits and/or treatment approvals that FDEP requires including but not limited too:
   1. Generic Permit for Discharges from Petroleum Contaminated Sites (62-621.300(1)). Allows discharges from sites with automotive gasoline, aviation gasoline, jet fuel, or diesel fuel contamination; or
   2. Permit for all Other Contaminated Sites (62-04; 62-302; 62-620 & 62-660). The coverage is available only through the individual NPDES permit issued by FDEP, allows discharges from sites with general contaminant issues i.e. ground water and/or soil contamination other than petroleum fuel contamination; or
   3. Generic Permit for the Discharge of Produced Ground Water from Any Non-Contaminated Site Activity (62-621.300(2), F.A.C.); or
   4. Generic Permit for Stormwater Discharge from Large or Small Construction Activities (62-621.300(4)(a), F.A.C.); or
   5. An Individual Wastewater Permit (62-604.300(8) (a)

E. The Contractor shall implement the appropriate treatment that is acceptable to FDEP and City to attain compliance for all excess limits encountered during dewatering activities. Treatment may include, but is not limited to: Chemical, Biological, Electrolysis or any combination of the three.

F. The Contractor shall make every effort to minimize the spread of contamination into uncontaminated areas. Provide for the health and safety of all workers at the job site and make provisions necessary for the health and safety of the public that may be exposed to any potentially hazardous conditions. Ensure provision adhere to all applicable laws, rules or regulations covering hazardous conditions and will be in a manner commensurate with the level of severity of the conditions.

G. If necessary, provide contamination assessment and remediation personnel to handle site assessment, determine the course of action necessary for site security and perform the necessary steps under applicable laws, rules and regulations for additional assessment and/or remediation work to resolve the contaminations issue.

H. Delineate the contamination area(s) and any staging or holding area required and develop a work plan that will provide the schedule of projected completion dates for the final resolution of the contamination issue.

I. Maintain jurisdiction over activities inside any delineated contamination areas and any associated staging or holding areas. Be responsible for the health and safety of workers within the delineated areas. Provide continuous access to representatives of regulatory or enforcement agencies having jurisdiction.

3.04 REMOVAL

Immediately upon completion of the dewatering system, the Contractor shall remove all of his equipment, materials, and supplies from the site of the Work, remove all surplus materials and debris, fill in all holes or excavations, and grade the site to elevations of the surface levels which existed before work started. The site shall be thoroughly cleaned and approved by the City.

END OF SECTION

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SECTION 02215
FINISH GRADING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Provide finish grading to all areas within the limits of construction.

B. Grade sub-soil. Cut out areas to receive stabilizing base course materials for paving and sidewalks. Place, finish grade, and compact topsoil.

1.02 PROTECTION

A. Prevent damage to existing fencing, trees, landscaping, natural features, benchmarks, pavement, and utility lines. Correct damage at no cost to the city.

1.03 SHOP DRAWINGS AND SUBMITTALS

A. Submittals shall be submitted to the City for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."

PART 2 - PRODUCTS

2.01 MATERIALS

A. All material supplied shall be one of the products specified in Appendix D "List of Approved Products" appended to these technical specifications.

B. Topsoil: Friable loam free from subsoil, roots, grass, excessive amount of weeds, stones, and foreign matter; acidity range (pH) of 5.5 to 7.5; containing a minimum of 4% and a maximum of 25% organic matter. The topsoil shall be suitable for the proposed plant growth shown on the Drawings and specified. Use topsoil stockpiles on site if conforming to these requirements. If there is not sufficient topsoil available at the project site, the Contractor shall furnish additional topsoil as required to complete the Work at no additional cost to the City.

PART 3 - EXECUTION

3.01 SUB SOIL PREPARATION

A. Rough grade sub-soil systematically to allow for a maximum amount of natural settlement and compaction. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, etc. Remove sub-soil that has been contaminated with petroleum products.

B. Cut out areas to subgrade elevation which are to receive stabilizing base for paving and sidewalks.

C. Bring sub soil to required levels, profiles, and contours. Make changes in grade gradual. Blend slopes into level areas.

D. Slope grade away from building a minimum of 2-inches in 10-feet unless indicated otherwise on the Drawings.

E. Cultivate subgrade to a depth of 3-inches where topsoil is to be placed. Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted sub-soil.

3.02 PLACING TOPSOIL

A. Place topsoil in areas where seeding, sodding, and planting is to be performed. Place to the following minimum depths, up to finished grade elevations.
   1. 6-inches for seeded areas
   2. 4-1/2-inches for sodded areas
   3. 24-inches for shrub beds
   4. 18-inches for flower beds

B. Use topsoil in relatively dry state. Place during dry weather.

C. Fine grade topsoil eliminating rough and low areas to ensure positive drainage. Maintain levels, profiles, and contours of subgrades.

D. Remove stones, roots, grass, weeds, debris, and other foreign material while spreading.

E. Manually spread topsoil around trees, plants, and buildings to prevent damage which may be caused by grading equipment.

F. Lightly compact placed topsoil.

3.03 SURPLUS MATERIAL

A. Remove surplus sub soil and topsoil from site.

B. Leave stockpile areas and entire job site clean and raked, ready to receive landscaping.

END OF SECTION

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SECTION 02220
EXCAVATING, BACKFILLING, AND COMPACTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Excavate, backfill, and compact as required for the construction of the utility system consisting of piping and appurtenances, and structural construction as shown on the Drawings and specified herein. The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to perform all excavation, backfill, compaction, grading, and slope protection to complete the Work. The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his bid, all underground utilities locations and appurtenances shown on the construction Drawings.

B. Where riprap, bedding stone, or geotextile fabric is required in association with excavation or slope protection activities, the Contractor shall furnish and install materials in accordance with the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, Section 530 – Riprap. This includes compliance with physical and gradation requirements for rubble and bedding stone, installation over geotextile fabric per FDOT Section 514 and Index 199, and proper placement per FDOT construction methods. All materials shall meet durability and size specifications, and damaged geotextile fabric shall be replaced at no additional cost to the City.

C. Definitions:
   1. Maximum Density: Maximum weight in pounds per cubic foot of a specific material as determined by AASHTO T-180 (ASTM D155).
   2. Optimum Moisture: Percentage of water in a specific material at maximum density.
   3. Rock Excavation: Excavation of any hard natural substance which requires the use of explosives and/or special impact tools such as jack hammers, sledges, chisels, or similar devices specifically designed for use in cutting or breaking rock, but exclusive of trench excavating machinery.
   4. Suitable: Suitable materials for fills shall be non-cohesive, non-plastic granular local sand and shall be free from vegetation, organic material, marl, silt, or muck. The Contractor shall furnish all additional fill material required.
   5. Unsuitable: Unsuitable materials are highly organic soil (peat or muck) classified as A-8 in accordance with AASHTO Designation M 145.

D. Plan For Earthwork: The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his bid, the conformation of the ground, the character and quality of the substrata, the types and quantities of materials to be encountered, the nature of the groundwater conditions, 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. Prior to commencing the excavation, the Contractor shall submit a plan of his proposed operations, including maintenance of traffic, to the City for review. The Contractor shall consider, and his plan for excavation shall reflect, the equipment and methods to be employed in the excavation. The prices established in the Proposal for the Work to be done will reflect all costs pertaining to the Work.

1.02 QUALITY ASSURANCE

A. Testing laboratory employed by the City will make such tests as are deemed advisable. The Contractor shall schedule his work to permit a reasonable time for testing before placing succeeding lifts and shall keep the laboratory informed of his progress. Costs for initial testing shall be paid by the City; however, tests which have to be repeated because of the failure of the tested material to meet specification shall be paid for by the Contractor and the cost of re-testing shall be deducted from payments due the Contractor.

B. Standards
   1. AASHTO: American Association of State Highway and Transportation Officials
   2. ANSI: American National Standards Institute
   3. ASCE: American Society of Civil Engineers
   4. ASTM: American Society for Testing and Materials
   5. AWWA: American Water Works Association
   6. OSHA 29 CFR Subpart P – Excavations and Trenches a) 1926.650, 1926.651, 1926.652
   7. OSHA 29 CFR Subpart J - a) 1910.146 for Confined Space Entry

1.03 JOB CONDITIONS

A. Existing Utilities
   1. The Contractor is responsible for subsurface verification of existing utilities prior to construction. Locate existing utilities in the area of work in accordance with Sunshine State One Call regulations, Chapter 556, "Underground Facility Damage Prevention and Safety Act", FS.
   2. Should uncharted or incorrectly charted piping or other utility be encountered during excavation, notify the City. Keep all facilities in operation and repair damaged utilities to the satisfaction of the City.
   3. Damage and repair costs to such piping or utilities are the Contractor's responsibility.
   4. If utilities are to remain in place, the Contractor shall provide adequate means of protection.

B. Test borings and the sub-surface exploration data if previously done on the site will be made available upon request and are for the Contractor's information only.

1.04 PROTECTION

A. Sheeting and Bracing
   1. Requirements of the Trench Safety Act shall be adhered to at all times.

2. Furnish, put in place, and maintain such sheeting and bracing as may be required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, to protect adjacent structures and power poles from undermining, and to protect workers from hazardous conditions or other damage. Such support shall consist of braced steel sheet piling, braced wood lagging and soldier beams or other acceptable methods. If the City is of the opinion that at any point sufficient or proper supports have not been provided, the City may order additional supports put in at the expense of the Contractor, and compliance with such order shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and compacted. Where soil cannot be properly compacted to fill a void, lean concrete shall be used as backfill at no additional expense to the City.
3. The Contractor shall construct the sheeting outside the neat lines of the foundation unless indicated otherwise for the method of operation. Sheeting shall be plumb and securely braced and tied in position. Sheeting and bracing shall be adequate to withstand all pressure to which the structure or trench will be subjected. Any movement or bulging which may occur shall be corrected by the Contractor at their own expense so as to provide the necessary clearances and dimensions.
4. Where sheeting and bracing is required to support the sides of excavations for structures, the Contractor shall engage a Professional Geotechnical Engineer, registered in the State of Florida, to design the sheeting and bracing. The sheeting and bracing installed shall be in conformity with the design, and the Professional Engineer shall provide certification of this.
5. The installation of sheeting, particularly by driving or vibrating, may cause distress to existing structures. The Contractor shall evaluate the potential for such distress and, if necessary, take all precautions to prevent distress of existing structures because of sheeting installation.
6. The Contractor shall leave in place to be embedded in the backfill all sheeting and bracing not shown on the Drawings but which the City may direct him in writing to leave in place at any time during the progress of the Work for the purpose of preventing damage to structures, utilities, or property, whether public or private. The City may direct that timber used for sheeting and bracing be cut off at any specified elevation.
7. All sheeting and bracing not left in place shall be carefully removed in such manner as not to endanger the construction or other structures, utilities, or property. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, or otherwise as may be directed by the City.
8. The right of the City to order sheeting and bracing left in place shall not be construed as creating any obligation on the City's part to issue such orders, and their failure to exercise this right shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the Work occasioned by negligence or otherwise, growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

9. No wood sheeting is to be withdrawn if driven below mid-diameter of any pipe, and under no circumstances shall any wood sheeting be cut off at a level lower than 1-foot above the top of any pipe.

B. Pumping and Drainage:
   1. The Contractor shall at all times during construction provide and maintain proper equipment and facilities to remove all water entering excavations, and shall keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fills, structures, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing the water level to return to the natural level as stipulated in Section 02140 "Dewatering." The Contractor shall engage a Professional Geotechnical Engineer registered in the State of Florida to design the dewatering systems. The Contractor shall submit to the City for a plan for dewatering systems prior to commencing work. The dewatering system installed shall be in conformity with the overall construction plan, and the Professional Engineer shall provide certification of this. The Professional Engineer shall be required to monitor the performance of the dewatering systems during the progress of the Work and require such modifications as may be required to assure that the systems are performing satisfactorily.
   2. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at the proposed bottom of excavation and to preserve the integrity of adjacent structures. Dewatering by trench pumping will not be permitted if migration of fine grained natural material from bottom, sidewalls, or bedding material will occur.
   3. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped from the excavation to maintain a bottom free from standing water.
   4. The Contractor shall take all additional precautions to prevent uplift of any structure during construction.
   5. Permission to use any storm sewers or drains for water disposal purposes shall be obtained from the authority having jurisdiction. Any requirements and costs for such use shall be the responsibility of the Contractor. However, the Contractor shall not cause flooding by overloading or blocking up the flow in the drainage facilities, and he shall leave the facilities unrestricted and as clean as originally found. Any damage to facilities shall be repaired or restored as directed by the City or the authority having jurisdiction, at no cost to the City.
   6. The Contractor shall prevent flotation by maintaining a positive and continuous operation of the dewatering system. The Contractor shall be fully responsible and liable for all damages which may result from failure of this system.
   7. Removal of dewatering equipment shall be accomplished after compaction/density testing has been completed and the system is no longer required. The Contractor shall remove the material and equipment constituting the system.
   8. The Contractor shall take all necessary precautions to preclude the accidental discharge of fuel, oil, or other contaminates in order to prevent adverse effects on groundwater quality.

1.05 TESTING AND INSPECTION SERVICE

A. The City will provide a geotechnical testing and inspection service. The services include testing soil materials and quality control testing during filling and backfilling operations. Samples of soil materials shall be furnished to the testing service by the Contractor. The City shall pay costs of initial geotechnical testing. The Contractor shall pay for any subsequent testing required due to failure and laboratory stand-by charges incurred.

B. The Contractor shall provide monthly density testing reports to the City during backfilling activities. Density testing reports not submitted in a timely manner shall result in rejection of the pipe installed and rejection of the density testing reports until such time that density re-testing is coordinated and repeated at the Contractors expense.

C. Density testing scheduled subsequent to backfilling activities shall be coordinated with, and witnessed by the City. Failure by the Contractor to coordinate or have the City present shall result in rejection of the submitted density testing reports and re-testing at the Contractor's expense.

D. Dewatering systems shall not be removed until compaction/density testing has been completed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General:
   1. All fill material shall be subject to the review and acceptance of the City.
   2. All fill material shall be free of organic material, trash, or other objectionable material. The Contractor shall remove excess or unsuitable material from the job site.

B. Common Fill Material: Common fill shall consist of mineral soil, substantially free of clay, organic material, muck, loam, wood, trash, and other objectionable material which may be compressible or which cannot be compacted properly. Common fill shall not contain stones larger than 3-1/2-inches in any dimension in the top 12-inches or 6-inches in any dimension in the balance of fill area. Common fill shall not contain asphalt, broken concrete, masonry, rubble or other similar materials. It shall have physical properties that allow it to be easily spread and compacted during filling. Additional common fill shall be no more than 12 % by weight finer than the No. 200 mesh sieve, unless finer material is approved for use in a specific location by the City. Select Common Fill shall be as specified as above from common fill, except that the material shall contain no stones larger than 1/2-inches in largest dimension, and shall be no more than 5 % by weight finer than the No. 200 mesh sieve.

C. Structural Fill: Structural fill shall be reasonably well graded sand to gravelly sand having the following gradation:

US Sieve Size	Percent Passing By Weight

No. 1	100
No. 4	75 - 100
No. 40	15 - 80
No. 100	0 - 30
No. 200	0 - 12

D. Class 1 Soils*: Manufactured angular, granular material, 1/4 to 1-1/2-inches (6 to 4 mm) size, including materials having significance such as crushed stone or rock, broken coral, crushed slag, cinders, or crushed shells. Sieve analysis for crushed stone is given below separately.

Crushed Stone: Crushed stone shall consist of clean mineral aggregate free from clay, loam or organic matter, conforming to ASTM C33 stone size No. 89 and with particle size limits as follows:

U.S. Sieve Size	% Passing By Weight
½	100
3/8	100
No. 4	20 – 25
No. 8	5 – 30
No. 16	0 - 10
No. 50	0 - 2

E. Class II Soils**:
1. GW: Well graded gravels and gravel-sand mixtures, little or no fines. Fifty percent or more retained on No. 4 sieve. More than 95 % retained on No. 200 sieve. Clean.
2. GP: Poorly graded gravels and gravel-sand mixtures, little or no fines. Fifty percent or more retained on No. 4 sieve. More than 95 % retained on No. 200 sieve. Clean.
3. SW: Well graded sands and gravelly sands, little or no fines. More than passes No. 4 sieve. More than 95 % retained on No. 200 sieve. Clean.
4. SP: Poorly graded sands and gravelly sands, little or no fines. More than 50 % passes No. 4 sieve. More than 95 % retained on No. 200 sieve. Clean.

*Soils defined as Class I materials are not defined in ASTM D2487.
**In accordance with ASTM D2487, less than 5 % pass No. 200 sieve.

F. Coarse Sand: Sand shall consist of clean mineral aggregate with particle size limits as follows:

U.S. Sieve Size	Percent Passing By Weight
3/8	100
No. 10	85 – 100
No. 40	20 – 40
No. 200	0 - 12

G. Other Material: All other material, not specifically described, but required for proper completion of the Work shall be selected by the Contractor and acceptable by the City.

PART 3 - EXECUTION

3.01 PREPARATION

A. Clearing:
   1. The construction areas shall be cleared of all obstructions and vegetation including large roots and undergrowth within 10-feet of the lines of the excavation.
   2. Strip and stockpile topsoil on the site at the location to be determined by the City.

3.02 EXCAVATION

A. General: Excavations for roadways, structures, and utilities must be carefully executed in order to avoid interruption of utility service.

B. Excavating for Roadways/Structures/Utilities:
   1. Excavation shall be made to such dimensions as will give suitable room for building the foundations and the structures, for bracing and supporting, for pumping and draining, and for all other work required.
      a. Excavation for precast or prefabricated structures shall be carried to an elevation 2-feet lower than the proposed outside bottom of the structure to provide space for the select backfill material. Prior to placing the select backfill, the excavation shall be measured by the City to verify that the excavation has been carried to the proper depth and is reasonably uniform over the area to be occupied by the structure.
      b. Excavation for structures constructed or cast in place in dewatered excavations shall be carried down to the bottom of the structure where dewatering methods are such that a dry excavation bottom is exposed and the naturally occurring material at this elevation leveled and left ready to receive construction. Material disturbed below the founding elevation in dewatered excavations shall be replaced with Class B concrete.
      c. Footings: Cast-in-place concrete footing sides shall be formed immediately after excavation.
   2. Immediately document the location, elevation, size, material type and function of all new subsurface installations, and utilities encountered during the course of construction.
   3. Excavation equipment operators and other concerned parties shall be familiar with subsurface obstructions as shown on the Drawings and should anticipate the encounter of unknown obstructions during the course of the Work.
   4. Encounters with subsurface obstructions shall be hand excavated.
   5. Excavation and dewatering shall be accomplished by methods that preserve the undisturbed state of subgrade soils. Subgrade soils which become soft, loose, "quick" or otherwise unsatisfactory for support of structures as a result of inadequate dewatering or other construction methods shall be removed and replaced by crushed stone as required by the City at the Contractor's expense.
   6. The bottom of excavations shall be rendered firm and dry before placing any piping or structure.
   7. All pavements shall be cut with saws or approved power tools prior to removal.

8. Excavated material shall be stockpiled in such a manner as to prevent nuisance conditions. Surface drainage shall not be hindered. Excavated material not suitable for backfill shall be removed from the site and disposed of by the Contractor.

3.03 DRAINAGE

A. The Contractor shall at all times during construction provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavations, and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition. The dewatering method used shall prevent disturbance of earth below grade.

B. All water pumped or drained from the Work shall be disposed of in a suitable manner without undue interference with other work, without damage to surrounding property, and in accordance with pertinent rules and regulations.

C. No construction, including pipe laying, shall be allowed in water. No water shall be allowed to contact masonry or concrete within 24-hours after being placed. The Contractor shall constantly guard against damage due to water and take full responsibility for all damage resulting from his failure to do so.

D. The Contractor will be required at his expense to excavate below grade and refill with crushed stone (gradation 57 or 89) or other acceptable fill material if the City determines that adequate dewatering has not been provided.

3.04 UNDERCUT

A. If the bottom of any excavation is below that shown on the Drawings or specified because of Contractor error, convenience, or unsuitable subgrade due the Contractor's excavation methods, he shall refill to normal grade with fill at his own cost. Fill material and compaction method shall be approved by the City.

3.05 FILL AND COMPACTION

A. Compact and backfill excavations and construct embankment according to the following schedule. (Modified Proctor standard shall be ASTM D-1557):

STRUCTURES AND ROADWORK

Area	Material	Compaction
Beneath Structures	Structural Fill	12-inch lifts, compacted to 98% maximum density as determined by AASHTO T-180. Fill Should not be placed over any in-place soils until those deposits have been compacted to 98% Modified Proctor.
Around Structures	Structural Fill	12-inch lifts, 95% of maximum density as determined by AASHTO T-180. Rubber Tire or vibratory plate compactors shall be used

Beneath Paved Surfaces	Common Fill	12-inch lifts, 98% by maximum density as determined by AASHTO T-180 or as required by the FDOT Standards.
Open Areas	Common Fill	12-inch lifts, 95% by maximum density as determined by AASHTO T-180.

B. Pipe shall be laid in open trenches unless otherwise indicated on the Drawings or elsewhere in the Contract Documents.

C. Excavations shall be backfilled to the original grade or as indicated on the Drawings. Deviation from this grade because of settling shall be corrected. The backfill operation shall be performed to comply with all rules and regulations and in such a manner that it does not create a nuisance or safety hazard.

D. Embankments shall be constructed true to lines, grades, and cross sections shown on the plans or ordered by the City. Embankments shall be placed in successive layers of not more than 8-inches in thickness, loose measure, for the full width of the embankment. As far as practicable, traffic over the Work during the construction phase shall be distributed so as to cover the maximum surface area of each layer.

E. If the Contractor requests approval to backfill material utilizing lifts and/or methods other than those specified herein, such request shall be in writing to the City. Acceptance will be considered only after the Contractor has performed tests, at the Contractor's expense, to identify the material used and density achieved throughout the backfill area utilizing the method of backfill requested. The City's acceptance shall be in writing.

F. One compaction test location shall be required for each 300 linear feet of pipe and for every 100 square feet of backfill around structures as a minimum. The City may determine that more compaction tests are required to certify the installation depending on field conditions. The locations of the compaction tests within the trench shall be in conformance with the following schedule:
   1. At least one test at the spring line of the pipe.
   2. At least one test for each 12-inch layer of backfill within the pipe bedding zone for pipes 24-inches and larger.
   3. One test at an elevation of 1-foot above the top of pipe.
   4. One test for each 2-feet of backfill placed from 1-foot above the top of the pipe to finished grade elevation.
   5. Density testing is required for sanitary sewer manholes. Tests shall be staggered around the manhole within 3-feet of the structure's outside diameter.
      a. First test shall be 1-foot above the structure base.
      b. Second test shall be 2-feet above the first test and subsequent tests every 2-feet up the finished grade.
   6. The Contractor shall provide additional compaction and testing prior to commencing further construction if the City's testing reports and inspection indicate that the fill has been placed below specified density.
   7. The Contractor shall coordinate testing with the City approved testing laboratory and shall provide monthly test results to the City in a timely manner during construction activities. Density testing scheduled subsequent to backfilling activities shall be

coordinated with the City and witnessed by the City representative. Failure by the Contractor to coordinate or have the City representative present shall result in rejection of the submitted density testing reports and re-testing at the Contractor's expense. Density testing reports not submitted in a timely manner shall result in rejection of the pipe installed and rejection of the density testing reports until such time that density re-testing is coordinated and repeated at the Contractor's expense as deemed necessary by the City's representative.

8. Dewatering systems shall not be removed until compaction/density testing has been completed.

END OF SECTION

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SECTION 02230
SITE PREPARATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Layout of work and protection of benchmarks

B. Protection of structures, trees, or vegetation to remain

C. Clearing and grubbing

D. Stripping and storing topsoil

1.02 RELATED SECTIONS

A. Section 02100 – Temporary Erosions and Sedimentation Control

B. Section 02505 – Pipeline Removal and Taking Out of Service

1.03 COORDINATION

A. Notify the following utility owners which may have utilities in the project area and coordinate with them to avoid service interruptions and/or safety hazards:
   1. Florida Power & Light
   2. AT&T
   3. CenturyLink
   4. Florida Public Utilities
   5. Gas Utility Company
   6. City of Pembroke Pines
   7. Broward County
   8. All other applicable Utility Owners

B. Contact “Sunshine State, One-Call” by dialing “811”, to determine if there are other utilities in the area, and their location. For additional information: www.callsunshine.com.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 BENCHMARK AND MONUMENTS

Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of the Owner. All benchmarks, property corners, and other survey monuments that are lost, damaged, or destroyed shall be replaced by a Licensed Surveyor at the Contractor's expense.

3.02 LAYING OUT WORK

A. Base lines, property lines, and easement lines, are shown on the Drawings. Benchmarks utilized are also shown on the drawings.

B. Stake out the construction, establish lines and levels, temporary benchmarks, batter boards, centerlines and reference points for the work, and verify all dimensions relating to interconnection with existing features.

C. Report any inconsistencies in the proposed grades, lines and levels, dimensions and locations to the Engineer before commencing work.

D. Contain all construction activities within the right-of-way, easements, and property secured by the Owner, as shown on the drawings. Do not disturb surrounding properties or travel on surrounding properties without written consent from the property owner. Repair or reconstruct damaged areas on an immediate basis. All costs for repairs shall be the responsibility of the Contractor.

3.03 BURNING

Burning is not allowed, unless notes on the drawings specifically allow it to occur. In the event burning is allowed, secure all necessary permits.

3.04 PROTECTION OF TREES, SHRUBS, AND LAWNS

A. Protect all trees and shrubs located outside the right-of-way, easements, and Owner secured property, particularly those trees and shrubs located adjacent to work areas FILL AND COMPACTION.

B. Within the right-of-way, easements, and Owner secured property, the intent is to allow trees and shrubs to remain in accordance with the following schedule:
   1. New roadway construction – trees and shrubs to remain where located more than 15 feet from the back of curb, or outside the limits of excavation or fill areas, whichever is further.
   2. Utility pipeline construction – trees and shrubs to remain outside a 15-foot-wide path, centered on the pipeline.

C. Protect branches, trunks, and roots of trees and shrubs that are to remain. Trees to remain in the construction area shall be boxed, fenced or otherwise protected before any work is started; remove boxing when directed by the Engineer. Do not permit heavy equipment or stockpiles within branch spread. Remove interfering branches without injury to trunks

and cover scars with tree paint.

D. All lawn areas disturbed by construction shall be replaced with like kind to a condition similar or equal to that existing before construction. Where sod is to be removed, it shall be carefully removed, and the same re-sodded, or the area where sod has been removed shall be restored with new sod in the manner described in the applicable section.

E. Where fencing, walls, shrubbery, grass strips or area must be removed or damaged incident to the construction operation, the Contractor shall, after completion of the work, replace or restore to the original condition.

F. The cost of all labor, materials, equipment, and work for restoration shall be deemed included in the appropriate Contract Item or items, or if no specific item is provided therefore, as part of the overhead cost of the Work, and no additional payment will be made therefore.

3.05 PUBLIC NUISANCE

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

B. Sound levels shall not exceed 55 dBA 8 a.m. to 8 p.m. This sound level shall be measured at the exterior of the nearest exterior wall of the nearest residence. Levels at the equipment shall not exceed 85 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 these levels. Work stoppage by the Owner for excessive noise shall not relieve the Contractor from completing the Work on time.

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

3.06 EXISTING UTILITIES

A. The Owner has had existing utility depths determined at some locations. The resulting soft dig reports are contained in the Appendix B “Underground Locates prepared by DRMP”. The Contractor shall conduct additional utility verification where needed to perform its work and protect existing utilities.

B. Utility lines that are damaged during construction shall be repaired by the Contractor and service restored within 4-hours of the breakage. The Owner retains the option of repairing any damage to utility pipes in order to expedite service to the customers. The Contractor will remain responsible for all costs associated with the repair.

C. Exploratory excavations shall be conducted by the Contractor for the purpose of locating underground pipelines or structures in advance of the construction. Test pits shall be excavated in areas of potential conflicts between existing and proposed facilities and at piping connections to existing facilities a minimum of 48-hours or 1,000-feet in advance of work. If there is a potential conflict, the Contractor shall notify the Owner

immediately. Information on the obstruction to be furnished by the Contractor shall include: Location, Elevation, Utility Type, Material and Size. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Owner.

D. It is intended that wherever existing utilities must be crossed, deflection of the pipe within specified limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the Drawings. However, when in the opinion of the Owner this procedure is not feasible, the Owner may direct the use of fittings for a utility crossing or conflict transition as detailed on the Drawings.

3.07 RELOCATION OF UTILITIES

A. Active utilities which do not interfere with the work shall be supported and protected from damage. After obtaining the Engineer's approval, relocate or remove active utilities which will interfere with work as indicated. Pay for all damage to active utilities and for relocation or removal of all interfering utilities which are ascertainable from Drawings, surveys, site inspection or encountered during construction.

B. Coordinate with each utility and pay all costs associated with the protection of existing facilities during construction. Also coordinate necessary relocations or other construction related matters with each utility.

C. Inactive or abandoned utilities and appurtenant structures encountered shall be removed to avoid interference as directed by the Engineer. Exposed ends of abandoned lines shall be plugged or capped in a water-tight manner.

3.08 CLEARING AND GRUBBING

A. Areas to receive clearing and grubbing shall include all areas to be occupied by the proposed improvements, areas for fill and site grading, and borrow sites. Remove trees outside of these areas only as indicated on the Drawings or as approved in writing by the Engineer.

B. Clearing shall consist of removing trees and brush and disposal of other materials that encroach upon or otherwise obstruct the work.

C. Exercise extreme care during the clearing and grubbing operations. Do not damage existing structures, pipes or utilities.

D. Grubbing shall consist of removing and disposing of stumps, roots larger than 2" in diameter, and matted roots. Remove to a depth of not less than 18" below the original surface level of the ground.

E. All combustible debris and refuse from site preparation operations shall be removed to legal offsite disposal areas.

3.09 TOPSOIL REMOVAL

A. All areas to be occupied by proposed improvements, and borrow sites shall be stripped of all brush, weeds, grass, roots and other material.

B. Remove all loamy, organic topsoil suitable for seeding and planting to whatever depth encountered and store separately from other excavated material. Stockpile in designated areas and provide for proper drainage. Cover storage piles as required to prevent windblown dust.

C. All removed topsoil shall be stockpiled within the project work area. Topsoil can be incorporated into the project in all areas that are to be grassed.

D. Dispose of unsuitable topsoil as specified under disposal of debris. Excess topsoil shall be removed from site unless specifically noted on Contract Drawings.

3.10 DISPOSAL OF DEBRIS

A. All combustible debris and refuse from site preparation operations shall be removed to legal offsite disposal areas.

B. All non-combustible debris (not including acceptable fill material, fences, or other structures), resulting from site preparation operations shall become the property of the Contractor and shall be removed to legal offsite disposal areas.

END OF SECTION

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SECTION 02570
STABILIZED SUBGRADE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: All labor, materials, and equipment required to install stabilized subgrade.

1.02 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO) latest edition:
   1. AASHTO T-180 – Moisture-Density Relations of Soils Using a 10-lb Rammer and 18-in Drop

B. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition:
   1. Section 914 – Stabilization Materials

1.03 QUALITY ASSURANCE

A. Field compaction density, stability, and thickness testing frequencies of the subgrade shall be tested once every 300 linear feet of paving per 24-foot-wide strip, staggered left, center, and right of centerline. Where less than 300 linear feet of asphalt is placed in 1- day, provide minimum of 1 test for each per day's construction at a location designated by the city.

1.04 SHOP DRAWINGS AND SUBMITTALS

A. Submittals shall be submitted to the City for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."
   1. Materials certificates signed by material producer and Contractor, certifying that each material item complies with specified requirements.

1.05 SYSTEM DESCRIPTION

A. Stabilize the roadbed below the proposed base to provide a firm and unyielding subgrade.

B. Provide a finished roadbed section that meets the bearing value requirements regardless of the quantity of stabilizing materials necessary to be added.

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PART 2 - PRODUCTS

2.01 GENERAL

A. All material supplied shall be one of the approved products.

B. The Contractor may choose the type of stabilizing material.

C. Materials may be lime rock, shell rock, cemented coquina, or shell-base sources approved by the FDOT.

D. At least 97% by weight of the total material shall pass a 3-1/2-inch (90-mm) sieve. Material having a plasticity index greater than 10 or a liquid limit greater than 40 shall not be used as a stabilizer.

2.02 LIMEROCK

A. For limerock, carbonates of calcium and magnesium shall be at least 70%.

2.03 CRUSHED SHELL

A. Crushed shell for this use shall be mollusk shell (i.e., oysters, mussels, clams, cemented coquina). Steamed shell will not be permitted.

B. At least 50% by weight of the total material shall be retained on the No. 4 (4.75 µm) sieve.

C. Not more than 20% by weight of the total material shall pass the No. 200 (75 µm) sieve. The determination of the percentage passing the No. 200 (75 µm) sieve shall be by washing only.

2.04 LOCAL MATERIALS

A. Local materials used for this stabilizing may be soils or recyclable materials such as crushed concrete, roof tiles, asphalt coated base, or reclaimed pavement. However, no materials that deteriorate over time, cause excessive deformations, contain hazardous substances, contaminates, or do not improve the bearing capacity of the stabilized material may be used.

PART 3 - EXECUTION

3.01 GENERAL

A. Prior to the beginning of stabilizing operations, construct the area to be stabilized to an elevation such that, upon completion of stabilizing operations, the completed stabilized subgrade will conform to the lines, grades, and cross-section shown in the plans. Prior to spreading any additive stabilizing material, bring the surface of the roadbed to a plane approximately parallel to the plane of the proposed finished surface.

B. Process the subgrade to be stabilized in 1 course, unless the equipment and methods

being used do not provide the required uniformity, particle size limitation, compaction, and other desired results, in which case, the City will direct that the processing be done in more than 1 course.

3.02 APPLICATION OF STABILIZING MATERIAL

A. When additive stabilizing materials are required, spread the designated quantity uniformly over the area to be stabilized.

B. When materials from an existing base are to be used in the stabilizing at a particular location, place and spread all of such materials prior to the addition of other stabilizing additives.

C. Spread commercial stabilizing material by the use of mechanical material spreaders, except that where use of such equipment is not practicable, use other means of spreading, but only upon written approval of the proposed alternate method.

3.03 MIXING

A. Perform mixing using rotary tillers or other equipment meeting the approval of the City. The Contractor may mix the materials in a plant of an approved type suitable for this Work. Thoroughly mix the area to be stabilized throughout the entire depth and width of the stabilizing limits.

B. Perform the mixing operations as specified (either in place or in a plant) regardless of whether the existing soil, or any select soils placed within the limits of the stabilized sections, have the required bearing value without the addition of stabilizing materials.

3.04 MAXIMUM PARTICLE SIZE OF MIXED MATERIALS

A. At the completion of the mixing, ensure that the gradation of the material within the limits of the area being stabilized is such that 97% will pass a 3-1/2-inch sieve and that the material does not have a plasticity index greater than 8 or liquid limit greater than 30. Note that clay balls or lumps of clay size particles (2 microns or less) cannot be considered as individual particle sizes. Remove any materials not meeting the plasticity requirements from the stabilized area. The Contractor may break down or remove from the stabilized area materials not meeting the gradation requirements.

3.05 COMPACTION

A. Compact the materials at a moisture content permitting the specified compaction. If the moisture content of the material is improper for attaining the specified density, either add water or allow the material to dry until reaching the proper moisture content for the specified compaction.

3.06 FINISH GRADING

A. Shape the completed stabilized subgrade to conform to the finished lines, grades, and

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cross-section indicated in the Drawings. Check the subgrade using elevation stakes or other means approved by the City.

3.07 CONDITION OF COMPLETED SUBGRADE

A. After completing the stabilizing and compacting operations, ensure that the subgrade is firm and substantially unyielding to the extent that it will support construction equipment and will have the bearing value required by the Drawings.

B. Remove all soft and yielding material, and any other portions of the subgrade that will not compact readily. Replace yielding material with suitable material so that the whole subgrade is brought to line and grade with proper allowance for subsequent compaction.

3.08 MAINTENANCE OF COMPLETED SUBGRADE

A. After completing the subgrade, maintain it free from ruts, depressions, and any damage resulting from the hauling or handling of materials, equipment, and tools. The Contractor is responsible for maintaining the required density until the subsequent base or pavement is in place including any repairs or replacement of curb and gutter or sidewalk which might become necessary in order to recompact the subgrade in the event of underwash or other damage occurring to the previously compacted subgrade. Perform any such recompaction at no expense to the City. Construct and maintain ditches and drains along the completed subgrade section.

3.09 FIELD QUALITY CONTROL

A. When proper moisture conditions are attained, compact the material to not less than 98% of maximum density determined by AASHTO T-180, and a minimum LBR of 40.

END OF SECTION

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SECTION 02573
ASPHALT PAVEMENT REMOVAL AND REPLACEMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Mill or remove existing asphalt pavement and base materials and install asphalt paving on a prepared base or as an overlay to existing asphalt pavement sections. Provide Maintenance of Traffic and coordinate and install temporary and permanent replacement of traffic signalization and pavement striping and markings.

1.02 REFERENCES

A. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, 2000 and 2004 editions.
   1. Section 300 – Prime and Tack Coats for Base Courses (2000 and 2004 Editions)
   2. Section 320 – Hot Bituminous Mixtures – Plant, Methods, and Equipment (2000 and 2004 Editions)
   3. Section 327 – Milling of Existing Asphalt Pavement (2000 and 2004 Editions)
   4. Section 330 – Hot Bituminous Mixtures – General Construction Requirements (2000 and 2004 Editions)
   5. Section 331 – Type S Asphalt Concrete (2000 Edition)
   6. Section 334 – Superpave Asphalt Concrete (2004 Edition)
   7. Section 901 – Coarse Aggregate (2000 and 2004 Editions)
   8. Section 902 – Fine Aggregate (2000 and 2004 Editions)
   9. Section 916 – Bituminous Materials (2000 and 2004 Editions)
   10. Section 917 – Mineral Filler (2000 and 2004 Editions)

B. Florida Department of Transportation (FDOT) Design Standards, 2000 and 2004 editions.

1.03 QUALITY ASSURANCE

A. Asphalt pavements shall be plant-mixed hot bituminous mixtures. Plant operations shall not begin unless all weather conditions are suitable for laying operations. A prime and tack coat shall be first applied to newly constructed bases. A tack coat shall be applied on existing pavements that are to be overlayed with an asphalt mix and between successive layers of asphalt mix. Apply prime and tack coats when ambient or base surface temperature is above 40°F, and when temperature has been above 35ºF for 12- hours immediately prior to application. Construct asphaltic concrete paving when ambient temperature is above 45°F. Do not apply when base is wet, contains excess moisture, or during rain. Establish and maintain required lines and elevations.

B. Do not spread the mixture when the wind is blowing to such an extent that proper and adequate compaction cannot be maintained or when sand, dust, etc., are being deposited on the surface being paved to the extent that the bond between layers will be diminished.

C. Field compaction density and thickness testing frequencies of the asphalt shall be tested once every 300-linear feet of paving per 24-foot wide strip, staggered left, center, and right of centerline. Where less than 300-linear feet of asphalt is placed in 1-day, provide minimum of 1 test for each per day's construction at a location designated by the City.

D. Asphalt extraction gradation shall be tested from grab samples collected once every 1,800-square yards of asphalt delivered to the site, or a minimum of once per day. Obtain the results in a timely manner (no later than the end of the day) so that adjustments can be made if necessary.

E. On initial use of a Type S mix design at a particular plant, as a minimum, run an additional extraction gradation analysis if more than 500-tons [450-metric tons] of mixture are produced on the first day of production.

F. Tolerances for Quality Control Tests (Extraction Gradation Analysis) shall be in accordance with FDOT Specification Section 331.

1.04 SHOP DRAWINGS AND SUBMITTALS

A. Submittals shall be submitted to the City for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."
   1. Submit for each proposed design mix the Gradation analysis; Grade of asphalt cement used; and Marshall Stability in pounds flow.
   2. Provide a single percentage of asphalt by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%. For structural mixes (S-1, S-3) establish the optimum asphalt content at a level corresponding to a minimum of 4.5% air voids. Provide the laboratory density of the asphalt mixture for all mixes except Open-Graded Friction Courses.
   3. Identify source and description of the materials to be used.
   4. Provide certification that the mix design conforms to specification requirements.
   5. Field compaction density and thickness testing.
   6. Field asphalt extraction gradation.

PART 2 - PRODUCTS

2.01 GENERAL

A. All material supplied shall be one of the products specified in Appendix D "List of Approved Products" appended to these technical specifications.

B. Type S Asphalt Concrete (Type S-1 or S-3) is required. The equivalent fine Type SP (Superpave) Asphalt Concrete mixture (Traffic Level C) meeting the requirements of FDOT Specification Section 334 may be selected as an alternate at no additional cost to the City. The equivalent mixes are as follows:
   1. Type S-1: Type SP-12.5
   2. Type S-3: Type SP-9.5

C. Asphalt plant and equipment shall meet the requirements in FDOT Specification Section 320.

2.02 AGGREGATE

A. Coarse Aggregate, Stone, Slag, or Crushed Gravel shall meet the requirements in FDOT Specification Section 901.

B. Fine Aggregate shall meet the requirements in FDOT Specification Section 902.

C. Aggregate gradation shall meet the following:

Table 02573-1
Bituminous Concrete Mixtures
(Gradation Design Range)

Type	Total Aggregate Passing Sieves1							
	3/4-inch [19.0 mm]	1/2-inch [12.5 mm]	3/8-inch [9.5 mm]	No. 4 [4.75 mm]	No. 10 [2.0 mm]	No. 40 [425 µm]	No. 80 [180 µm]	No. 200 [75 µm]
S-1[4]	100	88-98	75-93	47-75	31-53	19-35	7-21	2-6
S-3[4]		100	88-98	60-90	40-70	20-45	10-30	2-6
ABC-1		100						0-12
ABC-2		100			55-90			0-12
ABC-3[2]	70-100			30-70	20-60	10-40		2-10
FC-2[3]		100	85-100	10-40	4-12			
FC-3[4]		100	88-98	60-90	40-70	20-45	10-30	2-6

1. In inches [mm] or sieves [µm].
2. 100% passing 1-1/2-inch [37.5 mm] sieve.
3. The City may increase the design range for the No. 10 [200 mm] sieve for lightweight aggregates.
4. The City may retain up to 1% on the maximum sieve size.

D. Use clean aggregate containing no deleterious substances. Do not use coarse or fine aggregate which contains more than 0.5% of phosphate.

E. In laboratory tests, and for the purpose of proportioning the paving mixture, consider all material passing the No. 10 [2.00-mm] sieve and retained on the No. 200 [75 µm] sieve as fine aggregate, and the material passing the No. 200 [75 µm] sieve as mineral filler.

F. Do not use any screenings in the combination of aggregates containing more than 15% of material passing the No. 200 [75 µm] sieve. When two screenings are blended to produce the screening component of the aggregate, one of such screenings may contain up to 18% of material passing the No. 200 [75 µm] sieve, as long as the combination of the two does not contain over 15% material passing the No. 200 [75 µm] sieve. Screenings may be washed to meet these requirements.

2.03 ASPHALT CEMENT

A. Superpave PG Asphalt Binder or Recycling Agent shall meet the requirements in FDOT Specification Section 916.

B. Mineral Filler shall meet the requirements in FDOT Specification Section 917.

C. Marshall design mix shall be in accordance with the following:

Table 02573-2
Marshall Design Properties For Bituminous Concrete Mixes

Mix Type	Minimum Marshall Stability (lbs.)	Flow* (0.01 in)	Minimum VMA (%)	Air Voids (%)	Minimum Effective Asphalt Content (%)	VFA Voids Filled with Asphalt (%)
S-1	1,500	8-13	14.5	4-5	**	65-75
S-3	1,500	8-13	15.5	4-6	**	65-75
ABC-1	500	7-15	15	5-16	6.0	-
ABC-2	750	7-15	15	5-14	5.5	-
ABC-3	1,000	8-13	14	4-7	**	65-78
FC-2	-	-	-	-	-	-
FC-3	1,500	8-13	15.5	4-6	**	65-75

* The maximum Flow value during production shall not exceed one point more than shown in the Table.
** The ratio of the percentage by weight of total aggregate passing the No. 200 sieve to the effective asphalt content expressed as a percentage by weight of total mix shall be in the range of 0.6 to 1.2.

2.04 BITUMINOUS MIXTURE

A. Use a bituminous mixture composed of a combination of aggregate (coarse, fine or mixtures thereof), mineral filler, if required, and bituminous material. Ensure that no more than 20% by weight of the total aggregate used is silica sand or local materials as defined in FDOT Specification Section 902. Size, grade, and combine the several aggregate fractions in such proportions that the resulting mixture meets the grading and physical properties of the verified mix design.

PART 3 - EXECUTION

3.01 GENERAL

A. Set up, install and maintain temporary traffic control devices and detours as necessary in accordance with Specification Section 1570 "Maintenance of Traffic."

B. Asphalt pavements, including all surface courses and base courses, where shown to be open cut and removed on the Drawings or specified in the Project Manual, shall be removed to a line back from each edge of the trench, other excavation, or to the limits indicated on the Drawings. Pavements shall be cut straight, clean and square with a power saw or other tools and equipment suitable for the Work.

C. Asphalt pavements, where shown to be milled on the Drawings or specified in the Project Manual, shall be milled according to FDOT Specification Section 327.

D. Asphalt mixtures shall meet the general construction requirements specified in FDOT Specification Section 330.

E. Spread the mixture only when the surface upon which it is to be laid has been previously prepared, is intact, firm, and properly cured, and is dry. Do not spread mixture that cannot be finished and compacted during daylight hours.

F. Deliver the asphalt cement from the asphalt plant at a temperature not to exceed 350°F and equip the transport tanks with sampling and temperature sensing devices meeting the requirements of FDOT. Maintain the asphalt cement in storage within a range of 230°F to 350ºF in advance of mixing operations. Maintain constant heating within these limits, and do not allow wide fluctuations of temperature during a day's production.

G. Produce a homogeneous mixture, free from moisture and with no segregated materials, that meets all specification requirements for the mixture, including compliance with the Marshall Properties. Also apply these requirements to all mixes produced by the drum mixer process and all mixes processed through a hot storage or surge bin, both before and after storage.

3.02 PREPARATION OF APPLICATION SURFACES

A. Prior to the laying of the mixture, clean the surface of the base or pavement to be covered of all loose and deleterious material by the use of power brooms or blowers, supplemented by hand brooming where necessary.

B. Where an asphalt mix is to be placed on an existing pavement or old base that is irregular, and wherever the plans indicate, bring the existing surface to proper grade and cross-section by the application of patching or leveling courses.

C. Where an asphalt mix is to be placed over a newly constructed surface treatment, sweep and dispose of all loose material from the paving area.

D. Paint all structures which will be in actual contact with the asphalt mixture, with the exception of the vertical faces of existing pavements and curbs or curb and gutter, with a uniform coating of asphalt cement to provide a closely bonded, watertight joint.

E. Apply a prime and tack coat on newly constructed bases and apply a tack coat, as specified in FDOT Specification Section 300, on existing pavement structures that are to be overlaid with an asphalt mix and between successive layers of all asphalt mixes.

3.03 PLACING MIXTURE

A. Lay all asphaltic concrete mixtures, including leveling courses, other than adjacent to curb and gutter or other true edges, by the string line method to obtain an accurate, uniform alignment of the pavement edge.

B. For each paving machine operated, use a separate crew, each crew operating as a full unit. The Contractor's Certified Paving Technician in charge of the paving operations may be responsible for more than one crew but must be physically accessible to the City at all times when placing mix.

C. Check the depth of each layer at frequent intervals, and make adjustments when the thickness exceeds the allowable tolerance. When making an adjustment, allow the paving machine to travel a minimum distance of 32-feet to stabilize before the second check is made to determine the effects of the adjustment.

D. In limited areas where the use of the spreader is impossible or impracticable, the Contractor may spread and finish the mixture by hand.

E. Straightedge and back-patch after obtaining initial compaction and while the material is still hot.

F. Upon arrival, dump the mixture in the approved mechanical spreader, and immediately spread and strike-off the mixture to the full width required, and to such loose depth for each course that, when the Work is completed, the required weight of mixture per square yard [square meter], or the specified thickness, is secured. Carry an excess amount of mixture ahead of the screed at all times. Hand-rake behind the machine as required.

G. Construct each course in layers of the thickness as shown on FDOT Design Standards Index No. 513.

H. Before starting any rolling, check the surface; correct any irregularities; remove all drippings, fat sandy accumulations from the screed, and fat spots from any source; and replace them with satisfactory material. Do not skin patch. When correcting a depression while the mixture is hot, scarify the surface and add fresh mixture.

3.04 APPLICATION OF LEVELING COURSES

A. Before spreading any leveling course, fill all depressions in the existing surface more than 1-inch deep by spot patching with leveling course mixture, and then compact them thoroughly.

B. Place all courses of leveling by the use of two (2) motor graders; equip one with a spreader box. Use other types of leveling devices after they have been approved by the City.

C. When the total asphalt mix provided for leveling exceeds 50-lb/yds² [27-kg/m²], place the mix in two or more layers, with the average spread of any layer not to exceed 50-lb/yd² [27-kg/m²]. When using Type S-3 Asphaltic Concrete for leveling, do not allow the average spread of a layer to be less than 50-lb/yd² [27-kg/m²] or more than 75-lb/yd² [40-kg/m²]. The Contractor may vary the rate of application throughout the Project as directed by the City. When leveling in connection with base widening, the City may require placing all the leveling mix prior to the widening operation.

3.05 COMPACTING MIXTURE

A. The coverage is the number of times the roller passes over a given area of pavement. Regardless of the rolling procedure used, complete the final rolling before the surface temperature of the pavement drops below 160°F.

B. Seal Rolling: Provide two (2) coverages with a tandem steel-wheeled roller (either vibratory or static), weighing 5 to 12-tons, following as close behind the spreader as possible without pick-up, undue displacement, or blistering of the material. Use vibratory rollers in the static mode for layers of 1-inch or less in thickness.

C. Intermediate Rolling: Provide five (5) coverages with a self-propelled pneumatic-tired roller, following as close behind the seal rolling operation as the mix will permit.

D. Final Rolling: Provide one (1) coverage with a tandem steel-wheeled roller (static mode only), weighing 5 to 12-tons, after completing the seal rolling and intermediate rolling, but before the surface pavement temperature drops below 160ºF.

E. Operate the self-propelled, pneumatic-tired roller at a speed of 6 to 10-mph. For each roller, do not exceed an area of coverage of 4,000 yd²/hour; if rolling Type S Asphaltic Concrete, do not exceed an area of coverage of 3,000 yd²/hour.

F. Use a sufficient number of self-propelled pneumatic-tired rollers to ensure that the rolling of the surface for the required number of passes does not delay any other phase of the laying operation and does not result in excessive cooling of the mixture before completing the rolling. In the event that the rolling falls behind, discontinue the laying operation until the rolling operations are sufficiently caught up.

G. Use hand tamps or other satisfactory means to compact areas which are inaccessible to a roller, such as areas adjacent to curbs, headers, gutters, manholes, etc.

H. Use self-propelled pneumatic-tired rollers to roll all patching and leveling courses. Where placing the initial leveling course over broken concrete pavement, use a pneumatic-tired roller that weighs at least 15-tons. For Type S-3 Asphaltic Concrete leveling courses, use a steel-wheeled roller to supplement the traffic rollers. On other leveling courses, use a steel-wheeled roller to supplement the traffic rollers on all passes after the first pass.

I. Do not allow the rollers to deposit gasoline, oil, or grease onto the pavement. Remove and replace any areas damaged by such deposits as directed by the City. While rolling is in progress, test the surface continuously, and correct all discrepancies to comply with the surface requirements. Remove and replace all drippings, fat or lean areas, and defective construction of any description. Remedy depressions that develop before completing the rolling by loosening the mixture and adding new mixture to bring the depressions to a true surface. Should any depression remain after obtaining the final compaction, remove the full depth of the mixture, and replace it with sufficient new mixture to form a true and even surface. Correct all high spots, high joints, and honeycombing as directed by the City. Remove and replace any mixture remaining unbonded after rolling. Correct all defects prior to laying the subsequent course.

J. Use a self-propelled pneumatic-tired roller on the first structural layer placed on a milled surface. Compact with a minimum of three passes.

3.06 JOINTS

A. Place the mixture as continuously as possible. Do not pass the roller over the unprotected end of the freshly laid mixture except when discontinuing the laying operation long enough to permit the mixture to become chilled. When thus interrupting the laying operation, construct a transverse joint by cutting back on the previous run to expose the full depth of the mat.

B. For all layers of pavement except the leveling course, place each layer so that longitudinal construction joints are offset 6-inches to 12-inches laterally between successive layers.

C. When laying fresh mixture against the exposed edges of joints (trimmed or formed as provided above), place it in close contact with the exposed edge to produce an even, well-compacted joint after rolling.

3.07 SURFACE REQUIREMENTS

A. Obtain a smooth surface on all pavement courses placed, and then straightedge all intermediate and final courses with a 15-foot rolling straightedge. Furnish a 15-foot [4.572-m] manual straightedge, and make it available at the job site at all times during the paving operation for checking joints and surface irregularities.

B. Produce a finished surface of uniform texture and compaction with no pulled, torn, or loosened portions and free of segregation, sand streaks, sand spots, or ripples.

3.08 ACCEPTANCE REQUIREMENTS

A. Upon completion of the final surface or friction course, the City will test the finished surface with a 15-foot rolling straightedge. Correct all deficiencies in excess of 3/16- inch.

B. If correction is made by removing and replacing the pavement, remove the full depth of the course and extend at least 50-feet on either side of the defective area for the full width of the paving lane.

C. If correction is made by overlaying, cover the length of the defective area and taper uniformly to a featheredge thickness at a minimum distance of 50-feet on either side of the defective area. Extend the overlay the full width of the roadway. Maintain the specified cross slope. The City may adjust, as necessary, the mix used for the overlay for this purpose.

D. The maximum deficiency from the specified thickness as follows:
   1. For pavement of a specified thickness of 2-1/2-inches or more: 1/2-inch
   2. For pavement of a specified thickness less than 2-1/2-inches: 1/4-inch

E. Where the deficiency in thickness is: (1) in excess of 3/8-inch for pavement of less than 2-1/2-inches in specified thickness, or (2) in excess of 3/4-inch for pavement of specified thickness of 2-1/2-inches or more, correct the deficiency either by replacing the full thickness for a length extending at least 50-feet from each end of the deficient area.

F. For any case of excess deficiency of the pavement, if approved by the City for each particular location, correct the deficient thickness by adding new surface material, and compact it to the same density as the adjacent surface. The City will determine the area to be corrected and the thickness of new material added.

3.09 REPAIR AND RESTORATION

A. Replace asphalt pavement or roadway surfaces cut or damaged to equal or better condition than the original, including stabilization, base course, surface course, curb and gutter, and other appurtenances.

3.10 SIGNALIZATION, PAVEMENT STRIPING AND MARKING

A. The Contractor shall be responsible for coordinating, repairing or replacing all traffic signalization devices and traffic loops damaged during the pavement milling, removal and replacement process.

B. The Contractor shall be responsible for coordinating, inventorying, and replacing all temporary and permanent pavement striping and markings damaged during the asphalt pavement milling, removal, and replacement process.

C. Temporary pavement striping and markings shall be paint or reinforced retro-reflective removal tape. Foil back tape is not acceptable. Permanent pavement striping and markings shall be alkyd thermoplastic tape and raised reflective pavement markers.

END OF SECTION

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SECTION 02576
CONCRETE SIDEWALKS AND DRIVEWAYS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Constructing new concrete sidewalks, driveways, and curb and gutters as shown on the Drawings.

1.02 QUALITY ASSURANCE

A. Codes and Standards: Comply with applicable sections of F.D.O.T. Specifications and local governing regulations.

B. The mixture, placement, and curing of all concrete work shall be in accordance with F.D.O.T. Specifications.

1.03 SHOP DRAWINGS AND SUBMITTALS

A. Submittals shall be submitted to the City for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."

B. Furnish manufacturer's product data, design mixes, test reports, and materials certifications.

1.04 JOB CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities, as specified under Section 01570 "Maintenance of Traffic."

B. Utilize flagman, barricades, warning signs, and warning lights as required.

1.05 GUARANTEE

A. All restored areas within the public right-of-way shall be guaranteed for 1-year after final acceptance. In the event of cracked or broken concrete surfaces, the Contractor shall make the necessary repairs to restore the concrete within 10-calendar days after notification by the City. The cost of such repairs shall be paid by the Contractor.

PART 2 - PRODUCTS

2.01 GENERAL

A. All material supplied shall be one of the approved products.

2.02 CONCRETE MATERIALS

A. Forms: Steel or wood for each type of use of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.
   1. Use flexible spring steel forms or laminated boards to form radius bends as required.
   2. Coat forms with a non-staining form release agent that will not discolor or deface the surface of the concrete.

B. Fibermesh Reinforcement: Fibermesh reinforcement fibers shall be 2-inches to 3-inches collated polypropylene fibers. Fibers shall be in strict accordance with the manufacturer recommendations and within the time as specified in ASTM C94, Type III 4.13 and applicable building codes.

C. Concrete Materials: Comply with requirements of F.D.O.T. Section 347 for concrete materials, admixtures, bonding materials, curing materials, and others as required.

D. Epoxy Resin Grout: Type N as specified in F.D.O.T. Section 926.

E. Aggregate, brick, or other material required to match existing driveway or walk shall be as approved by the City.

2.03 CONCRETE MIX, DESIGN, AND TESTING

A. Comply with requirements of applicable F.D.O.T. Section 347 for concrete mix design, sampling and testing, and quality control, and as herein specified.

B. Design the mix to produce standard weight concrete consisting of Portland cement, aggregate, air entraining admixture, and water to produce the following properties.
   1. Compressive Strength: Class B, 3,000 psi for walks and curbs.
   2. Compressive Strength: Class A, 4,000 psi for driveways.
   3. Air Content: 3% to 6% .

C. Concrete slump shall not exceed plus or minus 1-inch from approved design slump.

PART 3 - EXECUTION

3.01 CONCRETE SIDEWALK, DRIVEWAY, AND CURB AND GUTTER

A. Surface Preparation:
   1. Remove loose material from the compacted sub base surface immediately before

placing concrete.

2. Proof-roll prepared sub base surface to check for unstable areas and the need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

B. Form Construction:
   1. Set forms to the required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of the Work and so that forms can remain in place at least 24-hours after concrete placement.
   2. Check completed form work for grade alignment to the following tolerances:
      a. Top of forms not more than 1/8-inch in 10-feet.
      b. Vertical face on longitudinal axis, not more than 1/4-inch in 10-feet.
   3. Clean forms for reuse immediately after use, and coat with form release agent as often as required to ensure separation from concrete without damage.

C. Concrete Placement:
   1. Do not place concrete until sub base and forms have been checked for line and grade. Moisten if required to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are completed to required finish elevation and alignment. Use special colors or aggregate as required to match existing material.
   2. Place concrete using methods which prevent segregation of the mix. Consolidate concrete along the 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 dislocation of reinforcing, dowels, and joint devices. Do not use vibrators to push or move concrete in forms or chute.
   3. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2-hour, place a construction joint.
   4. An automatic machine may be used for sidewalk or curb and gutter placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results which meet or exceed the minimum herein specified. Machine placement must produce sidewalks and/or curbs and gutters to the required cross-section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.
   5. Joints: Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of the concrete, unless otherwise indicated. Construct transverse joints at right angles to the centerline, unless otherwise indicated. When joining existing structures place transverse joints to align with previously placed joints, unless otherwise indicated.
      a. Weakened-Plane Joints: Provide weakened-plane (contraction) joints sectioning concrete into areas as shown on the Drawings. Construct weakened plane joints for a depth equal to at least 1/4 concrete thickness, by sawing within 24-hours of placement or formed during finishing operations. Place joints at intervals not to exceed 10-feet if not otherwise indicated.
      b. Construction Joints: Place construction joints at the end of all pours and at locations where placement operations are stopped for a period of more than 1/2-

hour, except where such pours terminate at expansion joints. Construction joints shall be as shown or, if not shown, use standard metal keyway-section form of appropriate height.

c. Expansion Joints:
   (1) Provide premolded joint filler for expansion joints abutting concrete curbs, catch basin, manholes, inlets, structures, walks, and other fixed objects, unless otherwise indicated.
   (2) Locate expansion joints at 12-feet on center for concrete walks unless otherwise indicated.
   (3) Extend joint fillers full-width and depth of joint, and not less than 1/2-inch below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surface.
   (4) Furnish joint fillers in one-piece lengths for the full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together. Pieces shorter than 4-inches shall not be used unless specifically shown as such.
   (5) Protect the top edge of the joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.
   (6) Fillers and Sealants: Comply with the requirements of these specifications for preparation of joints, materials installation, and performance, and as herein specified.

D. Concrete Finishing:
   1. After striking-off and consolidating concrete, smooth the surface by screening and floating. Use hand methods only where mechanical floating is not possible. Adjust the floating to compact the surface and produce a uniform texture.
   2. After floating, test surface for trueness with a 20-foot straightedge. Variations exceeding 1/3-inch for any two points within 10-feet shall not be acceptable. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.
   3. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round 10-1/2-inch radius, unless otherwise indicated. Eliminate any tool marks on concrete surface.
   4. After completion of floating and when excess moisture or surface sheen has disappeared, broom finish sidewalks by drawing a fine-hair broom across concrete surface, perpendicular to a line of pedestrian traffic. If the existing material has another finish, match existing finish.
   5. Do not remove forms for 24-hours after concrete has been placed. After form removal, clean ends of joints and point up any minor honeycombed areas.

E. Curing:

   Protect and cure finished concrete paving and walks, complying with applicable requirements of F.D.O.T. Section 350. Use moist-curing methods for initial curing of approved concrete curing compounds whenever possible.

F. Repairs and Protections:

1. Repair or replace broken or defective concrete, as directed by the City.
2. Drill test cores where directed by the City, 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 resin grout.
3. Protect concrete from damage until acceptance of work. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
4. Sweep concrete pavement and wash free of stains and discolorations, dirt, and other foreign material just prior to final inspection.

3.02 STAMPED CONCRETE DRIVEWAY

A. Pre-restoration Assessment:
   1. Site Inspection: Conduct a site visit to assess the current condition of the stamped concrete driveway, including surface damage, fading, and pattern wear.
   2. Concrete Sampling: Sample the existing color using an appropriate concrete stain or dye to ensure a perfect match. Consider environmental exposure such as sunlight, weathering, and oxidation that may have altered the color over time.
   3. Pattern Identification: Identify the original stamped pattern (e.g., cobblestone, slate, brick, etc.). If the pattern is worn or damaged, the contractor must document it and ensure the restoration matches the original or recommend an acceptable variation if the pattern is unrecognizable.

B. Restoration Process:
   1. Surface Preparation
      a. Cleaning: Pressure wash the entire surface using a mild detergent and water to remove dirt, grime, debris, and any existing coatings that might interfere with the restoration process.
      b. Crack Repair: Fill any cracks in the concrete using appropriate crack repair methods, such as polyurethane sealants, epoxy, or similar materials that blend with the surrounding concrete.
      c. Surface Etching (if applicable): For smooth or glossy surfaces, lightly etch the concrete to ensure proper bonding for the stain and sealant application.

   2. Color Matching & Application
      a. Color Sample: Take a sample of the existing color in various locations to account for any variations across the driveway.
      b. Staining: Use high-quality concrete stain or dye to match the existing color. Apply in multiple thin layers, allowing adequate drying time between coats, ensuring uniform color consistency.
      c. Blending: Blend any color inconsistencies to achieve a seamless transition across the driveway.

   3. Pattern Restoration
      a. Pattern Repair: If parts of the stamped pattern are faded or damaged, the contractor must restore or reapply the stamping technique in a way that matches

the existing pattern. This may involve using custom stamps or techniques to match the original.

b. Re-stamping: If re-stamping is required, use high-quality stamps and release agents that match the original design's texture and appearance.

4. Sealing
   a. Sealer Selection: Select a high-quality, UV-resistant, non-slip sealer that is appropriate for stamped concrete driveways. The sealer must protect against staining, fading, and weathering.
   b. Application: Apply the sealer evenly across the driveway, ensuring no streaks or bubbles. Apply one or two coats as needed for durability and aesthetic consistency.

C. Quality Assurance:
   1. Color and Pattern Consistency: The contractor must provide samples of the color and pattern restoration for approval before applying the final coat.
   2. Final Inspection: Upon completion, the contractor should conduct a thorough inspection to ensure the restoration is consistent with the original driveway's appearance in terms of color, texture, and pattern.

3.03 FIELD QUALITY CONTROL

A. General: Repair or remove and replace unacceptable concrete sidewalk, driveways, or curb and gutter as directed by the City.

B. Surface Elevation: Actual surface elevations shall be within ± 0.05 feet of specified or indicated elevations an any given point. Surface elevations between any 2 given points shall be interpolated from a direct line between the 2 points. Surfaces exceeding actual elevation tolerances of more than ± 0.05 feet at any 2 points within a distance of 15-feet will not be acceptable.

END OF SECTION

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SECTION 02578
SOLID SODDING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Establishing a stand of grass by furnishing and placing grass sod. Included are fertilizing, watering, and maintenance as required to assure a healthy stand of grass. Solid sodding shall be placed on all slopes greater than 4:1, within 10-feet of all proposed structures, and in all areas where existing grass or sod (regardless of it's condition) is removed or disturbed by Contractor's operation unless otherwise specified or shown on the Drawings.

1.02 SHOP DRAWINGS AND SUBMITTALS

A. Submittals shall be submitted to the City for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."
   1. A certification of sod quality by the producer shall be delivered to the City ten days prior to use.

PART 2 - PRODUCTS

2.01 GENERAL

A. All material supplied shall be one of the products specified in Appendix D "List of Approved Products" appended to these technical specifications.

2.02 GRASS SOD

A. Grass sod for the road rights-of-way shall be of variety to match the existing adjacent area and shall be well matted with grass roots. The sod shall be taken up in rectangles, preferably 12-inch by 24-inch, shall be a minimum of 2-inches in thickness, and shall be live, fresh, and uninjured at the time of planting.

B. Grass sod for restoration of new construction sites and/or areas disturbed by construction on existing sites shall be St. Augustine well matted with grass roots. The sod shall be taken up in rectangles, preferably 12-inch by 24-inch, shall be a minimum of 2-inches in thickness, and shall be live, fresh, and uninjured at the time of planting.

C. It shall be reasonably free of weeds and other grasses and shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. The sod shall be planted as soon as possible after being dug and shall be shaded and kept moist until it is planted.

2.03 FERTILIZER

A. Commercial fertilizers shall comply with the state fertilizer laws.

B. The numerical designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid, and (3) water-soluble potash contained in the fertilizer.

C. The chemical designation of the fertilizer shall be 6-6-6. At least 50% of the nitrogen shall be derived from organic sources. At least 50 % of the phosphoric acid shall be from normal super phosphate or an equivalent source, which will provide a minimum of two units of sulfur. The amount of sulfur shall be indicated on the quantitative analysis card attached to each bag or other container.

2.04 WATER FOR GRASSING

A. The water used in the sodding operations shall be by the Contractor as approved by the City.

PART 3 - EXECUTION

3.01 PREPARATION OF GROUND

A. The area over which the sod is to be placed shall be scarified or loosened to a depth and then raked smooth and free from debris. Where the soil is sufficiently loose and clean, the City, at its discretion, may authorize the elimination of ground preparation.

3.02 APPLICATION OF FERTILIZER

A. Before applying fertilizer, the soil pH shall be brought to a range of 6.0 - 7.0.

B. The fertilizer shall be spread uniformly over the area to be sodded at the rate of 700- pounds per acre, or 16-pounds per 1,000 square feet, by a spreading device capable of uniformly distributing the material at the specified rate. Immediately after spreading, the fertilizer shall be mixed with the soil to a depth of approximately 4-inches.

C. On steep slopes, where the use of a machine for spreading or mixing is not practicable, the fertilizer shall be spread by hand and raked in and thoroughly mixed with the soil to a depth of approximately 2-inches.

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3.03 PLACING SOD

A. The sod shall be placed on the prepared surface, with edges in close contact and shall be firmly and smoothly embedded by light tamping with appropriate tools.

B. Where sodding is used in drainage ditches, or on slopes of 4:1 or greater, the setting of the pieces shall be staggered to avoid a continuous seam along the line of flow. Along the edges of such staggered areas, the offsets of individual strips shall not exceed 6- inches. In order to prevent erosion caused by vertical edges at the outer limits, the outer pieces of sod shall be tamped so as to produce a featheredge effect.

C. On slopes greater than 2:1, the Contractor shall, if necessary, prevent the sod from sliding by means of wooden pegs driven through the sod blocks into firm earth at suitable intervals.

D. Sod which has been cut for more than 72-hours shall not be used unless specifically authorized by the City after the inspection thereof. Sod which is not planted within 24-hours after cutting shall be stacked in an approved manner, maintained, and properly moistened. Any pieces of sod that, after placing, show an appearance of extreme dryness shall be removed and replaced by fresh, uninjured pieces.

E. Sodding shall not be performed when weather and soil conditions are, in the City's opinion, unsuitable for proper results.

3.04 WATERING

A. The areas on which the sod is to be placed shall contain sufficient moisture, as determined by the City, for optimum results. After being placed, the sod shall be kept in a moist condition to the full depth of the rooting zone for at least 2-weeks. Thereafter, the Contractor shall apply water as needed until the sod roots and starts to grow for a minimum of 60-days (or until final acceptance, whichever is latest).

3.05 MAINTENANCE

A. The Contractor shall maintain, at his expense, the sodded areas in a satisfactory condition until final acceptance of the Project. Such maintenance shall include repairing of any damaged areas and replacing areas in which the establishment of the grass stand does not appear to be developing satisfactorily.

B. Replanting or repair necessary due to the Contractor's negligence, carelessness, or failure to provide routine maintenance shall be at the Contractor's expense.

END OF SECTION

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SECTION 02784
CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: This section specifies aluminum coated steel chain link fence, nominally 6-feet high, complete with gates to be constructed around the area indicated on the Drawings.

1.02 QUALITY ASSURANCE

A. Chain link fences and gates shall be constructed in accordance with specified standards, as well as all pertinent codes and regulations. Where provisions of pertinent codes conflict with the specifications, the more stringent provisions shall govern.

B. Chain link fences and gates shall be manufactured by established, reputable manufacturers that have been engaged in the manufacture of chain link fencing for at least 10-years.

1.03 SHOP DRAWINGS AND SUBMITTALS

A. Submittals shall be submitted to the City for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."

B. The Contractor shall submit layout drawings of all fence and gate installations along with details and manufacturer's literature of all fence and gate materials in the Project.

C. The Contractor shall submit all motor data, connection diagrams, wiring diagrams, and O&M instructions for all gate operators in the Project.

PART 2 - PRODUCTS

2.01 GENERAL

A. All material supplied shall be one of the products specified in Appendix D "List of Approved Products" appended to these technical specifications.

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2.02 MATERIALS

A. Fabric: The fabric shall be aluminum coated steel chain link, 72-inches high, No. 9-gauge wire woven in a 2-inch mesh. The fabric shall conform to the requirements of ASTM Designation A491. The aluminum coating shall be a minimum of 0.40-ounces per square foot of wire surface for No. 9-gauge fabric. The fabric shall have a minimum tensile strength of 75,000-psi. The weight of the coating shall be determined by the strip test as defined in ASTM Designation A428. The fabric shall be coated with an ultra violet stable black PVC coating which meets ASTM standards F688 Class I.

B. Post and Other Appurtenances: All posts and other appurtenances used in the construction of this fence shall be hot dipped galvanized with a minimum of 1.8-ounces per square foot of surface. Pipe sections shall conform to the requirements of ASTM Designation A120. All posts, rails, and fittings shall be coated with an ultra violet stable black PVC coating which meets ASTM standards F688 Class I.

C. Sizes of Posts, Gate Frames, and Rails:

COMPONENT	DIMENSIONS	
	Nominal Diameter	NPS Pipe Schedule
1. End, corner & pull posts	3-inch	40
2. Gateposts (one leaf width 8-feet or less)	3-inch	40
3. Intermediate posts	2-3/8-inch	40
4. Gate Frames	1-5/8-inch	40
5. Braces	1-5/8-inch	40
6. Top Rails	1-5/8-inch	20

D. Gates
   1. Swing Gates: Gates shall be complete with latches, stops, keepers, and hinges. Gate frames shall be constructed of round tubular members continuously welded at all corners or assembled with fittings. Welds shall be painted with aluminum or zinc based paint prior to application of PVC coating. Gate filler shall be of the same fabric as specified for the fence and shall be attached securely to the gate frame with No. 9 tie wires at intervals not exceeding 12-inches. Hinges shall be of adequate strength for the gate and with large bearing surfaces for clamping in position. The hinges shall not twist or turn under the action of the gate. The gates shall be easily operable by one person. Latches, stops, and keepers for all gates, along with 1-inch stainless steel chain and padlock, shall be provided.
   2. Sliding Gates: Sliding gates shall be complete with latches, stops, keepers, rollers, and roller tracks. Gate shall ride on a double wheel carrier. Gateposts shall be 3-inch Sch. 40 and frame shall be 1-5/8-inch Sch. 40. Slide pipe tracks shall be 1-5/8-inch Sch. 40. Safety post (outside of gatepost) shall be 3-inch Sch. 40. Fabric shall match fence.

3. Gate padlocks shall be the City standard, case brass, shackle-case hardened steel, 1-inch links with 12-inch chain, 606 finish and keyed alike when more than one.

E. Top Rail: The top rail shall be provided with couplings approximately every 20-feet. Couplings are to be the outside sleeve type, at least 6-inches long.

F. Concrete: Concrete shall have a minimum compressive strength of 2,500-psi at 28-days.

G. Hardware: Miscellaneous hardware shall be of steel, malleable iron or ductile iron of standard design and conform to the requirements of the Chain Link Fence Manufacturer's Institute. All parts shall be galvanized except ties and clips may be aluminum.

H. Power Gate Operators: The operators for sliding gates shall be Robot Industries, Inc. Model LSG-100, Venco Model SJH, or acceptable equal units designed for use on cantilever sliding gates. Operator motors shall be 1 horsepower and shall be wound for 208 volt, 3 phase, and 60 Hz power supply. Units shall provide gate speed of not less than 75-feet per minute. Units shall be arranged for ground level mounting on 6-inch concrete pads. A quick disconnect for manual operation with a padlock control shall be provided. The cover for the operator shall be of galvanized steel, and the units shall be provided with electric overload protection.

PART 3 - EXECUTION

3.01 ARRANGEMENT

A. Posts: Posts shall be uniformly spaced, not to exceed 10-feet on centers. Intermediate posts shall have waterproof tops, which have integrally cast openings through which the top rails shall pass. Terminal posts shall consist of end, corner, and pull posts.

B. Braces: Braces shall be provided at each gate, corner, pull, and end post.

C. Top Rails: The top rails shall pass through the line post tops and form a continuous brace from end to end of each stretch of fence. The top rail shall be securely fastened to the terminal posts by heavy pressed steel brace bands and malleable end connections.

D. Bottom Tension Wire: The bottom tension wire shall be No. 7-gauge aluminum coated spring coil or crimped wire. Minimum weight of aluminum coating shall be 0.40-ounces per square foot of wire surface. The tension wire shall be stretched taut between terminal posts and securely fastened to each intermediate post 2-inches above the finish grade line. Tension wire shall be attached to the fence fabric with aluminum hog rings every 24-inches.

E. Stretcher Bars: Stretcher bars shall be no less than 3/16-inch by 3/4-inch in cross section and shall have minimum length 2-inches longer than the fabric height. Stretcher bars shall be used for attaching the fabric to all terminal posts by threading through the fabric and being attached to the posts with No. 9-gauge tension bands, or other positive mechanical means, spaced at 24-inch centers. One (1) stretcher bar shall be provided for each gate and end post and 2 for each corner and pull post.

F. Ties and Clips: Fabric shall be fastened to all intermediate posts with 9-gauge tie wires, spacing not to exceed 12-inches apart. Fabric shall be tied to top rail with 9-gauge tie wires, spacing not to exceed 24-inches on centers.

3.02 INSTALLATION

A. Post Setting: Line and terminal posts shall be set in holes 12-inches in diameter, 42- inches deep with 36-inch post embedment. After the post has been set and plumbed, the hole shall be filled with concrete. The exposed surface of the concrete shall be crowned to shed water.

B. Terminal and Gateposts: Terminal and gateposts shall be set as specified above and shall be braced to the nearest post with a galvanized horizontal brace used as a compression member and a galvanized 3/8-inch steel truss rod and turnbuckle used as a tension member.

C. Fabric: Fabric shall not be stretched until concrete footings have cured a minimum of 3-days. Chain link fabric shall be placed on the side designated by the City and shall be stretched taut approximately 2-inches above finish grade and securely fastened to all posts. Rolls of wire fabric shall be joined by weaving a single strand into the ends of the rolls to form a continuous mesh.

END OF SECTION

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SECTION 02840

GUARDRAIL AND HANDRAIL

PART 1 GENERAL

1.01 Section Includes

A. FDOT Guardrail

B. FDOT Aluminum Pipe Handrail

1.02 Related Sections

A. Guardrail Products and Installation - FDOT Index No. 400, FDOT Specification Section 536

B. Aluminum Handrail Products and Installation - FDOT Index No. 520

1.03 Scope of Work

Furnish and install a heavy-duty inclined trash rack at the pump station intake, including galvanized bar screen, concrete embedment frame (if required), maintenance access platform with hot-dip galvanized open steel grating, and OSHA-compliant aluminum guardrail/handrail system. Work includes coordination with structural and drainage elements to ensure proper integration and functionality.

1.04 References

A. Requirements defined in this section are supplemental to FDOT specifications. Products identified herein relate to FDOT options.

B. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

C. Florida Department of Transportation Roadway and Traffic Design Standards, latest edition.

1.05 Submittals

A. Provide shop drawings which indicate the following:

1. Guardrail layout including post locations and anchorage
2. Handrail layout including anchor and base details

PART 2 PRODUCTS

2.01 Guardrail Posts

Guardrail posts shall be fabricated from galvanized steel or aluminum, as required to match the handrail system. Posts shall comply with OSHA requirements for guardrail systems and be securely mounted to the access platform or concrete surface.

2.02 Guardrail End Anchorage

Provide end anchorage type IV.

2.03 Trash Rack and Access Platform

A. Trash Rack:

1. Fabricate from hot-dip galvanized steel bar stock with 1-inch minimum spacing between vertical bars.
2. Bars shall be inclined between 60–75 degrees from horizontal for optimal debris deflection and maintenance access.
3. Mount to cast-in-place concrete or approved channel frame embedded in pump station structure.

B. Access Platform:

1. Construct platform using galvanized open steel bar grating (minimum ¼" thick bearing bars).
2. Support system shall accommodate 250 lb concentrated load and 100 lb/sf live load.

C. Guardrail and Handrail:

1. Provide aluminum pipe handrail system per FDOT Index No. 520.
2. System shall include toe plates and comply with OSHA fall protection standards.

D. Coating/Finish:

1. All steel components to be hot-dip galvanized in accordance with ASTM A123.
2. Aluminum handrails shall be mill finish or anodized per project standard.

PART 3 EXECUTION - Not Used

END OF SECTION

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SECTION 02910

LANDSCAPING

PART 1 GENERAL

1.01 Section Includes

Materials, installation, maintenance of trees, ground cover, and shrubs

1.02 Related Sections

Section 02920 - Grassing

1.03 General Requirements

A. Furnish all labor, materials, equipment, and incidentals required to install trees, ground cover, and shrubs, to place accessory planting materials and to maintain and guarantee all planted areas, in areas as shown on the Drawings. All work shall be in strict adherence with sound nursery practice and shall include maintenance and watering of all the work of this Contract until final completion and acceptance by the Owner.

B. The landscaping shall be performed by a subcontractor who is fully experienced in projects of this scope and whose main business is landscaping. The subcontractor shall be subject to the approval of the Engineer.

C. Provide under this Section all landscaping appurtenances as shown on the landscaping drawings and specifications.

1.04 Submittals

A. Submit to the Engineer for approval, complete written maintenance instructions for each type of plant furnished under the Contract.

B. Submit representative samples of any or all of required accessory planting materials as ordered by the Engineer.

C. All trees, shrubs and sod shall have a valid and current state of Florida, Division of Plant Industry (DPI) inspection certification prior to being transported to the construction site. Submit the DPI certification to the Engineer and maintain a copy of the certification onsite with the construction records.

1.05 Warranty

The life and satisfactory condition of all plant material planted shall be guaranteed by the Contractor for a minimum of one calendar year. Guarantee shall include complete

replacement with material of the same kind and size as in the original work if not in a healthy condition, as determined by the Engineer, at the end of the warranty period.

1.06 Maintenance

A. Plant material maintenance shall begin when planting operations start and shall extend until final acceptance of the work.

B. Maintain all plant materials under this Contract to the satisfaction of the Engineer. Maintenance shall include necessary watering, cultivation, weeding, pruning, spraying, tightening and repair to guy wires, removal of dead material, resetting, and other work required to conform with referenced standards and accepted nursery standards as approved.

C. Plant materials which are in a tilted or in a leaning position shall be properly righted

D. After final acceptance by the Owner and until 120 days after acceptance of all plantings, the landscaping subcontractor shall make monthly inspections of materials and report in writing to the Engineer the conditions of the plants and the necessary requirements to keep the plants in a healthy growing condition.

PART 2 PRODUCTS

2.01 Materials

A. Plant species and size shall conform to those indicated in the Plant List and in plant locations shown on the Drawings. All plants shall be Florida Grade No. 1, or better.

B. Plants shall be sound, healthy, vigorous, free from plant diseases, insects, pest, or their eggs, and shall have healthy normal root systems. Plants shall be nursery grown stock, freshly dug. No heeled in, cold storage or collected stock will be acceptable.

C. Shape and Form:

1. Plant material shall be symmetrical, typical for the variety and species, and shall conform to the measurements specified in the Plant List.
2. Plants used where symmetry is required shall be matched as nearly as possible.
3. Plants shall not be pruned prior to delivery except as authorized.
4. All plants shall have been transplanted or root pruned at least once in the past 3 years.
5. Unless otherwise noted, street trees shall be free of branches up to 6 feet, with the single leader well branched, and with straight trunks.
6. Shrubs shall have been twice transplanted, have fully developed root systems, be heavily canned with foliage to base, fulfill dimensions required, and be typical of the species.

7. Ground covers shall have sturdy fibrous root systems and shall be heavily leafed.

D. Measurement: The height and/or width of trees shall be measured from the ground or across the normal spread of branches with the plants in their normal position. The measurement shall not include the immediate terminal growth.

E. Substitutions in plant species or size shall be made only with the written approval of the Engineer.

F. Ground cover plants shall be planted in beds which receive 4 inches of approved topsoil, thoroughly disced into the soil. The finished surface, compacted and settled, shall conform generally with and at all points to the required grade. Plants shall be spaced as shown, and in accordance with the best practices of the trade.

G. Planting Soil:

1. Soil for backfilling around plants and planting beds shall be a good grade of garden loam as approved. Soil shall be free of heavy clay, coarse sand, stones, lumps, sticks or other foreign material. The soil shall not be delivered or used in a muddy condition.
2. The soil shall be taken from ground that has never been stripped. There shall be a slight acid reaction to the soil with no excess of calcium or carbonate. The soil shall be free from excess weeds or other objectionable material.
3. Soil for trees and shrubs shall be delivered in a loose, friable condition. All trees should average approximately 1 cubic yard per tree. There will be 4-inches of planting soil in ground cover areas and 1/8 cubic yard per shrub or vine.
4. No marl shall be used in ground cover planting beds.

H. Any required landscaping stone shall be inert, nonleaching material as specified on the Drawings. Provide physical samples for approval before purchase. No crushed limerock shall be used.

PART 3 EXECUTION

3.01 Planting Procedures

A. Plant Locations: All plants shall be located as shown on the Drawings, to dimensions if shown, to scale if not dimensioned. Large areas or beds shall be scaled, and the plants spaced evenly. Approval by the Engineer is required before any plants are installed.

B. Tree Staking: All tree staking and bracing shall be included herein in accordance with sound nursery practice and shall generally be in accordance with the details shown. Furnish all materials required for staking and bracing as approved.

C. Tree Pits: Pits for trees shall be at least 2 feet greater in diameter than the specified diameter of the ball. Pits shall be of sufficient depth to allow a 6-inch layer of planting soil under the ball when it is set to grade. Bottom of pit shall be loosened prior to backfilling. Other specifications for tree pits shall be as shown on the plans.

D. Digging and Handling:

1. Plants shall be handled at all times so that roots or balls are adequately protected from sun or drying winds. Tops or roots of plants allowed to dry out will be rejected.
2. Balled or burlapped plants shall be moved with firm, natural balls of soil, not less than 1-foot diameter of ball to every 1-inch caliper of trunk, and a depth of not less than 2/3 of ball diameter. No plant shall be accepted when the ball of earth surrounding its roots has been cracked or broken. All trees, except palm and seedling pines, shall be dug with ball and burlapped. Root pruning shall have been done a minimum of four weeks before planting at the job.
3. Bare root plants shall be dug with spread of root and of sufficient depth to ensure full recovery of the plant.

E. When balled and burlapped plants are set, planting soil shall be carefully tamped under and around the base of the balls to prevent voids. All burlap, rope, wires, etc., shall be removed from the sides and tops of balls, but no burlap shall be pulled from underneath. Roots of bare rooted plants shall be properly spread out and planting soil carefully worked in among them.

F. Before plants are backfilled with planting soil, fertilizer tables, Agriform 20-10-5 or equal, shall be placed in each pit. Provide three tablets for each tree and one for each shrub or vine.

G. All plants shall be set straight or plumb, in locations shown on the Drawings. Except as otherwise specified, plants shall be planted in pits and shall be set at such level that, after settlement, they bear the same relation of the finished grade or surrounding ground as they bore to the grade of the soil from which they are taken.

H. Pruning shall be carefully done by experienced plantsmen. Prune immediately upon acceptance by the Owner, including any broken branches, thinning all small branches and tipping back main branches (except main leaders).

I. Excess soil and debris shall be disposed of off the project site unless ordered stockpiled by the Engineer.

3.02 Obstructions Below Ground

A. If underground construction utilities or obstructions are encountered in excavation of the planting areas, or pits, other locations for the plant material may be selected by the Engineer.

B. Such changes shall be done without additional compensation.

3.03 Tree and Plant Protection

A. The Contractor shall remove only those trees selected for removal by the Engineer. Prior to removal of said trees, the Contractor shall obtain a tree removal permit, if required. All other trees in the vicinity of the work shall be protected against damage by the Contractor until all work under the Contract has been completed.

B. Consult with the Engineer, and remove agreed-on roots and branches which interfere with construction. Employ qualified tree surgeon to remove, and to treat cuts.

C. Provide temporary barriers to the height of six feet (6-foot/0-inches), around each, or around each group of trees and plants.

D. Protect root zones of trees and plants:

1. Do not allow vehicular traffic or parking.
2. Do not store materials or products.
3. Prevent dumping of refuse or chemically injurious materials or liquids.
4. Prevent puddling or continuous running water.

E. Carefully supervise excavating, grading and filling, and subsequent construction operations, to prevent damage.

F. In case of inadvertent damage to any tree, by the Contractor or any of his subcontractors or employees, the Contractor shall provide replacement of each size tree with a new tree of acceptable type, size and quality, subject in each case to the approval of the Owner.

G. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed, and when approved by the Engineer.

H. Clean and repair damage caused by installation, fill and grade the areas of the site to required elevations and slopes, and clean the area.

3.04 Replacement

A. At the end of the warranty period, any plant required under this Contract that is dead or not in satisfactory growth as determined by the Engineer shall be removed. Plants replaced shall be guaranteed for 90 days after date of replacement.

B. Replacement of plants necessary during the guarantee period shall be the responsibility of the Contractor, except for possible replacements of plants

resulting from removal, vandalism, acts of neglect on the part of others, or acts of God.

C. All replacements shall be plants of the same kind and size as specified in the landscape drawings. They shall be furnished and planted as herein specified. The cost shall be the responsibility of the Contractor.

END OF SECTION

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SECTION 02931

ARBORIST TREE PROTECTION

PART 1 - GENERAL

1.01 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. Contractor shall engage and pay a Certified Arborist who will be responsible for supervising implementation of tree, shrub and plant protection throughout construction.

1.02 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches above the ground for trees up to, and including, 4-inch size; and 12 inches above the ground for trees larger than 4- inch size.

B. DBH (Diameter at Breast Height): The diameter at breast height of a tree's trunk measured at a height four and one-half (4 ½) feet above grade. In the case of multiple trunk trees, the DBH shall mean the sum of each trunk's diameter measured at a height of four and one-half (4 ½) feet above grade.

C. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction.

D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated on the Drawings.

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

1.03 SUBMITTALS

A. Certified Arborist: Submit evidence contract with acceptable Certified Arborist prior to commencing site mobilization activities.

B. 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.

B. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction prior to the work.

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.

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.

1.5 QUALITY ASSURANCE

A. Arborist Qualifications: Certified Arborist as certified by International Society of Arboriculture (ISA) or registered by the American Society of Consulting Arborists. In addition, Certified Arborist shall have experience in tree risk assessments, preferably TRAQ Qualified.

B. 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.

1.6 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. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil: 80 percent sand and 20 percent muck thoroughly mixed with a commercial shredder/blender or equivalent. Material shall be proportioned by volume rather than weight and site mixing is not allowed. Mixture shall be free from rocks greater that ½" in size, limbs, roots, and other deleterious matter. The Landscape Architect reserves the right to reject topsoil, at any time, used during the execution of the work not meeting specifications.

B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:

1. Type: Shredded Melaleuca, Grade A.
2. Color: Natural.

C. Protection-Zone Fencing: Fencing fixed in position as indicated on the Drawings.

PART 3 - EXECUTION

3.1 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated with flagging tape.

B. Protect tree root systems from damage caused by runoff or spillage of chemically injurious materials while mixing, placing, or storing construction materials. Protect root

systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Above-ground surface runoff shall not be directed into the tree canopy area from adjacent areas. Ensure that sidewalks or other construction do not trap water near the tree.

D. Protect existing plant materials from unnecessary cutting, breaking and skinning of roots and branches, skinning and bruising of bark.

E. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.

1. Apply 3-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

3.2 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.

B. Maintain protection zones free of weeds and trash.

C. 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 City.

D. Maintain protection-zone fencing and signage in good condition as acceptable to 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.

3.3 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to specifications.

B. Trenching near Trees: Where trenching for utilities is required within drip lines, tunnel under and around roots of 2-1/2 inches diameter or larger by hand digging. Do not cut main lateral roots that are two inches or larger. Cut smaller roots that are smaller than two inches that interfere with installation of new Work. Use sharp, approved pruning tools.

C. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with

installation of utilities. Cut roots as required for root pruning.

D. 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 3 inches back from new construction and as required for root pruning. . Treat and cover cut ends as directed by Certified Arborist.

E. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover, pack with wet peat moss or four layers of wet untreated burlap and temporarily support and protect roots from damage until permanently relocated and covered with backfill. Irrigate to eliminate voids and air pockets.

3.4 ROOT PRUNING

A. Certified Arborist shall direct tree root pruning and relocation work that are affected by temporary and permanent construction. Procedure for each tree may vary and shall be subject to approval by Certified Arborist and prior to commencing Work.

B. Prune as follows:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, mutilate, 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 in accordance with specifications.

C. Root Pruning at Edge of Protection Zone: Prune 6 inches outside of the protection zone, by cleanly cutting all roots to the depth of the required excavation.

D. 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.

3.5 PRUNING

A. Certified Arborist shall direct removal of branches from trees and large shrubs and correctional pruning and cabling that are affected by temporary and permanent construction. Procedure for each tree may vary and shall be subject to approval by Certified Arborist and prior to commencing Work.

B. 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).
3. Tree limbs shall be trimmed or removed only under direction of skilled and experienced supervisor, according to directions of Arborist.

C. Chip removed branches and dispose of off-site.

3.6 REGRADING

A. Grade changes shall be limited to six inches of cut or fill from original grade and shall be accomplished by hand.

B. 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.

C. 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.

D. 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.

E. 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.

3.7 REPAIR AND REMOVAL OF TREES

A. Repair and Removal of Trees: Certified Arborist will determine whether trees shall be restored or removed. Treat and restore trees damaged by construction operations in a manner acceptable to City and owner of the tree, shrub, landscaping and other vegetation. Perform restoration and pruning promptly after damage occurs to prevent progressive deterioration of damaged trees. If trees cannot be restored, replace trees and plants which are damaged or destroyed due to work operations at no cost to the City.

1. Remove dead and damaged trees that are determined by Certified Arborist to be incapable of restoration to normal growth pattern.

2. Contractor shall be liable for all damage and necessary restoration actions to existing trees, including trunk, branches, or roots. Restoration shall be performed under direction of Certified Arborist.

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3.8 REPAIR AND REPLACEMENT OF SHRUBS AND GROUND COVER

A. Repairs and Replacements of Shrubs and Ground Cover: Repair shrubs and other vegetation damaged by construction operation in manner acceptable to the City.

1. Make repairs promptly after damage occurs to prevent progressive deterioration of damaged plant. Remove and replace all dead and damaged plants up to six-inch diameter which are determined by the Certified Arborist as being incapable of restoration to normal growth pattern.

2. Provide new shrubs of same size and species as those replaced or as acceptable to the City.

3.9 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.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and properly dispose of them off Owner's property.

END OF SECTION

SECTION 09900
PAINTING

1. GENERAL

1.1 Description

A. This specification defines the methods of surface preparation, coating systems, and methods of application for painting of surfaces as outlined herein.

B. The Contractor shall furnish all supervision, materials, labor, tools, equipment, scaffolding or other structures, incidentals required for transportation, unloading, storage and application of paint and protective coating systems and associated products for the surfaces listed herein and not otherwise excluded. All surfaces described shall be included within the scope of this Section. Surface preparation, priming, and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of the work.

C. "**Paint**", as used herein, means all coating systems, materials, including primers, emulsions, enamels, epoxies, sealers and fillers, and other applied materials whether used as a prime, intermediate, or finish coats.

D. The Work includes painting and finishing of interior and exterior exposed items and surfaces such as structural steel, miscellaneous metals, ceilings, walls, floors, doors, frames, transoms, fans, construction signs, guardrails, posts, pipes, fittings, valves, tanks, equipment, and all other work obviously required to be painted unless otherwise specified herein or on the Contract Drawings. The omission of minor items in the schedule of work shall not relieve the Contractor of his obligation to include such items where they come within the general intent of the specifications as stated herein. The following major items of the Project shall be coated:

1. Interior and exterior of cast-in-place concrete, concrete block walls, ceilings, stucco walls and exterior concrete block walls.
2. Interior of concrete water retaining structures.
3. Exterior and interior of buried concrete surfaces (cast-in-place, precast or block).
4. Exposed ferrous surfaces of any components of equipment, pumps, motors, tanks and ferrous or galvanized metal fittings and accessories (except stainless steel).
5. Submerged surfaces, surfaces exposed to liquids, and surfaces in vaults of any ferrous metal and aluminum components of equipment, piping, fittings and valves (except stainless steel).

6. Exposed surfaces of PVC components of piping, fittings, valves, electrical conduit, and equipment.

7. Exposed exterior surfaces of all metallic piping, fittings and valves located on the interior and exterior of buildings and structures. This shall include new piping, fittings and valves for the Project.

8. Embedded aluminum or aluminum in contact with dissimilar metals or in contact with corrosive atmospheres.

E. The following items will not be painted unless otherwise noted:

1. Any code-requiring labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.

2. Any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts, unless otherwise indicated.

3. Stainless steel angles, tube, pipe, etc.

4. Aluminum or fiberglass handrails, walkways, kickplates/toeboards, windows, louvers, grating, checker plate, hatches, and stairways unless otherwise indicated.

5. Products with polished chrome, aluminum, nickel, or stainless-steel finish.

6. Stainless steel, brass, bronze, chromium plate, anodized aluminum, and aluminum other than exposed utility tubing.

7. Flexible couplings, lubricated bearing surfaces, insulation, and plastic pipe or duct interiors.

8. Plastic switch plates and receptacle plates.

9. Signs, nameplates, code-required labels, equipment identification, performance rating, name or nomenclature plates.

10. Finish hardware.

11. Packing glands and other adjustable parts, unless otherwise indicated.

12. “Pre-finished” items including architectural woodwork and casework, toilet enclosures, metal lockers, elevator equipment, light fixtures, and distribution cabinets.

13. Portions of metal, other than aluminum, embedded in concrete. This does not apply

to the back face of items mounted to concrete or masonry surfaces which shall be painted before erection. Aluminum to be embedded in, or in contact with, concrete shall be coated to prevent electrolysis.

14. Sprinkler heads.

F. All work shall be done in strict accordance with this specification, the Contract Drawings, painting package and the manufacturer's printed instructions.

1.2 Definitions

A. **Field Painting** is the painting of new or rebuilt items at the Project Site.

B. **Shop Painting** is the painting of new or rebuilt items in the shop prior to delivery to the Project Site.

C. **Dry Film Thickness (DFT)** is the thickness of a coat of paint in fully cured state measured in mils ($^{1}/_{1000}$ inch).

D. Definitions of additional painting terms as defined in ASTM D-16, unless otherwise specified.

E. The abbreviations and definitions listed below, when used in this specification, shall have the following meanings:

1.	SSPC:	Steel Structures Painting Council
2.	Exterior:	Outside, exposed to weather
3.	Interior Dry:	Inside, not subject to immersion service
4.	Interior Wet:	Inside, subject to immersion service
5.	ASTM:	American Society of Testing Materials
6.	NACE:	National Association of Corrosion Engineers
7.	NFPA:	National Fire Protection Association
8.	OSHA:	Occupational Safety and Health Administration
9.	NSF:	National Science Foundation
10.	AWWA:	American Water Works Association

1.3 Quality Assurance

A. **Provide the best quality grade of the various types of coatings** as regularly manufactured by approved paint materials manufacturers. Materials not displaying the manufacturer's identification as a standard, best-grade product will not be acceptable.

B. The Contractor shall be responsible for a satisfactory paint application which will adhere without peeling, flaking, delamination, blistering or discoloration. Before application of any painting materials, the Contractor shall submit a Project specific Letter of Certification from the manufacturer of the materials to be used. The letter shall state that the manufacturer recommends the materials selected for the application proposed.

C. Painting shall be accomplished by experienced painters specializing in industrial painting familiar with all aspects of surface preparations and applications required for this Project. Work shall be done in a safe and workmanlike manner. Prior to application of coating materials, the approved paint manufacturer shall submit shall submit a Project specific letter certifying that the Contractor or his painting subcontractor are qualified to apply their respective products.

D. Provide undercoat paint produced by the same manufacturer as the finish coats. **Undercoat and finish coat paints shall be compatible**. **Use only thinners approved by the paint manufacturer, and use only within recommended limits**.

E. Reference Standards

1. All work shall conform to applicable provisions of the following standards, except as modified herein:

a. American National Standards Institute (ANSI)

ANSI Standard	Standard Title
ANSI/EIA RS-359-1969	Colors for Identification and Coding (ANSI C83.1)
ANSI Z53.1-1979	Safety Color Code and Marking Physical Hazards
ANSI A13.1-1975	Scheme for the Identification of Piping Systems

b. American Society for Testing and Materials (ASTM)

ASTM Standard	Standard Title
ASTM D 2200-67(1980)	Pictorial Surface Preparation Standards for Painting Steel Structures
ASTM D 3276-80	Recommended Guide for Paint Inspectors

c. National Association of Corrosion Engineers (NACE)

d. Occupational Safety and Health Administration (OSHA)

e. National Science Foundation (NSF)

f. National Fire Protection Association (NFPA)

g. American Water Works Association (AWWA)

F. Acceptable Manufacturers

1. It is the intent of this specification section that the Contractor **use one paint manufacturer throughout**, unless otherwise approved by the Engineer. Products shall be manufactured by one of the following:

   a. Tnemec Company, Inc.

   b. Carboline Company

   c. Induron Coatings, Inc.

   d. Devoe, Inc.

   e. Xypex

   f. Or approved equal.

2. No request for substitution will be considered that decreases the dry film thickness (DFT) and/or number of coats to be applied, or that offers a change from the generic type of coating specified.

1.4 Submittals

A. Materials and Shop Drawings

1. Submit to the Engineer as provided in the General Conditions, Supplementary Conditions and Section 01300, “Submittals”, shop drawings, manufacturer's specifications and data on the proposed paint systems, including, but not limited to, the following:

   a. Percent solids by volume.

   b. Minimum and maximum recommended dry-film thickness (DFT) per coat for prime, intermediate and finish coats for each application.

c. Recommended and detailed surface preparation procedures and techniques.

d. A certificate identifying the type and gradation of abrasives used for surface preparation.

e. Recommended thinners for each of the proposed painting/coating systems.

f. A statement verifying that the specified prime coat is recommended by the manufacturer for use with the specified intermediate and finish coats.

g. Application procedures and instructions including recommended equipment and temperature limitations.

h. Curing requirements and instructions.

i. Material Safety Data Sheets (MSDS) for each painting/coating material.

j. A certificate identifying the type and gradation of abrasives used for surface preparation.

B. Color Samples

1. The manufacturer's standard color charts for color selection by the Owner.

1.5 Product Delivery, Handling and Storage

A. Deliver all materials to the job site in "new", "original", "unopened packages and containers bearing the manufacturers' name, trade name and label analysis, in accordance with Section 01600, "Materials and Equipment".

B. Containers shall be clearly marked to indicate any hazards connected with the use of the paint and steps which should be taken to prevent injury to those handling the product.

C. All containers shall be handled and stored in such a manner as to prevent damage or loss of labels or containers. All containers shall be handled and stored in a steel cabinet raised four (4) inches above the floor to prevent damage from spillage or loss of labels on containers.

D. The Owner shall designate areas for storage and mixing of all painting materials. Store only acceptable product materials on the Project site. Restrict storage to paint materials and related equipment.

E. All painting materials shall be stored in a clean, dry, well-ventilated place, protected from sparks, flame, direct rays of the sun or from excessive heat. Paint susceptible to damage from low temperatures shall be kept in a heated storage space when necessary. The Contractor shall be solely responsible for the protection of the materials stored by himself at the job site. Empty coating cans shall be required to be neatly

stacked in an areas designated by the owner and removed from the job site on a schedule determined by the owner.

F. Storage of paint materials and related equipment shall comply with the requirements or pertinent codes and fire regulations. The Contractor shall take all safety precautions in accordance with Section 7 of AWWA D102, NFPA Bulleting No. 101 and all federal, state and local regulations. In addition, all safety precautions noted on the manufacturer's Material Safety Data Sheets (MSDS) and other literature shall be strictly followed. Proper containers outside of buildings shall be provided by the Contractor and used for painting wastes. No plumbing fixtures shall be used for this purpose.

G. Used rags shall be removed from the buildings every night and every precaution taken against “spontaneous combustion”.

1.6 Job Conditions

A. Apply water-base paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50°F by the paint and 90°F unless otherwise permitted manufacturer’s printed instructions.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45°F and 95°F unless otherwise permitted by the paint manufacturer’s printed instructions.

C. Do not apply paint in rain, fog, or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.

D. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and maintained within the temperature and humidity limits specified by the paint manufacturer during application and drying periods.

1.7 Warranty and Guarantees

A. All paint and coatings work performed under these specifications shall be in compliance with the project requirements.

1.8 Identification Systems

A. Paint piping and equipment for identification purposes in accordance with Section 09905, “Piping, Valve and Equipment Identification System”.

2. PRODUCTS

2.1 Materials

A. All paint shall be manufactured by one of the suppliers listed in Article 1.04(G), herein, and shall be their highest grade and quality of paint.

B. The following coating systems list a product by name to establish a standard of quality; other products of the same generic types may be submitted to the Engineer for approval as described in Article 1.06, herein. When other than the specified coating system is proposed, the Contractor shall submit a list, in an electronic format) giving the proposed coatings, brand, trade name, generic type and catalog number of the proposed system for the Engineer's review and approval, prior to the application of the painting/coating system.

C. Paint used in successive field coats shall be produced by the same manufacturer. Paint used in the first field coat over shop painted or previously painted surfaces shall cause no wrinkling, lifting, or other damage to underlying paint. Shop paint shall be of the same type and manufacture as used for field painting by the Contractor.

D. Emulsion and alkyd paints shall contain a “mildewcide” and both the paint and “mildewcide” shall conform to OSHA and Federal requirements, including Federal Specification TT-P-19.

E. **No paint containing lead or chromate shall be allowed on the Project**. Oil shall be pure boiled linseed oil.

F. Rags shall be clean painter's rags, completely sterilized.

G. All cleaners, thinners, driers and other additives and surface pretreatment materials shall only be those approved for use by the manufacturer of the coatings.

H. Do not dilute paints except as recommended by the paint manufacturer.

I. All recommendations of the paint manufacturer in regard to the health and safety of the workmen shall be followed.

J. All coatings to be shop applied must meet the requirements for volatile organic compounds (VOC) of not more than 3.5 pounds per gallon after thinning.

2.2 Coating Schedule

A. The following coating systems table lists the general features of the standard coating systems, by service and generic type, and is provided as a general guideline for this project:

System No.	Generic Type	Surface Material	Finish	Typical Function
1	Epoxy / Polyurethane	Ferrous Metal, Non-galvanized	Gloss	Exterior Metals not subject to immersion or frequent splashing
7	Epoxy	Ferrous Metal, Non-galvanized	Semi-gloss	Metals subject to immersion or frequent splashing
8	Epoxy	Ferrous Metal, Galvanized	Semi-gloss	Metals subject to immersion or frequent splashing
11	Acrylic	Concrete	Low sheen	Precast concrete ceilings, beams and columns
15	Elastomeric	Masonry	Low sheen	Exterior masonry
16	Acrylic	Masonry	Low sheen	Interior masonry
18	Acrylic	Plaster, Stucco	Low sheen	Exterior plaster, stucco
25	Coal Tar Epoxy	Ferrous Metal	Semi-gloss	Metals submerged in non-potable water
26	Coal Tar Epoxy	Concrete	Semi-gloss	Submerged concrete in non- potable water or below grade
29	Sealer, Hardener	Concrete	Semi-gloss	Concrete Floors

2.3 Coating Systems

A. System No. 1

1. System No. 1 shall be used for exterior non-galvanized ferrous metals that are not subject to immersion or frequent splashing of water, reclaimed water or wastewater, including but not limited to the following:

   a. Exposed exterior piping, valves and fittings.

   b. Clarifier and sludge thickener bridge, top side and railings.

2. Surface Preparation: SP-6

3. Shop Primer

   a. One (1) coat of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	Series I Omnithane	1	3
Carboline	Carbocoat 115	1	2

4. Field Touch-Up: Same material as Shop Primer.

5. Intermediate Coat

   a. Provide intermediate coats of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	N 69	1	3.5
Carboline	Carbocoat 45	2	1.5 - 2.0

6. Finish Coat

   a. One (1) full coat of High Gloss aliphatic polyurethane:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	1074	1	3
Carboline	Carbocoat 45	1	1.5

B. System No. 7

1. System No. 7 shall be used for non-galvanized, ferrous metals subject to immersion or frequent splashing, including but not limited to, the following:

   a. Submerged piping and piping subject to splashing

   b. Submersible pumps

   c. Mixers

   d. Clarifiers, grit collectors, and sludge thickeners

      1) Interior mechanisms

      2) Steel weirs, troughs, supports

      3) Bridge underside

   e. Submerged miscellaneous metal, equipment, etc. without a factory-applied final finish.

2. Surface Preparation: SP 10

3. Shop Primer

   a. One (1) coat of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	Series I Omnithane	1	2.5 - 3.5
Carboline	Carboguard 890	1	4

4. Field Touch-Up

   a. The “field touch-up” coating shall be the same material as the shop primer.

5. Finish Coat

   a. Two (2) coats of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	Series 446 Permashield MCU	2	5.0 - 7.0
Carboline	Carboguard 890	2	5

C. System No. 8

1. System No. 8 shall be used for galvanized, ferrous metals subject to immersion or frequent splashing, including but not limited to, the following:

   a. Submerged galvanized piping and piping subject to splashing.

   b. Submerged galvanized conduit, miscellaneous metal, equipment, etc. without a factory-applied final finish.

2. Surface Preparation: SP M1 and SP 7

3. Field Clean-Up: Remove all grease, oil and contaminants with rags soaked in Toluol or Xylol in accordance with SSPC – SP1.

4. Primer

   a. One (1) coat of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	Series N69	1	2.5 - 3.5
Carboline	Carboguard 890	1	4

5. Finish Coat

   a. Two (2) coats of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	Series N69 Epoxoline	2	2.5 - 3.5
Carboline	Carboguard 890	2	5

D. System No. 11

1. System No. 11 shall be used for interior concrete requiring a matte finish, including but not limited to the following:

   a. Precast concrete ceilings, beams and columns.

2. Surface Preparation: SP C2

3. Filler

   a. The need for a filler may be deleted if concrete surface has been “rubbed” finish.

   b. There is no need for filler for concrete that is to be “submerged.

   c. Filler shall be applied until the surface is “pin-hole” free using the product of one of the manufacturers below (or approved equal), except as indicated above:

Manufacturer	Coating	Coating Application (ft2 / gallon)
Tnemec	215 Surfacing Epoxy	As needed
Carboline	Sanitile 100	72

   d. Remove excess filler from the concrete surface.

4. Finish Coat

   a. Two (2) coats of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	Series 6 Tneme-Cryl	2	2.5
Carboline	Sanitile 155	2	2

E. System No. 15

1. System No. 15 shall be used for exterior masonry requiring a matte finish.

2. Surface Preparation: SP C2

3. Filler

   a. Filler shall be applied until the surface is “pin-hole” free using the product of one of the manufacturers below (or approved equal), except as indicated above:

Manufacturer	Coating	Coating Application (ft2 / gallon)
Tnemec	Series 1254	130
Carboline	Sanitile 100	72

   b. Remove excess filler from the concrete surface.

4. Finish Coat

   a. Two (2) coats of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	Series 6 Tneme-Cryl	2	2.5
Carboline	Sanitile 155	2	2

F. System No. 16

1. System No. 16 shall be used for interior masonry requiring a matte finish.

2. Surface Preparation: SP C2

3. Filler

   a. Filler shall be applied until the surface is "pin-hole" free using the product of one of the manufacturers below (or approved equal), except as indicated above:

Manufacturer	Coating	Coating Application (ft2 / gallon)
Tnemec	Series 54 Modified Epoxy Masonry Filler	80
Carboline	Sanitile 100	72

   b. Remove excess filler from the concrete surface.

4. Finish Coat

   a. Two (2) coats of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	Series 6 Tneme-Cryl	2	2.5
Carboline	Sanitile 155	2	2

G. System No. 18

1. System No. 18 shall be used for the following exterior surfaces:

   a. Concrete columns and beams.

   b. Plaster and stucco.

2. Surface Preparation: SP P2

3. Primer

   a. Filler shall be applied until the surface is "pin-hole" free using the product of one of the manufacturers below (or approved equal), except as indicated above:

Manufacturer	Coating	Coating Application (ft2 / gallon)
Tnemec	Series 218	As needed
Carboline	Sanitile 100	72

b. Remove excess filler from the concrete surface.

4. Finish Coat

a. Two (2) coats of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	Series 6 Tneme-Cryl	2	2.5
Carboline	Sanitile 155	2	2

H. System No. 25

1. System No. 25 shall be used for metal surfaces, including but not limited to the following:

a. Submerged piping

2. Surface Preparation: SP 10

3. Shop Primer

a. One (1) coat of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	Series 1	1	2.5 - 3.5
Carboline	Carboguard 60	1	3

4. Field Touch-Up

   a. The "field touch-up" coating to be applied, as required, shall be from one of the following manufacturers, or approved equal:

Manufacturer	Coating
Tnemec	Series I
Carboline	Bitumastic 300M

5. Finish Coat

   a. Two (2) coats of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	446 Permashield MCU **	2	6.0 - 8.0
Carboline	Bitumastic 300M	2	8

* Apply the second coat within 90 hours of the first coat.
** Apply the second coat within 7 days of the first coat.

I. System No. 26

1. System No. 26 shall be used for concrete surfaces, including but not limited tothe following:

   a. Submerged concrete (**treatment trains, clarifiers**, etc.).

   b. All precast structures or cast-in-place concrete below grade (interior and exterior).

2. Surface Preparation: SSPC – SP 13 – Abrasive blast to provide an anchor profile equal to ICRI CSP 5 or greater.

3. Finish Coat

a. Two (2) coats of one of the following, or approved equal:

Manufacturer	Coating	No. of Coats	DFT per Coat (mils)
Tnemec	Tnemec 46-413 Tneme-Tar *	2	9
Carboline	Bitumastic 300M	2	8

* Apply the second coat within 90 hours of the first coat.
* Apply the second coat within 24 hours of the first coat.
*** Apply the second coat within 7 days of the first coat.

J. System No. 29

1. System No. 29 shall be used for all non-painted, exposed concrete flooring surfaces.

2. Surface Preparation: SP C1

3. System 29 shall consist of the application of three (3) coats of one of the following:

   a. Tnemec Series 629 CT Densifyer

   b. Sonneborn “Kure-N-Seal”

   c. Euclid Chemical Company “Surfhard”

   d. Lambert Corporation “Solidus”

   e. Approved Equal.

2.4 Extra Paint

A. Furnish two (2) unopened gallon cans of each type and each color of paint used, properly marked for future use by the Owner.

3. EXECUTION

3.1 General

A. Inspection of Surfaces

1. Before application of the prime coat and each succeeding coat, **inspect all surfaces**, adjoining work and conditions under which coating systems are to be applied and report to the EOR, any existing unsatisfactory conditions.

2. **Any defects or deficiencies shall be corrected by the Contractor before application of any subsequent coating**. Commencement of surface preparation and painting shall constitute the acceptance of existing conditions and any defects appearing in the painting work thereafter shall be by the Contractor.

3. When any appreciable time has elapsed between coatings, previously coated areas shall be carefully inspected by the Owners Representative, and where, in his opinion, surfaces are damaged or contaminated, they shall be cleaned and recoated at the Contractor's expense. Recoating times of the manufacturer's printed instructions shall be adhered to.

4. Coating thickness shall be determined by the use of a properly calibrated inspection gauge for non-ferrous and cementitious surfaces. Coating thickness minimums shall be adhered to. **If a surface fails the DFT test, the entire surface shall be recoated at no additional cost to the Owner.**

B. Equipment

1. Effective oil and water separators shall be used in all compressed air lines serving spray painting and sandblasting operations to remove oil or moisture from the air before it is used. Separators shall be placed as far as practical from the compressor.

2. All equipment for application of the paint and the completion of the work shall be furnished by the Contractor in “first-class condition” and shall comply with recommendations of the paint manufacturer.

3.2 Protection of Surfaces Not Scheduled to be Coated

A. **Protect surrounding areas and surfaces** not scheduled to be coated from damage during surface preparation and application of coatings.

B. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

C. Provide temporary closures as required to prevent circulation of dust from adjacent areas where other work is in progress. Where it is necessary to remove existing protection of work of others, such protection shall be fully replaced.

D. Locate and protect all existing utilities, structures and appurtenances.

3.3 Shop Painting

A. Surface Preparation

1. All ferrous metal to be primed in the shop shall have all rust, dust and scale, as well as all other foreign substances, removed by sandblasting or pickling in accordance with SSPC-SP5 or SP8, respectively. Cleaned metal shall be primed or pretreated immediately after cleaning to prevent new rusting. Under no circumstances will cleaned metal be allowed to sit overnight before priming, or pretreatment and priming.

2. All non-ferrous metals shall be solvent cleaned prior to the application of primer.

3. In addition, galvanized surfaces which are to be topcoated shall first be degreased then primed.

4. All non-ferrous metal surfaces shall also be scarified prior to topcoating.

B. Materials Preparation

1. Mix and prepare painting materials in strict accordance with the manufacturer's recommendations and directions, stirring materials before and during application to maintain a mixture of uniform density, free of film, dirt and other foreign materials.

2. No thinners shall be used except those specifically mentioned and only in such quantity as directed by the manufacturer in his instructions. If thinning is used, sufficient additional coats shall be applied to assure the required dry film thickness is achieved. The manufacturer's recommended thinner or cleanup solvent shall be used for all clean-up.

3. Application by brush, spray, airless spray or roller shall be as recommended by the manufacturer for optimum performance and appearance.

C. Applications

1. All painting shall be done by skilled and experienced craftsmen and shall be of highest quality workmanship. Coating systems shall be as specified herein.

2. **Apply paint in accordance with the manufacturer's directions**. Use applicators and techniques best suited for the type of material being applied.

3. All paint and coatings materials shall be stored under cover and at a temperature within 10°F of the anticipated application temperature and **at least 5°F above the dew point**.

4. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color, and appearance.

5. Paint shall be applied in a neat manner with finished surfaces free of runs, sags, ridges, laps, and brush marks. Each coat shall be applied in a manner that will produce an even film of uniform and proper thickness.

6. Paint back sides of access panels and removable or hinged covers to match the exposed surfaces.

7. The equipment manufacturer or supplier shall provide touch-up paint for items with shop applied finish coats.

8. Where specified in the individual sections, primer coat(s) shall be applied in the shop by the equipment manufacturer. The shop coats shall be as specified and shall be compatible with the field coat or coats.

D. Certification

1. The Contractor shall obtain from the equipment manufacturer or supplier, prior to shipment of equipment, a **written certification that surface preparation, coating brand, material, DFT, and application method complied with this Section**.

3.4 Surface Preparation

A. Prepare all surfaces in accordance with the coating manufacturer's instructions and as specified. Surfaces shall be uniform texture, dry, and free from all dust, rust, scale, splinters, loose particles, disintegrated paint, grit, oil, grease, or deleterious substances that will adversely affect adhesion or appearance of the coating. Rough edges of metal, weld seams and sharp edges from scaffold lugs shall be ground to a curve.

B. Exposed nails and other ferrous metals on surfaces to be coated shall be spot- primed with a metal primer compatible with the finish.

C. Surfaces that have been cleaned, pretreated, and/or otherwise prepared for painting shall be given a coat of the first-coat material as soon as practicable prior to any deterioration of the prepared surface.

D. Hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items and surfaces not to be painted which are in contact with or nearby surfaces to be painted shall be removed, masked, or otherwise protected prior to surface preparation and painting operations.

E. The application of paint shall be held as an acceptance of the surfaces and working conditions and the painter will be held responsible for the results reasonably expected from the materials and processes specified.

F. Program the cleaning and painting so contaminants from the cleaning process will not fall onto wet, newly-painted surfaces.

G. **Do not sandblast or prepare more surface area in one (1) day than can be coated in one (1) day**. Prepare surfaces and apply coatings the same day.

H. Do not sandblast PVC, CPVC or FRP piping or equipment. Do not sandblast epoxy- or enamel-coated pipe that has already been factory coated, except to repair scratched or damaged coatings.

I. **The surface shall be cleaned as specified for the paint system being used**. All cleaning shall be as outlined in the Steel Structures Painting Council's (SSPC) Surface Preparation Specification unless otherwise noted. If surfaces are subject to contamination, other than mill scale or normal atmospheric rusting, the surfaces shall be pressure washed, and acid or caustic pH residues neutralized, in addition to the specified surface preparation.

J. Visual standards, SSPC-VIS-1, "Pictorial Surface Preparation Standards for Painting Steel Surfaces," and the National Association of Corrosion Engineers (NACE), "Blasting Cleaning Visual Standards" TM-01-70 and TM-01-75 shall be considered as standards for proper surface preparation.

K. Oil, grease, soil, dust, etc., deposited on the surface preparation that has been completed shall be removed prior to painting according to SSPC - SP1 Solvent Cleaning.

L. Weld flux, weld spatter and excessive rust scale shall be removed by Power Tool Cleaning as per SSPC - SP 11.

M. All weld seams, sharp protrusions, and edges shall be ground smooth prior to surface preparation or application of any coatings.

N. All areas requiring field welding shall be masked off prior to shop coating, unless waived by the Engineer.

O. All areas which require field touch-up after erection, such as welds, burnbacks, and mechanically damaged areas, shall be cleaned by thorough Power Tool as specified in SSPC - SP11.

P. "Touch-up systems will be same as original specification except that approved manufacturer's organic zinc-rich shall be used in lieu of inorganic zinc where this system was originally used. Also strict adherence to manufacturer's complete touch-up recommendations shall be followed. Any questions relative to compatibility of products shall be brought to the Engineer's attention; otherwise, the Contractor assumes full responsibility.

Q. Wherever the words “solvent cleaning”, “hand tool cleaning”, “wire brushing”, or “blast cleaning” or similar words are used in these specifications or in paint manufacturer’s specifications, they shall be understood to refer to the applicable SSPC (Steel Structures Painting Council, Surface Preparation Specifications, ANSI A159.1) specifications listed above.

R. When specified, the surface shall be pretreated in accordance with the specified treatment prior to application of the prime coat of paint.

S. Ferrous Metal Surfaces

1. Remove any oil or grease from surfaces to be coated with clean rags soaked in a solvent recommended by the coating manufacturer in accordance with SSPC specifications. Any chemical contamination shall be eliminated by means of neutralization or flushing or both prior to additional surface preparation. Clean rags shall be changed each 100 ft^2.

2. For immersion service, all sharp edges and welds shall be ground smooth to a rounder contour, all weld splatter shall be removed, and all pits and dents shall be filled, and all imperfections shall be corrected prior to sandblasting.

3. For non-immersion service, all sharp edges and welds shall be ground, all weld splatter shall be removed, all pits and dents shall be filled, and all imperfections shall be corrected prior to sandblasting.

4. For immersion service, all surfaces to be coated shall be sandblasted to white metal in accordance with Steel Structures Painting Council Specification SSPC - SP10 of the National Association of Corrosion Engineers Specification NACE 2. A white metal blast is defined as removing all rust, scale, paint, etc., to a clean white metal which has a uniform gray-white appearance. No streaks or stains or rust or any other contaminants are allowed. The proper abrasive to obtain the specified surface profile (anchor pattern) designated in the coating manufacturer's most recent printed application instructions shall be used. After sandblasting, dust and spent sand shall be removed from the surfaces by brushing or vacuum cleaning. The prime coat shall be applied as soon as possible after the blasting preparation is finished and always before the surface starts to rust. No sandblasted surface shall stand overnight before coating.

5. For non-immersion service, or wherever specified in the coating manufacturer's most recent printed application instructions for other services, all surfaces to be coated shall be sandblasted to near white metal in accordance with Steel Structures Painting Council Specification SSPC - SP10 or the National Association of Corrosion Engineers Specification NACE 2. A near white metal blast is defined as removing all rust, scale, paint, etc., except for very light shadows, very slight streaks or slight discolorations caused by rust stain, mill scale oxides, or slight, tight residues of paint or coatings that may remain. The proper abrasive to obtain the

specified surface profile (anchor pattern) designated in the coating manufacturer's most recent printed Application Instructions shall be used. After sandblasting, dust and spent sand shall be removed from the surfaces by brushing or vacuum cleaning. The prime coat shall be applied as soon as possible after the blasting preparation is finished and always before the surface starts to rust. No sandblasted surface shall stand overnight before coating. (This is 95 percent of any given surface area blasted to white metal).

6. For non-immersion service surfaces to be coated shall be sandblasted where specified to a commercial sandblast in accordance with Steel Structures Painting Council Specification SSPC - SP 6 or National Association of Corrosion Engineers Specification NACE 3. A commercial sandblast is defined as removing all rust, scale, paint, etc., except for slight shadows, streaks or discolorations caused by rust stain, mill scale oxides or slight, tight residues of paint or coating that may remain, if the surface is pitted, slight residues or paint or rust, may be found in the bottom of pits. The proper abrasive to obtain the specified surface profile (anchor pattern) designated in the coating manufacturer's most recent printed Application Instructions shall be used. After sandblasting, dust and spent sand shall be removed from the surfaces by brushing or vacuum cleaning. The prime coat shall be applied as soon as possible after the blasting preparation is finished and always before the surface starts to rust. no sandblasted surface shall stand overnight before coating (this is b of any given surface area blasted to white metal).

7. Ferrous metal surfaces previously exposed to sulfides shall be sandblasted, flame cleaned, and sandblasted again in accordance with the recommended surface preparation for the particular service in question.

8. Where blast cleaning is done in the field, only "virgin" sand, grit, or abrasive will be used.

9. Inaccessible areas, such as behind tank rafters or skip-welded lap joints, or in between back-to-back angle iron bracing, shall be coated before assembly to prevent corrosive action from taking place in these inaccessible areas. All surface voids shall be sealed-welded and back-to-back bracing and tank rafters either coated before assembly or eliminated from the design and construction. Sharp corners and edges shall be ground to a smooth contour and welds prepared as described above.

T. Concrete Surfaces

1. All efflorescence, laitance, chalk, dust, dirt, oils, grease, concrete curing agents, form release agents, sealers, old coatings and other chemical contaminants shall be removed either by steam cleaning with detergent, by scrubbing with a hot trisodium phosphate solution consisting of two (2) pounds of trisodium phosphate to each gallon of hot water (160°F), or by high pressure water blasting (3,000 psi or higher). Multiple cleaning operations may be required to remove all

contaminants. Repeat the cleaning operation until the contamination is removed and flush the area with clean water to remove residual cleaning solution. Allow to dry thoroughly before coating.

2. **All concrete surfaces to be coated shall be clean and dry**. "Dry" is defined for new concrete as free of moisture and fully cured which is a minimum of 30 days at 75°F and fifty percent (50%) Relative Humidity or some equivalent cure time at other conditions (7 days minimum for stucco). The moisture content of the concrete shall be determined by using both of the following methods.

    a. The presence of moisture shall be checked by taping a one-foot square piece of 20 mil thick minimum plastic film on the surface. Pieces of test plastic film should be placed at various locations that are likely to be slow drying out, such as below grade, low spots in floors, inside corners and lower wall areas. The plastic film should be carefully sealed with tape to prevent the escape of any moisture or vapor that would be trapped behind the film. The film should be left in place over night or longer to allow sufficient time for moisture migration. After a minimum of sixteen (16) hours, remove and examine the backside for moisture condensation and inspect the concrete surface for darkened areas. The source of the moisture, if present, shall be located, and the cause corrected prior to coating.

    b. The presence of moisture shall also be determined with a moisture detection device such as a Delmhorst Model DLM2E, or equal. Moisture determined by this method shall be less than fourteen (14) percent moisture content before coating operations shall be allowed to proceed.

3. Do not use form oils incompatible with the coating, concrete curing agents, or concrete hardeners on concrete surfaces to be coated.

4. Old paint and unremoved tar stains shall be solvent cleaned with naphtha, trichloroethylene, or perchloroethylene. Proper safety precautions shall be observed if this step is necessary. The surface shall be flushed with fresh water and dried.

5. Concrete and/or cinder block walls to receive a coating shall be air-blasted with 100 psi clean, dry, oil-free air to remove dust, etc., and wire brushed to remove all loose and/or weak mortar. See the requirements for sumps, tanks and other water-bearing structures below.

6. Concrete floors shall be thoroughly swept clean and then acid etched. Acid etching consists of first dampening the entire surface with clean water (avoid and excess of water that will for puddles). Acid etch the damp floor with a 10 to 15 percent solution of hydrochloric (muriatic) or phosphoric acid. Allow the acid to stand on the floor until the bubbling stops. For best results, while the acid is bubbling scrub the floor with a stiff bristled brush. Do not allow the "spent" acid to dry on the floor.

Rinse the surface thoroughly with fresh water. If the surface does not appear as rough as medium grit sandpaper, repeat the above steps. Neutralize the surface with a five percent (5%) solution of soda ash, tri-sodium phosphate, or ammonium hydroxide in clean water. Let the solution stand for ten (10) minutes on the surface. Rinse thoroughly with water. The surface must be slightly alkaline (pH of 9.0) prior to coating.

7. The floors or concrete sumps, tanks or other water-bearing structures should be acid etched as described above or they may be sandblasted. The walls of concrete sumps and tanks must be sandblasted. Roughen the surface to a texture equivalent to that of medium grit sandpaper. Use a compressed air blast nozzle with oil-free air. The abrasive used should be dry silica sand with the maximum particle size that will pass through a sixteen (16) mesh screen and minimum particle size retained on a thirty (30) mesh screen. After the blast cleaning is completed, sand, dust and loose particles should be removed from the surface by vacuuming or blowing off with high pressure oil-free air. Examine the surface for texture and uniformity, as well as the removal of dust, efflorescence and laitance. Patch voids and cracks that will cause discontinuities in the coating or unsightly appearance using a patching compound compatible with the coating system.

U. Galvanized Steel and Non-Ferrous Metal

1. Galvanized steel and aluminum will only be coated when so specified.

2. Surfaces shall be clean and dry. Remove dust and dirt by blowing off the surface with high pressure air or wiping clean with dry rags. Oil, grease and protective mill coatings should be removed by solvent cleaning in accordance with SSPC-SP1.

3. White mst should be removed from galvanized steel or aluminum by hand or power brushing. Care should be taken not to damage or remove the galvanizing. Rust should be removed from old galvanized steel by Hand or Power Tool Cleaning in accordance with SSPC - SP2 or SSPC - SP11.

4. All surfaces shall be scarified by brush blasting for immersion service or hand sanding for non-immersion service.

5. Other surface preparation, as outlined in the coating manufacturer's latest written Application Instructions, shall be observed for more demanding exposures.

V. Stainless Steel

1. Stainless steel will only be coated when so specified, or when it is adjacent to areas to be coated such as piping supports, anchor bolts or flange bolts.

2. Stainless steel requires only solvent cleaning prior to coating using any one of the methods in SSPC - SP1. Only solvents and cleaning solutions containing less than

200 ppm of halogens should be used to prevent stress corrosion cracking.

3. Stainless steel may be whip-blasted to provide a surface profile to increase the mechanical bond of the coating system. The height of the profile and the texture required should be defined for the operator and as a standard for the acceptance of the work. Pictorial standards for the surface cleanliness of carbon steel are not applicable to stainless steel, since there are no corrosion products or mill scale to remove from the surface.

4. Abrasive blast cleaning procedures outlined by the Steel Structures Painting Council for carbon steel may also be used for stainless steel. Only very hard silica sand or other abrasive media should be used for a fast cutting action and to obtain a sharp angular profile.

W. PVC or Other Plastic Piping or Ductwork

1. Solvent clean.

2. If recommended by the manufacturer, lightly abrade surface with medium grade sandpaper. Remove dust by wiping with clean rags.

X. Previously-Painted Surfaces (Except Ferrous Metal, Non-immersion)

1. Careful examination of the old coating is necessary in order to determine the condition of the coating prior to recommending the degree of surface preparation that will be needed. The old coating shall be shaved with a knife to ascertain its present adhesion to the substrate, as well as the flexibility of the film. If the old coating has a tendency to powder or shatter easily under the knife, or disbonds freely from the substrate or underfilms, it would indicate total removal is necessary.

    a. When up to ten percent (10%) of the total area has failed, spot blasting back to at least one (1) inch into sound film, feathering of edges and spot priming is required.

    b. When the coating system has deteriorated to approximately twenty-five percent (25%) of the total area, or if the coating is brittle, eroded or underfilm rusting is present, completely remove the original coating system by sandblasting as specified.

2. Tank linings, immersion-service coatings, and some other types of high performance coatings generally require total removal before recoating. Consult the manufacturer's recommendations for which of the other types of high performance coatings require total removal.

3. In instances where the film has been eroded due to weathering or worn thin due to abrasion or impingement with no rusting, the surface contaminants may be removed

through high pressure water blasting (approximately 2,000 to 3,000 psi, over 4 gallons per minute) with emulsifying agents or cleaners, rinsed and dried. Roughening of the surface shall be used to improve the adhesion of subsequent coats. Recoat with the recommended finish coat(s).

3.5 Materials Preparation

A. Mix and prepare painting materials in strict accordance with the manufacturer's recommendations and directions, stirring materials before and during application to maintain a mixture of uniform density, free of film, dirt, and other foreign materials. Colors shall be thoroughly mixed with no streaks or separation of color.

B. Mechanical mixers, capable of thoroughly mixing the pigment and vehicle together, shall mix the paint prior to use where required by manufacturer's instructions; thorough hand mixing will be allowed for small amounts up to one (1) gallon.

C. Pressure pots shall be equipped with mechanical mixers to keep the pigment in suspension, when required by manufacturer's instructions. Otherwise, intermittent hand mixing shall be done to assure that no separation occurs.

D. All mixing shall be done in accordance with SSPC Vol. 1, Chapter 4, "Practical Aspects, Use and Application of Paints" and/or with manufacturer's recommendations.

E. Except where otherwise specified, thinning shall be done only if necessary for the workability of the coating material and then, only in accordance with the coating manufacturer's most recent printed application instructions. Use only the thinner provided by the coating manufacturer. If thinning is used, sufficient additional coats shall be applied to assure the required dry film thickness is achieved. The manufacturer's recommended thinner or cleanup solvent shall be used for all cleanup. Do not incorporate in the coating any thinners or solvents used for cleaning brushes or equipment.

F. Exercise care to keep fire hazards to a minimum. Provide an approved hand fire extinguisher near each paint storage and mixing area. No oily waste, rags, or painting equipment shall be left scattered throughout the premises.

G. Protect all adjacent areas against damage and leave storage and mixing areas clean at the completion of painting.

H. Application by brush, spray, airless spray or roller shall be as recommended by the manufacturer for optimum performance and appearance.

3.6 Application

A. Paint shall be applied only on thoroughly dry surfaces and during periods of favorable weather, unless otherwise allowed by the paint manufacturer.

1. Except as provided below or where the manufacturer allows, painting shall not be permitted when the atmospheric temperature is below 50°F, or when freshly painted surfaces may be damaged by rain, fog, dust, or condensation, and/or when it can be anticipated that these conditions will prevail during the drying period.

2. No exterior painting shall be done during inclement weather when relative humidity exceeds 85%, or under conditions identified by the manufacturer as unsuitable.

B. No coatings shall be applied unless surface temperature is a minimum of 5°F above the dew point; the temperature must be maintained during curing.

DEW POINT* CALCULATION CHART "Surface Temperature at which Condensation begins"											
RH	Ambient Air Temperature (°F)										
	20	30	40	50	60	70	80	90	100	110	120
90%	18	28	37	47	57	67	77	87	97	107	117
85%	17	26	36	45	55	65	76	84	95	103	113
80%	16	25	34	44	54	63	73	82	93	102	110
75%	15	24	33	42	52	62	71	80	91	100	108
70%	13	22	31	40	50	60	68	78	88	96	105
65%	12	20	29	38	47	57	66	76	85	93	103
60%	11	19	27	36	45	55	64	73	83	92	101
55%	9	17	25	34	43	53	61	70	80	89	98
50%	6	5	23	31	40	50	59	67	77	86	94
45%	4	13	21	29	37	47	56	64	73	82	91
40%	1	11	18	26	35	43	52	61	69	78	87
35%	-2	8	16	23	31	40	48	57	65	74	83
30%	-6	4	13	20	28	36	44	52	61	69	77

*Dew Point: Temperature at which moisture will condense on a surface. No coating shall be applied unless the surface temperature is a minimum of 5°F above this point. The temperature must be maintained during curing.

Example: If the air temperature is 70°F and the relative humidity is 65%, then the dew point is 57°F. No coating shall be applied unless the surface temperature is 62°F.

C. Paint all exposed surfaces in rooms scheduled for painting whether or not colors are designated in schedules, except where the natural finish of material is obviously intended and specifically noted as a surface not be painted. Where items or surfaces are not specifically mentioned, paint these the same as adjacent similar materials or areas. If the color of the finishes are not designated, the Engineer will select them from the standard colors available for the materials systems as specified.

D. Ventilation

1. Provide adequate ventilation for safe application and for proper drying of coatings on interior surfaces.

2. Ensure solvent vapors are released during and after application of coatings. Remove vapors by exhausting air from the lowest portions of tanks and enclosed spaces and keep tops open and clear.

3. During coating application in enclosed areas, the capacity of ventilating fans shall be at least 300 cfm per gallon of coating applied per hour.

4. Provide continuous forced ventilation at a rate of at least one complete air change per four (4) hours for at least five (5) days after the coating application is completed.

E. The average rate of application shall not exceed the theoretical rate of coverage recommended by the coating manufacturer for the type of surface involved, less an allowance for losses. Average dry film thickness shall not be less than thickness set forth under Painting Systems. Not more than 10-20% of points inspected may be less than 90% of the specified thickness. Deficiencies shall be corrected by application of additional coating.

F. Each coat shall be uniform in coverage and color. Successive coats shall perceptibly vary in color. Each coat shall be carefully examined and faulty material, poor workmanship, holidays, damaged areas and other imperfections shall be touched up prior to applying succeeding coats. Comply with coating manufacturers' recommendations for drying time between coats.

G. Bottoms, sides and edges of doors shall receive same finish as faces of doors. If refitting of wood doors is done prior to final acceptance, refinish at no extra cost.

H. Incidental niches, recesses, passages, closets, etc., shall be finished to match similar or adjacent spaces.

I. Access doors, panels, convectors, grilles and similar items shall be coated the same color as adjacent work, except for non-ferrous metal or where otherwise directed by the Engineer.

J. Primed hardware shall be coated to match adjacent work to which they are attached.

K. In the event that the finished surfaces are not acceptable, completely refinish entire unit areas and sections as necessary to eliminate visible laps or other indications of repairs.

L. Color Selection

1. Colors for Multi-Coat Systems

a. Each coat shall be applied in a different color or shade from the preceding coat to aid in determining the uniformity and coverage of the coating.

b. The finish coat color shall be selected by the Engineer and Owner.

c. When a white finish coat is specified, the last two (2) coats shall be white.

2. Color Coding Piping

a. All exposed piping shall be identified as specified in Section 09905, “Piping and Equipment Identification System”.

b. The pipe identification system shall include color coding or banding, legends, and arrows.

M. All painting shall be done by skilled and experienced craftsmen and shall be of highest quality workmanship.

N. **Apply paint in accordance with the manufacturer's directions**. Use applicators and techniques best suited for the type of material being applied. All equipment shall be maintained in good working order and shall be comparable to that described in the coating manufacturer's most recent application instructions. It

shall be thoroughly cleaned and inspected daily. Worn spray nozzles, tips, etc., shall be replaced regularly. Effective oil and water separators shall be used and serviced on all air lines.

O. All paints and coating materials shall be stored under cover and at a temperature within 10°F of the anticipated application temperature and at least 5°F above the dew point.

P. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color, and appearance.

Q. Paint shall be applied in a neat manner with finished surfaces free of runs, sags, ridges, laps, and brush marks. Edges of paint adjoining other colors or materials shall be sharp and true. Each coat shall be applied in a manner that will produce an even film of uniform and proper thickness. Allow each coat to dry thoroughly before applying the next coat, follow manufacturer's recommendations taking into account temperature and relative humidity as indicated in Article 3.06(B) of this specification section.

R. All interior surfaces of structures shall be finish coated prior to installation of equipment, conduit, and other exposed items by mechanical, electrical, or instrumentation.

1. Paint back sides of access panels and removable or hinged covers to match the exposed surfaces.

S. Finish exterior doors on tops, bottoms, and side edges the same as the exterior faces, unless otherwise indicated.

T. Sand lightly between each succeeding enamel or varnish coat.

U. Omit the first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise specified.

V. <u>Retouching Existing Painted Surfaces</u>

1. Existing painted surfaces damaged by the modification work or other operations of the Contractor shall be retouched to conform to the above coating systems and blend in with the new and existing work.

2. Damaged surfaces shall be repainted with not less that two (2) coats, and other existing surfaces that are listed shall be repainted with the coating system specified.

W. The prime and intermediate coats as specified for the various coating systems may be applied in the shop by the manufacturer. The shop coats shall be of the type specified and shall be compatible with the field coat or coats. Such items as pumps, motors, equipment, electrical panels, etc shall be given at

least one touch-up coat with the intermediate coat material and one complete finish coat in the field.

X. Field Painting in the immediate vicinity of, or on, energized electrical and rotating equipment, and equipment and/or pipes in service shall not be performed without the approval of the Engineer.

Y. Extreme care shall be exercised in the painting of all operable equipment, such as valves, electric motors, etc., so that the proper functioning of the equipment will not be affected.

Z. The Contractor's scaffolding shall be erected, maintained, and dismantled without damage to structures, machinery, equipment or pipe. Drop cloths shall be used where required to protect buildings and equipment. All surfaces required to be clear for visual observations shall be cleaned immediately after paint application.

AA. Painting shall not be performed on insulated pipe within three (3) feet of insulation operations or, on insulation whose covering and surface coat have not had time to set and dry. Painting shall not be performed on uninsulated pipe within one (1) foot of any type of connection until the connection has been made, except as directed by the Engineer.

BB. The prime coat shall be applied immediately following surface preparation and in no case later than the same working day. All paint shall be applied by brushing, paint mitt and roller, conventional spraying, or airless spraying, using equipment approved by the paint manufacturer.

CC. Each coat of paint shall be recoated as per manufacturer's instructions. Paint shall be considered recoatable when an additional coat can be applied without any detrimental film irregularities such as lifting or loss of adhesion.

DD. Surfaces that will be inaccessible after assembly shall receive either the full specified paint system or three shop coats of the specified primer before assembly.

EE. Finish colors shall be in accordance with the Painting and Color Schedule and shall be factory mixed (i.e., there shall be no tinting by the Contractor, unless authorized by the Engineer).

FF. All edges and weld seams in immersion service shall receive a "stripe coat" (applied by brush) of the first coat prior to application of the full first coat.

GG. All open seams in the roof area of tanks shall be filled after application of the topcoat with a flexible caulking such as Sika Flex 1A, or approved equal.

HH. Unsatisfactory Application

1. If the item has an improper finish, color or insufficient dry film thickness, the surface shall be cleaned and top coated with the specified material to obtain the specified color and coverage. Specific surface preparation information is to be secured from the coatings manufacturer.

2. All visible areas of chipped, peeled or abraded paint shall be hand or power-sanded, feathering the edges. The areas shall then be primed and finish coated in accordance with the specifications.

3. Work shall be free of runs, bridges, shiners, laps or other imperfections. Evidence of these conditions shall be cause for rejection.

4. Any defects in the coating system shall be repaired by the Contractor per written recommendations of the coating manufacturer.

5. Any repairs made on steel surfaces for immersion service shall be holiday detected in accordance with ASTM G-62 - Low Voltage Holiday Detection.

    a. Areas found to have holidays shall be marked and repaired in accordance with the paint manufacturer’s instructions.

    b. The Engineer shall be notified of the holiday testing time so that he may be present during the testing.

3.7 Application Restrictions

A. Environmental Requirements

1. Comply with the manufacturer's recommendations as to environmental conditions under which coatings and coating systems can be applied.

    a. The conditions below shall be adhered to even if the manufacturer's recommendations are less stringent. If the manufacturer's recommendations are more stringent, they shall apply.

    b. No coatings shall be applied when the air, surface, and material temperature is below 55°F or above 95°F for 24 hours prior to and 24 hours after coating application. Surface temperature shall be at least 5°F above the dew point for 24 hours prior to and 24 hours after coating application. The dewpoint shall be determined by use of a sling psychrometer in conjunction with U.S. Weather Bureau psychometric tables. Do not apply coatings when the relative humidity exceeds 85% percent or to damp or wet surfaces, unless otherwise permitted by the coating manufacturer's printed instructions. The Contractor is referred to Article 3.06(B) of this specification section for additional information.

    c. No painting shall be done when the surfaces may become damaged by rain, fog or condensation or when it is anticipated that these conditions will prevail

during the drying period, unless suitable enclosures to protect the surface are used. Provisions shall be made, at the Contractor's expense, to control atmospheric conditions artificially inside the enclosure, within the limits suitable for painting throughout the painting operations. Where heat is necessary, it shall be supplied by the painting applicator and shall be of such type that it will maintain an air and coated surface temperature of 55°F minimum prior to and after the coating application as described above, and 90°F minimum during the cure stage if hot air forced curing is recommended by the coating manufacturer for special coatings. Further, this heater shall be of such type as not to contaminate the surface area to be or being coated with combustion products. The Contractor shall supply utilities to run electric or gas heaters. Any surface coating damaged by moisture or rain shall be removed and redone as directed by the Engineer or Owner.

2. Do not apply finish in areas where dust is being or will be generated during application through full cure.

3. **All exterior painting shall be done only in dry weather.**

4. **Spray application shall occur only when wind velocities, including gusts, are less than ten (10) miles per hour. All materials, equipment, etc. in the vicinity of spray application shall be protected from overspray.**

B. Weather Conditions

1. Do not paint in the rain, wind, snow, mist and fog or when the steel or metal surface temperatures are less than 5°F above the dew point.

2. No coatings shall be applied unless the relative humidity is below 85%.

3. Do not paint when the temperature of the metal to be painted is above 120°F.

4. Do not apply alkyd, chlorinated rubber, inorganic zinc, silicone aluminum, or silicone acrylic paints if the air or surface temperature is below 40°F or expected to be below 40°F within twenty-four (24) hours.

5. Do not apply epoxy, acrylic latex, and polyurethane paints on an exterior or interior surface if the air or surface temperature is below 60°F or is expected to drop below 55°F within twenty-four (24) hours.

C. Application of materials shall be done only on properly prepared surfaces as herein specified. Between any two (2) coats of material, unless specifically cover in the coating manufacturer's most recent printed application instructions, if more than one (1) week passes between subsequent coats, the coating manufacturer will be contacted for his recommended preparation of the surface **prior** to application of the next coat. This preparation might include brush-off blasting, steam cleaning, or solvent wiping (with an indicated solvent) and shall be specified in writing by the material supplier and followed by the applicator. Any surface coating damaged by

moisture or rain shall be removed and redone as directed by the Engineer or Owner.

D. **In no case shall paint be applied to surfaces which show a moisture content greater that fourteen percent (14%)**. The presence of moisture shall be determined prior to coating by testing with a moisture detection device such as a Delmhorst Model DLM2E, or equal.

3.8 Minimum Coating Thickness

A. Coating thickness shall meet or exceed the specified minimum dry film thickness (DFT) in all areas. The average coating thickness as determined by multiple representative DFT measurements shall meet or exceed the mid-point of DFT range. If below this DFT value, the surface shall be recoated with at least the minimum DFT until the total DFT meets or exceeds the mid-point DFT.

B. Coverage rates are theoretical as calculated by the coating manufacturer and are, therefore, the maximum allowable.

C. Apply a prime coat to material which is required to be painted or finished, and which has not been prime coated by others.

D. On masonry, application rates will vary according to surface texture; however, in no case shall the manufacturer's stated coverage rate be exceeded. On porous surfaces, is shall be the painter's responsibility to achieve a protective and decorative finish either by decreasing the coverage rate or by applying additional coats of paint.

E. Recoat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

3 9 Finishes

A. Pigmented (Opaque) Finishes

1. Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage.

2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

B. Complete Work

1. Match approved samples for color, texture, and coverage.

2. Remove, refinish, or repaint work not in compliance with specific requirements.

3.10 Workmanship

A. The Contractor must show proof that all employees associated with this project shall have been employed by the Contractor for a period of not less than six (6) months.

B. All painting shall be done by skilled and experienced craftsmen and shall be of highest quality workmanship.

C. Painting shall be performed by experienced painters in accordance with the recommendations of the paint manufacturer. All paint shall be uniformly applied without sags, runs, spots, or other blemishes. Work which shows carelessness, lack of skill, or is defective in the opinion of the Engineer, shall be corrected at the expense of the Contractor.

D. The Contractor shall provide the names of at least six (6) other projects of similar size and scope that they have successfully completed under their current company name.

3.11 Field Quality Control

A. All non-ferrous surfaces shall be checked for the number of coats and thickness by use of a Tooke gauge, or equal.

B. **All ferrous surfaces shall be checked for film thickness** by use of an Elcometer or Micro-Test magnetic dry film gauge, or equal, properly calibrated.

C. In addition, submerged tank linings and metals shall be tested for freedom from holidays and pinholes by use of a Tinker-Rasor, K-D Bird Dog Holiday Detector, or equal.

3.12 Protection

A. **All other surfaces shall be protected while painting**.

B. Protection of furniture and other movable objects, equipment, fittings, and accessories shall be provided throughout the painting operation. Remove all electric plates, surface hardware, etc., before painting; protect and replace when completed.

C. **Mask all machinery nameplates and all machined parts not to receive paint**. Lay drop cloths in all area where painting is being done to adequately protect flooring and other work from all damage.

3.13 Cleaning

A. The Contractor shall perform the work under this Section while keeping the premises free from accumulation of dust, debris, and rubbish and shall remove all scaffolding, paint cloths, paint, empty paint containers, and brushes from buildings and the project site when completed.

B. All paint brushed, splattered, spilled, or splashed on any surface not specified to be painted shall be removed.

C. **The Contractor shall insure that all glass throughout that portion of the facility in which he worked is cleaned of dirt and paint before he leaves the job site**. Further, the Contractor shall insure that all glass in this area is thoroughly washed and polished.

D. All cloths and waste that might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each day. Upon completion of the work, all staging, scaffolding and containers shall be removed from the Project Site and/or destroyed in an approved and legal manner.

E. Upon completion of the Project, remove from the premises all rubbish and accumulated material and leave the work in a neat and clean condition, acceptable to the Engineer and Owner.

3.14 Extra Stock

A. Upon completion of painting work, the Owner shall be furnished, at no additional cost, unopened containers providing **a minimum of two (2) gallons of each type and color of finish paint for touching up**.

B. Multi-component coatings shall have each component supplied in separate containers boxed together. Paint container labels shall be complete with manufacturer's name, generic type, number, color, and location where used.

END OF SECTION

SECTION 09905

PIPING, VALVE AND EQUIPMENT IDENTIFICATION SYSTEM

1. GENERAL

1.1 Description

A. Scope of Work

1. The work included under this Section consists of providing an identification system for piping systems and related equipment.

1.2 Quality Assurance

A. Standards

1. Unless otherwise indicated, all materials, workmanship and practices shall conform to the following standard(s):

STANDARD	DESCRIPTION
American National Standard Institute (ANSI)	
ANSI A13.1	Scheme for the Identification of Piping Systems

1.3 Submittals

A. The Contractor shall submit shop drawings, manufacturer's descriptive literature, illustrations, specifications, and other pertinent data in accordance with Section 01300, "Submittals".

B. Schedules

1. Provide a typewritten list of all tagged valves giving tag color, shape, letter code and number, the valve size, type, use, and general location.

2. Provide a complete list of materials to be furnished and surfaces on which they will be used.

C. Samples

1. Provide a sample of each type of valve tag supplied.

2. Provide a sample of each type of identification tape and marker balls supplied.

3. Provide manufacturer's color charts for color selection by the Engineer.

1.4 Product Delivery, Storage and Handling

A. Delivery of Materials

1. Except for locally mixed custom colors, deliver sealed containers with labels legible and intact.

B. Storage of Materials

1. Store only acceptable project materials on project site.

2. Store in a suitable location.

3. Restrict storage to paint materials and related equipment.

4. Comply with all health and fire regulations.

1.5 Job Conditions

A. Environmental Requirements

1. Comply with manufacturer's recommendations as to the environmental conditions under which coatings and coating systems can be applied.

2. Do not apply finish in areas where dust is being generated.

B. Protection

1. Cover or otherwise protect all finished work of other trades and surfaces not to be painted.

2. PRODUCTS

2.1 Materials

A. Materials for painting shall conform to requirements of Section 09900, "Painting".

B. Materials selected for coating systems for each type of surface shall be the product of a single manufacturer.

C. Aboveground piping shall be identified by painting the name of the material flowing through the pipe as well as flow arrows (text and arrow type to be provided by the Engineer).

1. Markers shall be of wording and color as shown in Table 09905-1.

2. Lettering shall be as follows:

   a. 2¼-inches high for pipes 3 inches in diameter and larger.

   b. 1 1/8-inches high for pipes less than 3 inches in diameter.

3. Flow arrows shall be as follows:

   a. 2¼-inches by six (6) inches for pipes three (3) inches in diameter and larger.

   b. 1 1/8-inches by three (3) inches for pipes less than three (3) inches in diameter.

D. Buried piping shall be identified by identification tape installed over the centerline of the pipelines or by color coded pipe polywrap when required for use with aggressive soils or as conditions may warrant.

1. Identification Tape for Steel or Iron Pipe and Conduit

   a. Identification tape shall be manufactured of inert polyethylene film so as to be highly resistant to alkalis, acids, or other destructive agents found in the soil, and shall have a minimum thickness of four (4) mils.

   b. The tape width shall be six (6) inches and shall have the background color specified below, imprinted with black letters. The imprint shall be as specified below and shall repeat itself a minimum of once every two (2) feet for the entire length of the tape.

   c. The tape shall be Terra Tape Standard 250 or approved equal.

2. Identification Tape for Plastic or Non-Magnetic Pipe and Conduit

   a. Identification tape shall be manufactured of reinforced polyethylene film with a minimum overall thickness of 9.7 mils and shall have a 0.5 mil thick magnetic metallic foil core.

   b. The tape shall be highly resistant to alkalis, acids, and other destructive agents found in the soil.

   c. The tape width shall be three (3) inches and shall have the background color specified below, imprinted with black letters. The imprint shall be as specified below and shall repeat itself a minimum of once every two (2) feet for the entire length of the tape.

   d. The tape shall be Terra Tape Sentry Line 1350 or approved equal.

3. Tape background colors and imprints shall be as follows:

Imprint	Pipe Service	Background Color
"Caution: Wastewater Line Buried Below"	RWW	Green
"Caution: Electrical Line Buried Below"	ELECT	Red
"Caution: Water Line Buried Below"	RW, FW, PW	Blue
"Caution: Telephone Line Buried Below"	TELE	Orange
"Caution: Gas Line Buried Below"	GAS	Yellow
"Caution: Reuse Line Buried Below"	REUSE	Purple

4. Identification tape shall be "Terra Tape" as manufactured by Reef Industries, Inc., Houston, TX; Allen Systems, Inc., Wheaton, IL; or approved equal.

5. Polyethylene encasement for buried piping

   a. Provide virgin polyethylene encasement in conformance with AWWA C105/A21.5. Polyethylene to be Type I, Grade E-1, 0.4 maximum flow rate, 1200 psi minimum tensile strength, 300 percent minimum elongation, 800 volt/mil thickness minimum dielectric strength.

   b. Polyethylene material shall have a minimum nominal thickness of .008 inch (8 mils). The minus tolerance on thickness shall not exceed 10 percent of the nominal thickness.

   c. Polyethylene material shall be color coded in accordance with the standards for identification of the conveyance system being encased.

E. Aboveground Valve Identification

1. A coded and numbered tag attached with a stainless-steel chain and/or stainless steel "S" hooks (Type 304) shall be provided on all valves.

2. Tag Types

   a. Tags for valves on pipe shall be stainless steel, or anodized aluminum, 19 gauge thick.

   b. Colors for aluminum tags shall, where possible, match the color code of the pipeline on which it is installed.

   c. Tags shall be stamped with NC for "normally closed" valves and stamped with NO for "normally open" valves.

3. Coding

a. In addition to the color coding, each tag shall be stamped or engraved with wording or abbreviations to indicate the information presented in Article 2.1(G)(1) (a-g).

b. All color and letter coding shall be approved by the Engineer.

c. Above ground valve tags shall be furnished with stainless steel (Type 304) wire for attachment thereof. The tag shall not be attached to the handwheel or crank operators or any part of the valve which would inhibit operation of the valve.

d. Valve service shall either be as listed in Table 09905-1, or by equipment abbreviation if associated with a particular piece of equipment. Valve numbering shall be as approved by the Owner.

F. Belowground Valve Identification

1. Buried valves shall have valve boxes protected by a concrete pad as identified on the Contract Drawings. The concrete pad for the valve box cover shall have a 3-inch diameter, 19 gauge thick, bronze disc embedded in the surface as shown on the Contract Drawings. The bronze disc shall have the following information neatly stamped on it:

   a. Valve Service: See Table 09905-1 for the abbreviations to be used

   b. Valve Identification No.: To be provided by the Engineer and Owner

   c. Size of valve, inches

   d. Type of valve

      1) GV: Gate Valve

      2) BFV: Butterfly Valve

      3) PV: Plug Valve

      4) Other valve abbreviations shall be provided by the Engineer.

   e. Number of turns to fully open the valve

   f. Direction to open the valve

   g. Year of Installation

2. The valve schedule, abbreviations, words, identification, etc. shall be approved by the Engineer and Owner prior to submission for casting.

3. The information contained in the valve schedules shall be coded on the tags in a system provided by the Engineer and Owner.

G. The valve schedule, abbreviations, words, identification, etc. shall be approved by the Engineer and Owner prior to submission for casting.

H. The information contained in the valve schedules shall be coded on the tags in a system provided by the Owner.

I. Above ground valve tags shall be furnished with stainless steel chain and/or stainless steel “S” hooks (Type 316) for attachment thereof. The tag shall not be attached to the handwheel or crank operators or any part of the valve which would inhibit operation of the valve.

3. EXECUTION

3.1 Color Coding for Pipes and Equipment

A. Piping color codes, and code labels for pipe identification on this project shall conform to Table 09905-1.

TABLE 09905-1

Service	Mark	Conduit, Pipe, and Valve Color Code	Letter and Flow Arrow Color
Fire Hydrant	---	Red	---
Potable Water	PW	Dark Blue	White
Pumps	---	Battleship Grey	---
Raw Water	RW	Light Blue	Black

Note: All pipe hangers shall be painted to match the color of the piping.

B. General Notes and Guidelines

1. Pipelines, equipment, or other items which are not listed here shall be assigned a color by the Owner and Engineer and shall be treated as an integral part of the contract, with no additional cost to the Owner.

2. Color coding shall consist of color code painting and identification of all exposed conduits, through lines and pipelines for the transport of gases, liquids, or semi-liquids including all accessories such as valves, insulated pipe coverings, fittings, junction boxes, bus bars, connectors and any operating accessories which are integral to a whole functional mechanical pipe and electrical conduit systems.

3. All moving parts, drive assemblies, and covers for moving parts which are potential hazards shall be “Safety Orange”.

4. All safety equipment shall be painted in accordance with OSHA standards.

5. All in-line equipment and appurtenances not assigned another color shall be painted the same base color as the piping. The pipe system shall be painted with the pipe color up to, but not including, the flanges attached to pumps and mechanical equipment assigned another color.

6. All pipe hangers and pipe support floor stands shall be painted, unless specified otherwise due to material of construction.

C. All hangers and pipe support floor and accessories stands shall be painted to match their piping. The system shall be painted up to, but not including the face of flanges or the flexible conduit connected to electrical equipment. Structural members used solely for pipe hangers or supports shall be painted to match their piping. Where the contact of dissimilar metals may cause electrolysis and where aluminum will contact concrete, mortar or plaster, the contact surface of the metals shall be coated in accordance with Section 09900, “Painting”.

D. All systems which are an integral part of the equipment, that is originating from the equipment and returning to the same piece of equipment, shall be painted between and up to, but not including, the face of flanges or connections on the equipment.

E. All insulated surfaces, unless otherwise specified, shall be given one (1) coat of glue sizing, one (1) prime coat and one (1) finish coat.

F. System code lettering and arrows shall conform to the requirements of ANSI A13.1 marked on piping as follows:

1. Legends shall be of the following color for the respective pipe color.

Key to Classification of Predominant Colors for Piping		Color of Letters, if not otherwise specified
(F) Fire Protection	Red	White
(D) Dangerous	Yellow	Black
	Orange	Black
(S) Safe	Green	Black
	White	Black
	Black	White
	Light Grey	Black
	Dark Grey	White
	Aluminum	Black
(P) Protective	Blue	White

2. All piping containing or transporting corrosive or hazardous chemicals shall be identified with labels every ten (10) feet and with at least two (2) labels in each room. Otherwise, markers shall be placed no more than twenty (20) feet apart with at least one (1) marker on every straight run and additional markers at turns and where pipe passes through walls.

3. An arrow indicating direction of flow shall be placed adjacent to each marker.

3.2 Fabricated Equipment

A. Unless otherwise indicated or specifically approved, all fabricated equipment shall be shop primed and finished. See Section 09900, “Painting”.

B. The Contractor shall be responsible for and take whatever steps are necessary to properly protect the shop prime and finish coats against damage from weather or any other cause.

C. Where specified in other Sections of these specifications for mechanical equipment, the Contractor shall apply field coat or coats of paint in accordance with Section 09900, “Painting”. If the shop finish coat is unsatisfactory due to poor adhesion or other problems with primer or finish coats, the coatings shall be removed and replaced by sandblasting, priming and finishing in accordance with Section 09900, “Painting” and this Section.

D. Wherever fabricated equipment is required to be sandblasted, the Contractor shall protect all motors, drives, bearings, gears, etc., from the entry of grit. Any equipment found to contain grit shall be promptly and thoroughly cleaned. Equipment contaminated by grit in critical areas, such as bearings, gears, seals, etc., shall be replaced at no cost to the Owner.

3.3 Installation of Identification Tape

A. Identification tape shall be installed for all buried pipelines, as applicable to the Project, in accordance with the manufacturer's installation instructions and as specified herein.

B. Identification tape for piping shall be installed at two (2) locations:

   1. One (1) foot below finished grade along centerline of pipe, and.

   2. Directly on top of the pipe.

3.4 Buried Valves

A. In paved or concrete areas, the tops of valve box covers shall be set flush with the pavement or top of the concrete. In concrete areas, valve boxes shall be embedded.

B. Following paving operations, a twenty-four (24) inch square shall be neatly cut in the pavement around the box and the paving removed. The top of the box shall then be adjusted to the proper elevation and a twenty-four (24) inch square by six (6) inch thick concrete pad (with #5 rebar installed) poured around the box cover. Concrete pads in traffic areas shall be reinforced with No. 4 reinforcement bars as shown on the Contract Drawings. Concrete for the pad shall be Class B, with a compressive strength of 3,000 psi.

C. In unpaved areas, the tops of valve box covers shall be set 0.10-foot above finished grade. After the top of the box is set to the proper elevation, a twenty-four (24) inch square by six (6) inch thick concrete pad (with #5 rebar installed) shall be poured around the box cover. Concrete for the pad shall be Class B, with a compressive strength of 3,000 psi.

D. The bronze valve identification disc shall be embedded in the concrete pad.

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 11210

SUBMERSIBLE WELL PUMPS

PART 1 GENERAL

1.01 Section Includes

A. Hydraulically driven axial flow submersible pump, power unit, and appurtenances.

B. Well disinfection and bacteriological testing.

1.02 Related Sections

A. Section 02511 - Raw Water Transmission System

B. Section 16050 - Electrical - General Provisions

1.03 References

A. American Water Works Association (AWWA) and American National Standards Institute (ANSI) latest edition:

1. AWWA C654 - Disinfection of Wells

1.04 Submittals

A. Manufacturer's specification data and descriptive literature.

B. Certified performance curves showing capacity versus head, pump speed, and hydraulic power input.

C. Motor efficiencies and power factors at all design operating points.

D. The following data shall be submitted for each motor:

1. Manufacturer's designation
2. Number of Phases
3. Horsepower output
4. Voltage
5. Time rating
6. Full load amperes
7. Temperature rise
8. Code
9. RPM at full load
10. Design letter
11. Frequency

12. Service factor

E. Drawings showing general dimensions, connections, and wiring diagrams.

F. Procedures for proper installation.

G. Manufacturer's guarantee.

H. Information about the nature and location of parts, service crews and repair facilities.

I. Disinfection methods and equipment to be used.

J. Dechlorination methods and equipment to be used.

K. Certified Hydraulic System performance data including:

a. Flow vs. head curve
b. Required hydraulic pressure and flow rate
c. Proper RPM range

L. Documentation for quick-connect hydraulic couplings and hose routing.

M. Manufacturer’s hydraulic monitoring system description.

N. Skid layout of diesel power unit with all appurtenances.

O. Summary of submergence requirements and allowable operating ranges.

1.05 Quality Assurance

Samples of water for well testing shall be collected and tested by a State Certified Testing Laboratory.

1.06 Operation and Maintenance Manuals

After approval of shop drawings, submit one complete set in PDF format containing Operation and maintenance instruction bulletins, and complete parts list.

1.07 Warranty

Guarantee the equipment to be free from defects in design, materials and workmanship for 1 year from the date of shipment from factory. During the warranty period, furnish and install replacement parts for any defective component at no additional cost.

PART 2 PRODUCTS

2.01 General

A. This specification covers factory-assembled, hydraulically driven submersible axial flow pumps furnished with suitable hydraulic drive units and accessories as specified herein.

B. The pumping units shall be designed and furnished in accordance with the latest Hydraulic Institute Standards and applicable AWWA provisions for raw water pumping applications.

C. The pumps shall be designed and constructed to operate reliably and with a reasonable service life when installed in a continuous submersible pumping application with hydraulic drive.

2.02 Operating Conditions

A. The final elevation of the submersible well pump will be determined once the well drilling and step drawdown testing has been completed. The well elevation will be adjusted by adjusting the length of the pump column.

B. The pump, motor size, design flow and design head are as follows.

Design Flow (GPM)	20,000 GPM Each
Design Head (TDH)	17.5 FT
Min Motor HP	118 hp
Min Efficiency	78%
Max Speed RPM	560 RPM
MWI Pump Model	HAC330X30
Liquid	Stormwater
Pump Bowl Setting	-4.57 FT
Well Inner Casing Diameter	45.6 In
Pump Discharge (In)	30 In

2.03 Pump Construction

A. Pump components shall be constructed from corrosion-resistant materials and machined to close tolerances. The propeller bowl assembly shall include a venturi housing with a removable stainless-steel liner, designed to ensure smooth flow transition and minimal head loss.

B. Propeller blades shall be constructed of ASTM A304 stainless steel. Each blade shall be free from defects and balanced for optimum performance and minimal vibration. Propellers shall be keyed and secured to the shaft with a locknut.

C. The pump inlet (suction bell) shall be fabricated from ASTM A242 alloy steel, with an inlet diameter of at least 1.5 times the propeller diameter and protective bars to prevent large debris entry. The inlet shall be designed to minimize vortex formation and maintain uniform flow.

D. Materials of construction shall be as follows:

Component	Material
Suction Bell	ASTM A242 Alloy Steel
Bowl Housing	ASTM A24A with SS Liner
Propeller	ASTM A304 Stainless Steel
Propeller Shaft	Solid Stainless-Steel Bar
Bearings	Angular Contact, Oil Lubricated
Seal Assembly	Silicon Carbide + Lip Seal
Discharge Tube	ASTM A242, min. 2/8” wall
Hydraulic Motor Housing	ASTM A242 Alloy Steel (3/8”)

E. Hydraulic motor shall be submersible-rated and integrated within the discharge-side of the pump. The motor shall be enclosed and sealed for continuous submerged operation and coupled directly to the propeller shaft. Hydraulic inlet and outlet ports shall terminate in quick-connect fittings for ease of installation.

F. Electrical cable is not required for pump operation. Hydraulic hoses between the power unit and pump shall include both supply and return lines and shall be field routed per manufacturer's recommendations.

G. No column pipe or motor cable is required. The complete pump assembly shall be installed as a factory-assembled unit and submerged directly in the wet well or intake structure.

2.04 Hydraulic Drive Unit

A. Each pump shall be powered by a diesel-driven, skid-mounted hydraulic power unit furnished and tested by the pump manufacturer for compatibility with the submersible pump system.

B. Power unit shall include:

   a. Fixed displacement vane-type hydraulic pump.

   b. Diesel engine with radiator, exhaust, fuel system, and battery-powered electric start.

c. Control panel with start/stop, pressure and temperature gauges, and automatic safety shutdowns.
d. Integrated oil reservoir with breather, level gauge, and full-flow filtration.
e. Adjustable pressure relief valves and quick-connect couplings.
f. Clutch-start system for smooth load engagement/disengagement.
g. Sufficient cooling capacity for continuous operation in ambient temperatures up to 122°F.

PART 3 EXECUTION

3.01 Installation

A. Install pump and power units per manufacturer's recommendations. All equipment shall be installed and mounted as shown in the drawings and in accordance with the manufacturer's recommendations. Piping shall be run as shown on the plans and be connected to all units in a manner to prevent leakage of water. Any departures from the locations or arrangements of units or connections shall be detailed by the Contractor and submitted to the Engineer and the Owner for approval.

3.02 Well and Pump Disinfection and Bacteriological Testing

A. Following installation of the submersible well pump and all wet well site mechanical pipe and fittings, the well shall be disinfected in accordance with Sections 1 through 4 and Section 5.2 of American Water Works Association (AWWA) Standard C654.

B. The wet well shall not be placed in service until samples are collected and all required testing is complete and satisfactory.

C. Samples of water shall be collected by a representative of a State Certified Testing Laboratory with a representative of the Owner present.

D. The discharge locations for chlorinated water shall be approved by the Owner. Neutralize the chlorine residual by means of a reducing agent in accordance with AWWA C651.

E. A total of at least 20 samples -- each taken on a separate but consecutive workday and taken at least six hours apart from the other samples -- shall be collected after first pumping the well to waste to remove all residual chlorine and then pumping the well to waste at a rate approximately equal to that of the permanent well pump

for at least 15 minutes before each sample is collected, and the samples shall be analyzed for the presence of total residual chlorine, total coliform, and E. coli.

F. Two samples are allowed to be collected per day, provided the samples are collected at least six hours apart, and the well pumped to waste for at least 15 minutes before each sample is collected.

G. If any sample shows the presence of free or combined chlorine, the sample shall be considered invalid. If any sample shows the presence of E. coli, contact the Owner immediately for determination of whether the sample should be considered invalid and the well redisinfected and resampled in accordance with subparagraph E above.

H. If more than ten percent of the total number of samples collected show the presence of total coliform or if either of the last two samples collected shows the presence of total coliform, the well shall be redisinfected and resampled in accordance with subparagraph E above.

I. Disinfection shall include the submerged pump assembly and all raw water piping up to the first isolation valve.

3.03 Chemical and Physical Analysis

The Owner has collected water samples at all of the wells and has sent these samples to a recognized, independent laboratory to be tested for all primary and secondary drinking water regulation contaminants including volatile organic and synthetic organic contaminants, radionuclides, turbidity, etc., all as required by FDEP for permitting of new wells. Testing shall be performed in accordance with Hydraulic Institute Standard HI 14.6. Power unit operation and hydraulic pressures shall be recorded during field testing.

3.04 Field Test

A. After installation of the well pump, conduct a field operational test of each well pump to demonstrate the pump's performance, under the observation of the Engineer, to determine if the installed equipment meets the purpose and intent of the Specifications. Tests shall be conducted at various pumping rates, as directed by the Engineer.

B. Tests shall demonstrate that the equipment and Work is not defective electrically, mechanically, or otherwise; and is in a safe and satisfactory operating condition.

C. Tests shall include checks for excessive vibration, leaks in all piping and seals, correct operation of controls systems and equipment, and motor power input in kilowatts.

D. Contractor shall conduct a field pumping test in accordance with the Hydraulic Institute Standards. The pump shall be field tested to establish the field pumping rate, head, and overall efficiency. The field testing shall include measurement of

voltage and amperage. The static water level and the pumping water level shall be measured and recorded. Three copies of a report documenting the field-testing performance shall be prepared and submitted.

E. Startup support shall include pressure testing of hydraulic lines, pump system checkout, and training of Owner's personnel on startup, shutdown, and maintenance procedures.

END OF SECTION

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SECTION 15065

POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

1. GENERAL

1.1 Scope of Work

A. Furnish all labor, materials, equipment and incidentals required and install, disinfect and test polyvinyl chloride (PVC) pipe, fittings and appurtenances of the sizes and in the locations shown on the Contract Drawings and as specified herein.

B. The Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference between pipes, or for other reasons. Pipe fitting notation is for the Contractor's convenience and does not relieve him/her from installing and jointing different or additional items where required to achieve a complete piping system.

C. Pipe/piping refers to all pipe, fittings, material and appurtenances required to construct PVC pressure piping systems throughout the Project, as specified, complete and in place.

1.2 Reference Standards

A. Unless otherwise indicated, all materials, workmanship and practices shall conform to the following standards:

STANDARD	DESCRIPTION
American Society for Testing and Materials (ASTM)	
ASTM A-242	Standard Specification for High-Strength Low-Alloy Structural Steel
ASTM A-320	Standard Specification for Alloy-Steel Bolting Materials for Low-Temperature Service
ASTM A-536	Standard Specification for Ductile Iron Castings
ASTM D-1784	Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
ASTM D-1785	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D-2464	Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D-2467	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D-2564	Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
ASTM D-2774	Standard Practice for Underground Installation of Thermoplastic Pressure Piping

ASTM D-2855	Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
ASTM D-3139	Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM F-437	Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
ASTM F-477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
American Water Works Association (AWWA)	
AWWA C-110	Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids
AWWA C-111	Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C-651	Disinfecting Water Mains
AWWA C-900	Polyvinyl Chloride (PVC) Pressure Pipe, 4-in Through 12-in for Water Distribution
AWWA C-905	Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14-in Through 36-in.
AWWA M-23	PVC Pressure Pipe and Fittings
National Sanitation Foundation (NSF)	
Std No. 14	Plastic Piping Components and Related Materials
Std No. 61	Drinking Water System Components - Health Effects

B. Where reference is made to one of the above standards, the revision in effect at the time of Bid Opening shall apply.

1.3 Quality Assurance

A. All PVC pipe and fittings shall be from a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these specifications.

B. Pipe for use with domestic potable water shall have an NSF seal of approval. The Supplier shall be responsible for the provisions of all test requirements specified in NSF Standard No. 14 as applicable.

C. Acceptable Manufacturers of PVC shall include Certain-Teed Products, Corporation; Johns-Manville (J-M), or approved equal.

1.4 Submittals

A. Submit to the Engineer, in accordance with the General Conditions, Supplementary Conditions and Section 01300, “Submittals”, within thirty (30) days of the Effective Date of the Agreement, the name of the pipe and fitting manufacturers and a list of materials to be furnished by each manufacturer. The submittal shall include information on the local representative for each manufacturer, if the product is sold

through a distributor, descriptive literature, illustrations, specifications, installation instructions and related information.

B. Shop Drawings including piping layouts and schedules shall include dimensioning, fittings, types and locations of valves and appurtenances, joint details, methods and location of supports, anchorage, gasket material, grade of material and all other pertinent technical information for all items to be furnished.

C. Prior to each shipment of pipe, certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM and AWWA Standards specified herein shall be submitted.

1.5 System Description

A. The equipment and materials specified herein are intended to be of standard types for use in transporting water, wastewater and reclaimed water.

B. Note information in pipe schedule on Contract Drawings, if any, and in this Section, especially concerning pressures, minimum thickness, etc.

C. The Contractor is responsible for compatibility between pipe materials, fittings and appurtenances.

1.6 Product Delivery, Storage and Handling

A. PVC pipe shall be delivered to the Project Site in unbroken bundles packaged in such a manner as to provide protection against damage. When possible, pipe should be stored at the Project Site in unit packages ready for use. Package units shall be handled using a forklift or a spreader bar with fabric straps. Packaged units shall not be stacked higher than two (2) units high at the Project Site. Any pipe damaged in shipment shall be replaced as directed by the Engineer, at no additional cost to the Owner.

B. When it is necessary to store PVC pipe and fittings for more than thirty (30) days, exposure to direct sunlight shall be prevented by covering the pipe with an opaque material. Adequate air circulation above and around the pipe shall be provided as required to prevent excessive heat accumulation. PVC pipe shall not be stored close to heat sources or hot objects such as heaters, fires, boilers or engine exhaust. Pipe gaskets shall be protected from excessive exposure to heat, direct sunlight, ozone, oil and grease. The interior and all sealing surfaces of pipe, fittings and other appurtenances shall be kept clean and free of dirt and foreign matter.

C. All pipe and fittings shall be thoroughly cleaned before installation and the interior shall be kept clean until testing.

D. Care shall be taken in handling and laying pipe and fittings to avoid severe impact blows, crushing, abrasion damage, gouging or cutting. Pipe shall be lowered, not dropped, from trucks or into trenches. All cracked, damaged or defective pipe and fittings, or any length of pipe having a gouge, scratch or other permanent indentation of more than ten percent (10%) of the wall thickness in depth, shall be

rejected and removed at once from the work and replaced with new acceptable pipe at no additional cost to the Owner.

1.7 Job Conditions

A. Water in Excavation

1. Water shall not be allowed in the trenches while underground pipes, fittings, valves and/or accessories are being laid and/or tested.

2. The Contractor shall not open more trench than the available pumping facilities are able to dewater to the satisfaction of the Engineer. The Contractor shall assume responsibility for disposing of all water so as not to injure or interfere with the normal drainage of the territory in which he is working.

3. In no case shall the pipelines being installed be used as drains for such water, and the ends of the pipe shall be kept properly and adequately plugged during construction by the use of approved stoppers and not by improvised equipment.

4. All necessary precautions shall be taken to prevent the entrance of mud, sand, or other obstructing matter into the pipelines. If on completion of the work any such materials has entered the pipelines, it must be cleaned as directed by the Engineer so that the entire system will be left clean and unobstructed.

2. PRODUCTS

2.1 General

A. All materials that come into contact with potable water shall be on either the EPA or NSF lists of products approved for use in contact with potable water. Manufacturers shall submit an affidavit with the shop drawings indicating approval by the EPA or NSF for the materials used in products that come into contact with potable water, in accordance with Rule 62-555.320(3), Florida Administrative Code.

2.2 Polyvinyl Chloride (PVC) Pipe and Fittings

A. Small Diameter Gravity Drainage Piping (< 4-inches)

1. PVC pipe smaller than four (4) inches nominal diameter used for gravity drainage piping shall be Schedule 40 pipe in accordance with ASTM D-1785.

2. Schedule 40 PVC pipe shall have solvent welded joints as specified for PVC pressure pipe.

B. Large Diameter Gravity Drainage Piping (≥ 4-inches)

1. Unless otherwise noted, large gravity drainage piping shall conform to the requirements and shall have gasketed integral bell ends:

Pipe Size (inches)	Pipe Requirements
4 -12	AWWA C900, DR25
> 12	AWWA C905, DR25

2. Pipe shall be designed for a maximum working pressure at not less than 100 psi and with not less than a 4 to 1 sustained hydrostatic pressure safety factor.

3. Fitting shall be ductile iron fittings with restrained mechanical joints and as specified in Section 15062, “Ductile Iron Pipe and Fittings”.

4. Pipe shall be made of ductile iron pipe O.D.'s instead of IPS.

C. Small PVC Pressure Piping (< 4-inches)

1. Unless otherwise specified, PVC pressure pipe smaller than four (4) inches nominal diameter shall conform to the following requirements, as shown on the Contract Drawings or specified in other Sections.

Pipe Size (inches)	Pipe Requirements
< 4	Schedule 80, ASTM D-1785

2. Schedule 80 pipe shall have solvent welded joints unless otherwise shown on the Contract Drawings or specified in other Divisions.

3. PVC pressure pipe shall bear the approved seal of the National Sanitation Foundation (NSF).

4. PVC pipe that is exposed to sunlight shall be manufactured with UV additives to provide resistance to ultraviolet light deterioration.

5. Fittings

   a. Socket type, solvent welded fittings for Schedule 80 PVC pipe, less thanthree (3) inches in diameter, shall be in conformance with ASTM D-2467. Socket type, solvent welded fittings for Schedule 80 CPVC pipe, less than three (3) inches in diameter, shall be in conformance with ASTM F-439.

   b. Threaded type fittings for Schedule 80 PVC pipe, less than three (3) inches in diameter, shall be in conformance with ASTM D-2464. Threaded type fittings for Schedule 80 CPVC pipe, less than three (3) inches in diameter, shall be in conformance with ASTM F-437.

   c. Solvent weld solvent welded or threaded joints shall be “water-tight”.

   d. All fittings for PVC pipelines greater than or equal to three (3) inches shall be ductile iron. All adapters, fittings and transition gaskets necessary to connect PVC fittings shall be furnished.

6. Flanges

   a. Flanges for Schedule 80 PVC pipe shall be rated for a 150 psi working pressure with ANSI B-16.1 dimensions and bolting pattern.

   b. Flanges shall be connected to PVC piping with either solvent welded or threaded joints in accordance with ASTM D-2467 or ASTM D-2464, respectively. Gaskets shall be neoprene, full faced type with a minimum thickness of 1/8-inch.

   c. Nuts and bolts shall be hexagonal with machine threads, manufactured of Type 316 stainless steel in accordance with ASTM A-320, Class 2.

   d. Type 304 stainless steel flat washers with lock washers shall be used against PVC flanges.

   e. The nuts shall have a hardness that is lower than that of the bolts and washers by a difference of 50 Brinnell hardness to prevent galling during installation.

7. PVC solvent cement shall be in compliance with ASTM D-2564 and in accordance with the pipe manufacturer's recommendations. The Contractor shall use a cleaner recommended by the manufacturer for cleaning the pipe/fittings prior to solvent welding. Lubricant for Schedule 80 threaded joints shall be Teflon tape only.

8. Provide suitable adapters for connections to equipment and other piping systems.

D. Large PVC Pressure Piping (≥ 4-inches)

1. Unless otherwise noted, PVC pressure pipe for the nominal diameters shown shall conform to the following requirements, have gasketed integral bell ends, and be manufactured to ductile iron O.D.'s instead of IPS.

Pipe Size (inches)	Pipe Requirements	Max. Working Pressure (psi)
4 - 12	AWWA C900, DR-18	150
> 12	AWWA C905, DR-18	235

2. PVC pipe shall bear the NSF marking of approval when used for potable water applications.

3. PVC Pipe shall be designed for maximum working pressure as indicated above and with not less than a 4 to 1 sustained hydrostatic pressure safety factor.

4. Fittings shall be ductile iron fittings with restrained mechanical joint ends as specified in Section 15062, “Ductile Iron Pipe and Fittings”. All adapters, fittings and transition gaskets necessary shall be furnished.

5. PVC pipe that is exposed to sunlight shall be manufactured with UV additives to provide resistance to ultraviolet light deterioration.

6. Bell and Spigot

    a. Pipe joints shall be made with integral bell and spigot pipe ends meeting ASTM D-3139, “Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals”. The bell shall consist of an integral thickened wall section designed to be at least as strong as the pipe wall.

    b. The bell shall be supplied with factory glued rubber ring gasket which conforms to the manufacturer's standard dimensions and tolerances.

    c. The gasket shall meet the requirements of ASTM F-477, "Elastomeric Seals (Gaskets) for Joining Plastic Pipe".

    d. PVC joints shall be "Ring-Tite" as manufactured by Johns-Manville Manufacturing Company, Inc. or an equal approved by the Engineer.

7. Fittings

    a. All fittings for use with PVC pipe three (3) inches and larger in size shall be ductile iron with a minimum working pressure of 250 psi and shall conform to ANSI/AWWA A21.10/C-110, latest revision except as shown on the Contract Documents.

    b. Fittings shall have mechanical joint bell ends manufactured in accordance with ANSI/AWWA A21.11/C-111, latest revision. Jointing materials for mechanical joints shall be provided by the fitting manufacturer. Materials, assembly and bolting shall be in accordance with ANSI/AWWA A21.11/C-111, latest revision.

    c. Tee head nuts and bolts for mechanical joints shall be manufactured of corrosion resistant high strength, low alloy COR-TEN steel meeting the requirements of ASTM A-242, or approved equal.

    d. All cast iron and ductile iron fittings for use with PVC pipe shall be coated and lined, as specified for ductile iron pipe in Section 15062, “Ductile Iron Pipe and Fittings”, intended for similar service, as noted on the Contract Drawings.

8. Restrained Joints

    a. In accordance with the Contract Drawings, to prevent pipe joints and fittings from separating under pressure, pipe joints and fittings shall be restrained

as follows, or with EOR approved equal:

1) PVC pipe bell and spigot joints shall be restrained with the EBBA Iron MEGALUG® Series 1500 Restrainer or an equal approved by the Engineer. The restraining device and tee head bolts shall be manufactured of high strength ductile iron meeting ASTM A-536, Grade 65-45-12. Clamping bolts and nuts shall be manufactured of corrosion resistant high strength, low alloy COR-TEN steel meeting the requirements of ASTM A-242.

2) Mechanical joint fittings used with PVC pipe shall be restrained with the EBBA Iron MEGALUG® Series 2000 PV Restrainer or an equal approved by the Engineer. The restraining device and tee head bolts shall be manufactured of high strength ductile iron meeting ASTM A-536, Grade 65-45-12. Clamping bolts and nuts shall be manufactured of corrosion resistant high strength, low alloy COR-TEN steel meeting the requirements of ASTM A-242.

E. Clear PVC Reinforced Tubing

1. Clear PVC tubing, for chemical applications shown on the Contract Drawings, shall be nylon reinforced, PVC clear tubing.

2. The inside diameter shall be as shown on the Contract Drawings or as specified in Sections of this Project Manual.

3. Tubing shall be able to withstand a working pressure of 150 psi.

4. Tubing shall be Amaclear "R" as manufactured by Amazon Hose Rubber Company, or approved equal.

F. All ductile iron fittings and accessories for pipelines (above grade - flanged; below grade - mechanical joint) shall be compatible with the pipe.

G. PVC fittings shall meet the requirements of AWWA C-900/C-905 and be of the same, or higher, pressure rating as the pipeline.

H. PVC color shall be in accordance with the Contract Documents.

3. EXECUTION

3.1 Storage and Handling of PVC Pipe

A. Delivery, Storage and Handling of PVC pipe shall follow the requirements of Article 1.7 of this Section.

3.2 Installation of PVC Pipe and Fittings

A. No single piece of pipe shall be laid unless it is straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than $^{1}/_{16}$-inch per foot of length. If a piece of pipe fails to meet this requirement check for straightness, it shall be rejected and removed from the site. Laying instructions of the pipe manufacturer shall be explicitly followed.

B. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost to the Owner.

C. All PVC pipe and fittings and cast or ductile iron fittings shall be laid in accordance with the pipe manufacturer's published installation guide, the AWWA Manual of Practice No. M23, "PVC Pipe - Design and Installation" and the Uni-Bell Plastic Pipe Association installation recommendations.

D. In preparation of pipe installation, placement (stringing) of pipe should be as close to the trench as practical on the opposite side of the trench from the excavated material. The bell ends of the pipe should point in the direction of the work progress.

E. Pipe and fittings shall be laid accurately to the lines and grades indicated on the Contract Drawings or as indicated by the Engineer. Care shall be taken to insure a good alignment both horizontally and vertically and to give the pipe a firm bearing along its entire length. Any pipe that has its grade or joint disturbed after laying shall be taken up and re-laid.

F. All pipe and fittings shall be cleared of sand, dirt and debris before laying. All precautions shall be taken to prevent sand, dirt or other foreign material from entering the pipe during installation. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe. Any sand, dirt or other foreign material that enters the pipe shall be removed fro the pipe immediately. The interior of all pipe and fittings shall be kept clean after installation until accepted in the complete work.

G. Any time that pipe installation is not in progress, including lunchtime, the open ends of the pipe shall be closed by a watertight plug or other method approved by the Engineer. Plugs shall remain in the pipe ends until all water is removed from the trench. No pipe shall be installed when trench conditions are unsuitable for such work, including standing water, excess mud, rain or snow.

H. Good alignment shall be preserved during installation. The deflection at joints shall not exceed that recommended by pipe manufacturer. Fittings, in addition to those shown on the Contract Drawings, shall be provided, if required, in crossing utilities which may be encountered upon opening the trench.

I. <u>Field Cutting of PVC Pipe</u>

1. Field cutting of pipe shall be done in a neat workmanlike manner without

creating damage to the pipe. The pipe shall be cut square with a fine-toothed hand or power saw or other cutter or knife designed for use with plastic pipe.

2. Prior to cutting, the pipe shall be marked around its entire circumference or a square-in vise shall be used to ensure the pipe end is cut smooth at right angles to the axis of the pipe.

3. Remove burrs by smoothing edges with a knife, file, or sandpaper.

4. Bevel the cut end of the pipe with a pipe beveling tool, wood rasp or portable sander to prevent damage to the gasket during joint assembly. A factory finished beveled end should be used as a guide to ensure a proper beveling angle and correct depth of bevel. Round off any sharp edges on the leading edge of the bevel with a knife or file.

J. Any pipe having defective joint surfaces shall be rejected, marked as such and immediately removed from the job site.

K. Each length of the pipe shall have the assembly mark aligned with the pipe previously laid and held securely until enough backfill has been placed to hold the pipe in place.

L. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched and conform to the required grade. The pipe shall not be driven down to grade by striking it.

M. Precautions shall be taken to prevent flotation of the pipe in the trench.

N. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below top of the pipe. As trench boxes, moveable sheeting, shoring or plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be recompacted to provide uniform side support for the pipe.

3.3 Jointing PVC Pipe (Push-On Type)

A. **Pipe shall be laid with bell ends looking ahead**.

B. The PVC bell and spigot joint shall be assembled in accordance with the pipe manufacturer's installation instructions, ASTM D-2774, and AWWA Manual M-23. Clean the interior of the bell, the gasket, and the spigot of the pipe to be jointed with a rag to remove any dirt or foreign material before assembling. Inspect the gasket, pipe spigot bevel, gasket groove, and sealing surfaces for damage or deformation.

C. Lubricate the spigot end of the pipe with a lubricant supplied or specified by the pipe manufacturer for use with gasketed PVC pipe in the application being installed

(potable water, wastewater, effluent, or reclaimed water). The lubricant should be applied as specified by the pipe manufacturer. After the spigot end is lubricated, it must be kept clean and free of dirt and sand. If dirt and sand adhere to the lubricated end, the spigot must be wiped clean and relubricated.

D. Insert the spigot into the bell so that it contacts the gasket uniformly. Align the pipe sections and push the spigot end into the bell until the manufacturer's reference mark on the spigot is flush with the end of the bell. The pipe should be pushed into the bell using a bar and block. The joint shall not be assembled by "stabbing" or swinging the pipe into the bell, nor shall construction machinery be used to push the pipe into the bell.

E. If undue resistance to insertion of the spigot end is encountered or if the reference mark does not reach the flush position, disassemble the joint and check the position of the gasket. If the gasket is twisted or pushed out of its seat, inspect the components, repair or replace damaged items, clean the components, and repeat the assembly steps. Be sure the pipe is in proper alignment during assembly. If the gasket was not out of position, check the distance between the spigot end and the reference mark and relocate the mark if it is out of position.

F. The weight of valves and fittings shall not be carried by the PVC pipe. The valve or fitting shall be supported by a concrete cradle as shown on the standard details. Concrete for the cradle shall be poured against undisturbed soil.

3.4 Jointing Mechanical Joint Fittings

A. Mechanical joints at valves, fittings and where designated shall be in accordance with the AWWA C-111 and the instructions of the pipe manufacturer. Suitable PVC to cast iron adapters shall be installed prior to installing fittings. PVC beveled spigots shall be cut flush prior to insertion in mechanical joint pipe. To assemble the joints in the field, thoroughly clean the joint surfaces and rubber gasket with soapy water before tightening the bolts.

B. Bolts shall be tightened to the specified torques. Under no condition shall extension wrenches or pipe over handle of ordinary ratchet wrench be used tosecure greater leverage.

3.5 PVC Joint Assembly for Threaded and Solvent Welded Pipe

A. All threaded and solvent welded joints shall be made watertight in accordance with ASTM D-2855, ASTM D-2564, and AWWA Manual M-23. All pipe cutting, threading, and jointing procedures for threaded and solvent welded PVC pipe joints shall be in strict accordance with the pipe and fitting manufacturer's printed installation instructions. Thread lubricant for threaded joints shall be teflon tape only.

B. At threaded joints between PVC and metal pipes, the metal side shall contain the socket end and the PVC side the spigot. A metal spigot shall not, under any circumstances, be screwed into a PVC socket.

C. The Contractor shall make sure that the proper cement is used with the proper pipe and fittings. Never use CPVC cement on Type I PVC pipe or, conversely, never use PVC cement on CPVC pipe and fittings.

3.6 Restrained Joints

A. Restrained joints shall be made in strict, complete accordance with the manufacturer's recommendations.

B. All piping shall be restrained as indicated on the Contract Drawings.

C. All fittings shall be restrained.

D. In cases where the calculated required length of restrained pipe is not evenly divisible by nominal laying lengths of pipe, the total required length of restrained pipe shall be rounded up to the next closest nominal length that is evenly divisible by the standard laying length.

3.7 Field Painting

A. Pipe normally exposed to view shall be painted and marked as specified in Section 09900, "Painting" and Section 09905, "Piping, Valve and Equipment Identification System".

3.8 Separation of Non-Potable Water Mains and Potable Water Mains

A. Horizontal Separation

1. Existing and proposed water and wastewater or non-potable force mains shall be separated at least six (6) feet horizontally.

2. Horizontal separation between water mains and wastewater or non-potable force mains must always be a minimum of six (6) feet unless a closer than separation has been specifically detailed on the Contract Drawings that have been approved under the FDEP Permit.

B. Vertical Separation

1. Parallel Lines

a. Whenever potable water and non-potable water lines (reclaimed, sanitary, stormwater, force mains) run parallel and do not meet the horizontal separation requirements, then the lines shall be vertically separated with the potable water line at least eighteen (18) inches above the top of the non-potable lines.

2. Crossings

a. Force mains crossing water mains shall be installed to provide a minimum

vertical distance of eighteen (18) inches measured from the outside of the potable water line to the outside of the non-potable line. The potable water line may be either above or below the non-potable line at crossings. The constructed pipeline shall be installed so that the pipeline joints are as far from the crossing as possible.

3.9 Concrete Pipe Encasement

A. Concrete for concrete pipe encasement shall have a minimum strength of 3,000 psi at twenty-eight (28) days and encasement shall be constructed in accordance with details shown on the Contract Drawings. Encasement shall be constructed where:

1. Indicated on the Contract Drawings.

2. Piping is laid under buildings, structures and structure pads.

B. The points of beginning and ending of concrete pipe encasement shall not be more than six (6) inches from a pipe joint to protect the pipe from cracking due to uneven settlement of its foundation or the erects of superimposed live loads.

C. Pipe encasement, if necessary shall provide a minimum coverage of twelve (12) inches all around the pipe including pipe bells.

3.10 Connection to Existing Water, Wastewater and Reuse Systems

A. The Contractor shall coordinate making connection of the new mains to mains which are in service at the time of construction with the Owner.

B. The Contractor shall not connect to existing facilities unless the Engineer and a representative of the Owner are present.

C. Operation of all system valves shall be the responsibility of the Owner's personnel only. At no time shall the Contractor operate any system valves. System valves shall be defined as any valve which has main pressure against either side of the valve. The Contractor shall notify the Owner to request that a valve be operated, in writing, at least twenty-four (24) hours prior to the time operation is required.

3.11 Cleaning and Flushing of Pipelines

A. Following the hydrostatic and leakage tests, all the mains constructed under this Contract shall be cleaned and flushed to remove sand, loose dirt, and other debris. The minimum flushing velocity shall be 2.5 feet per second. Flushing shall continue until clean water flows from the main. However, the Contractor shall endeavor to use the minimum amount of flushing water required to complete the work.

B. Upon completion of testing for the gravity drain line system, drain lines shall be flushed to remove dirt, sand, stones, and other debris which may have entered the lines during construction and settled out in the lines and/or manholes. Materials and debris flushed from the drain lines shall be removed from a downstream manhole, basin or lift station and disposed of at an approved disposal area.

C. Temporary blowoffs may be required for the purpose of flushing mains. Temporary blowoffs shall be installed as close as possible to the ends of the main being flushed. Blowoffs installed on the main shall be the same diameter as the main. Temporary blowoffs shall be removed and plugged after the main is flushed. All costs for installing and removing temporary blowoffs shall be at no additional cost to the Owner.

D. Blowoffs and temporary drainage piping used for flushing shall not be discharged into any gravity sewer or pumping station wetwell. The Contractor shall obtain prior approvals from the Engineer and the Owner as to the methods and locations of flushing water discharge.

3.12 Disinfection of Potable Water Pipelines

A. Before any portion of the potable water piping systems is to be placed in service, it shall be disinfected; and its disinfection shall be demonstrated by bacteriological tests conducted in accordance with Standard Methods for Examination of Water and Wastewater, latest edition, for the coli-aerogenes group, by an approved laboratory, acceptable to the Engineer and the County Health Department.

3.13 Pressure Testing of Pipe

A. After installation, the pipe shall be tested for compliance with the specifications. The Contractor shall furnish all necessary equipment and labor for the pressure test and leakage test on the pipelines.

B. Pressure testing of pipeline shall be in accordance with Section 15044, “Pressure Testing of Piping”.

END OF SECTION

SECTION 15100

VALVES AND APPURTENANCES

1. GENERAL

1.1 Description

A. The Work included in this Section consists of furnishing all labor, equipment, materials, and incidentals required to install and test, complete and ready for operation, all valves and appurtenances as shown on the Contract Drawings and as specified herein.

B. The equipment shall include, but is not limited to, the following:

1. Gate Valves

2. Pressure Relief Valves

3. Backpressure Sustaining Valves

4. Valve Boxes

C. General Design

1. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of water, air, chemicals, etc., depending on the application.

1.2 Quality Assurance

A. All types of valves and appurtenances shall be the products of well-established reputable firms who are fully experienced, reputable and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these specifications as applicable.

B. Compliance with Standards

1. Valves and appurtenances shall meet the requirements of the following applicable standards that shall be made a part of the Contract Documents by reference:

a. American Water Works Association (AWWA).

b. American Society for Testing and Methods (ASTM)

c. American National Standard Institute (ANSI)

d. American Society of Mechanical Engineers (ASME)

1) ASME B31.9 for building services piping valves

2) ASME B16.10 and B16.34 compliance for ferrous valves (dimension and design criteria).

e. National Sanitation Foundation (NSF)

1) NSF 61 for valve materials for potable water use.

C. Valving and Appurtenance Inspection

1. The Contractor shall obtain from the valve and appurtenance manufacturer's, a certificate of inspection to the effect that the equipment supplied for this Contract have been inspected at the plant and that they meet the requirements of these specifications.

2. All valving and appurtenances shall be subject to visual inspection at the time of delivery by rail or truck and also just before they are installed. Equipment that does not conform to these specifications will be rejected and must be removed immediately by the Contractor and shall be replaced at no additional cost to the Owner.

3. The entire product of any plant may be rejected when, in the opinion of the Engineer, the methods of manufacture fail to secure uniform results, or where the materials used are such as to produce valves or appurtenances.

1.3 Submittals

A. All shop drawings shall be submitted to the Engineer for approval in accordance with Section 01300, "Submittals", prior to construction.

B. Complete shop drawings of all valves and appurtenances shall be submitted to the Engineer for approval prior to ordering of materials. The valve manufacturers shall certify, in writing, that the valve design and materials of construction are suitable for the intended service.

C. Shop drawings for valves and appurtenances shall include, at a minimum, the following:

4. Certified Dimensional Drawings of all piping, fittings, valves and appurtenances.

5. A separate shop drawing submittal will be required for each major item and for each different type of an item within a major item. For example, separate submittals will be required for butterfly, plug, ball, solenoid, check, and automatic air release valves. All submittals shall be in accordance with the

General and Supplementary Conditions and Section 01300, “Submittals”.

D. Quality Control Submittals

1. Certificate of Compliance for:

   a. Electric Operators: Full compliance with AWWA C-540

   b. Butterfly Valves: Full compliance with AWWA C-504

   c. Plug Valves: Full compliance with AWWA C-517

2. Test and inspection data.

3. Manufacturer’s certificate of proper installation and check-out.

4. Operation and Maintenance Manuals.

E. Submit manufacturer’s catalog data and detail construction sheets showing all valve parts. Describe each part by material of construction, specification (such as AISI, ASTM, SAE, CDA, etc.), and grade and type. Identify each valve by tag number to which the catalog data and detail sheets pertain.

F. Show valve dimensions including layout lengths. Show port sizes. Show dimensions and orientation of valve actuators, as installed on the valve. Show the location of internal stops for gear actuators. State differential pressure and fluid velocity used to size the actuators. For worm gear actuators, state the radius of the gear sector in contact with the worm and state the handwheel diameter.

G. Show valve linings and coatings and submit the manufacturer’s catalog data and descriptive literature.

H. Submit three (3) copies of a report verifying that the valve interior linings and exterior coatings have been tested for holidays and lining thickness. Describe test results and repair procedures for each valve. Do not ship valves to the Project Site until the reports have been returned and marked either “Approved” or “Approved as Noted”.

I. For butterfly and eccentric plug valves, show the clear diameter or size of the port. Show the actual area of the port as a percentage of the area as calculated for the nominal valve size.

J. Acceptance of Material and Certifications

1. The Manufacturer/Supplier shall furnish a certified Affidavit of Compliance for all valves, appurtenances and other products or materials furnished under this Contract complies with all applicable provisions of current AWWA, ASTM, NSF and ANSI standards, and these specifications.

2. No valves and/or appurtenances will be accepted for use in the Work on this project until the Affidavit has been submitted.

K. Submit O&M Manuals for valves, appurtenances and other products and materials requiring periodic maintenance and/or explanation of operation.

1.4 Delivery, Storage and Handling

A. All valves and appurtenances shall be handled in such manner as to ensure a sound undamaged condition during shipping, delivering, and installing.

B. Care shall be taken not to injure the valve and/or appurtenance coating and/or lining.

C. The Contractor shall exercise care when handling lined valves and appurtenances.

D. The insides of valves and appurtenances shall be kept free of dirt and debris.

1.5 Job Conditions

A. Water in Excavation

1. Water shall not be allowed in the trenches while underground valves and/or appurtenances are being laid and/or tested.

2. The Contractor shall not open more trench than the available pumping facilities

are able to dewater to the satisfaction of the Engineer. The Contractor shall assume responsibility for disposing of all water so as not to injure or interfere with the normal drainage of the territory in which he is working.

3. All necessary precautions shall be taken to prevent the entrance of mud, sand, or other obstructing matter into the valves and appurtenances. If on completion of the work any such materials have entered either valves or appurtenances, it must be cleaned as directed by the Engineer so that the entire system will be left clean and unobstructed.

2. PRODUCTS

2.1 General

A. Install valves complete with operating handwheels or actuators, levers, chain wheels, extension stems, floor stands, gear operators, operating nuts, chains, wrenches and accessories required for operation.

B. All valves and appurtenances shall be of the size shown on the Contract Drawings and all equipment of the same type shall be from a single manufacturer.

C. All valves and appurtenances shall have the name of the manufacturer, size of the valve and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

D. All bolts, washers and nuts shall be Type 304 stainless steel.

2.2 Finishes

A. Potable Water

1. Epoxy Lining and Coating:

a. An epoxy lining and coating shall be applied to all potable water valves and appurtenances in accordance with AWWA C-550, unless otherwise specified and NSF approved.

b. Either two-part liquid material or heat-activated (fusion) material shall be used, except only heat-activated material shall be used if the specifications call for “fusion” or “fusion bonded” epoxy.

c. A minimum seven (7) mil dry film thickness shall be provided except where limited by valve operating tolerances.

2. Exposed Valves:

   a. Exposed valves shall be coated in accordance with Section 09900, “Painting”.

   b. Safety isolation valves and lockout valves with handles, handwheels or chain wheels shall be painted “safety yellow”.

B. Raw Wastewater, Secondary Effluent and Reclaimed Water

1. Exterior Coating for Buried Valves and Appurtenances:

   a. All exterior surfaces of valves and appurtenances shall be clean, dry and free from rust and grease before coating.

   b. Valves and appurtenances to be installed underground shall be coated on the exterior at the factory with a two (2) coat coal tar epoxy system with a minimum total finish dry film thickness of twenty (20) mils.

   c. Prior to back filling, all uncoated nuts, bolts, glands, rods, and other parts of joints for underground installation shall be coated in the field with coal tar epoxy equal to Koppers Bitumastic No. 300-M.

2. Exterior Coating for Exposed Valves and Appurtenances:

   a. All exterior surfaces of valves and appurtenances shall be clean, dry and free from rust and grease before coating.

   b. For valves and appurtenances installed above-ground, the exterior ferrous parts of all valves shall be shop primed at the factory with one (1) coat, minimum dry film thickness of four (4) mils, of a lead/chromate free, rust-inhibitive universal epoxy primer. The primer shall be suitable for the finish paint specified. Following installation, all above-ground valves shall be finish painted.

   c. Exposed piping shall be painted in accordance with Sections 09900, “Painting” and 09905, Piping, Valve and Equipment Identification System”.

3. Interior Valve and Appurtenance Lining:

   a. The interior of the valve body and valve disc shall be coated with a two- coat fusion bonded or thermosetting epoxy coating in accordance with AWWA C-550, latest revision.

   b. The coating shall be NSF approved, with a minimum thickness of six (6) mils. Surfaces shall be clean, dry, and free from rust and grease before coating.

2.3 Gate Valves (GV)

A. General

1. Gate valves shall have a clear waterway equal to the nominal diameter of the pipe when fully open.

2. The opening nut or wheel shall have an arrow cast in the metal indicating the direction of the opening. Each valve shall have the manufacturer's distinctive markings, pressure rating and year of manufacture cast on the body. Prior to shipment from the factory, each valve shall be tested by applying to it a hydrostatic pressure equal to twice the specified working pressure.

3. Hydrostatic and leakage testing shall be conducted in strict accordance with ANSI/AWWA C-500, latest revision or ANSI/AWWA C-509, latest revision whichever is applicable.

4. All gate valves which are installed on pipe sizes larger than three (3) inches shall have mechanical joint or flanged ends to fit the pipe run in which they are to be used. Flanged valves shall be faced and drilled to the ANSI 125/150- pound standard. Mechanical joint ends shall be to the AWWA Standard C111-72. Gate valves installed on pipes three (3) inches and smaller shall have slip on joints or screwed ends. Screwed ends shall be to the NPT Standard.

5. Gate valves shall open left or counter-clockwise when viewed from the stem.

6. Buried gate valves shall be furnished with two (2) inch square AWWA standard nut operators with a valve box and cover. Gate valves located above ground or inside structures shall be furnished with handwheel operators and shall have a suitable indicator arrow to give the valve position from fully open to fully closed.

B. Bronze Gate Valves: Aboveground - Two (2) inches and Smaller

1. The aboveground gate valves, two (2) inches in size and smaller, for water and air service, shall be Class 150 all bronze valves conforming to Federal Specification WW-V-54d, Type 1, Class B designed for a non-shock water pressure of 300 psi at a working temperature of 200°F.

2. Bronze for the valve body and internals shall be in accordance with ASTM B 16.18.

3. Valves shall be furnished with screwed ends, handwheel operator (aluminum or brass), non-rising stem, one-piece solid wedge disc and screwed bonnet.

4. Packing shall be Teflon or Kevlar aramid fiber.

5. Valves shall be as manufactured by Crane, Powell, or an approved equal.

6. The minimum weight of valves shall be as follows:

Valve Size (Inches)	Valve Weight (Pounds)
½	1
¾	1.5
1	2.5
1¼	3.6
1½	4.6
2	7.6

C. Iron Gate Valves: Two (2) inches and Larger

1. Iron gate valves shall open by turning to the left (counter-clockwise), when viewed from the stem. When fully open, gate valves shall have a clear waterway equal to the nominal diameter of the pipe. The operating nut or hand wheel shall have an arrow cast in the metal indicating the direction of opening. Each valve shall have the manufacturer's distinctive marking, pressure rating and year of manufacture cast on the body. Prior to shipment from the factory, each valve shall be tested by applying to it a hydrostatic pressure equal to twice the specified working pressure. Hydrostatic and leakage tests shall be conducted in strict accordance with ANSI/AWWA C-500 or ANSI/AWWA C-509, latest revisions, whichever is applicable.

2. Gate valves with nominal sizes from 2 to 2 ½ inches shall conform to ANSI/AWWA C-500, latest revision, and shall be designed for a minimum working pressure of 200 psi. Valves shall be iron body, bronze-mounted, double disc, parallel seat, non-rising stem type with double, Buna-N, O-ring stem seals. Bronze items of construction shall include the stems, seat rings, stem nuts, wedge bushings, and upper and lower wedges. Bronze used for construction of these items shall be low zinc alloy bronze. Valve ends shall be screwed and as specified for steel pipe and fittings. Interior ferrous surfaces of the valve, except for finished or bearing surfaces, shall be coated with a two-part fusion bonded or thermosetting epoxy coating in accordance with AWWA C-550, latest revision. The coating shall be holiday-free, NSF approved, with a minimum thickness of sixteen (16) mils. Surfaces shall be clean, dry, and free from rust and grease before coating. Exterior surfaces shall be coated as specified hereinafter. Operators shall be handwheel, lever or AWWA 2-inch square nut as required and approved by the Engineer. Gate valves for this size range shall be as manufactured by Mueller Company, Dresser Industries, Inc., American Valve and Hydrant Valve Company, Kennedy Valve Manufacturing Company, Pratt Valves, or equal.

3. Gate valves with nominal sizes greater than three (3) inches shall conform to ANSI/AWWA C-509, latest revision, and shall be designed for a minimum working pressure of 200 psi. Valves shall be of the iron body resilient seat type with O-ring stem seals. The valve stem, stem nut, glands, and bushings shall be bronze. The valve disc shall be constructed to assure uniform seating pressure between the disc seat ring and body seating surface. The bottom seating surface shall be machined. The resilient seat of valve shall be formed by replaceable resilient seat ring seals made from internally reinforced molded

rubber which are attached to the disc ring with stainless steel screws, or by a special corrosion and chlorine resistant, synthetic elastomer that is permanently bonded to and completely encapsulates a cast iron valve disc. Valve ends for underground installation shall be of the mechanical joint type as specified for ductile iron pipe and flanged for above-ground valves. Resilient-seated type gate valves shall be manufactured by Mueller Company, Dresser Industries, Inc., American Valve and Hydrant Valve Company, Kennedy Valve Manufacturing Company, Pratt Valves, or equal.

4. Valve Joints:

   a. All gate valves shall have either mechanical joint, restrained joint, or flanged ends to fit the pipe run in which they are to be used.

   b. Gate valves installed on push-on joint pipe shall have mechanical joint ends unless otherwise specified.

5. Valve Operators:

   a. Unless otherwise shown on the Contract Drawings or specified herein, gate valves shall have non-rising stems.

   b. Buried gate valves shall be furnished with a two (2) inch square AWWA standard nut operator with a valve box and cover and the nut shall be brought to approximately six (6) inches from the valve box pad elevation and “pinned”.

   c. Gate valves located aboveground or inside structures shall be furnished with a handwheel operator which shall have an arrow cast in the metal indicating the direction of opening.

   d. Gate valves used as isolation valves for reduced pressure back flow preventers shall be of the open screw and yoke (OS&Y) design with a handwheel operator.

D. Gate Valves for Tapping Valves and Sleeves

1. Tapping Valves:

   a. Tapping valves shall conform to ANSI/AWWA C-500 or C-509, latest revision, and shall be designed for a minimum working pressure of 150 psi.

   b. Tapping valves three (3) inches to twelve (12) inches shall be resilient seat type gate valves as specified in Article 2.3. Resilient seat type tapping valves shall be furnished with a raised guide ring cast integrally on the flanged end which is designed to match the groove in the tapping sleeve. The purpose of this guide ring shall be to ensure true alignment of the valve with the tapping sleeve.

c. Tapping sleeves larger than twelve (12) inches shall be iron body, bronze mounted gate valves, with double disc, parallel seat and non-rising stem. The stem shall be bronze and sealed by two "O" rings. The stem nut shall be bronze and cast integrally into the top wedge. The valve disc seating mechanism shall be bottom wedging, hook and wedge type, with disc hooks and wedges as separate interacting parts. The valve shall be designed for vertical mounting in approximately level setting on buried water lines. The valve ends shall be flanged American Standard Class 125-pound steam pressure ratings on one side of the valve and mechanical joint on the other side for use with the class and type of pipe to be installed from the tapping sleeve. Tapping sleeves twelve (12) inches and larger shall be furnished with a raised guide ring cast integrally on the flanged end as specified above for resilient seat type tapping valves.

d. The valve shall open left or counter-clockwise when viewed from the stem. The valve shall be furnished with a 2-inch square AWWA standard nut operator with a valve box and cover as specified herein.

2. Tapping Sleeves:

a. Tapping sleeves shall be of the cast iron, mechanical joint type, with a working pressure rating of 200 psi for sizes four (4) inches through twelve (12) inches and 150 psi for sizes fourteen (14) inches and larger, and shall conform to the applicable sections of AWWA Standard C-110, latest revision.

b. Sleeve and glands shall be of the split-type for assembly on the pipe, and the sleeve and mechanical joint glands and gaskets shall be sized for use with the class and type of pipe being tapped. Sleeve and glands shall be standard bituminous coated, and shall be furnished complete with all accessories. The outlet flange shall be Class 125 Standard. The Contractor shall obtain approval from the Engineer for drilling machine used prior to tapping connections.

3. Operator:

a. Two (2) inch square nut or other operator specified on the Contract Drawings or by the Engineer.

4. Gate valves shall be manufactured by Mueller Company, Dresser Industries, Inc., American Valve and Hydrant Valve Company, Kennedy Valve Manufacturing Company, or equal.

5. Interior and Exterior coatings shall be in accordance with Article 2.2.

E. Knife Gate Valves (KGV) - Stainless Steel

1. Knife gate valves shall be resilient seated, full, round port design for high flow capacity and minimal pressure drop. The valve body port area shall not be less

than eighty percent (80%) of the nominal pipe diameter. Valves shall be designed for positive drip-tight shutoff at 150 psi. All materials of construction shall be as specified herein and shall be suitable for use with raw wastewater. The valves shall be equipped with a floor stand operator with handwheel and extensions where shown on the Contract Drawings. Provide bevel gear actuators for valves fourteen (14) inches and larger.

2. Body and Gate:

   a. The body material shall be carbon steel ASTM A-36 with a liner of Type 316 stainless steel ASTM A-240.

   b. The body shall have a lugged design drilled tapped in accordance with ANSI 150 standards.

   c. The gate shall be constructed of Type 316 stainless steel in accordance with ASTM A-240, finish ground on each side to prevent packing or seat damage.

3. Packing and Gland Material:

   a. The packing gland shall be Type 316 stainless steel in accordance with ASTM A-240.

   b. Valve packing shall be square braided PTFE impregnated synthetic fiber. Removal or replacement of the packing shall be accomplished without necessitating the removal of the valve from the pipeline.

4. Yoke Sleeve:

   a. The yoke super structure shall be constructed of ASTM A-36. The yoke sleeve shall be aluminum bronze in accordance with ASTM B-30, Alloy C84400.

   b. The bonnet shall be Type 316 stainless steel.

5. Seat Ring and Seat:

   a. The seat ring shall be Type 316 stainless steel in accordance with ASTM A-240.

   b. The resilient seat material shall be EPDM or Neoprene and shall be bonded to the seat ring.

6. The stem and gate shall be manufactured of Type 316 stainless steel in accordance with ASTM A-240.

7. Interior and Exterior coatings shall be in accordance with Article 2.2.

8. The valve shall be cast of stainless steel and shall be manufactured by DeZurik, or approved equal.

2.4 Butterfly Valves

A. General

1. Butterfly valves for shall meet or exceed the design standards of ANSI/AWWA C-504-150B, latest revision and designed for a minimum working pressure of 150 psi.

2. Valves shall be bubble tight in either direction at the rated pressure and shall be suitable for throttling and/or operation after long periods of inactivity.

3. The manufacturer shall provide the Engineer with a letter of compliance, within twenty (20) calendar days of the Notice to Proceed indicating that the valve and all materials are compatible with the liquid to flow through it and applicable for the intended use.

4. All valves shall be furnished with position indication.

5. Valve discs shall rotate 90° from the fully open position to the fully closed position.

6. Thrust Bearings:

   a. Provide thrust bearings to hold the valve disc in the center of the valve seat. No bearings shall be mounted inside the valve body within the waterway.

   b. Do not use thrust bearings in which a metal bearing surface on the disc rubs in contact with an opposing metal surface on the inside of the body.

7. Bronze Components:

   a. Bronze components in contact with water shall comply with the following requirements:

Constituent	Maximum Content (%)
Zinc	7
Aluminum	2
Lead	8
Copper + Nickel + Silicon	83

8. Port Sizes:

   a. For valves twenty-four (24) inches and smaller, the actual port diameter shall be at least ninety-three percent (93%) of the nominal valve size. For valves larger than twenty-four (24) inches, the port diameter shall not be more than 1.25- inches smaller than the nominal valve size.

   b. The dimension of the port diameter shall be the clear waterway diameter plus the thickness of the seat.

B. Valve Bodies

1. Valve bodies shall be constructed of high-strength cast iron conforming to ASTM A126, Class B or ductile iron conforming to ASTM A536.

2. Buried valves shall have integrally cast mechanical joint ends as specified for ductile iron pipe and above-ground valves shall have cast iron flanges.

3. End flanges shall conform in dimensions and drilling to ANSI B 16.1, Class 125.

4. Two trunnions for shaft bearings shall be integral with each valve body.

5. Valve body thickness shall be in strict accordance with ANSI/AWWA C-504, latest revision, for Class 150B valves.

C. Valve Seat Ring

1. The valve seat ring shall be constructed of Type 316 stainless steel. The seating edges of the seat ring shall be smooth and polished.

2. The seat ring shall be capable of compensating for changes in direction of flow to assure a bubble tight seal in either direction.

D. Valve Discs

1. Valve discs shall be solid (no cores) for 24-inch and smaller valves; and shall be either solid or hollow core for valves greater than 24-inch. Valve discs shall be constructed of ductile iron in conformance with AWWA C-504.

2. The valve disc shall be of the offset type design to provide 360° uninterrupted seating.

E. Valve Shafts

1. Valve shafts may consist of a one-piece unit extending completely through the valve disc bearings and into the operating mechanism or may be of the "stub shaft" type, which comprises two separate shafts inserted into the valve disc

hubs. If used, stub shafts shall extend a minimum of 1½ shaft diameters into the valve disc hubs.

2. Valve shafts shall be constructed of Type 304 stainless steel or a stainless steel with greater overall corrosion and oxidation resistance.

3. The minimum shaft diameter shall conform to ANSI/AWWA C-504, latest revision, for Class 150B valves.

4. The valve disc shall be attached to the shaft by means of "O" ring sealed taper pins.

5. The valve shaft seal shall consist of "O" rings in bronze cartridge or self-adjusting nitrile Vee-type ring seals.

F. Valve Seats

1. Valve seats shall be of a corrosion and chlorine resistant synthetic rubber compound bonded to a high-grade stainless-steel retaining ring and secured to the valve disc by Type 316 stainless steel set screws or shall be molded in, vulcanized, and bonded to the body.

2. Seats bonded to the body shall withstand a 75-pound pull tested in accordance with ASTM D429, Method B.

3. The valve seat shall be adjustable and replaceable in the field without dismantling operator, disc, or shaft.

G. Valve Bearings

1. Valve shafts shall be fitted with sleeve-type bearings.

2. Bearings shall be corrosion resistant and self-lubricating (Nylon or Teflon).

3. Bearings shall be designed for a pressure not exceeding the published design load for the bearing material, or 1/5 of the compressive strength of the bearing or shaft material.

H. Valve Operators

1. All butterfly valves shall open left or counter-clockwise (CCW) when viewed from the stem. Automatic valve operators shall have motorized valve actuators as specified hereinafter. Manual valve operators shall be of the worm gear or traveling nut type and shall be fully enclosed suitable for buried or submerged service.

2. All operators shall have adjustable mechanical stop limiting devices to prevent over travel of the disc. Should an adjustment of the disc be required to maintain a bubble tight seal, this adjustment shall be made externally without removing

the operator housing cover. The operator shall be designed such that all adjustments can be made under pressure and without the possibility of dirt getting into the operator lubricant. Any adjustments through the lower shaft will not be acceptable.

3. Units furnished for buried service shall be fully gasketed and grease packed.

4. Manual valves located above ground and above grating shall be equipped with handwheel or chainwheel operators and shall have a suitable indicator arrow to give valve position from “fully open” to “fully closed”.

5. Buried butterfly valves and valves below grating shall be furnished with a two (2) inch square AWWA nut operator with valve box and cover. The stems shall be “pinned” and shall bring the 2-inch square nut to approximately six (6) inches from the finished valve pad elevation. Operator components shall, at the extreme operator positions, withstand without damage a pull of 200 lbs. for handwheel or chainwheel operators or an input torque of 300 ft-lbs. for operating nuts.

I. Interior and Exterior coatings shall be in accordance with Article 2.2.

J. Valve Testing

1. Prior to shipment from the factory, hydrostatic and leakage tests shall be conducted on each butterfly valve. Hydrostatic and leakage tests shall be conducted in strict accordance with ANSI/AWWA C-504, latest revision, and results shall be submitted to the Engineer.

2.5 Ball Valves

A. PVC Ball Valves

1. General:

a. All PVC ball valves ½-inch through 4-inch in size shall be of one-piece capsule type manufactured of Type I, Grade 1 PVC.

b. All ball valves shall be true union design with two-way blocking capability and shall have solvent welded socket or NPT threaded ends.

c. All ball valves shall be designed for a 150-psi water working pressure at 120°F.

d. Manually operated ball valves shall be supplied with an ABS lever operating handle. Motorized ball valves shall be equipped with an electric actuator as specified hereinafter.

2. PVC Ball Valves for Anti-Scalant, Sodium Hydroxide, Hydrofluosilicic Acid, Phosphate Inhibitor and Ammonia:

a. The ball valves shall be manufactured with Teflon seats.

b. Seals shall be EPDM except for use with Hydrofluosilicic Acid and chlorine service which shall be Viton.

c. The valves shall be provided with double unions and a ball blocking feature.

d. The operator type shall be a manually operated ABS lever handle.

e. PVC ball valves shall be manufactured by Plast-O-Matic, Asahi/America, Hayward, or an approved equal.

3. PVC Ball Valves Used with Halar (ECTFE) Sulfuric Acid Piping Systems:

a. The ball valves shall be of the diaphragm type manufactured of Halar with Teflon seats and diaphragm material.

b. The valve shall be flanged and provide a bubble-tight closure at the operating pressure and temperature.

c. The operator type shall be a manually operated ABS lever handle.

d. PVC ball valves shall be manufactured by Plast-O-Matic, Asahi/America, Hayward, or an approved equal.

4. PVC Ball Valves Used with Teflon-Lined Carbon Steel Sulfuric Acid Piping Systems:

a. The ball valves shall be of the plug type manufactured of a carbon steel body with a solid one-piece Teflon PFA lining and a Teflon PFA encapsulated plug. The Teflon lining shall line all wetted surfaces and the flange faces. The valve shall provide in-line reseating of the plug. The exterior body shall have a factory applied chemically resistant coating that is resistant to sulfuric acid. The valve shall be flanged.

b. The valve shall be flanged and provide a bubble-tight closure at the operating pressure and temperature.

c. The operator type shall be a manually operated ABS lever handle.

d. PVC ball valves shall be manufactured by Flowserv, Mueller Chem-Plug, Richter or approved equal.

5. PVC Ball Valves for Bulk Sodium Hypochlorite:

a. The ball valves shall be manufactured of Grade I, Type 1 PVC and shall be of the true union design with a two-way blocking capability.

b. All O-rings shall be Viton with Teflon seats. Teflon seats shall have an elastomeric backing cushion of the same material as the valve seals.

c. The stem shall have double O-rings and be of the blowout-proof design.

d. The addition of a 1/8-inch vent hole drilled and deburred by the manufacturer is required (relief orifice to prevent the build-up of pressure from chemical trapped within the valve). The valve shall be installed with the vent hole on the upstream side of the system to keep the cavity of the ball fluidized.

e. The valve handle shall double as carrier removal and/or tightening tool.

f. The operator type shall be a manually operated ABS lever handle or an electric motorized operator where identified on the Contract Drawings.

g. PVC ball valves shall be manufactured by Asahi/America DuoBloc-21 or an approved equal.

6. Standard PVC Ball Valves for Water and Reclaimed Water Service:

a. All PVC ball valves ½-inch through 4-inch in size shall be of one-piece capsule type manufactured of Type 1, Grade 1 PVC.

b. Ball valves shall be true union design with two-way blocking capability and shall have solvent welded socket or NPT threaded ends.

c. Ball valves shall have Teflon seats with Viton backing cushions and Viton O-ring seals, and shall be designed for a 150-psi water working pressure at 120°F.

d. Manually operated valves shall be supplied with ABS lever operating handles. Motorized ball valves shall be equipped with an electric actuator as specified hereinafter.

e. PVC ball valves shall be manufactured by Plast-O-Matic, Asahi/America, Hayward, or an approved equal.

B. Stainless Steel Ball Valves

1. Stainless steel ball valves shall be of the standard port type with flanged connections for the sizes indicated on the Contract Drawings or specified herein.

2. Stainless Steel ball valves shall be designed for a working pressure of 200 psi with positive shut off when in the closed position.

3. The valve shall be a one (1) piece, Grade CF-8M, Type 316 stainless steel body, ANSI B16 with a solid Type 316 stainless steel ball and stem.

4. The seats and seals shall be Teflon.

5. The ball shall have a full-bore port design machined from a solid metal piece with highly polished surfaces.

6. Manually operated ball valves shall be furnished with level operators manufactured of forged Type 316 stainless steel with a molded vinyl sleeve.

7. Stainless steel ball valves shall be manufactured by KTM, DeZurik, Neles-Jamesbury, or an approved equal.

C. Electric Actuator for PVC Ball Valves

1. Where indicated on the Contract Drawings, PVC ball valves shall be provided with an electric actuator. The actuator shall be matched to the valve and shall have sufficient operating torque to operate the valve for its maximum expected breakaway torque.

2. The actuator shall be capable of full 90° actuation within ten (10) seconds. The actuator shall be UL listed and suitable for 120-volt AC, 60 Hz, one-phase electric power, and shall be provided with a corrosion-resistant, NEMA 4 enclosure.

3. The valve actuator shall be provided with a manual operator override which is disengageable such that the valve cannot be operated electrically while the manual override is engaged.

4. The actuator shall be furnished with a high torque, reversible, brushless, capacitor run, heavy duty motor with built-in motor overload protection, and gears and shafts shall be heat treated, high allow steel.

5. The unit shall be permanently lubricated and travel limit switches shall be independently adjustable. The actuator shall be provided with an integral electrical terminal strip, position indicator, over-torque protection, and travel limit switches for position light operation.

6. The valve actuator enclosure shall be provided with a combination heater and thermostat to maintain the case interior above 40°F.

7. Two additional limit switches shall be provided to energize and de-energize a pump interlocked with the valve.

2.6 Diaphragm Valves

A. Diaphragm Valves for Anti-Scalant, Sodium Hydroxide, Hydrofluosilicic Acid, Phosphate Inhibitor and Ammonia

1. The diaphragm valves shall be constructed on Type I, Grade I PVC with Teflon seats.

2. The diaphragm shall be EPDM except for use with Hydrofluosilicic Acid and chlorine service which shall be Viton.

3. The valve shall be provided with double unions and a bubble-tight closure at the operating pressure and temperature.

4. Diaphragm valves shall be manufactured by Asahi/America, Simtech, or an approved equal.

B. Diaphragm Valves Used with Halar (ECTFE) Sulfuric Acid Piping Systems

1. The diaphragm valves shall be constructed of Halar with Teflon seats.

2. The diaphragm material shall be teflon.

3. The valve shall be flanged and provide a bubble-tight closure at the operating pressure and temperature.

4. The diaphragm valves shall be manufactured by Asahi/America, or an approved equal.

C. Diaphragm Valves for Bulk Sodium Hypochlorite

1. The diaphragm valves shall be manufactured of Grade I, Type 4 PVC with Teflon seats for use with twenty percent (20%) bulk sodium hypochlorite.

2. Diaphragms shall be PTFE and shall accept the installation of a PVDF gas barrier between the layers of EPDM and PTFE.

3. The valve shall be flanged and provide a bubble-tight closure at the operating pressure and temperature.

4. The valves shall come standard with a position indicator, travel stop, and bonnet O- ring sealing arrangement.

5. The operator shall be a handwheel with capped indicator stem.

D. Bronze Angle Hose Valves

1. Angle-type hose valves, less than two (2) inches in size, shall have a brass or bronze body (ASTM B-62 or ASTM B-584, Alloy C83600) with rising or non- rising stem, composition disc, and bronze or malleable iron handwheel.

2. The stem shall be bronze, ASTM B-62, ASTM B-584 (Alloy 83600), or ASTM B-198 (Alloy 87600).

3. The valve shall have a cold-water service pressure rating of 150 psi.

4. Provide a cap and chain with the valve.

5. Threads on the valve outlet shall be American National Standard fire hose coupling screw thread.

6. Valves shall be Nibco T-301-HC, Powell Figure 151 with Figure 527 nipple adapter, Crane 17TF with hose nipple adapter, or approved equal.

E. Bronze Hose Bibbs

1. Hose bibbs of size ½-inch, ¾-inch and 1-inch shall be all bronze (ASTM B-62 or ASTM B-584, Alloy C83600) with rising or non-rising stem, composition disc, and bronze or malleable iron handwheel.

2. The stem shall be bronze, ASTM B-99, Alloy 651; ASTM B-371, Alloy C69400; or ASTM B-584, Alloy 87600. The packing shall be Teflon or graphite.

3. The valve shall have a cold-water service pressure rating of 150 psi.

4. Provide a cap and chain with the valve.

5. Threads on the valve outlet shall be American National Standard fire hose coupling screw thread (ANSI B1.20.7).

6. Provide a vacuum breaker approved by the State of Florida Health Department on each hose bibb.

7. Valves shall be Jenkins Figure 112, 113 or 372; Nibco T-113-HC; Powell Figure 503H, or approved equal.

F. Electric Actuator for Diaphragm Valves

1. Where indicated on the Contract Drawings, diaphragm valves shall be provided with an electric actuator. The actuator shall be matched to the valve and shall have sufficient operating torque to operate the valve for its maximum expected breakaway torque.

2. The actuator shall be capable of full 90° actuation within ten (10) seconds. The actuator shall be UL listed and suitable for 120-volt AC, 60 Hz, one-phase electric power, and shall be provided with a corrosion-resistant, NEMA 4 enclosure.

3. The valve actuator shall be provided with a manual operator override which is disengageable such that the valve cannot be operated electrically while the manual override is engaged.

4. The actuator shall be furnished with a high torque, reversible, brushless, capacitor run, heavy duty motor with built-in motor overload protection, and gears and shafts shall be heat treated, high allow steel.

5. The unit shall be permanently lubricated and travel limit switches shall be

independently adjustable. The actuator shall be provided with an integral electrical terminal strip, position indicator, over-torque protection, and travel limit switches for position light operation.

6. The valve actuator enclosure shall be provided with a combination heater and thermostat to maintain the case interior above 40°F.

7. Two additional limit switches shall be provided to energize and de-energize a pump interlocked with the valve.

2.7 Plug Valves

A. General

1. Plug valves shall be of the non-lubricated eccentric type for use in wastewater service with flanged or mechanical joint ends as specified herein. Valves shall open by turning to the left (counter-clockwise), when viewed from the stem. The port area of the valves shall be rectangular with a minimum of eighty percent (80%) of the full pipe area. The valves shall be capable of providing a drip-tight shutoff to the full valve rating with the pressure in either direction.

2. Plug valves shall be tested in accordance with AWWA C-517 – latest edition. Each valve shall be performance tested in accordance with AWWA requirements and shall be given a leakage test and hydrostatic test. The leakage test shall be applied to the face of the plug tending to unseat the valve. The leakage test shall be performed at the valve rating pressure as specified herein. The manufacturer shall furnish certified copies of the reports covering proof of design testing.

3. All interior ferrous surfaces of the valve that will come into contact with the wastewater shall be coated with a factory applied, thermally bonded epoxy coating in accordance with AWWA C-550, latest revision. Surfaces shall be clean, dry and free from rust, oil and grease before coating. Exterior surfaces shall be coated as specified hereinafter.

4. Valve Joints:

   a. All plug valves installed above-ground, in valve vaults or on flange piping shall have flanged ends. Flanges shall comply with facing, drilling and thickness requirements of the ANSI Standards for Class 125 dimensions.

   b. Nuts and bolts for flanged connections in valve vaults or corrosive environments shall be Type 304 stainless steel in accordance with ASTM A-320, Class 2.

   c. Nuts and bolts for above-ground installations or non-corrosive atmospheres shall be Type 304 stainless steel in accordance with ASTM A-320, Class 2.

d. All buried plug valves shall have mechanical joint ends with dimensions, bolting patterns and assembly in strict accordance with ANSI/AWWA C- 111, latest revision.

e. Tee head bolts and nuts for mechanical joints shall be manufactured of CORTEN-A, high strength, low alloy, corrosion resistant steel as manufactured by NSS Industries, or an approved equal.

f. Plug valves four (4) inch in size and larger buried underground, and all plug valves six (6) inch in size and larger installed above-ground, buried or in valve vaults shall be furnished with mechanical gear actuators. Gear actuators shall be furnished with AWWA Standard 2-inch square operating nuts for buried valves, or handwheel, chainwheel or 2-inch square nut operators for above- ground or valve vault installation, as shown on the Contract Drawings. The gear actuator shall be sized for the maximum pressure differential across the valve, equal to the pressure rating of the valve. All gearing shall be enclosed in a high strength cast iron housing, suitable for running in a lubricant.

B. Prior to shipment from the factory, each valve shall be hydrostatically tested as follows. Valve seats shall be tested to provide leak tight shut off to 175 psi for valves through 12-inch and 150 psi for valves 14 inches and larger, with pressure in either direction. In addition, a hydrostatic shell test shall be performed with the plug open to a pressure twice that of rating specified above to demonstrate overall pressure integrity of the valve body.

C. Plug valves shall be eccentric plug valves as manufactured by DeZurik, Henry- Pratt Co., or approved equal.

D. Eccentric Plug Valves

1. Valve bodies and cover shall be constructed of high strength cast iron conforming to ASTM A126, Class B and AWWA C517, latest revisions. Valve bodies shall be cast with raised eccentric seats which have a corrosion-resistant welded-in overlay of not less than ninety percent (90%) pure nickel on all surfaces contacting the plug face. Valve seats shall be in accordance with AWWA C517, latest revisions.

2. Valves shall be furnished with resilient faced plugs with neoprene facing, suitable for use with wastewater or sludge. Valves shall be furnished with replaceable, permanently lubricated, stainless steel sleeve-type bearings in the upper and lower plug stem journals. Plug stem bearings shall comply with AWWA C517, latest revisions.

3. The valves shall be of the bolted bonnet design with shaft seals designed so that they can be repackaged without removing the bonnet or gear operator and the packing shall be adjustable. Packing material shall be Buna-Vee type packing. Valve shaft seals shall be in accordance with AWWA C517, latest revisions.

4. All exposed valve nuts, bolts, springs, washers, and the like shall be Type 304 stainless steel.

5. Eccentric plug valves shall be as manufactured by DeZurik, Henry-Pratt Co., or approved equal.

E. Interior and Exterior coatings shall be in accordance with Article 2.2.

F. Pressure Rating for the valves shall be in accordance with ANSI B16.1-1967 and shall be as follows:

Pipe Size (inches)	Pressure Rating (psi)
< 12	175
> 14	150

2.8 Check Valves

A. Slanting Disc Check Valves with Bottom Mounted Oil Dashpot

1. Slanting disc check valves shall conform to AWWA specifications and shall be designed for a minimum water working pressure of 150 psi. Check valves shall have a cast iron body and the ends shall be flanged, Class 125 in accordance with ANSI B16.1. The disc shall be manufactured of ductile iron, ASTM B-584, C83600. The seat ring and disc ring shall be manufactured of bronze, ASTM B- 271, C92200, and must be of the design that permits replaceability in the field without need for special tools or machining. The pivot pin(s) in the body and the bushings in the disc lugs shall be stainless steel, but of different hardness to prevent galling and must conform to ASTM specifications A-582 T303 and A- 269 T304, respectively. Shafts shall also be manufactured of stainless steel.

2. The flow area, through the valve body inlet and outlet, shall be equal to the pipe size, and gradually increased to an area forty percent (40%) greater than the pipe size through the valve seat. Inspection ports shall be provided upstream and downstream of the valve disc.

3. Check valves shall be supplied with an outside indicator that visually shows the disc position at all times. An electrical signal switch shall be provided with each valve which can be mounted on the indicator cover to give a remote signal indicating whether the valve is opened or closed.

4. The check valves shall be oil cushioned with a bottom-mounted dash such that it opens smoothly on pump start-up and closes at a controlled rate of speed following pump shut-down. The cushioning device shall control the valve closure by way of the interchange of oil to and from the oil reservoir. The use of an air or gas pressurized oil reservoir shall not be permitted. On start-up of the pump, the check valve disc shall open in response to the flow and then afford the minimum resistance to the flow. Upon pump shut-down, the valves shall initiate with an adjustable closing speed.

5. Check valves shall absolutely prevent the return of water back through the valve when the inlet pressure decreases below the downstream pressure. The check valve shall be constructed such that the disc and body seat ring may be easily removed and replaced without removing the valve from the line.

6. Each valve shall be hydrostatically tested at the factory, at a test pressure of 300 psi.

7. All check valves provided shall have an external valve position indicator to indicate whether the valve is opened, closed, or partially closed.

8. Interior Valve Coating:

    a. Prior to shipment from the factory, the interior ferrous surfaces of the valve, except for finished, non-ferrous or bearing surfaces, shall be coated with a fusion bonded or thermosetting epoxy coating in accordance with AWWA C- 550, latest revision.

    b. The coating shall be holiday-free, NSF approved, with a minimum thickness of sixteen (16) mils. Surfaces shall be clean, dry and free from rust and grease before coating.

9. Exterior Valve Coating:

    a. All exterior surfaces of the check valves shall be clean, dry and free from rust and grease before coating. Exterior ferrous parts of all valves shall be shop primed at the factory with one (1) coat, a minimum dry film thickness of four (4) miles, of a lead and chromate-free primer with rust inhibitive pigments and synthetic resins. The primer shall be suitable for the finish paint specified.

    b. Following installation, above ground valves, and those in vaults shall be finish painted in accordance with Section 09900, “Painting”.

B. Swing Check Valves Three inches and Larger

1. Swing check valves three (3) inches and larger shall be a cast iron body valve with bronze seat ring and bronze clapper or cast-iron clapper with a bronze disc ring and of the “non-shock” type. Swing check valves shall be designed and manufactured in accordance with AWWA C-508, and shall be suitable for use on the appropriate line type (water, wastewater, reclaimed water, etc.).

2. Check valves ends shall be flanged, Class 125 in accordance with ANSI B16.1.

3. Swing check valves shall be completely bronze fitted with a renewable bronze seat ring and a rubber faced disc.

4. All bronze clapper or internal parts shall be capable of being removed from

the valve by removing the cover. Valves shall incorporate an external lever and weight unless otherwise indicated on the Contract Drawings. Valves shall be modified for installation in a vertical line with the flow up.

5. All check valves provided shall have an external valve position indicator to indicate whether the valve is opened, closed, or partially closed.

C. Globe Style Silent Check Valves - Raw Water Service

1. Globe style silent check valves shall be designed for a minimum of 150 psi working pressure and shall have a Type 60-45-10 ductile iron body with ANSI CL-150 flanged end connections. The flow area through the body shall be equal to or greater than the cross-sectional area of the pipe.

2. The valve plug and seat shall be manufactured of ASTM B-584 bronze with a BUNA-N resilient seat option. The valve plug must be centered guided at both ends with a through integral shaft and spring loaded for guaranteed silent shut-off operation. The seat and plug shall be hand replaceable in the field for ease of maintenance.

3. The spring shall be helical or conical and manufactured of Type 316 stainless steel.

4. All interior ferrous surfaces, except for finished or bearings surfaces, shall be coated with three coats, fifteen (15) mils DFT Tnemec Series 20 Interior Lining. Interior coating shall be suitable for preventing corrosion to the body from the brackish water containing up to 2,600 ppm TDS, 1200 ppm chloride and 4 ppm hydrogen sulfide flowing through the valve. The exterior of the valve shall be factory primed with a prime compatible with the finish coating specified in Section 09900, “Painting”.

D. Diaphragm Check Valves for Anti-Scalant, Sodium Hydroxide, Hydrofluosilicic Acid, Phosphate Inhibitor and Chlorine Solution

1. The diaphragm check valves shall be constructed on Type I, Grade 1 PVC with Viton diaphragms.

2. The diaphragm check valve shall utilize a normally closed design which is entirely automatic in action and shall be provided with double true unions.

3. The check valve must operate effectively in any position it is installed in.

4. The diaphragm check valve shall be designed for a minimum water working pressure of 150 psi.

E. Diaphragm Check Valves Used in Low Pressure Sulfuric Acid Piping Systems

1. The diaphragm check valves shall be constructed with a PVDF housing.

2. The diaphragm material shall be Viton.

3. The check valve must operate effectively in any position it is installed in.

4. The diaphragm check valve shall be designed for a minimum water working pressure of 150 psi.

F. Lined Ball Check Valves Used in High Pressure Sulfuric Acid Piping Systems

1. The following type of check valve shall be used with Teflon lined carbon steel piping for high pressure sulfuric acid piping systems.

2. The valve shall be a Teflon PFA lined ball check valve and shall have a ductile iron body with flanges and shall be capable of being used in either the horizontal or vertical position. The Teflon lining shall line all wetted surfaces and the flanged faces. The ball shall be fabricated of PTFE. The exterior body shall have a factory applied chemically resistant coating that is resistant to sulfuric acid.

3. The check valve must operate effectively in any position it is installed in.

4. The diaphragm check valve shall be designed for a minimum working pressure of 150 psi.

G. Diaphragm Check Valves for Low Pressure Ammonia Gas

1. The diaphragm check valves shall be constructed on Type I, Grade 1 PVC with BUNA-N diaphragms.

2. The diaphragm check valve shall utilize a normally closed design which is entirely automatic in action.

3. The check valve must operate effectively in any position it is installed in.

4. The diaphragm check valve shall be designed for a minimum water working pressure of 150 psi.

H. Tru-union Ball Check Valves for Sodium Hydroxide

1. The diaphragm valves shall be manufactured of Grade I, Type 1 PVC with Viton seats.

2. The ball check valve shall utilize a normally closed design which is entirely automatic in action.

3. The check valve must operate effectively in any position it is installed in and shall be provided with double true unions.

4. The diaphragm check valve shall be designed for a minimum water working pressure of 150 psi.

I. Double-Door Check Valves for Permeate and Concentrate

1. The double-door check valves shall be manufactured of Grade I, Type 1 PVC with Viton seals.

2. The ball check valve shall utilize a normally closed design which is entirely automatic in action. The check valve must operate effectively in any position it is installed in.

3. The diaphragm check valve shall be designed for a minimum water working pressure of 150 psi.

J. Swing Check Valves for Permeate, Cleaning Solution and Scrubber Recirculation Water

1. The swing check valves shall be manufactured of polypropylene conforming to ASTM D-4101 cell classification PP0210B67272 with EPDM seats and seals.

2. The valves shall incorporate a single disc design suitable for either horizontal or vertical installation with equal effectiveness.

3. The valves shall be of the top entry bonnet type design for maintenance purposes. The diaphragm check valve shall be designed for a minimum working pressure of 150 psi.

K. Bronze Angle Hose Valves

1. Angle-type hose valves, less than two (2) inches in size, shall have a brass or bronze body (ASTM B-62 or ASTM B-584, Alloy C83600) with rising or non-rising stem, composition disc, and bronze or malleable iron handwheel.

2. The stem shall be bronze, ASTM B-62, ASTM B-584 (Alloy 83600), or ASTM B-198 (Alloy 87600).

3. The valve shall have a cold-water service pressure rating of 150 psi.

4. Provide a cap and chain with the valve.

5. Threads on the valve outlet shall be American National Standard fire hose coupling screw thread.

2.9 Pressure Relief Valves (PRV's)

A. PRV's for Sodium Hypochlorite Use

1. Pressure relief valves shall be of the in-line pattern design and manufactured of Grade 1, Type 1 PVC with Viton seals.

2. The valve shall be provided with threaded end connections.

3. The operator shall be of the “adjusting screw” type.

4. The valve shall be rated for a pressure of 100 psi.

B. PRV’s for Sodium Hydroxide Use

1. Pressure relief valves shall be of the in-line pattern design and manufactured of Grade 1, Type 1 PVC with EPDM seals.

2. The valve shall be provided with threaded end connections.

3. The operator shall be of the “adjusting screw” type.

4. The valve shall be rated for a pressure of 100 psi.

C. PRV’s for Sulfuric Acid Use

1. Pressure relief valves shall be of the angle or in-line pattern design and manufactured of Teflon with a Teflon shaft and Viton seals.

2. The valve shall be provided with threaded end connections.

3. The operator shall be of the “adjusting screw” type.

4. The valve shall be rated for a pressure of 100 psi.

D. PRV’s for Antiscalant, Hydrofluosilicic Acid and Phosphate Inhibitor Use

1. Pressure relief valves shall be of the angle pattern design and manufactured of Grade 1, Type 4 CPVC with Teflon shaft and Viton seals.

2. The valve shall be provided with threaded end connections.

3. The operator shall be of the “adjusting screw” type.

4. The valve shall be rated for a pressure of 100 psi.

2.10 Backpressure Sustaining Valves

A. The backpressure sustaining valve(s) shall throttle to maintain a pre-set pressure on the upstream side of a valve. If upstream pressure drops below the valve setting, the valve will close. Turning clockwise on the sustaining pilot handwheel will increase the setting and turning clockwise will decrease the setting. The backpressure valve shall be of the in-line pattern design and manufactured of

Teflon with Teflon wetted diaphragm, zinc plated steel spring, and HDPE adjusting screw. The valve shall be supplied with all Type 316 stainless steel fasteners.

B. The operator shall be of the “adjusting screw” type.

C. The valve shall be rated for a pressure of 150 psi.

D. The valve shall be provided for use with sulfuric acid.

2.11 Isolation Valves

A. Isolation valves shall be provided for the following services: water, sulfuric acid, anti- scalant, hydrofluosilicic acid, sodium hydroxide, ammonia gas, sodium hypochlorite and phosphate inhibitor.

B. The isolation valves shall be of the ball type. Materials of construction of the valve body shall be compatible with the type of service, as indicated above, and as shown on the Contract Drawings.

C. Valves shall be of the threaded, flanged, socket, plain, union or grooved ends as required by the Contractor.

D. The operator shall be of the “handle” type compatible with the type of service.

E. The valve shall be rated for an operating pressure of 150 psi.

2.12 Solenoid Valves

A. Potable Water Service

1. The solenoid valve shall be normally closed and shall be equipped with a manual override operator. The valve shall be of the general-purpose type and shall be fabricated with a body and trim of stainless steel.

2. The operator shall be of the solenoid type rated for 120 V service.

3. The valve shall be rated for an operating pressure of 150 psi.

B. Ammonia Gas

1. The solenoid valve shall be normally closed and shall be equipped with a manual override operator. The valve shall be of the stainless-steel body and trim type. The solenoid valve shall be explosion proof, waterproof, and shall met NEMA 7 enclosure requirements.

2. The operator shall be of the solenoid type rated for 120 V service.

3. The valve shall be rated for an operating pressure of 150 psi.

2.13 Pinch Valves

A. Valves are to be of the full cast metal body, mechanical pinch type with flange joint ends on both the body and the sleeve trim. The valve shall have face-to-face dimensions of standard gate valves, in accordance with ANSI B16.10 up to 12" size. The flanges shall be drilled to mate with ANSI B16.1, Class 125 flanges. The valve body halves are to be sealed with an elastomer sheet gasket cut to fit the contour of the valve body. Body shall be epoxy coated for additional corrosion protection.

B. The sleeve trim shall be one piece construction with integral flanges drilled to be retained by the flange bolts. The sleeve trim shall be reinforced with calendared nylon or calendared polyester fabric to match service conditions. The sleeve trim shall be connected to the pinch bar by tabs imbedded in the sleeve trim- reinforcing ply. All internal valve metal parts are to be completely isolated from the process fluid by the sleeve trim.

C. For full port and reduced port sleeves, the port areas shall be 100% of the full pipe area at the valve ends.

D. The steel mechanism shall be double acting with pinching of the sleeve trim occurring equally from two sides. ACME threads shall be used on all valve mechanisms. There shall be no cast parts in the operating mechanism.

E. A torque tube shall be fitted to the body of the valve via a mounting plate. The tube shall extend from the valve to above grade level, providing protection for the operating stem and sealing the opening in the top body half. Valve shall be operated by turning a non- rising stem, contained within the torque tube, and connected to the pinch mechanism. Bevel gear operators shall be provided on all valves over 8" size, and on smaller sizes as specified on the purchase order. Torque tube shall be epoxy coated for additional corrosion protection.

F. The handwheel shall be constructed of welded, tubular steel and be connected to the bevel gear operator by means of a single retaining bolt. The handwheel shall be fitted with a lubrication fitting to allow lubrication of the stem.

G. Valves shall be of the Series 75-B as manufactured by Red Valve Company, or approved equal.

H. Manufacturer's authorized representative shall be available for customer service during installation and start-up, and to train personnel in the operation, maintenance and troubleshooting of the valve.

2.14 Electric Motor Operated Pinch Valves

A. Valves shall be two (2) inches of the full cast metal body, mechanical pinch type with flange joint ends. The valve length shall be a given in ISA S75.08. The flanges shall be drilled and tapped to mate with ANSI B16.1, Class 125/ ANSI B16.5, Class 150 flanges.

B. The sleeve trim shall be one piece construction with integral flanges drilled to be retained by the flange bolts. The sleeve trim shall be reinforced pure gum rubber. The sleeve trim shall be connected to the pinch bar by tabs imbedded in the sleeve trim reinforcing ply. All internal valve metal parts are to be completely isolated from the process fluid by the sleeve trim. For full port and reduced port sleeves the port areas shall be one hundred percent (100%) of the full pipe area at the valve ends.

C. The solid steel pinch mechanism shall be single acting, closing the sleeve from the top only. The mechanism shall be supported in the valve body. There shall be no cast parts in the operating mechanism. The mechanism shall be connected to the electrically actuated actuator through an ACME threaded stem. The electric motor shall be as specified. The pinch mechanism shall be adjustable for stroke without removing the valve from the line. The valve shall be manufactured in the USA.

D. The electrically actuated control valve actuator shall be an “on/off” actuator. The actuator shall have a bronze operating nut, NEMA 4 enclosure, Class 5 insulation, with two (2) year train limit switches, two (2) torque switches, manual handwheel override, reversing starters, and a transformer. The actuator shall also have three (3) push-button control switches (O/S/C), a selector switch (L/O/R), and a mechanical dial position indicator (MDPI). The actuator shall be manufactured by Limitorque, Rotork, or an approved equal.

E. An electric motor rotates a threaded nut, pushing a threaded stem into the valve body, pinching the sleeve closed. Reversing the direction of the electric motor pulls the stem out of the valve body, opening the sleeve.

2.15 Telescoping Valves

A. “Flared Style”, stainless steel telescoping valves, shall be provided where indicated on the Contract Drawings. The valve tube shall be designed to travel inside a riser pipe.

B. The stainless-steel tube, twelve (12) inches in diameter shall be manufactured of Type 304 stainless steel seamless pipe or tube. The tube length shall be of sufficient length to facilitate valve travel and maintain an appropriate insert depth. Valve tubes are to be a minimum 1/8-inch thick and are attached to connecting stems by use of a lifting ball.

C. A stainless-steel companion flange and neoprene slip seal gasket shall be provided by the valve manufacturer. The gasket shall have a minimum thickness of ¼-inch. The inside diameter of the gasket is to be 1/8-inch smaller than the outside diameter of thevalve tube to provide a friction seal. The gasket is to be sandwiched between the riser pipe flange and the companion flange. The gasket and companion flange shall include a 125 lb. standard drilling pattern to match the riser pipe.

D. The lift bail shall be of the same material as the tube and be rigidly welded to the tube.

E. Lifts (Non-Rising Stem) shall be of the ball bearing supported handwheel type with dial position indicator, mounted to a fabricated galvanized steel non-rising stem pedestal. The pedestal shall be manufactured with a square, main vertical member and a telescoping type torque tube. The torque tube must incorporate a square thrust pocket at the top to house a square thrust nut, to prevent rotation of the valve tube assembly. The bottom of the torque tube shall be attached to the lifting bail with Type 304 stainless steel anchor bolts and nuts.

F. Handwheels shall be a minimum of twelve (12) inches in diameter and shall include a clear plastic butyrate stem cover with a mylar strip type position indicator, calibrated in
¼-inch increments to illustrate the valve position. The mylar strip, provided by the manufacturer, shall be affixed by the Contractor.

G. Cleaning and shop priming coating shall be provided on all ferrous materials by the manufacturer.

2.16 Air Release Valves

A. Clean Water Air Release Valves

1. Small Valves:

a. Valves ¾-inch and smaller shall be of the simple-lever type with a cast iron body, ASTM A48, Class 35, Type 316 stainless steel trim, and Viton orifice button. Valves shall have a working pressure rating of at least 150 psi.

b. Valves shall be shall be properly sized for the proposed application and of the proper materials of construction for the intended service (water, etc.) and shall be a product manufactured by APCO, Valmatic, or approved equal.

2. Large Valves:

a. Valves one (1) inch or larger shall have a heavy-duty compound lever operating mechanism with Type 316 stainless steel pivot pins and Type 316 stainless steel retaining rings.

b. Valves shall be constructed of cast iron, ASTM A48, Class 35 with Type 316 stainless steel trim and float. Valves shall have an adjustable orifice button, constructed of Type 316 stainless steel with viton or Buna-N seating.

c. Provide ½-inch threaded outlet and stainless-steel plug for the top cover and body drain. Valves shall have a working pressure rating of at least 300 psi.

d. Valves shall be shall be properly sized for the proposed application and of the proper materials of construction for the intended service (water, etc.) and shall be a product manufactured by APCO, Valmatic, or approved equal.

B. Wastewater and Reclaimed Water Air Release Valves

1. Air release valves for wastewater service shall be of the long stem and body type designed to keep the valve operating mechanism as free from contact with the wastewater as possible.

2. Valves shall have a two (2) inch threaded inlet, with a one (1) inch blow- off connection with a one (1) inch blow-off valve (gate valve), ½-inch back- flushing attachments with a ½-inch outlet. The outlet and back flushing connections shall be quick couplings. The valve shall have a minimum orifice diameter of $^{5}/_{16}$-inch.

3. Valves shall be shall be properly sized for the proposed application and of the proper materials of construction for the intended service (wastewater, reclaimed water, etc.) and shall be a product manufactured by APCO, Valmatic, or approved equal.

4. Valves shall be constructed of cast iron, ASTM A48, Class 35 with Type 316 stainless steel trim, lever pins and float.

5. Valves shall have a working pressure rating of at least 150 psi.

C. Air and Vacuum Wastewater/Reclaimed Water Valves

1. Air and vacuum valves for wastewater service shall be of the long stem and body type designed to keep the valve operating mechanism as free from contact with the wastewater as possible.

2. Valves shall have a two (2) inch threaded inlet, with a one (1) inch blow- off connection with a one (1) inch blow-off valve (gate valve), ½-inch back- flushing attachments with a ½-inch outlet. The outlet and back flushing connections shall be quick couplings. The valve shall have a minimum orifice diameter of one (1) inch. The valves on the discharge piping of pumping stations shall have the orifice sized as required to expel air on pump starting.

3. Valves shall be shall be properly sized for the proposed application and of the proper materials of construction for the intended service (wastewater, reclaimed water, etc.) and shall be a product manufactured by APCO, Valmatic, or approved equal.

4. The valve body shall be constructed of cast iron, ASTM A48, Class 35. The valve and float shall be Type 316 stainless steel. Valves shall have a working pressure rating of at least 150 psi.

D. Valve End Connections

1. Valves smaller than three (3) inches shall have threaded ends. Valves four (4) inches and larger shall have flanged ends.

2. Flanges for Class 150 valves shall comply with ANSI B 16.1, Class 125.

3. Flanges for Class 300 valves shall comply with ANSI B16.1, Class 250.

4. Threaded ends shall comply with ANSI B2.1.

E. All air release and vacuum relief valves shall be isolated from the service line with a Type 316 stainless steel gate valve for valves up to 3-inches, and a flanged body butterfly valve for valves greater than three (3) inches (provide a spacer plate if required to clear the rotation of the butterfly disc).

2.17 Surge Anticipating Control Valve

A. Main Valve

1. The main valve shall be a center guided diaphragm actuated globe valve of either oblique (Y) or angle pattern design. The body and cover shall be ductile iron, A-536, with stainless steel seat. The internal and external surfaces of the valve body shall be fusion bonded coated. End connections shall meet the ANSI, ISO, DIN, JIS, or other internally recognized standards as required.

2. The body shall have a replaceable non-threaded seat ring that is held in place by set screws which tighten into a body groove. This seat should be accessible and serviceable without removing the valve from the pipeline. The seat area shall have a flow opening without stem guides, bearings, or supporting ribs.

B. Actuator

1. The actuator assembly shall be a double chamber design with a separating partition between the lower surface of the diaphragm and the main valve. The entire actuator assembly consisting of a seal disk, valve shaft, bearing, diaphragm assembly, separating partition, and top cover must be removable from the valve as a single unit.

2. The control chamber between the diaphragm and the separation partition shall be capable of being open to or isolated from the valve internal body pressure. The stainless-steel valve shaft shall be guided throughout its travel by a bearing in the separating partition. The replaceable resilient seal shall be rectangular in cross section and contained on three- and one-half sides. A lift shall be provided on the seal disc outside edge to lock the seal in place.

3. The actuator assembly must be capable of accepting a V-port throttling plug by simply bolting the device to the seal disk.

C. Control System

1. The high- and low- pressure relief pilots shall be direct acting, adjustable, spring-loaded diaphragm actuated valves. The high-pressure pilot shall have a built-in needle valve to adjust the main valve closing speed.

2. The body and cover of the pilot valves shall be of brass or bronze construction with stainless steel trim and resilient seal. The main valve shall be equipped with either a mechanical or hydraulic flow limiting device.

3. Liquid to the pilots must be filtered and cock valves must be provided to isolate the control loop.

D. Quality Assurance

1. The main valve, pilots, control tubing, filter, and isolation valves shall be factory assembled and tested. 'the valve shall be NSF 61 approved.

2. The valve manufacturer must be completely certified to the ISO 9002 Quality Assurance Standard.

2.18 Reduced Pressure Backflow Preventer (RPBP)

A. Potable Water Service

1. Reduced pressure backflow preventers for potable water service shall meet the requirements of AWWA C-511.

B. Concentrate Service

1. The reduced pressure principle backflow preventor shall consist of two independently operating, spring loaded patented cartridge checks with a hydraulically operated differential pressure relief valve located between and below the cartridge checks, required test cocks and butterfly type at inlet and outlet shut off valves. When normal flow exists, both check valves are open and pressure in the area between the check valves is at least 2 psi lower that the inlet pressure. The differential pressure relief valve is closed during normal flow. If cessation of normal flow occurs, the differential pressure relief valve will automatically open and discharge to maintain a 2 psi pressure lower than the inlet pressure. The differential pressure relief valve is closed during normal flow conditions.

2. If normal flow is interrupted the differential pressure relief valve will automatically open and discharge to maintain the zone at least 2 psi lower than the inlet pressure. This action will prevent a back flow or back siphonage condition. After the required differential is established the differential pressure relief valve closes automatically.

3. The body, check valves, springs and cam-arms shall be composed of Type 316 stainless steel. The cam-checks shall have rubber faced disks and replaceable seats.

4. The relief valve shall be mounted under the body of the check body and shall have an external relief sensing line. The relief valve shall be a balanced rolling

diaphragm with no sliding seals and will be able to be removed from the check body and be replaceable.

5. The RPBP shall be fully serviceable, in-line, without the use of specialized tools and shall include a single top bolted entry for inspection port for easy servicing of checks.

6. The RPBP shall be manufactured by Ames Inc., Model No. 400055 or approved equal.

2.19 Valve Operators

A. General

1. All operators shall be sized to operate the valve at the valve's full-rated pressure. Gear actuator shall be sized for the maximum pressure differential across the valve, equal to the pressure rating of the valve. All gearing shall be enclosed in a high- strength cast iron housing, suitable for running in a lubricant. Housing shall be provided with seals on all shafts to prevent the entry of dirt and water into the actuator. The actuator shaft and quadrant shall be supported on permanently lubricated bronze bearings. The actuator shall clearly indicate valve position for above-ground and valve vault installations and an adjustable stop shall be provided to set closing torque. The actuator shall be capable of withstanding an over-torque without damage up to 450 foot-pounds for two (2) inch square nut operators and to 300 foot-pounds for handwheel or chainwheel operators.

2. Valve operators, handwheels or levers shall open by turning counter- clockwise (CCW) and shall be constructed of non-corrosive materials.

3. Four (4) inch and smaller aboveground valves shall be furnished with manual actuators, one-quarter turn to open. The actuator shall be supplied with an AWWA Standard two (2) inch operating nut with a standard valve operating lever.

4. Exposed operators shall be furnished with chainwheel operators, geared operators, extension stems, floor stands, and other elements to permit operation from the normal operating level.

5. All valve stem extensions for buried valves shall be “pinned”.

B. Plug Valves

1. Unless otherwise noted, plug valves installed in valve vaults or buried underground shall have gear actuators with two (2) inch square nut designed for buried and submerged service. The valve shall have seals on all shafts and gaskets on valve and actuator covers to prevent entry of water and dirt. Actuator mounting brackets for buried or submerged service shall be totally enclosed

and shall have gasket seals. All exposed valve nuts, bolts, springs, washers, and the like shall be Type 304 stainless steel.

2. Unless otherwise noted, above-ground plug valves six (6) inches in size and larger shall be furnished with mechanical gear actuators furnished with handwheel, chainwheel, or two (2) inch square nut operators, as shown on the Contract Drawings.

C. Manual Operators

1. Manual operators include handwheel, chainwheel, lever and handle type operators. When the maximum force to operate a valve under full operating head exceeds forty (40) pounds, gear reduction operators shall be provided.

2. Lever Operator:

   a. Levers shall be fabricated of non-corrosive materials. They shall include a set screw and be grease lubricated.

   b. The operator shall be capable of being locked in any position and shall be provided with an adjustable memory stop.

3. Handwheel:

   a. Gate/valve operators shall be selected so that no more tha)n forty (40) pounds effort on the operator will be required to open or close a gate/valve. Gate/valve operators shall be located at a maximum height of forty-two (42) inches above the structure. When the normal yoke elevation is above 42- inches above structure, the geared lift shall be coupled to a ninety degree (90° bevel gear box by means of a floating shaft and lovejoy couplings. This gearbox shall be mounted on the edge of the self-contained yoke. All shafts and couplings shall be Type 304 stainless steel and aligned to acceptable coupling tolerance. All cast iron gearbox housings shall be epoxy coated in accordance with Section 09900, “Painting”, for corrosion protection.

   b. All operators shall be geared and shall have a weatherproof case iron housing or pedestal with a bronze operating nut. An effective gear ratio of at least 2:1 is required.

   c. The operator shall include a position indicator and self-locking feature to prevent the disc or plug from creeping.

   d. Gear operators shall be totally enclosed and lubricated. Operators shall be grease lubricated and provided with grease fittings.

   e. Handwheel operators supplied with floorstands and benchstands shall be self-locking at any position of stem travel. Cranks and handwheels shall be cast iron and hot dip galvanized after fabrication. Cranks shall be no less

than twelve (12) inches long and shall be keyed to the operating nut. Handwheels shall not have a diameter greater than thirty (30) inches.

f. Self-locking gear shall be a one-piece design of gear bronze material (ASTM B 427), accurately machine cut. The sector gear shall be hardened alloy steel (ASTM A-322), grade G41500 or ASTM A-148, Grade 105-85, with thread ground and polished. The reduction gearing shall run in a proper lubricant.

4. Buried Operators:

a. Buried service operators on valves larger than 2½ inches shall have a 2- inch AWWA operating nut. Buried operators on valves 2-inches and smaller shall have cross handle for operation for forked key. All moving parts of the valve and operators shall be enclosed in a housing to prevent contact with the soil.

b. Buried service operators for quarter-turn valves shall be designed to withstand 450 foot-pounds of input torque at the fully open or fully closed positions without damage to the valve or operator and shall be grease packed and gasketed to withstand a submersion in water to 10 psi.

c. Valves shall be installed with “pinned” extension stems, as required, valve boxes, concrete valve pad and valve identification tag.

D. Electric Motor Operated Valve Actuators

1. General:

a. The actuators shall be suitable for use on a nominal 480 volt three-phase 60 Hertz power supply and are to incorporate motor, integral reversing starter, local control facilities, and terminals for remote control and indication connections.

b. The actuator shall include a device to ensure that the motor runs with the correct rotation for the required direction of valve travel with either phase sequence of the three-phase power supply connected to the actuator.

c. It shall be possible to carry out the setting of the torque, turns, and configuration of the indication contacts without the necessity to remove any electrical compartment covers.

2. Actuator Sizing:

a. The actuator shall be sized to guarantee valve closure at the specified differential pressure.

b. The safety margin of motor power available for seating and unseating the valve shall be sufficient to ensure torque switch trip at maximum valve

torque with the supply voltage ten percent (10%) below nominal.

c. The operating speed shall be such as to give valve closing and opening at approximately 10 - 12 inches per minute.

3. Ambient Temperature:

a. The actuator shall be capable of functioning in an ambient temperature ranging from -22 ºF (-30ºC) to +158ºF (+70ºC).

4. Motor:

a. The electric motor shall be Class F insulated with a time rating of at least fifteen

b. (15) minutes at 104ºF (40ºC) or twice the valve stroking time, whichever is the longer, at an average load of at least 33% of the maximum valve torque.

c. Electrical and mechanical disconnection of the motor should be possible without draining the lubricant from the actuator gear case. Plugs and sockets are not acceptable as a means of electrical connection for the motor.

5. Motor Protection:

a. Protection shall be provided for the motor as follows:

1) The motor shall be de-energized in the event of stall when attempting to unseat a jammed valve.

2) Motor temperature shall be sensed by a thermostat to protect against overheating.

3) Single phasing protection.

6. Gearing:

a. The actuator gearing shall be totally enclosed in an oil-filled gear case suitable for operation at any angle. All main drive gearing must be of metal construction. Where the actuator operates gate valves or large diameter ball or plug valves, the drive shall incorporate a lost-motion hammerblow feature. For rising spindle valves, the output shaft shall be hollow to accept a rising stem and incorporate thrust bearings of the ball or roller type at the base of the actuator, and the design should be such as to permit the gear case to be opened for inspection or disassembled without releasing the stem thrust or taking the valve out of service.

b. Standard SAE80EP gear oil shall be used to lubricate the gear case. Special or exotic lubricants shall not be used as they may be difficult to source in remote locations.

7. Hand Operation:

   a. A handwheel (non-corrosive material) shall be provided for emergency operation engaged when the motor is declutched by a lever or similar means; the drive being restored to power automatically by starting the motor.

   b. The hand/auto selection lever should be padlockable in both the "Hand" and "Auto" positions. It should be possible to select “Hand” operation while the actuator is running or start the actuator motor while the “Hand/Auto” selection lever is locked in "Hand" without damage to the drive train.

   c. The handwheel drive must be mechanically independent of the motor drive, and any gearing should be such as to permit emergency manual operation in a reasonable time.

   d. Clockwise operation of the handwheel shall give closing movement of the valve.

8. Drive Bushing:

   a. The actuator shall be furnished with a drive bushing easily detachable for machining to suit the valve stem or gearbox input shaft. Normally the drive bushing shall be positioned in a detachable base of the actuator.

   b. Thrust bearings, when housed in a separate thrust base, should be of the “sealed for life” type.

9. Torque and Turns Limitations:

   a. Torque and turns limitation to be adjustable as follows:

      1) Position setting range: 2.5 to 100,000 turns, with resolution to 7.5° of actuator output.

      2) Torque setting: 40% to 100% rated torque.

      3) Torque sensing must be affected directly electrically or electronically. Extrapolating torque from mechanically measured motor speed is not acceptable due to response time. Torque measurement shall be independent of variations in frequency, voltage or temperature.

      4) "Latching" shall be provided for the torque sensing system to inhibit torque off during unseating or during starting in mid-travel against high inertia loads.

b. The electric circuit diagram of the actuator should not vary with valve type remaining identical regardless of whether the valve is to open or close on torque or position limit. An inexpensive setting tool is required for non- intrusive calibration and interrogation of the actuator. This setting tool will provide speedy interrogation capabilities as well as security in a non- intrusive intrinsically safe watertight casing.

10. Remote Valve Position/Actuator Status Indication:

a. In the event of a (main) power (supply) loss or failure, the position contacts must continue to be able to supply remote position feedback and maintain interlock capabilities. If batteries are required to maintain contact functionality the actuator vendor shall provide a supply sufficient for thirty (30) continuous days of unpowered operation with one (1) complete valve cycle every hour.

b. A backup power source must be provided in the actuator to ensure correct remote indication should the actuator be moved manually when the power supply is interrupted.

c. The position of the actuator and valve must be updated contemporaneously, even when the power supply is not present.

d. Four (4) contacts shall be provided which can be selected to indicate any position of the valve with each contact externally selectable as normally open or normally closed. The contacts shall be rated at 5A, 250V AC, 30V DC.

e. As an alternative to providing valve position, any of the four (4) above contacts shall be selectable to signal one of the following:

1) Valve Opening or Closing

2) Valve Moving (Continuous or Pulsing)

3) Local Stop Selected

4) Local Selected

5) Remote Selected

6) Open or Close Interlock Active

7) ESD Active

8) Motor Tripped on Torque in Mid-Travel

9) Motor Tripped on Torque Going Open

10) Motor Tripped on Torque Going Closed

11) Pre-Set Torque Exceeded

12) Valve Jammed

13) Actuator Being Operated by Handwheel

14) Lost Main Power Phase

15) Customer 24V DC or 120V AC Supply Lost

16) Battery Low

17) Internal Failure Detected

18) Thermostat Tripped

f. Provision shall be made in the design for the addition of a contact less transmitter to give a 4-20 mA analog signal corresponding to valve travel for remote indication when required.

11. Local Position Indication:

a. The actuator must provide a local display of the position of the valve, even when the power supply is not present. The display shall be able to be rotated in 90° increments so as to provide easy viewing regardless of mounting position.

b. The actuator shall include a digital position indicator with a display from fully open to fully closed in 1% increments. Red, green, and yellow lights corresponding to Open, Closed, and Intermediate positions shall be included on the actuator. The digital display shall be maintained even when the power to the actuator is isolated.

c. The local display should be large enough to be viewed from a distance of six feet (6') when the actuator is powered up.

12. Integral Starter and Transformer:

a. The reversing starter, control transformer, and local controls shall be integral with the valve actuator, suitably housed to prevent breathing and condensation buildup. For ON/OFF service, this starter shall be an electromechanical type suitable for 60 starts per hour and of a rating appropriate to the motor size. For modulating Denitrification Filter Effluent valves, the starter shall be suitable for up to a maximum of 1,200 starts per hour. The controls supply transformer shall be fed from two of the incoming

three phases. It shall have the necessary tapings and be adequately rated to provide power for the following functions:

1) 120V AC energization of the contactor coils

2) 24V DC output where required for remote controls

3) Supply for all the internal electrical circuits

4) The primary and secondary windings shall be protected by easily replaceable fuses.

13. Integral Push Buttons and Selector:

a. Integral to the actuator shall be local controls for Open, Close, and Stop, and a local/remote selector Switch, padlockable in any one of the following three positions:

1) Local Control Only

2) Off (No Electrical Operation)

3) Remote Control plus Local Stop Only

b. It shall be possible to select maintained or non-maintained local control.

c. The local controls shall be arranged so that the direction of valve travel can be reversed without the necessity of stopping the actuator.

14. Control Facilities:

a. The necessary wiring and terminals shall be provided in the actuator for the following control functions described herein.

b. Removable links for substitution by external interlocks to inhibit valve opening and/or closing.

c. Connections for external remote controls fed from an internal 24V DC supply and/or from an external supply of (min. 12V, max. 120V) to be suitable for any one or more of the following methods of control:

1) Open, Close, and Stop.

2) Open and Close.

3) Overriding Emergency, Shutdown to Close (or Open) Valve from a "Make" Contact.

4) Two-Wire Control, Energize to Close (or Open), De-Energize to Open (or Close).

d. Selection of maintained or push-to-run control for modes (1) and (2) above shall be provided and it shall be possible to reverse valve travel without the necessity of stopping the actuator. The starter contactors shall be protected from excessive current surges during travel reversal by an automatic time delay on energization of approximately 300 ms.

e. Provision shall be made for connectivity with field bus control systems via a plug-in card. The following interfaces shall be available:

1) Modbus

2) Approved equal.

f. The internal circuits associated with the remote control and monitoring functions are to be designed to withstand simulated lightning impulses of up to 2.0 kV.

15. Monitoring and Diagnostics Facilities:

a. Facilities shall be provided for monitoring actuator operation and availability as defined herein.

b. Monitor (availability) relay, having one change-over contact, the relay being energized from the control transformer only when the Local/Off/Remote selector is in the "Remote" position to indicate that the actuator is available for remote (Operations Room) operation.

c. Where required, it shall be possible to provide indication of thermostat trip and "Remote" selected as discreet signals.

d. A non-intrusive hand-held computer must be available, capable of duplex communication for uploading and downloading all variables for the actuator as well as performing detailed diagnostics.

e. Actuators shall include a diagnostic module, which will store and enable download of historical actuator data to permit analysis of changes in actuator or valve performance. A software tool shall be provided to allow configuration and diagnostic information to be reviewed and analyzed and reconfigured.

f. Diagnostic status screens must be provided to show multiple functions simultaneously so troubleshooting can be affected rapidly and efficiently. All diagnostic information should be contained on no more than eight (8) screens so multiple functions can be checked simultaneously.

g. Provision shall be made to display valve torque demand as a percent of rated actuator torque and position simultaneously, so as to facilitate valve troubleshooting and diagnostics.

16. Wiring and Terminals:

a. Internal wiring shall be of tropical grade PVC insulated stranded cable of appropriate size for the control and three phase power. Each wire shall be clearly identified at each end.

b. The terminals shall be embedded in a terminal block of high tracking resistance compound.

c. The terminal compartment shall be separated from the inner electrical components of the actuator by means of a watertight seal.

d. The terminal compartment of the actuator shall be provided with a minimum of three (3) threaded cable entries. When required, a forth cable entry shall be provided.

e. All wiring supplied as part of the actuator to be contained within the main enclosure for physical and environmental protection. External conduit connections between components are not acceptable.

f. Control logic circuit boards mid relay boards must be mounted on plastic mounts to comply with double insulated standards. No more than a single primary size fuse shall be provided to minimize the need to remove single covers for replacement.

g. A durable terminal identification card showing plan of terminals shall be provided attached to the inside of the terminal box cover indicating:

1) Serial Number.

2) External Voltage Values.

3) Wiring Diagram Number.

4) Terminal Layout.

(a) This must be suitable for the contractor to inscribe cable core identification beside terminal numbers.

17. Enclosure:

a. Actuators shall be 'O' ring sealed, watertight to NEMA 6, and shall at the same time have an inner watertight and dustproof "O" ring seal between the terminal compartment and the internal electrical elements of the actuator

fully protecting the motor and all other internal electrical elements of the actuator from ingress of moisture and dust when the terminal cover is removed on site for cabling.

b. The enclosure must allow for temporary site storage without the need for electrical supply connection.

c. All external fasteners should be of Type 304 stainless steel.

d. Actuators for explosion hazardous applications shall in addition be certified flameproof for Zones 1 and 2 (Divisions 1 and 2) Group gases.

18. Startup Kit:

a. Each actuator shall be supplied with a startup kit comprising installation instruction, electrical wiring diagram, and sufficient spare cover screws and seals to make good any site losses during the commissioning period.

19. Performance Test Certificate:

a. Each actuator must be performance tested and individual test certificates shall be supplied free-of-charge. The test equipment should simulate a typical valve load and the following parameters should be recorded:

1) Current at maximum torque setting.

2) Torque at maximum torque setting.

3) Flash Test Voltage.

4) Actuator Output Speed or Operating Time.

b. In addition, the test certificate should record details of specification, such as gear ratios for both manual and automatic drive, closing direction, and wiring diagram code number.

20. Experience:

a. All technologies and devices used in the actuator must have a minimum of five (5) years' of commercial operating experience for that specific manufacturer, including torque and position sensing, lubrication, and electrical compartment design.

b. Electric motor valve actuators shall be as manufactured by Auma Actuators, or approved equal.

2.20 Valve Boxes

A. Furnish, assemble, and place a valve box over the operating nut for each buried valve. The valve box shall be designed so as to prevent the transmission of surface loads directly to the valve or piping.

B. Valve boxes shall be of the adjustable slide-type of suitable length with an interior diameter of not less than five (5) inches. The valve boxes shall be manufactured of cast iron and shall be of the two piece design including a bottom section and top section with cover. The cast iron cover shall be cast with the applicable service, "WATER," "WASTEWATER," "REUSE," etc., markings. The top section shall be adjustable for elevation and shall be set to allow equal movement above and below finished grade.

C. The castings shall be manufactured of clean, even grain, gray cast iron conforming to ASTM A48, Class 30B for Gray Iron Castings; and shall be smooth, true to pattern, free from blow holes, sand holes, projections, and other harmful defects. The seating surfaces of both the cover and the top section shall be machined so that the cover will not rock after it has been seated.

D. The valve boxes shall be coated inside and outside with an asphaltic coating prior to machining, so that the machined seating surfaces will be free of any coating. Cast iron valve box assemblies shall be Clow Corp. No. F-2452, Tyler Corp. Series 6855 or 6865 or an approved equal.

E. Valve extension stems shall be provided for all buried valves when the operating nut is deeper than three (3) feet below finished grade. The stems shall be “pinned” and shall bring the 2-inch square nut to approximately six (6) inches from the finished valve pad elevation.

2.21 Tie Rods

A. When prior approval is obtained from the Engineer, ductile iron pipe, fittings, and valves may be restrained using a “tie bolt joint restraint”.

B. Joint restraint materials for this method of restraint shall be the Super-Star SST Series Joint Restraint System as manufactured by Star National Products, a Division of Star Industries, Inc. Columbus, Ohio, or an approved equal.

C. All bolts, nuts, washers, tie rods, and other fasteners for the joint restraint system shall be manufactured of CORTEN high strength, low alloy, corrosion-resistant steel in conformance with ASTM A242, or EOR approved equal. Tie bolts shall be manufactured of heat treated CORTEN steel, or EOR approved equal. Tie rods and all fasteners for the system shall be galvanized in conformance with the requirements of ASTM A123. Tie rods shall have a minimum diameter of ¾-inch. The number of tie rods required per joint shall be as recommended by the manufacturer.

D. Prior to backfilling after installation, all parts of the joint restraint system shall be coated with coal tar epoxy equal to Kop-Coat Bitumastic No. 300-M, for a minimum dry film thickness of twenty (20) mils.

2.22 Valve Identification

A. Aboveground Valve Identification

1. A coded and numbered tag attached with a stainless steel chain and/or stainless steel "S" hooks shall be provided on all valves.

2. Tag Types:

   a. Tags for valves on pipe shall be stainless steel, or anodized aluminum, 19 gauge thick.

   b. Colors for aluminum tags shall, where possible, match the color code of the pipe line on which it is installed.

   c. Square tags shall be used to indicate "normally closed" valves and round tags shall indicate "normally open" valves.

3. Coding:

   a. In addition to the color coding, each tag shall be stamped or engraved with "wording" or abbreviations to indicate the information presented in Article 2.1(G)(1)(a-g) of Specification Section 09905, "Piping, Valve and Equipment Identification System".

   b. Above ground valve tags shall be furnished with stainless steel (Type 316) wire for attachment thereof. The tag shall not be attached to the handwheel or crank operators or any part of the valve which would inhibit operation of the valve.

   c. Valve service shall either be as listed in Table 09905-1 (Section 09905), or by equipment abbreviation if associated with a particular piece of equipment. Valve numbering shall be as approved by the Engineer and/or Owner.

B. Belowground Valve Identification

1. Buried valves shall have valve boxes protected by a concrete pad as identified on the Contract Drawings. The concrete pad for the valve box cover shall have a 3-inch diameter, 19 gauge thick, bronze disc embedded in the surface as shown on the Contract Drawings. The bronze disc shall have the following information neatly stamped on it:

   a. Valve Service: See Table 09905-1 for the abbreviations to be used

b. Valve Identification No.: To be provided by the Engineer and Owner

c. Size of valve, inches

d. Type of valve

1) GV: Gate Valve

2) BfV: Butterfly Valve

3) PV: Plug Valve

4) Other valve abbreviations shall be provided by the Engineer.

e. Number of turns to fully open the valve

f. Direction to open the valve

g. Year of Installation

2. The information contained in the valve schedules shall be coded on the tags in a system.

C. The information contained in the valve schedules shall be coded on the tags in a system provided by the Owner.

D. Above ground valve tags shall be furnished with stainless steel chain and/or stainless steel “S” hooks (Type 316) for attachment thereof. The tag shall not be attached to the handwheel or crank operators or any part of the valve which would inhibit operation of the valve.

2.23 Expansion Joints

A. Water Service

1. Expansion joints shall be manufactured of molded EPDM with a single wide arch. Expansion joints shall be suitable for buried service or above ground service. Flanges shall be drilled to ANSI 125 lb.

2. Working pressures are as follows:

Size (inches)	Pressure (psi)
2 - 12	150
14	130
16 - 20	110
24 - 30	100
36	90

3. The maximum temperature shall be 250°F.

4. Expansion joints shall be Model 100 HT/711 as manufactured by Metraflex or approved equal.

5. Expansion joints shall be furnished with 304 stainless steel split, bevelled retaining rings and control rod assemblies to limit over expansion or compression. A minimum of two control units shall be furnished with each expansion joint and shall be suitable for working pressures as specified above.

B. Chemical Solution Service

1. Expansion joints shall be manufactured of molded elastomer with a single wide arch, regular or reducing style as shown in the drawings. Expansion joints shall be suitable for above ground service with PVC piping.

2. Elastomers shall be suitable for the proposed chemical service as follows:

Solution Type	Cover / Tube Material
Cleaning Solution	EPDM
Scrubber Recirculation Solution	PTFE

3. Flanges shall be drilled to ANSI 125#. Working pressures are as follows:

Size (inches)	Pressure (psi)
12-Feb	150

4. The maximum temperature shall be 250°F.

5. Expansion joints shall be furnished with 316 stainless steel split, bevelled retaining rings and control rod assemblies to limit over expansion or compression. A minimum of two control units shall be furnished with each expansion joint and shall be suitable for working pressures as specified above.

C. Wastewater Service

1. Expansion joints shall be manufactured of molded chlorobutyl and polyester with a filled single such. Expansion joints shall be suitable for buried service or above ground service. Flanges shall be drilled to ANSI 125 lb.

2. Working pressures are as follows:

Size (inches)	Pressure (psi)
2 - 12	150
14	130
16 - 20	110
24 - 30	100
36	90

3. The maximum temperature shall be 250°F.

4. Expansion joints shall be furnished with 304 stainless steel split, bevelled retaining rings and control rod assemblies to limit over expansion or compression. A minimum of two control units shall be furnished with each expansion joint and shall be suitable for working pressures as specified above.

2.24 Sediment Strainers

A. Sediment strainers shall be Y-type manufactured of transparent Type 1, Grade 1 PVC with threaded or solvent welded socket ends.

B. The screen for the strainers shall be 20 mesh, Type 316 stainless steel. The screen shall be easily removed for cleaning or replacement from the filter body without removing the body from the pipeline. The bonnet seal shall be EPDM "O" rings.

C. The sediment strainers shall have a pressure rating as follows:

Strainer Size	Water Non-Shock Pressure Rating
½-inch to 1-inch	150 psi at 70° F
1½-inch to 2-inch	90 psi at 70° F
3-inch to 4-inch	60 psi at 70° F

2.25 Unions

A. Unions on ferrous pipe 2 inches in diameter and smaller shall be 150 pounds malleable iron, zinc-coated.

B. Unions on water piping 2½ inches in diameter and larger shall be of the flange pattern, 125-pound class, zinc-coated.

C. Gaskets for flanged unions shall be of the best quality fiber, plastic, or leather.

D. Unions shall not be concealed in walls, ceilings, or partitions.

2.26 Pressure Gauge Assemblies

A. Pressure gauges shall have the following design features

1. Silicone oil filled (3000 centistoke fluid with an ethylene polymer blowout disc).

2. Stem mounted pressure gauge with a 4-inch or 4.5-inch aluminum dial with black numerals on a white background (for pump service).

3. Stem mounted pressure gauge with a two and one-half (2½) inch aluminum dial with black numerals on a white background (for all other services).

4. Type 316 stainless steel bourdon tube and internal movement.

5. 330 series stainless steel case and ring.

6. Safety glass lens.

7. Threaded lens retaining ring.

8. Adjustable pointer with over-pressure stop and zero pointer stop.

9. Either friction or gear adjustable.

10. Blowout protection.

11. One-half (½) inch, Type 316 stainless steel stem mounting.

12. ±1.0 percent accuracy based on full scale.

13. No stop pins shall be permitted on the dial face.

14. Internal stop pins shall be required to prevent the sector gear from becoming disengaged from the geared needle post as a result of over or under pressure range.

B. Provide Type 316 stainless steel pressure snubbers on all gauges not protected by diaphragm seals. Provide a supply of replacement fill liquid for all gauges supplied for the entire Project. Pressure gauges shall be as manufactured by U. S. Gauge, Ashcroft, Marshalltown, Marsh, or approved equal.

C. Pressure Gauge Service and Ranges

1. Pressure gauges shall be furnished for the following services with the indicated ranges noted. Diaphragm seals shall be furnished for gauges as indicated. This table is for the Contractor's convenience only, and may not depict all systems or all services that require gauges.

Service	No. Required	Range	Diaphragm Seal
RAS and WAS Pump Discharge	9	0 - 100 psi	Yes
IMLR Pump Discharge	4	0 - 5	Yes

* Verify with chemical equipment manufacturer

2. Pressure gauges not identified in the table above shall be provided on the individual pieces of equipment specified in Division 11, “Equipment” and shall meet the pressure gauge requirements specified herein.

D. Diaphragm Seals (Pipe sizes 12-inch and smaller)

1. Pressure gauges shall be furnished with diaphragm protection seals which shall be joined to the pressure gauges and filled at the manufacturer's factory. The seals shall be of the removable design such that the bottom member can be removed for cleaning without disturbing the diaphragm. The diaphragm shall be Type 316 stainless steel. The top and bottom members of the seal shall be Type 316 stainless steel.

2. Connections for both the gauge and the bottom connection shall be ½-inch female NPT threaded connections. The bottom member shall have a ¼-inch plugged flushing connection with a Type 316 stainless steel plug.

3. Liquid filling for the diaphragm seals shall be silicone oil. Provide a supply of replacement fill liquid for all diaphragm seals supplied for the entire Project. Diaphragm protection seals shall be supplied by the manufacturer of the gauge.

E. Each pressure gauge assembly shall be furnished with an isolation ball valve. The valve body, stem, and all other parts of valves shall be manufactured of Type 316 stainless steel. The valve packing shall be high-density TFE. Valve connections shall be ½-inch female NPT threaded connections. Ball valves for pressure gauge assembly isolation shall be 45 Series as manufactured by the Whitey Company, or an equal approved by the Engineer.

2.27 Floor Box and Stem

A. Plain type, for support of non-rising type stem.

B. Complete with stem, operating nut, and stem guide brackets.

C. Stem Guide: Space such that stem L/R ratio does not exceed 200.

D. Anchor Bolts: Type 304 stainless steel.

E. Manufacturers and Products

1. Neenah Foundry: R 7506.

2. Clow: F 5690

3. EOR approved equal

2.28 Emergency Shower/Eye Wash (ES/EW)

A. Furnish and install a combination emergency shower and an eye wash unit where shown on the Contract Drawings.

B. The emergency shower shall have a ten (10) inch stainless steel shower head, eye wash bowl, stay open stainless steel ball valves, a rigid stainless steel pull rod for control of the shower and hand and foot control for the eye wash, and a stainless steel standard to support the ball valve and the shower head. The

emergency shower shall be furnished complete with automatic flow control devices as required to limit water flow to 20 gpm.

C. The emergency eye wash shall have an eleven (11) inch stainless steel receptor bowl, anti-surge eyewash heads including a stainless steel dust cover that protects the heads and automatically releases with water pressure, stainless steel wall mounting bracket and a stainless steel trap. The emergency eye wash shall be furnished complete with automatic flow control devices as required to limit water flow to 3 gpm.

D. Provide the combination emergency shower and an eye wash unit with a bleed valve to limit temperature in the emergency fixture to 100°F. The bleed valve shall be Haws Model SP17A or equal.

E. All exposed emergency shower piping shall be insulated with ½-inch thick closed cell tubing insulating per ASTM C534, Type 1. Paint insulation with two (2) coats of semigloss water base paint, specifically recommended for weather protection, Rubatex R-180FS Insulation, Rubatex 374 Coating, or equal. Install as shown on the Contract Drawings.

F. Provide a 1¼-inch supply inlet, and 1¼-inch waste tee.

G. The combination emergency shower and an eye wash unit shall be Haws Model 8330, or approved equal.

H. Emergency Water Alarm (EWA)

1. Emergency water alarm units and components shall be furnished and installed in conjunction with all emergency shower and eyewash units and fixtures. The emergency water alarm unit shall have brass double pole, double throw flow switch, junction box, UL Listed and CSA approved flashing amber light, audible alarm with a minimum 90 db sound output, all wiring and mounting brackets. The emergency water alarm unit shall be Haws Model 9001 DPDT or approved equal.

2. Wiring between flow switches and emergency water alarm units will be done under Division 16 including furnishing and installing a relay and reset button for each unit. The alarm condition shall be monitored by the SCADA system.

3. Electrical characteristics for this unit are 110 volts, single phase, 60 Hz.

4. Control valves adjacent to flow alarm switches shall be fitted gated valves with bronze lock shields.

5. Installation of flow switches in the piping system shall be in accordance with the manufacturer's recommendations.

2.29 Spare Parts

A. Special tools, if required for normal operation and maintenance, shall be supplied with the equipment.

2.30 Quality Control

A. The Contractor shall follow the Manufacturer's and Supplier's recommended product quality control specifics as required for the Project.

2.31 Hose Bibb

A. Provide the number, type and materials as shown on the Contract Drawings.

B. Hose racks shall be fabricated from Type 304 stainless steel.

2.32 Washdown Hose

A. Hoses shall be fifty (50) feet long, 1-inch diameter abrasion and weather resistant and "kink-proof", industrial grade hose with a ¼-turn industrial grade stainless steel ball valve, with a 1-inch stainless steel male x female (NPT) QF series quick connect coupling on the supply end.

B. An industrial grade stainless steel spray nozzle shall be provided on each hose.

C. All components shall be manufactured by Amazon Hose & Rubber Company or approved equal.

2.33 Miscellaneous Items

A. Other items necessary for the complete installation and not specified herein shall conform to the details and notes shown on the Contract Drawings.

B. All minor items implied, usually included, or required for the construction of a complete operating system shall be installed whether shown on the Contract Drawings or not.

3. EXECUTION

3.1 Inspection

A. All valves and other material shall be subject to inspection and approval by the Engineer after delivery, and no broken, cracked, imperfectly coated, or otherwise damaged or unsatisfactory material shall be used.

B. When a defect or crack is discovered, the damaged item shall not be installed and shall be replaced.

3.2 Preparation

A. All exterior surfaces of iron body valves shall be clean, dry and free from rust and grease before coating.

B. For valves installed underground or in valve vaults, all exterior ferrous parts or valve and actuator shall be coated at the factory with a thermally bonded epoxy coating in accordance with AWWA C-550, latest revision, or with coal tar epoxy (Engineer approval required). Coal tar epoxy shall be applied in two (2) 8-mil dry film thickness coats for a minimum total finish dry film thickness of sixteen (16) mils. Prior to backfilling, all uncoated nuts, bolts, glands, rods and other part of joints shall be coated in the field with coal tar epoxy. The coal tar epoxy shall be Carboline Bitumastic No. 300-M. Amercoat No. 78, or approved equal.

C. For above-ground service, the exterior ferrous parts of all valves shall be coated as follows:

1. Prior to shipment from the factory, valves shall be coated with a thermally bonded epoxy coating in accordance with AWWA C-550, latest revision, or shall be shop painted with one (1) coat, 1.5 mils dry film thickness, of a combination lead and chromate primer with rust-inhibitive pigments and synthetic resins (Engineer approved method).

2. Following installation in the field, valves shall be painted with one (1) coat, 1.5 mils dry film thickness, of a combination lead and chromate primer with rust- inhibitive pigments and synthetic resins. Valves shall be finish painted with two (2) coats, 1.5 mils dry film thickness each coat, of a medium to long oil alkyd resin coating. Field applied coatings shall be as manufactured by the Carboline or an equal approved by the Engineer. The color of the finish coats shall be in accordance with the piping color code in the painting schedule.

3.3 Installation

A. Cover for buried valves shall not be less than that indicated on the Contract Drawings. Pipe elevations shall be maintained as indicated on the Drawings. Maintain a minimum pipe cover of thirty-six (36) inches, unless otherwise approved by the Engineer.

B. Valves of the size and type shown on the Contract Drawings shall be set plumb and installed at the locations indicated on the Contract Drawings. Valves shall be installed in accordance with manufacturer's installation instructions and with the details shown on the Contract Drawing and shall be rigidly supported.

C. Valves shall be installed such that they are supported properly in their respective positions, free from distortion and strain. Valves shall be installed such that their weight is not borne by pumps and equipment that are not designed to support the weight of the valve.

D. Valves shall be carefully inspected during installation; they shall be opened wide and then tightly closed and the various nuts and bolts shall be tested for tightness. Special care shall be taken to prevent any foreign matter from becoming lodged in the valve seat. Check and adjust all valves for smooth operation.

E. Install valves with the operating stem in either horizontal or vertical position.

F. Allow sufficient clearance around the valve operator for proper operation.

G. Clean iron flanges by wire brushing before installing flanged valves. Clean carbon steel flange bolts and nuts by wire brushing, lubricate threads with oil or graphite, and tighten nuts uniformly and progressively. Clean threaded joints by wire brushing or swabbing. Apply teflon joint compound or teflon tape to pipe threads before installing threaded valves. All joints shall be watertight.

H. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Contract Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the Contractor shall check all plans and figures which have a direct bearing on their location and he shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.

I. Pipe for use with flexible couplings shall have plain ends as specified in the respective pipe sections in Division 15, “Mechanical”.

J. Flanged joints shall be made with Type 304 stainless steel bolts, nuts and washers. Mechanical joints shall be made with mild corrosion resistant alloy steel bolts and nuts. All exposed bolts shall be painted the same color as the pipe. All buried bolts and nuts shall be heavily coated with two (2) coats of bituminous paint comparable to Inertol No. 66 Special Heavy, or approved equal.

K. Pressure gauges shall not be installed until after the substantial completion date unless otherwise requested by the Owner.

L. For buried valves, a valve box shall be centered accurately over the operating nut and the entire assembly shall be plumb. The tops of valve boxes shall be adjusted to the proper elevation as specified below and as shown on the Contract Drawings.

1. In paved areas, the tops of valve box covers shall be flush with the pavement. Following paving operations, a twenty-four (24) inch square shall be neatly cut in the pavement around the box and the paving removed. The top of the box shall then be adjusted to the proper elevation and a twenty-four (24) inch square by six (6) inch thick concrete pad poured around the box cover. Concrete pads in traffic areas shall be reinforced with No. 4 reinforcement bars as shown on the Contract Drawings. Concrete for the pad shall be 3,000 psi compressive strength at 28 days.

2. In unpaved areas, tops of valve box covers shall be set one (1) inch above finished grade. After the top of the box is set to the proper elevation, a twenty-four (24) inch square by six (6) inch thick concrete pad shall be poured around the box cover. Concrete for the pad shall be 3,000 psi compressive strength at 28 days.

3. The concrete pad for the valve box cover shall have a three (3) inch diameter, identification disc embedded in the concrete surface as shown on the Contract Drawings. The bronze identification disc shall be as specified in Section 09905, "Piping, Valve and Equipment Identification System" and shall have the information as shown on the Contract Drawings neatly stamped on it.

M. Valve Orientation

1. Install operating stem vertical when the valve is installed in horizontal runs of pipe having centerline elevations 4.5 ft or less above finished floor, unless otherwise shown.

2. Install operating stem horizontal in horizontal runs of pipe having centerline elevations between 4.5 feet and 6.75 feet above finish floor, unless otherwise shown.

3. If no plug valve seat position is shown, locate as follows:

   a. Horizontal Flow: The flow shall produce an "unseating" pressure, and the plug shall open into the top half of valve.

   b. Vertical Flow: Install seat in the highest portion of the valve.

N. Install a line size ball valve and union upstream of each solenoid valve, in-line flow switch, or the in-line electrical device, excluding magnetic flowmeters, for isolation during maintenance.

O. Locate valve to provide accessibility for control and maintenance. Install access doors in finished walls and ceilings for valve access.

P. Floor Box and Stem

Q. Steel extension stem length shall locate operating nut in floor box.

R. All valves and appurtenances shall be tested hydrostatically for a minimum of two (2) hours, concurrently with the pipeline in which they are installed at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. Protect or isolate any parts of valves, operators, or control and instrumentation systems whose pressure rating is less than the pressure used for the pressure test(s). If valve joints leak during pressure testing, loosen or remove the nuts and bolts, reseat or replace the gasket, reinstall or retighten the bolts and nuts, and hydrostatically retest the joints.

S. Following installation, all above-ground valves shall be painted in accordance with the painting system specified in Section 09900, “Painting”. Following installation of buried valves or valves installed in valve vaults, repair any scratches, marks and other types of surface damage, etc., with a coating equal to the original coating supplied by the manufacturer.

3.4 Installation of Air Release and Air and Vacuum Valves

A. Piping, fittings, and the air release and air and vacuum valves shall be installed as shown on the Contract Drawings.

B. Air Release/Air and Vacuum valves shall be installed on the discharge side of all “non-submersible” type pumping stations.

C. The air release valve assemblies shall be installed so that they are properly supported and such that they will function properly and freely and no parts shall be strained.

D. Air release valve testing shall be performed during the testing of pipeline which air release is attached.

3.5 Installation of Tie Rods

A. Tie rods shall be installed in strict accordance with the manufacturer's written installation requirements.

B. Unless otherwise indicated on the Contract Drawings, the size and number of tie rods for a joint or installation shall be as recommended by the manufacturer's design chart for a working pressure of 150 psi.

C. Following installation and prior to backfilling, all parts of the buried tie rod joint restraint system, including tie rods, tie bolts, nuts, washers, and other fasteners, shall be coated with two (2) coats, ten (10) mils DFT per coat, of coal tar epoxy equal to Koppers Bitumastic No. 300-M.

3.6 Inspection and Hydrostatic Pressure and Leakage Testing

A. Completed pipe shall be subjected to hydrostatic pressure test for 2 hours at full working pressure. All leaks shall be repaired and lines retested as approved by the Engineer. Prior to testing, the gravity pipelines shall be supported in an approved manner to prevent movement during tests.

B. Hydrostatic pressure and leakage testing shall be performed in accordance with Section 15044, “Pressure Testing of Piping”.

END OF SECTION

DRAFT DOCUMENT FOR COMMISSION REVIEW

CITY OF PEMBROKE PINES

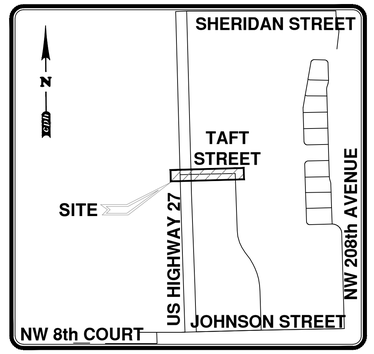
SEEPAGE STORMWATER PUMP STATION

AT

TAFT STREET AND SW 209 AVENUE

PEMBROKE PINES, FL 33029

BROWARD COUNTY, FLORIDA



VICINITY MAP

NOT TO SCALE

CITY COMMISSION

MAYOR	ANGELO CASTILLO
VICE - MAYOR	MICHAEL HERNANDEZ
COMMISSIONER	MARIA RODRIGUEZ
COMMISSIONER	JAY D. SCHWARTZ
COMMISSIONER	THOMAS GOOD JR.

ABBREVIATIONS

AL. or ALUM.	Aluminum	MATL.	Material
ASPH.	Asphalt	MAX.	Maximum
Ba.V.	Ball Valve	MG	Million Gallons
BLDG.	Building	MGD	Million Gallons Per Day
BM	Bench Mark	NG	Natural Grade
BT	Buried Telephone	NIC	Not in Contract
BTS	Biological Treatment System	NPW	Non-potable Water
B.F.V.	Butterfly Valve	NTS	Not To Scale
CFS	Cubic Feet Per Second	NWL	Normal Water Level
CIP or CI	Cast Iron Pipe	OC	On Center
CONC.	Concrete	OD	Outside Diameter
CONST.	Construction	OH. E.	Overhead Electric
CONT.	Continued	PE	Plain End
CMU	Concrete Masonry Unit	PL.	Plate
C.V.	Check Valve	PP	Power Pole
C.Y.	Cubic Yards	PROP.	Proposed
DIA.	Diameter	PT	Pressure Treated
DIP or DI	Ductile Iron Pipe	P.V.	Plug Valve
DOT	Dept. Of Transportation	PVC	Polyvinyl Chloride
DR. or DW.	Drive Or Driveway	PVMT.	Pavement
EA	Each	PW	Potable Water
ED	Equipment Drain	R	Radius
ESM'T	Easement	RAS	Return Activated Sludge
EF	Each Face	RCP	Reinforced Concrete Pipe
EFF.	Effluent	RED.	Reducer
ELEC.	Electrical	REINF.	Reinforced
ELEV. or EL.	Elevation	REQ'D	Required
EQUIP.	Equipment	Reuse	Reuse Water
EXIST.	Existing	RT.	Right
EXP.	Expansion	RWM	Reclaimed Water Main
EXT.	Extended	R/W	Right-of-way
EW	Each Way	SAN	Sanitary
FD	Floor Drain	S.F.	Square Feet
FDOT	Florida Department of Transportation	SPEC.	Specification
F.E.	Fire Extinguisher	STA.	Station
F.F.	Finish Floor	SQ.	Square
FLEX.	Flexible	SS	Stainless Steel
FLG.	Flanged	STN. STL.	Stainless Steel
FM	Force Main	SWD	Side Water Depth
GALV.	Galvanized	SW (S/W).	Sidewalk
GM	Gas Main	S.Y.	Square Yards
GPM	Gallons Per Minute	T	Telephone Cable
GS	Galvanized Steel	TBM	Temporary Benchmark
GSP	Galvanized Steel Pipe	TOF	Top Of Floor
G.V.	Gate Valve	TRANS.	Transformer
HB	Hose Bibb	TYP.	Typical
HORIZ.	Horizontal	UE	Underground Electric
HP	Horsepower	UG	Underground
HWL	High Water Level	UT	Underground Telephone
ID	Identification	VCP	Vitrified Clay Pipe
I.D.	Inside Diameter	VAC.	Vacuum
INF.	Influent	VERT.	Vertical
I.P.	Iron Pipe	WAS	Waste Activated Sludge
INV.	Invert	W.L.	Water Line
L.F.	Linear Feet	W.F.	Water Fountain
MANF.	Manufacturer	WM	Water Main
MATL.	Material		

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PROJECT AREA

VERTICAL DATUM: NAVD88

THE SIZE OF THESE PLANS MAY HAVE BEEN SLIGHTLY ALTERED BY REPRODUCTION PROCESSES, THIS MUST BE CONSIDERED WHEN SCALING ANY REPRODUCED PLANS FOR THE PURPOSE OF COLLECTING DATA.

cph
www.cphcorp.com
Building Better Communities Together
1992 SW 1st. Street
Miami, FL 33135
Ph: 305.274.4805

Plans Prepared By:
CPH, LLC
A Full Service A & E Firm

KYLE MICHAEL BECHTELHEIMER LICENSE No. 86673 STATE OF FLORIDA PROFESSIONAL ENGINEER
KYLE M. BECHTELHEIMER, P.E.
FL P.E. NO. 86673

No.	Revision	Date

Designed: K.B.
Drawn: J.C.
Checked: A.S.
Job No.: 2400768
Date: 9/12/2025 © 2026

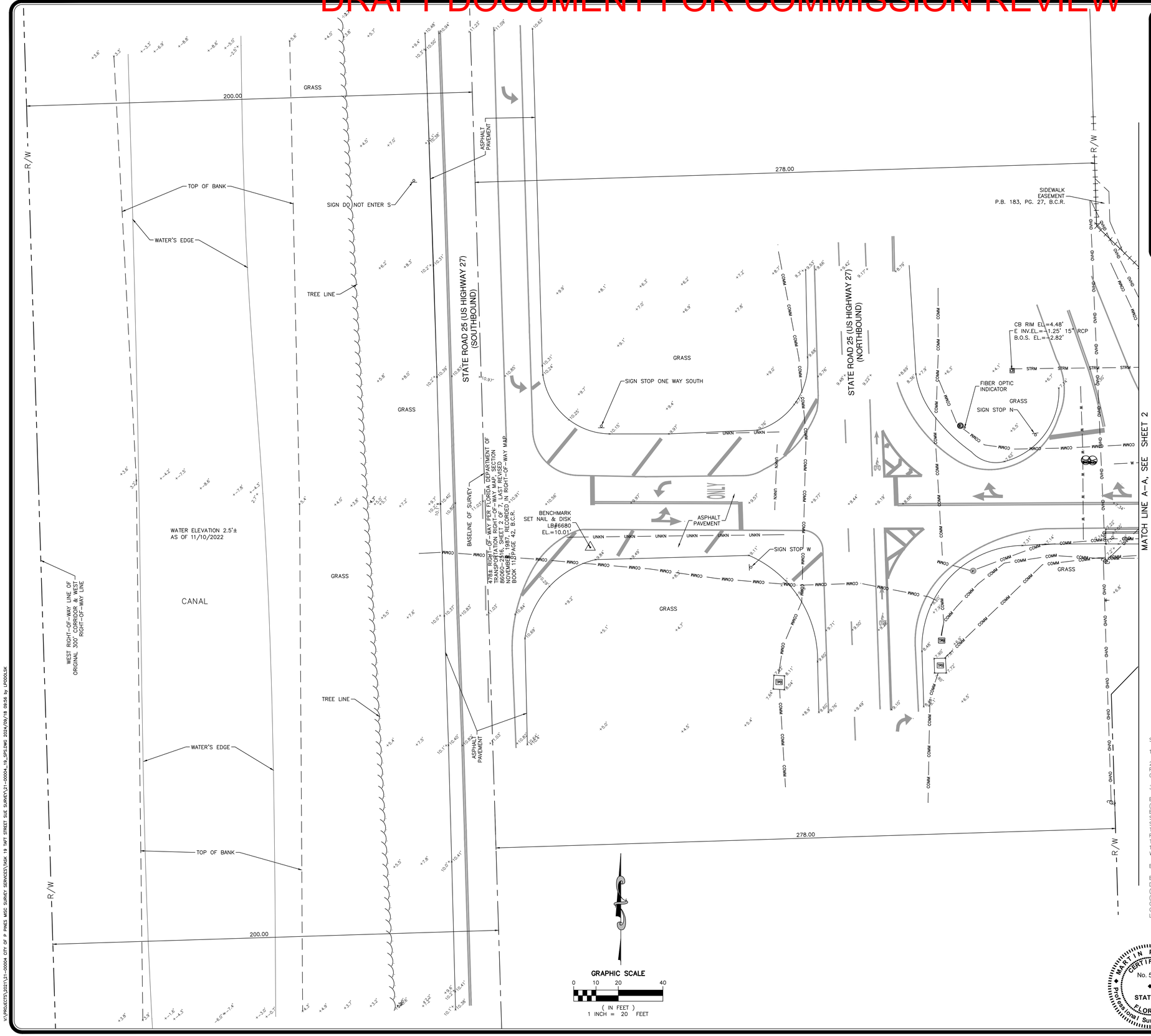
COVER

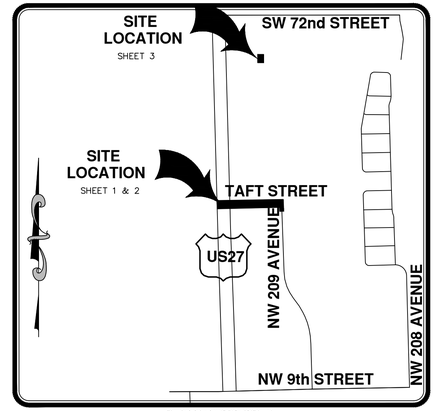
CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

Sheet No.
G-0

DRAFT DOCUMENT FOR COMMISSION REVIEW





TOWNSHIP 51S – RANGE 39E – SECTION 10

LOCATION MAP

N.T.S.

SYMBOL LEGEND:

- STORM DRAINAGE MANHOLE
- CATCH BASIN
- STREET SIGN
- CURB INLET
- SEWER VALVE
- CLEAN OUT
- WIRE PULL BOX
- WATER VALVE
- CONCRETE POWER POLE
- FIRE HYDRANT
- FIBER OPTIC CABLE INDICATOR
- GAS VALVE
- WATER METER
- IRRIGATION CONTROL BOX
- BACKFLOW PREVENTER
- GUY ANCHOR
- TELEPHONE MANHOLE
- STRM — STORM DRAINAGE PIPE
- OVHD — OVERHEAD WIRE
- NON-VEHICULAR ACCESS LINE
- G — NATURAL GAS UNDERGROUND LINE
- W — WATER UNDERGROUND LINE
- COMM — COMMUNICATION UNDERGROUND LINE
- UNKN — UNKNOWN UNDERGROUND LINE

ABBREVIATIONS:

EL. – ELEVATION
INV. – INVERT
P.B. – PLAT BOOK
PG. – PAGE
U.E. – UTILITY EASEMENT
B.O.S. – BOTTOM OF STRUCTURE
RCP – REINFORCED CONCRETE PIPE
HDPE – HIGH DENSITY POLYURETHANE PIPE
DIA. – DIAMETER
CLF – CHAIN LINK FENCE
MH – MANHOLE
R/W – RIGHT OF WAY
℄ – CENTERLINE
B.C.R. – BROWARD COUNTY RECORDS
P/L – PROPERTY LINE

TREE LEGEND:

PALM HEIGHT IN FEET
15'
PALM TREE
ROYAL PALM TREE
TREE
GUMBO LIMBO TREE
FICUS TREE
OAK TREE
CYPRESS TREE
MAHOGANY TREE
SILVER BUTTONWOOD TREE
TRUNK DIAMETER IN INCHES
8"–20"
CANOPY SIZE IN FEET

SURVEY NOTES:

1. SCALE OF SOME FEATURES MAY BE EXAGGERATED FOR CLARITY.

2. THIS SURVEY WAS NOT ABSTRACTED BY THE UNDERSIGNED SURVEYOR FOR RIGHT-OF-WAY, EASEMENT, OR OTHER ENCUMBRANCES OF RECORD, AND OWNERSHIP WAS NOT DETERMINED.

3. ELEVATION NOTE:

ELEVATIONS ARE RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AND ARE BASED ON BROWARD COUNTY ENGINEERING DIVISION BENCHMARK # 2051 DESCRIBED AS FOLLOWS: STANDARD BROWARD COUNTY ENGINEERING DIVISION BRASS DISC LOCATED 237 FEET SOUTH OF THE PROJECTED CENTERLINE OF JOHNSON STREET, 277 FEET EAST OF THE EAST EDGE OF PAVEMENT OF US 27, 7 FEET NORTH OF THE CENTERLINE OF A ROCK ROAD WHICH RUNS EAST OFF OF US 27 TO A SOUTHERN BELL ANTENNA TOWER STATION WHICH IS ENCLOSED BY A 8 FEET CYCLONE FENCE. MARK LOCATED 1.8 FEET NORTHWEST OF THE NORTH STEEL GATE POST OF SAID FENCE, 1 FOOT WEST OF SAID FENCE.

ELEVATION = 11.948 (NGVD29) – 1.54 = 10.408 (NAVD88).

ELEVATIONS AS SHOWN WERE CONVERTED FROM THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (N.G.V.D. '29) TO THE NORTH AMERICAN VERTICAL DATUM OF 1988, (N.A.V.D. '88) USING THE FOLLOWING CONVERSION: N.G.V.D. '29 VERTICAL DATUM, (IN FEET) –1.54'=N.A.V.D. '88 VERTICAL DATUM. THE CONVERSION FACTOR WAS OBTAINED FROM THE NATIONAL GEODETIC SURVEY WEB SITE ORTHOMETRIC HEIGHT CONVERSION PROGRAM USING THE LATITUDE AND LONGITUDE OF THE PROJECT LOCATION TO DETERMINE A CONVERSION FACTOR FOR THIS SPECIFIC LOCATION.

I HEREBY CERTIFY THAT THIS SURVEY MEETS STANDARDS OF PRACTICE AS SET FORTH BY THE FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES OF PROFESSIONAL SURVEYORS AND MAPPERS IN CHAPTER 5J–17, FLORIDA ADMINISTRATIVE CODE, PURSUANT TO SECTION 472.027, FLORIDA STATUTES.
DATED THIS 10th DAY OF NOVEMBER 2022 A.D.

MARTIN P. ROSSI
No. 5857
STATE OF FLORIDA
Professional Surveyor & Mapper

MARTIN P. ROSSI
PROFESSIONAL SURVEYOR AND MAPPER
STATE OF FLORIDA REGISTRATION No. 5857
NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER

NO.	DATE	REVISIONS	DWN.
1	9/04/24	REVISED TO ADD UNDERGROUND UTILITIES AS PER FIELD	MR

TAFT STREET FORCEMAIN

FOR: CITY OF PEMBROKE PINES, BROWARD COUNTY, FLORIDA

SKETCH OF TOPOGRAPHIC SURVEY

MILLER LEGG
South Florida Office: 5747 N. Andrews Way
Ft. Lauderdale, Florida 33309-2364
954-436-7000 Fax: 954-436-8664
www.millerlegg.com

CERTIFICATES OF AUTHORIZATION:
EB7318 LB6680 LC0337

DES.	DWN.	CHK.
	LP	MR

PROJECT / FILE NO.
21–00004

DRAWING NO.
TS–1

DATE DRAWN:
9/9/24

V:\PROJECTS\2021\21-00004 CITY OF P PINES MISC SURVEY SERVICES\TASK 19 TAFT STREET SUE SURVEY\21-00004_19_SPS.DWG 2024/09/18 08:56 by LPOOLSIK

DRAFT DOCUMENT FOR COMMISSION REVIEW

PARCEL "A"
"27 AT TAFT INDUSTRIAL"
P.B. 183, PG. 27, B.C.R.

PARCEL 'A'
"LAKEVIEW COMMERCE CENTER"
P.B. 172, PG. 21, B.C.R.

PARCEL "G"
"CHAPEL TRAIL II"
P.B. 112, PG. 16, B.C.R.

TAFT STREET

NW 209th AVENUE

MATCH LINE A–A, SEE SHEET 1

MATCH LINE B–B, SEE BELOW ON THE LEFT

MATCH LINE B–B, SEE ABOVE ON THE RIGHT

GRAPHIC SCALE
0 10 20 40
(IN FEET)
1 INCH = 20 FEET

SYMBOL LEGEND:
- STORM DRAINAGE MANHOLE
- CATCH BASIN
- STREET SIGN
- CURB INLET
- SEWER VALVE
- CLEAN OUT
- WIRE PULL BOX
- WATER VALVE
- CONCRETE POWER POLE
- FIRE HYDRANT
- FIBER OPTIC CABLE INDICATOR
- GAS VALVE
- WATER METER
- IRRIGATION CONTROL BOX
- BACKFLOW PREVENTER
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- PALM HEIGHT IN FEET
- PALM TREE
- ROYAL PALM TREE
- TREE
- GUMBO LIMBO TREE
- FICUS TREE
- OAK TREE
- CYPRESS TREE
- MAHOGANY TREE
- SILVER BUTTONWOOD TREE
- TRUNK DIAMETER IN INCHES
- CANOPY SIZE IN FEET

NO.	DATE	REVISIONS	DES.	DWN.
1	9/04/24	REVISED TO ADD UNDERGROUND UTILITIES AND BOUNDARY	MR	LP

TAFT STREET FORCEMAIN

FOR: CITY OF PEMBROKE PINES, BROWARD COUNTY, FLORIDA

SKETCH OF TOPOGRAPHIC SURVEY

MILLER LEGG
South Florida Office: 5747 N. Andrews Way
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CERTIFICATES OF AUTHORIZATION:
EB7318 LB6680 LC0337

DES.	DWN.	CHK.
	LP	MR

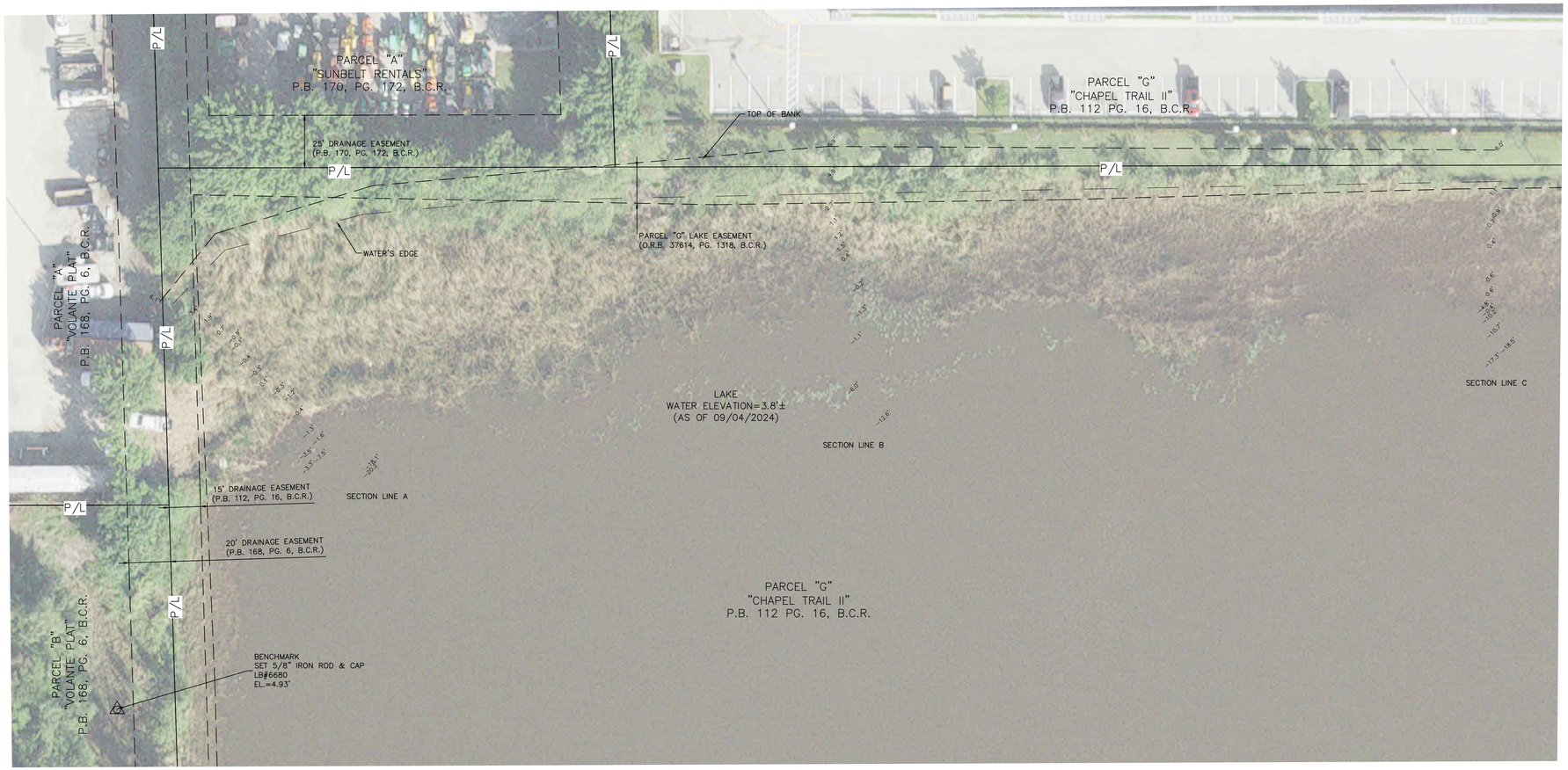
PROJECT / FILE NO.
21–00004

DRAWING NO.
TS–2

DATE DRAWN:
9/9/24

V:\PROJECTS\2021\21–00004 CITY OF P PINES MISC SURVEY SERVICES\SKP\ 19 TAFT STREET SUE SURVEY\21–00004_19_SRS.DWG 2024/09/18 09:56 by LP000LSK

DRAFT DOCUMENT FOR COMMISSION REVIEW



SYMBOL LEGEND:

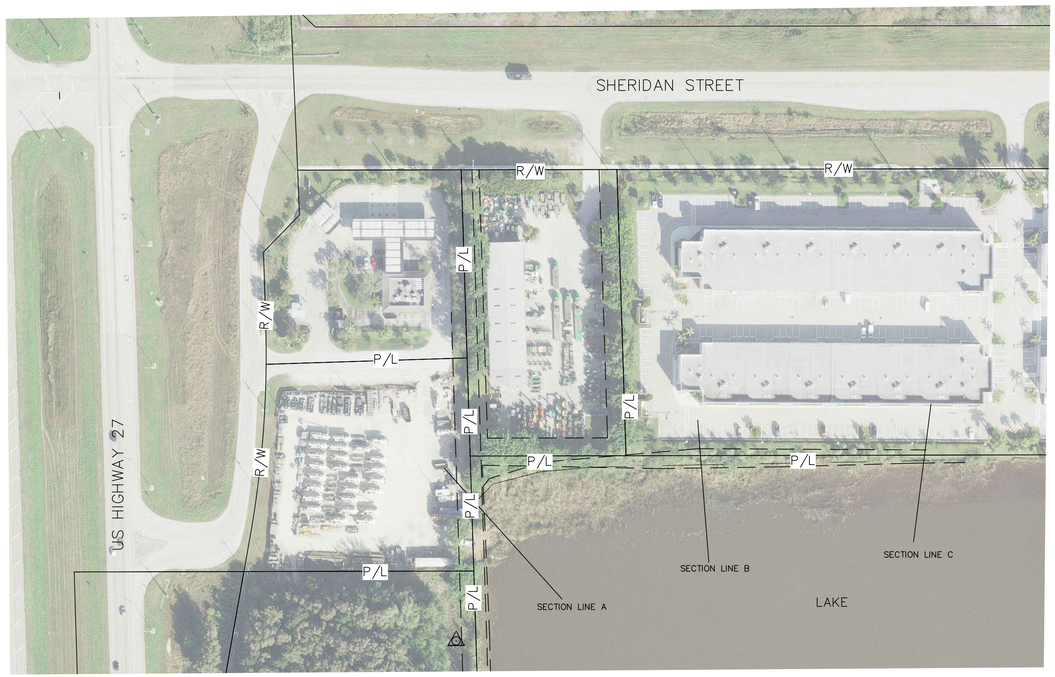
- STORM DRAINAGE MANHOLE
- CATCH BASIN
- STREET SIGN
- CURB INLET
- SEWER VALVE
- CLEAN OUT
- WIRE PULL BOX
- WATER VALVE
- CONCRETE POWER POLE
- FIRE HYDRANT
- FIBER OPTIC CABLE INDICATOR
- GAS VALVE
- WATER METER
- IRRIGATION CONTROL BOX
- BACKFLOW PREVENTER
- GUY ANCHOR
- TELEPHONE MANHOLE
- STRM — STORM DRAINAGE PIPE
- OVHD — OVERHEAD WIRE
- NON-VEHICULAR ACCESS LINE
- G — NATURAL GAS UNDERGROUND LINE
- W — WATER UNDERGROUND LINE
- COMM — COMMUNICATION UNDERGROUND LINE
- UNKN — UNKNOWN UNDERGROUND LINE

ABBREVIATIONS:

EL.	– ELEVATION
INV.	– INVERT
P.B.	– PLAT BOOK
PG.	– PAGE
U.E.	– UTILITY EASEMENT
B.O.S.	– BOTTOM OF STRUCTURE
RCP	– REINFORCED CONCRETE PIPE
HDPE	– HIGH DENSITY POLYURETHANE PIPE
DIA.	– DIAMETER
CLF	– CHAIN LINK FENCE
MH	– MANHOLE
R/W	– RIGHT OF WAY
℄	– CENTERLINE
B.C.R.	– BROWARD COUNTY RECORDS
P/L	– PROPERTY LINE

TREE LEGEND:

- 15' — PALM HEIGHT IN FEET
- PALM TREE
- ROYAL PALM TREE
- TREE
- GUMBO LIMBO TREE
- FICUS TREE
- OAK TREE
- CYPRESS TREE
- MAHOGANY TREE
- SILVER BUTTONWOOD TREE
- 8"-20" — TRUNK DIAMETER IN INCHES
- CANOPY SIZE IN FEET



KEY MAP
NOT TO SCALE

GRAPHIC SCALE
0 15 30 60
(IN FEET)
1 INCH = 30 FEET

SKETCH OF TOPOGRAPHIC SURVEY

TAFT STREET FORCEMAIN

FOR: CITY OF PEMBROKE PINES, BROWARD COUNTY, FLORIDA

NO.	DATE	REVISIONS & ADDITIONS OR DELETIONS	DES.	DWN.
1	9/04/24	REVISED TO SHOW BACKGROUND TOPO	MR	LP

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CERTIFICATES OF AUTHORIZATION:
EB7318 LB6680 LC0337

DES.	DWN.	CHK.
	LP	MR

PROJECT / FILE NO.
21-00004

DRAWING NO.
TS-3

DATE DRAWN:
9/9/24

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DRAFT DOCUMENT FOR COMMISSION REVIEW

GENERAL CONSTRUCTION NOTES:

ALL WORK AND REQUIREMENTS FROM THE NOTES IN THIS PAGE SHALL BE A REQUIREMENT OF THE CONTRACT AND EXECUTED BY THE CONTRACTOR AT NO ADDITIONAL COST. ALL WORK WILL COMPLY WITH CITY OF PEMBROKE PINES AND SOUTH BROWARD DRAINAGE DISTRICT (SBDD) MINIMUM STANDARDS.

1. ALL CONSTRUCTION CONNECTING TO CITY OF PEMBROKE PINES SYSTEM SHALL CONFORM TO THE CONTRACT DOCUMENTS AND CITY'S STANDARDS.
2. THE UTILITIES IMPROVEMENTS AND ADJUSTMENTS SHOWN ON THESE DRAWINGS ARE INTENDED TO MAINTAIN THE INTEGRITY OF THE CITY'S WATER, WASTEWATER, AND RAW WATER SYSTEMS. ALL MATERIALS AND CONSTRUCTION TO BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE DRAWINGS DO NOT INCLUDE WORK PERFORMED ON, OR FOR UTILITY SYSTEMS OWNED BY OTHERS.
3. LOCATIONS OF EXISTING UTILITIES AS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL FIELD VERIFY THE EXISTENCE AND LOCATION OF ALL ABOVE GROUND AND UNDERGROUND UTILITIES. CONTRACTOR SHALL CONTACT SUNSHINE ONE CALL PER STATE LAW PRIOR TO EXCAVATION. ALL EXISTING UTILITIES SHALL REMAIN AND ARE TO BE PROTECTED AND SUPPORT AS NEEDED FOR WATER MAIN INSTALLATION.
4. ALL EXISTING AND NEW WATER AND SEWER VALVES, VALVE BOXES, AND MANHOLES SHALL BE PROTECTED AND ADJUSTED TO FINISHED GRADE AS SHOWN ON THE DRAWINGS. VALVE AND VALVE BOXES SHALL REMAIN ACCESSIBLE AT ALL TIMES. ANY VALVES THAT MIGHT BE COVERED DURING CONSTRUCTION SHALL BE MARKED WITH A MARKER (GREEN FOR SEWER AND BLUE FOR WATER), A MINIMUM OF FOUR (4) FEET ABOVE GRADE. ALL VALVES UNDER CONSTRUCTION ARE TO REMAIN CLOSED DURING CONSTRUCTION AND REMAIN CLOSED UNTIL DIRECTION TO OPEN IS ISSUED BY CITY.
5. THE CONTRACTOR SHALL PROTECT EXISTING SERVICE CONNECTIONS AND MAINS DURING CONSTRUCTION AND SHALL COORDINATE THE RELOCATION OF SERVICES WITH CITY AND EOR PROJECT REPRESENTATIVE(S). THE CONTRACTOR WILL RELOCATE EXISTING SERVICES AS NECESSARY AND AS DIRECTED BY CITY PERSONNEL.
6. SEE DETAIL SHEET FOR SEPARATION REQUIREMENTS BETWEEN WATER MAINS, SEWER MAINS AND OTHER PIPELINES AND MAINS. NO CONCRETE ENCASEMENT OF PIPES WILL BE PERMITTED.
7. WHEN USING SCALED DATA CONSIDER THAT THESE PLANS MAY HAVE BEEN ALTERED IN SIZE DURING REPRODUCTION.
8. LOCATIONS AND DIMENSIONS OF EXISTING RIGHT-OF-WAYS AND EASEMENTS ARE BASED ON BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY AND STAKE THE LIMITS OF THE RIGHT-OF-WAYS AND EASEMENTS IN ORDER TO AVOID ENCROACHMENTS BEFORE CONSTRUCTION.
9. WHEN OBTAINING DATA AND INFORMATION FROM THE PLANS, NUMERICAL FIGURES SHALL BE USED IN PREFERENCE TO SCALED DIMENSIONS AND LARGER SCALE DRAWINGS IN PREFERENCE TO SMALLER SCALE DRAWINGS.
10. PIPE LENGTHS SHOWN ON PLANS ARE APPROXIMATE. ACTUAL LENGTHS ARE TO BE DETERMINED DURING CONSTRUCTION.
11. NOTIFY FIBER OPTICS COMPANIES SEVEN (7) DAYS PRIOR TO ANY CONSTRUCTION. EXTREME CAUTION SHALL BE EXERCISED IN THE AREAS OF FIBER OPTICS.
12. ALL STATIONS AND OFFSETS REFER TO THE BASELINE OF STATIONING.
13. MAINTAIN ACCESS TO ALL BUSINESSES AND RESIDENCES AT ALL TIMES.
14. ALL FITTINGS ON EXISTING MAINS ARE ASSUMED TO HAVE THRUST BLOCKS. CONTRACTOR SHALL USE CAUTION WHEN WORKING IN THESE AREAS.
15. LOCAL COMMERCIAL ACCESS SHALL BE MAINTAINED AT ALL TIMES. PROVIDE WRITTEN NOTIFICATION TO RESIDENTS SEVEN (7) DAYS PRIOR TO IMPLEMENTING ANY ROADWAY OR DRIVEWAY CLOSURE. A SECOND NOTICE WILL BE GIVEN 24 HOURS IN ADVANCE OF CLOSURE.
16. SUPPORT & PROTECT ALL EXISTING UTILITIES. CONTRACTOR SHALL CONTACT UTILITY OWNERS FOR LOCATION OF ALL EXISTING FACILITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH UTILITY OWNERS AND BE RESPONSIBLE FOR PROVIDING TEMPORARY SUPPORT FOR UTILITY POLES AND ALL OTHER UTILITIES.
17. THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN EXCAVATING IN PROXIMITY OF WATER MAINS, WASTEWATER FORCE MAINS, GRAVITY MAINS, AND RECLAIMED WATER MAINS. MAIN LOCATIONS SHOWN ON PLANS ARE NOT EXACT OR GUARANTEED. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING EXISTING UTILITY LOCATIONS.
18. COMPLETE ALL CONSTRUCTION WITHIN RIGHT OF WAY LIMITS AND EASEMENT LIMITS.
19. PIPE SIZES SHOWN ON PLANS ARE MINIMUM NOMINAL INSIDE DIAMETER.
20. ALL CONNECTIONS TO EXISTING MAINS SHALL BE MADE BY THE CONTRACTOR ONLY AFTER THE PROPOSED CONNECTION PROCEDURE AND WORK SCHEDULE HAVE BEEN REVIEWED AND ACCEPTED BY THE OWNER. THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST TO THE OWNER A MINIMUM OF FIVE (5) WORKING DAYS PRIOR TO SCHEDULING ANY CONNECTIONS. ALL CONNECTIONS TO BE COMPLETED IN THE PRESENCE OF AUTHORIZED CITY PERSONNEL. THE REQUEST SHALL REFERENCE THE PROFESSIONAL LAND SURVEYOR CERTIFIED COMPLETED AS-BUILT RECORD DRAWINGS PREVIOUSLY SUBMITTED AND SHALL OUTLINE THE FOLLOWING:
    a. POINTS OF CONNECTION, FITTINGS TO BE USED, METHODS OF FLUSHING AND DISINFECTION AND VERIFICATION OF RESTRAINT ON EXISTING PIPE.
    b. ESTIMATED CONSTRUCTION TIME FOR THE CONNECTIONS.

    THE OWNER SHALL REVIEW THE SUBMITTAL WITHIN FIVE (5) WORKING DAYS AFTER RECEIVING IT AND INFORM THE CONTRACTOR REGARDING APPROVAL OR DENIAL OF THE REQUEST. IF THE OWNER REJECTS THE REQUEST, THE CONTRACTOR SHALL RESUBMIT THE REQUEST MODIFYING IT IN A MANNER ACCEPTABLE TO THE OWNER. ALL CONNECTIONS SHALL ONLY BE MADE ON THE AGREED UPON DATE AND TIME.
    SHOULD THE CONTRACTOR NOT INITIATE AND COMPLETE THE CONNECTION WORK IN THE AGREED UPON MANNER, HE SHALL BE REQUIRED TO RESCHEDULE THE CONNECTION BY FOLLOWING THE PROCEDURE OUTLINED ABOVE.
21. THE CONTRACTOR SHALL NOT OPERATE ANY VALVES IN THE SYSTEM WITHOUT THE PRESENCE AND AUTHORIZATION OF CITY PERSONNEL.
22. PROTECT EXISTING IMPROVEMENTS TO THE MAXIMUM EXTENT POSSIBLE.
23. RESTORE ALL EXISTING IMPROVEMENTS AND DISTURBED AREAS TO ORIGINAL OR BETTER CONDITION. PAVEMENT TO BE RESTORED IN ACCORDANCE WITH THE PAVEMENT RESTORATION DETAILS SHOWN ON THE CONSTRUCTION DETAIL SHEETS. CONTRACTOR TO PROVIDE OWN SURVEY AS NEEDED TO MATCH EXISTING CONDITIONS.
24. ASPHALTIC CONCRETE RESURFACING SHALL BE COMPLETED TO THE ORIGINAL EDGE OF PAVEMENT. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE EXISTING PAVEMENT OUTSIDE OF RESURFACING LIMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL DAMAGE TO THE EXISTING ROADWAY OUTSIDE THE LIMITS OF THE RESURFACING.
25. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SATISFYING ALL REQUIREMENTS OF REGULATORY AGENCY PERMITS FOR CONSTRUCTION ACTIVITIES AND RELATED ACTIVITIES.
26. BENCHMARK LOCATIONS AND ELEVATION ARE SHOWN IN THE PLANS AS REPRESENTED BY SURVEYOR AT THE TIME OF SURVEY. CONTRACTOR SHALL INSTALL HIS OWN TEMPORARY BENCHMARKS AS DEEMED NECESSARY. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CITY INSPECTOR.
27. IMMEDIATELY AT ONSET OF CONSTRUCTION, CONTRACTOR SHALL FIELD VERIFY HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING UTILITIES CRITICAL TO COMPLETING THE PROJECT (INCLUDING WATER, SEWER, POWER, TELEPHONE, GAS, AND CABLE TV) AND SHALL EVALUATE POTENTIAL CONFLICTS IN A WRITTEN REPORT. ANY CONFLICTS SHALL BE REPORTED TO ENGINEER/OWNER IMMEDIATELY UPON DISCOVERY AND DETAILED IN THE REPORT. CONTRACTOR SHALL ASSUME ALL EXISTING UTILITIES SHALL REMAIN AND WILL BE SUPPORTED BY THE CONTRACTOR DURING CONSTRUCTION.
28. NO VALVE BOXES, METERS, PORTIONS OF MANHOLES, OR OTHER APPURTENANCES OF ANY KIND RELATING TO ANY UNDERGROUND UTILITIES SHALL BE LOCATED IN ANY PORTION OF A CURB-AND-GUTTER OR SIDEWALK SECTION. CONTRACTOR SHALL ADVISE EOR IMMEDIATELY UPON DISCOVERY OF A POTENTIAL CONFLICT.
29. WHERE REQUIRED, AT NO ADDITIONAL COST TO THE CITY, THE CONTRACTOR SHALL USE TEMPORARY SHEETING OR TRENCH BOXES TO MINIMIZE THE SIZE OF EXCAVATIONS AND PROTECT EXISTING ROADWAYS, UTILITIES, STORM WATER SYSTEMS AND OTHER FACILITIES. CONTRACTOR TO COMPLY WITH OSHA TRENCH SAFETY REQUIREMENTS AT ALL TIMES. CITY PERSONNEL ARE AUTHORIZED TO SHUT DOWN ANY UNSAFE OPERATIONS IF WITNESSED, WITHOUT REPERCUSSION OR LIABILITY FOR DELAY, OR COST IMPACT.
30. THE CONTRACTOR SHALL RECOGNIZE AND ABIDE BY ALL OSHA EXCAVATION SAFETY STANDARDS, INCLUDING THE FLORIDA TRENCH SAFETY ACT (90-96, LAWS OF FLORIDA). ANY MATERIAL, CONSTRUCTION METHODS, OR MATERIAL COST TO COMPLY WITH THESE LAWS SHALL BE INCIDENTAL TO THE CONTRACT.
31. ALL COMPACTION SHALL BE 98% OF AASHTO T-180.
32. PAVED / CONCRETE DRIVEWAYS SHALL BE TEMPORARILY RESTORED WITHIN 24 HOURS WITH AN ALL WEATHER PATCH. ALL DIRT DRIVEWAYS SHALL BE RESTORED TO SAME TYPE OR BETTER CONDITION WITHIN 24 HOURS.
33. CONTRACTOR SHALL PROVIDE A DETAILED RESTORATION SCHEDULE WHICH SHALL BE SUBMITTED FOR REVIEW PRIOR TO CITY PERMITS BEING ISSUED.
34. CONTRACTOR SHALL MAINTAIN DRAINAGE IN DITCHES AND SWALES AT ALL TIMES. THIS INCLUDES ALL TURBIDITY BARRIERS, SYNTHETIC HAY BAILS, ADDITIONAL FILL MATERIAL, BYPASS PUMPING AND SWALE RESTORATION INCLUDING SODDING. ALL DITCH WORK SHALL MEET THE TEMPORARY EROSION AND SEDIMENT CONTROL REQUIREMENT OF INDEX 102 AND INDEX 103 OF THE LATEST FDOT DESIGN STANDARDS. PAYMENT FOR DITCH AND SWALE MAINTENANCE SHALL BE INCLUDED IN THE PRICE OF THE PIPE AND NO SEPARATE PAYMENT WILL BE CONSIDERED.
35. THE CONTRACTOR SHALL INSTALL TEMPORARY WATER TIGHT BULKHEADS, APPROVED BY THE ENGINEER, WITHIN THE END OF THE NEW PIPELINE, WHENEVER PIPE LAYING OPERATIONS ARE NOT TAKING PLACE.
36. ALL EXISTING TRAFFIC SIGNS WITHIN THE PROPOSED CONSTRUCTION LIMITS ARE TO BE PROTECTED. CAUTION SHOULD BE EXERCISED WHILE RELOCATING EXISTING SIGNS WHERE DIRECTED. IF THE SIGNS ARE DAMAGED BEYOND USE, AS DETERMINED BY THE ENGINEER, THE DAMAGED SIGNS SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.
37. DIRECTIONAL DRILL OPERATION SHALL MEET THE REQUIREMENTS OF FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION, SECTION 555, DIRECTIONAL BORE.
38. BORE TRACKING AND MONITORING: AT ALL TIMES DURING THE PILOT BORE THE CONTRACTOR SHALL PROVIDE AND MAINTAIN A BORE TRACKING SYSTEM THAT IS CAPABLE OF ACCURATELY LOCATING THE POSITION OF THE DRILL HEAD IN THE X, Y, AND Z AXES. THE CONTRACTOR SHALL RECORD THESE DATA AT LEAST ONCE PER DRILL PIPE LENGTH OR EVERY THIRTY (30) FEET, WHICHEVER IS LESS. DOWNHOLE AND SURFACE GRID TRACKING SYSTEM: CONTRACTOR SHALL MONITOR AND RECORD X, Y, AND Z COORDINATES RELATIVE TO AN ESTABLISHED SURFACE SURVEY BENCHMARK, FROM DOWNHOLE SURVEY DATA USING A DOWNHOLE WIRELINE SYSTEM. "TRU-TRACKER" ENERGIZED SURFACE GRID, OR EQUIVALENT, SHALL BE INSTALLED AND USED TO SUPPLEMENT THE WIRELINE SYSTEM. THE GRIDS SHALL BE SURVEYED TO ESTABLISH HORIZONTAL AND VERTICAL POSITION TO 0.1 FEET ACCURACY. DATA TO BE RECORDED MUST INCLUDE CLOCK AND PITCH INFORMATION, DEPTH, TRANSMITTER TEMPERATURE, BATTERY STATUS, AND POSITION (X, Y) THE DATA SHALL BE CONTINUOUSLY MONITORED AND RECORDED AT LEAST ONCE PER DRILL PIPE LENGTH.
39. CONTRACTOR SHALL PROVIDE ALL TEMPORARY FILL AND STORM PIPING NECESSARY TO INSTALL NEW CONSTRUCTION. RESTORE ALL DISTURBED AREAS TO PRE EXISTING CONDITIONS OR BETTER.
40. ALL DISTURBED SOD SHALL BE PERMANENTLY REPLACED WITH SOD. NO SEEDING IS ALLOWED AS A METHOD OF REPLACEMENT, ONLY AS PART OF A TEMPORARY EROSION CONTROL PLAN TO STABILIZE DISTURBED SOD PRIOR TO END OF PROJECT SOD RESTORATION.
41. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SURVEYING DURING CONSTRUCTION. AS-BUILTS SHALL BE ELECTRONICALLY SUBMITTED TO EOR FOR REVIEW PRIOR TO ACCEPTANCE AND FINAL COMPLETION OF WORK.

PERMITS, PLANS, SHOP DRAWINGS:

1. PERMITS OR LETTERS OF DETERMINATION FROM FDEP, SFWMD, ACOE, FDOT, USACE, AND ALL OTHER APPROPRIATE PERMITTING AGENCIES SHALL BE OBTAINED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. A STAMPED APPROVED SET OF PLANS BY THE EOR SHALL BE PRESENT ON THE SITE AT ALL TIMES.
3. SHOP DRAWINGS SHALL BE ELECTRONICALLY SUBMITTED TO CITY AND SBDD FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
4. INSTALLATION OF MATERIALS AND/OR STRUCTURES PRIOR TO SHOP DRAWING APPROVAL IS NOT PERMITTED.
5. TWO HARD COPIES AND ONE ELECTRONIC COPY OF RECORD DRAWINGS SHALL BE SUBMITTED TO CITY AND EOR AT OR BEFORE THE FINAL INSPECTION. RECORD DRAWINGS SHALL CONFORM TO CITY STANDARDS, SPECIFICATIONS AND DETAILS.

M.O.T. NOTES:

1. THE MAINTENANCE OF TRAFFIC FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH U.S. DEPARTMENT OF TRANSPORTATION "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD), LATEST EDITION, AND THE FLORIDA DEPARTMENT OF TRANSPORTATION'S "ROADWAY AND TRAFFIC DESIGN STANDARDS" LATEST EDITION. CONTRACTOR SHALL BE RESPONSIBLE FOR PREPARING AND SUBMITTING A M.O.T. PLAN IN ACCORDANCE WITH FDOT GUIDELINES, REGULATIONS AND STANDARDS TO THE CITY OR COUNTY(WHICHEVER IS APPLICABLE) FOR APPROVAL PRIOR TO COMMENCING WORK. THE CONTRACTOR'S M.O.T. PLAN SHALL BE SEALED BY A FLORIDA REGISTERED CIVIL ENGINEER WITH KNOWLEDGE OF PREPARING TRAFFIC CONTROL PLANS.
2. THE POSTED SPEED LIMITS ALONG THE ROADWAYS UNDER CONSTRUCTION SHALL BE IN FORCE, UNLESS IT IS DEEMED APPROPRIATE THAT THE SPEED BE REDUCED.
3. THE CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE PATTERNS DURING CONSTRUCTION ACTIVITIES.
4. THE CONTRACTOR SHALL NOTIFY BUSINESSES AND RESIDENCES WITHIN THE CONSTRUCTION AREA AT LEAST (5) WORKING DAYS PRIOR TO CONSTRUCTION AND SHALL MAINTAIN ACCESS AT ALL TIMES.
5. THE CONTRACTOR SHALL ADJUST THE MAINTENANCE OF TRAFFIC SIGNS AND BARRICADES AS NEEDED PER FIELD CONDITIONS.
6. CONTRACTOR SHALL MAINTAIN PEDESTRIAN AND VEHICULAR TRAFFIC PER FDOT REQUIREMENTS. CONTRACTOR SHALL PROVIDE ALL WARNING SIGNALS, SIGNS, LIGHTS AND FLAG MEN AS REQUIRED BY FDOT IN THE "MANUAL OF TRAFFIC CONTROL AND SAFE PRACTICES" (FDOT INDEXES 600 - 8501, TO ENSURE SAFE PASSAGE OF VEHICULAR AND PEDESTRIAN TRAFFIC DURING CONSTRUCTION ACTIVITIES.

EROSION AND SEDIMENT CONTROLS:

1. AN EROSION CONTROL PLAN SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO THE PRE-CONSTRUCTION MEETING. THE CONTRACTOR SHALL EXECUTE ALL MEASURES NECESSARY TO LIMIT THE TRANSPORT OF SEDIMENTS OUTSIDE THE LIMITS OF THE PROJECT TO THE VOLUME AND AMOUNT AS THAT ARE EXISTING PRIOR TO THE COMMENCEMENT OF CONSTRUCTION PERIOD. PROVISION MUST BE MADE TO PRESERVE THE INTEGRITY AND CAPACITY OF CHECK WEIRS, SEDIMENT BASINS, SLOPE DRAINS, GRADING PATTERNS, ETC. REQUIRED TO MEET THIS PROVISION THROUGHOUT THE LIFE OF THE CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE HAY BALES, SILT BARRIERS, TEMPORARY GRASSING, ETC. AS REQUIRED TO FULLY COMPLY WITH THE INTENT OF THIS SPECIFICATION. PROVIDE STORM WATER BY-PASS PIPING OF PUMPING TO MAINTAIN DRAINAGE IN ALL LOCATIONS NECESSARY FOR EQUIPMENT STAGING.

A. STOCKPILING MATERIAL
NO EXCAVATED MATERIAL SHALL BE STOCKPILED IN SUCH A MANNER AS TO DIRECT RUNOFF DIRECTLY OFF THE PROJECT SITE OR INTO ANY ADJACENT WATER BODY OR STORMWATER COLLECTION FACILITY.

B. EXPOSED AREA LIMITATION
THE SURFACE AREA OF OPEN, RAW ERODABLE SOIL EXPOSED BY CLEARING AND GRUBBING OPERATIONS OR EXCAVATION AND FILLING OPERATIONS SHALL BE CONTROLLED, SO THAT THIS OPERATION WILL NOT SIGNIFICANTLY AFFECT OFFSITE DEPOSIT SEDIMENTS.

C. INLET PROTECTION
INLETS AND CATCH BASINS SHALL BE PROTECTED FROM SEDIMENT LADEN STORMWATER RUNOFF UNTIL THE COMPLETION OF THE ALL CONSTRUCTION OPERATIONS THAT MAY CONTRIBUTE SEDIMENT TO THE INLET.

D. TEMPORARY SEEDING
AREAS OPENED BY CONSTRUCTION OPERATIONS THAT ARE NOT ANTICIPATED TO BE DRESSED OR RECEIVE FINAL GRASSING TREATMENT WITHIN THIRTY (30) DAYS SHALL BE SEEDED WITH A QUICK GROWING GRASS SPECIES WHICH WILL PROVIDE AN EARLY COVER, DURING THE SEASON IN WHICH IT IS PLANTED. TEMPORARY SEEDING SHALL BE CONTROLLED SO AS TO NOT ALTER OR COMPETE WITH PERMANENT GRASSING. THE RATE OF SEEDING SHALL BE 30 POUNDS PER ACRE.

E. TEMPORARY SEEDING AND MULCHING
SLOPES STEEPER THAN 6:1 THAT FALL WITHIN THE CATEGORY ESTABLISHED IN 4 ABOVE, SHALL ADDITIONALLY RECEIVE MULCHING OF APPROXIMATELY TWO (2) INCHES, LOOSE MEASURE, OF MULCH MATERIAL CUT INTO THE SOIL OF THE SEEDED AREA TO A DEPTH OF FOUR (4) INCHES.

F. TEMPORARY GRASSING
SEEDED OR SEEDED AND MULCHED AREA(S) SHALL BE ROLLED AND WATERED AS REQUIRED TO ASSURE OPTIMUM GROWING CONDITIONS FOR THE ESTABLISHMENT OF A GOOD GRASS COVER.

G. TEMPORARY RE-GRASSING
IF, AFTER 14 DAYS, THE TEMPORARY GRASSED AREAS HAVE NOT ATTAINED A MINIMUM OF 75% GOOD GRASS COVER, THE AREA WILL BE REWORKED AND ADDITIONAL SEEDS APPLIED TO ESTABLISH THE DESIRED VEGETATION COVER.

H. MAINTENANCE
ALL FEATURES OF THE PROJECT SHALL BE CONSTRUCTED TO PREVENT EROSION AND SEDIMENT AND SHALL BE MAINTAINED DURING THE LIFE OF THE CONSTRUCTION SO AS TO FUNCTION PROPERLY WITHOUT THE TRANSPORT OF SEDIMENTS OUTSIDE THE LIMITS OF THE PROJECT.

2. TEMPORARY SILT FENCES AND STAKED SILT BARRIERS, SHALL BE IN ACCORDANCE WITH F.D.O.T. STANDARD SPECIFICATION, SEC. 104.6, 104.7 AND SEC. 985 AND SHALL BE INSTALLED ALONG THE WESTERN LIMITS OF THE PROJECT.
3. ALL DISTURBED AREAS SHALL BE RESTORED WITH SOD (NO SEED AND MULCH) WITH THE SAME TYPE OF SOD UNLESS NOTED OTHERWISE ON PLANS.

PIPELINE SYSTEM

1. THE ENTITY THAT WILL OPERATE AND MAINTAIN THE PIPELINE SYSTEM SHOWN ON THESE PLANS IS SBDD. THE CONTRACTOR SHALL MEET ALL THE REQUIREMENTS OF THE CITY OF PEMBROKE PINES AND SBDD STANDARD ENGINEERING SPECIFICATION.
2. ALL PIPE SHALL BE PVC, UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
3. INSTALL ALL UTILITY MAINS AT A MINIMUM 36 INCHES OF COVER OR AS INDICATED ON THE DRAWINGS.
4. DUCTILE IRON PIPE AND FITTINGS WITHIN 10 FEET OF GAS MAINS SHALL HAVE AN 8-MIL POLYETHYLENE WRAP IN ACCORDANCE WITH ANSI/AWWA C105/A21.5.
5. PVC PIPE 4" - 12" SHALL CONFORM TO AWWA C900. PIPE 14" - 36" SHALL CONFORM TO AWWA C905. PIPE SHALL CONFORM TO ASTM D1784, TYPE I, GRADE I, 4000 PSI DESIGN STRESS, AND SHALL BE NATIONAL SANITATION FEDERATION (NSF) APPROVED. PIPE SHALL BE CLASS 100 (DR25) WITH MARKINGS ON EACH SECTION SHOWING CONFORMANCE TO THE ABOVE SPECIFICATIONS. JOINTS SHALL BE RUBBER GASKETED CONFORMING TO AWWA C900 OR C905 THE BELL SHALL BE INTEGRAL WITH THE PIPE AND OF EQUAL OR GREATER PRESSURE RATING. THE BELL OF PIPE AND FITTINGS USING PUSH-ON JOINTS SHALL HAVE AN INTEGRAL GROOVE TO RETAIN THE GASKET IN PLACE.
6. ALL FITTINGS SHALL BE MANUFACTURED OF DUCTILE IRON, CONFORMING TO ANSI/AWWA C110/A21.10 OR ANSI/AWWA C153/A21.53. ALL FULL BODY (C110/A21.10) FITTINGS SHALL BE PRESSURE RATED TO 250 PSI, MINIMUM. ALL COMPACT FITTINGS (C153/A21.53) SHALL BE PRESSURE RATED TO 350 PSI, MINIMUM.
7. MECHANICAL AND PUSH ON JOINTS FOR DUCTILE IRON PIPE AND FITTINGS SHALL BE RUBBER GASKETED, CONFORMING TO ANSI/AWWA C111/A21.11. LUBRICANTS OTHER THAN THAT FURNISHED BY THE PIPE MANUFACTURER WITH THE PIPE SHALL NOT BE USED.
8. ALL FITTINGS SHALL BE RESTRAINED IN ACCORDANCE WITH DIPRA, "THRUST RESTRAINT DESIGNED FOR DUCTILE IRON PIPE". PIPE JOINTS SHALL BE RESTRAINED UPSTREAM AND DOWNSTREAM OF FITTINGS IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS OR THE TABLE SHOWN IN THE DRAWINGS, WHICHEVER IS GREATER. DUCTILE IRON RESTRAINED JOINTS SHALL BE AMERICAN FAST GRIP GASKET, FLEX-RING, FIELD FLEX RING, LOK-RING, US PIPE TR-FLEX, EBAA MEGALUG, OR EQUAL. PVC PIPE JOINTS SHALL BE RESTRAINED USING MECHANICAL DEVICES, UNI-FLANGE BLOCK BUSTER SERIES 1350 OR ENGINEER APPROVED EQUAL.
9. INTERIOR LINING FOR VALVES 4 INCH AND LARGER SHALL BE EITHER MINIMUM 40 MILS DRY FILM THICKNESS (60 MILS NOMINAL) OF CERAMIC EPOXY LINING, AS MANUFACTURED UNDER THE NAME OF "PROTECTO 401", OR MINIMUM 40 MILS DRY FILM THICKNESS (60 MILS NOMINAL) OF FUSION BONDED EPOXY AND POLYETHYLENE LINING, AS MANUFACTURED UNDER THE NAME OF "POLYBOND PLUS", OR EQUAL. EXTERIOR COATING FOR BURIED VALVES SHALL BE RUST INHIBITING EPOXY PRIMER, FOLLOWED BY A COAL TAR EPOXY, TOTAL MINIMUM DRY FILM THICKNESS OF 16 MILS, APPLIED AT THE FACTORY. EXTERIOR COATING OF EXPOSED VALVES SHALL BE FACTORY APPLIED RUST INHIBITING EPOXY PRIMER, MINIMUM 3 MILS DRY FILM THICKNESS. AFTER INSTALLATION, EXTERIOR SURFACES SHALL BE PAINTED WITH TWO COATS TNEMEC SERIES 2 TNEME-GLOSS, GLIDDEN LIFE MASTER PRO HIGH PERFORMANCE ACRYLIC NO. 6900 SERIES, OR EQUAL, AT 4 MILS MINIMUM DRY FILM THICKNESS PER COAT. PAINT COLOR TO BE IN ACCORDANCE WITH LOCAL UTILITY REQUIREMENTS.
10. VALVES SHALL BE RESILIENT WEDGE GATE VALVES. VALVES SHALL BE LOCATED AT NOT MORE THAN 500 FOOT INTERVALS IN COMMERCIAL, INDUSTRIAL AND HIGH DENSITY RESIDENTIAL AREAS AND AT NOT MORE THAN 1000 FOOT INTERVALS IN ALL OTHER AREAS. APPROPRIATE VALVING SHALL ALSO BE PROVIDED AT THE DOWNSTREAM SIDES OF TEES AND CROSSES AND BOTH SIDES OF A DIRECTIONAL BORE OR JACK AND BORE. THIS SHALL INCLUDE ALL SIDES OF TEES AND CROSSES WITHIN LOOPED SYSTEMS, WHERE FLOW IS POTENTIALLY MULTIDIRECTIONAL.
11. ALL BURIED VALVES SHALL BE PROVIDED WITH ADJUSTABLE VALVE BOXES APPROXIMATELY 5 INCHES IN DIAMETER WITH A MINIMUM THICKNESS OF 3/16 INCH CAST IRON. BOXES SHALL BE OF SUFFICIENT LENGTH TO OPERATE ALL VALVES BURIED IN THE GROUND, CONSISTING OF BASE, CENTER SECTION, AND TOP SECTION WITH COVER. VALVE BOXES LOCATED IN UNPAVED AREAS SHALL BE SLIP TYPE DESIGN TO PERMIT MOVEMENT OF THE TOP SECTION WITHOUT TRANSMITTING FORCES ONTO THE VALVE BODY. VALVE BOXES CAST INTO CONCRETE OR ASPHALT SURFACING SHALL HAVE BRASS COVERS. ALL VALVE BOX COVERS SHALL BE INTERNALLY CHAINED TO VALVE BOXES WITH AN APPROXIMATELY 18 INCH GALVANIZED CHAIN. VALVE BOX COVERS SHALL BE CAST WITH THE INSCRIPTION "STORM".
12. PVC PIPE SHALL BE COLOR CODED GREEN (FORCE MAINS), WITH 2" LETTERING ("STORM FORCE MAIN") ON TWO SIDES OF THE PIPE IN AT LEAST THREE AREAS PER PIPE SECTION.
13. INSTALL IDENTIFICATION TAPE ALONG ALL DUCTILE IRON PIPE AND PVC PIPE, MINIMUM THICKNESS 4 MILS, WIDTH 6 INCHES, LETTER SIZE 1 INCH, TEXT TO BE "STORM FORCE MAIN". APPLY TAPE TO SURFACE OF PIPE, CONTINUOUSLY EXTENDING FROM JOINT TO JOINT. TAPE COLOR AND LETTERING SHALL BE BLACK PRINTING ON GREEN BACKGROUND. PLACE TAPE AS FOLLOWS: 2" - 8" PIPE - CENTER ALONG TOP HALF OF PIPE; 10" - 18" PIPE - PLACE ALONG BOTH SIDES OF THE TOP HALF OF PIPE; 20" PIPE AND LARGER - PLACE ON BOTH SIDES OF TOP HALF OF PIPE WITH A THIRD STRIP CENTERED ALONG TOP HALF OF PIPE.
14. INSTALL WARNING TAPE ALONG ALL PIPELINES, PLACED 2 FEET ABOVE PIPE. TAPE SHALL BE 6-INCH WIDE VINYL CONTINUOUS TAPE. TAPE SHALL BE COLORED BROWN WITH BLACK LETTERING, CODED AND WORDED "CAUTION: STORM MAIN BURIED BELOW".
15. INSTALL LOCATING WIRE ALONG ALL PVC PIPELINES. WIRE SHALL BE COLOR-CODED 14 GAUGE CONTINUOUS INSULATED WIRE. COLOR CODING SHALL BE SIMILAR TO WARNING TAPE COLORS. INSTALL LOCATOR WIRE ALONG ALL PRESSURIZED PIPELINES 2" AND LARGER. LOOP WIRE INTO ALL VALVE BOXES. LOOPING TO OCCUR EVERY 500 FEET MINIMUM. WHERE THERE ARE NO VALVE BOXES TO ALLOW LOOPING, PROVIDE ACCESS BOXES PER UTILITY REQUIREMENTS. CHECK WIRE FOR ELECTRICAL CONTINUITY.
16. ALL CHANGES IN DIRECTION SHALL BE MADE WITH FITTINGS OR APPROVED JOINT DEFLECTION. BENDING OF PIPE, EXCEPT COPPER AND POLYETHYLENE, IS PROHIBITED. JOINT DEFLECTION SHALL NOT EXCEED 75% OF THE MANUFACTURER'S RECOMMENDED MAXIMUM DEFLECTION.
17. TEST PROCEDURES SHALL BE APPROVED BY THE ENGINEER. ALL TESTS SHALL BE MADE IN THE PRESENCE OF THE ENGINEER AND UTILITY. NOTIFY THE ENGINEER AND THE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY WORK IS TO BE INSPECTED OR TESTED.
18. PROVIDE ALL EQUIPMENT FOR TESTING. INCREMENTS ON GAGES USED FOR LOW PRESSURE AIR TESTING SHALL BE OF SCALED TO THE NEAREST 0.1 PSI. GAGES, PUMPS, AND HOSES SHALL BE IN GOOD WORKING ORDER WITH NO NOTICEABLE LEAKS.
19. APPLY HYDROSTATIC TEST PRESSURE OF 100 PSI FOR 10 MINUTES AND FOR SUCH ADDITIONAL PERIOD NECESSARY FOR THE ENGINEER TO COMPLETE THE INSPECTION OF THE LINE UNDER TEST. DO NOT EXCEED PIPE MANUFACTURER'S SUGGESTED TIME DURATION AT THE TEST PRESSURE. IF DEFECTS ARE NOTED, REPAIRS SHALL BE MADE AND THE TEST REPEATED UNTIL ALL PARTS OF THE LINE WITHSTAND THE TEST PRESSURE.
20. APPLY LEAKAGE TEST PRESSURE OF 100 PSI. MAINTAIN PRESSURE AT A MAXIMUM VARIATION OF 5% DURING THE ENTIRE LEAKAGE TEST. THE DURATION OF THE LEAKAGE TEST SHALL BE TWO HOURS MINIMUM, AND FOR SUCH ADDITIONAL TIME NECESSARY FOR THE ENGINEER TO COMPLETE INSPECTION OF THE SECTION OF LINE UNDER TEST. LEAKAGE MEASUREMENTS SHALL NOT BE STARTED UNTIL A CONSTANT TEST PRESSURE HAS BEEN ESTABLISHED. THE LINE LEAKAGE S

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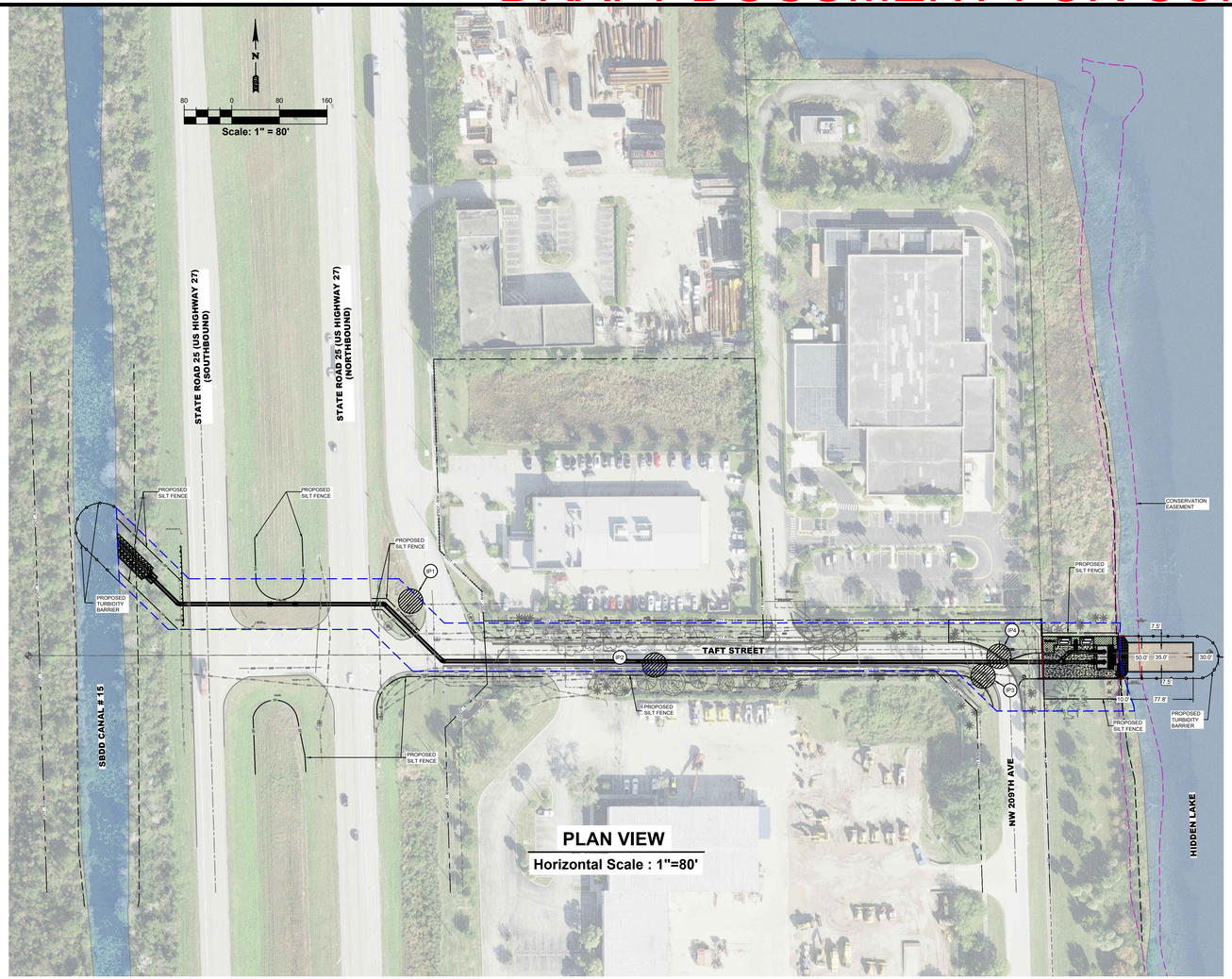
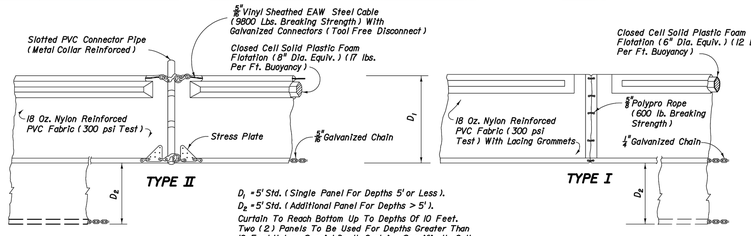


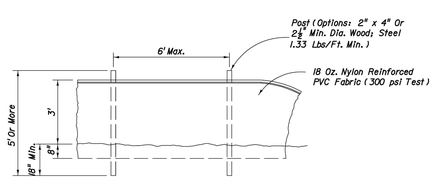
PLAN VIEW
Horizontal Scale : 1"=80'



D_1 = 5' Std. (Single Panel For Depths 5' or Less).
D_2 = 5' Std. (Additional Panel For Depths > 5').
Curtain To Reach Bottom Up To Depths Of 10 Feet. Two (2) Panels To Be Used For Depths Greater Than 10 Feet Unless Special Depth Curtains Specifically Call For In The Plans Or As Determined By The Engineer.

NOTICE: COMPONENTS OF TYPES I AND II MAY BE SIMILAR OR IDENTICAL TO PROPRIETARY DESIGNS. ANY INFRINGEMENT ON THE PROPRIETARY RIGHTS OF THE DESIGNER SHALL BE THE SOLE RESPONSIBILITY OF THE USER. SUBSTITUTIONS FOR TYPES I AND II SHALL BE AS APPROVED BY THE ENGINEER.

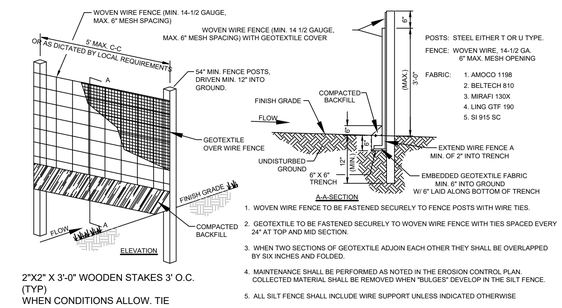
FLOATING TURBIDITY BARRIERS



STAKED TURBIDITY BARRIER

LEGEND

- CONSTRUCTION LIMITS
- SILT FENCE
- EXISTING EASEMENT
- EXISTING CONSERVATION EASEMENT
- PROPOSED TURBIDITY BARRIER
- IP1 TEMPORARY COMPOSIT FILTER SOCK



POSTS: STEEL EITHER T OR U TYPE.
FENCE: WOVEN WIRE, 14-1/2 GA. 6" MAX. MESH OPENING
FABRIC: 1. AMOCO 1198 2. BELTECH 810 3. MIRAFI 130X 4. LING GTF 190 5. SI 915 SC

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES.
2. GEOTEXTILE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF GEOTEXTILE ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NOTED IN THE EROSION CONTROL PLAN. COLLECTED MATERIAL SHALL BE REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.
5. ALL SILT FENCE SHALL INCLUDE WIRE SUPPORT UNLESS INDICATED OTHERWISE

2"X2" X 3'-0" WOODEN STAKES 3' O.C. (TYP)
WHEN CONDITIONS ALLOW. TIE SOCK AT OVERLAP TO PREVENT SOCK MOVEMENT WHEN NOT STAKED (PAVEMENT APPLICATION).

SEDIMENTATION/ SILT FENCE WITH WIRE SUPPORT
N.T.S.

USAGE NOTES:

1. ANCHORING STAKES BE SIZED, SPACED, AND BE OF A MATERIAL THAT EFFECTIVELY SECURES THE FILTER SOCK. STAKE SPACING SHALL BE A MAXIMUM OF THREE FEET.
2. OVERLAP ENDS OF SOCK PER MANUFACTURERS RECOMMENDATIONS. (1' MIN. 3' MAX.)
3. USE 8" TO 12" DIA. SOCK ON CURBSIDE IN TRAFFIC AREAS.
4. USE 12"-18" DIA. SOCK IN NON-TRAFFIC AREAS OR AREAS WJERE SAFETY IS NOT A CONCERN.

DESIGN CRITERIA:

COMPOST FILTER SOCKS ARE DESIGNED TO RETAIN SEDIMENT TRANSPORTED IN SHEET FLOW FROM DISTURBED AREAS. COMPOST FILTER SOCKS PERFORM THE SAME FUNCTION AS SILT FENCE, ALLOW A HIGHER FLOW RATE, AND ARE USUALLY FASTER AND CHEAPER TO INSTALL. WHERE ALL RUNOFF IS TO BE TREATED BY THE COMPOST FILTER SOCK THE MAXIMUM SLOPE LENGTH BEHIND THE COMPOST FILTER SOCK SHALL NOT EXCEED THOSE SHOWN IN TABLE 1. THE DRAINAGE AREA SHALL NOT EXCEED ¼ ACRE FOR EVERY 100 FT OF COMPOST FILTER SOCK.

THE SEDIMENT AND POLLUTANT REMOVAL PROCESS CHARACTERISTIC TO COMPOST FILTER SOCKS COMBINES BOTH FILTERING AND DEPOSITION FROM SETTLING SOLIDS. THIS IS DIFFERENT THAN METHODS THAT RELY ON PONDING FOR DEPOSITION OF SOLIDS FOR SEDIMENT CONTROL, SUCH AS SILT FENCE. PONDING OCCURS WHEN WATER FLOWING TO THE COMPOST FILTER SOCK ACCUMULATES FASTER THAN THE HYDRAULIC FLOW THROUGH RATE OF THE COMPOST FILTER SOCK. HYDRAULIC FLOW-THROUGH RATES FOR COMPOST FILTER SOCKS ARE 50% GREATER THAN SILT FENCE FILTER FABRIC. GREATER HYDRAULIC FLOW-THROUGH RATES REDUCE PONDING. COMPOST FILTER SOCK MESH NETTING SHALL MEET THE NETTING SPECIFICATION IN TABLE 2. COMPOST FILTER SOCKS SHALL MEET THE SPECIFICATIONS IN TABLE 3. COMPOST USED IN COMPOST FILTER SOCKS SHALL MEET THE SPECIFICATION DESCRIBED UNDER COMPOST FILTER MEDIA SPECIFICATIONS.

COMPOST FILTER MEDIA SPECIFICATIONS

COMPOST USED FOR COMPOST FILTER SOCK FILLER MATERIAL (FILTER MEDIA) SHALL BE WEED FREE AND DERIVED FROM A WELL-DECOMPOSED SOURCE OF ORGANIC MATTER. THE COMPOST SHALL BE PRODUCED USING AN AEROBIC COMPOSTING PROCESS MEETING CFR 503 REGULATIONS INCLUDING TIME AND TEMPERATURE DATA. THE COMPOST SHALL BE FREE OF ANY REFUSE, CONTAMINANTS OR OTHER MATERIALS TOXIC TO PLANT GROWTH. NON-COMPOSTED PRODUCTS WILL NOT BE ACCEPTED. TEST METHODS FOR THE ITEMS BELOW SHOULD FOLLOW US COMPOSTING COUNCIL TEST METHODS FOR THE EXAMINATION OF COMPOSTING AND COMPOST GUIDELINES FOR LABORATORY PROCEDURES:

A. PH – 5.0-8.0 IN ACCORDANCE WITH TMECC 04.11-A, "ELECTROMETRIC PHDETERMINATIONS FOR COMPOST"

B. PARTICLE SIZE – 99% PASSING A 2 IN (50MM) SIEVE AND A MAXIMUM OF 40% PASSING A 3/8 IN (9.5MM) SIEVE, IN ACCORDANCE WITH TMECC 02.02-B, "SAMPLE SIEVING FOR AGGREGATE SIZE CLASSIFICATION". (NOTE- IN THE FIELD, PRODUCT COMMONLY IS BETWEEN ½ IN [12.5MM] AND 2 IN [50MM] PARTICLE SIZE.)

C. MOISTURE CONTENT OF LESS THAN 60% IN ACCORDANCE WITH STANDARDIZED TEST METHODS FOR MOISTURE DETERMINATION.

D. MATERIAL SHALL BE RELATIVELY FREE (<1% BY DRY WEIGHT) OF INERT OR FOREIGN MAN MADE MATERIALS.

E. A SAMPLE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO BEING USED AND MUST COMPLY WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

TABLE 1

Land Slope	Move
Percent	Feet
<2	100
2 to 5	75
5 to 10	50
10 to 20	25
>20*	15

*In areas where the slope is greater than 20% , a flat area length of 10 ft between the toe of the slope to the compost filter sock should be provided.

Table 2

Material Type	Multi-Filament Polypropylene	Multi-Filament Polypropylene
Material Characteristic	Photodegradable	Photodegradable
Mesh Opening	3/8 in (10mm)	1/8 in (3mm)
Tensile Strength (ASTM 5035-95)	44 psi (3.09 kg/cm2)	202 psi (14.2 kg/cm2)*
% Original Strength from Ultraviolet Exposure (ASTM G-155)	100% at 1000 hr	100% at 1000 hr

TABLE 3

Material Type	12 in (300mm) Diameter
Effective Circumference	38 in (960mm)
Density (when filled)	32 lbs/ft (50 kg/in)
Air Space	20%
Hydraulic Flow Through Rate	11.3 gpm/ft (141 L/min/m)
P Factor (RUSLE)	0.1-0.32

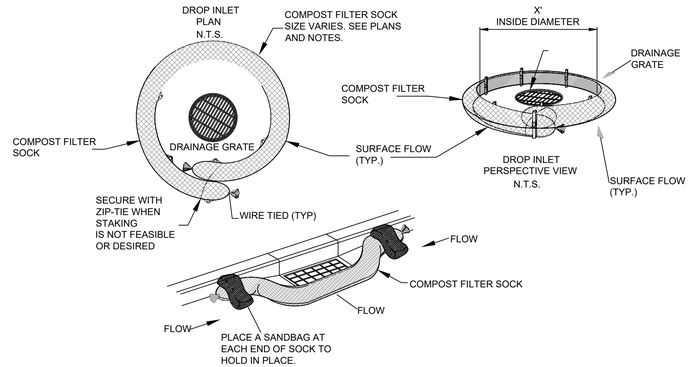
CONSTRUCTION SPECIFICATIONS

THE COMPOST FILTER SOCK SHALL BE INSTALLED ACCORDING TO THIS SPECIFICATION, AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

1. COMPOST FILTER SOCKS SHOULD BE INSTALLED PARALLEL TO THE BASE OF THE SLOPE OR OTHER DISTURBED AREA. IN EXTREME CONDITIONS (I.E., 2:1 SLOPES), A SECOND COMPOST FILTER SOCK SHALL BE CONSTRUCTED AT THE TOP OF THE SLOPE.
2. STAKES SHALL BE INSTALLED THROUGH THE MIDDLE OF THE COMPOST FILTER SOCK ON 10 FT (3M) CENTERS, USING 2 IN (50MM) BY 2 IN (50MM) BY 3 FT (1M) WOODEN STAKES. IN THE EVENT STAKING IS NOT POSSIBLE, I.E., WHEN COMPOST FILTER SOCKS ARE USED ON PAVEMENT, HEAVY CONCRETE BLOCKS SHALL BE USED BEHIND THE COMPOST FILTER SOCKS TO HELP STABILIZE DURING RAINFALL/RUNOFF EVENTS.
3. STAKING DEPTH FOR SAND AND SILT LOAM SOILS SHALL BE 12 IN (300MM), AND 8 IN (200MM) FOR CLAY SOILS.
4. LOOSE COMPOST MAY BE BACKFILLED ALONG THE UPSLOPE SIDE OF THE COMPOST FILTER SOCK, FILLING THE SEAM BETWEEN THE SOIL SURFACE AND THE DEVICE, IMPROVING FILTRATION AND SEDIMENT RETENTION.
5. IF THE COMPOST FILTER SOCK IS TO BE LEFT AS A PERMANENT FILTER OR PART OF THE NATURAL LANDSCAPE, IT MAY BE SEEDED AT TIME OF INSTALLATION FOR ESTABLISHMENT OF PERMANENT VEGETATION. THE ENGINEER WILL SPECIFY SEED REQUIREMENTS.
6. COMPOST FILTER SOCKS ARE NOT TO BE USED IN PERENNIAL, EPHEMERAL, OR INTERMITTENT STREAMS.

MAINTENANCE

SEDIMENT SHALL BE REMOVED ONCE IT HAS ACCUMULATED TO ONE-HALF THE ORIGINAL HEIGHT OF THE BARRIER. COMPOST FILTER SOCKS SHALL BE REPLACED WHENEVER IT HAS DETERIORATED TO SUCH AN EXTENT THAT THE EFFECTIVENESS OF COMPOST FILTER SOCK IS REDUCED. COMPOST FILTER SOCKS SHALL REMAIN IN PLACE UNTIL DISTURBED AREAS HAVE BEEN PERMANENTLY STABILIZED. ALL SEDIMENT ACCUMULATION AT THE COMPOST FILTER SOCK SHALL BE REMOVED AND PROPERLY DISPOSED OF BEFORE THE COMPOST FILTER SOCK IS REMOVED



CURB INLET PERSPECTIVE VIEW
N.T.S.

CONTRACTOR TO FIELD VERIFY ALL CURB INLETS AND CATCH BASINS WITHIN THE PROJECT LIMITS. ALL CURB INLETS AND CATCH BASINS MUST BE PROTECTED ACCORDING TO THE STORMWATER POLLUTION PREVENTION PLAN.

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KYLE MICHAEL BECHTELHEIMER LICENSE No. 86673 STATE OF FLORIDA PROFESSIONAL ENGINEER
KYLE M. BECHTELHEIMER, P.E.
FL P.E. NO. 86673

No.	Date	Revision

Designed: K.B.
Drawn: J.C.
Checked: A.S.
Job No.: 2400768
Date: 9/12/2025 © 2025

STORMWATER POLLUTION PREVENTION PLAN

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

Sheet No.
G-2

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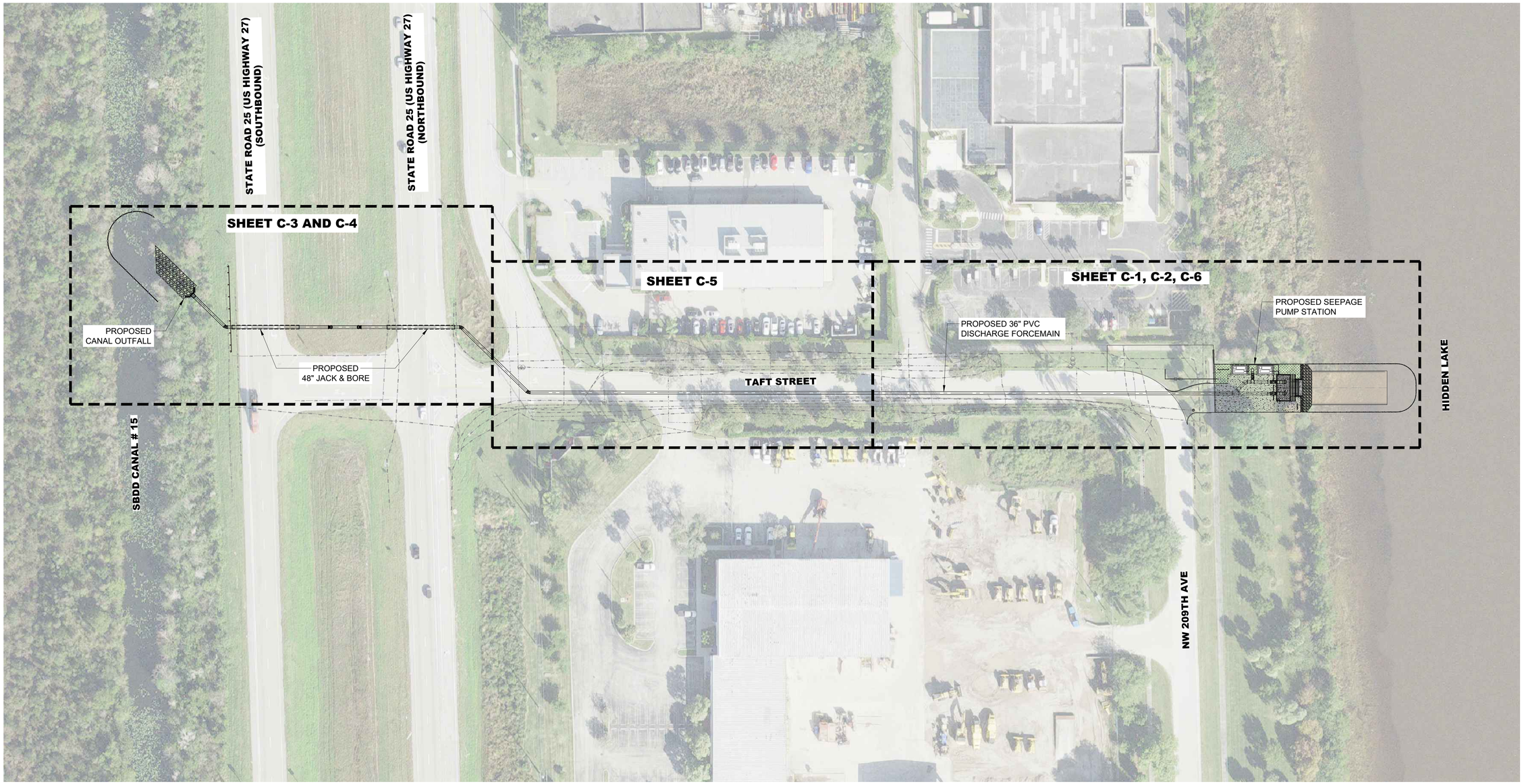

N

50 0 50 100

Scale: 1" = 50'

PLAN VIEW

Horizontal Scale : 1"=50'

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KYLE MICHAEL BECHTELHEIMER
LICENSE
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STATE OF FLORIDA
PROFESSIONAL ENGINEER

KYLE M. BECHTELHEIMER, P.E.
FL P.E. NO. 86673

No.	Date	Revision
1		
2		
3		
4		
5		
6		
7		

Designed: K.B.
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KEY MAP

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

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Sheet No.
G-3

Drawing name: J:\2400768_Pembroke Pines SW Seepage\Civil\DWG_Current_Plan_Set\4. G-3 Key Map.dwg Oct 13, 2025 - 9:56am jchavez

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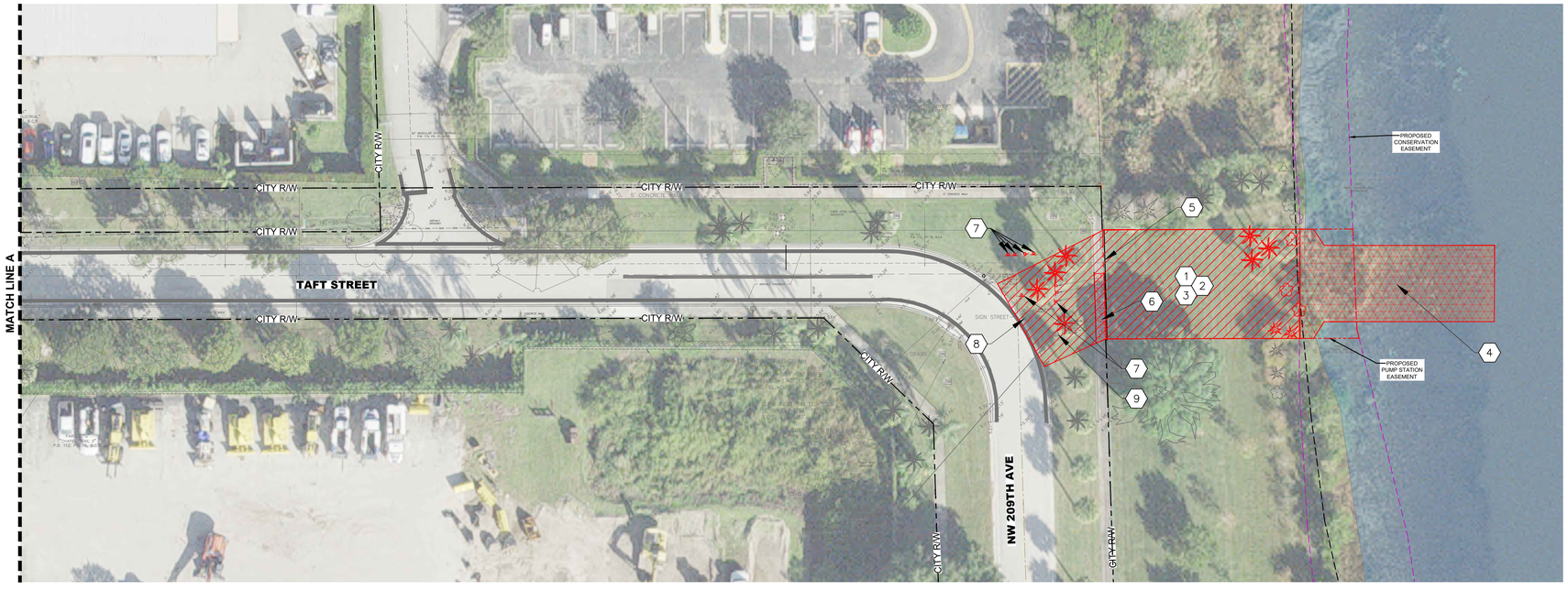
PLAN VIEW

Horizontal Scale : 1"=30'



PLAN VIEW

Horizontal Scale : 1"=30'

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30 0 30 60

Scale: 1" = 30'

PLAN NOTES

1. THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THIS PLAN HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR ACCURACY. PRIOR TO THE START OF ANY DEMOLITION ACTIVITY, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES FOR ON SITE LOCATIONS OF EXISTING UTILITIES.
2. ALL ON SITE UNDERGROUND STRUCTURES AND PIPING MUST BE COMPLETELY REMOVED AND OVEREXCAVATED BY A MINIMUM OF 12" BENEATH THE STRUCTURES UNLESS APPROVED BY OWNER OR ENGINEER. CONTRACTOR SHALL USE APPROVED FILLING MATERIAL FOR FILLING THESE AREAS. FILL SHALL BE OF CLEAN, FINE SAND AASHTO CLASS A-3 AND SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" IN THICKNESS AND COMPACTED TO AT LEAST 98% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY (ASTM D-1557).
3. CONTRACTOR SHALL PROTECT ALL EXISTING BUILDING AREAS FROM DAMAGE AND SHALL, AT THEIR EXPENSE, RESTORE TO ORIGINAL CONDITION ANY AREAS OR FINISHES DAMAGED BY THEIR WORK.
4. EXISTING UTILITIES SHALL BE MAINTAINED DURING CONSTRUCTION AND CONTRACTOR SHALL NOTIFY OWNER OF ANY DISRUPTIONS 48 HRS IN ADVANCE AND PROVIDE INTERIM UTILITIES AS REQUIRED.
5. CONTRACTOR MUST STOP OPERATION AND NOTIFY THE OWNER FOR PROPER DIRECTION IF ANY ENVIRONMENTAL OR HEALTH RELATED CONTAMINATE IS ENCOUNTERED DURING THE DEMOLITION/EXCAVATION PROCESS.
6. PRIOR TO DEMOLITION OCCURRING, ALL EROSION CONTROL DEVICES ARE TO BE INSTALLED.
7. CONTRACTOR MAY LIMIT SAW-CUT & PAVEMENT REMOVAL TO ONLY THOSE AREAS WHERE IT IS REQUIRED AS SHOWN ON THIS SHEET BUT IF ANY DAMAGE IS INCURRED ON ANY OF THE SURROUNDING PAVEMENT, SIDEWALK, ETC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IT'S REMOVAL AND REPAIR.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLISHING AND REMOVING ALL VEGETATION, TREES, AND DEBRIS AS INDICATED.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND LEGALLY DISPOSING ALL OTHER RUBBISH, RUBBLE, AND DEBRIS CAUSED BY DEMOLITION. WORK MUST COMPLY WITH ALL OTHER APPLICABLE LAWS AND REGULATIONS GOVERNING DISPOSAL OF WASTES AND DEBRIS.
10. CONTRACTOR SHALL COORDINATE WITH CITY FOR APPROVAL ON LOCATIONS FOR STORAGE AND STAGING AREAS.

LEGEND

- CONTRACTOR TO REMOVE AND DEMOLISH EXISTING SIDEWALK
- CONTRACTOR TO REMOVE AND DEMOLISH ALL EXISTING STRUCTURES/DEBRIS/SOD
- DREDGING OF HIDDEN LAKE
- FULL TREE REMOVAL. TREES RANGING FROM 15' TO 25' IN DIAMETER

KEYNOTES LEGEND

1. CONTRACTOR TO USE CAUTION WHEN DIGGING AROUND EXISTING UTILITIES (CONTACT UTILITY PROVIDERS FOR UTILITY LOCATES)
2. EXISTING UTILITIES TO BE REMOVED - CONTRACTOR TO COORDINATE WITH UTILITY COMPANY PRIOR TO REMOVAL
3. CONTRACTOR TO CLEAR AND GRUB AND DISPOSE OF ENTIRE AREA
4. CONTRACTOR TO PERFORM DREDGING PER EXCAVATION DETAILS ON SHEET C-8
5. REMOVE AND DISPOSE OF EXISTING 4' CHAIN LINK FENCE
6. REMOVE AND DISPOSE OF EXISTING SIDEWALK (32 LF)
7. CONTRACTOR TO RELOCATE EXISTING STREET SIGNS
8. REMOVE AND DISPOSE OF EXISTING CURB & GUTTER
9. CONTRACTOR TO PROTECT EXISTING DRAINAGE MH

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DEMOLITION PLAN

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
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Sheet No.
C-0

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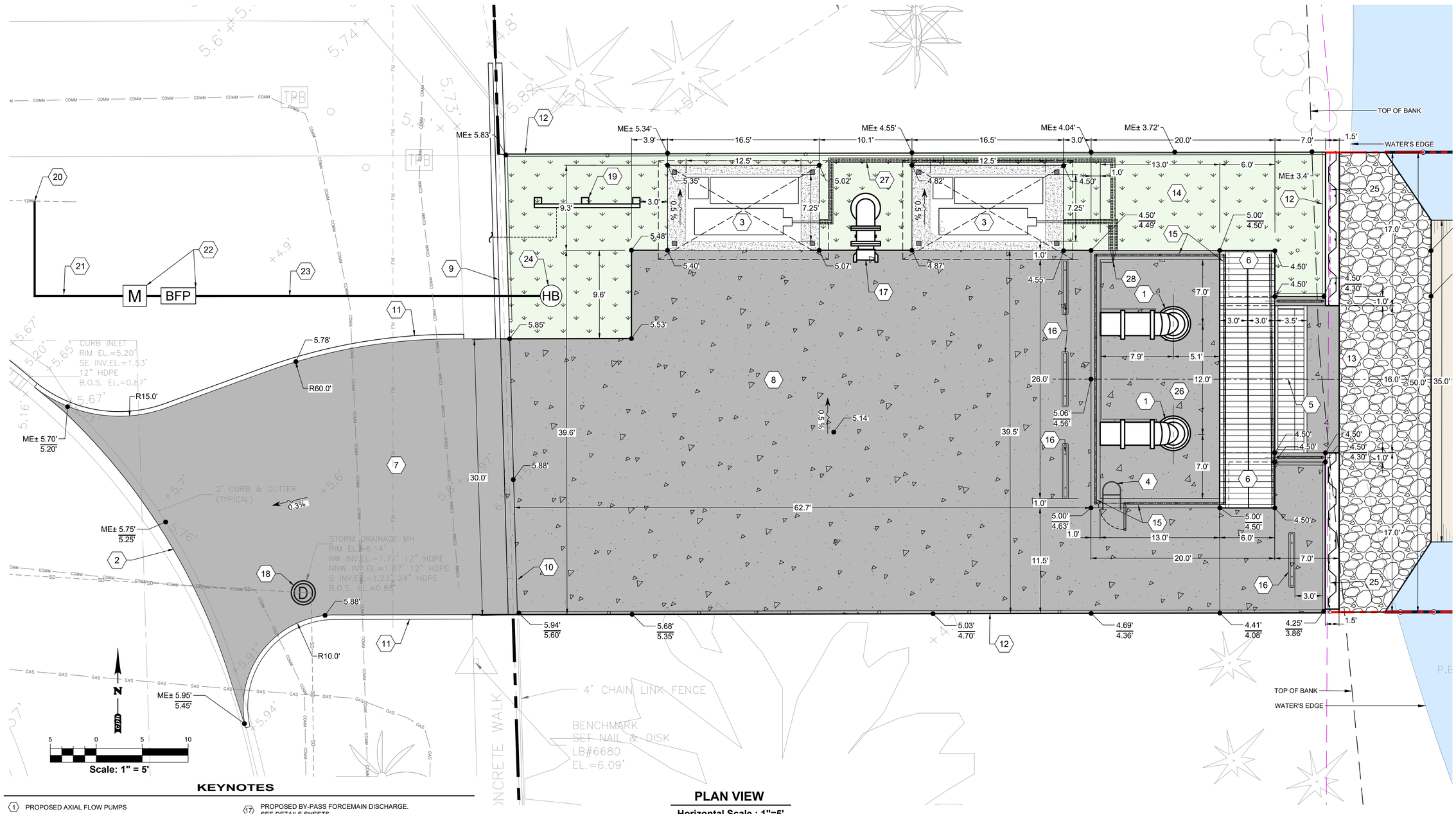

PLAN VIEW

Horizontal Scale : 1"=5'

KEYNOTES

1. PROPOSED AXIAL FLOW PUMPS
2. SAWCUT AND STRIP BACK EXIST. ASPHALT AND ROCKBASE AS SHOWN AND CONNECT TO EXIST. PAVEMENT
3. PROPOSED ELECTRIC DRIVE UNITS, CONCRETE PAD, AND CANOPY. SEE STRUCTURAL SHEETS.
4. PROPOSED NON-SLIP/NON CORROSIVE FIXED ACCESS SAFETY LADDER. SEE DETAILS SHEETS
5. PROPOSED TRASH SCREEN. SEE DETAILS SHEETS
6. PROPOSED OSHA-COMPLIANT GALVANIZED STEEL GUARDRAIL SYSTEM. SEE DETAILS SHEETS
7. PROPOSED ASPHALT PAVEMENT
8. PROPOSED 6" THICK CONCRETE SLAB
9. PROPOSED TRACK ROLLERS MOUNTED ONTO FENCE. SEE DETAILS SHEETS
10. PROPOSED 30' WIDE ROLLING GATE
11. PROPOSED CURB TYPE "D"
12. PROPOSED 6 FT CHAIN LINK FENCE + 1FT OF BARBED WIRE
13. PROPOSED RIP-RAP OF 4"-8" AVERAGE DIAMETER STONES
14. PROPOSED SOD
15. PROPOSED ALUMINUM HANDRAILING BOLTED ON TOP OF CONCRETE INTAKE WALLS
16. PROPOSED CONCRETE WHEEL STOP
17. PROPOSED BY-PASS FORCEMAIN DISCHARGE. SEE DETAILS SHEETS
18. CONTRACTOR TO ADJUST STORM MANHOLE RIM ELEVATION TO FINISHED GRADE
19. PROPOSED ELECTRICAL PANEL AND CONNECTION. SEE ELECTRICAL SHEETS
20. PROPOSED 1" SERVICE CONNECTION. 12"x1" DOUBLE STRAP S.S. SERVICE SADDLE. SEE DETAIL W-4
21. PROPOSED 20 LF OF 1" POLYETHYLENE TUBING
22. PROPOSED 1" WATER METER BOX AND BACKFLOW PREVENTER
23. PROPOSED 38 LF OF 1" POLYETHYLENE TUBING
24. PROPOSED 3/4" HOSE BIBB AND RACK
25. PROPOSED SHEET PILE WALL. SEE STRUCTURAL SHEETS
26. PROPOSED CONCRETE INTAKE STRUCTURE. SEE STRUCTURAL SHEETS
27. PROPOSED ABOVEGROUND HEAVY-DUTY PERFORATED CABLE TRAY, MOUNTED 6" ABOVE FINISHED GRADE. CONTRACTOR SHALL EXERCISE CAUTION TO AVOID CONFLICT WITH PROPOSED ELECTRIC CONDUIT
28. PROPOSED HYDRAULIC PUMP LINES. CONTRACTOR TO STACK AND MOUNT LINES TO INTAKE WALLS USING TYPE 316 STAINLESS STEEL HARDWARE.

LEGEND

- EXISTING SPOT ELEVATION
- PROPOSED DRAINAGE FLOW DIRECTION
- PROPOSED ASPHALT PAVEMENT
- PROPOSED CONCRETE
- PROPOSED SOD AREA
- PROPOSED RIP-RAP OF 4"-8" AVERAGE DIAMETER STONES

PLAN NOTES

1. THE PROJECT SITE IS LOCATED WITHIN FEMA ZONE X AREA OF MINIMAL FLOOD HAZARD.
2. PRIOR TO ANY CONSTRUCTION ACTIVITY, CONTRACTOR SHALL FIELD STAKE THE PROJECT GEOMETRY TO ENSURE PROPOSED DIMENSIONS FIT EXISTING CONDITIONS. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY IF ANY DISCREPANCIES ARISE.
3. CONTRACTOR SHALL INSTALL EROSION AND SEDIMENTATION CONTROL MEASURES AS DESCRIBE IN THE CONTRACT DOCUMENTS, PRIOR TO START OF ANY WORK.
4. CONTRACTOR SHALL MATCH PROPOSED CONCRETE AND PAVEMENT TO EXISTING IN GRADE AND ALIGNMENT AFTER SAWCUTTING TO CREATE A STRAIGHT CLEAN EDGE.
5. CONTRACTOR SHALL VERIFY POSITIVE DRAINAGE FLOW AWAY FROM BLDG. AND THAT A MINIMUM SLOPE OF AT LEAST 1% IN THE DIRECTION OF DRAINAGE FLOW INDICATED CAN BE ACHIEVED.
6. SITE GRADES SHALL BE ADJUSTED AS REQUIRED TO MATCH NEW GRADES INDICATED ON PLANS.
7. WHEN PERFORMING GRADING OPERATIONS DURING PERIODS OF WET WEATHER, CONTRACTOR SHALL PROVIDE ADEQUATE DEWATERING, DRAINAGE, AND GROUND WATER MANAGEMENT TO CONTROL MOISTURE OF SOILS.
8. CONTRACTOR SHALL SAWCUT AND REMOVE EXISTING SIDEWALK AS NECESSARY TO TIE INTO PROPOSED DRIVEWAY PAVEMENT. SIDEWALK SHALL BE RECONSTRUCTED TO MEET EXISTING GRADE AND ADA COMPLIANCE.

Surface Type	Area (ac)	Runoff Coefficient	Weighted C Value
Existing Impervious	0	0	
Existing Pervious	0.2400	0.8000	
Total Existing	0.2400		0.8000
Proposed Impervious	0.1100	0.9800	
Proposed Pervious	0.1300	0.8000	
Total Proposed	0.2400		0.8825

Pre-Development Runoff (cfs)	0.0360
Post - Development Runoff (cfs)	0.0400
Total Change(cfs)	0.0040

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A Full Service A & E Firm

KYLE MICHAEL BECHTELHEIMER LICENSE No. 86673 STATE OF FLORIDA PROFESSIONAL ENGINEER
KYLE M. BECHTELHEIMER, P.E.
FL P.E. NO. 86673

No.	Revision	Date
1		
2		
3		
4		
5		
6		

Designed: K.B.
Drawn: J.C.
Checked: A.S.
Job No.: 2400768
Date: 9/12/2025 © 2025

PUMP STATION SITE, PAVING, AND GRADING PLAN

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE

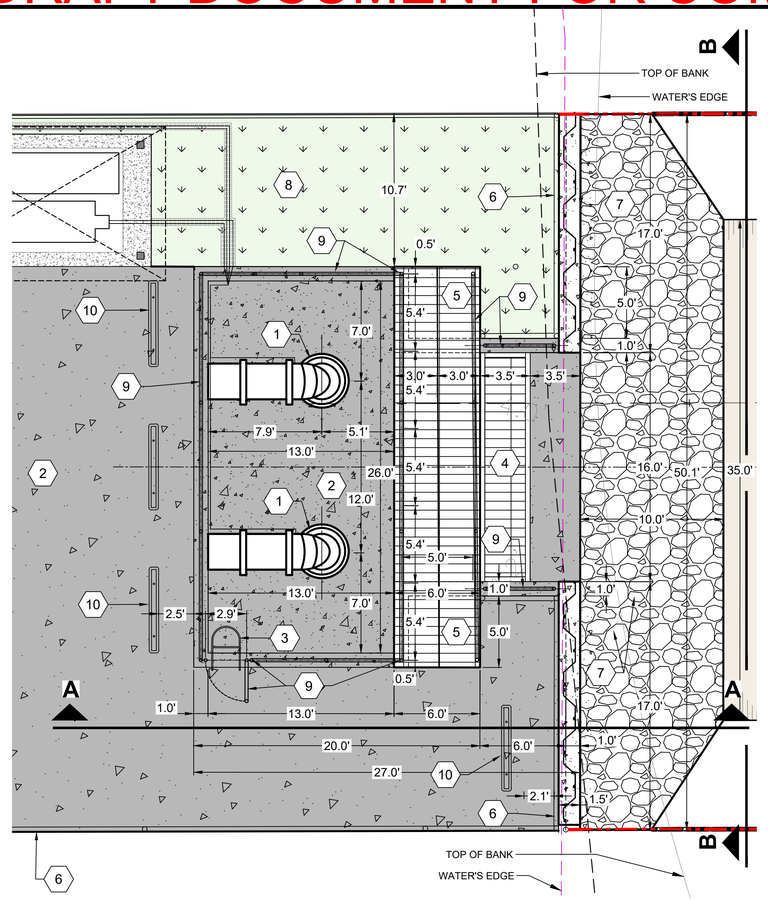
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

Sheet No.
C-1

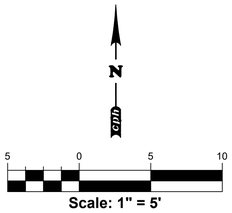
Drawing name: J:\2400768_Pembroke Pines SW Seepage\Civil\DWG_Current_Plan_Set\6. C-1 Pump Station Site Plan.dwg Oct 17, 2025 - 8:41am amartin

DRAFT DOCUMENT FOR COMMISSION REVIEW



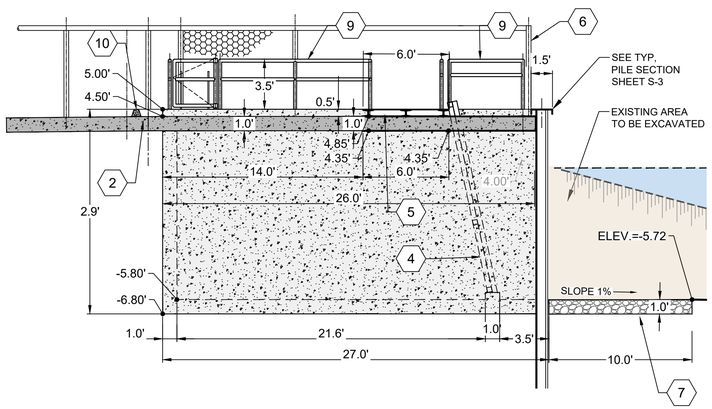
PLAN VIEW

Horizontal Scale : 1"=5'



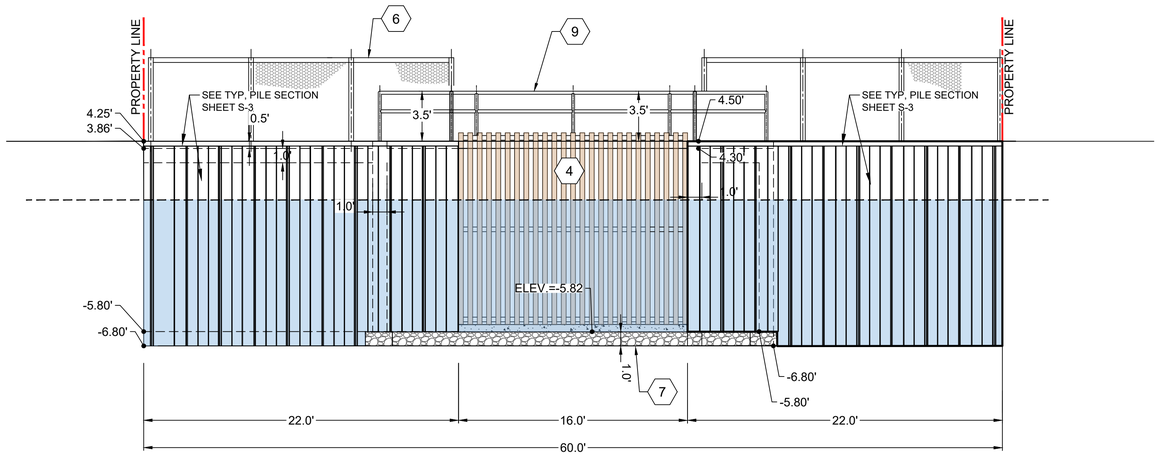
KEYNOTES

1. PROPOSED 30" DISCHARGE AXIAL FLOW PUMPS BY MWI PUMPS OR APPROVED EQUAL
2. PROPOSED 6" THICK CONCRETE SLAB. SEE STRUCTURAL SHEETS
3. PROPOSED NON-SLIP/NON CORROSIVE FIXED ACCESS SAFETY LADDER. SEE DETAILS SHEETS
4. PROPOSED TRASH SCREEN. SEE DETAILS SHEETS
5. PROPOSED OSHA-COMPLIANT GALVANIZED STEEL GUARDRAIL SYSTEM. SEE DETAILS SHEETS
6. PROPOSED 6FT CHAIN LINKED FENCE + 1FT OF BARRED WIRE
7. PROPOSED RIP-RAP OF 4"-8" AVERAGE DIAMETER STONES
8. PROPOSED SOD
9. PROPOSED ALUMINUM HANDRAILING BOLTED ON TOP OF CONCRETE INTAKE WALLS
10. PROPOSED CONCRETE WHEEL STOP



SECTION A-A

Horizontal Scale : 1"=5'



SECTION B-B

Horizontal Scale : 1"=5'

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KYLE M. BECHTELHEIMER, P.E.
FL P.E. NO. 86673

No.	Date	Revision

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Job No.: 2400768
Date: 9/12/2025 © 2025

INTAKE STRUCTURE PLAN AND SECTIONS

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

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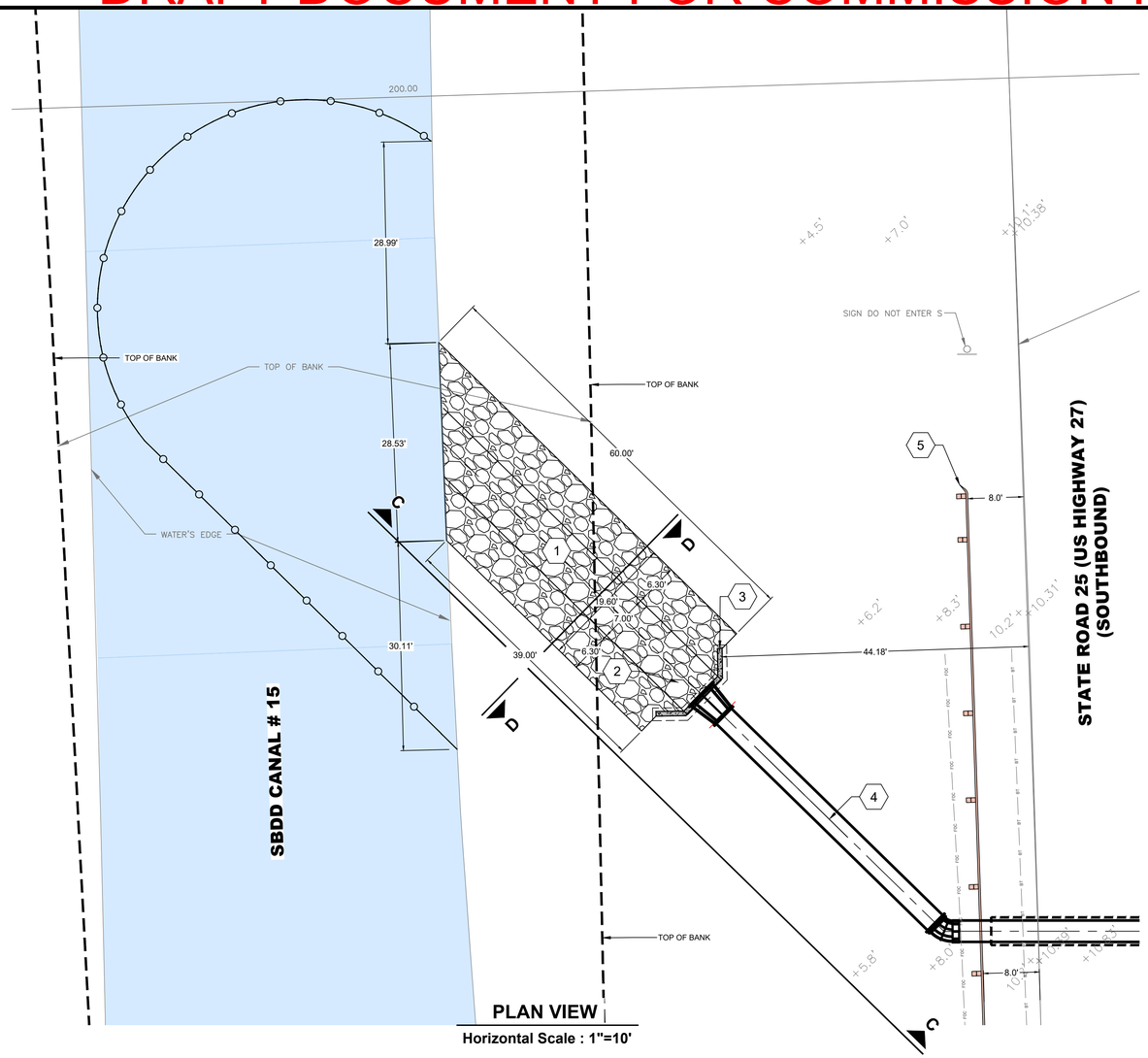
Sheet No.
C-2

DRAFT DOCUMENT FOR COMMISSION REVIEW



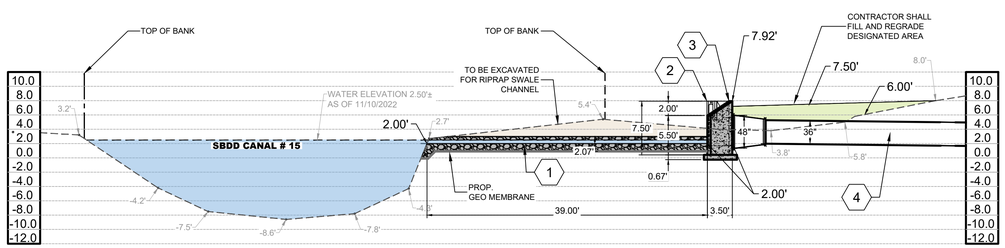
PLAN VIEW

Horizontal Scale : 1"=10'

Scale: 1" = 10'

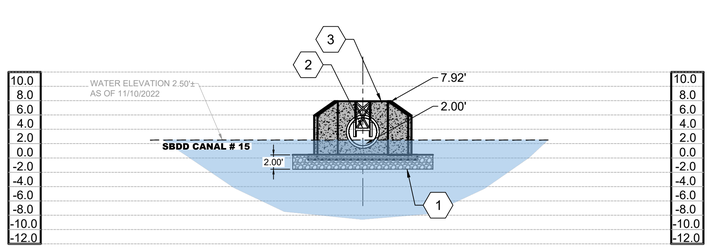
KEYNOTES

1. PROPOSED RIP-RAP OF 4"-8" AVERAGE DIAMETER STONES WITH GEOSYNTHETIC MEMBRANE
2. PROPOSED 48" OUTFALL DISCHARGE
3. PROPOSED CAST IN PLACE CONCRETE HEAD WALL. SEE STRUCTURAL SHEETS
4. PROPOSED 36" PVC DISCHARGE FORCEMAIN. SEE PLAN AND PROFILE SHEETS
5. PROPOSED FDOT GUARDRAIL SHALL CONFORM TO LATEST EDITION OF FDOT STANDARD PLANS AND SPECIFICATIONS. REFER TO INDEX 536-001



SECTION C-C

Horizontal Scale : 1"=10'



SECTION D-D

Horizontal Scale : 1"=10'

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KYLE M. BECHTELHEIMER, P.E.
FL P.E. NO. 86673

No.	Date	Revision

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Job No.: 2400768
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OUTFALL STRUCTURE PLAN AND SECTIONS

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE

TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

Sheet No.
C-3

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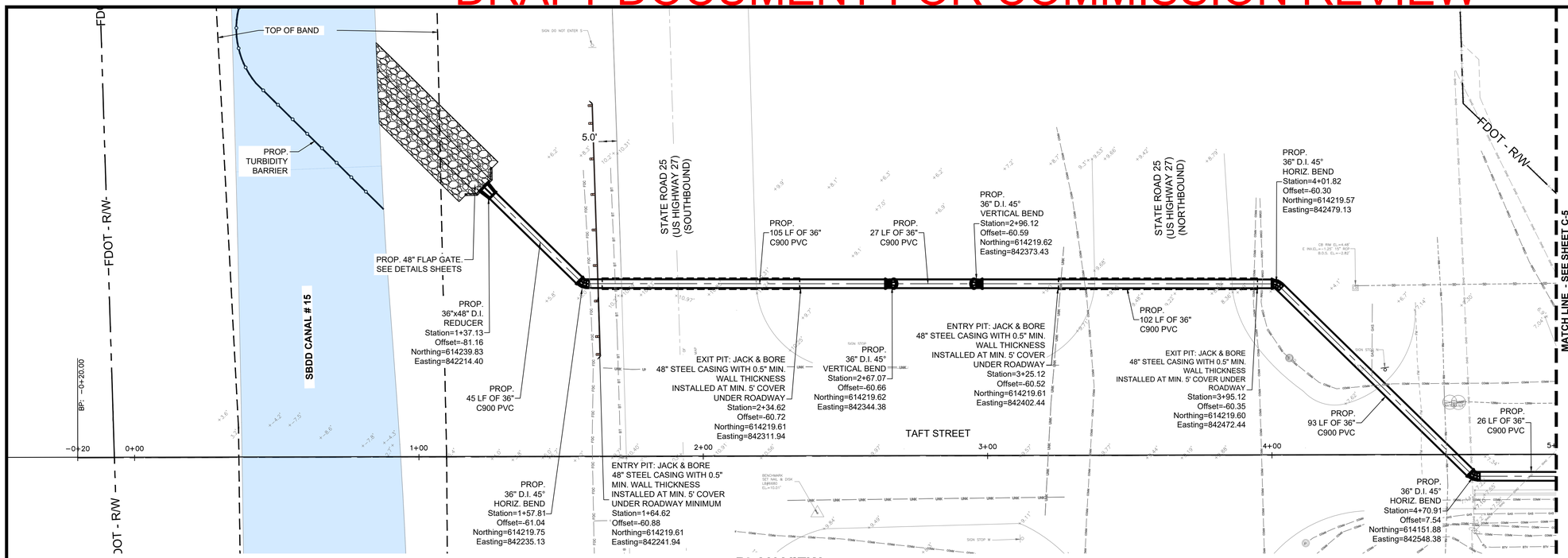
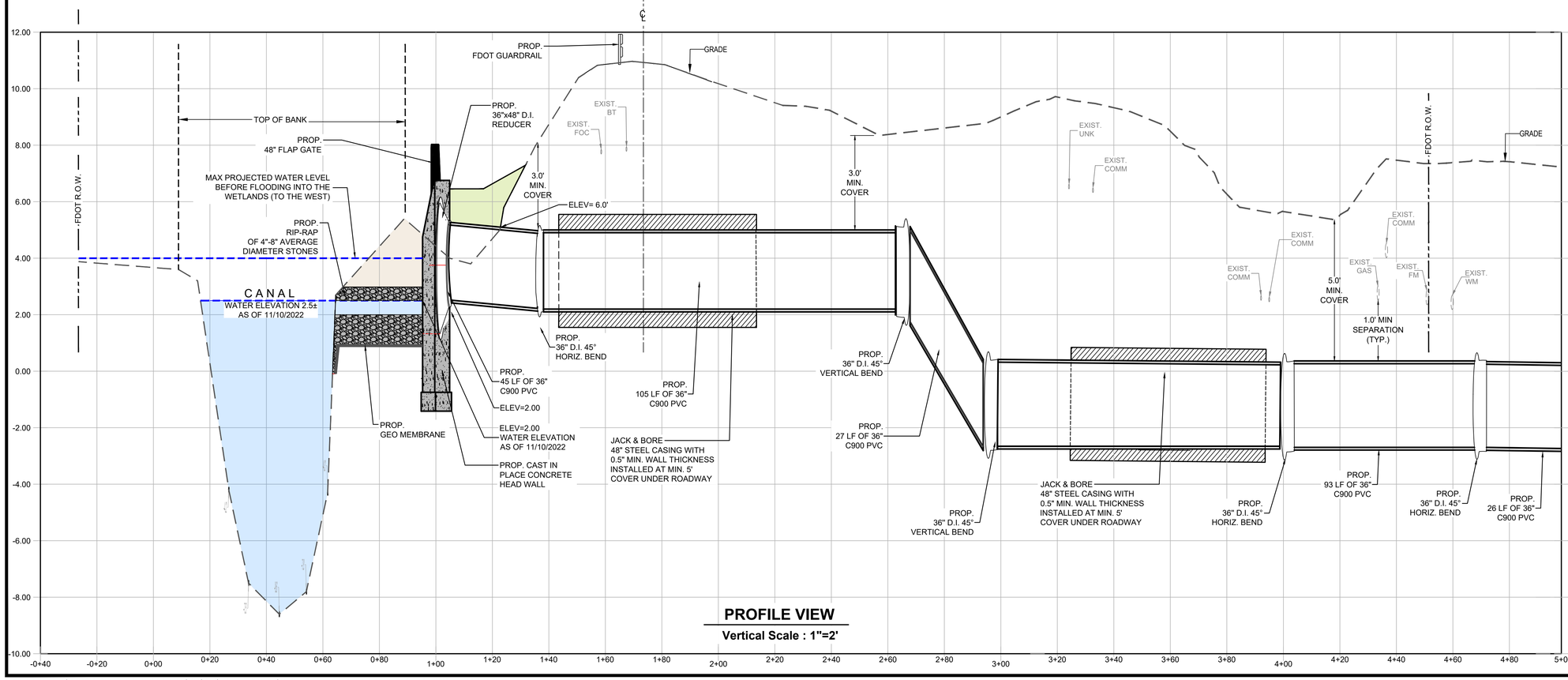


PLAN VIEW

Horizontal Scale : 1"=20'



PROFILE VIEW

Vertical Scale : 1"=2'

PLAN NOTES

1. THE SIZE, LOCATION, AND POINTS OF CONNECTION FOR FORCE MAINS SHALL BE FINALIZED AT TIME OF CONSTRUCTION PLAN REVIEW.
2. GPR AND EXPLORATORY DIGS MUST BE PERFORMED BY CONTRACTOR PRIOR TO ANY CONSTRUCTION. LOCATE FINDINGS SHALL BE SUBMITTED TO EOR FOR REVIEW AND APPROVAL BEFORE COMMENCING WORK.
3. ALIGNMENTS AND CONNECTIONS SHALL BE VERIFIED BY CONTRACTOR BEFORE STARTING PIPELINE INTERVENTION.
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5. SEPARATION REQUIREMENTS PER FDEP REQUIREMENTS.
6. PRESSURE TEST REQUIRED ON DOWNSTREAM PIPE OF PUMP STATION SHOULD BE TESTED IN ACCORDANCE WITH AWWA STANDARD.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ALL AFFECTED AREAS TO EQUAL OR BETTER CONDITIONS AT NO ADDITIONAL COST TO OWNER.

LEGEND

- PROP. 36" C900 PVC
- JACK & BORE SECTION 48" STEEL CASING WITH 0.5" MINIMAL WALL THICKNESS
- PROP. RIP-RAP OF 4"-8" AVERAGE DIAMETER STONES
- PROPOSED CONCRETE
- PROP. FDOT GUARDRAIL
- CITY R.O.W.
- FDOT R.O.W.
- EXIST. BURIED ELECTRIC
- EXIST. BURIED FIBER OPTIC
- EXIST. BURIED TELEPHONE
- EXIST. BURIED COMMUNICATIONS
- EXIST. BURIED TELEVISION
- EXIST. OVERHEAD UTILITIES
- EXIST. WATER MAIN
- EXIST. STORM DRAIN PIPE
- EXIST. FORCE MAIN
- EXIST. GAS UTILITY
- EXIST. UNKNOWN UTILITY

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FORCEMAIN PLAN AND PROFILE

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE

TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

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Sheet No.
C-4

Drawing name: J:\2400768_Pembroke Pines SW Seepage\Civil\DWG_Current_Plan_Set\9. C-4 ForceMain Plan And Profile.dwg Oct 13, 2025 - 1:43pm jchavez

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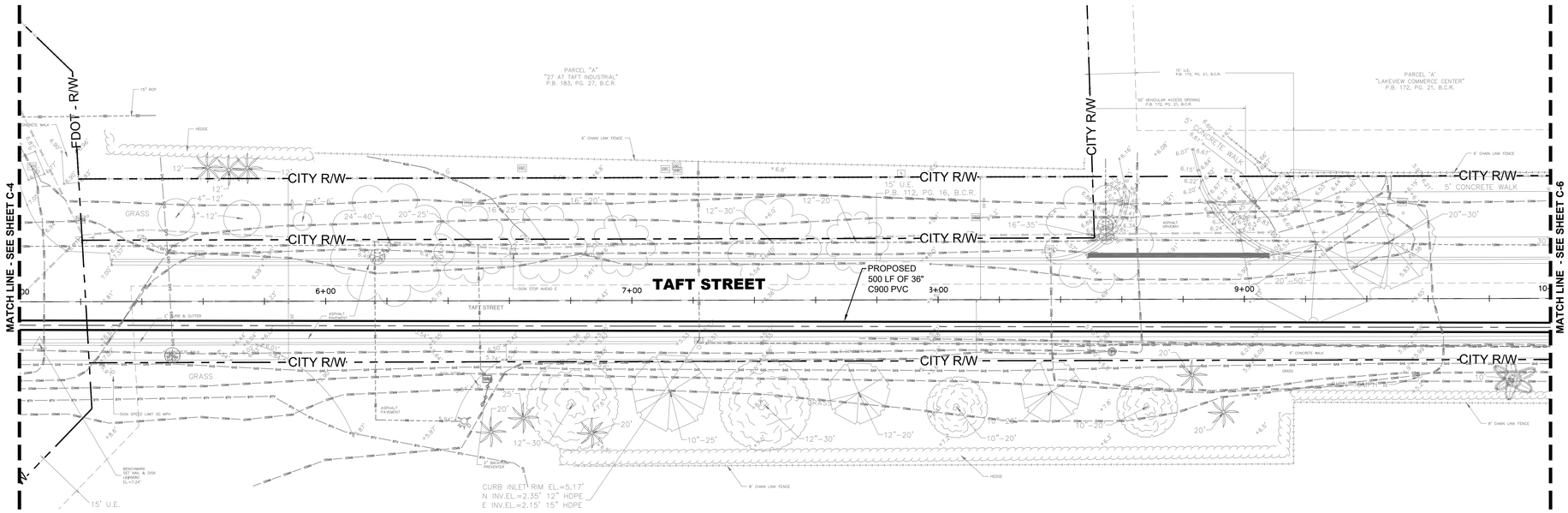
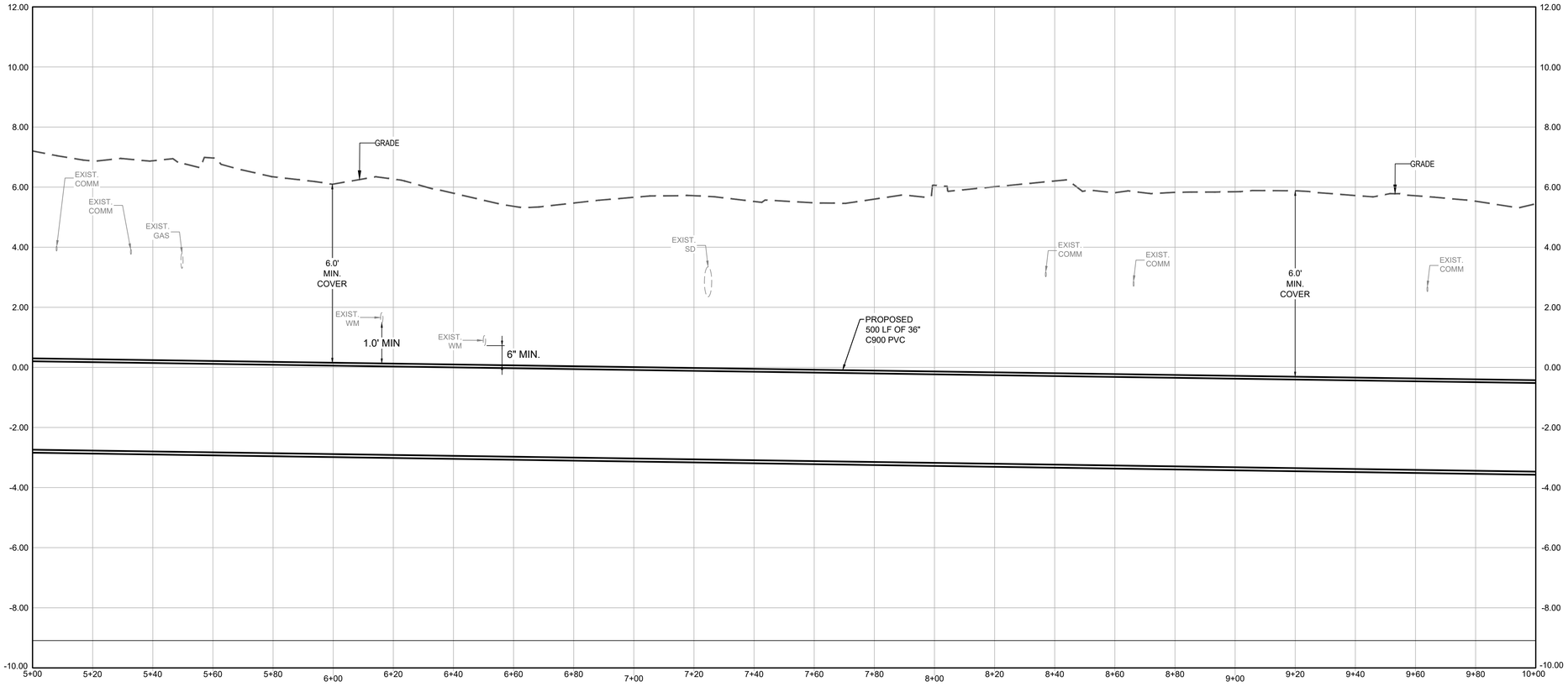


PLAN VIEW

Horizontal Scale : 1"=20'



PROFILE VIEW

Vertical Scale : 1"=2'

PLAN NOTES

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7. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ALL AFFECTED AREAS TO EQUAL OR BETTER CONDITIONS AT NO ADDITIONAL COST TO OWNER.

LEGEND

- PROP. 36" C900 PVC
- CITY R.O.W.
- FDOT R.O.W.
- ELEC — EXIST. BURIED ELECTRIC
- FOC — EXIST. BURIED FIBER OPTIC
- BT — EXIST. BURIED TELEPHONE
- COMM — EXIST. BURIED COMMUNICATIONS
- BTV — EXIST. BURIED TELEVISION
- OVHD — EXIST. OVERHEAD UTILITIES
- WM — EXIST. WATER MAIN
- SD — EXIST. STORM DRAIN PIPE
- FM — EXIST. FORCE MAIN
- GAS — EXIST. GAS UTILITY
- UNK — EXIST. UNKNOWN UTILITY

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FORCEMAIN PLAN AND PROFILE

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE

TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
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Sheet No.
C-5

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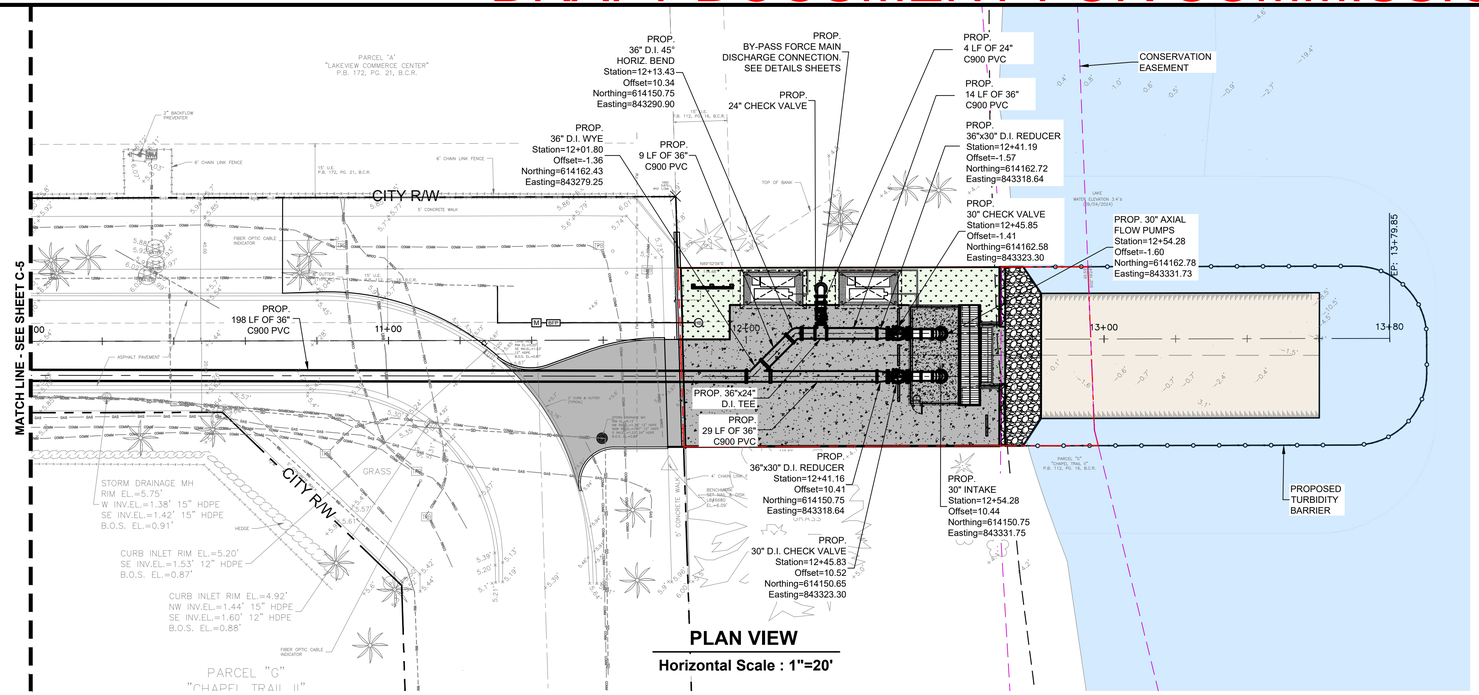
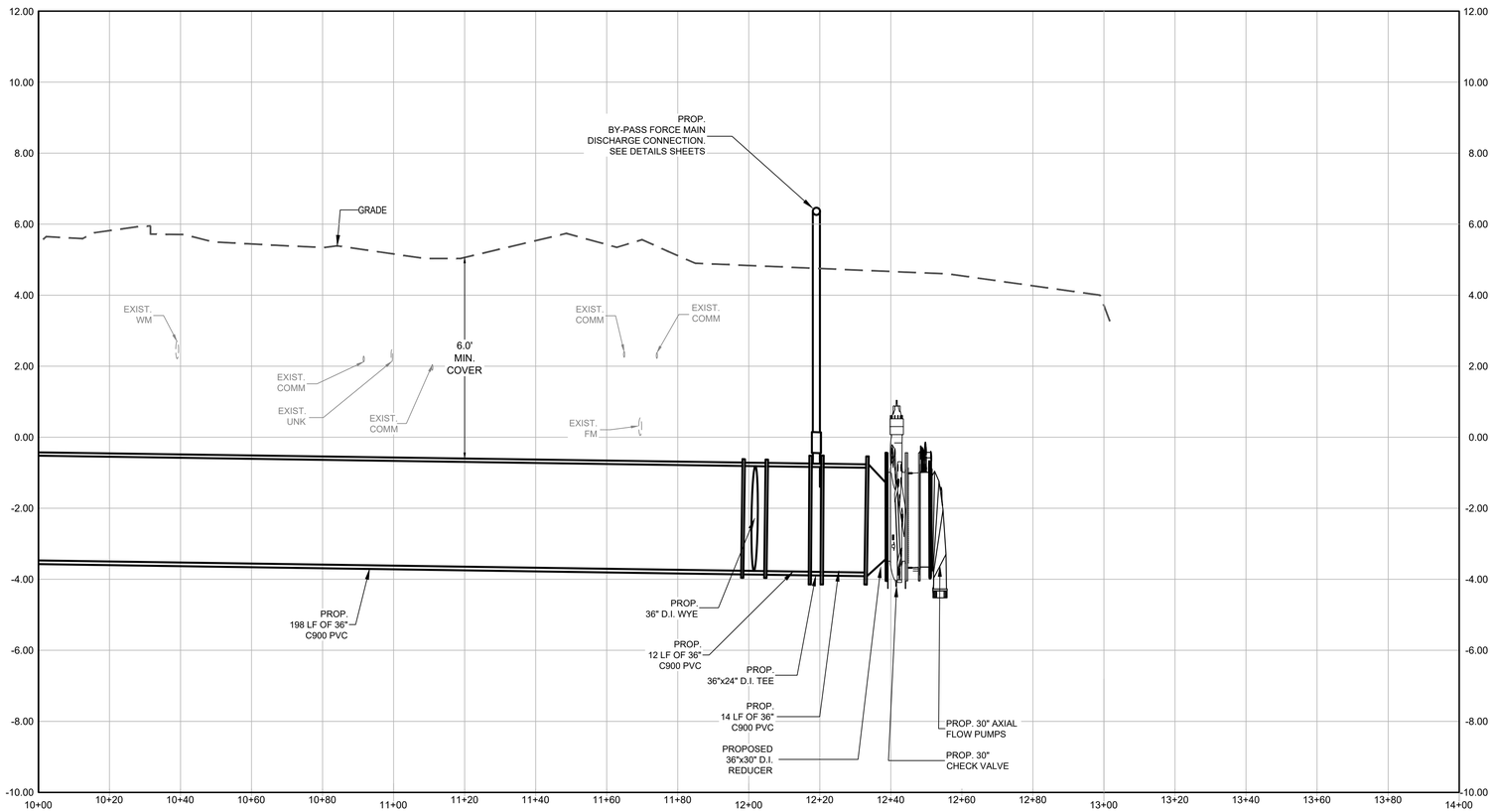


PLAN VIEW

Horizontal Scale : 1"=20'



PROFILE VIEW

Vertical Scale : 1"=2'

Scale: 1" = 20'

PLAN NOTES

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LEGEND

- PROP. 36" C900 PVC
- PROP. RIP-RAP OF 4"-8" AVERAGE DIAMETER STONES
- PROP. CONCRETE
- PUMP STATION EASEMENT
- CONSERVATION EASEMENT
- CITY R.O.W.
- FDOT R.O.W.
- EXIST. BURIED ELECTRIC
- EXIST. BURIED FIBER OPTIC
- EXIST. BURIED FIBER TELEPHONE
- EXIST. BURIED COMMUNICATIONS
- EXIST. BURIED TELEVISION
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- EXIST. UNKNOWN UTILITY

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No.	Date	Revision

Designed: K.B.
Drawn: J.C.
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Job No.: 2400768
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FORCEMAIN PLAN AND PROFILE

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE

TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

Sheet No.
C-6

DRAFT DOCUMENT FOR COMMISSION REVIEW

PLAN VIEW

Horizontal Scale : 1"=40'

N

40 0 40 80

Scale: 1" = 40'

PLAN NOTES

1. OWNERSHIP IS BASED UPON OBSERVING ABOVE GROUND UTILITY FEATURES, SUNSHINE 811 DIG TICKETS AND PROFESSIONAL JUDGEMENT.NO RECORDS RESEARCH WAS PERFORMED BY DRMP.
2. SURVEY OF UTILITIES WAS PERFORMED BY DRMP.
3. VERTICAL INFORMATION IS RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
4. BEARINGS AND COORDINATES ARE RELATIVE TO THE STATE PLANE COORDINATES FLORIDA EAST ZONE, NORTH AMERICAN DATUM OF 1983/11 ADJUSTMENT (NAD 83/11).
5. PROJECT UNITS IN U.S. SURVEY FEET
6. THE SPECIFIC PURPOSE OF THIS SURVEY IS TO DETERMINE THE HORIZONTAL AND VERTICAL LOCATION OF VACUUM TEST HOLES AS MARKED ON THE SURFACE BY THE SUBSURFACE UTILITY ENGINEERING DEPARTMENT OF DRMP INC.

LIMITS: THE INTERSECTION OF US 27 AND TAFT ST TO INTERSECTION OF NW 209TH AVE

LEGEND

BT	BURIED TELEPHONE
CONC	CONCRETE COVERED UTILTY
DBC	DIRECT BURIED CABLE
GM	GAS MAIN
N/A	NOT APPLICABLE
NUF	NO UTILITY FOUND
PEP	POLYETHYLENE PIPE
PSM	PROFESSIONAL SURVEYOR AND MAPPER
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
SR	STATE ROAD
TH	TEST HOLE
UNK	UNKNOWN
UTV	UTILITY VERIFICATION SHEET
VvH	VERIFIED VERTICALLY & HORIZONTAL
WM	WATER MAIN

SUMMARY OF VERIFIED UTILITIES

V_{vh} #	UTILITY DESCRIPTION (Owner, type)	SIZE	MATERIALS	NORTHING	EASTING	EXISTING GROUND ELEVATION	TOP ELEVATION	COMMENTS
TH-1	AT&T, BURIED TELEPHONE	2X2.5" 2X1/2	DBC	614202.257	842246.540	10.08	6.80	
TH-2	TECO PEOPLES GAS, GAS MAIN	6"	PEP PERPLANS	614198.950	842512.432	5.18	0.90	
TH-3	CITY OF PEMBROKE PINES, FORCE MAIN	UNK	PVC	614175.409	842529.938	7.45	3.00	BELOW WATER TABLE FOUND UTILITY @4.5' POSSIBLE PVC UNABLE OBTAIN SIZE
TH-4	CITY OF PEMBROKE PINES, WATER MAIN	UNK	UNK	614175.314	842538.062	7.42	2.70	BELOW WATER TABLE POSSIBLE METAL UNABLE TO OBTAIN SIZE
TH-5	EXPLORATORY, NO UTILITY FOUND	N/A	N/A	614177.993	842592.470	6.81	N/A	DUG TO 4' PROBED TO 5'+/- NO UTILITY FOUND, POSSIBLE WM AT A DEPTH OF ± 7' GPR VERIFIED
TH-6	TECO PEOPLES GAS, GAS MAIN	2"	PEP	614174.406	842626.713	6.95	4.00	
TH-6A	UNKNOWN, BURIED FIBER OPTIC CABLE	4X2"	PEP	614176.200	842624.469	7.08	5.80	
TH-6B	UNKNOW, BURIED FIBER OPTIC CABLE	2X2"	PEP	614174.198	842625.816	7.00	5.00	
TH-6C	UNKNOWN OWNER, UNKNOWN UTILITY	2"	PVC	614174.244	842625.560	7.01	5.40	FOUND 2" PVC IN POOR CONDITION
TH-7	CITY OF PEMBROKE PINES, WATER MAIN	4"	PVC	614170.516	842693.457	5.92	1.40	
TH-7A	UNKNOWN, BURIED FIBER OPTIC CABLE	4X2"	PEP	614168.743	842694.234	5.84	4.50	
TH-8	CITY OF PEMBROKE PINES, WATER MAIN	UNK	PVC	614179.596	842982.233	6.45	1.30	BELOW WATER TABLE AND ROCKS UNABLE TO OBTAIN SIZE
TH-9	UNKNOWN OWNER, UNKNOWN UTILITY	4"	PVC	614176.272	843116.492	5.62	2.70	
TH-10	CITY OF PEMBROKE PINES, WATER MAIN	UNK	UNK	614176.555	843118.545	5.62	0.30	UNABLE TO OBTAIN SIZE AN MATERIAL UTILITY IS BELOW WATER TABLE
TH-11	UNKNOWN OWNER, UNKNOWN UTILITY	4"	PVC	614174.295	843174.736	5.70	3.00	
TH-12	CITY OF PEMBROKE PINES, FORCE MAIN	UNK	UNK	614172.999	843246.898	5.60	0.60	UNABLE TO OBTAIN SIZE AN MATERIAL UTILITY IS BELOW WATER TABLE
TH-13	UNKNOWN, BURIED FIBER OPTIC CABLE	2"	PVC	614173.081	843249.933	5.30	2.10	

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Plans Prepared By:
CPH, LLC
A Full Service A & E Firm

KYLE MICHAEL BECHTELHEIMER
LICENSE
No. 86673
STATE OF FLORIDA
PROFESSIONAL ENGINEER
KYLE M. BECHTELHEIMER, P.E.
FL P.E. NO. 86673

No.	Date	Revision

Designed: K.B.
Drawn: J.C.
Checked: A.S.
Job No.: 2400768
Date: 9/12/2025 © 2025

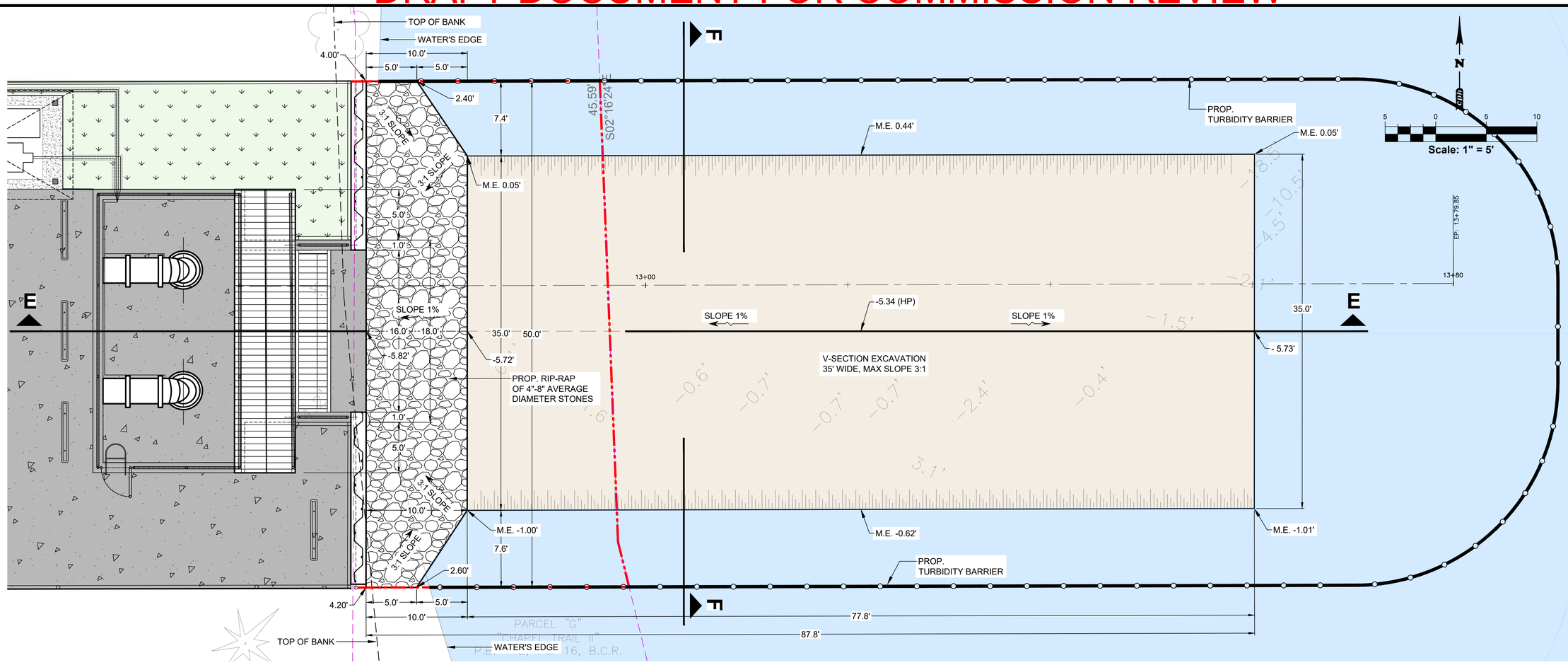
SUBSURFACE EXPLORATION LOCATIONS AND DATA

CITY OF PEMBROKE PINES PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST BROWARD COUNTY, FLORIDA

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

Sheet No.
C-7

DRAFT DOCUMENT FOR COMMISSION REVIEW



PLAN VIEW

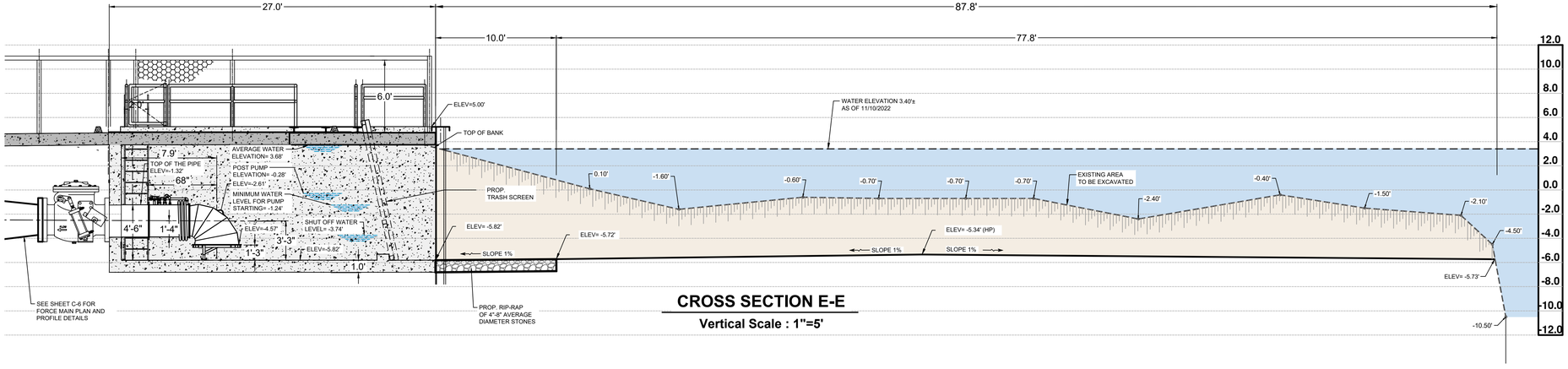
Horizontal Scale : 1"=5'

DATA

DREDGE VOLUME	:	250 CY
TOTAL WORK IMPACTED AREA	:	28,450 SF
LAKE WORK IMPACTED AREA	:	5,720 SF
TOP OF CANAL BANK IMPACTED AREA	:	1,020 SF
*NO DIRECT IMPACTS ON CANAL		

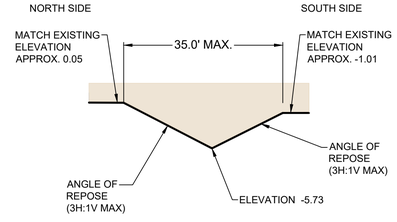
PLAN NOTES

1. CONTRACTOR SHALL PERFORM ALL EXCAVATION AND GRADING IN ACCORDANCE WITH SFWMD, FDEP, ACOE, AND BROWARD COUNTY ENVIRONMENTAL PROTECTION DIVISION PERMIT CONDITIONS.
2. CONTRACTOR SHALL INSTALL AND MAINTAIN TURBIDITY BARRIERS AND EROSION CONTROLS AS REQUIRED TO PREVENT IMPACTS TO ADJACENT WATERS.
3. EXCAVATED MATERIAL SHALL BE TRANSPORTED AND DISPOSED OF AT AN APPROVED OFF-SITE FACILITY UNLESS OTHERWISE NOTED IN THE PLANS OR PERMITS.
4. CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS, INCLUDING LAKE BANKS AND ADJACENT UPLANDS, TO EQUAL OR BETTER CONDITION THAN EXISTING.
5. FINAL SLOPES, GRADES, AND ELEVATIONS SHALL CONFORM TO THE PLANS AND BE VERIFIED IN THE FIELD PRIOR TO ACCEPTANCE.
6. CONTRACTOR SHALL COORDINATE WITH THE ENGINEER BEFORE DEVIATING FROM PLAN ELEVATIONS, LIMITS, OR HAUL ROUTES.
7. CONTRACTOR SHALL MONITOR TURBIDITY AND WATER QUALITY DURING EXCAVATION AS REQUIRED BY PERMIT CONDITIONS.
8. IMPORTED FILL, IF USED, SHALL BE CLEAN AND FREE OF DEBRIS, ORGANIC MATTER, OR CONTAMINANTS, AND MEET BROWARD COUNTY STANDARDS.
9. ACCESS, STAGING, AND HAUL ROUTES SHALL BE LOCATED TO MINIMIZE DISTURBANCE AND SHALL BE RESTORED UPON COMPLETION OF WORK.
10. CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND COMPLYING WITH ALL APPLICABLE PERMITS AND REGULATIONS.



CROSS SECTION E-E

Vertical Scale : 1"=5'



CROSS SECTION F-F

Not To Scale

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KYLE MICHAEL BECHTELHEIMER LICENSE No. 86673 STATE OF FLORIDA PROFESSIONAL ENGINEER
KYLE M. BECHTELHEIMER, P.E.
FL P.E. NO. 86673

No.	Date	Revision

Designed: K.B.
Drawn: J.C.
Checked: A.S.
Job No.: 2400768
Date: 9/12/2025 © 2025

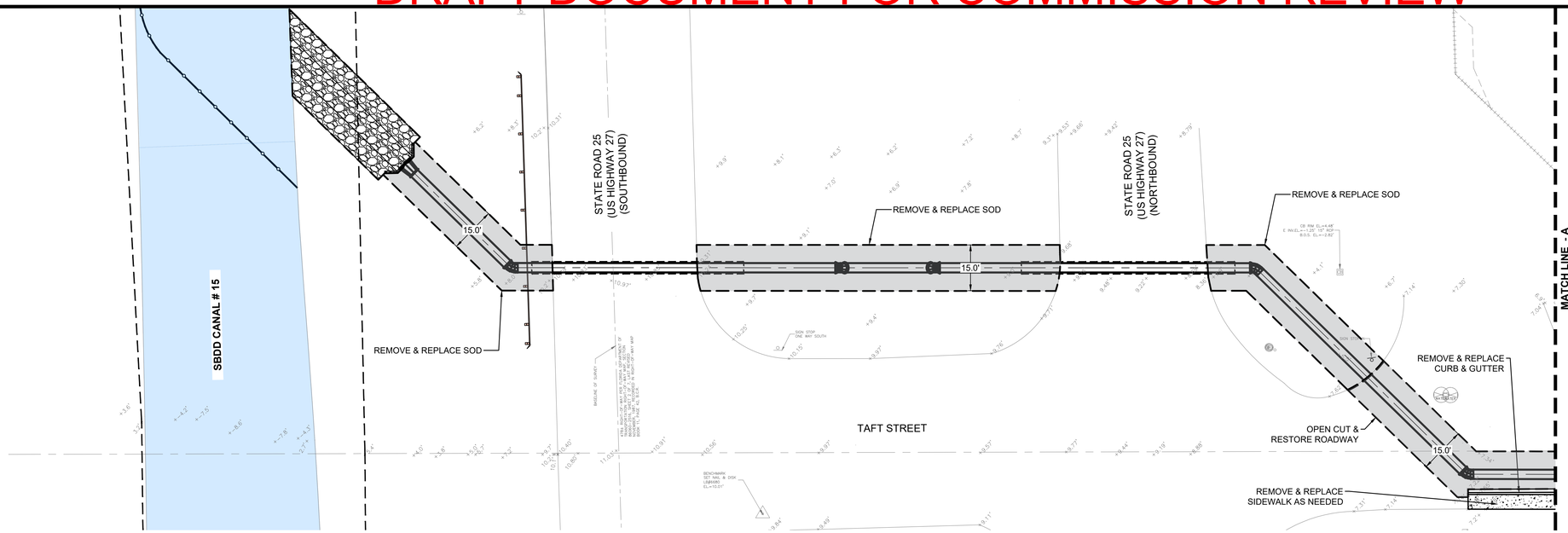
EXCAVATION AND CROSS SECTION

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 200 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

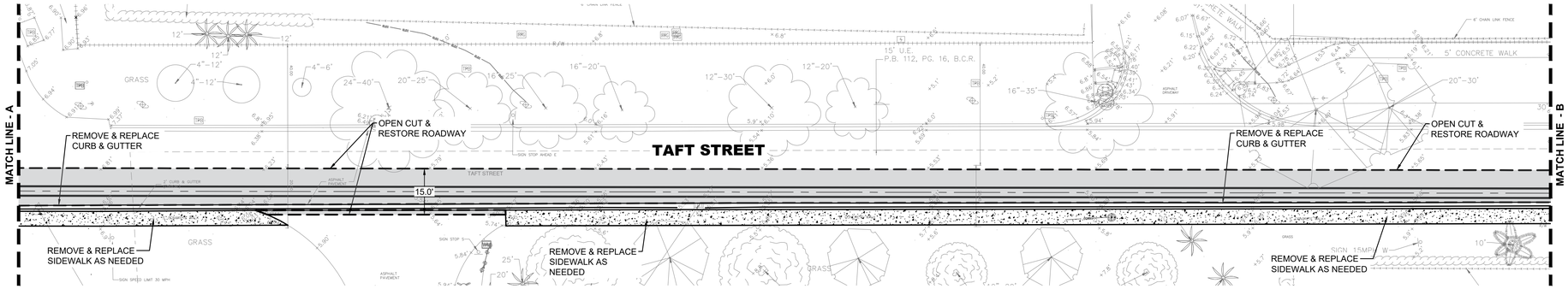
Sheet No.
C-8

DRAFT DOCUMENT FOR COMMISSION REVIEW



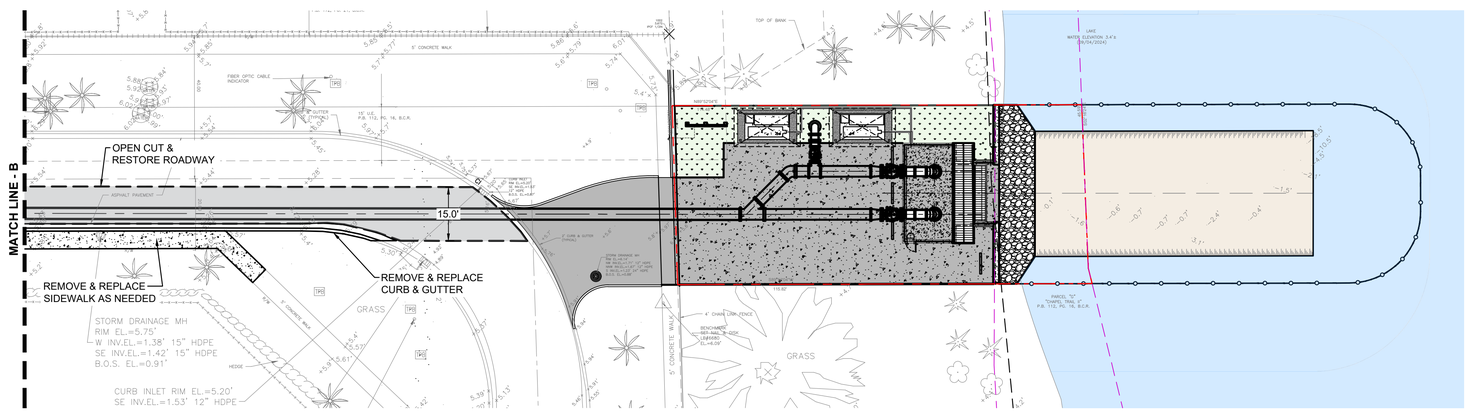
PLAN VIEW

Horizontal Scale : 1"=20'



PLAN VIEW

Horizontal Scale : 1"=20'



PLAN VIEW

Horizontal Scale : 1"=20'

PLAN NOTES

1. CONTRACTOR SHALL RESTORE ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES, WHETHER OR NOT SPECIFICALLY SHOWN ON THESE PLANS.
2. SOD SHALL BE REPLACED IN ALL GRASSED AREAS DISTURBED DURING CONSTRUCTION WITH MATCHING SPECIES AND THICKNESS.
3. ASPHALT PAVEMENT RESTORATION SHALL INCLUDE FULL-LANE WIDTH FOR THE LIMITS OF DISTURBANCE AND SHALL MATCH EXISTING PAVEMENT THICKNESS, GRADE, AND FINISH.
4. CONCRETE CURB AND GUTTER REPLACEMENT SHALL MATCH EXISTING CROSS-SECTION, ALIGNMENT, GRADE, AND FINISH.
5. CONCRETE SIDEWALK REPLACEMENT SHALL MATCH EXISTING WIDTH, THICKNESS, GRADE, FINISH, AND ADA REQUIREMENTS.
6. ALL RESTORATION SHALL CONFORM TO APPLICABLE JURISDICTIONAL STANDARDS AND SPECIFICATIONS.
7. CONTRACTOR SHALL MAINTAIN SAFE PEDESTRIAN AND VEHICULAR ACCESS DURING ALL RESTORATION ACTIVITIES.
8. CONTRACTOR TO SUBMIT MOT PLANS FOR CITY APPROVAL AND COORDINATE FOR NIGHT WORK.

N

20 0 20 40

Scale: 1" = 20'

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No.	Date	Revision

Designed: K.B.
Drawn: J.C.
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RESTORATION PLAN

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

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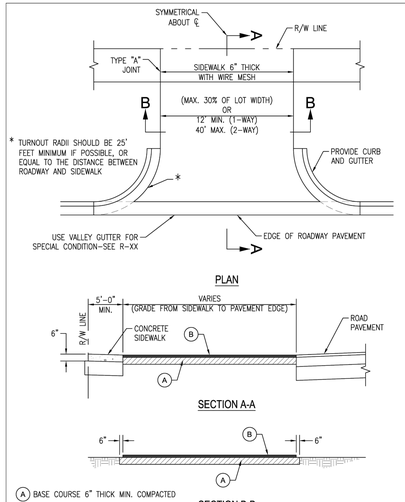
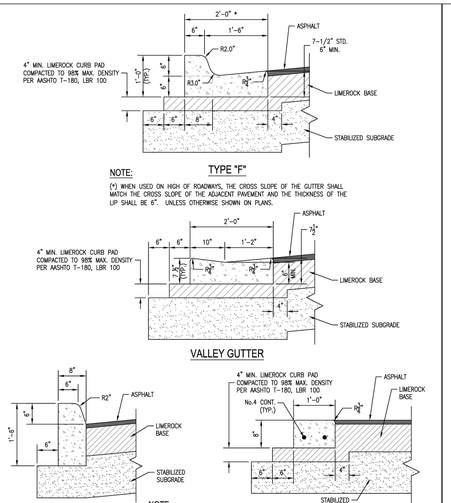
Sheet No.
C-9

Drawing name: J:\2400768_Pembroke Pines SW Seepage\Civil\DWG_Current_Plan_Set\14.C-9 Restoration Plan_1_4211_ae8a4ef1.sv$.dwg Oct 17, 2025 - 8:33am amartin

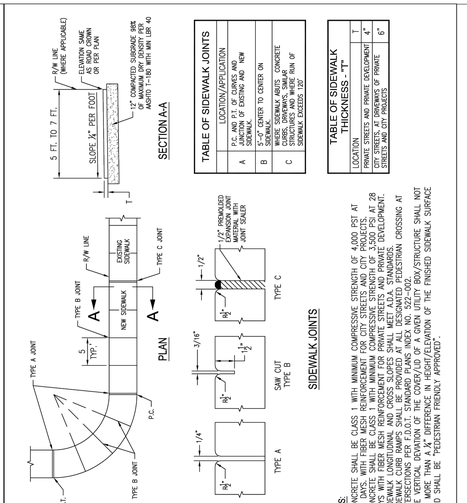
DRAFT DOCUMENT FOR COMMISSION REVIEW



CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION	STANDARD ROAD DETAIL	
APPROVED: J.M.	REVISED:	R-21
DATE: 11/05/99	ASPHALT DRIVEWAY COMMERCIAL AND INDUSTRIAL	

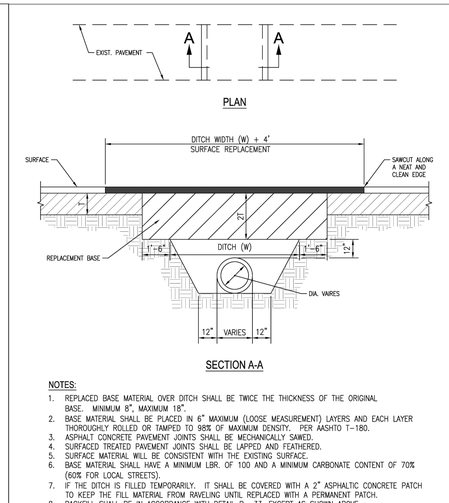


CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION	STANDARD ROAD DETAIL	
APPROVED: J.M.	REVISED: 10/18/18	R-26
DATE: 11/05/99	CONCRETE CURBS	



NOTES:
1. CONCRETE SHALL BE CLASS 1 WITH MINIMUM COMPRESSIVE STRENGTH OF 4,000 PST AT 28 DAYS, WITH FIBER MESH REINFORCEMENT FOR CITY STREETS AND CITY PROJECTS. CONCRETE SHALL BE CLASS II WITH MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS WITH FIBER MESH REINFORCEMENT FOR PRIVATE STREETS AND PRIVATE DEVELOPMENT.
2. SIDEWALK LONGITUDINAL AND CROSS SLOPES SHALL MEET ADA STANDARDS.
3. SIDEWALK SHALL BE CONSTRUCTED AS SHOWN ON PLANS AT INTERSECTIONS AND CROSSINGS.
4. INTERSECTIONS PER F.D.O.T. STANDARD PLANS, INDEX NO. 522-002.
5. THE VERTICAL DEVIATION OF THE COVER/LID OF A GIVEN UTILITY BOX/STRUCTURE SHALL NOT VARY MORE THAN 1/4" FROM THE VERTICAL ELEVATION OF THE FINISHED SIDEWALK SURFACE AND SHALL BE "PEDESTRIAN FRIENDLY APPROVED".

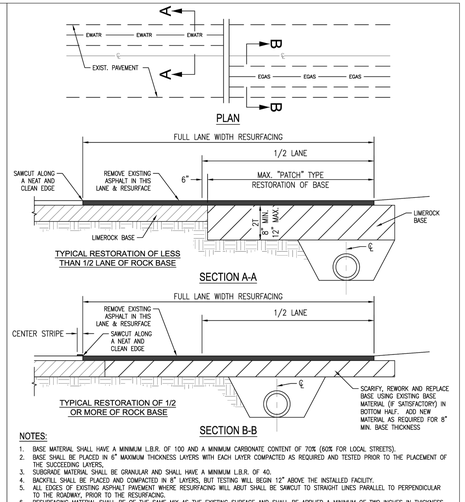
CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION	STANDARD ROAD DETAIL	
APPROVED: J.M.	REVISED: 12/01/20, 9/17/20, 2/18/21, 6/01/22	R-28
DATE: 11/05/99	CONCRETE SIDEWALK	



NOTES:
1. REPLACED BASE MATERIAL OVER DITCH SHALL BE TWICE THE THICKNESS OF THE ORIGINAL BASE. MINIMUM 8", MAXIMUM 18".
2. BASE MATERIAL SHALL BE PLACED IN 6" MAXIMUM (LOOSE MEASUREMENT) LAYERS AND EACH LAYER THOROUGHLY ROLLED OR TAMPED TO 98% OF MAXIMUM DENSITY. PER AASHTO T-180.
3. ASPHALT CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED.
4. SURFACED TREATED PAVEMENT JOINTS SHALL BE LAPPED AND FEATHERED.
5. SURFACE MATERIAL WILL BE CONSISTENT WITH THE EXISTING SURFACE.
6. BASE MATERIAL SHALL HAVE A MINIMUM LBR. OF 100 AND A MINIMUM CARBONATE CONTENT OF 70% (60% FOR LOCAL STREETS).
7. IF THE DITCH IS FILLED TEMPORARILY, IT SHALL BE COVERED WITH A 2" ASPHALTIC CONCRETE PATCH TO KEEP THE FILL MATERIAL FROM RAVELING UNTIL REPLACED WITH A PERMANENT PATCH.
8. BACKFILL SHALL BE IN ACCORDANCE WITH DETAIL R- 33, EXCEPT AS SHOWN ABOVE.

RE: B.C.P.W.D. PLATE No.6

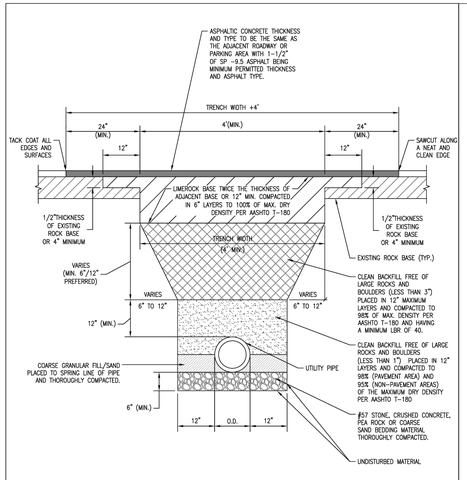
CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION	STANDARD ROAD DETAIL	
APPROVED: J.M.	REVISED:	R-34
DATE: 11/05/99	FLEXIBLE PAVEMENT RESTORATION PERPENDICULAR UTILITY INSTALLATION	



NOTES:
1. BASE MATERIAL SHALL HAVE A MINIMUM L.B.R. OF 100 AND A MINIMUM CARBONATE CONTENT OF 70% (60% FOR LOCAL STREETS).
2. BASE SHALL BE PLACED IN 6" MAXIMUM THICKNESS LAYERS WITH EACH LAYER COMPACTED AS REQUIRED AND TESTED PRIOR TO THE PLACEMENT OF THE SUCCEEDING LAYERS.
3. SUBGRADE MATERIAL SHALL BE GRANULAR AND SHALL HAVE A MINIMUM L.B.R. OF 40.
4. BACKFILL SHALL BE PLACED AND COMPACTED IN 8" LAYERS, BUT TESTING WILL BECIN 12" ABOVE THE INSTALLED FACILITY.
5. ALL EDGES OF EXISTING ASPHALT PAVEMENT WHERE RESURFACING WILL ABUT SHALL BE SAWCUT TO STRAIGHT LINES PARALLEL TO PERPENDICULAR TO THE ROADWAY, PRIOR TO THE RESURFACING.
6. RESURFACING MATERIAL SHALL BE OF THE SAME MIX AS THE EXISTING SURFACE AND SHALL BE APPLIED A MINIMUM OF TWO INCHES IN THICKNESS.
7. REFER TO DETAIL R-33 (DETAILED PROCEDURE).

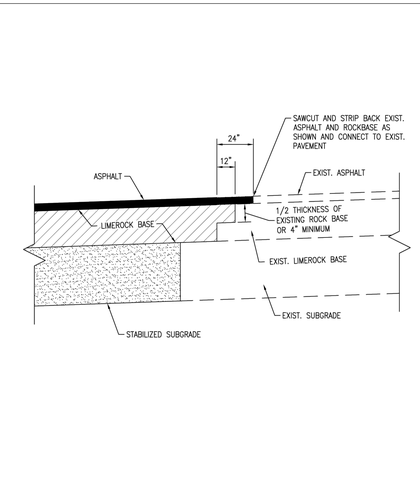
RE: B.C.P.W.D. PLATE No.7

CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION	STANDARD ROAD DETAIL	
APPROVED: J.M.	REVISED:	R-35
DATE: 11/05/99	FLEXIBLE PAVEMENT RESTORATION PARALLEL UTILITY INSTALLATION	

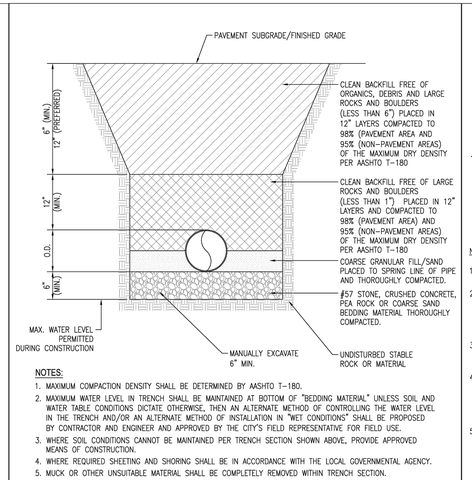


NOTES:
1. REFER TO CITY STANDARDS G-1 AND R-44 FOR ADDITIONAL INFORMATION ON TRENCH BACKFILL.

CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION	STANDARD ROAD DETAIL	
APPROVED: K.M.K.	REVISED: 12/15/22, 01/14/21, 02/05/20	R-44
DATE: 10/30/19	TYPICAL TRENCH BACKFILL	

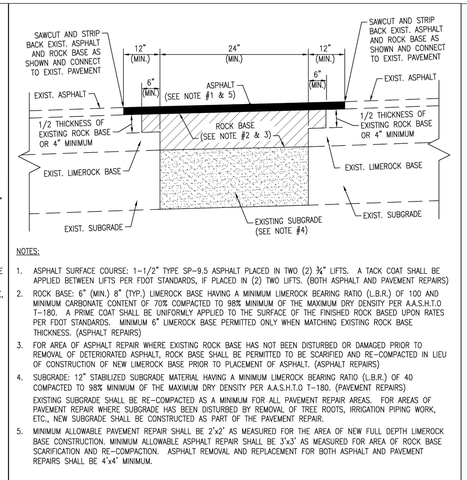


CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION	STANDARD ROAD DETAIL	
APPROVED: J.M.	REVISED: 10/18/18	R-39
DATE: 11/05/99	PAVEMENT CONNECTION	



NOTES:
1. MAXIMUM COMPACTION DENSITY SHALL BE DETERMINED BY AASHTO T-180.
2. MAXIMUM WATER LEVEL IN TRENCH SHALL BE MAINTAINED AT BOTTOM OF "BEDDING MATERIAL" UNLESS SOIL AND WATER TABLE CONDITIONS DICTATE OTHERWISE, THEN AN ALTERNATE METHOD OF CONTROLLING THE WATER LEVEL IN THE TRENCH AND/OR AN ALTERNATE METHOD OF INSTALLATION IN "WET CONDITIONS" SHALL BE PROPOSED BY CONTRACTOR AND ENGINEER AND APPROVED BY THE CITY'S FIELD REPRESENTATIVE FOR FIELD USE.
3. WHERE SOIL CONDITIONS CANNOT BE MAINTAINED PER TRENCH SECTION SHOWN ABOVE, PROVIDE APPROVED MEANS OF CONSTRUCTION.
4. WHERE REQUIRED SHEETING AND SHORING SHALL BE IN ACCORDANCE WITH THE LOCAL GOVERNMENTAL AGENCY.
5. MUCK OR OTHER UNSUITABLE MATERIAL SHALL BE COMPLETELY REMOVED WITHIN TRENCH SECTION.
6. WHEN THE PIPE IS LAID IN THE PREPARED TRENCH, TRUE TO LINE AND GRADE, THE PIPE BARREL SHALL RECEIVE CONTINUOUS UNIFORM SUPPORT. #57 STONE, 3/4" WASHED ROCK, CRUSHED STONE, PEA ROCK OR COARSE SAND SHALL BE USED TO PROVIDE UNIFORM BEDDING.
7. JOINTS ARE REQUIRED TO BE WRAPPED WITH FILTER FABRIC.

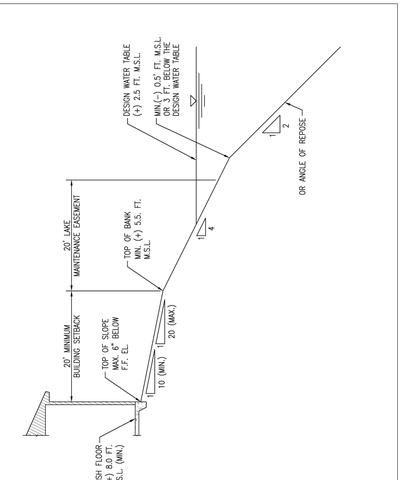
CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION	STANDARD ROAD DETAIL	
APPROVED: K.M.K.	REVISED: 08/09/21, 10/21/21	R-47
DATE: 02/08/21	ASPHALT AND PAVEMENT REPAIR	



NOTES:
1. ASPHALT SURFACE COURSE: 1-1/2" TYPE SP-9.5 ASPHALT PLACED IN TWO (2) ¾" LIFTS. A TACK COAT SHALL BE APPLIED BETWEEN LIFTS PER FDOT STANDARDS, IF PLACED IN (2) TWO LIFTS. (BOTH ASPHALT AND PAVEMENT REPAIRS)
2. ROCK BASE: 6" (MIN.) 8" (TYP.) LIMEROCK BASE HAVING A MINIMUM LIMEROCK BEARING RATIO (L.B.R.) OF 100 AND MINIMUM CARBONATE CONTENT OF 70% COMPACTED TO 98% MINIMUM OF THE MAXIMUM DRY DENSITY PER A.A.S.H.T.O T-180. A PRIME COAT SHALL BE UNIFORMLY APPLIED TO THE SURFACE OF THE FINISHED ROCK BASED UPON RATES PER FDOT STANDARDS. MINIMUM 6" LIMEROCK BASE PERMITTED ONLY WHEN MATCHING EXISTING ROCK BASE THICKNESS. (ASPHALT REPAIRS)
3. FOR AREA OF ASPHALT REPAIR WHERE EXISTING ROCK BASE HAS NOT BEEN DISTURBED OR DAMAGED PRIOR TO REMOVAL OF DETERIORATED ASPHALT, ROCK BASE SHALL BE PERMITTED TO BE SCARIFIED AND RE-COMPACTED IN LIEU OF CONSTRUCTION OF NEW LIMEROCK BASE PRIOR TO PLACEMENT OF ASPHALT. (ASPHALT REPAIRS)
4. SUBGRADE: 12" STABILIZED SUBGRADE MATERIAL HAVING A MINIMUM LIMEROCK BEARING RATIO (L.B.R.) OF 40 COMPACTED TO 98% MINIMUM OF THE MAXIMUM DRY DENSITY PER A.A.S.H.T.O T-180. (PAVEMENT REPAIRS)
   EXISTING SUBGRADE SHALL BE RE-COMPACTED AS A MINIMUM FOR ALL PAVEMENT REPAIR AREAS. FOR AREAS OF PAVEMENT REPAIR WHERE SUBGRADE HAS BEEN DISTURBED BY REMOVAL OF TREE ROOTS, IRRIGATION PIPING WORK, ETC., NEW SUBGRADE SHALL BE CONSTRUCTED AS PART OF THE PAVEMENT REPAIR.
5. MINIMUM ALLOWABLE PAVEMENT REPAIR SHALL BE 2'x2' AS MEASURED FOR THE AREA OF NEW FULL DEPTH LIMEROCK BASE CONSTRUCTION. MINIMUM ALLOWABLE ASPHALT REPAIR SHALL BE 3'x3' AS MEASURED FOR AREA OF ROCK BASE SCARIFICATION AND RE-COMPACTION. ASPHALT REMOVAL AND REPLACEMENT FOR BOTH ASPHALT AND PAVEMENT REPAIRS SHALL BE 4'x4' MINIMUM.

ALL MATERIALS AND CONSTRUCTION OF THE PAVEMENT REPAIR STRUCTURE SHALL BE IN ACCORDANCE WITH THE FDOT 'STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION', LATEST EDITION.

CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION	STANDARD DRAINAGE DETAIL	
APPROVED: J.M.	REVISED:	D-1
DATE: 11/05/99	LAKE/CANAL/WATERWAY BANK SLOPE REQUIREMENTS	



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FL P.E. NO. 86673

No.	Date	Revision

Designed: K.B.
Drawn: J.C.
Checked: A.S.
Job No.: 2400768
Date: 9/12/2025 © 2025

CIVIL DETAILS

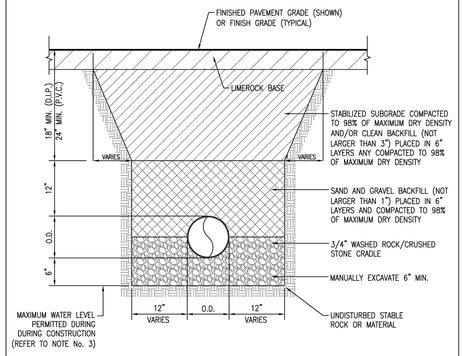
CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

Sheet No.
C-10

Drawing name: J:\2400768_Pembroke Pines SW Seepage\Civil\DWG_Current_Plan_Set\15. C-10, C-11, C-12 Details.dwg Oct 14, 2025 - 1:57pm jchavez

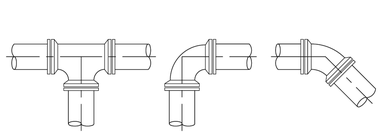
DRAFT DOCUMENT FOR COMMISSION REVIEW



NOTES:

1. MAXIMUM DENSITY SHALL BE DETERMINED BY AASHTO T-180.
2. MAXIMUM DEPTH TO BOTTOM OF PRESSURE MAINS SHALL NOT EXCEED SIX (6) FEET UNLESS OTHERWISE APPROVED BY THE CITY OF PEMBROKE PINES UTILITY DEPARTMENT.
3. MAXIMUM WATER LEVEL IN TRENCH SHALL BE MAINTAINED AT BOTTOM OF "BEDDING MATERIAL" UNLESS SOI LAND WATER TABLE CONDITIONS DICTATE OTHERWISE, THEN AN ALTERNATE METHOD OF CONTROLLING THE WATER LEVEL IN THE TRENCH AND/OR ALTERNATE METHOD OF INSTALLATION IN "WET CONDITIONS" SHALL BE PROPOSED BY CONTRACTOR AND ENGINEER AND APPROVED BY CITY'S FIELD REPRESENTATIVE FOR FIELD USE.

CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION		STANDARD GENERAL DETAIL	
APPROVED: J.M.	REVISED:	WATER AND SEWER TRENCH BACKFILL	G-1
DATE: 11/05/99	6/15/20		

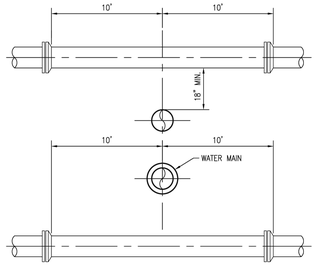


RESTRAINED PIPE LENGTH (LINEAL FEET)					
PIPE SIZE	TEE & WYE	90°BEND	45°BEND	22 1/2°BEND	11 1/4°BEND
6"	27	27	16	9	5
8"	34	34	20	11	6
10"	41	41	24	14	7
12"	48	48	28	16	8
14"	55	55	32	18	10
16"	62	62	35	20	11
18"	69	69	39	22	12
20"	75	75	42	24	13
24"	87	87	49	27	14
30"	104	104	57	31	17
36"	120	120	65	35	19
42"	134	134	72	39	21
48"	147	147	79	42	22
54"	160	160	85	45	24

NOTE:

THE FIGURES IN THIS TABLE ARE BASED ON 150 PSI TEST PRESSURE WITH 2.5 FEET OF COVER AND 2000 POUNDS PER SQUARE FOOT SOIL BEARING AGAINST UNDISTURBED TRENCH. A 20% SAFETY FACTOR HAS BEEN ADDED.

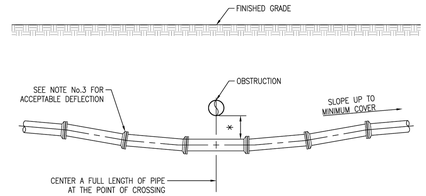
CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION		STANDARD GENERAL DETAIL	
APPROVED: J.M.	REVISED:	RESTRAINED JOINTS	G-2
DATE: 11/05/99			



NOTES:

1. A WATER MAIN SHOULD CROSS OVER PIPES WHEREVER POSSIBLE MAINTAINING A 36 INCH COVER FOR PVC, 30 INCH COVER FOR D.I.P. AND 18 INCH SEPARATION AS MINIMUMS.
2. WHEREVER A WATER MAIN CROSSES UNDER A SEWER MAIN, OR CROSSES OVER WITH LESS THAN 18 INCHES VERTICAL SEPARATION, THEN D.I.P. SHALL BE USED FOR BOTH PIPES FOR A DISTANCE OF 20 FEET CENTERED ON CROSSING WITH NO JOINTS WITHIN 10 FEET OF THE CROSSING.
3. 18 INCH SEPARATION SHOULD BE MAINTAINED BETWEEN ALL PIPES (STORM, SEWER, WATER) WHENEVER POSSIBLE. 12 INCHES IS THE ABSOLUTE MINIMUM SEPARATION WITH D.I.P. REQUIRED FOR ANY SEPARATION LESS THAN 18 INCHES.
4. MAINTAIN 10 FEET HORIZONTAL SEPARATION BETWEEN WATER AND SEWER AS A MINIMUM.
5. 3 FOOT HORIZONTAL CLEARANCE SHALL BE PROVIDED BETWEEN UTILITIES AND ANY OBSTRUCTIONS (CATCH BASINS, CONCRETE POLES, ETC.)
6. 5 FOOT HORIZONTAL CLEARANCE SHALL BE PROVIDED BETWEEN UTILITIES AND TREES.

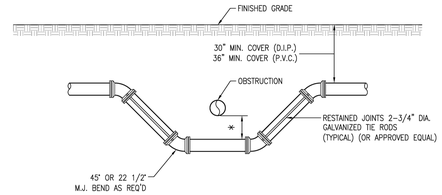
CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION		STANDARD GENERAL DETAIL	
APPROVED: J.M.	REVISED:	UTILITY CROSSING GENERAL REQUIREMENTS	G-4
DATE: 11/05/99			



NOTES:

1. (*) 18" MINIMUM CLEARANCE REQUIRED FOR WATER AND SEWER MAIN CROSSINGS, 12" MINIMUM CLEARANCE REQUIRED FOR OTHER UTILITY CROSSINGS.
2. THE DEFLECTION TYPE CROSSING SHALL BE USED WHENEVER POSSIBLE. ONLY UNDER SPECIFIC ORDERS BY THE ENGINEER SHALL THE FITTING TYPE CROSSING BE ALLOWED.
3. CONSTRUCT CROSSING USING 75% OF MANUFACTURES MAXIMUM JOINT DEFLECTION (MAXIMUM).

CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION		STANDARD GENERAL DETAIL	
APPROVED: J.M.	REVISED:	UTILITY CROSSING DEFLECTION TYPE	G-5
DATE: 11/05/99			



NOTES:

1. (*) 18" MINIMUM CLEARANCE REQUIRED FOR WATER AND SEWER MAIN CROSSINGS, 12" MINIMUM CLEARANCE REQUIRED FOR OTHER UTILITY CROSSINGS.
2. COAT TIE RODS WITH A COAL TAR ENAMEL AFTER ASSEMBLY (2 COATS MIN.)
3. TIE RODS MAY BE OMITTED WHEN OTHER APPROVED METHODS OF RESTRAINING ARE UTILIZED.

CITY OF PEMBROKE PINES ENGINEERING/UTILITIES DIVISION		STANDARD GENERAL DETAIL	
APPROVED: J.M.	REVISED:	UTILITY CROSSING FITTING TYPE	G-6
DATE: 11/05/99			

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KYLE MICHAEL BECHTELHEIMER LICENSE No. 86673 STATE OF FLORIDA PROFESSIONAL ENGINEER
KYLE M. BECHTELHEIMER, P.E.
FL P.E. NO. 86673

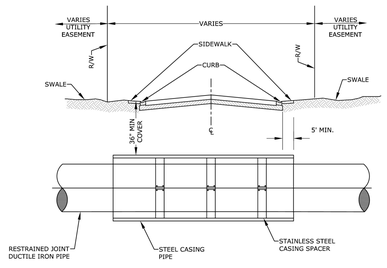
No.	Revision	Date

Designed: K.B.
Drawn: J.C.
Checked: A.S.
Job No.: 2400768
Date: 9/12/2025 © 2025

BROWARD COUNTY PUBLIC WORKS DEPARTMENT PLOTTED: 10/2024

WATER & WASTEWATER SERVICES ENGINEERING DIVISION 2555 WEST COPANS ROAD POMPANO BEACH, FL 33069 PHONE NO. 954-831-0745 FAX: 954-831-0925

STANDARD DETAIL



NOTES:

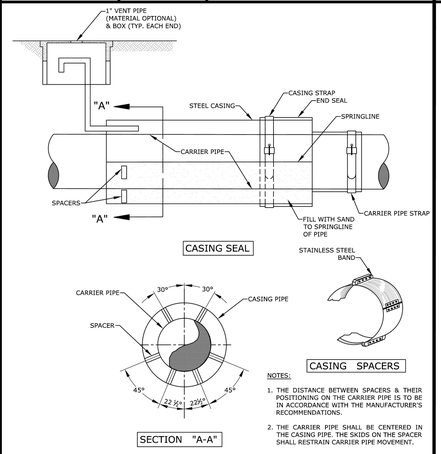
1. THE END OF THE CASING PIPE SHALL EXTEND BEYOND THE EDGE OF PAVEMENT A MINIMUM OF 5'.
2. WHEN CONSTRUCTION IS WITHIN FDOT OR RAILROAD JURISDICTION, ADDITIONAL REQUIREMENTS OF THE UTILITY ACCOMMODATION MANUAL SHALL BE MET.

REVISED	JACK AND BORE PROFILE	FIGURE 153
7/7/2021		

BROWARD COUNTY PUBLIC WORKS DEPARTMENT PLOTTED: 10/2024

WATER & WASTEWATER SERVICES ENGINEERING DIVISION 2555 WEST COPANS ROAD POMPANO BEACH, FL 33069 PHONE NO. 954-831-0745 FAX: 954-831-0925

STANDARD DETAIL



NOTES:

1. THE DISTANCE BETWEEN SPACERS & THEIR POSITIONING ON THE CARRIER PIPE IS TO BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
2. THE CARRIER PIPE SHALL BE CENTERED IN THE CASING PIPE. THE SKIDS ON THE SPACER SHALL RESTRAIN CARRIER PIPE MOVEMENT.

REVISED	CASING PIPE DETAIL JACK AND BORE	FIGURE 154
7/7/2021		

BROWARD COUNTY PUBLIC WORKS DEPARTMENT PLOTTED: 10/2024

WATER & WASTEWATER SERVICES ENGINEERING DIVISION 2555 WEST COPANS ROAD POMPANO BEACH, FL 33069 PHONE NO. 954-831-0745 FAX: 954-831-0925

STANDARD DETAIL

SPECIFICATIONS FOR CARRIER AND CASING PIPES

	CARRIER PIPE	CASING PIPE
CONTENTS TO BE HANDLED	WATER/WASTEWATER	NONE
OUTSIDE DIAMETER	DETERMINED BY PROJECT	SEE TABLE
PIPE MATERIAL	DIP	STEEL
SPECIFICATION AND GRADE	ANSI/AWWA C151/A21.51	ASTM A139, GRADE"B"
PRESSURE CLASS/WALL THICKNESS	350	0.500"
ACTUAL WORKING PRESSURE	150 PSI	NONE
TYPE OF JOINT	RESTRAINED	WELDED
COATING	BLACK BITUMINOUS	BLACK BITUMINOUS
METHOD OF INSTALLATION	CASING SPACERS	JACK AND BORE
PROTECTION AT ENDS OF CASING	N/A	CASING END SEAL

NOTES:

1. CASING PIPE TO BE INSTALLED UNDER ROAD BY JACKING AND BORING.
2. ALL WORK DONE WITHIN FDOT OR RAILROAD RIGHT OF WAY IS SUBJECT TO INSPECTION AND DIRECTION OF THEIR ENGINEER.
3. ALL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT AWWA STANDARDS FOR PIPE LINES CONVEYING NONFLAMMABLE SUBSTANCES AND FDOT REQUIREMENTS AS PER UTILITY ACCOMMODATION GUIDE, LATEST VERSION.
4. FIELD AND SHOP WELDS OF THE CASING PIPES SHALL CONFORM WITH AWS STANDARD SPECIFICATIONS. FIELD WELDS SHALL BE COMPLETE PENETRATIONS, SINGLE-BEVEL GROOVE TYPE JOINTS.
5. STEEL CASING SHALL CONFORM TO THE REQUIREMENTS OF ASTM DESIGNATION A139. THE CASING PIPES SHALL HAVE THE MINIMUM NOMINAL DIAMETER AND MINIMUM WALL THICKNESS AS SHOWN.
6. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO STARTING JACKING AND BORING.
7. MINIMUM VERTICAL CLEARANCE BETWEEN PROPOSED CASING PIPE AND OTHER EXISTING UTILITIES SHALL BE 12" MINIMUM.
8. STAINLESS STEEL CASING SPACERS WITH POLYMER RUNNERS SUBJECT TO APPROVAL OF WWS.

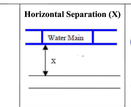
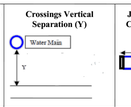
CARRIER PIPE SIZE	NOMINAL DIA OF STEEL CASING PIPE
6"	14"
8"	16"
10"	20"
12"	24"
14"	24"
16"	30"
18"	34"
20"	36"
24"	42"
30"	42"
36"	48"
42"	54"
48"	72"

REVISED	JACK AND BORE PIPE DETAILS	FIGURE 155
7/7/2021		

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH RULE 62-555.314, F.A.C.

The following table summarizes the required separation distances from public water mains to other pipes as provided in Rule 62-62-555.314, F.A.C. Exceptions to these required distances are addressed on the second page.

Separation Requirements for Public Water System Mains:

Other Pipe	Horizontal Separation (X)	Crossings Vertical Separation (Y)	Joint Spacing (Z) @ Crossings (Full Joint Centered)
			
• **Storm Sewers** • **Stormwater Force Mains** • **Reclaimed Water Pipelines regulated under Part III of Chapter 62-610, F.A.C.**	3 ft. minimum	For water main installed above other pipe (preferred), 12 inches is the minimum except for storm sewer, then 6 inches is the minimum and 12 inches is preferred 12 inches minimum if water main is below other pipe	Alternate 3 ft. minimum
• **Vacuum Sanitary Sewer**	10 ft. preferred 3 ft. minimum	For water main installed above other pipe, 12 inches preferred and 6 inches minimum 12 inches minimum if water main is below other pipe	Alternate 3 ft. minimum
• **Gravity or Pressure Sanitary Sewer** • **Sanitary Sewer Force Main** • **Reclaimed Water Pipelines not regulated under Part III of Chapter 62-610, F.A.C.**	10 ft. preferred 6 ft. minimum (note - 3 ft. minimum for gravity sanitary sewer where the bottom of the water main is laid at least 6 inches above the top of the gravity sanitary sewer)	For water main installed above other pipe (preferred), 12 inches is the minimum except for gravity sewer, then 6 inches is the minimum and 12 inches is preferred 12 inches minimum if water main is below other pipe	Alternate 6 ft. minimum
• **On-Site Sewage Treatment & Disposal System**	10 ft. minimum	NA	NA

Refer to the next page for exceptions to the minimum separation requirements provided above.

Disclaimer – This document is provided for your convenience only. Please refer to Rule 62-555.314, F.A.C., for additional construction requirements.

EXCEPTIONS TO MINIMUM SEPARATION REQUIREMENTS

Where it is not technically feasible or economically sensible to comply with the requirements of 62-555.314(1) or (2), F.A.C., **the Department shall allow exceptions to these requirements if suppliers of water or construction permit applicants provide technical or economic justification for each exception and provide alternative construction features that afford a similar level of reliability and public health protection**.

Acceptable alternative construction features include the following:

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62-555.314(5)(a), F.A.C.

Figure 1. Horizontal separation distance X less than required but not less than 3 feet

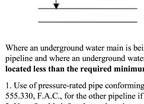
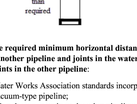


Figure 2. Joint spacing distance Z less than required



Where an underground water main is being laid **less than the required minimum horizontal distance** from another pipeline and where an underground water main is **crossing another pipeline and joints in the water main are being located less than the required minimum distance from joints in the other pipeline**:

1. Use of pressure-rated pipe conforming to the American Water Works Association standards incorporated into Rule 62-555.330, F.A.C., for the other pipeline if it is a gravity- or vacuum-type pipeline;
2. Use of welded, fused, or otherwise restrained joints for either the water main or the other pipeline; **or**
3. Use of watertight casing pipe or concrete encasement at least four inches thick for either the water main or the other pipeline.

LOCATION OF PUBLIC WATER SYSTEM MAINS IN ACCORDANCE WITH 62-555.314(5)(b), F.A.C.

Figure 3. Horizontal separation distance X less than 3 feet

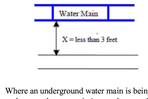
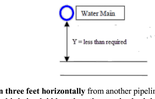


Figure 4. Crossing vertical separation distance Y less than required



Where an underground water main is being laid **less than three feet horizontally** from another pipeline and where an underground water main is **crossing another pipeline and is being laid less than the required minimum vertical distance from the other pipeline**:

Use of pipe, or casing pipe, having high impact strength (i.e., having an impact strength at least equal to that of 0.25-inch-thick ductile iron pipe) or concrete encasement at least four inches thick for both the water main **and** for the other pipeline if it is new and is conveying wastewater or reclaimed water.

Disclaimer – This document is provided for your convenience only. Please refer to Rule 62-555.314, F.A.C., for additional construction requirements.

CIVIL DETAILS

CITY OF PEMBROKE PINES PEMBROKE PINES SEEPAGE

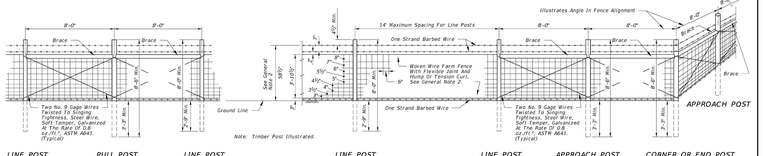
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

Sheet No.
C-11

Drawing name: J:\2400768_Pembroke Pines SW Seepage\Civil\DWG_Current_Plan_Set\15. C-10, C-11, C-12 Details.dwg Oct 14, 2025 - 1:58pm jchavez

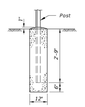
DRAFT DOCUMENT FOR COMMISSION REVIEW



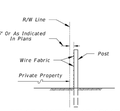
LINE POST | PULL POST | LINE POST | LINE POST | LINE POST | APPROACH POST | CORNER OR END POST

DESIGN NOTE:

This index details fencing that is constructed with farm fabric 465" (47" nominal) in height and with specific ground clearance and specific barbed wire spacings. For fencing of different height or installation details, the fence shall be fully detailed in the Contract plans.



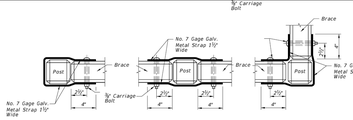
CONCRETE BASE FOR ANGULAR STEEL POST



FENCE POSITION AT LOCATIONS WITHOUT FRONTAGE ROADS

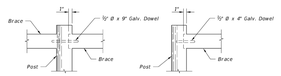
(REFER TO DETAIL PLANS FOR FENCE POSITION AT LOCATIONS WITH FRONTAGE ROADS)

LAST REVISION	DESCRIPTION:	FY 2023-24 STANDARD PLANS	FENCE TYPE A	INDEX	SHEET
11/01/17				550-001	2 of 3

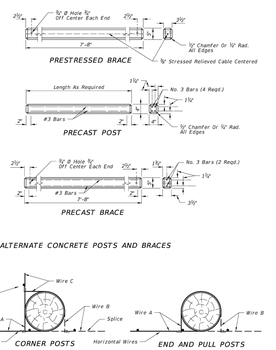


BRACE AND POST | BRACE TO BRACE ON LINE | BRACE TO BRACE AT CORNER

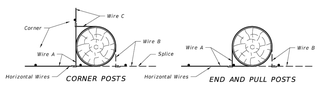
FASTENER FOR CONCRETE POST AND BRACES



FASTENER FOR TIMBER POST AND BRACE



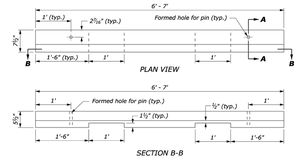
ALTERNATE CONCRETE POSTS AND BRACES

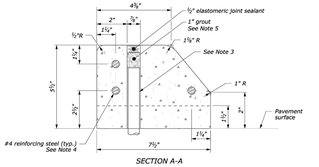


Each horizontal wire to be wrapped around corner, end and pull posts and tied to same wire. See General Notes 5 and 17. Timber post illustrated; these methods also apply to steel and concrete post illustrations.

SPLICES

LAST REVISION	DESCRIPTION:	FY 2023-24 STANDARD PLANS	FENCE TYPE A	INDEX	SHEET
11/01/17				550-001	3 of 3

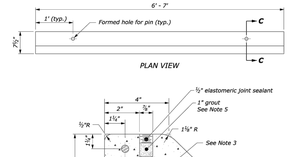




CONCRETE WHEELSTOP WITH DRAIN

NOTES:

1. *Center wheelstops between and perpendicular to stall lines.*
2. *Variations in wheelstops will be allowed to meet manufacturer's standards as approved.*
3. *Pin the wheelstops in place according to Subsection 609.08.*
4. *Extend the reinforcing steel to within 1 inch of ends of wheelstop.*
5. *Place grout conforming to Subsection 725.13(a)(2) as shown.*

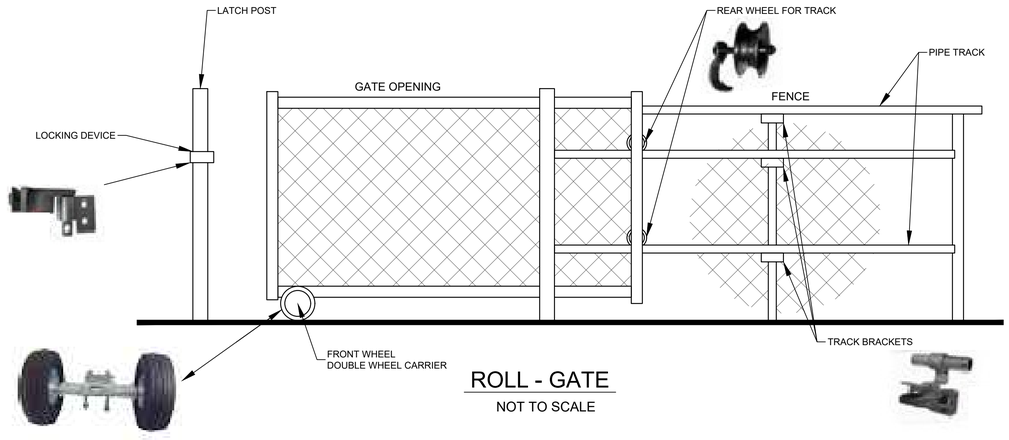


* Increase distance for wall or other obstructions as directed.

WHEELSTOP LAYOUT

CONCRETE WHEELSTOP WITHOUT DRAIN

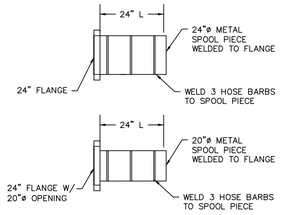
U.S. DEPARTMENT OF TRANSPORTATION, FHWA OFFICE OF FEDERAL LANDS HIGHWAY	CONCRETE WHEELSTOP	EFLHD DETAIL: E609-03
NO SCALE		SPECIFICATION: FP-14
		APPROVED FOR USE: 05/2024



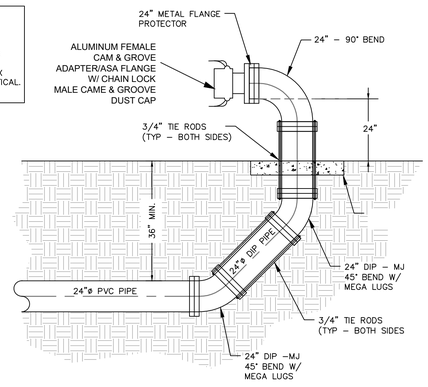
ROLL - GATE

NOT TO SCALE

CONTRACTOR TO PROVIDE THE FOLLOWING AS PART OF CONTRACT:
1. 24" FLANGE WITH 24"L METAL SPOOL PIECE WELDED AS ONE PIECE FOR 24"ø PIPE.
2. 24" FLANGE WITH 20" OPENING AND 24"L METAL SPOOL PIECE WELDED AS ONE PIECE FOR 20"ø PIPE

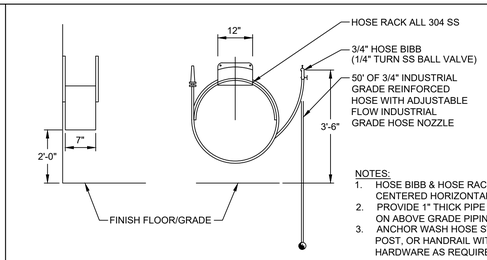


NOTES:
1. MECHANICAL RESTRAINTS ARE TO BE PROVIDED AT ALL JOINTS AND CHANGES IN DIRECTION/BENDS OR OTHER FITTINGS.
2. USE PVC PIPE FROM JUNCTION BOX UP TO FIRST 45° BEND GOING VERTICAL.

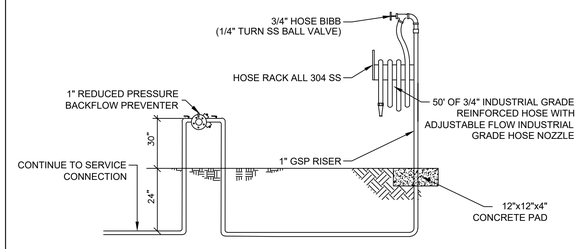


DISCHARGE BY-PASS CONNECTION DETAIL

NOT TO SCALE

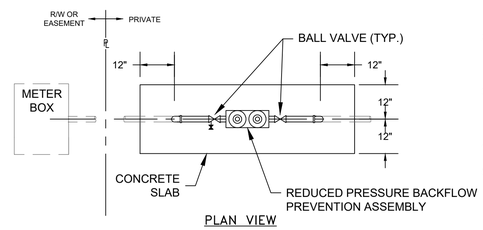


NOTES:
1. HOSE BIBB & HOSE RACK SHALL BE CENTERED HORIZONTALLY ON COLUMN.
2. PROVIDE 1" THICK PIPE WRAP INSULATION ON ABOVE GRADE PIPING.
3. ANCHOR WASH HOSE STATION TO WALL, POST, OR HANDRAIL WITH TYPE 304 SS HARDWARE AS REQUIRED.

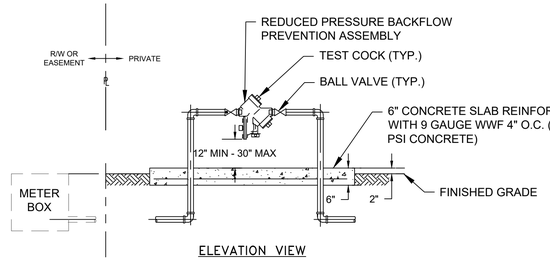


WATER HOSE BIBB AND RACK DETAIL

NOT TO SCALE



NOTES:
1. THE ASSEMBLY SHALL BE INSTALLED WITH MINIMUM HORIZONTAL CLEARANCES OF 30 INCHES FREE FROM OBSTRUCTIONS IN ALL DIRECTIONS.
2. GUARD POSTS SHALL BE INSTALLED IF THE ASSEMBLY IS EXPOSED TO POSSIBLE DAMAGE FROM VEHICULAR TRAFFIC, AS DETERMINED BY THE CITY.
3. THE ASSEMBLY SHALL BE INSTALLED IN AN ACCESSIBLE LOCATION AND SHALL HAVE UNRESTRICTED AND CONTINUOUS ACCESS TO THE BACKFLOW PREVENTION ASSEMBLY.
4. ALL PIPES AND FITTING SHALL BE SCHEDULE 80 GALVANIZED STEEL.
5. REFER TO CITY OF TAMPA'S CROSS CONNECTION CONTROL AND BACKFLOW PREVENTION MANUAL FOR INSTALLATION REQUIREMENTS.



REDUCED PRESSURE BACKFLOW PREVENTER

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Ph: 305.274.4805

Plans Prepared By:
CPH, LLC
A Full Service A & E Firm

KYLE MICHAEL BECHTELHEIMER LICENSE No. 86673 STATE OF FLORIDA PROFESSIONAL ENGINEER
KYLE M. BECHTELHEIMER, P.E.
FL P.E. NO. 86673

No.	Date	Revision

Designed: K.B.
Drawn: J.C.
Checked: A.S.
Job No.: 2400768
Date: 9/12/2025 © 2025

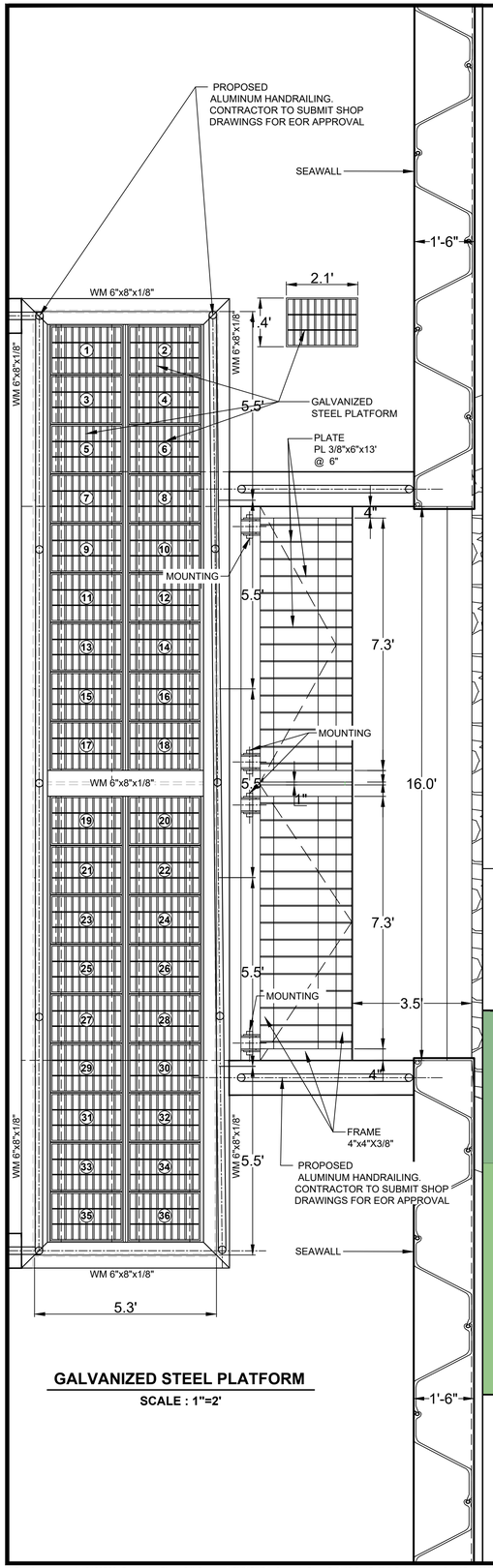
CIVIL DETAILS

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

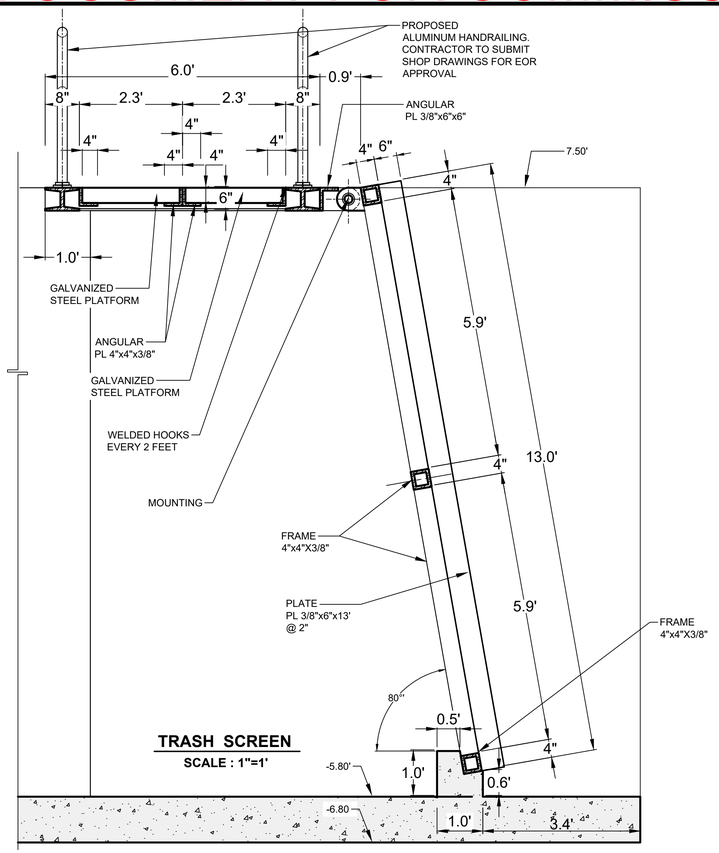
THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

Sheet No.
C-12

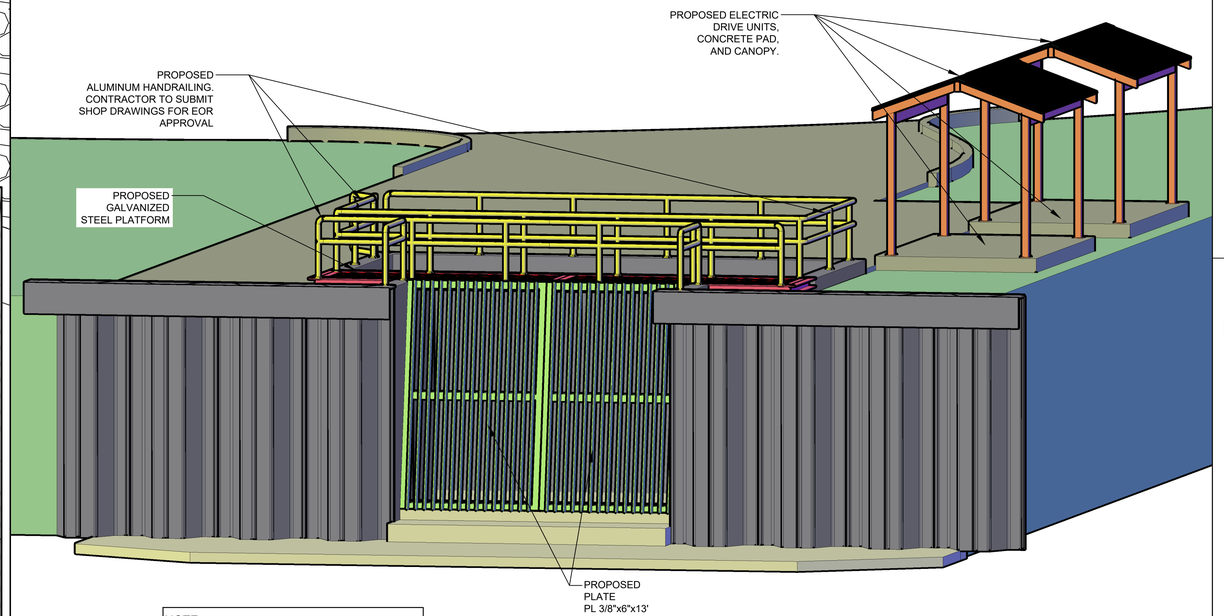
DRAFT DOCUMENT FOR COMMISSION REVIEW



GALVANIZED STEEL PLATFORM
SCALE : 1"=2'

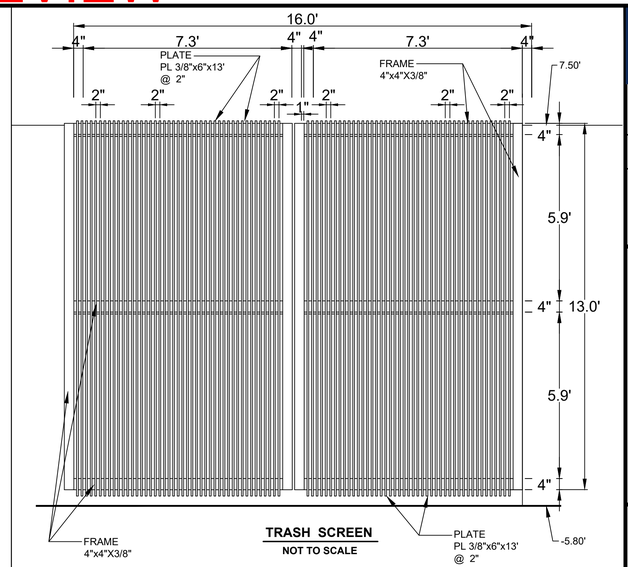


TRASH SCREEN
SCALE : 1"=1'

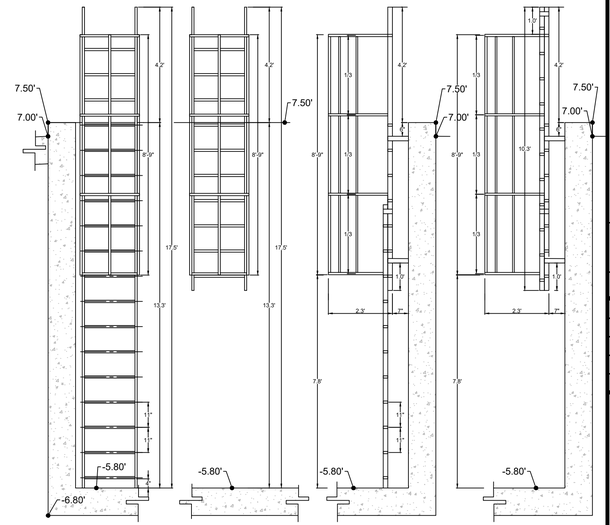


NOTE:
3D MOCK-UP IS FOR DESIGN INTENTIONS ONLY, CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR EOR AND OWNER APPROVAL.

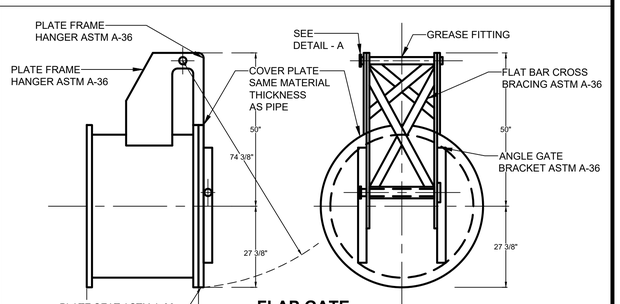
3D TRASH SCREEN
NOT TO SCALE



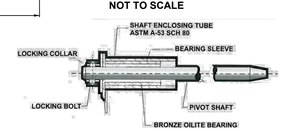
TRASH SCREEN
NOT TO SCALE



SAFETY LADDER
NOT TO SCALE



FLAP GATE
NOT TO SCALE



DETAIL-A
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Sheet No.
C-13

DRAFT DOCUMENT FOR COMMISSION REVIEW

STRUCTURAL DESIGN INFORMATION

THE STRUCTURAL DESIGN OF THESE STRUCTURES WAS BASED ON THE DESIGN CRITERIA

A. BUILDING CODE
FLORIDA BUILDING CODE 2023 8TH EDITION

B. DESIGN CANOPY ROOF LOADS

DEAD LOADS	5 PSF
LIVE LOADS	20 PSF

B. WIND DESIGN DATA:

WIND PRESSURES PER ASCE:	7-22
ULTIMATE DESIGN WIND SPEED, Vasd	105 MPH (PER FBC 3105.4.2.1)
NOMINAL DESIGN WIND SPEED, Vult	81 MPH
RISK CATEGORY:	I
WIND EXPOSURE CATEGORY:	**C**
DESIGN WIND PRESSURE	**+/- 50 PSF**

FOUNDATION NOTES

1. DESIGN SOIL BEARING PRESSURE IS **2,500** PSF PER THE GEOTECHNICAL REPORT.
2. A GEOTECHNICAL REPORT ON THE SUBSURFACE SOILS CONDITIONS HAS BEEN PREPARED FOR THIS PROJECT BY **UNIVERSAL ENGINEERING SCIENCES REPORT NO.: 2130.24001112.0000 , DATED: JULY 24, 2025 .**
3. ALL CONTRACTORS INVOLVED WITH THE EXCAVATION, BACKFILL AND FOUNDATION CONSTRUCTION SHALL FAMILIARIZE THEMSELVES WITH THIS REPORT.
4 ALL WORK REGARDING SITE PREPARATION, EARTH FILL CONSTRUCTION, BACKFILL REQUIREMENTS, FOUNDATION PREPARATIONS, ETC., SHALL BE IN STRICT CONFORMANCE TO THE GEOTECHNICAL ENGINEER'S REPORT. THE REPORT IS PART OF THE CONTRACT DOCUMENTS.
5. FOUNDATION BEARING SURFACES SHALL BE INSPECTED UNDER THE DIRECTION OF THE PROJECT GEOTECHNICAL ENGINEER.
6. IF NOT OTHERWISE SPECIFIED IN GEOTECHNICAL REPORT, COMPACT ALL FILL TO 98% OF OPTIMUM LABORATORY DENSITY IN ACCORDANCE WITH ASTM D698 STANDARD PROCTOR METHOD.
7. DO NOT BACKFILL AGAINST FOUNDATION OR BASEMENT WALLS UNTIL FLOOR SLAB/FRAMING IS IN PLACE OR PERMISSION IS OBTAINED FROM THE ARCHITECT.
8. EXCEPT FOR CANTILEVER RETAINING WALLS OR UNLESS NOTED OTHERWISE ON DRAWINGS, SUBGRADE WALLS ARE SUPPORTED BY THE FLOOR ABOVE AND BELOW. PROPER TEMPORARY BRACING MAY BE USED IN LEIU OF THE FLOOR SUPPORT BASED ON THE DESIGN BY A PROFESSIONAL ENGINEER.
9. ALL FOOTINGS ARE TO REST ON FIRM, LEVEL, UNDISTURBED SOIL OR ENGINEERED FILL, OF BEARING CAPACITY NOTED, REGARDLESS OF ELEVATIONS SHOWN ON DRAWINGS.
10. WHERE ROCK OR SHALE IS THE BEARING MATERIAL, PROVIDE 6" DEEP PENETRATION.
11. WHERE FOOTINGS ARE IN CLOSE PROXIMITY OF SEWERS, BOTTOM OF FOOTINGS SHALL BE AT LEAST 8" BELOW INVERT ELEVATION OF SEWERS.
12. EXCAVATIONS FREE OF WATER AT ALL TIMES.
13. USE LEAN CONCRETE (F'C=1500 PSI) FOR OVER-EXCAVATION OF FOOTINGS AND REPLACEMENT OF WEAKENED.
14. PROVIDE POSITIVE DRAINAGE AWAY FROM EXCAVATIONS SO AS NOT TO ALLOW STANDING WATER FOR LONG PERIODS OF TIME.
15. PROVIDE A 10 MIL THICK VAPOR BARRIER BETWEEN THE COMPACTED BASE AND CONCRETE SLAB.
16. DO NOT PUNCTURE THE VAPOR BARRIER. LAP AND TAPE ENDS.
17. PERFORM ALL SITEWORK UNDER THE DIRECT SUPERVISION OF A GEOTECHNICAL ENGINEER.

GENERAL NOTES

1. IT SHALL BE THE SOLE RESPONSIBLY OF THE CONTRACTOR TO INITIATE, MAINTAIN AND SUPERVISE ALL SAFETY PROCEDURES, WHILE FOLLOWING ALL APPLICABLE SAFETY CODES, BUILDING CODES AND GOVERNING REGULATIONS WITH JURISDICTION OVER THE CONSTRUCTION SITE DURING ALL PHASES OF CONSTRUCTION. THE STRUCTURAL ENGINEER OF RECORD IS NOT RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION OR FOR RELATED SAFETY PROCEDURES.

2. THE STRUCTURAL DRAWINGS ARE ONE DISCIPLINE OF THE CONTRACT DOCUMENTS AND DO NOT BY THEMSELVES CONTAIN ALL THE INFORMATION REQUIRED TO PROPERLY COMPLETE THE PROJECT STRUCTURE. THE GENERAL CONTRACTOR SHALL REFER TO THE ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS AND COORDINATE THE INFORMATION INDICATED IN THESE CONSTRUCTION DOCUMENTS WITH THE STRUCTURAL DRAWINGS TO PROPERLY CONSTRUCT THE PROJECT.

3. ALL DETAILS, SECTIONS AND NOTES INDICATED ON THE CONSTRUCTION DOCUMENTS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR SITUATIONS ELSEWHERE UNLESS OTHERWISE SHOWN.

4. SHOULD ANY OF DETAILED INSTRUCTIONS SHOWN ON THE PLANS CONFLICT WITH THESE STRUCTURAL NOTES. THE SPECIFICATIONS, OR WITH EACH OTHER, THE STRICTEST PROVISION SHALL GOVERN.

5 SHOP DRAWINGS
A. SUBMIT THE FOLLOWINGS DRAWINGS TO THE ENGINEER FOR REVIEW PRIOR TO FABRICATION:
1. ALUMINUM CANOPY STRUCTURE
2. CONCRETE MIX
3. REBAR

6. CHANGES AND MODIFICATIONS:
SUBMIT WRITTEN REQUEST TO THE ARCHITECT FOR APPROVAL OF ANY PROPOSED CHANGE TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. SPLICING, CUTTING, NOTCHING AND OTHER ALTERATIONS TO STRUCTURAL MEMBERS IS PROHIBITED WITHOUT WRITTEN AUTHORIZATION OF THE STRUCTURAL ENGINEER. ANY UNAUTHORIZED DEVIATION FROM THE CONTRACT DOCUMENTS, AND CORRECTION THEREOF, IS THE RESPONSIBILITY OF THE CONTRACTOR.

7. CONTRACTOR SHALL BRACE ALL CONSTRUCTION AGAINST GRAVITY, LATERAL & UPLIFT LOADS UNTIL STRUCTURE IS COMPLETE.

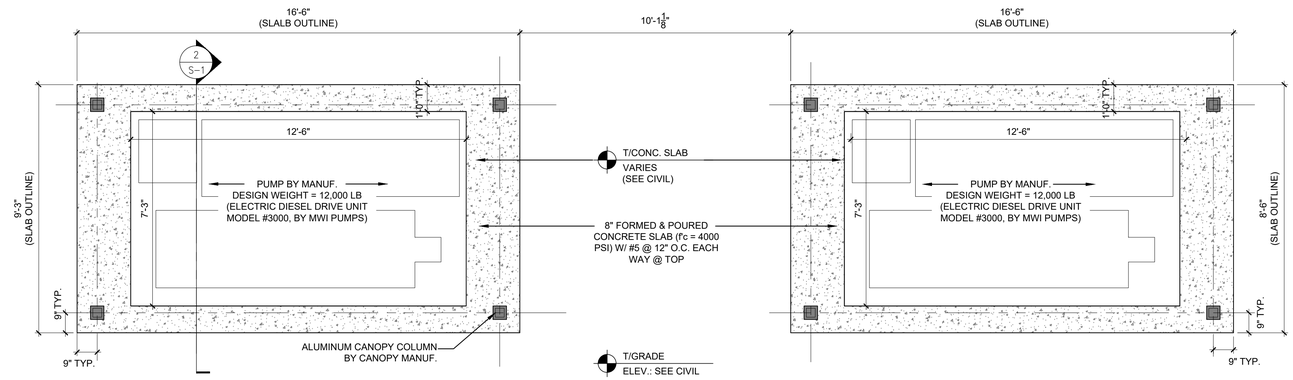
CONCRETE

1. ALL CONCRETE SHALL BE IN ACCORDANCE WITH THE "AMERICAN CONCRETE INSTITUTE BUILDING CODE" (ACI 318) AND WITH "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" (ASI 301) LATEST EDITIONS.
2. CONCRETE MEMBERS SHALL HAVE THE FOLLWING MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS:
A. STRUCTURAL CONCRETE
CLASS LOCATION f'c (psi)
1. FOUNDATIONS - 4000 PSI
A. ALL DEFORMED REINFORCING BARS: ASTM A615, GR. 60
B. ALL WELDED WIRE FABRIC: ASTMA1064, DELIVERED IN FLAT SHEETS
2. ALL OTHER CONCRETE TO BE 4000 PSI UNLESS NOTED OTHERWISE

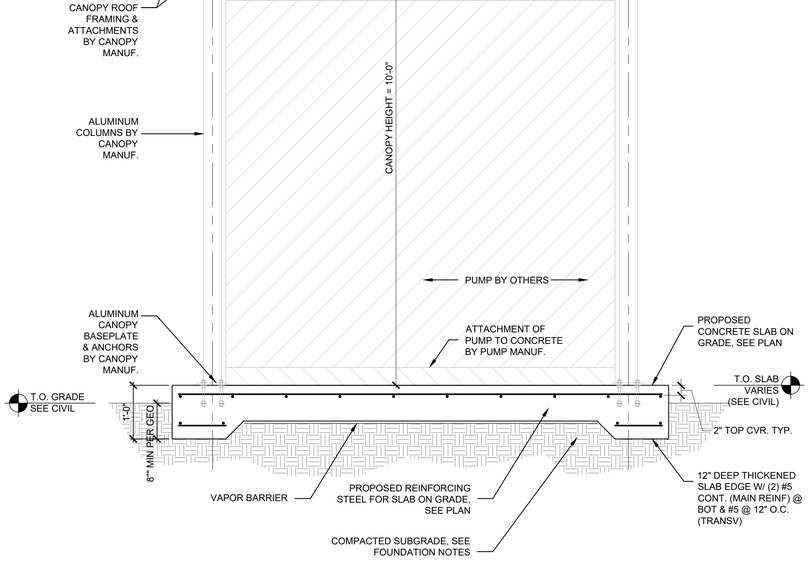
3. ALL CONCRETE CONSTRUCTION SHALL CONFORM TO THE LATEST ADOPTED EDITIONS OF THE STANDARDS AND MATERIAL SPEFICATIONS REFERENCED HEREIN.
4. CONCRETE MIX SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ACI 301 CHAPTER 3, METHOD 1 OR METHOD 3. CONTRACTOR SHALL SUBMIT BACKUP DATA PER SECTION 26.4 OF ACI 318 LATEST EDITION.
5. ALL REINFORCING STEEL SHALL BE NEW DOMESTIC DEFORMED BILLET STEEL CONFORMING TO ASTM A615 GR. 60. SUBMIT ALL REINFORCING STEEL SHOP DRAWINGS FOR APPROVAL PRIOR TO ANY FABRICATION.
6. CONCRETE COVER FOR REINFORCING STEEL SHALL BE AS REQUIRED BY ACI SPECIFICATIONS.
7. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185. WELDED WIRE FABRIC SHALL BE LAPPED AT LEAST 12 INCHES UNLESS NOTED OTHERWISE.
8. REBAR LAP LENGTH SHALL BE 48 BAR DIAMETERS MINIMUM, UNLESS NOTED OTHERWISE ON DRAWINGS.
9. PROVIDE ACI STANDARD HOOKS UNLESS NOTED OTHERWISE ON DRAWINGS.
10. ALL CONCRETE WORK SHALL CONFORM TO ACI 318 LATEST EDITION "THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE STRUCTURES", ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS," ACI 305 "HOT WEATHER CONCRETING," AND ACI 306 "COLD WEATHER CONCRETING."
11 ALL CONCRETE DETAILS SHALL CONFORM TO ACI 315 LATEST EDITION "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES" UNLESS NOTED OTHERWISE ON THE DRAWINGS.
12. CONTRACTOR SHALL REFER TO ARCHITECTURAL AND MECHANICAL DRAWINGS FOR LOCATIONS AND SIZES OF SLEEVES, OPENINGS, EMBEDDED ITEMS, SLAB RECESSES, SLOPES, ETC. THESE ITEMS SHAL BE COORDINATED WITH OTHER TRADES AND INSTALLED PRIOR TO CONCRETE PLACEMENT.
13. CONTRACTOR SHALL VERIFY ANCHOR BOLT SIZES AND LOCATIONS PRIOR TO CONCRETE PLACEMENT.
14. BAR LENGTHS PROVIDED ON DRAWINGS DO NOT INCLUDE HOOK LENGTH. HOOKS SHALL BE PROVIDED AT TOP BARS, AT BEAM ENDS, AND SLAB EDGES.
15. CONTRACTOR SHALL PROVIDE CHAIRS, BOLSTERS, SPACERS, ETC. AS REQUIRED TO SECURELY SUPPORT REINFORCEMENT. SUPPORT ITEMS ON EXPOSED CONCRETE SHALL BE PLASTIC.SUPPORT REINFORCEMENT, TIPPED OR STAINLESS STEEL IN HIGHLY CORROSIVE ENVIRONMENTS, SUPPORT ITEMS SHALL BE PLASTIC.
16. ONE COPY OF ALL CONCRETE TEST RESULTS SHALL BE SUBMITTED BY THE TESTING AGENCY DIRECTLY TO THE ENGINEER OF RECORD.
17. THE CONTRACTOR SHALL SEAL ALL HAIRLINE CRACKING IN CONCRETE SLAB ON GRADE WITH A CRACK SUPPRESSION KIT SUCH AS LATICRETE OR APPROVED EQUAL.
18. A COPY OF THE "FIELD REFERENCE MANUAL" ACI SP-15 LATEST EDITION SHALL BE KEPT BY THE CONTRACTOR ON SITE.
19. FIELD MANUAL: PROVIDE AT LEAST ONE COPY OF THE ACI FIELD REFERENCE MANUAL.
20. CONCRETE COVER: UNLESS OTHERWISE NOTED, DETAIL REINFORCING TO PROVIDE MINIMUM COVER AS FOLLOWS:
17. THE CONTRACTOR SHALL SEAL ALL HAIRLINE CRACKING IN CONCRETE SLAB ON GRADE WITH A CRACK SUPPRESSION KIT SUCH AS
A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3 INCHES
B. CONCRETE EXPOSED TO EARTH OR WEATHER

#5 BARS AND SMALLER	1-1/2 INCHES
OTHERS	2 INCHES
C. CONCRETE NOT EXPOSED TO EARTH OR WEATHER	
BEAM AND COLUMN BARS INCLUDING TIES, STIRRUPS AND SPIRALS	1-1/2 INCHES
SLABS, WALLS AND JOISTS:	
#11 BARS AND SMALLER	3/4 INCHES
OTHERS	1-1/2 INCHES

21. SLUMP, (AT POINT OF PLACEMENT): 5" (+/- 1")
22. CALCIUM CHLORIDE SHALL NOT BE USED IN ANY FORM.
ANCHORS USED IN EXTERIOR APPLICATIONS SHALL BE HOT-DIP GALVANIZED CARBON STEEL OR STAINLESS STEEL.



1 FOUNDATION PLAN
3/8" = 1'-0"



2 SECTION
3/4" = 1'-0"

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Miami, FL 33135
Ph: 305.274.4805

Plans Prepared By:
CPH, LLC
A Full Service A & E Firm

No.	Date	Revision

Designed:	D. TILUS VITAL
Drawn:	D. TILUS VITAL
Checked:	E. AVILES
Job No.:	2400768
Date:	8/11/2025

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CONCRETE SLAB DESIGN

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
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BROWARD COUNTY, FLORIDA

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Sheet No.
S-1

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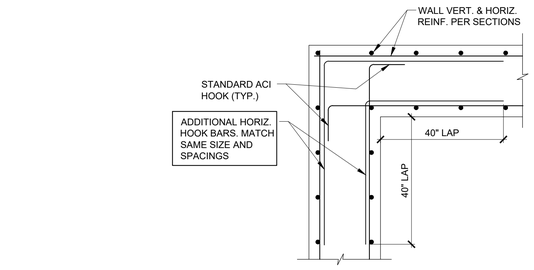
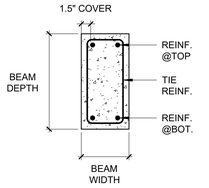


CONCRETE CAP L-SHAPED CORNER SECTION

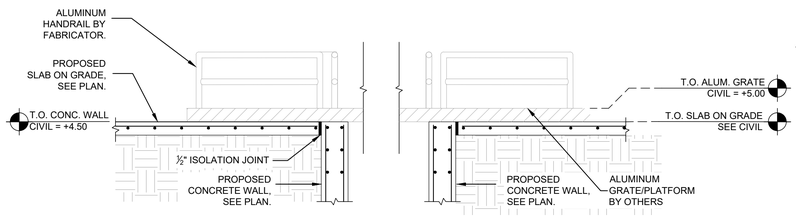
4 3/4" = 1'-0"



CONCRETE BEAM SCHEDULE

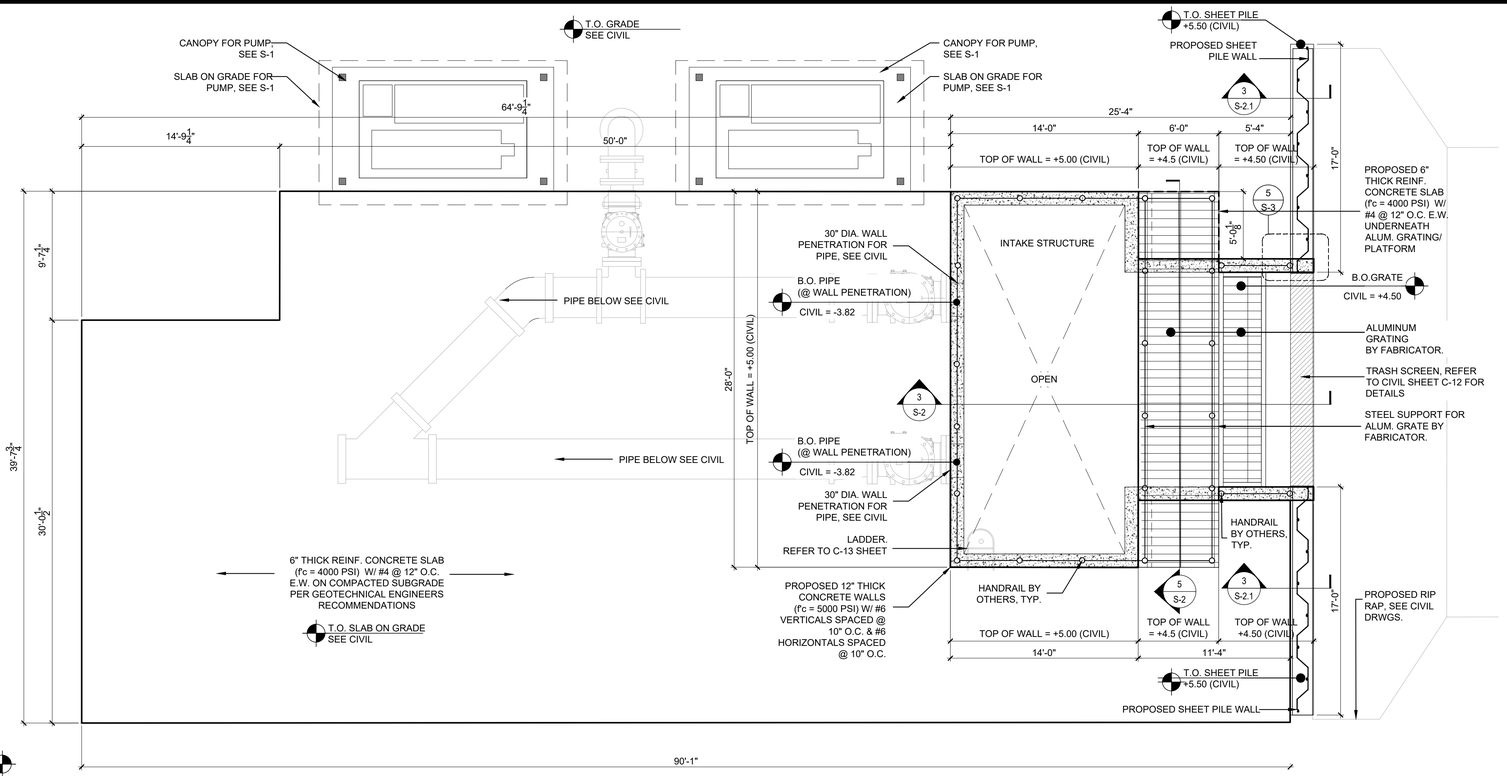
MARK	DIMENSIONS		REINFORCEMENT			
	WIDTH	DEPTH	TOP	MIDDLE	BOTTOM	TIES
CB1	12"	18"	(2) #5	N/A	(3) #5	#3 @ 12" O.C.

CONCRETE BEAM SECTION



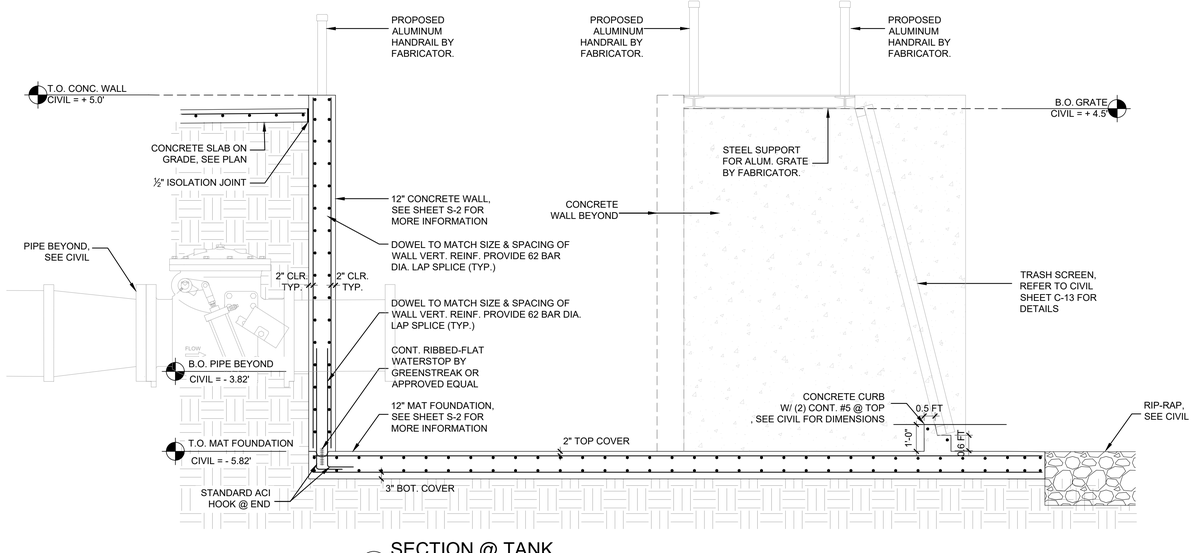
SECTION @ GRATE

5 3/8" = 1'-0"



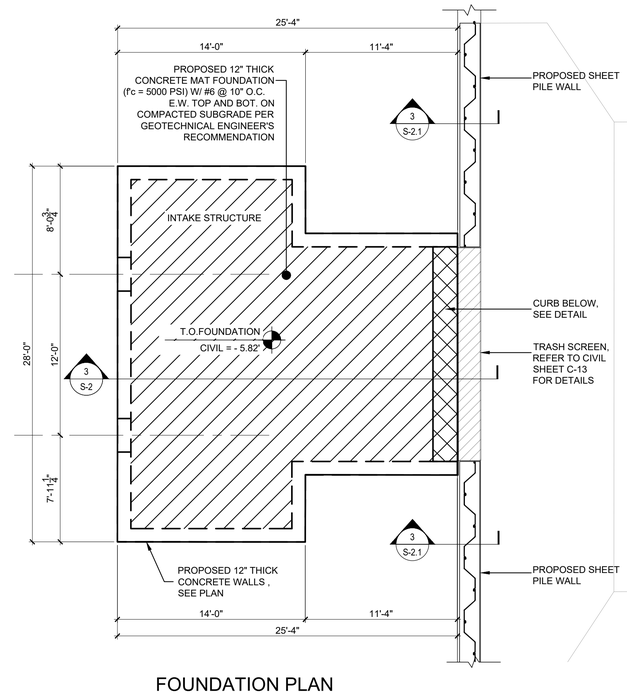
PLAN VIEW @ FINISHED GRADE (SLAB ON GRADE & INTAKE STRUCTURE)

1 3/16" = 1'-0"



SECTION @ TANK

3 3/8" = 1'-0"



FOUNDATION PLAN (INTAKE STRUCTURE)

2 3/16" = 1'-0"

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No.	Date	Revision

Designed:	D. TILUS VITAL
Drawn:	D. TILUS VITAL
Checked:	E. AVILES
Job No.:	2400768
Date:	8/11/2025

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INTAKE STRUCTURE

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

Sheet No.
S-2

DRAFT DOCUMENT FOR COMMISSION REVIEW

STEEL SHEET PILING DESCRIPTION

CONSTRUCTION REQUIREMENTS

SHEET PILING DESIGN SUMMARY SHALL BE PER TABLE ON THIS SHEET

STEEL SHEET PILING SHALL BE DRIVEN TO FORM A TIGHT BULKHEAD. A DRIVING HEAD SHALL BE USED AND ANY PILING WHICH DOES NOT PROVIDE A TIGHT BULKHEAD SHALL BE PULLED AND REPLACED AT CONTRACTOR'S EXPENSE.

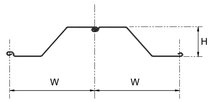
STEEL SHEET PILING THAT IS FULL LENGTH AS SHOWN ON THE PLANS AND IS REQUIRED TO BE DRIVEN BELOW THE SPECIFIED CUT-OFF ELEVATION SHALL BE SPLICED WITH ADDITIONAL STEEL SHEET PILING WITH A FULL PENETRATION BUTT WELD. SPLICING WILL BE LIMITED TO THREE PER PILE SHEET. A SPLICE SHALL NOT BE LESS THAN 3 FEET FROM ANOTHER SPLICE ON THE SAME PILE.

WELDING SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF ANSI/AWS D 1.1.

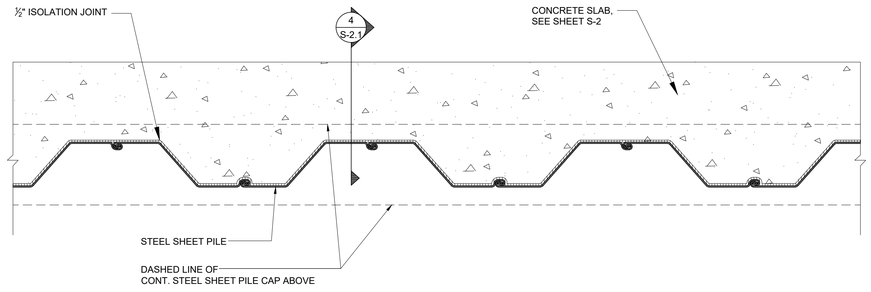
COMPACTION RECOMMENDATIONS PER GEOTECHNICAL REPORT:

"THE WALLS SHOULD BE DESIGNED TO SUBTAIN WATER WITH A PRESURE HEAD AT THE APPROPRIATE DESIGN FLOOD ELEVATION. BACKFILL BEHIND THE WALL SHOULD BE APPROVED SAND FILL AND SHOULD BE PLACED IN LOOSE LIFTS NOT EXCEEDING 12 INCHES IN THICKNESS AND SHOULD BE COMPACTED TO MINIMUM DRY DENSITY BETWEEN 92% AND 95% OF THE MAXIMUM MODIFIED PROCTOR DRY DENSITY. OVERCOMPACTION IN THESE AREAS SHOULD BE AVOIDED. "

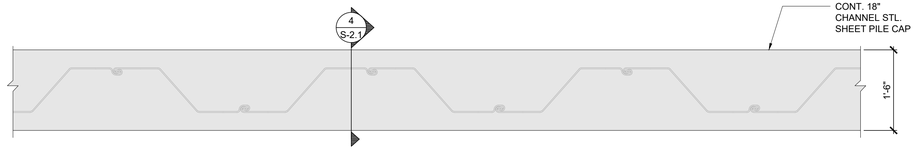
PZ 35 SHEET PILE WALL DESIGN DATA TABLE



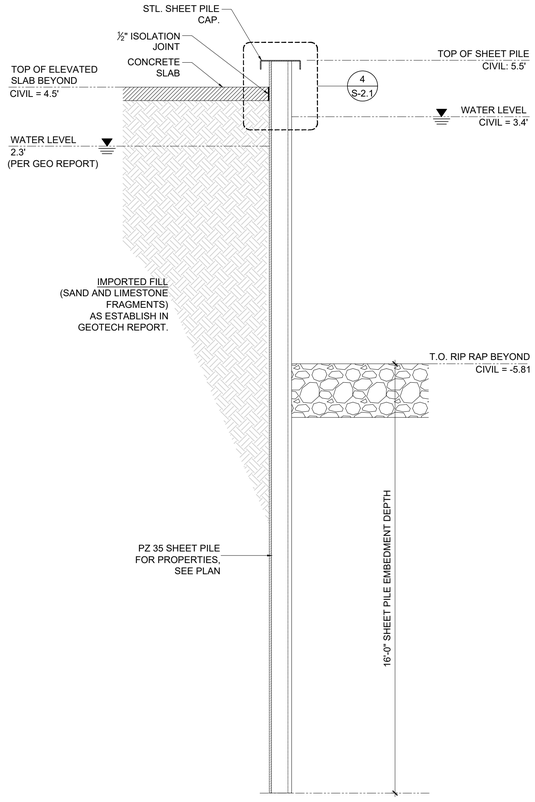
MIN. ALLOWABLE MOMENT (M)	21 K-FT
MIN. SECTION MODULUS (S)	7.63 IN ^{3}/FT
MOMENT OF INERTIA (I)	361.22 IN ^{4}/FT
THICKNESS (T) (FLANGE, WEB)	0.6 IN , 0.5 IN
SECTION DEPTH (H)	14.9 IN
SECTION WIDTH	22.64 IN
DESIGN MODULUS OF ELASTICITY (E)	29000 KSI
YIELD STRENGTH (FY)	50 KSI
MATERIAL (TYPE)	HOT ROLLED STEEL
STANDARD COLORS	MILL FINISH
PROFILE / SHAPE	AS SHOWN
MIN. PILE TIP ELEVATION	(16'-0" MIN. EMBED)



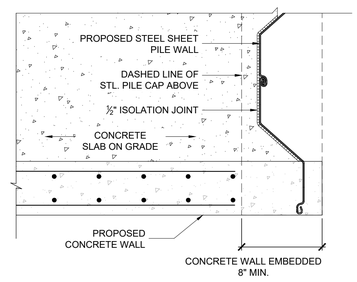
1 SECTION BELOW CAP
3/4" = 1'-0"



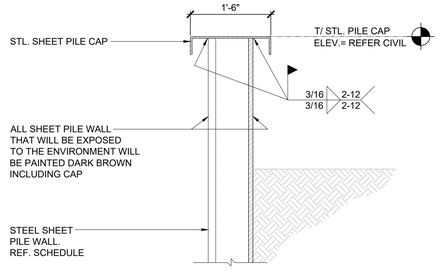
2 SECTION @ STEEL CAP
3/8" = 1'-0"



3 TYP. SHEET PILE SECTION
3/8" = 1'-0"



5 CONCRETE WALL TO SHEET PILE CONNECTION - ENLARGED PLAN VIEW
3/4" = 1'-0"



4 STEEL CAP SECTION
3/4" = 1'-0"

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Plans Prepared By:
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SHEET PILE DESIGN @ INTAKE STRUCTURE

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
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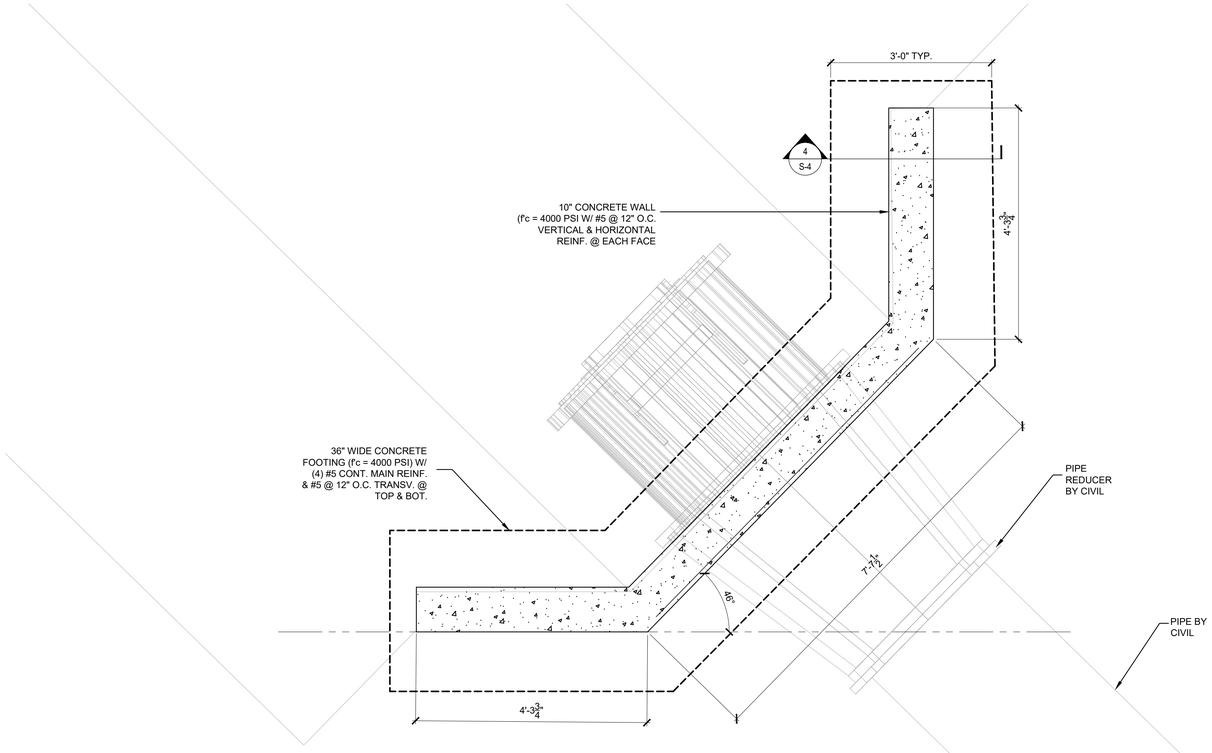
Sheet No.
S-3

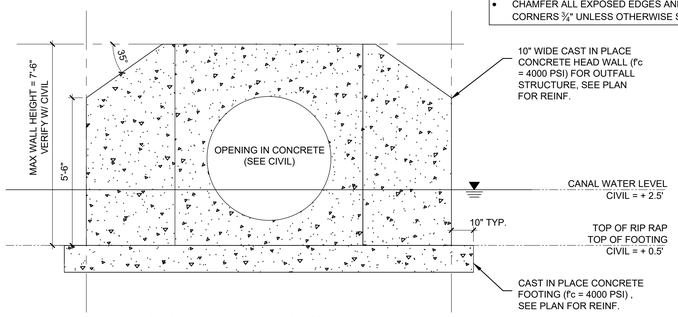
DRAFT DOCUMENT FOR COMMISSION REVIEW



FOUNDATION PLAN (OUTFALL STRUCTURE)

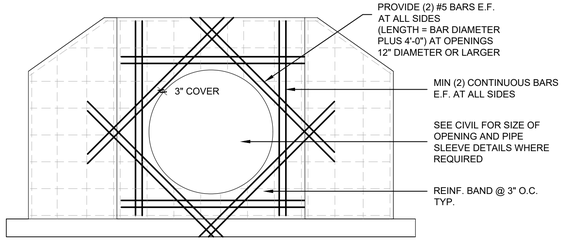
1 3/8" = 1'-0"

GENERAL NOTES:
- USE CLASS II FOR ALL CONCRETE
- CHAMFER ALL EXPOSED EDGES AND CORNERS ¾" UNLESS OTHERWISE SHOWN.



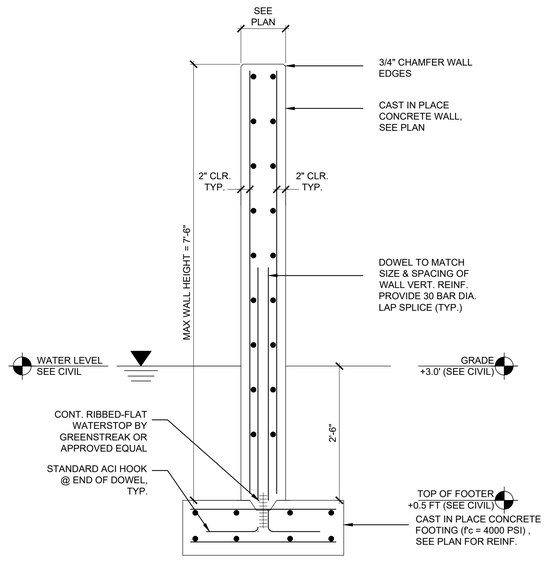
SECTION @ OUTFALL STRUCTURE

2 3/8" = 1'-0"



TYPICAL OPENING DETAIL

3 3/8" = 1'-0"



WALL SECTION

4 3/4" = 1'-0"

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OUTFALL STRUCTURE

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PEMBROKE PINES SEEPAGE
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Sheet No.
S-4

Drawing name: J:\2400768_Pembroke Pines SW Seepage\Structural\01_CAD\S4, Outfall Structure.dwg Oct 16, 2025 - 3:04pm dtilus

DRAFT DOCUMENT FOR COMMISSION REVIEW

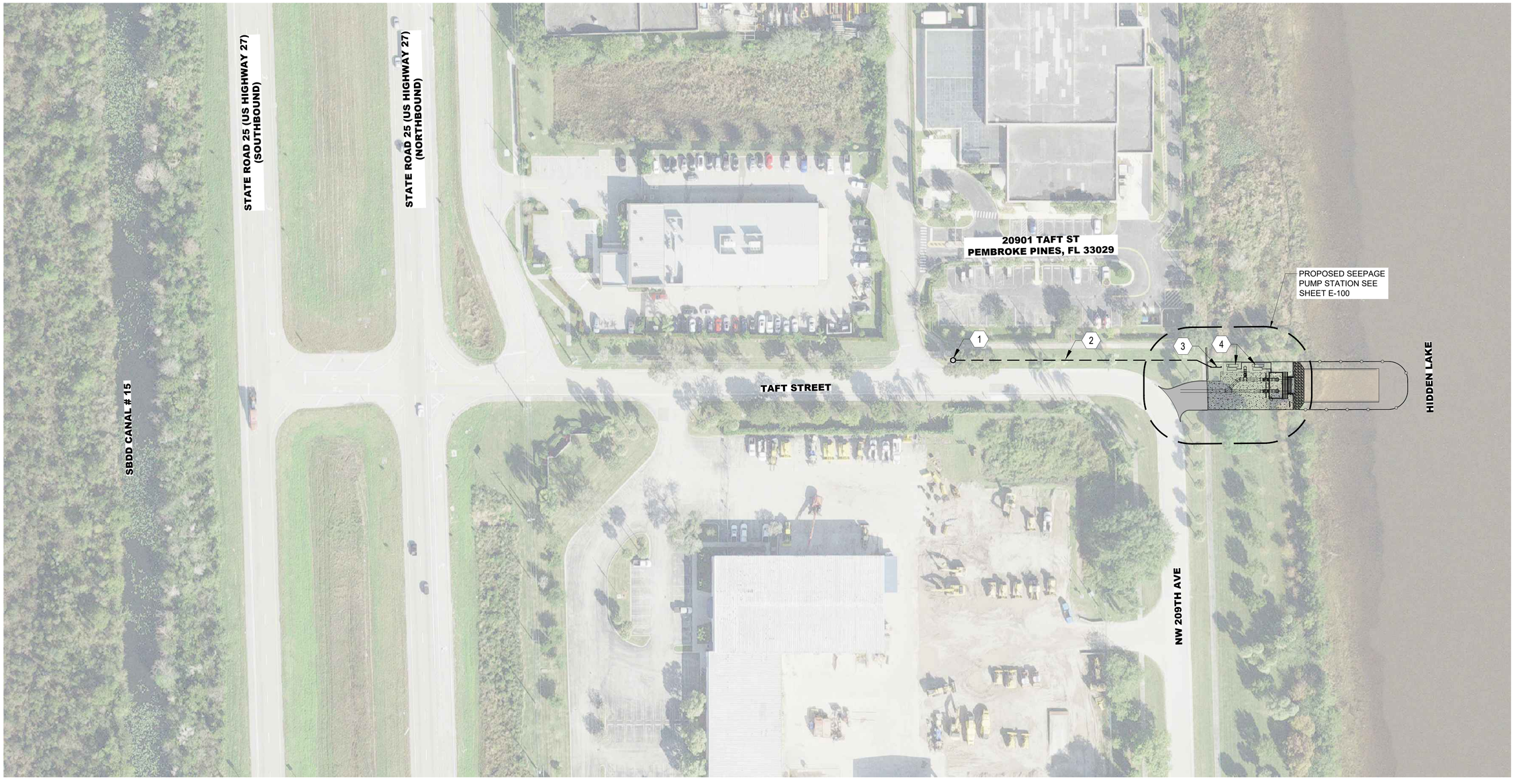
KEY NOTES

1. APPROXIMATE LOCATION OF END-OF-LINE POLE ON FPL DISTRIBUTION LINE - COORDINATE SERVICE CONNECTION WITH FPL (954) 442-6352
2. SERVICE LATERAL - SEE ELETRICAL SITE PLAN
3. ELECTRICAL SERVICE RACK
4. HYDRAFLO HYDRAULIC PUMP SKID

N

50 0 50 100

Scale: 1" = 50'



ABBREVIATIONS

A	AMPERE ("AMP")	N	NEUTRAL	XFMR	TRANSFORMER
AIC	AMPS INTERRUPTING CAPACITY	NEC	NATIONAL ELECTRICAL CODE		
C	CONDUIT	OCPD	OVERCURRENT PROTECTION DEVICE		
CB	CIRCUIT BREAKER	PH	PHASE		
EGC	EQUIPMENT GROUNDING CONDUCTOR	PRI	XFMR PRIMARY COIL		
ESO	EMERGENCY SHUT OFF	RCPTL	RECEPTACLE		
FLA	FULL LOAD AMPS	SCA	SHORT CIRCUIT AMPS		
FPL	FLORIDA POWER & LIGHT	SEC	XFMR SECONDARY COIL		
G	GROUND	SBJ	SYSTEM BONDING JUMPER		
GEC	GROUNDING ELECTRODE CONDUCTOR	SSBJ	SUPPLY-SIDE BONDING JUMPER		
GEN	GNERATOR				
GFI, GFCI	GROUND FAULT CIRCUIT INTERRUPTER	TBL	TABLE		
MBJ	MAIN BONDING JUMP	V	VOLTS		

PLAN VIEW

Horizontal Scale : 1"=50'

LEGEND

- CIRCUIT BELOW GRADE
- 20/1 CIRCUIT BREAKER, 20 AMP, 1 POLE
- GROUND
- TRANSFORMER

SHEET INDEX

E-000	ELECTRICAL PROJECT LAYOUT SHEET
E-100	ELECTRICAL SITE PLAN
E-101	ELECTRICAL SCHEDULES & DETAILS
E-102	ELECTRICAL SPECIFICATIONS AND GENERAL NOTES

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GREGORY D. TAYLOR LICENSE No. 77811 STATE OF FLORIDA PROFESSIONAL ENGINEER
GREGORY D. TAYLOR, P.E.
FL P.E. NO. 77811

No.	Date	Revision
A		
A		
A		
A		
A		
A		
A		

Designed: G.D.T.
Drawn: J.A.V.
Checked: G.D.T.
Job No.: 2400768
Date: 9/12/2025 © 2025

ELECTRICAL PROJECT LAYOUT SHEET

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE

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Sheet No.
E-000

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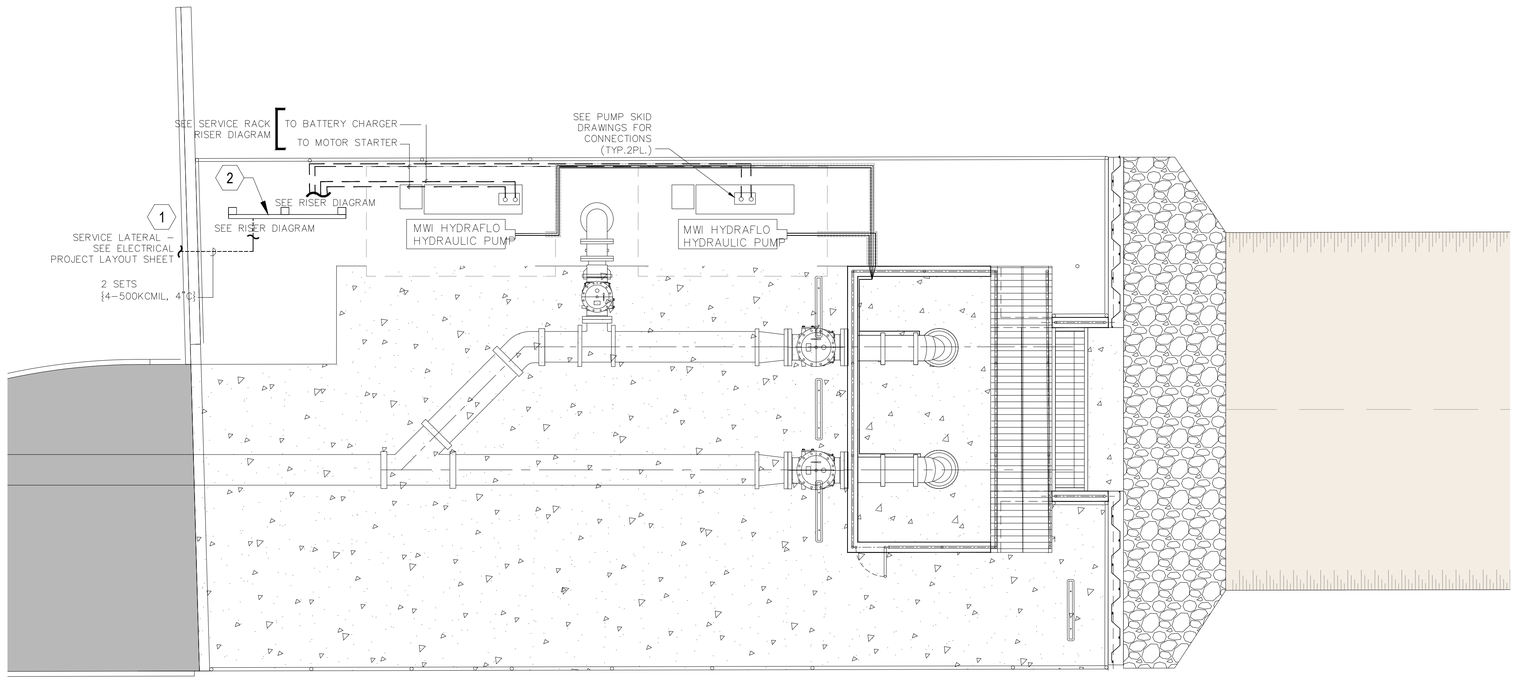

PLAN VIEW

Horizontal Scale : 1"=7'

N

7 0 7 14

Scale: 1" = 7'

GENERAL NOTES

1. LOCATIONS SHOWN ON THE HYDRAFLO PUMPS FOR CONNECTIONS ARE DIAGRAMMATIC. REFER TO MWI DIESEL/ELECTRIC DRIVE DRAWINGS FOR ACTUAL CONNECTION LOCATIONS

KEY NOTES

1. SERVICE LATERAL FROM UTILITY TRANSFORMER - SEE ELECTRIC PROJECT LAYOUT SHEET
2. 10' CONCRETE RACK; SEE E-101 FOR MORE DETAILS

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A		
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ELECTRICAL SITE PLAN

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PEMBROKE PINES SEEPAGE
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Sheet No.
E-100

DRAFT DOCUMENT FOR COMMISSION REVIEW

Name: HP

MAIN LUGS: 800 AMPS
VOLTAGE: 480Y/277V
PHASE: 3
WIRE: 4
ENCLOSURE: NEMA 3R
AIC: 35 K AMPS
MOUNTING: RACK
MANUFACTURER:

Status: NEW
Project Name: PEMBROKE PINES PUMPS
Project Number: 2400768
Fed From: MTS

NOTES	CKT #	CIRCUIT DESCRIPTION	CODE	LOAD/PHASE (KVA) A	B	C	CIRCUIT BREAKER TRIP	POLES	POLES	TRIP	LOAD/PHASE (KVA) A	B	C	CODE	CIRCUIT DESCRIPTION	CKT #	NOTES
				66.5							66.5						
	1	PUMP MOTOR - WEST HYDRAFLO	M		66.5		600	3	3	600		66.5		M	PUMP MOTOR - EAST HYDRAFLO	2	
						66.5							66.5				
	3	SPARE					20	1	1	45	10.0			O	10KVA XFMR	4	
	5	SPARE					20	1	1	20					SPARE	6	
	7	SPARE					20	1	1	20					SPARE	8	
				66.5	66.5	66.5					76.5	66.5	66.5				

	CONN. LOAD (KVA)	ADJUST. FACTOR	DEMAND FACTOR	DEMAND LOAD (KVA)
LIGHTING (L)	0.0	1.00	1.25	0.0
RECEPTACLES (R)	0.0	---	NEC	0.0
LARGEST MOTOR (M)	199.4	1.00	1.25	249.3
ALL OTHER MOTORS (M)	199.4	1.00	1.00	199.4
HEATING (H)	0.0	1.00	1.00	0.0
COOLING (C)	0.0	1.00	1.00	0.0
OTHER (O)	10.0	1.00	1.00	10.0
WATER HEATERS (W)	0.0	1.00	1.25	0.0
DRYERS (D)	0.0	1.00	1.00	0.0
KITCHEN (K)	0.0	1.00	1.00	0.0

PER NEC ARTICLE 220

TOTAL CONNECTED LOAD: 408.9 KVA
TOTAL DEMAND LOAD: 458.7 KVA
DEMAND AMPS: 552.4 AMPS

PANEL EQUIPMENT:
INTEGRAL SURGE PROTECTIVE DEVICE

Name: LP

MAIN BREAKER: 60 AMPS
VOLTAGE: 240/120V
PHASE: 1
WIRE: 3
ENCLOSURE: NEMA 3R
AIC: 10 K AMPS
MOUNTING: RACK
MANUFACTURER:

Status: NEW
Project Name: PEMBROKE PINES PUMPS
Project Number: 2400768
Fed From: HP VIA XFMR

NOTES	CKT #	CIRCUIT DESCRIPTION	CODE	LOAD/PHASE (KVA) A	B		CIRCUIT BREAKER TRIP	POLES	POLES	TRIP	LOAD/PHASE (KVA) A	B		CODE	CIRCUIT DESCRIPTION	CKT #	NOTES
	1	BATTERY CHARGER (EAST)	O	1.0			20	1	1	20					SPARE	2	
	3	BATTERY CHARGER (WEST)	O		1.0		20	1	1	20		0.2		R	DUPLEX RECEPTACLE	4	
	5	SPARE					20	1	1	20					SPARE	6	
	7	SPARE					20	1	1						SPACE	8	
	9	SPD					30	2	1						SPACE	10	
	11								1						SPACE	12	
NOTES				1.0	1.0						0.0	0.2					

1. PROVIDE LOCK-ON ASSEMBLY

	CONN. LOAD (KVA)	ADJUST. FACTOR	DEMAND FACTOR	DEMAND LOAD (KVA)
LIGHTING (L)	0.0	1.00	1.25	0.0
RECEPTACLES (R)	0.2	---	NEC	0.2
LARGEST MOTOR (M)	0.0	1.00	1.25	0.0
ALL OTHER MOTORS (M)	0.0	1.00	1.00	0.0
HEATING (H)	0.0	1.00	1.00	0.0
COOLING (C)	0.0	1.00	1.00	0.0
OTHER (O)	2.0	1.00	1.00	2.0
WATER HEATERS (W)	0.0	1.00	1.25	0.0
DRYERS (D)	0.0	1.00	1.00	0.0
KITCHEN (K)	0.0	1.00	1.00	0.0

PER NEC ARTICLE 220

TOTAL CONNECTED LOAD: 2.2 KVA
TOTAL DEMAND LOAD: 2.2 KVA
DEMAND AMPS: 9.1 AMPS

PANEL EQUIPMENT:

VOLTAGE DROP CALCULATIONS (DISTANCES SHOWN ARE FOR CALCULATION PURPOSES ONLY)

CIRCUIT FROM	CIRCUIT TO	VOLTAGE OF CIRCUIT (L-N) (1Ø)	(L-L) (1Ø or 3Ø)	PHASE (1=1Ø, 3=3Ø)	AMPS (per ckt wire)	CIRCUIT WIRES (# in parallel)	WIRE SIZE (AWG or kcmil)	WIRE TYPE (AL , CU)	CONDUIT TYPE (AL, PVC, STEEL)	ONE-WAY LENGTH (FT.)	INCREMENTAL VOLTAGE DROP (volts)	TOTAL V.D. FROM SOURCE (volts)	TOTAL V.D. AT LOAD (%)
FPL	PANEL		480	3	543.00	2	500	CU	PVC	300	3.81	3.81	0.79%
PANEL	PUMP (WEST)		480	3	240.00	1	350	CU	PVC	25	0.39	4.20	0.88%
FPL	PANEL		480	3	543.00	2	500	CU	PVC	300	3.81	3.81	0.79%
PANEL	PUMP (EAST)		480	3	240.00	1	350	CU	PVC	45	0.71	4.52	0.94%
FPL	PANEL		480	3	543.00	2	500	CU	PVC	300	3.81	3.81	0.79%
PANEL	CHRGR (WEST)	120		1	8.33	1	10	CU	PVC	25	0.50	1.45	1.21%
FPL	PANEL		480	3	543.00	2	500	CU	PVC	300	3.81	3.81	0.79%
PANEL	CHRGR (EAST)	120		1	8.33	1	10	CU	PVC	45	0.90	1.85	1.54%

UTILITY SHORT CIRCUIT CALCULATION

METHOD	UTILITY KVA	VOLT / Ph	%Z (if known)	SCAsec
Infinite Bus	500	480 / 3	1.50	40,094

SCA PROVIDED AT THE TRANSFORMER IS (##,###) AIC PER (UTILITY COMPANY). TRANSFORMER KVA AND IMPEDANCE RATING (IF KNOWN) PROVIDED BY (UTILITY COMPANY). (UTILITY COMPANY) CONTACT: (NAME) AT (PHONE NUMBER).

DISTANCES SHOWN ARE FOR CALCULATION PURPOSES ONLY.

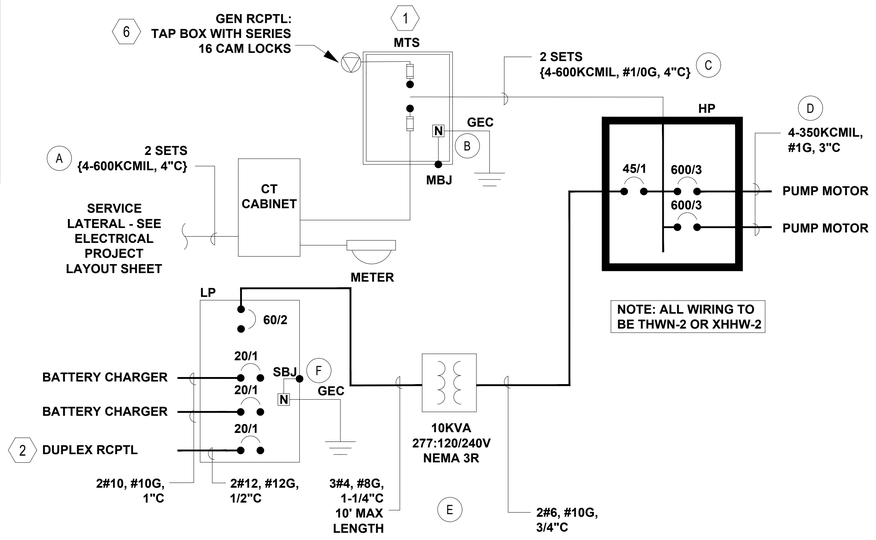
POINT-TO-POINT SHORT CIRCUIT CALCULATION

FROM	TO	VOLTS / Ph	# of SETS	WIRE SIZE	WIRE TYPE	CONDUIT	LENGTH*	SCA
UTILITY	HP	480 / 3	2	500	COPPER	PVC	300	22,120
HP	T1	480 / 1	1	1	COPPER	STEEL	10	19,638
T1	LP	240 / 1	1	6	COPPER	STEEL	10	1,852

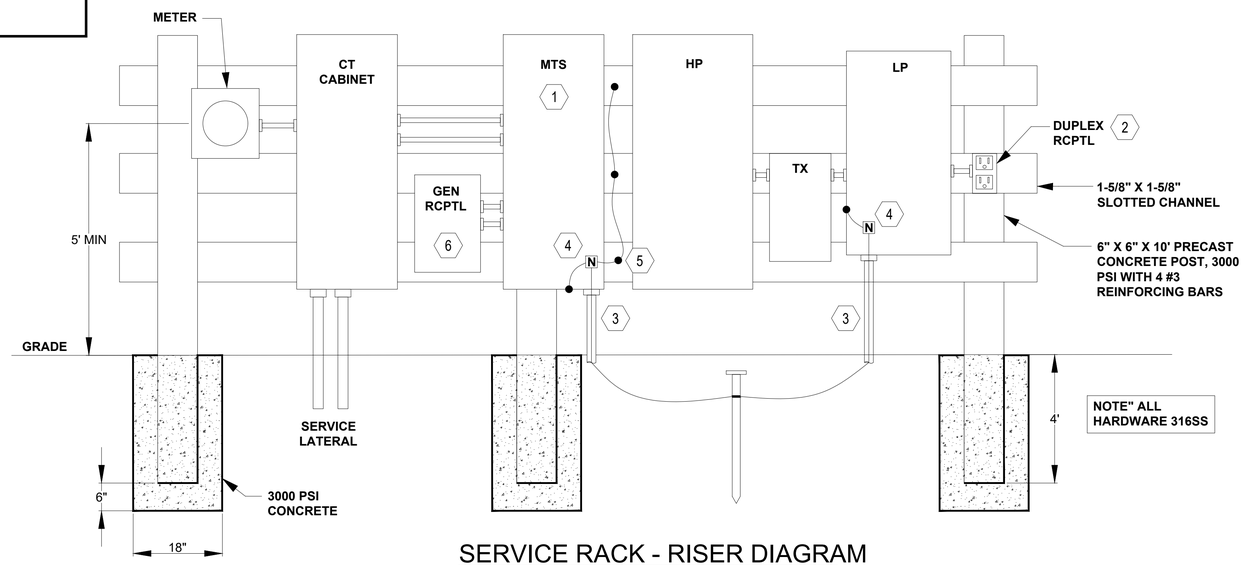
STEP-DOWN TRANSFORMER SHORT CIRCUIT CALCULATION

LABEL	PRI. V / Ph	SEC. V / Ph	XFMR KVA	XFMR %Z	SCApri	SCAsec
T1	480 / 1	240 / 1	10	2	19,638	1,978

* LENGTH(S) SHOWN ARE FOR DESIGN PURPOSES ONLY AND DO NOT REPRESENT THE REQUIRED LENGTH OF CONDUCTORS AND CONDUIT. DUE TO THE INVERSE RELATIONSHIP BETWEEN SHORT-CIRCUIT CURRENT AND CONDUCTOR LENGTH, LENGTHS ARE UNDER-ESTIMATED IN ORDER TO ENSURE CALCULATION OF A WORST-CASE SHORT-CIRCUIT CURRENT FOR SIZING EQUIPMENT SHORT-CIRCUIT CURRENT INTERRUPTING RATINGS.



ONE-LINE DIAGRAM
N.T.S



SERVICE RACK - RISER DIAGRAM
N.T.S

CALCULATIONS

A SERVICE CONDUCTORS
WIRE: 800A CB --> 2 SETS 600KCMIL@420A
CONDUIT [TBL. C.9]: 4-600KCMIL --> 4"C

B GEC: [TBL. 250.66]
2*600KCMIL = 1200KCMIL > 1100KCMIL --> #3/0
MBJ: [TBL. 250.102(C)(1)]
2*600KCMIL = 1200KCMIL > 1100KCMIL --> NOTE 1
MJB ≥ 12.5%(TOTAL CM)
0.125(1200KCMIL) = 150KCMIL --> #3/0

C PANEL HP FEEDER
SAME AS SERVICE CONDUCTORS PLUS EGC
EGC: 800A OCPD --> #1/0 [TBL. 250.122]

D MOTOR BRANCH CIRCUITS
200HP @ 480V/3PH: 240FLA [TBL. 430.50]
CB ≤ 250% x FLA [TBL 430.52]
≤ 2.5(240) = 600A/3P
WIRE ≥ 125% x FLA [430.22]
≥ 1.25(240) = 300A---> 350KCMIL (310A @ 75°C)
EGC: [TBL. 250.122]
600A OCPD --> #1
CONDUIT: [TBL. C.9]
4-350; #1G --> 3"C

E TRANSFORMER
- PRI FLA = 10/0.277 = 36.1
OCPD ≤ 125% x FLA [TBL. 430.3(B)]
≤ 1.25(36) = 45A/1P
WIRE ≥125% x FLA [215.2(A)]
≥ 1.25(36) = 45 --> #6 (55A @ 60°C)
EGC: [TBL 250.122]
45A OCPD --> #10
CONDUIT: [TBL. C.9] 2#6, #10G --> 3/4"C
- SEC FLA = 10/0.24 = 41.7
WIRE ≥ 125% x FLA [215.2(A)]
≥1.25(42) = 53 --> #6 (55A @ 60°C)
[240.21(C)(2)] --> AMPACITY ≥ OCPD
OCPD = 60A --> #4 (70A @ 60°C)
SSBJ: [TBL. 250.102(C)(1)]
#4 CONDUCTORS --> #8
(SSBJ ROUTED WITH SEC CONDUCTORS TO BOND XFMR AND PANEL ENCLOSURES)
CONDUIT: [TBL. C.9]
3#4, #8G --> 1-1/4"C

F PANEL LP ON SEPARATELY DERIVED SOURCE
SBJ: [TBL. 250.102(C)(1)] #4 CONDUCTORS --> #8
GEC: [TBL. 250.66] #4 CONDUCTORS --> #8

KEY NOTES

1. MTS: 800A, 600V, 3PH, 4W, DOUBLE-THROW FUSED DISCONNECT SWITCH, SERVICE-ENTRANCE RATED, NEMA 3R ENCL.
2. PROVIDE WEATHER-RESISTANT GFI RECEPTACLE IN WP-IN-USE BOX.
3. #3/0 GEC IN 3/4"C TO 3/4"X20' COPPER-CLAD GROUND ROD. PROVIDE BONDING BUSHING ON BOTH ENDS OF CONDUITS. #3/0 BONDING CONDUCTOR BETWEEN RODS SEPARATED AT LEAST 6' APART. BOND NEUTRAL TO GROUND BAR OR ENCLOSURE IN BOTH SERVICE DISCONNECT "MTS" AND PANEL "LP" AND BOND TO 3 HORIZONTAL METAL STRUTS ON CONCRETE POSTS
4. BOND NEUTRAL TO GROUND BAR OR ENCLOSURE
5. BOND TO 3 HORIZONTAL METAL STRUTS ON CONCRETE POSTS
6. QUICK CONNECT PANEL, 800A, 480V, 3PH, 4W, WITH GROUND, NEMA3R ENCL.

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GREGORY D. TAYLOR LICENSE No. 77811 STATE OF FLORIDA PROFESSIONAL ENGINEER
GREGORY D. TAYLOR, P.E.
FL P.E. NO. 77811

No.	Date	Revision
A1		
A2		
A3		
A4		
A5		
A6		
A7		

Designed: G.D.T.
Drawn: J.A.V.
Checked: G.D.T.
Job No.: 2400768
Date: 9/12/2025 © 2025

ELECTRICAL SCHEDULE & DETAILS

CITY OF PEMBROKE PINES
PEMBROKE PINES SEEPAGE
TAFT STREET AND SW 209 AVENUE
SECTION 10 & 3-TOWNSHIP 51 SOUTH-RANGE 39 EAST
AND SECTION 34, TOWNSHIP 50 SOUTH, RANGE 39 EAST
BROWARD COUNTY, FLORIDA

THIS SHEET NOT VALID FOR CONSTRUCTION WITHOUT COMPLETE SET OF PLANS. SEE GENERAL NOTES FOR MASTER LEGEND.

Sheet No.
E-101

DRAFT DOCUMENT FOR COMMISSION REVIEW

SECTION 26 05 01 - COMMON WORK RESULTS - ELECTRICAL

1.01 GENERAL REQUIREMENTS

A. THIS PORTION OF THE WORK IS PART OF TOTAL PROJECT AND ALL PROVISIONS OF THE PROJECT GENERAL REQUIREMENTS, CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS AND ALL OTHER CONTRACT DOCUMENTS SHALL ALSO APPLY TO THIS SECTION OF THE PROJECT. ALL THE PLANS AND SPECIFICATIONS ARE TO BE A PART OF THE TOTAL PROJECT AND ALL CONTRACTORS ARE HEREBY DIRECTED TO THESE PLANS AND SPECIFICATIONS FOR THE TOTAL SCOPE OF THE WORK. ANY DISCREPANCY OR DIFFERENCES BETWEEN ANY OF THESE PLANS AND SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT OR ENGINEER FOR INTERPRETATION.

B. THE ELECTRICAL DRAWINGS SHOW THE SCOPE AND THE GENERAL ARRANGEMENT OF ALL ELECTRICAL, EQUIPMENT, AND WIRING DEVICES AND SHALL BE FOLLOWED AS CLOSELY AS ACTUAL BUILDING CONSTRUCTION, SITE CONDITIONS, AND AS THE WORK OF OTHER TRADES PERMITS. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC ONLY, AND ARE NOT INTENDED TO INCLUDE ALL THE DETAILS OR DIMENSIONS SHOWN ON THE ARCHITECTURAL, STRUCTURAL, OR MECHANICAL DRAWINGS, AND CONVERSELY THE SAME; HOWEVER, EACH DRAWING IS INTENDED TO SUPPLEMENT THE OTHERS, AND THE INTERPRETATION OF THE DRAWINGS SHALL BE SUCH THAT THE ARCHITECTURAL, STRUCTURAL, MECHANICAL OR ELECTRICAL DETAILS ARE INCLUDED ON ALL THE VARIOUS DRAWINGS. FIGURED DIMENSIONS, WHERE SHOWN, SHALL TAKE PRECEDENCE OVER SCALED DRAWINGS. WHEN NO FIGURES OR DIMENSIONS ARE NOTED, THE DRAWINGS SHALL BE ACCURATELY FOLLOWED. IN THE EVENT CERTAIN DETAILS AND ITEMS NECESSARY FOR THE COMPLETE BUILDING AND TO OBTAIN THE DESIRED RESULTS ARE OMITTED FROM THE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL REQUEST INSTRUCTIONS AND INSTALL SAME. THE ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS SHOWN ON ALL OF THE DRAWINGS. GENERAL AND STRUCTURAL DRAWINGS SHALL TAKE PRECEDENCE OVER ELECTRICAL DRAWINGS. THE CONTRACTOR SHALL INVESTIGATE THE STRUCTURAL AND FINISH CONDITIONS AFFECTING THE WORK AND SHALL ARRANGE HIS WORK ACCORDINGLY.

C. IN THE EVENT CERTAIN DISCREPANCIES ARE DISCOVERED BETWEEN PLANS AND SPECIFICATIONS AFTER BIDDING HAS TAKEN PLACE, THE INTERPRETATION OF THE INTENDED FUNCTION WILL BE BY THE OWNER. THE CONTRACTOR SHALL BEAR THE COST OF FURNISHING AND INSTALLING THE REQUIRED MATERIAL SO AS TO PROVIDE A COMPLETE AND WORKING SYSTEM.

1.02 SUBSTITUTION CLAUSE

A. EACH ITEM SPECIFIED HEREIN SHALL REQUIRE PRIOR APPROVAL OF THE ARCHITECT FOR ANY SUBSTITUTIONS. IF ANY CONTRACTOR WISHES TO BID ON ANY EQUIPMENT OTHER THAN THE MANUFACTURERS LISTED, HE SHALL REQUEST IN WRITING APPROVAL OF SAID EQUIPMENT AT LEAST SEVEN (7) CALENDAR DAYS PRIOR TO BID DATE OR AS SET FORTH IN THE ARCHITECTURAL SPECIFICATIONS. (ARCHITECTURAL SPECIFICATIONS TAKE PRECEDENCE). ALL ITEMS SUBMITTED FOR PRIOR APPROVAL SHALL BE BOUND IN A BINDER AND SEPARATED WITH INDEX TABS.

1.03 SCOPE

A. ALL LABOR, MATERIAL, SERVICES AND SKILLED SUPERVISION NECESSARY FOR CONSTRUCTION, ERECTION, INSTALLATION, AND CONNECTION OF ALL CIRCUITS AND ELECTRICAL EQUIPMENT SPECIFIED HEREIN OR SHOWN ON DRAWINGS, IN A WORKMAN LIKE MANNER. DELIVER TO OWNER UPON COMPLETION READY FOR USE IN ALL RESPECTS, THE FOLLOWING COMPLETE ELECTRICAL SYSTEM:

1. COMPLETE SECONDARY SERVICES AND BRANCH CIRCUIT WIRING
2. COMPLETE EQUIPMENT WIRING
3. ALL LIGHTING FIXTURES COMPLETE WITH LAMPS AS SPECIFIED HEREIN
4. TELEPHONE CONDUIT SYSTEM & PULL STRING
5. FIRE ALARM AND WIRING OF DEVICES INDICATED
6. ALL CONTROL WIRING FOR TEMPERATURE CONTROLS
7. ALL TEMPORARY WIRING FOR LIGHTS AND POWER DURING CONSTRUCTION
8. AUTOMATION WIRING FOR ALL EQUIPMENT SPECIFIED UNDER MECHANICAL SECTION
9. ALL EMPTY RACEWAYS AS SHOWN ON PLANS WITH PULL STRING
10. PUBLIC ADDRESS OR MUSIC SYSTEMS
11. RELOCATION OF ANY EXISTING ELECTRICAL EQUIPMENT AS REQUIRED

B. FAILURE TO MENTION ANY SPECIFIC ITEMS NECESSARY FOR A COMPLETE SYSTEM SHALL NOT EXCUSE THE CONTRACTOR FROM FURNISHING AND INSTALLING SAME.

1.04 CODES AND STANDARDS

A. ALL MATERIALS AND WORKMANSHIP SHALL COMPLY WITH ALL APPLICABLE CODES, SPECIFICATIONS, LOCAL ORDINANCES, INDUSTRY STANDARDS, LATEST EDITION OF THE NEC, AND UTILITY COMPANY REGULATIONS. IN NO CASE WILL WORK OR MATERIALS INFERIOR TO THESE SPECIFICATIONS BE ACCEPTED EVEN IF PERMITTED BY CODE.

B. IN CASES OF DIFFERENCE BETWEEN BUILDING CODES, SPECIFICATIONS, STATE LAWS, LOCAL ORDINANCES, INDUSTRY STANDARDS AND UTILITY COMPANY REGULATIONS AND THE CONTRACT DOCUMENTS, THE MOST STRINGENT WILL GOVERN.

1.05 COORDINATION

A. THE ELECTRICAL WORK SHALL BE COORDINATED WITH THE REQUIREMENTS OF THESE SPECIFICATIONS, AND ALSO WITH THE REQUIREMENTS OF THE OTHER DIVISIONS AND WITH ALL OF THE DRAWINGS FOR THE ENTIRE PROJECT. THE ELECTRICAL WORK SHALL BE ACCOMPLISHED ON SUCH A SCHEDULE AND IN SUCH A MANNER AS NOT TO DELAY NOR INTERFERE WITH OTHER CONSTRUCTION WORK.

B. THE CONTRACTOR SHALL PROMPTLY REPORT TO THE OWNER ANY DELAY OR DIFFICULTIES ENCOUNTERED IN THE INSTALLATION OF HIS WORK WHICH MIGHT PREVENT PROMPT AND PROPER INSTALLATION OF HIS WORK OR MAKE IT UNSUITABLE TO CONNECT OR RECEIVE THE WORK OF OTHERS. HIS FAILURE TO SO REPORT SHALL CONSTITUTE AN ACCEPTANCE OF THE WORK OF THE CONTRACTOR AS BEING FIT AND PROPER FOR THE RECEPTION OF HIS WORK.

C. THE CONTRACTOR SHALL CAREFULLY LAY OUT HIS WORK ON THE PREMISES AND MAKE PROPER PROVISION FOR THE OTHER WORK. OFFSETS SHALL BE MADE WHEREVER IT IS NECESSARY TO CLEAR FINISH ROOMS, STRUCTURAL MEMBERS, OR OTHER OBSTRUCTIONS. THE CONTRACTOR SHALL CAREFULLY PLAN HIS WORK SO AS TO MINIMIZE THE NUMBER OF OFFSETS REQUIRED.

D. THE CONTRACTOR SHALL ALSO CAREFULLY COORDINATE THE LOCATION OF ALL EQUIPMENT CONDUIT RUNS, FLOOR AND WALL PENETRATIONS, ETC., WITH THE INSTALLATION OF WORK IN DIVISION 15000 AND OTHER SECTIONS OF THESE SPECIFICATIONS. ANY WORK INSTALLED BY THE CONTRACTOR WITHOUT CONSIDERING EQUIPMENT, DUCTWORK, PIPING, ETC., OF OTHER TRADES, SHALL BE CHANGED OR RELOCATED AS REQUIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. THIS INCLUDES ALL ELECTRICAL DEVICES, SWITCHES, RECEPTACLES, PHONE/COMMUNICATION OUTLETS, ETC. THAT ARE MOUNTED IN WALLS ABOVE OR AROUND CABINETS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY FINAL LOCATION AND MOUNTING HEIGHTS WITH ARCHITECTURAL CASEWORK/INTERIOR ELEVATIONS/DETAILS. WHERE APPLICABLE, THE CONTRACTOR SHALL ALSO VERIFY WITH THE OWNER OR OWNER'S REPRESENTATIVE FOR ANY SPECIFIC CONDITIONS OR REQUIREMENTS FOR ELECTRICAL DEVICES MENTIONED ABOVE.

E. ALL ELECTRICAL SERVICE AND TELEPHONE SERVICE REQUIREMENTS SHALL BE COORDINATED BY THE CONTRACTOR AS SHOWN ON PLANS AND CONFIRMED WITH THE UTILITY COMPANY BY THE CONTRACTOR TO ENSURE THAT UTILITIES ARE ACCEPTED BY THE UTILITY COMPANY IT CONCERNS.

1.06 INSTALLATION AND ARRANGEMENT

A. THE CONTRACTOR SHALL ARRANGE CONDUITS, RACEWAYS AND ELECTRICAL EQUIPMENT TO PERMIT READY ACCESS TO COMPONENTS AND TO CLEAR THE OPENING TO SWINGING AND OVERHEAD DOORS AND OF ACCESS PANELS. THIS ALSO INCLUDES THE INSTALLATION OF ALL SERVICE DISCONNECTS AT MECHANICAL EQUIPMENT. THE CONTRACTOR SHALL MOUNT SERVICE DISCONNECTS ON AN ADJACENT WALL OR NON-REMOVABLE PANELS TO ALLOW REMOVABLE PANELS TO BE REMOVED FOR FUTURE SERVICING OF EQUIPMENT.

1.07 TEMPORARY LIGHT AND POWER

A. THE CONTRACTOR SHALL PROVIDE TEMPORARY FEEDERS OF SUFFICIENT CAPACITY FROM LOCAL BUILDING SERVICES OR FROM THE LOCAL UTILITY COMPANY AS APPLICABLE TO TAKE CARE OF THE ELECTRIC REQUIREMENTS FOR THE BUILDING DURING CONSTRUCTION. BASE TEMPORARY LIGHTS ON 200 WATT LAMPS PER 1,000 SQUARE FEET FLOOR SPACE. MOTORS UP TO 1/2 HP, 120 VOLT ONLY PROVIDED FOR. INSTALL SUFFICIENT WIRING AND OUTLETS TO INSURE PROPER LIGHTING CORRIDORS. NECESSARY TRANSFORMERS, METERS, CABLES, PROTECTIVE DEVICES, SWITCHES, ETC. PROVIDED AS REQUIRED. CONTRACTORS OF OTHER TRADES TO FURNISH THEIR OWN EXTENSION CORDS AND LAMPS AND SHALL PAY FOR THE COST OF WIRING OF CONSTRUCTION OFFICES USED BY THEM. GENERAL CONTRACTOR TO PAY FOR THE COST OF ENERGY CONSUMED BY ALL TRADES, INCLUDING THE COST OF LAMP REPLACEMENT. ANY TEMPORARY WIRING OF SPECIAL NATURE FOR LIGHT SHALL BE PAID FOR BY THE CONTRACTOR USING SAME. TEMPORARY CONNECTIONS SHALL BE SAFE AND IN ACCORDANCE WITH NEC AND OSHA.

1.08 RECORD DRAWINGS ("AS-BUILTS")

A. RECORD DRAWINGS - THE CONTRACTOR SHALL FURNISH TO THE OWNER AND ARCHITECT RECORD DRAWINGS SHOWING CONDUIT SYSTEMS WHERE APPLICABLE. CONDUIT SIZES, REROUTING, ETC., FOR UNDER FLOOR CONDUITS SHALL BE SHOWN. ALSO PROVIDE A REPRODUCIBLE TRACING OF THE SITE PLAN SHOWING POWER, TELEPHONE, CABLE, TV, SITE LIGHTING, ETC. IN ADDITION TO THESE DRAWINGS, A COMPLETE SET OF DRAWINGS FOR FIRE ALARM AND COMMUNICATION SYSTEM.

B. TYPEWRITTEN OR NEATLY HAND WRITTEN PANEL SCHEDULES SHALL BE PROVIDED FOR PANELBOARDS INDICATING THE LOADS SERVED AND THE CORRECT BRANCH CIRCUIT NUMBER, AS INSTALLED. ALSO LEAVE LEGIBLE CIRCUIT CARD IN POCKET OF BREAKER PANEL DOOR.

1.09 EQUIPMENT AND MATERIALS

A. ALL MATERIALS SHALL BE NEW AND SHALL BEAR THE MANUFACTURER'S NAME, TRADE NAME AND THE UL LABEL IN EVERY CASE WHERE A STANDARD HAS BEEN ESTABLISHED FOR THE PARTICULAR MATERIAL. THE EQUIPMENT TO BE FURNISHED UNDER EACH SECTION OF THE SPECIFICATIONS SHALL BE ESSENTIALLY THE STANDARD PRODUCT OF A UNITED STATES OF AMERICA MANUFACTURER REGULARLY ENGAGED IN THE PRODUCTION OF THE REQUIRED TYPE OF EQUIPMENT AND SHALL BE THE MANUFACTURER'S LATEST AND APPROVED DESIGN.

B. DELIVERY AND STORAGE: EQUIPMENT AND MATERIALS SHALL BE DELIVERED TO THE SITE AND STORED IN ORIGINAL CONTAINERS, SUITABLY SHELTERED FROM THE ELEMENTS, BUT READILY ACCESSIBLE FOR INSPECTION UNTIL INSTALLED. ALL ITEMS SUBJECT TO MOISTURE DAMAGE SHALL BE STORED IN DRY, HEATED SPACES.

C. EQUIPMENT AND MATERIALS OF THE SAME GENERAL TYPE SHALL BE OF THE SAME MAKE THROUGH THE WORK TO PROVIDE UNIFORM APPEARANCE, OPERATION AND MAINTENANCE.

D. PROTECTION OF WORK: THE CONTRACTOR SHALL TAKE PRECAUTIONS AT ALL TIMES TO PROPERLY PROTECT THE ELECTRICAL EQUIPMENT FROM DAMAGE. UNINSTALLED EQUIPMENT SHALL REMAIN CRATED AND COVERED WITH CANVAS OR HEAVY PLASTIC TARPAULINS UNTIL INSTALLED. EQUIPMENT THAT IS BEING INSTALLED, OR HAS BEEN INSTALLED, SHALL BE PROTECTED AGAINST DIRT, WATER, CONSTRUCTION DEBRIS, WEATHER, THEFT, AND CHEMICAL OR MECHANICAL DAMAGE. ALL DAMAGED EQUIPMENT SHALL BE REPAIRED AND/OR REPLACED. AT THE COMPLETION OF THE WORK, ALL FIXTURES, EQUIPMENT, AND MATERIALS SHALL BE THOROUGHLY CLEANED AND POLISHED. THE CONTRACTOR SHALL REPAIR AND CORRECT, AT HIS OWN EXPENSE, ALL DAMAGES AND DEFECTS WHICH DEVELOP BEFORE THE WORK IS ACCEPTED BY THE OWNER.

E. SAFETY WARNING SIGNS SHALL BE FURNISHED AND INSTALLED AT ALL ELECTRICAL EQUIPMENT AND SWITCHGEAR.

F. DIMENSIONS: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSURE THAT ITEMS TO BE FURNISHED FIT THE SPACE AVAILABLE. HE SHALL MAKE NECESSARY FIELD MEASUREMENTS TO ASCERTAIN SPACE REQUIREMENTS, INCLUDING THOSE FOR CONNECTIONS, AND SHALL FURNISH AND INSTALL SIZES AND SHAPES OF EQUIPMENT SO THAT THE FINAL INSTALLATION SHALL SUIT THE TRUE INTENT AND MEANING OF THE DRAWINGS AND SPECIFICATIONS.

G. MANUFACTURER'S DIRECTIONS SHALL BE FOLLOWED COMPLETELY IN DELIVERY, STORAGE, PROTECTION AND INSTALLATION OF ALL EQUIPMENT AND MATERIALS. THE CONTRACTOR SHALL PROMPTLY GIVE NOTICE IN WRITING OF ANY CONFLICT BETWEEN ANY REQUIREMENT OF THE CONTRACT DOCUMENTS AND THE MANUFACTURER'S DIRECTIONS AND SHALL OBTAIN THE WRITTEN INSTRUCTION BEFORE PROCEEDING WITH THE WORK. SHOULD THE CONTRACTOR PERFORM ANY WORK THAT DOES NOT COMPLY WITH THE MANUFACTURER'S DIRECTIONS OR SUCH WRITTEN INSTRUCTIONS, HE SHALL BEAR ALL COSTS ARISING IN CORRECTING THE DEFICIENCIES.

1.10 EQUIPMENT ACCESSORIES

A. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL EQUIPMENT, ACCESSORIES, CONNECTIONS, AND INCIDENTAL ITEMS NECESSARY TO FULLY COMPLETE THE WORK, READY FOR USE, OCCUPANCY AND OPERATION BY THE OWNER.

B. WHERE EQUIPMENT REQUIRING DIFFERENT ARRANGEMENT OF CONNECTIONS FROM THOSE SHOWN OR APPROVED, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL THE EQUIPMENT TO OPERATE PROPERLY AND IN HARMONY WITH THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. THE CONTRACTOR SHALL MAKE ALL INCIDENTAL CHANGES IN HEATERS, PANELBOARD, CONDUIT, WIRING, ETC. HE SHALL PROVIDE ANY ADDITIONAL MOTORS, CONTROLLERS, AND OTHER ADDITIONAL EQUIPMENT REQUIRED FOR THE PROPER OPERATION OF THE SYSTEM RESULTING FROM THE SELECTION OF EQUIPMENT, INCLUDING ALL REQUIRED CHANGE IN AFFECTED TRADES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER LOCATION OF ROUGHING-IN AND CONNECTIONS. SUCH CHANGES SHALL BE MADE AT NO INCREASE IN THE CONTRACT AMOUNT OR ADDITIONAL COST TO THE OTHER TRADES.

C. ANCHORS, BOLTS, AND SCREWS: SECURELY FASTEN CONDUIT STRAPS, CUTOUT SWITCHES, ETC., TO WALLS, SLABS, ETC., WITH CADMIUM PLATED SCREWS AND ACKERMAN-JOHNSON LEAD CINCH ANCHORS, EXPANSION BOLTS OR APPROVED EQUAL ANCHORS, FITTED IN HOLES DRILLED WITH STAR DRILL, AND FOR MORE SEVERE SERVICES, USE LEAD CINCH ANCHOR BOLTS OR APPROVED MANUFACTURER. FOR EXPOSED WORK, USE CADMIUM PLATED BOLTS. WOOD PLUGS WILL NOT BE ACCEPTED.

1.11 ELECTRICAL WORKMANSHIP

A. WHEREVER EQUIPMENT REQUIRING ELECTRICAL CONNECTION IS SPECIFIED, ALL WORKMANSHIP AND MATERIALS SHALL CONFORM WITH THE REQUIREMENTS OF THE ELECTRICAL SECTION OF THE SPECIFICATIONS. ALL DISCONNECT SWITCHES, STARTERS, PUSH BUTTON STATIONS, AND HAND-OFF AUTO SWITCHES SHALL BE FURNISHED, INSTALLED AND WIRED BY THE CONTRACTOR EXCEPT WHERE LISTED SPECIFICALLY TO BE FURNISHED WITH THE ITEM OF EQUIPMENT IT CONTROLS, IN WHICH CASE THE CONTRACTOR SHALL MOUNT AND WIRE COMPLETELY. ADDITIONAL DISCONNECTS REQUIRED BY THE ELECTRICAL CODE SHALL BE FURNISHED, INSTALLED AND CONNECTED UNDER THE ELECTRICAL SECTION OF THE SPECIFICATIONS.

B. COORDINATION: THE CONTRACTOR SHALL CHECK THE MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS TO ASSURE THE PROPER LOCATION AND ELECTRICAL SERVICE CHARACTERISTICS TO THE INDIVIDUAL OUTLETS SERVING MECHANICAL AND ELECTRICAL EQUIPMENT AND SHALL REQUEST APPROVAL OF ANY REQUIRED MODIFICATION TO SUIT THE ACTUAL EQUIPMENT TO BE FURNISHED.

C. IDENTIFICATION FOR ELECTRICAL EQUIPMENT AND CIRCUITS SHALL BE PROVIDED AND FURNISHED UNDER THIS SECTION, USING ITEM NUMBERS AND NOMENCLATURE AS SHOWN ON THE ELECTRICAL DRAWINGS, OR AS INSTRUCTED BY THE ARCHITECT.

1. ALL SWITCHGEAR, DISTRIBUTION PANELBOARDS, TRANSFORMERS, PANELBOARDS, DISCONNECTS. ASSOCIATED MOTOR STARTERS, CONTACTORS, AND TIME CLOCKS FURNISHED BY THE CONTRACTOR SHALL BE IDENTIFIED, BY NAMEPLATES INDICATING DESIGNATED LEGEND, VOLTAGE AND PHASE AND SHALL BE SECURELY FASTENED TO THE EQUIPMENT.

1.12 SYSTEM OPERATING TESTS

A. NECESSARY TESTS AND ADJUSTMENTS: ALL NECESSARY TESTS AND ADJUSTMENTS FOR THE PROPER OPERATION OF THE ELECTRICAL SYSTEM SHALL BE PERFORMED BY THE CONTRACTOR WITH INSTRUMENTS FURNISHED BY HIM FOR THIS PURPOSE. THE TEST RESULTS SHALL BE SUBMITTED IN WRITING TO THE ARCHITECT FOR REVIEW AND APPROVAL.

1.13 INSTRUCTIONS TO OWNER

A. THE CONTRACTOR SHALL INSTRUCT THE OPERATING PERSONNEL OF THE OWNER IN THE PROPER OPERATION AND MAINTENANCE OF ALL ELEMENTS OF THE ELECTRICAL SYSTEMS.

1.14 OPERATING AND MAINTENANCE MANUALS

A. SPARE PARTS LISTS, OPERATING INSTRUCTIONS, MANUFACTURER'S RECOMMENDED PREVENTATIVE MAINTENANCE INSTRUCTIONS AND SPECIFICATIONS SHEETS FOR EACH ITEM OF THE ELECTRICAL EQUIPMENT SHALL BE SUBMITTED, IN TRIPLICATE, BY THE CONTRACTOR AT THE PAY APPLICATION FOR 75% COMPLETION. ALL PAYMENT REQUEST OVER 75% WILL BE DENIED UNTIL THIS INFORMATION IS RECEIVED.

SECTION 26 05 34 - CONDUITS, CONDUIT FASTENINGS, AND CONDUIT FITTINGS

1.01 GENERAL

A. ALL WIRES AND CABLES SHALL BE RUN IN CONDUIT, WHICH SHALL BE RIGID METAL CONDUIT. RIGID PVC CONDUIT MAY BE USED FOR UNDERGROUND WORK IF APPROVED BY LOCAL CODE.

2.01 PRODUCTS

A. RIGID CONDUIT: THICK WALL HOT-DIPPED GALVANIZED, ASA STANDARD SPECIFICATION NO. C80-1, ENAMELED INSIDE AND OUT JOINTS SHALL BE WATERTIGHT THREADED TYPE WITH APPROVED SEALANT APPLIED TO MALE THREADS.

B. PVC CONDUIT, USED FOR UNDERGROUND INSTALLATION, SHALL BE AT LEAST 2 FEET BELOW FINISHED GRADE IN HARDSCAPE AND 18" BELOW FINISHED GRADE IN LANDSCAPE AREAS. ALL JOINTS SHALL BE WATERTIGHT, WHERE STUBBED UP THROUGH FLOOR, SLAB OR ABOVE GRADE, A 90° RIGID GALVANIZED ELBOW SHALL BE USED WITH RIGID GALVANIZED STUB UP TO 2 INCHES ABOVE GRADE. A BARE GROUND WIRE TO MEET CODE REQUIREMENTS SHALL BE INSTALLED WITH ALL CIRCUITS PULLED INTO PVC CONDUITS. CONDUIT SHALL BE AS MANUFACTURED BY CARLON. JOINT SEALANT SHALL BE AS PER MANUFACTURER'S RECOMMENDATION FOR SPECIAL PIPE. SCHEDULE 80 PVC WHERE SUBJECT TO PHYSICAL DAMAGE

C. CONDUIT SUPPORTS: ALL CONDUITS SHALL BE SECURED IN PLACE WITH APPROVED STRAPS, HANGER, OR CLAMPS PER NEC. NO WIRE FOR SUPPORT WILL BE ALLOWED.

D. FLEXIBLE CONDUIT: CONDUIT CONNECTIONS TO MOTORS AND VIBRATING EQUIPMENT SHALL BE MADE WITH 18-INCH MAXIMUM OF TYPE U.S. GRAY LIQUID TIGHT NEOPRENE JACKETED FLEXIBLE CONDUIT AS MANUFACTURED BY ANACONDA. FITTINGS SHALL BE LIQUID TIGHT INSULATED THROAT TYPE AS MANUFACTURED BY T. & B. BX WILL NOT BE PERMITTED.

3.01 INSTALLATION

A. CONDUITS INSTALLED IN OR UNDER CONCRETE OR BELOW GRADE SHALL BE THICK WALL PVC (SCH. 80) OR RIGID STEEL IF REQUIRED BY LOCAL CODES. SERVICE CONDUITS EXPOSED SHALL BE RIGID STEEL.

B. ALL POWER AND LIGHTING CONDUITS IN BUILDING SHALL BE EMT UNLESS OTHER TYPE IS REQUIRED BY LOCAL CODES.

C. USE FACTORY ELBOWS FOR 1-1/2" CONDUIT AND LARGER.

D. WHERE FLEXIBLE CONDUIT IS USED FROM OUTLET BOXES TO LIGHTING FIXTURES, USE 1/2" INCH FLEXIBLE METAL CONDUIT WITH AN APPROVED GROUNDING CONDUCTOR. MC CABLE WITH APPROVED GROUNDING CONDUCTOR IS ALLOWED.

E. QUANTITY OF CONDUCTORS IN CONDUIT, PER NEC.

F. REAM AND CLEAN CONDUIT BEFORE INSTALLATION AND PLUG OPENINGS AND BOXES TO KEEP THEM CLEAN DURING CONSTRUCTION.

G. ALL EXPOSED CONDUIT SHALL RUN NEATLY AT RIGHT ANGLES, PLUMB AND PARALLEL TO WALLS. ALIGN CONDUIT TERMINATIONS AT PANELBOARDS, SWITCHBOARDS, JUNCTION BOXES, ETC., AND INSTALL PLUMB. PROVIDE SUPPORTS AS REQUIRED TO HOLD ALIGNMENT.

H. CONDUITS SHALL BE NEATLY GROUPED WHERE SEVERAL LINES FOLLOW A PARALLEL COURSE. THEY SHALL BE WALL SUPPORTED, USING RING OR TRAPEZE-TYPE HANGERS. PERFORATED STRAP HANGERS OR TWISTED WIRE SHALL NOT BE ACCEPTED. HANGERS SHALL BE INSTALLED ON ALL CONDUIT RUNS AND SHALL NOT EXCEED 8'-0" ON CENTER.

SECTION 26 05 21 - WIRES AND CABLES (0-1000V)

1.01 GENERAL

A. ALL WIRES SHALL BE SOFT DRAWN, ANNEALED COPPER HAVING CONDUCTIVITY NOT LESS THAN 98% OF PURE COPPER AND WITH 600V THERMO-PLASTIC INSULATION. WIRE SHALL CONFORM TO THE LATEST REQUIREMENT OF THE NEC, MEET ASME AND ANSI SPECIFICATIONS AND SHALL BE STANDARD AWG SIZE.

2.01 PRODUCTS

A. LIGHTING AND RECEPTACLE, BRANCH MOTOR POWER AND PANEL FEEDERS CIRCUITS SHALL HAVE TYPE THHN/THWN/MTW INSULATION BUILDING WIRE (UNLESS OTHERWISE REQUIRED). ALL CONDUCTORS INSTALLED IN DAMP OR WET LOCATIONS OR UNDER GRADE SHALL HAVE INSULATION MEETING NEC. ALL WIRING INSTALLED IN HIGH-TEMPERATURE AREAS SHALL HAVE INSULATION RATED FOR THE AMBIENT TEMPERATURE.

B. ALL STRANDED CONDUCTORS SHALL BE FURNISHED WITH FINISHED FORGED COPPER CONNECTING LUGS, DRILLED OR REAMED THE FULL DIAMETER OF BASE CONDUCTORS.

C. ALL MAINS AND FEEDERS ARE TO RUN THE ENTIRE LENGTH IN CONTINUOUS LENGTHS WITHOUT JOINTS OR SPLICES. JOINTS IN BRANCH CIRCUITS SHALL OCCUR ONLY AT OUTLETS AND J BOXES WITH NO SPLICES OR TAPS IN CONDUITS.

D. PHASE COLORS PER ELECTRICAL STANDARDS.

E. MC CABLES PERMITTED AS ALLOWED BY LOCAL CODE AND 6 FEET OR LESS IN LENGTH MAY BE USED FOR TERMINATING LIGHTING FIXTURES IN SUSPENDED CEILINGS AND WHERE FISHED BETWEEN ACCESS POINTS THROUGH CONCEALED SPACES IN FINISHED BUILDINGS OR STRUCTURES AND SUPPORTING IS IMPRACTICAL.

SECTION 26 05 32 - OUTLET BOXES, CONDUIT BOXES AND FITTINGS

1.01 GENERAL

A. SIZE ALL BOXES IN ACCORDANCE WITH NEC 314.16.

2.01 PRODUCTS

A. INTERIOR
1. LIGHTING OUTLETS SHALL BE STANDARD 4-INCH OUTLET BOXES PROVIDED WITH 3/8" MALLEABLE IRON FIXTURE STUDS AND BOX HANGERS WHERE REQUIRED.

2. SWITCH AND RECEPTACLE OUTLETS LOCATED IN WALLS SHALL BE STANDARD SINGLE OR GANGED 4-INCH BOXES WITH COVERS AS REQUIRED FOR CONCEALED WORK.

B. EXTERIOR:

1. LIGHTING OUTLETS SHALL BE WEATHERPROOF DIE-CAST ALUMINUM ROUND BOXES.

2. SWITCH AND RECEPTACLE OUTLETS SURFACE-MOUNTED SHALL BE TYPES FS AND FD

C. BOXES SHALL BE MANUFACTURED BY APPLETON ELECTRIC CO., UNIVERSAL, RACO, NATIONAL ELECTRIC PRODUCTS, CROUSE-HINDS OR STEEL CITY.

SECTION 26 05 31 - SPLITTERS, JUNCTION BOXES, PULL BOXES AND CABINETS

1.01 GENERAL

A. SIZE PER NEC 314.16 FOR CONDUCTORS SMALLER THAN #4AWG, OR PER NEC 314.28 FOR CONDUCTORS #4AWG AND LARGER.
B. BOXES SHALL HAVE REMOVABLE SCREW COVERS FOR INSTALLATION AS INDICATED ON THE PLANS.

2.01 PRODUCTS

A. ABOVE-GRADE: GALVANIZED STEEL APPLETON , UNIVERSAL, RACO, NATIONAL ELECTRIC PRODUCTS, OR STEEL CITY.
B. IN-GRADE: CONCRETE OR COMPOSITE POLYMER, OLD CASTLE, CROUSE-HINDS

3.01 INSTALLATION

A. ABOVE-GRADE: BOX SHALL BE SECURELY MOUNTED WITH SUPPORTS INDEPENDENT OF THE CONDUITS ENTERING OR LEAVING THE BOXES.
B. IN-GRADE: SEE PLAN DETAILS

SECTION 26 27 26 - WIRING DEVICES

1.01 GENERAL

A. PROVIDE EACH SWITCH AND RECEPTACLE OUTLET UNLESS OTHERWISE NOTED OR HEREIN SPECIFIED WITH UNDERWRITER'S APPROVED SPECIFICATION GRADE DEVICES AS LISTED BELOW:

2.01 PRODUCTS

CATALOG NUMBERS ARE HUBBELL WIRING CO., UNLESS NOTED OTHERWISE.

A. WALL SWITCHES; 120/277V, 20A — PART #
ROCKER SWITCH — SNAP2121 (SPST); SNAP2123 (3-WAY)
SLIDING DIMMER SWITCH, 1000W — AS103

B. RECEPTACLES (5-20R) — PART #
DUPLEX 125V/20A — HBL5352
CONTROLLED DUPLEX — BR20C1 OR BR20C2 OR AS INDICATED IN PLANS
GFCI DUPLEX 125V/20A — GFR5362G

C. DEVICE PLATES: ALL SWITCHES AND RECEPTACLES SHALL BE EQUIPPED WITH SMOOTH NYLON PLATES. WHERE UNITS ARE GROUPED TOGETHER, THEY SHALL BE UNDER ONE COMMON PLATE. COLOR PER ARCHITECTURAL SPECIFICATIONS. PLATES SHALL BE STAINLESS STEEL IN ALL KITCHEN AREAS OF RESTAURANTS, MECHANICAL ROOMS, AND AREAS SUBJECT TO DAMAGE.

D. THE ABOVE SPECIFIED DEVICES ARE HUBBELL AND CONSTITUTE THE QUALITY AND TYPE OF DEVICES. COMPARABLE DEVICES AS MANUFACTURED BY P & S, WOODHEAD, & ARROW HART WILL BE ACCEPTABLE.

3.01 INSTALLATION

A. MOUNT SWITCHES 48" ABOVE FLOOR TO CENTERLINE OF BOX UNLESS OTHERWISE NOTED

B. COORDINATE SWITCH MOUNTING LOCATION WITH DETAILS.

C. MOUNT WALL RECEPTACLES 12" ABOVE FLOOR UNLESS OTHERWISE NOTED.

SECTION 26 28 23 - DISCONNECT SWITCHES - FUSED AND NON-FUSED

1.01 GENERAL

PROVIDE AND INSTALL ALL CIRCUIT DISCONNECT SWITCHES AS INDICATED ON PLANS AND SPECIFIED HEREIN.

2.01 PRODUCTS

A. DISCONNECT SWITCHES SHALL BE TYPE H.D. HEAVY DUTY, QUICK-MAKE QUICK-BREAK HORSEPOWER RATED, AND IN NEMA 1 ENCLOSURE UNLESS OTHERWISE NOTED. UNITS IN OUTDOOR LOCATIONS SHALL BE NEMA 3R ENCLOSURES UNLESS OTHERWISE NOTED.

B. UNITS SHALL HAVE VISIBLE CIRCUIT CONDITION IDENTIFICATION AND SHALL BE COVER INTERLOCKED. PROVISIONS SHALL BE MADE FOR PADLOCKING THE HANDLE IN THE "OFF" OR "ON" POSITION.

C. ALL FUSED UNITS SHALL BE EQUIPPED WITH FUSETRON CARTRIDGE FUSES AS MANUFACTURED BY BUSSMAN MANUFACTURING.

D. ALL SWITCHES THROUGHOUT SHALL BE OF THE SAME MANUFACTURER AND SHALL HAVE U.L. LABEL. UNITS SHALL BE AS MANUFACTURED BY GENERAL ELECTRIC, SQUARE D, EATON OR SIEMENS.

SECTION 26 24 01 - SERVICE EQUIPMENT (TEMPORARY)

1.01 GENERAL

A. CONTRACTOR SHALL HAVE RESPONSIBILITY FOR THE BASIC TEMPORARY WIRING, ALONG WITH MAINTENANCE THROUGHOUT THE DURATION OF THE PROJECT. BASIC TEMPORARY WIRING SHALL INCLUDE LIGHTING, POWER AND WIRING REQUIREMENTS FOR TEMPORARY CONSTRUCTION USE. IT IS NOT TO FORGEE ALL THE USAGE FOR TEMPORARY; HENCE, ONLY THE BASIC ITEMS SHOULD BE INVOLVED AND IF ADDITIONAL POWER OR LIGHTING IS REQUIRED, THEN THOSE REQUIRING SAME SHALL MAKE PROVISIONS FOR TEMPORARY LIGHTING AS REQUIRED TO PERFORM THEIR OWN WORK.

2.01