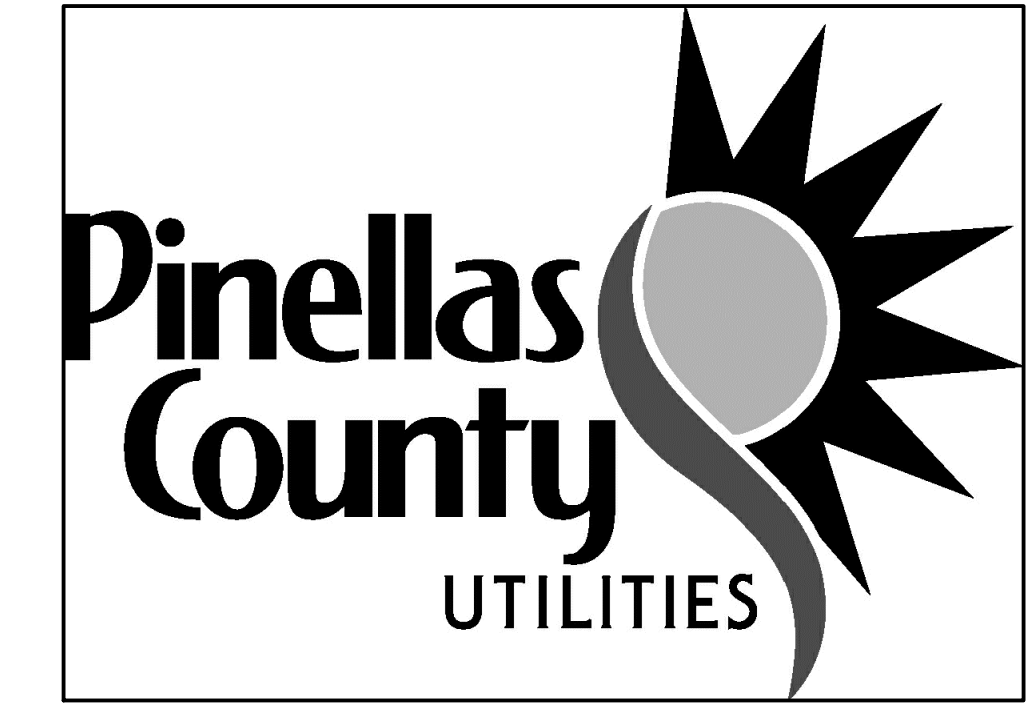
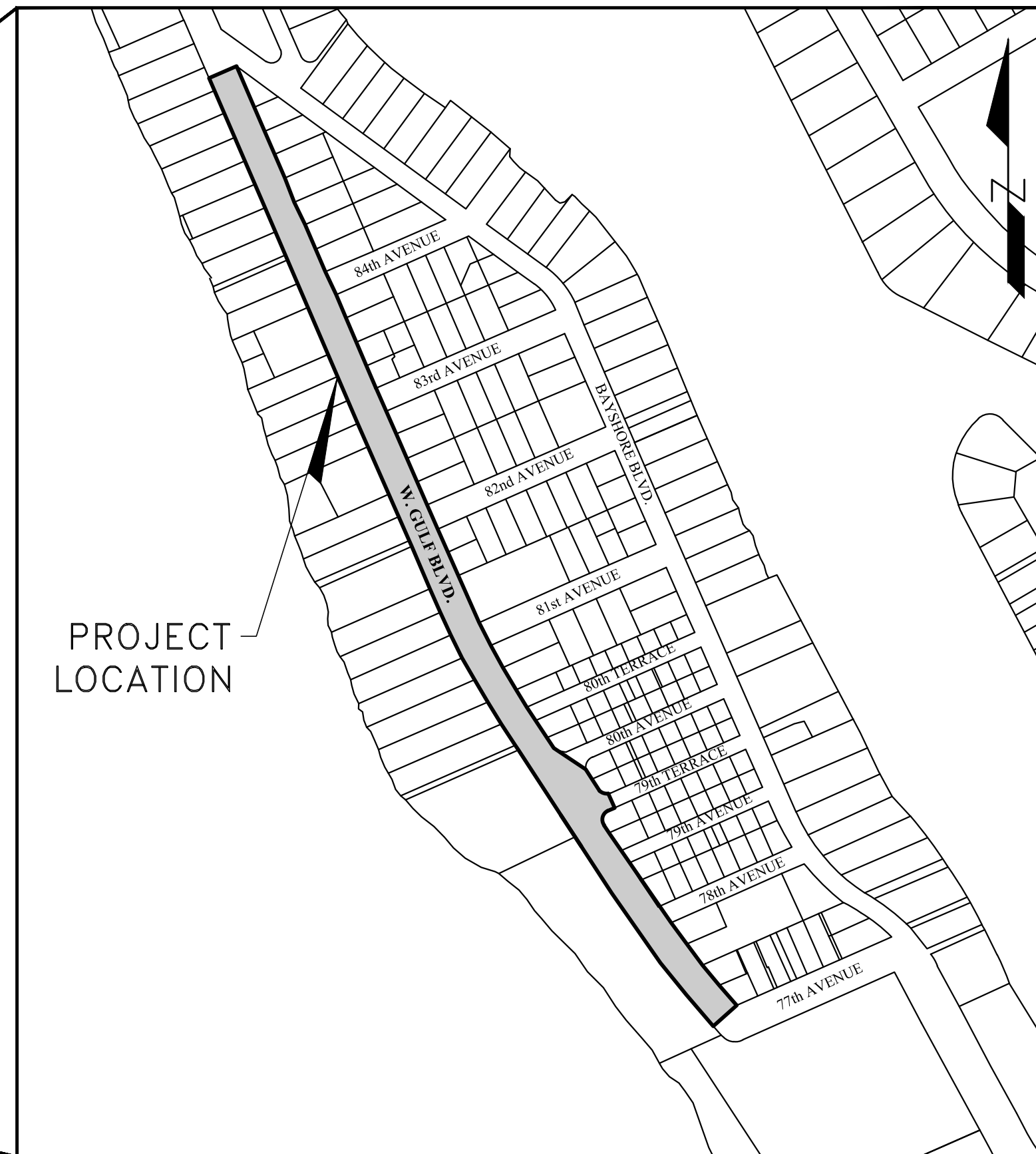
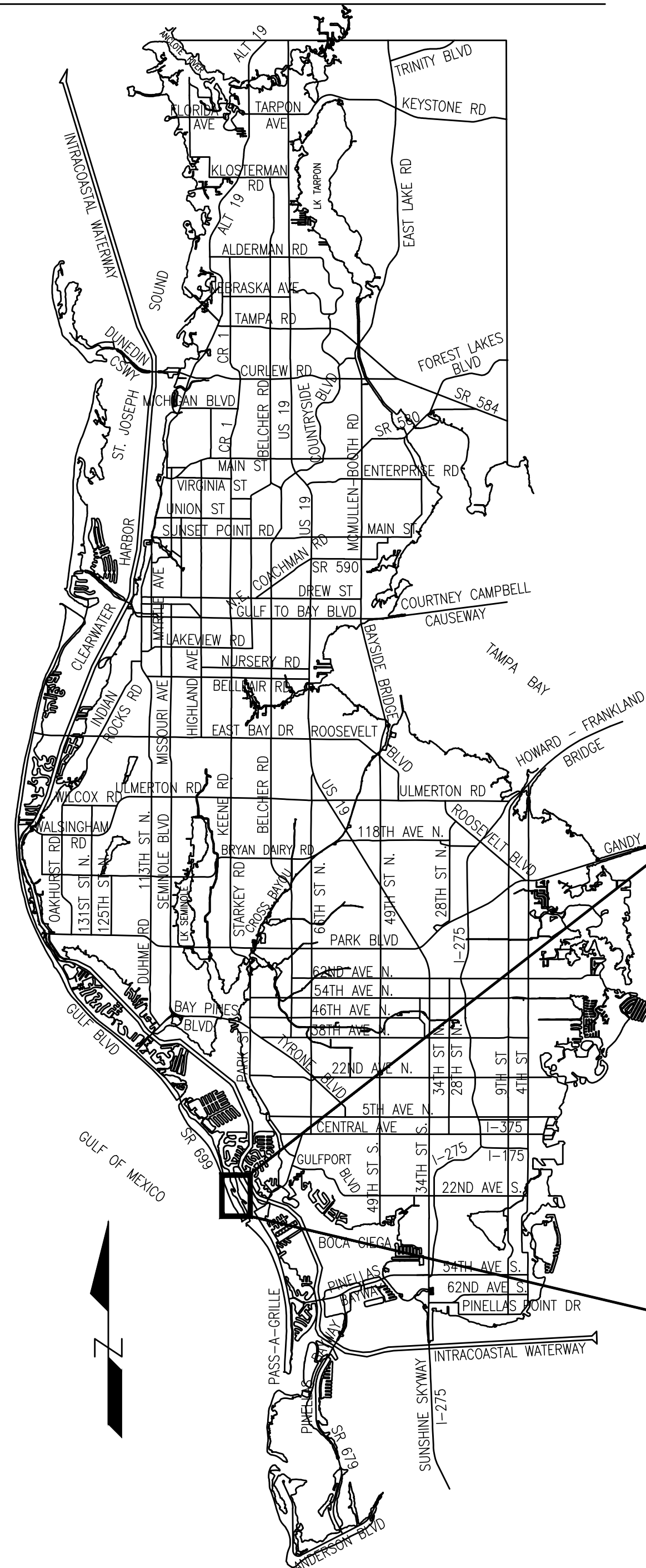


CITY OF TREASURE ISLAND IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674) PINELLAS COUNTY UTILITY ADJUSTMENTS



PINELLAS COUNTY
LOCATION MAP



SECTION 36, TOWNSHIP 31 SOUTH, RANGE 15 EAST

KEY MAP
NOT TO SCALE

SHEET NO.	INDEX OF PLANS SHEET TITLE
01	COVER SHEET
02	CONTROL PLAN & GENERAL NOTES
03-06	PLAN & PROFILE
07-16	TECHNICAL SPECIFICATIONS
17-18	GENERAL DETAILS

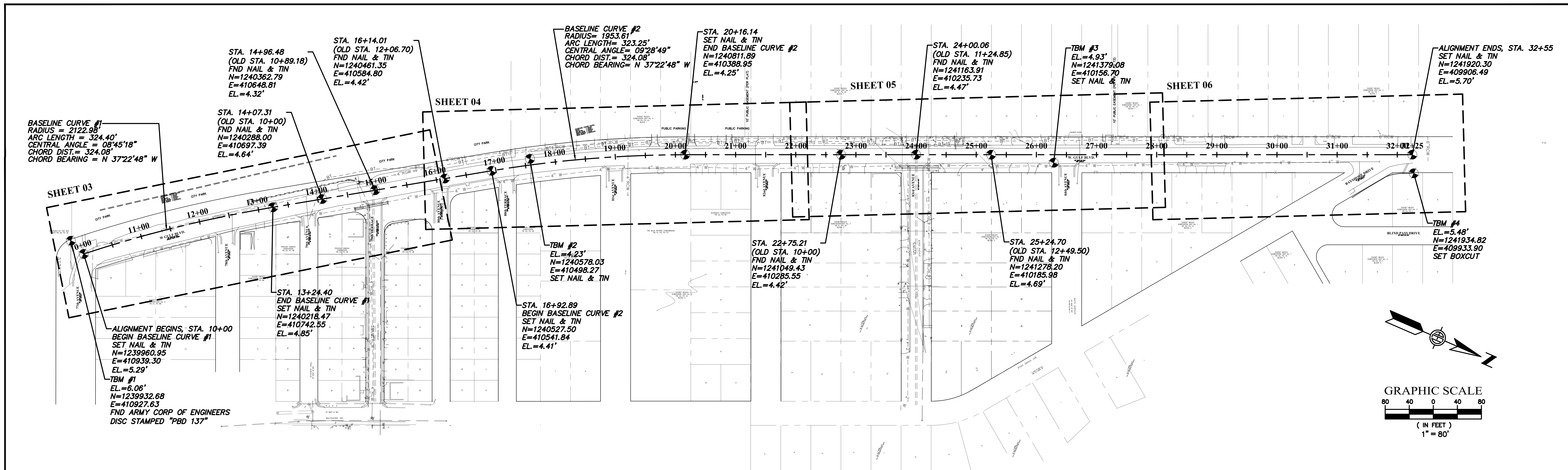
PROJECT MANAGER:
GUILLERMO BAY, E.I., PROJECT COORDINATOR

PINELLAS COUNTY
14 SOUTH FORT HARRISON AVENUE
CLEARWATER, FLORIDA 33756
PHONE: (727)464-4220

PREPARED BY:
ADVANCED
ENGINEERING & DESIGN, INC.
CIVIL • MUNICIPAL • SITE DESIGN • PERMITTING • PLANNING
3931 68TH AVENUE NORTH • PINELLAS PARK, FL 33781 • Phone: 727.526.9158 • Fax: 727.527.9683

WILLIAM G. REIDY, P.E. No. 35605 DATE
ENGINEER OF RECORD

\\AED-SERVER\Shared_Folders\CADD\Municipal\Pinellas County\17-PC-07 (T) Sunset Beach Phase VI WM Design\Cadd\Current\PC-07_C2.dwg, Nov 14, 2017 - 8:30am



CONTROL PLAN (W. GULF BLVD.)

SURVEY NOTES:

- DESCRIPTION**
- A PORTION OF SECTION 36, TOWNSHIP 31 SOUTH, RANGE 15 EAST, PINELLAS COUNTY, FLORIDA.
- SURVEYOR'S REPORT:**
1. SURVEY CREW: DAN McINTURFF, DINO SPENDL.
 2. NO UNDERGROUND INSTALLATIONS OR IMPROVEMENTS HAVE BEEN LOCATED EXCEPT AS SHOWN.
 3. NO INSTRUMENTS OF RECORD REFLECTING EASEMENTS, RIGHT OF WAY AND/OR OWNERSHIP WERE FURNISHED TO THIS SURVEYOR EXCEPT AS SHOWN.
 4. THIS SURVEY DOES NOT REFLECT OR DETERMINE OWNERSHIP.
 5. USE OF THIS SURVEY BY ANYONE OTHER THAN THOSE PREPARED FOR WILL BE THE RE-USERS SOLE RISK WITHOUT LIABILITY TO THE SURVEYOR.
 6. THERE MAY BE ITEMS DRAWN OUT OF SCALE TO GRAPHICALLY SHOW THEIR LOCATION.
 7. THE SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A CURRENT TITLE COMMITMENT AND IS SUBJECT TO EASEMENTS, RIGHTS-OF-WAY AND SIMILAR MATTERS OF TITLE.
 8. NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.
 9. THE HORIZONTAL DATUM WAS BASED ON STATE PLANE VALUES ARE TIED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM (GRID), WEST ZONE NORTH AMERICAN DATUM 1983-1991, ADJUSTMENT 1990, AND WERE DERIVED FROM COORDINATES PROVIDED BY THE CLIENT.
 10. HORIZONTAL CONTROL POINT No.1: FOP 3/4", N=1241321.12, E=410658.22
 11. HORIZONTAL CONTROL POINT No.2: FCIR 5/8" PLS 2550", N=1241405.45, E=410615.01
 12. ELEVATIONS SHOWN HEREON ARE IN FEET AND REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988. (N.A.V.D.) BENCHMARKS USED WERE PROVIDED BY CLIENT.
 13. REFERENCE BENCHMARK No.1: FOUND NAIL & DISK STAMPED "TRAV PT. SSMC" ELEVATION = 3.31"
 14. REFERENCE BENCHMARK No.2: FOUND NAIL & DISK STAMPED "TRAV PT. SSMC" ELEVATION = 2.66"
 15. THIS SURVEY IS FOR TOPOGRAPHIC PURPOSES AND IS NOT A BOUNDARY SURVEY.
 16. SURVEY DATE: JULY 29, 2016.

GENERAL NOTES:

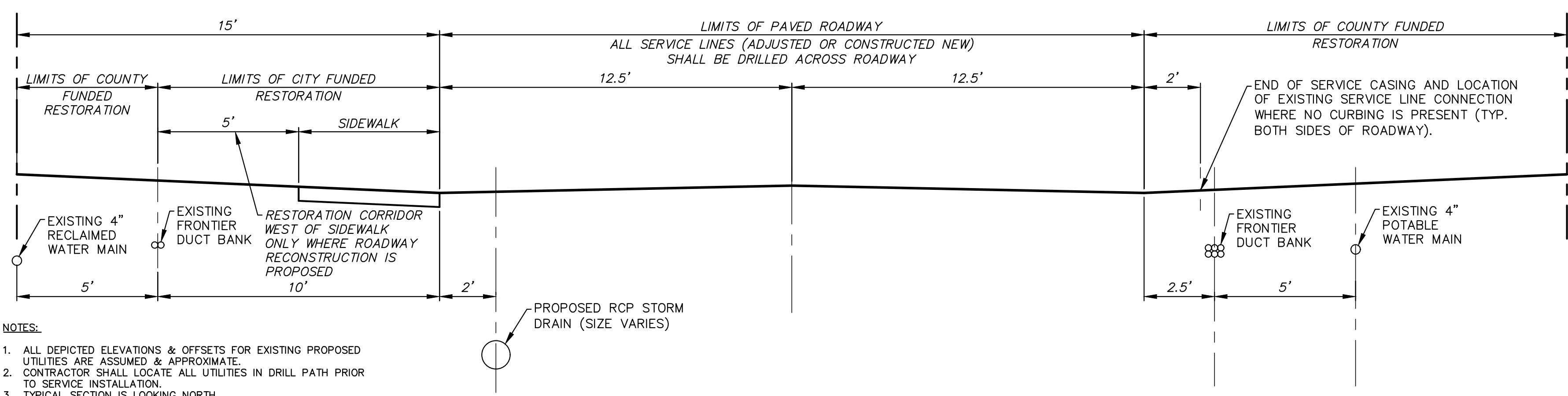
1. ALL DUCTILE IRON PIPING SHALL BE POLY WRAPPED.
2. THE CONTRACTOR SHALL EITHER BILL UNDER THE "ADJUST" OR "CONSTRUCT NEW" SERVICE PAY ITEMS. PAYMENT SHALL BE NOT BE PROVIDED UNDER BOTH ITEMS FOR A SINGLE SERVICE. CASING PIPE SHALL BE INCLUDED IN EITHER PAY ITEM.
3. SERVICE ADJUSTMENT SHALL RESULT IN NEW SERVICE INSTALLATION (INCLUDING CASING) FROM PARKWAY TO PARKWAY. CONNECTIONS TO EXISTING SERVICES SHALL BE MADE USING A PAK-JOINT TYPE COUPLING. COUPLING SHALL BE INSTALLED BEHIND THE CURBED LIMITS OF THE ROADWAY. THE CONTRACTOR SHALL PROTECT CURBING DURING ALL SERVICE ADJUSTMENT/CONSTRUCTION ACTIVITIES.
4. THE CONTRACTOR SHALL REFERENCE THE MEASUREMENT & PAYMENT SECTION FOR CLARIFICATION ON SPECIFIC ITEMS AND APPURTENANCES INCLUDED IN THE "ADJUST POTABLE/RECLAIMED WATER MAIN" PAY ITEMS.
5. THE CONTRACTOR SHALL ONLY ADJUST/CONSTRUCT SERVICES IF IN DIRECT CONFLICT WITH THE PROPOSED STORMWATER PIPING OR ROADWAY RECONSTRUCTION. PHYSICAL VERTICAL AND/OR HORIZONTAL ADJUSTMENT OF THE SERVICE IN PLACE SHALL FIRST BE ATTEMPTED PRIOR TO CONSTRUCTION OF SERVICE TUBING. PAYMENT WILL NOT BE PROVIDED FOR IN PLACE ADJUSTMENTS PERFORMED BY THE CONTRACTOR.
6. IT IS BELIEVED THAT ALL EXISTING POTABLE AND RECLAIMED WATER SERVICES HAVE CASINGS.
7. VALVE BOX LIDS SHALL BE PAINTED. SURFACE SHALL BE CLEANED PRIOR TO PAINTING. APPLICATION SHALL BE IN STRICT CONFORMANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND THE FOLLOWING COATS SHALL BE APPLIED: PRIMER - TNEMC SYSTEM SERIES 66; INTERMEDIATE COAT - SERIES 66; FINISH COAT - SERIES 73. COLOR SHALL BE SAFETY BLUE.
8. IT SHALL BE NOTED THAT REVERSE DEADMAN ARE REQUIRED AT THE CONNECTION POINTS FOR THE RESTRAINING OF EXISTING PIPING BUT NOT SPECIFICALLY DEPICTED ON THE PLANS (FOR CLARITY).
9. THE CONTRACTOR SHALL NOTIFY THE COUNTY WHEN POTABLE AND/OR RECLAIMED WATER METERS REQUIRE RELOCATION TO FACILITATE THE STORMWATER IMPROVEMENTS. METER RELOCATIONS SHALL BE PERFORMED BY THE COUNTY. THE CONTRACTOR SHALL PROVIDE THE COUNTY WRITTEN NOTICE FOR ANY METER RELOCATION WORK A MINIMUM OF ONE (1) WEEK BEFORE THE WORK IS NEEDED.
10. WATER MAIN SHUTDOWNS SHALL BE LIMITED TO THREE (3) HOURS. THE CONTRACTOR SHALL NOTIFY RESIDENTS 48-HOURS IN ADVANCE OF ANY WATER SHUTDOWN THROUGH THE USE OF DOOR HANGERS. THE CONTRACTOR SHALL PROVIDE THE COUNTY WRITTEN NOTICE FOR ANY SHUTDOWN WORK A MINIMUM OF ONE (1) WEEK BEFORE THE WORK IS NEEDED.
11. CONTRACTOR SHALL KEEP CONSTRUCTION FOOTPRINT WEST OF THE WEST GULF BLVD. CENTERLINE.

SUE DATA TABLE								
VVH No.	Utility Description (Owner, Type)	Size (in.)	Material	Location Information		Existing Ground Elevation	Top of Utility Elevation (Approx.) (ft.)	
				Station	Offset LT. / RT.			
VVH01	FRONTIER BURIED TELEPHONE	6"	PVC	14+15.35	30.36	LT.	4.65'	2.22'
VVH02	PINELLAS COUNTY, RCW	4"	UNK	15+8.8	18.51"	LT.	4.41'	3.26'
VVH03	PINELLAS COUNTY, RCW	4"	PVC	16+21.83	29.79"	LT.	4.49'	0.65'
VVH04	PINELLAS COUNTY, RCW	4"	UNK	21+33.01	9.17"	LT.	3.94'	1.12'
VVH05	PINELLAS COUNTY, RCW	4"	UNK	26+71.87	10.38"	LT.	4.74'	3.29'

LEGEND:

////////// PIPE TO REMAIN IN PLACE/
PLACED OUT OF SERVICE

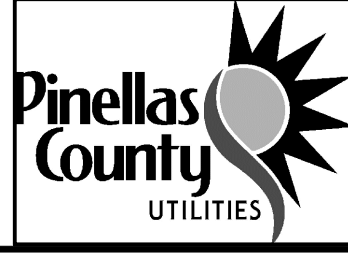
***** PIPE TO BE REMOVED



- NOTES:**
1. ALL DEPICTED ELEVATIONS & OFFSETS FOR EXISTING PROPOSED UTILITIES ARE ASSUMED & APPROXIMATE.
 2. CONTRACTOR SHALL LOCATE ALL UTILITIES IN DRILL PATH PRIOR TO SERVICE INSTALLATION.
 3. TYPICAL SECTION IS LOOKING NORTH.
 4. RESTORATION AREAS FOR SERVICE CONNECTIONS (TO EXISTING MAINS OR EXISTING SERVICES) SHALL BE LIMITED TO 5'x5'. CONCRETE DRIVEWAY RESTORATION SHALL ENTAIL WHOLE PANEL REMOVAL & REPLACEMENT.

POTABLE/RECLAIMED WATER SERVICE RESTORATION LIMITS

DESIGNED	J.V.K.		
DRAWN	S.A.T.		
CHECKED	W.G.R.		
REV. NO.	DATE	DESCRIPTION	REV. BY



PROJECT: **IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)**

DESCRIPTION: **CONTROL PLAN & GENERAL NOTES**

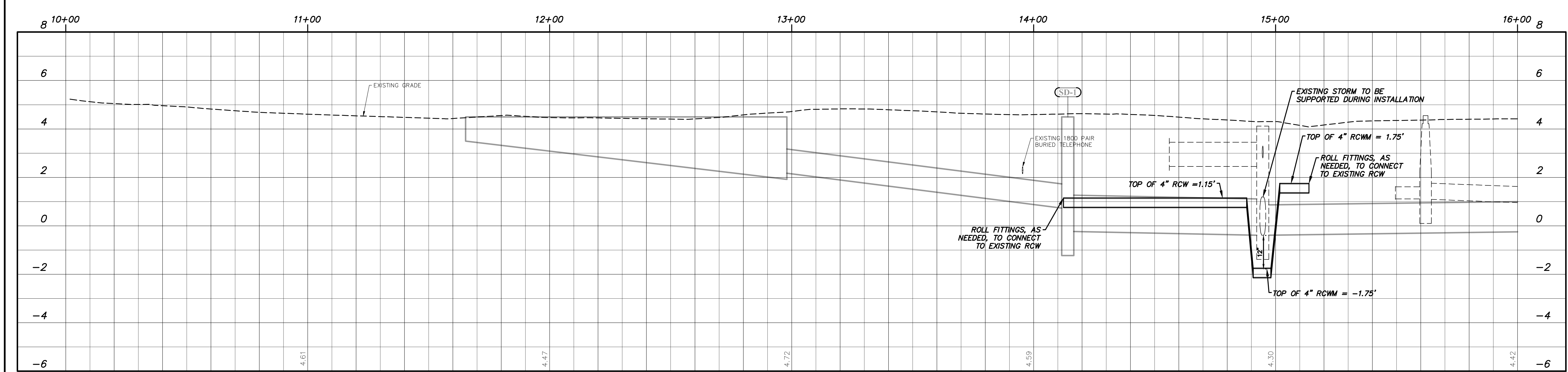
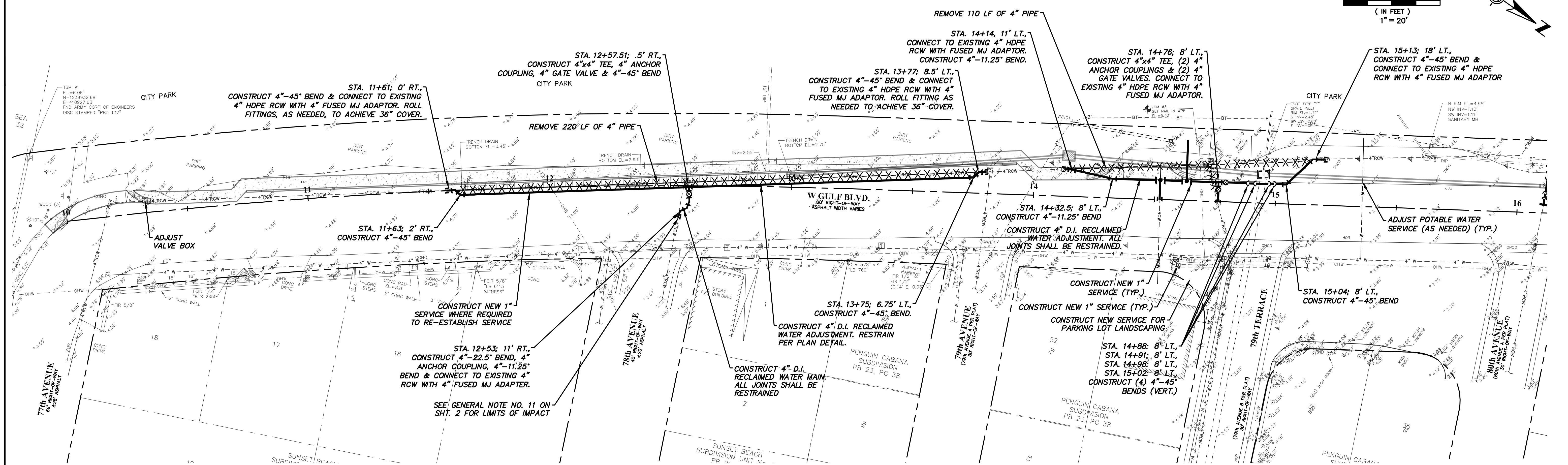
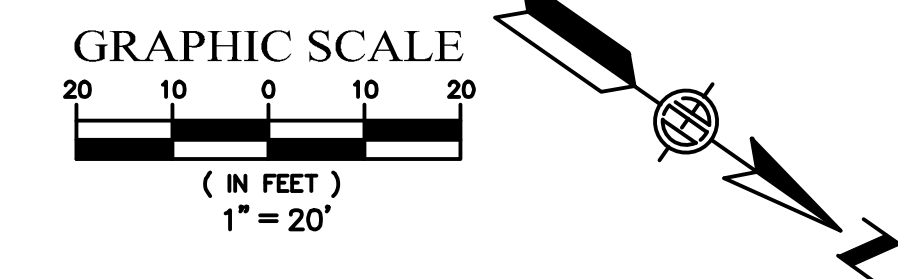
UTILITIES
14 S. FT. HARRISON AVE.,
CLEARWATER, FL 33756

APPROVED BY: **WILLIAM G. REIDY, P.E.**
FLA. LIC. NO 35605

DATE: **11/9/17**

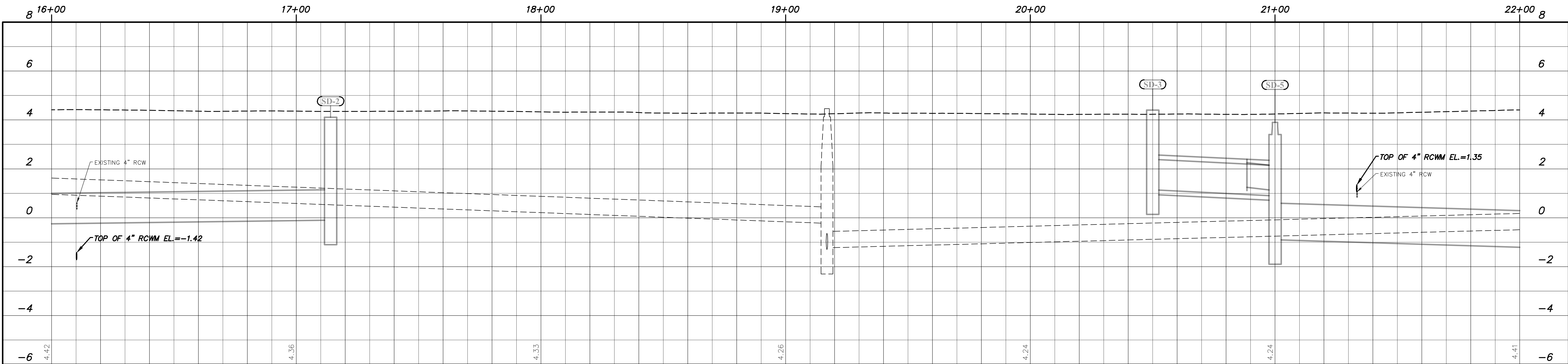
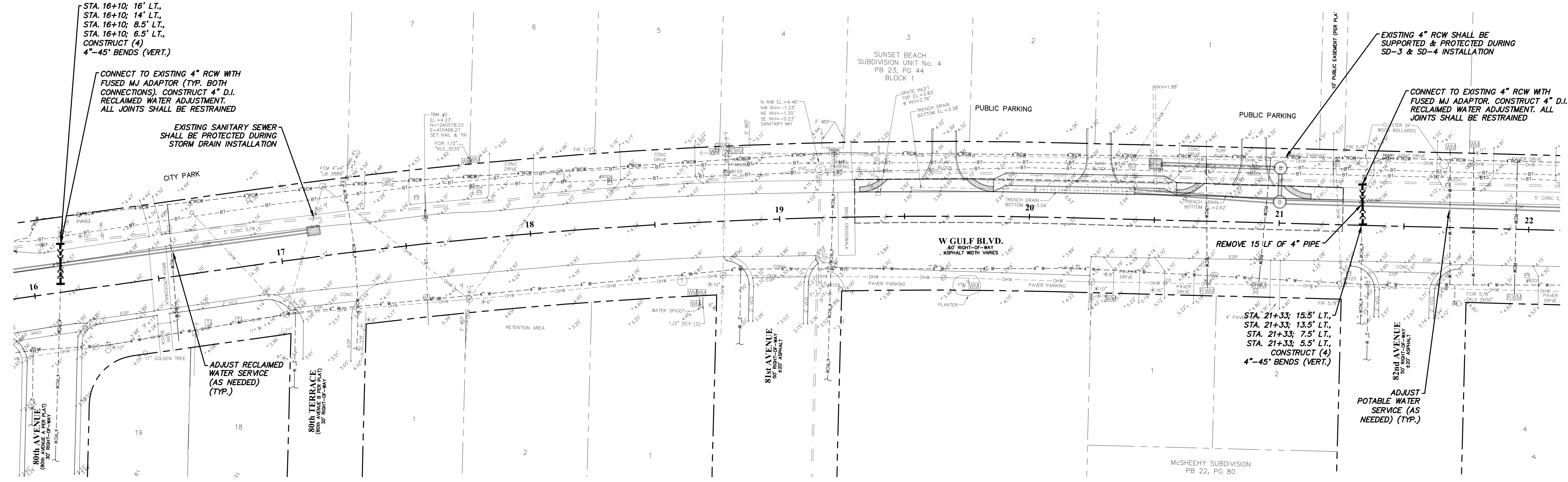
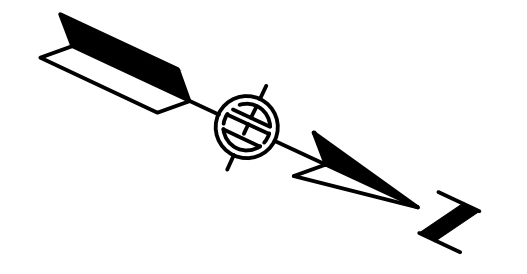
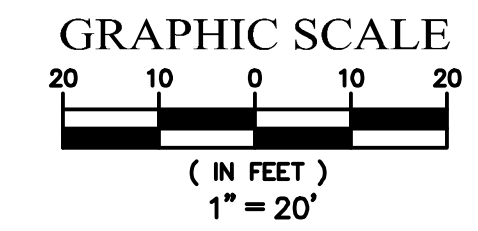
PROJECT NO. **17.PC-07**

SHEET: **2 OF 18**



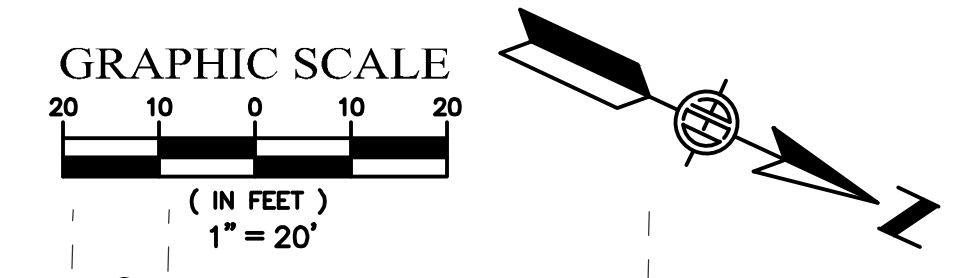
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DESIGNED	J.V.K.		PROJECT:	IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)	DESCRIPTION:	UTILITIES 14 S. FT. HARRISON AVE., CLEARWATER, FL 33756	APPROVED BY:	WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605	DATE:	11/3/17
DRAWN	S.A.T				PLAN & PROFILE				PROJECT NO.	17.PC-07
CHECKED	W.G.R.								SHEET:	3 OF 18
REV. NO.	DATE	DESCRIPTION	REV. BY	CHECKED						

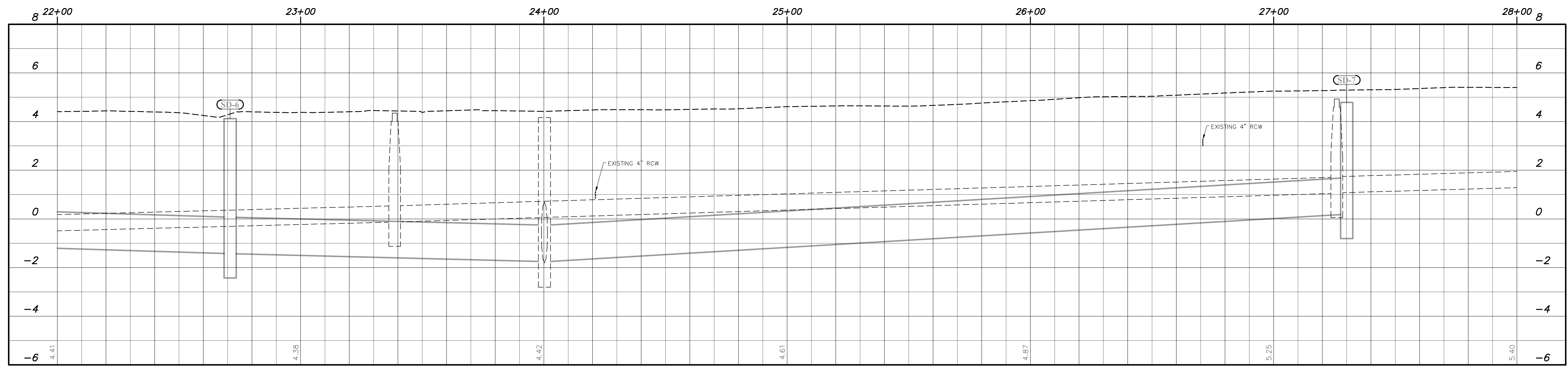
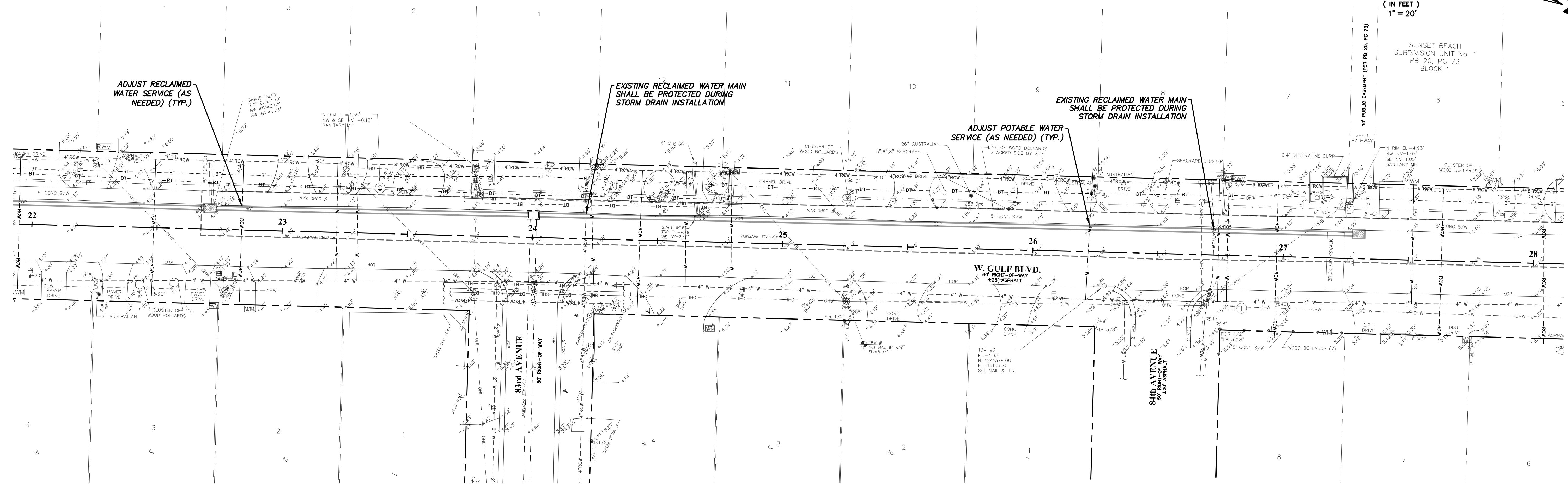


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DESIGNED	J.V.K.		PROJECT:	IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)	DESCRIPTION:	UTILITIES 14 S. FT. HARRISON AVE., CLEARWATER, FL 33756	APPROVED BY:	WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605	DATE	11/3/17
DRAWN	S.A.T				PLAN & PROFILE				PROJECT NO.	17.PC-07
CHECKED	W.G.R.								SHEET:	4 OF 18
REV. NO.	DATE	DESCRIPTION	REV. BY	CHECKED						



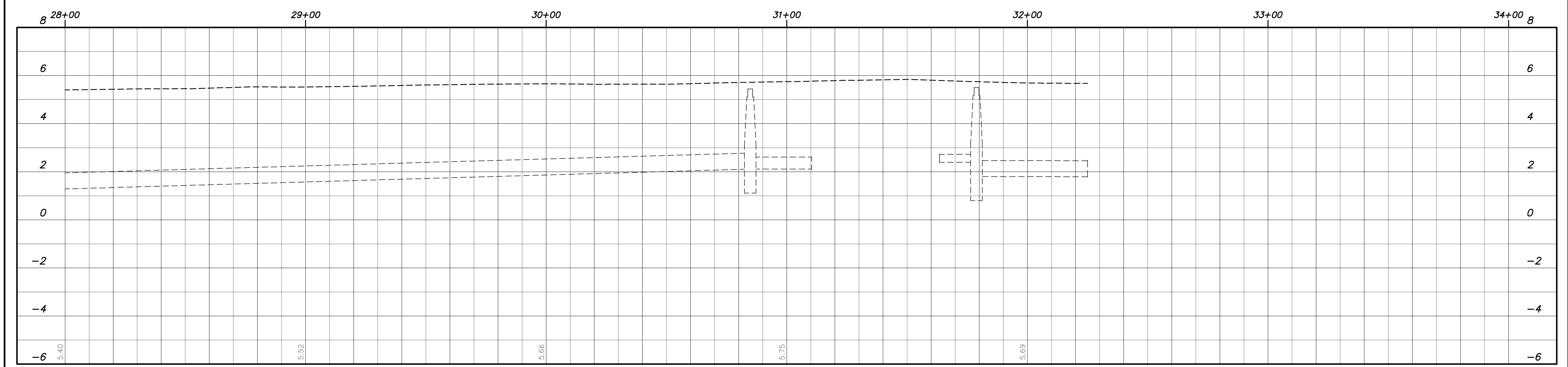
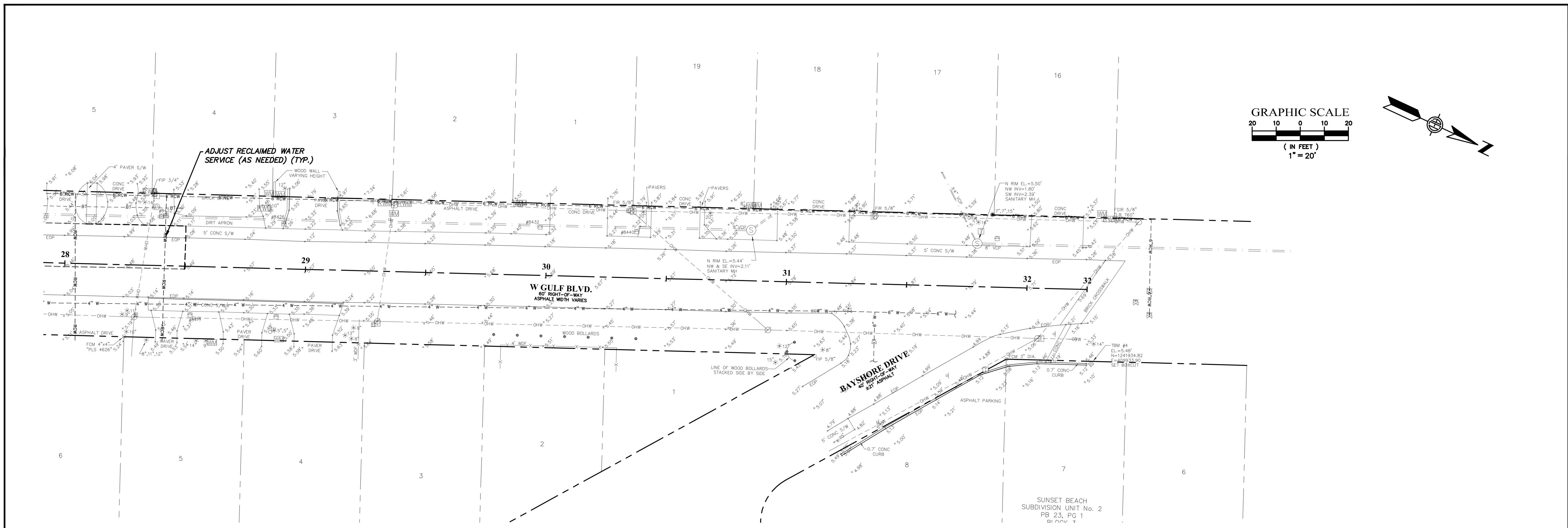
SUNSET BEACH
SUBDIVISION UNIT No. 1
PB 20, PG 73
BLOCK 1



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DESIGNED	J.V.K.		PROJECT:	IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)	DESCRIPTION:	UTILITIES 14 S. FT. HARRISON AVE., CLEARWATER, FL 33756	APPROVED BY:	WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605	DATE:	11/3/17
DRAWN	S.A.T			PLAN & PROFILE					PROJECT NO.	17.PC-07
CHECKED	W.G.R.								SHEET:	5 OF 18
REV. NO.	DATE	DESCRIPTION	REV. BY	CHECKED						

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DESIGNED	J.V.K.		PROJECT:	IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)	DESCRIPTION: PLAN & PROFILE	UTILITIES 14 S. FT. HARRISON AVE., CLEARWATER, FL 33756	APPROVED BY:	WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605	DATE	11/3/17		
DRAWN	S.A.T		REV. NO.	DATE			DESCRIPTION	REV. BY	CHECKED	W.G.R.	PROJECT NO.	17.PC-07
REV. NO.	DATE		DESCRIPTION	REV. BY			CHECKED	W.G.R.	SHEET:	6 OF 18		

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SECTION 01 35 00
SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.01 EXISTING UTILITIES

A. Where existing utility lines (water, gas, telephone, power, etc.) are intersected by proposed Work, the Contractor shall give a minimum of forty-eight (48) hours notice to the owners of such utilities to permit them to locate their lines prior to construction. The "Call Sunshine" Utility Notification Center shall be contacted at 1-800-432-4770 at least forty-eight (48) hours prior to start of excavation. Utilities, which are not members of the Utility Notification Center, shall be contacted individually by the Contractor.

1.02 REPAIRS

A. WORK SCHEDULE AND EMERGENCY RESPONSE TIME

1. Emergency response by the Contractor will be required within one hour of notice by telephone of required repair. The arrival of a repair crew will be required within two hours of the Contractor's assessment of the emergency situation.

2. The County will furnish the Contractor with the size, approximate depth and general location of the proposed repair. The Contractor shall be required to commence work on each assignment within ten (10) consecutive calendar days after the date contained in each written Notification to Proceed (unless such time is extended in writing by the County), and will be obligated to pursue the Work on each assignment with expeditious continuity until completion. The County may order the Contractor to proceed with the Work at a faster rate should a backlog of projects develop. In all cases, the Contractor will be required to begin restoration work within two working days and complete restoration work within ten (10) consecutive calendar days following approval of the repair by the Engineer. At the County's option, the maximum number of repairs assigned to the Contractor at one time may be a maximum of fifteen (15).

3. Each notification to proceed shall be accompanied by or preceded by two copies of the appropriate Atlas Sheet(s), plus other information including photographs (when available).

8/24/15 SPECIAL PROJECT PROCEDURES 01 35 00 - 1 PC-ST5

3. Water samples shall be taken, as special situations arise or as determined necessary by Utilities Water Quality Management, from the closest in line point downstream from the tap position. Samples shall be taken from this same point before and after the tap has been completed.

4. Open sample source and let water run for three to five minutes. Collect sample in an approved container, available from the Utilities lab, marking the container with the same location information as the coupon. Fill out the chain of custody sheet, also available from the Utilities lab, and deliver sample to the Utilities lab. The Utilities lab will send the sample off for analysis.

5. Disposal of the removed coupons shall follow procedures issued by Pinellas County Utilities, Solid Waste Department. Removed and bagged coupons shall be delivered to Utilities General Maintenance facility located at 6730 142nd Avenue N. Largo, where an authorized disposal barrel shall be located. The person delivering the coupon shall be required to sign a drop off log.

K. Additional Requirements for Tapping Concrete Pressure Pipe

1. Requirements for tapping concrete pipe shall be addressed on a case-by-case basis and specifications for such shall be included in the Special Provisions. Specifications shall be developed based on the pipe manufacturer's recommendations for the specific application.

2. All requirements shall be in accordance with the pipe manufacturer's and the tapping device manufacturer's recommendations.

PART 2 - PRODUCT (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

8/24/15 SPECIAL PROJECT PROCEDURES 01 35 00 - 5 PC-ST5

B. Field Layout

1. The County supplied Atlas Sheet, street address and other pertinent information will identify the general location of the repair. If there is evidence of the defect visible from the surface, such as a depression, the Contractor shall center his excavation on the evidence. If there is any question as to the general location described by the County, the Contractor shall approach the Engineer and address the questions before beginning with the excavation.

C. Restoration Schedule

1. All restoration work must be completed within ten (10) consecutive calendar days following approval of work at any given site. If the restoration work does not progress to the satisfaction of the Engineer, the Contractor may be directed to cease repair operations until such time as the Engineer may deem the restoration work completed to a degree permitting the resumption of repair work or the County may elect to perform any such restoration work and bill the Contractor for same. (At Engineer's discretion, payment shall be made by the Contractor direct to the County, or a like amount deducted by the County from monies due the Contractor for Work completed under this Contract).

3.03 POTABLE WATER, RECLAIMED WATER AND SANITARY SEWER SYSTEM CONSTRUCTION

A. Starting Project

1. The Contractor shall notify the Pinellas County Inspector and the Engineer FORTY-EIGHT (48) HOURS prior to starting construction (Saturday, Sunday and Holidays excluded). Upon notification, a meeting will be scheduled between the Pinellas County Inspector and the Contractor to review the plans.

B. Required Field Documents

1. The Contractor MUST have the following on the job site at all times and readily available prior to any construction:

a. The Pinellas County approved "Contractor's Copy" of construction plans stamped by the Florida Department of Environmental Protection (FDEP) or other permitting agency.

2. All required permits including:

8/24/15 SPECIAL PROJECT PROCEDURES 01 35 00 - 2 PC-ST5

SECTION 01 45 17
PIPELINE PRESSURE AND LEAKAGE TESTING REQUIREMENTS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall pressure and leakage test all pressure pipelines as specified herein. All piping, and equipment shall be tested in the field in the presence of the Engineer or the County's representative.

B. Prior to testing, all mains shall be flushed and pigged to remove all sand and other foreign matter. Flushing shall be terminated at the direction of the Engineer or County's representative. The Contractor shall dispose of the flushing water without causing a nuisance or property damage and in compliance with the National Pollution Discharge Elimination System (NPDES) and all applicable jurisdictions.

C. No testing shall be done until all joints are restrained. Temporary thrust blocks or reverse deadmen may be used with the County's prior approval.

1.02 SCHEDULING

A. All leakage testing, as defined herein, shall be completed by the Contractor under the supervision of the Pinellas County Utilities Inspector.

B. All leakage tests must be scheduled through the Pinellas County Utilities Inspector, with twenty-four (24) hours minimum notice and ONLY AFTER THE CONTRACTOR ACHIEVES A SUCCESSFUL PRE-PRESSURE TEST.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. All corporation stops used for testing and service lines shall be installed by the Contractor prior to pressure testing.

B. All hydrant control valves must be open while pressure testing.

C. All blow-off standpipes and injection points shall be removed upon satisfactory completion of sampling and testing. Corporation stops shall remain in line.

7/07/15 PIPELINE PRESSURE AND LEAKAGE TESTING REQUIREMENTS 01 45 17 - 1 PC-ST5

a. F.D.O.T.
b. County
c. Florida Department of Environmental Protection (FDEP)
d. City/Municipality

C. If field conditions require deviation from the approved plans, the Contractor shall notify the Project Engineer of the required change. The Project Engineer will make the necessary changes and submit a revised set of plans to the appropriate agency or agencies for approval.

D. All construction is subject to inspection and certain tasks require that the Pinellas County Inspector be on the site to properly document the procedure, test results and/or material used. On the occasions that the Pinellas County Inspector is required on site to observe these tasks, FORTY-EIGHT (48) hours advance notice will be required (Saturday, Sunday and Holidays excluded).

E. Should the Contractor suspend work on any given project, the Contractor shall provide written notification detailing the reason for the suspension to Pinellas County within two business days. Additionally, forty-eight (48) hours advance, written notice will be required for a restart of the project.

F. Should any materials be installed or backfilled prior to inspection by the Pinellas County Inspector, the facilities are subject to uncovering, exposing and/or disassembly for inspection. It is preferred that all material expected to be required for the project be on site for initial material inspection prior to commencing the project. Material thus delivered to the job site will be protected and stored as to insure preservation of quality and fitness.

G. Meters shall not be installed on potable and reclaimed water systems until all cleanup work is completed and a final inspection has been made by the Pinellas County Utilities Inspector.

H. All projects requiring a or Florida Department of Environmental Protection Permit will not receive water service until the Pinellas County Utilities receives a SEALED copy of the Engineer's Certificate of Completion and Compliance (As-built plans, if applicable) and a Release Form from the Florida Department of Environmental Protection (FDEP). The following must also be provided, if applicable:

1. Deed and Agreement to Deed to pipelines and appurtenances as additions to Pinellas County Utilities.

2. Deed of Conveyance to pipelines

8/24/15 SPECIAL PROJECT PROCEDURES 01 35 00 - 3 PC-ST5

D. Teflon tape shall be used on all threaded joints to avoid contamination (No pipe dope allowed).

E. It is the Contractor's sole responsibility to place sample points where designated by the Pinellas County Health Department.

F. The Contractor shall backfill all pipe and thrust blocking before pressure testing unless the Engineer directs certain joints or connections left uncovered. Where thrust blocking is provided the pressure test shall not be made until at least five days after the thrust blocking has been installed. A high early strength concrete may be used to reduce this time.

G. Each valved section of pipe shall be slowly filled with water and a pump shall be hooked to the pipe in a manner satisfactory to the Engineer to supply the test pressure. The pump, pipe connection and all necessary apparatus shall be furnished by the Contractor.

H. While the system is being filled with water, air shall be carefully and completely exhausted. If permanent air vents are not located at all high points, the Contractor shall install corporation stops or fittings and valves at such points so the air can be expelled as the pipe system is slowly filled with water. Service shall be tested as part of the main pipeline.

3.02 PRESSURE TEST FOR DUCTILE IRON AND PVC PIPE

A. All newly laid pipe, including fitting and valves shall be pressure tested by the Contractor, in accordance with AWWA C600 and C605 to verify the integrity of the pipeline before the leakage test is scheduled with the County.

B. Test pressures and durations shall be as follows:

	Pressure (psi)	Duration (hrs)
1. Sewage force mains	150	2
2. Reclaimed water mains	150	2
3. Potable water mains	150	2
4. Fire mains	200	2

C. All exposed pipe, fittings, valves, joints and appurtenances shall be carefully examined during the open-trench test. Any cracked or defective pipe, fittings, valves or appurtenances discovered in consequence of this test shall be removed and replaced with acceptable material and the test shall be repeated to the satisfaction of the Engineer.

7/07/15 PIPELINE PRESSURE AND LEAKAGE TESTING REQUIREMENTS 01 45 17 - 2 PC-ST5

3. Release of Lien/Cost Statement

4. Easement

I. Taps

1. All taps on existing, in service, pressurized mains for development projects will normally be made by Pinellas County personnel. All taps for pressure testing and chlorination will be saddle taps, made by the Contractor.

2. The Pinellas County Inspector must be present when the Contractor is working on an existing, in service, pressurized main. The Contractor shall notify all Pinellas County customers (via doorknob hangers) forty-eight (48) hours in advance of any discontinuance of service associated with this work. UNDER NO CIRCUMSTANCES WILL THE CONTRACTOR PERFORM ANY TASK THAT INVOLVES AN EXISTING, IN SERVICE, PRESSURIZED MAIN WITHOUT THE PINELLAS COUNTY INSPECTOR PRESENT ON SITE.

3. On development projects, the Project Engineer and/or Contractor will be responsible for staking the location of taps after verifying that the field conditions will permit said location and obtaining concurrence of the Pinellas County Inspector. Following the inspector's field check of the tap location, the inspector will schedule the tap through Pinellas County providing all required paperwork is in order. The inspector will be notified of the day and time for the tap.

J. Additional Requirements for Tapping Asbestos Cement Pipe

1. All taps in asbestos cement (AC) pipe shall be made with the pipe under pressure using only a tap machine having a built-in flush valve and the flush valve must remain open during the entire procedure. All taps shall be made with the pipe in a wet condition. The pipe shall remain wet throughout the entire tapping process. Extreme care should be taken to prevent any cutting dust from becoming airborne and personal protective equipment should be worn as the condition warrants.

2. Coupons from the tapping procedure shall be placed in a "zip lock" type bag in the wet condition. The bag shall be marked with the address where the tap was made and kept for disposal.

8/24/15 SPECIAL PROJECT PROCEDURES 01 35 00 - 4 PC-ST5

3.03 LEAKAGE TEST FOR DUCTILE IRON AND PVC PIPE

A. A leakage test shall be conducted in the presence of the Engineer and County Inspector after the pressure test has been satisfactorily completed. The Contractor shall, as before, furnish all pumps, pipe connections and other items required to satisfactorily complete the leakage test. The leakage test shall have a duration of two hours at the pressure specified for the pressure test. No pipe installation will be accepted if the leakage is greater than that determined by the formula for mechanical and push-on joints per hour:

$$L = \frac{SDP^{1/2}}{148,000} \left(\frac{L}{S} \right) \left(\frac{D}{P} \right)$$

L = Allowable leakage [gph]
S = Length of pipe tested [feet]
D = Nominal diameter of pipe [inches]
P = Average pressure during test [psig]

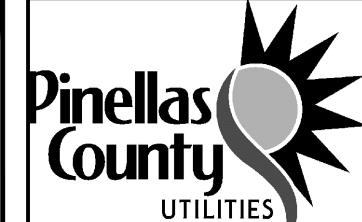
150 psi (per 1000ft.)
(Table 5.4 AWWA C 600-05 & Table 2 C605-5)

2	0.17
4	0.33
6	0.50
8	0.65
10	0.83
12	0.99
16	1.32
18	1.49
20	1.66
24	1.99
30	2.48
36	2.96
42	3.45
48	3.97
54	4.47

B. The Engineer, or his duly authorized representative, shall witness these tests. The Contractor shall be responsible for finding and repairing leaks. No additional cost may be incurred by the County due to repairs because of failure of either test. The Engineer has the authority to determine the number of repairs that will be made within a given length of pipe and has the right to request the Contractor to remove and relay a section of pipe if such does not comply with the established leakage rates as calculated using the formula above.

7/07/15 PIPELINE PRESSURE AND LEAKAGE TESTING REQUIREMENTS 01 45 17 - 3 PC-ST5

DESIGNED J.V.K.
DRAWN S.A.T.
CHECKED W.G.R.



PROJECT: IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)

DESCRIPTION: UTILITIES TECHNICAL SPECIFICATIONS

14 S. FT. HARRISON AVE., CLEARWATER, FL 33756

APPROVED BY: WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605

DATE: 4/3/17
PROJECT NO. 17.PC-07
SHEET: 7 OF 18

REV. NO. DATE DESCRIPTION

REV. BY

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1 C. For the duration of the test, the pressure in the main shall not be allowed
2 to drop more than 5 psi below the test pressure per AWWA C600 & C605.
3 Should the pressure drop 5 psi, makeup water shall be added to the line to
4 restore the pressure to the test pressure. This makeup water shall be
5 measured and shall be included in the total leakage measured. If loss is
6 greater than 5 psi, the test fails.
7
8
9
10 3.04 PRESSURE AND LEAKAGE TESTS OF UNDERGROUND HDPE PRESSURE
11 PIPING INCLUDING COMBINATIONS HDPE & PVC OR DUCTILE IRON
12
13 A. Filled pipelines shall be allowed to thermally stabilize such that the
14 temperature of the water and the pipe are equal. At temperatures above
15 one hundred (100) degrees F, the Engineer shall be consulted regarding
16 the need to reduce the test pressure.
17
18 B. The piping shall be tested between valved sections to a maximum length
19 of five thousand (5,000) feet.
20
21 C. For any test pressure from 1.0 to 1.5 times the system design pressure,
22 the total test time including initial pressurization, initial expansion, and time
23 at test pressure, shall not exceed eight hours. If the pressure test is not
24 completed due to leakage, equipment failure or other reason, the test
25 section shall be depressurized, and allowed to "relax" for at least eight
26 hours before bringing the test section up to test pressure again.
27
28 D. The test procedure consists of initial expansion, and the test phase:
29
30 1. During the initial expansion phase, the test section is pressurized to
31 10 psi above the test pressure (see Table A for Expansion
32 Pressure), and sufficient make-up water is added each hour for
33 three hours to return to the expansion phase pressure.
34
35 2. After the initial expansion phase, about four hours after
36 pressurization, the test phase begins.
37
38 3. During the test phase, the pipe is stabilized at the test pressure (see
39 Table A). The pressure shall remain steady within five percent of this
40 target value for two hours. If the pressure falls below five percent of
41 the test pressure (see Table A), leakage or insufficient expansion is
42 indicated, and the test shall be repeated after the pipe is allowed to
43 "relax" as indicated above. Make-up water is not allowed during the
44 test phase.
45
46

7/07/15 PIPELINE PRESSURE AND LEAKAGE TESTING REQUIREMENTS PC-ST5
01 45 17 - 4

1 3. Air release manhole (rim and bottom elevation and horizontal
2 location) i.e. ties to back of curb and nearest property corner or
3 permanent control point.
4 4. Detailed location of valves (horizontal), i.e., ties to back of curb
5 and nearest property corner or permanent control point.
6 5. Service connection locations for each designated meter.
7
8 B. All top of pipe elevations shall be accompanied by a finished grade
9 elevation at the same location.
10
11 C. Horizontal location of the pipe shall be defined using ties to back of curb
12 and nearest property corner, property line or permanent control point.
13
14 D. Should supplemental information be compiled or be available related to
15 the "As-Built" condition of the Project, the Contractor shall provide that
16 information, along with the "As-Built Record Drawing" documentation
17 outlined above, which is required under the terms of the contract. Such
18 supplemental information may include but not be limited to:
19
20 1. Length of pipe between fittings with depth every one hundred (100)
21 feet.
22 2. Elevation of top of pipe at grade changes.
23 3. Manufacturer of pipe.
24 4. Manufacturer, number of turns to open and depth of valves
25 5. Define location of transition point between differing pipe materials
26 6. Flow capacity of fire hydrants if such field information was obtained
27 during construction.
28
29 1.06 SPECIAL REQUIREMENTS FOR GRAVITY SEWER
30
31 A. In addition to that specified above, the following information shall be
32 provided on the Record Drawings:
33
34 1. Manhole rim and invert elevations (include pipe inverts).
35 2. Manhole horizontal location (i.e. ties to back of curb and nearest
36 property corner or permanent control point.)
37 3. Service laterals located from nearest down stream manhole
38 (indicate any laterals out of manholes).
39 4. Distance between manholes
40 5. Size and material of all pipe.
41
42 1.07 SPECIAL REQUIREMENTS FOR WASTEWATER PUMP STATIONS
43
44 A. In addition to that specified above, the following information shall be
45 provided on the Record Drawings:
46

7/07/15 PROJECT RECORD DOCUMENTS PC-ST5
01 78 39 - 3

1 Table A
2
3
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46

Pipe Class	Expansion Pressure	Test Pressure	5% Pressure Reduction
SDR 17	150 psi	140 psi	133 psi
SDR 13.5	170 psi	160 psi	152 psi
SDR 11	170 psi	160 psi	152 psi
SDR 9	210 psi	200 psi	190 psi

3.05 REPAIRS
A. The Contractor shall repair all leaks in the piping at no additional cost to the County.

END OF SECTION

7/07/15 PIPELINE PRESSURE AND LEAKAGE TESTING REQUIREMENTS PC-ST5
01 45 17 - 5

1 1. Location ties to back of curb and nearest property corner or
2 permanent control point.
3 2. Wet well invert elevations.
4 3. Pipe invert elevations.
5 4. Valve vault inverts.
6 5. Top of slab elevations.
7 6. "As Built" elevations of all construction elevations shown on the
8 Drawings.
9
10 1.08 SUBMITTAL
11
12 A. At Final Completion Date, deliver Record Documents to the Engineer.
13
14 B. Provide certified Record Drawings in electronic format (AutoCAD r14 or
15 later version) meeting Pinellas County Standards and one hardcopy
16 signed and sealed by a Florida registered surveyor and mapper.
17
18 C. Accompany submittal with transmittal letter in duplicate, containing:
19
20 1. Date.
21 2. Project title and number.
22 3. Contractor's name and address.
23 4. Title and number of each Record Document.
24 5. Signature of Contractor or his authorized representative.
25
26 PART 2 - PRODUCTS (Not Used)
27
28 PART 3 - EXECUTION (Not Used)
29

END OF SECTION

7/07/15 PROJECT RECORD DOCUMENTS PC-ST5
01 78 39 - 4

1 SECTION 01 78 39
2
3 PROJECT RECORD DOCUMENTS
4
5
6 PART 1 - GENERAL
7
8 1.01 REQUIREMENTS INCLUDED
9
10 A. Contractor shall maintain at the site one record copy of:
11
12 1. Drawings.
13 2. Specifications.
14 3. Addenda.
15 4. Change Orders and other modifications to the Contract.
16 5. Engineer's field orders or written instructions.
17 6. Approved shop drawings, working drawings and samples.
18 7. Field test records.
19 8. Construction photographs.
20 9. Detailed Progress Schedule.
21
22 1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES
23
24 A. Store documents and samples in Contractor's field office apart from
25 documents used for construction.
26
27 B. File documents and samples in accordance with CSI format.
28
29 C. Maintain documents in a clean, dry, legible, condition and in good order.
30 Do not use record documents for construction purposes.
31
32 D. Make documents and samples available at all times for review by the
33 Engineer and County.
34
35 E. As a prerequisite for monthly progress payments, the Contractor is to
36 exhibit the currently updated "record documents" for review by the
37 Engineer.
38
39 1.03 RECORDING
40
41 A. Label each document "PROJECT RECORD" in neat large printed letters.
42
43 B. Record information concurrently with construction progress. Do not
44 conceal any work until required information is recorded.
45
46 C. Drawings; Legibly mark to record actual construction:

7/07/15 PROJECT RECORD DOCUMENTS PC-ST5
01 78 39 - 1

1 SECTION 31 23 33
2
3 EXCAVATION AND BACKFILL FOR PIPES
4
5
6 PART 1 - GENERAL
7
8 1.01 SCOPE OF WORK
9
10 A. This work covers clearing and grubbing, site work, excavation, and backfill
11 for sanitary sewers, force mains, potable water mains, reclaimed water
12 mains and their appurtenances.
13
14 1.02. BURNING
15
16 A. Burning of debris will not be permitted.
17
18 1.03 CLEAN-UP
19
20 A. Clean-up is an essential part of the work. As the work progresses and is
21 completed, the Contractor shall clean the various sites of all operations and
22 completely restore all work areas to the satisfaction of the Engineer and the
23 County. This clean-up shall be done as promptly as practical and shall not
24 be left until the end of the construction period. No part of the work shall be
25 considered complete, and no payment will be made, until clean-up is
26 completed.
27
28 B. It is the Contractor's responsibility to assure that all construction sites and
29 all other affected properties are restored to a condition equal to, or better
30 than, the existing conditions prior to construction. All restoration is subject
31 to the approval of the Engineer and/or Property Owners.
32
33 1.04 DRAINAGE
34
35 A. It is the responsibility of the Contractor to maintain the existing drainage
36 systems during construction. Any damage done to an existing drainage
37 structure or system is to be immediately repaired to a condition equal to or
38 better than its original condition.
39
40 1.05 DUST CONTROL
41
42 A. It is the responsibility of the Contractor to control all dust problems that
43 may occur during the construction with required watering. Dust control will
44 be required seven days a week.
45
46

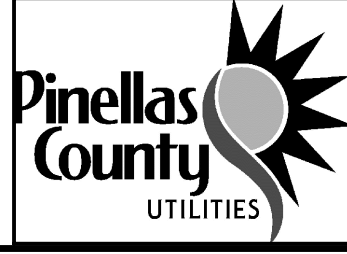
7/07/15 EXCAVATION AND BACKFILL FOR PIPES PC-ST5
31 23 33 - 1

1 1. Elevations of various structure elements in relation to grade.
2 2. All underground piping with elevations and dimensions. Changes in
3 piping location. Horizontal and vertical locations of underground
4 utilities and appurtenances, referenced to permanent surface
5 improvements. Actual installed pipe material, class, etc.
6 3. Location of internal utilities and appurtenances concealed in the
7 construction, referenced to visible and accessible features of the
8 structure.
9 4. Field changes of dimension and detail.
10 5. Changes made by Field Order or by Change Order.
11 6. Details not on original Contract Drawings.
12 7. Equipment and piping relocations.
13 8. Intersection details: At least three ties to every valve and fitting,
14 blowoff, fire hydrant and air release.
15 9. Services based on distance from main line pipe and property lines.
16 10. Backflow preventer assemblies locations, with ties to physical
17 features.
18
19 D. All horizontal locations, if not in the right-of-way, must relate to easement.
20
21 E. All elevations shall be in feet and tenths, referenced to NAVD 1988.
22
23 F. Specifications and Addenda; Legibly mark each Section to record:
24
25 1. Manufacturer, trade name, catalog number and supplier of each
26 product and item of equipment actually installed.
27 2. Changes made by Field Order or by Change Order.
28
29 1.04 SPECIAL REQUIREMENTS FOR MAIN REPAIRS
30
31 A. The Contractor will not be required to furnish as-built drawings for main
32 repairs, but shall be required to furnish a complete "bill of materials" used at
33 each repair, if requested by the County.
34
35 1.05 SPECIAL REQUIREMENTS FOR WATER MAINS, RECLAIMED WATER
36 MAINS AND FORCE MAINS
37
38 A. In addition to that specified above, the following information shall be
39 provided on the Record Drawings:
40
41 1. Location (vertical and any horizontal) at intervals not to exceed two
42 hundred (200) feet and at all locations where the direction changes
43 by more than ten (10) degrees.
44 2. Pipe size and material.
45
46

7/07/15 PROJECT RECORD DOCUMENTS PC-ST5
01 78 39 - 2

1 1.06 SPRINKLERS
2
3 A. The Contractor shall be responsible for sprinklers encountered within the
4 area of excavation and shall make sure that if disturbed or damaged, they
5 shall be rebuilt to the satisfaction of the Engineer or property Owner and
6 with no additional cost to the County.
7
8 1.07 EROSION CONTROL
9
10 A. It is the Contractor's responsibility to erect suitable silt fences, hay bales or
11 other erosion runoff control devices prior to commencement of earth moving
12 or excavation activities. The Contractor shall be responsible for maintaining
13 the silt fences, hay bales or other erosion runoff control devices in an
14 effective manner, repairing or replacing damaged or ineffective section
15 during the course of the work until a ground cover of grass is established
16 and final environmental approval has been obtained.
17
18 1.08 PERMITS FOR DEWATERING OPERATIONS
19
20 A. The Contractor is responsible for obtaining all permits required for
21 dewatering discharges, including a Florida Department of Environmental
22 Protection Generic Permit for Produced Groundwater.
23
24 PART 2 - PRODUCTS
25
26 2.01 MATERIALS
27
28 A. General
29
30 1. Materials for use as fill are described below. For each material, the
31 Contractor shall notify the testing lab of the source of the material at
32 least ten (10) calendar days prior to the date of anticipated use of
33 such material.
34
35 2. Materials shall be furnished as required from off site sources and
36 hauled to the site.
37
38 3. Disposal of unsuitable material is specified in this Section.
39
40 B. Common Fill
41
42 1. Common fill shall consist of mineral soil, free of organic material,
43 loam, wood, trash and other objectionable materials, which may be
44 compressible or which cannot be compacted properly. Common fill
45 shall not contain stones larger than four inches in any dimension,
46 broken concrete, masonry, rubble, or other similar materials. It

7/07/15 EXCAVATION AND BACKFILL FOR PIPES PC-ST5
31 23 33 - 2

DESIGNED	J.V.K.		PROJECT:	IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)	DESCRIPTION:	UTILITIES 14 S. FT. HARRISON AVE., CLEARWATER, FL 33756	APPROVED BY:	WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605	DATE:	4/3/17
DRAWN	S.A.T						DATE		PROJECT NO.	17.PC-07
CHECKED	W.G.R.								SHEET:	8 OF 18
REV. NO.	DATE	DESCRIPTION	REV. BY	CHECKED						

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1 shall have physical properties such that it can be readily spread
2 and compacted during filling.
3
4 2. Material falling within the above Specification, encountered during
5 the excavation, may be stored in segregated stockpiles for reuse.
6 All material, which in the opinion of the Engineer, is not suitable for
7 reuse shall be spoiled as specified herein for disposal of unsuitable
8 materials.
9
10 C. Crushed Stone
11
12 1. Crushed stone for pipe bedding shall be FDOT No. 57 in
13 accordance with Section 901-2 of the FDOT Standard
14 Specifications for Road and Bridge Construction.
15
16 D. Select Fill
17
18 1. Select fill shall be noncohesive, non-plastic material free of all
19 debris, lumps or clods. Fill material shall be clean earth fill
20 composed of sand or an approved mixture of clay and sand.
21 Backfill material placed within one foot of piping and appurtenances
22 shall not contain any stones or rocks larger than two inches in
23 diameter, or three-quarter inch in diameter for PVC pipe.
24
25 PART 3 - EXECUTION
26
27 3.01 SAFETY PRECAUTIONS AND TEMPORARY WORKS
28
29 A. The Contractor shall provide and maintain adequate barricades, construction
30 signs, torches, flashers and guards as required in pedestrian and vehicular
31 traffic areas. All safety rules and regulations of local authorities shall be
32 observed. Local fire officials shall be kept advised of roads closed and roads
33 re-opened.
34
35 B. Where required, the Contractor shall provide suitable crossings at street
36 intersections and driveways, and supply such aid, as may be required for
37 pedestrians and motorists, including delivery vehicles, to safely negotiate the
38 construction area. "Street Closed to Through Traffic" signs and "Detour"
39 routes shall be indicated and maintained by the Contractor when the job is
40 located in a public or private street or way. In the case of dead end streets,
41 the Contractor shall advise all concerned residents and make all
42 arrangements to maintain reasonable ingress and egress for the residents.
43 Particular attention shall be given to residents in bad health, emergencies
44 and emergency vehicles. The Contractor shall be responsible for building
45 and maintaining all by-pass roadway areas and restoring those areas to their
46 original condition.
47
48 C. The Contractor shall furnish temporary or permanent support, adequate
protection and maintenance of all underground facilities and utilities

7/07/15 EXCAVATION AND BACKFILL FOR PIPES PC-STS
31 23 33 - 3

1
2 3.05 DEPTH
3
4 A. Gravity Sewers
5
6 1. The depth of trenches for gravity sewers shall be such that the invert
7 of the pipe will be at elevations shown on the plan. Gravity sewers
8 shall be on straight alignment and constant grade between manholes.
9
10
11 B. Overdepth
12
13 1. When classified excavation is required, the rock shall be excavated to
14 a minimum depth of six inches below the trench depths as indicated
15 on the drawings or Specifications. Authorized overdepths in rock
16 excavation shall be refilled to grade with loose granular moist earth or
17 shell thoroughly tamped in place.
18
19 C. Trench shall be excavated to the depth required so as to provide a uniform
20 and continuous bearing and support for the pipe on solid and undisturbed
21 ground at every point between bell holes, except as necessary for removal
22 of pipe slings or other lifting tackle. Any part of the bottom of the trench
23 excavated to a point below the specified grade shall be corrected with
24 approved material at the Contractor's expense and thoroughly tamped as
25 directed by the Engineer.
26
27 D. Wherever unstable soil or muck that is determined by the Engineer to be
28 incapable of properly supporting the pipe is encountered in the bottom of the
29 trench, such material shall be removed to the required depth and the trench
30 refilled as specified to proper grade. If, in the opinion of the Engineer,
31 removal of the unstable material by this method is impractical, then the
32 Contractor shall support the pipe as detailed on the plans, or as directed by
33 the Engineer.
34
35 3.06 BACKFILL
36
37 A. General
38
39 1. The Contractor shall not perform any of the backfilling operations until
40 after he has inspected the lines and found them to be acceptable to
41 the County.
42
43 2. Backfill material shall consist of earth, loam, sandy clay, sand, gravel,
44 soft shale or other materials, free from organic materials, large clods
45 of earth, or stones. Where excavated material is not suitable for

7/07/15 EXCAVATION AND BACKFILL FOR PIPES PC-STS
31 23 33 - 7

1 encountered. Support, protection, maintenance and restoration are the
2 Contractor's responsibility at no additional cost to the County.
3
4 3.02 CLEARING AND GRUBBING
5
6 A. The Contractor shall remove only vegetation such as trees, shrubs, and
7 grass which interferes with the construction, as may be determined by the
8 Engineer, and he shall preserve and protect all other existing vegetation.
9
10 3.03 EXCAVATION
11
12 A. General
13
14 1. The Contractor shall perform all excavation of every description, and
15 of whatever substances encountered, to the depth indicated on the
16 Drawings, or as otherwise specified.
17
18 2. Trench excavation shall be such that the pipe can be laid to the
19 alignment and grade required. Trenches shall be shored and drained
20 in such a manner that work may proceed safely and efficiently.
21
22 3. Trench dewatering pumps shall discharge to natural drainage
23 channels, drains or sewers and shall be adequate to remove
24 accumulated storm and/or subsurface water. The Contractor shall
25 take necessary action to prevent surface water from flowing into the
26 trenches. It is the responsibility of the Contractor to assure that all
27 trench walls and trench bottoms are dry and remain dry during
28 pipeline construction.
29
30 4. The Contractor shall separate, remove and dispose of excavated
31 material not suitable for backfill, as directed by the Engineer.
32
33 5. All excavated material retained for backfill shall be piled in such a
34 manner as not to endanger the work or obstruct the sidewalks,
35 driveways or drainage. Fire hydrants, valve pit covers and hoses,
36 curb stop boxes, fire and police call boxes and other utility controls
37 shall be unobstructed and accessible at all times during construction.
38
39 B. Unclassified Excavation
40
41 1. Unclassified excavation shall include soil, clay, silt, sand, muck,
42 gravel, hardpan, loose shale, loose stones in masses and boulders
43 measuring less than one-half cubic yard in volume.
44
45
46 C. Classified Excavation
47

7/07/15 EXCAVATION AND BACKFILL FOR PIPES PC-STS
31 23 33 - 4

1 backfill, it shall be replaced by excess excavated material from other
2 areas.
3
4 3. In all areas, backfill material shall be deposited in six -inch layers and
5 carefully tamped until the compacted backfill depth reaches one foot
6 above the top of pipe.
7
8 4. No mechanical equipment, or machinery other than a hand operated
9 mechanical vibrator, will be allowed within the trench area until the
10 backfill has been properly tamped to one foot above the top of pipe.
11 The remainder of the backfill shall be deposited in one foot layers and
12 thoroughly tamped. Settling the backfill with water will be permitted, if
13 approved by the Engineer.
14
15 5. Where trenches are improperly backfilled, or where settlement
16 occurs, the trenches shall be reopened to the depth required for
17 proper compaction, refilled and compacted, and the surface restored
18 to the required grade and compaction, mounded over and smoothed
19 off.
20
21 B. Gravity Sewers
22
23 1. Haunching of native material shall be placed to the springline and
24 compacted. If ground water, or trench bottom conditions, is such as
25 to require use of Class I material, either to aid in dewatering, or to
26 provide foundation and bedding for the pipe, the haunching shall also
27 be of Class I material. Class I material contains angular, 1/4 inch to
28 1 1/2 inch graded stone. Care shall be taken to place the haunching
29 material, without voids, completely filling the trench from pipe wall to
30 trench wall.
31
32 C. Compaction Requirements
33
34 1. Trenches located under pavement or inside the two feet horizontal to
35 one foot vertical slope, downward from roadway shoulder or the back
36 of curb and from spring line to bottom of sub-grade or the finished
37 surface of the embankment, as appropriate, shall be compacted to a
38 density of one hundred (100) percent as determined by AASHTO T-
39 99 Method C.
40
41 2. Trenches located outside of the two feet horizontal to one foot vertical
42 slope downward from roadway shoulder or the back of curb and
43 where no vehicular traffic will pass over the trenches, back fill shall be
44 compacted to a density approximately equal to that soil adjacent to

7/07/15 EXCAVATION AND BACKFILL FOR PIPES PC-STS
31 23 33 - 8

1 1. Classified excavation shall be rock further defined as follows:
2 boulders, measuring one-half cubic yard or more in volume, rock
3 material in ledges, bedded deposits and unstratified masses,
4 conglomerate deposits firmly cemented and concrete or masonry
5 structures, except sidewalks and paving, that in the opinion of the
6 Engineer required for its removal drilling and blasting, wedging,
7 sledging, barring or breaking up with a power operated hand tool.
8
9 2. No soft or disintegrated rock that can be removed with a hand pick or
10 power operated excavator or shovel, no loose, shaken, or previously
11 blasted rock or broken stone in rock fillings or elsewhere, and no rock
12 exterior to the minimum limits of measurement allowed, which may
13 fall into the excavation, will be considered as rock.
14
15 3.04 TRENCH PREPARATION
16
17 A. Unsupported trench width shall be limited to the minimum practicable width
18 allowing working space to place and compact the haunching material. The
19 maximum width shall be the pipe diameter plus one foot on each side of the
20 pipe at springline for pipe in unsupported trenches. In sheeted trenches the
21 width of trench between faces of the sheeting shall be adequate to allow the
22 pipe bedding and haunching to be placed and completed, and the sheeting
23 removed without disturbing the bedding and haunching material within two
24 pipe diameters on each side of the pipe. Trench boxes and moveable
25 sheeting shall be wide enough to allow moving without disturbing the
26 bedding and haunching within two pipe diameters on each side of the pipe.
27 Trench boxes and moveable sheeting shall be constructed and used in the
28 trench to avoid disturbing the piping, bedding and haunching when being
29 moved forward in the trench.
30
31 B. Dewatering of the trench bottom shall be accomplished using adequate
32 means to allow preparation of bedding, placement of haunching and pipe in
33 a trench environment without standing water. Dewatering shall continue
34 until sufficient backfill is placed above the pipe to prevent flotation.
35
36 C. The trench shall be dug so that the pipe can be laid to the alignment and
37 depth required, and it shall be excavated only so far in advance of the pipe
38 laying as allowed by the Engineer. The trench shall be so braced and
39 drained that the workmen may work in it safely and efficiently. All trench
40 preparation shall comply with all of the latest applicable Local, State
41 (Florida Trench Safety Act) and Federal Regulations (OSHA: Safe Trench
42 Act). It is essential that the discharge of the trench dewatering pumps be
43 conducted to natural drainage channels, drains or storm sewers.
44
45 D. Bell holes shall be provided at each joint to permit the joint to be made
46 properly. Ledge rock, boulders and large stones shall be removed to

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31 23 33 - 5

1 the trench but not less than ninety-five (95) percent of the maximum
2 density as determined by AASHTO T-99, Method-C.
3
4 3. Backfill testing shall be performed in accordance with Pinellas County
5 Minimum Testing Frequency Requirements, latest edition, unless
6 called out differently by the Engineer on the plan documents.
7
8 D. Testing of Backfill
9
10 1. Trenching within, or across roadways, or other areas to be paved, or
11 stabilized shall be backfilled and compacted to their full depth.
12 Compaction shall be as specified in the Special Provisions or on the
13 Plans.
14
15 2. Density tests for backfilled trenches within, or across roadways, shall
16 be performed as specified or as directed by the Engineer, with at
17 least one test taken at different locations for each vertical foot
18 beginning from two feet over pipe to ground level.
19
20 3. Backfill testing shall be performed in accordance with Pinellas County
21 Minimum Testing Frequency Requirements, latest edition, unless
22 called out differently by the Engineer on the plan documents.
23
24 4. Where unsatisfactory compaction is revealed by the test, the
25 Contractor shall re-excavate, backfill, re-compact and/or rework the
26 backfill as required, to obtain the required degree of compaction over
27 the entire depth of the trench.
28
29 5. Satisfactory backfill compaction is an integral part of pipe laying,
30 paving, and stabilizing. Satisfactory density reports shall be on file
31 before each Contractor's statement is submitted for payment.
32
33 E. Disturbance of Sewer Mains
34
35 1. Sewer mains shall be checked by the Contractor to determine
36 whether any displacement of the pipe has occurred after the trench
37 has been backfilled to two feet above the pipe. If such inspection
38 shows poor alignment, displaced pipe or any defects, these defects
39 shall be remedied to the satisfaction of the Engineer by the
40 Contractor at his expense.
41
42 3.07 DISPOSAL OF SURPLUS MATERIAL
43
44 A. All excavated material not required or not suitable for fill, or backfill, shall be
45 disposed of by the Contractor, as directed by the Engineer.
46

7/07/15 EXCAVATION AND BACKFILL FOR PIPES PC-STS
31 23 33 - 9

1 provide a clearance of six inches on all pipe twenty-four (24) inches and
2 smaller and nine inches on pipe larger than twenty-four (24) inches. If
3 such removal is required, backfilling will be done with selected material
4 approved by the Engineer and tamped to establish the proper grade.
5
6 E. Trench Bottom
7
8 1. Where the bottom of the trench at subgrade is found to be unstable
9 or to include ashes, cinders, refuse, vegetable or other organic
10 matter, or large pieces or fragments of inorganic material that, in
11 the judgment of the Engineer, should be removed, the Contractor
12 shall excavate and remove such unsuitable material to the width
13 and depth as directed by the Engineer. Before the pipe is laid, the
14 subgrade shall be made by backfilling with an approved material in
15 three inch uncompacted layers. The layers shall be thoroughly
16 tamped as specified by the Engineer to provide the uniform and
17 continuous bearing support as heretofore described.
18
19 2. The trench shall be dry when the bottom is prepared. The trench
20 bottom shall be excavated, or filled and compacted, as required to
21 bring it to grade and shaped to receive and support the pipe barrel. In
22 addition, bell holes shall be excavated so that after placement only
23 the barrel of the pipe receives bearing pressure from and is uniformly
24 supported by, the bottom of the trench. Preparation of the trench
25 bottom and placement of the pipe shall be such that the final position
26 of the pipe is true to line and grade, and uniformly supported
27 throughout the barrel of each length. When pipe is placed in refill
28 material, additional refill of the same material shall be tamped on
29 each side of the barrel to the springline, thus forming a trough of firm
30 bedding.
31
32 F. All materials that, in the opinion of the Engineer, are suitable for reuse in
33 restoring the disturbed surface shall be kept separated from the general
34 excavation material and can only be used as directed by the Engineer.
35
36 G. All excavated material shall be piled in a manner that will not endanger the
37 work and that will avoid obstructing sidewalks and driveways. Hydrants,
38 valve pit covers, valve boxes, curb stop boxes, fire and police call boxes,
39 or other utility controls shall be left unobstructed and accessible until the
40 work is completed. Gutters, drainage inlets, natural water courses and
41 miscellaneous drainage structures shall be kept clear or other satisfactory
42 provisions made for their proper operation.
43
44 H. Hand methods for excavation shall be employed when damage to existing
45 facilities is likely if heavy equipment is utilized or as directed by the
46 Engineer.

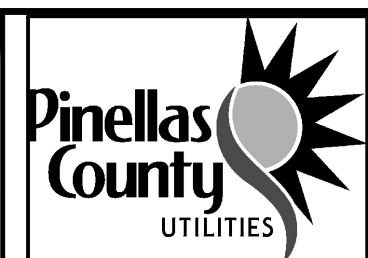
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1 B. Material suitable for backfill is to be stockpiled on, or near site, until released
2 by the Engineer for disposal.
3
4 3.08 SHEETING AND BRACING
5
6 A. The Contractor shall do all shoring and sheeting required to perform and
7 protect the excavation and, as required, for the safety of the employees.
8
9 B. All trenches shall be sheeted and braced as required by the Engineer and
10 all applicable Federal, State, County and Municipal regulations. Sheeting
11 and bracing shall be used to prevent shoring of adjacent soil and to
12 prevent damage to structures or the work. The sole responsibility for the
13 design, methods of installation, and adequacy of the sheeting and bracing,
14 shall be and shall remain that of the Contractor.
15
16 C. Sheeting and bracing or approved laying box shall be used in all trenches
17 unless the slopes are excavated until the natural angle of repose of the
18 soil is encountered.
19
20 D. In general, sheeting and bracing shall be removed as the excavation is
21 backfilled in such a manner as to avoid the caving in of the bank or
22 disturbance of adjacent areas or structures. The voids left by withdrawal
23 of the sheeting and bracing shall be carefully filled by jetting, ramming or
24 other means approved by the Engineer. Permission shall be obtained
25 from the Engineer prior to removal of any sheeting or bracing. Permission
26 shall not relieve the Contractor of any responsibility for damage due to
27 failure to leave such sheeting and bracing in place.
28
29 E. The Engineer may order, in writing, any or all sheeting or bracing to be left
30 in place for the purpose of preventing injury to adjacent structures,
31 property, etc. If left in place, such sheeting shall be cut off at the elevation
32 ordered, but in no case less than thirty-six (36) inches below the existing
33 grade. Bracing remaining in place shall be driven in tight. The right of the
34 Engineer to order sheeting and bracing to remain in place shall not be
35 construed as creating any obligation on his part to issue such orders.
36 Payment for sheeting and bracing, unless specifically called for on the
37 Drawings shall not be paid under separate item, but shall be included in
38 the payment for other items of work.
39
40 3.09 DEWATERING BY WELLPOINT
41
42 A. Wellpoints shall be spaced and at sufficient depths as required to
43 eliminate water during the excavation period until the work is completed.
44 Ample means and equipment shall be provided with which to remove
45 promptly, and dispose properly all water entering any excavation. This

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DESIGNED	J.V.K.	
DRAWN	S.A.T	
CHECKED	W.G.R.	
REV. NO.	DATE	DESCRIPTION

DESIGNED	J.V.K.
DRAWN	S.A.T
CHECKED	W.G.R.



PROJECT: IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)

DESCRIPTION: UTILITIES

14 S. FT. HARRISON AVE., CLEARWATER, FL 33756

APPROVED BY: WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605

DATE: 4/3/17
PROJECT NO. 17.PC-07
SHEET: 9 OF 18

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1 includes the use of sand or gravel as required to maintain adequate flow during the pipe laying or installation of other items of work within the excavation.
2
3
4
5 B. Water pumped or drained shall be disposed of in a suitable manner without damage to adjacent property to other work under construction or to street pavements or public parks.
6
7
8
9
10 clean and open for surface drainage. Water shall not be directed across or over pavements except through approved pipes or properly constructed troughs.
11
12
13
14
15
16 Payment for dewatering shall not be paid for under a separate item, but shall be included in the payment for other items of work, unless it is specifically included as a Pay Item in the Contract.
17
18
19
20 3.10 APPURTENANCES
21 A. Excavation for manholes and other appurtenances shall be made to size that will allow at least twelve (12) inches between their outer surfaces and the embankment or shoring.
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7/07/15 EXCAVATION AND BACKFILL FOR PIPES 31 23 33 - 11 PC-STS
1 2. The composition of the drill fluid is determined by the results of geological investigation executed in line with the framework of the project planned before construction.
2
3
4
5 3. The principal functions of drilling fluids used in HDD are:
6
7 a. Transporting drill cuttings to the surface by suspending and carrying them in the fluid stream flowing in the annulus between the borehole wall and the drill pipe/product.
8
9
10
11
12 b. Cleaning build-up on drill bits or reamer cutters by directing fluid streams at the cutters.
13
14
15
16
17 c. Cooling the downhole tools and electronic equipment.
18
19
20
21
22 d. Lubricating to reduce the friction between the drill pipe/product pipe and the borehole wall.
23
24
25
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27
28 e. Stabilizing the borehole, especially in loose or soft soils by building a low permeability filter cake, and exerting a positive hydrostatic pressure against the borehole wall.
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41
42 g. The following fluid properties are to be tested and considered to assure compatibility between the drilling fluid mixture and the native soil after proper identification and characterization. These fluid properties are density, viscosity, pH - value, circulation, volume and solid content.
43
44
45 h. The drilling fluid pressures and flow rates shall be continuously monitored and recorded by the Contractor at the pump and within the annular space within thirty (30) feet of the drilling head.
46
2.03 DRILLING SYSTEM
A. The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable
HORIZONTAL DIRECTIONAL DRILLING STANDARD SMALL DIAMETER INSTALLATIONS
7/07/15 33 05 21 - 4 PC-STS

SECTION 33 05 21
HORIZONTAL DIRECTIONAL DRILLING
STANDARD SMALL DIAMETER INSTALLATIONS
PART 1 - GENERAL
1.01 SCOPE OF WORK
A. The Work specified in this section consists of furnishing and installing underground utilities using the horizontal directional drilling (HDD) method of installation, also commonly referred to as directional boring or guided horizontal boring.
B. Small Diameter Installation shall be defined as a HDD that the nominal outside diameter of the product pipe is twelve (12) inches or less.
1.02 SUBMITTALS
A. Prior to beginning work, the Contractor must submit to the Engineer a Work plan detailing the procedure and schedule to be used to execute the Project.
B. The Contractor shall submit documentation that the proposed electrofusion personnel have been certified by the pipe or electrofusion accessory manufacturer.
C. All drilling fluids and loose cuttings shall be contained. No fluids shall be allowed to enter any unapproved areas or natural waterways.
HORIZONTAL DIRECTIONAL DRILLING STANDARD SMALL DIAMETER INSTALLATIONS
7/07/15 33 05 21 - 1 PC-STS

7/07/15 1 angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing.
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12 B. The drill head shall be steerable by changing its rotation and shall provide the necessary cutting surfaces and drilling fluid jets.
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2.04 GUIDANCE SYSTEM
A. The method of guidance utilized in locating and steering the pilot string from entry to exit shall be state of the art.
2.05 DRILLING FLUID (MUD) SYSTEM
A. A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid composed of bentonite clay, potable water and appropriate additives.
B. Drilling fluid shall be composed of clean water and bentonite clay. Water shall be from an authorized source with a pH of 8.5 - 10.
HORIZONTAL DIRECTIONAL DRILLING STANDARD SMALL DIAMETER INSTALLATIONS
7/07/15 33 05 21 - 5 PC-STS

D. The Contractor shall submit a Bentonite Management Plan that includes the following as a minimum.
1. Rapid response procedures - directional drilling shall be performed by a Contractor who has the expertise required to perform the related work.
2. Containment procedures - sediment control systems such as: silt fence or earth berms on uplands, and floating silt barriers or other aquatic barriers in water, and other means necessary to prevent the spread of the bentonite spill shall be installed immediately.
3. Timely cleanup capability - remediation of the lost bentonite shall begin immediately.
E. Contractor shall submit Specifications on directional drilling equipment to be used to ensure that the equipment will be adequate to complete the Project.
F. Specifications on material to be used shall be submitted to Engineer and material shall include the pipe, fittings, drilling mud, drilling additives and any other item which is to be an installed component of the Project or used during construction.
1.03 QUALITY ASSURANCE
A. The requirements set forth in this Specification include a wide range of procedural precautions necessary to insure that the very basic, essential aspects of a proper directional bore installation are adequately controlled.
HORIZONTAL DIRECTIONAL DRILLING STANDARD SMALL DIAMETER INSTALLATIONS
7/07/15 33 05 21 - 2 PC-STS

The Bentonite mixture used shall have the minimum viscosities as measured by a Marsh Funnel:
Rock, Clay - 60 sec.
Hard Clay - 40 sec.
Soft Clay - 45 sec.
Sandy Clay - 90 sec.
Stable Sand - 80 sec.
Loose Sand - 110 sec.
Wet Sand - 110 sec.
These viscosities may be varied to best fit the soil conditions encountered, as approved by the Engineer.
C. Additives to drilling fluid such as drill soap, polymers, etc. shall be "environmentally safe" and be approved for such usage.
D. The mud pumping system shall have a minimum capacity of 50 GPM and be capable of delivering the drilling fluid at a constant minimum pressure of 1000 psi.
2.06 OTHER EQUIPMENT
A. Pipe rollers shall be of sufficient size to fully support the weight of the pipe while being hydro-tested and during pull-back operations.
B. Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of Engineer.
C. Other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used unless approved by the Engineer prior to commencement of the Work.
HORIZONTAL DIRECTIONAL DRILLING STANDARD SMALL DIAMETER INSTALLATIONS
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outlined in this Specification. Adherence to the Specifications contained herein, or the Engineer's approval of any aspect of any directional bore operation covered by this Specification, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the Work authorized under the Contract.
B. Drilling Notes: The pipe shall be installed to the exact lines and grades shown on the plans by a State of Florida licensed and bonded underground utility Contractor, with minimum two years experience in Directional Drilling.
PART 2 - PRODUCTS
2.01 GENERAL
A. Directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pullback the pipe, a drilling fluid mixing, delivery system of sufficient capacity to successfully complete the crossing, a guidance system to accurately guide boring operations and trained and competent personnel to operate the system.
2.02 PRODUCT PIPE, JOINTS AND FITTINGS
A. PIPE
1. All product pipe to be installed by the HDD operation will be High Density Polyethylene (HDPE), Restrainted Joint PVC or Restrainted Joint Ductile Iron pipe.
2. Refer to material specifications for material requirements.
3. Refer to piping sections of this specification for pipe handling requirements.
B. FITTINGS
1. Refer to material specifications for material requirements.
C. DRILLING FLUID (MUD) SYSTEM
1. Drilling fluid shall be composed of a carrier fluid (water) and drilling fluid additives (bentonite and/or polymers).
HORIZONTAL DIRECTIONAL DRILLING STANDARD SMALL DIAMETER INSTALLATIONS
7/07/15 33 05 21 - 3 PC-STS

Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within the tolerances prescribed by the particular conditions of the Project.
PART 3 - EXECUTION
3.01 GENERAL
A. Contractor to contact Pinellas County Utilities at least forty-eight (48) hours before each of the following activities:
B. The drawings show existing utilities that are believed to be near the directional drill alignment. There is no guarantee that these utilities are located as shown or that other utilities may not be present.
C.
3.02 PERSONNEL REQUIREMENTS
A. All personnel shall be fully trained in their respective duties as part of the directional drilling crew and in safety.
3.03 DRILLING PROCEDURE
HORIZONTAL DIRECTIONAL DRILLING STANDARD SMALL DIAMETER INSTALLATIONS
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Table with 12 columns: REV. NO., DATE, DESCRIPTION, REV. BY, CHECKED, DESIGNED, DRAWN, PROJECT (IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)), DESCRIPTION (UTILITIES TECHNICAL SPECIFICATIONS), UTILITIES (14 S. FT. HARRISON AVE., CLEARWATER, FL 33756), APPROVED BY (WILLIAM G. REIDY, P.E.), DATE, PROJECT NO. (17-PC-07), SHEET (10 OF 18).

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Table with 2 columns: Description (A-H) and Date (7/07/15). Includes text about work site grading, surveying, safety regulations, and pipe installation. Title: HORIZONTAL DIRECTIONAL DRILLING STANDARD SMALL DIAMETER INSTALLATIONS.

Table with 2 columns: Description (I-K) and Date (7/07/15). Includes text about borehole stabilization, pipe testing, site restoration, and record keeping. Title: HORIZONTAL DIRECTIONAL DRILLING STANDARD SMALL DIAMETER INSTALLATIONS.

Table with 2 columns: Description (SECTION 33 11 01, PART 1 - GENERAL, etc.) and Date (8/24/15). Includes general specifications for potable water main piping and appurtenances. Title: SECTION 33 11 01 POTABLE WATER MAIN PIPING AND APPURTENANCES.

Table with 2 columns: Description (1-6) and Date (8/24/15). Includes details about curb installation, joint fittings, pipe backfilling, and abandonment of existing mains. Title: POTABLE WATER MAIN PIPING AND APPURTENANCES.

Table with 2 columns: Description (MATERIALS, EXECUTION, HANDLING) and Date (8/24/15). Includes specifications for materials, execution of work, and handling procedures. Title: POTABLE WATER MAIN PIPING AND APPURTENANCES.

Table with 2 columns: Description (FIELD LAYOUT, EXCAVATION, ALIGNMENT AND GRADE) and Date (8/24/15). Includes specifications for field layout, excavation, and grading. Title: POTABLE WATER MAIN PIPING AND APPURTENANCES.

Table with 2 columns: Description (LAYING AND JOINING BURIED WATER MAINS) and Date (8/24/15). Includes specifications for laying and joining buried water mains. Title: POTABLE WATER MAIN PIPING AND APPURTENANCES.

Table with 2 columns: Description (Standard plugs, plugging, tracer wire) and Date (8/24/15). Includes specifications for standard plugs, plugging procedures, and tracer wire installation. Title: POTABLE WATER MAIN PIPING AND APPURTENANCES.

Design and drawing information including: DESIGNED (J.V.K.), DRAWN (S.A.T.), CHECKED (W.G.R.), PROJECT (IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)), DESCRIPTION (TECHNICAL SPECIFICATIONS), UTILITIES (14 S. FT. HARRISON AVE., CLEARWATER, FL 33756), APPROVED BY (WILLIAM G. REIDY, P.E.), DATE (4/3/17), PROJECT NO. (17.PC-07), SHEET (11 OF 18).

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1 test for at least one wire prior to final acceptance of the
2 pipeline. Any cuts or breaks in the wire shall be repaired by
3 the Contractor at his expense.
4
5 h. The locator wire shall be tested by the Contractor at the time
6 of pressure testing. If this test fails, the Contractor is
7 responsible for repairing the locator wire and the pressure
8 test will be reschedule when the wire will pass.
9
10 7. Tracer Wire for Long Side Services
11
12 a. Each long side service or any service over 40 feet shall have
13 one (1) 14-gauge minimum solid copper locator wire duct
14 taped to top center of pipe.
15
16 b. The locator wire shall have colored insulation matching the type
17 of service provided in the service and be acceptable for direct
18 burial.
19
20 c. All splices of the wire shall be made with watertight connections
21 per material specification manual.
22
23 d. The wire shall be continuous along the service line.
24
25 e. The locator wire shall have one end sealed off and buried within
26 12-inches of the connection to the main with the other end
27 stubbed off in the service box with enough slack provided to
28 extend 10 to 12-inches out of each service box.
29
30 8. Contractor shall perform a tone test on each long side service using
31 a wire and cable locator. The locator wire system shall pass the
32 tone test prior to final acceptance of the service line. Any cuts or
33 breaks in the wire shall be repaired by the Contractor at his
34 expense.
35
36
37
38 B. Pigging, Flushing and Cleaning
39
40 1. All mains shall be pigged, cleaned and flushed to remove all sand
41 and other foreign matter. The Contractor shall be responsible for
42 developing a pigging and flushing plan to be submitted to the
43 Project Representative for approval prior to pigging and flushing.
44 The Contractor shall dispose of all water used for pigging and for
45 flushing without causing a nuisance or property damage, in
46 accordance with state and local requirements. Any permits or fees

POTABLE WATER MAIN PIPING AND APPURTENANCES
33 11 01 - 7

8/24/15 PC-STS

1 1. Flanged joints are intended mostly for above ground use and the
2 underground use of this joint is generally not desirable because of
3 the rigidity of the joint.
4
5 2. The flanges shall be thoroughly cleaned to remove grit, oil or
6 foreign matter. The flanged joints shall be filled so that the contact
7 faces bear uniformly on the gasket and then are tightened in a
8 crisscross order with a relatively uniform bolt stress.
9
10 3. The gaskets shall be installed in a manner that water tightness is
11 achieved without over torquing the bolts and as recommended by
12 the manufacturer. If, after tightening the bolts to the specified
13 torque, water continues to leak, the joint shall be disassembled and
14 properly reassembled.
15
16 4. The Contractor shall be very careful to prevent bending or torsional
17 strains from being applied to flanges, flanged fittings or flanged
18 appurtenances. Flanged pipe shall be properly anchored,
19 supported or restrained to prevent breakage of fittings and flanges.
20
21 5. Bolt requirements are as follows:
22

Pipe Size (inches)	Number Per Joint	Bolt Size (inches)	Threads per inch	Torque Ft.-lbs
4	8	5/8 x 3	11	60
6	8	3/4 x 3 1/2	10	100
8	8	3/4 x 3 1/2	10	100
10	12	7/8 x 4	9	160
12	12	7/8 x 4	9	160
16	16	1 x 4 1/2	8	245
20	20	1 1/8 x 3	7	390
24	20	1 1/4 x 5 1/2	7	545
30	28	1 1/4 x 6 1/2	7	545
36	32	1 1/2 x 7	6	875
42	36	1 1/2 x 7 1/2	6	875
48	44	1 1/2 x 8	6	875
54	44	1 3/4 x 8 1/2	5	1550

H. Jointing Special Joint Ductile Iron Pipe
1. Other special joint pipe shall be assembled or installed per
manufacturer's recommendations or directed by the Engineer. The
Contractor shall insure that the joint is thoroughly cleaned by

POTABLE WATER MAIN PIPING AND APPURTENANCES
33 11 01 - 11

8/24/15 PC-STS

1 required for the disposal of flushing water shall be the responsibility
2 of the Contractor.
3
4 2. Flushing water used by the Contractor shall be taken from an
5 approved potable water metered source. The water utility will
6 provide the meter and designate the source. The Contractor shall
7 be responsible for the cost of potable water used to flush potable
8 mains.
9
10 3. The cleaning of the new piping system shall be accomplished by
11 the controlled and pressurized passage of a series of hydraulic or
12 pneumatic polyurethane plugs of varying dimensions coatings, and
13 densities; which shall be selected by the pipe cleaning Contractor.
14 The Contractor shall provide a means to enter the pig into the
15 system, control and regulate flow, monitor flows and pressures, and
16 to remove the pig from the system. The Contractor shall maintain a
17 constant surveillance of the system and immediately report to the
18 proper authority any in-line problems encountered or any
19 malfunctions discovered in the piping system. A record of pig
20 models, sizes, styles, and other pertinent information shall be kept
21 by the Contractor and turned over to the County.
22
23 4. The Contractor shall furnish pig launching and retrieval equipment
24 to minimize additional valving, fittings and auxiliary water supplies.
25 Valves and blowoff assemblies, which are installed as part of the
26 project, shall be used as much as possible to minimize the number
27 of temporary ports required for proper flushing and cleaning.
28
29 5. All materials used shall be specifically manufactured for flushing
30 and cleaning pressure pigs, bends and valves. The pigs shall be
31 able to go through bends, open valves and fittings, and provide
32 adequate cleaning of the pipe.
33
34 6. Cost of Pigging Services- The cost to complete the requirements
35 under this section shall be included in the contract items provided in
36 the proposal sheet. There is no separate pay item for this work.
37
38 C. Jointing HDPE Pipe and Fittings
39
40 1. HDPE pipe shall be jointed by the butt-fusion process in
41 accordance with pipe manufacturer's directions. Contractor shall
42 provide butt-fusion technicians who are trained and certified by the
43 P.E. pipe manufacturer to complete the project. The date of
44 technician certification shall not exceed 12 months before
45 commencing construction.
46

POTABLE WATER MAIN PIPING AND APPURTENANCES
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1 removing all dirt, oil, grit, excess coatings and foreign matter to
2 insure a tight joint.
3
4 3.05 REMOVAL OF OUT OF SERVICE PIPE
5
6 A. Due to certain permit requirements, pipe that is to be removed from
7 service will have to be physically taken out of the ground. The limits of
8 pipe to be removed shall be specifically called for in the Plans or shall be
9 approved in writing by the Engineer. Any other removal not specifically
10 called for, shall be considered incidental to construction of other items in
11 the Contract and the Contractor will not receive compensation for such
12 work.
13
14 B. When removing pipe the Contractor shall excavate a trench wide enough
15 to dislodge the pipe from the surrounding soil, and long enough to be able
16 to handle the pipe without causing any damage to nearby utilities,
17 structures or adjacent property.
18
19 C. The removed pipe, fitting and appurtenances will become the Contractor's
20 property and he shall be responsible for proper disposal and any required
21 permits therefor.
22
23 D. Refer to Specification 01 35 00, Special Project Procedures for removal of
24 asbestos cement (AC) pipe.
25
26 3.06 INSTALLATION OF PIPE UNDER DRIVEWAYS
27
28 A. At the Engineer's discretion the Contractor will be required to auger pipes
29 under driveways, structures or trees to avoid removal or expensive
30 restoration of those structures. The Contractor will be allowed to utilize an
31 auger machine and to push or pull the carrier pipe into the bore without
32 the need of a casing.
33
34 B. The Contractor shall install the water pipe within the bore hole on a line
35 and grade to allow connection to open cut piping adjacent to the bore hole
36 within pipe jointing alignment limits defined for the pipe in question. The
37 completed installation shall not result in settlement of soil under the
38 driveway.
39
40
41
42 3.07 INSTALLATION OF PIPE UNDER HIGHWAYS AND RAILROADS
43
44 A. The General Contractor shall furnish and install protective steel pipe
45 casings and/or carrier pipe under highways/railroads in the pipe size,
46 thickness, length, location and details as shown on the drawings and

POTABLE WATER MAIN PIPING AND APPURTENANCES
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1 2. Butt-fusion means the butt-joining of the pipe by softening the
2 aligned faces of the pipe ends in a suitable apparatus and pressing
3 them together under controlled pressure.
4
5 3. The internal and external beads resulting from the butt-fusion
6 process shall be visible and examined for penetration 360 degrees
7 around the pipe diameter.
8
9 4. All fittings for HDPE pipe (4" and larger), except for D.I./HDPE
10 Mechanical Joint Adaptors, shall be ductile iron mechanical joint
11 fittings per material specification manual and shall be joined to the
12 pipe using a butt fused restrained mechanical joint adapter.
13
14 5. The D.I./HDPE mechanical joint adapter shall be connected to the
15 HDPE pipe by a heat-fused joint on one end, and connected to a
16 ductile iron pipe valve, or fitting with a mechanical joint on the other
17 end.
18
19 6. Solvent epoxy cementing and mechanical joining with bolt on wrap
20 around clamps or mechanical joints with out an adapter shall not be
21 used for connections.
22
23 7. Short pieces of pipe between valves and fittings shall be DIP with
24 all joints restrained for sizes 3-inches and larger. For 2-inch, the
25 short pieces shall be brass or Sch. 80 with IP threads and DI,
26 HDPE or brass fittings and all joints restrained.
27
28 D. Jointing Concrete Pressure Pipe and Fittings
29
30 1. Rubber O-rings shall be stored in a cool, dark place away from sun,
31 electric motors, and oil or grease for a short period of time and as
32 specified by manufacturer.
33
34 2. Prior to joining two sections of pipe, the surfaces of the joint rings
35 shall be thoroughly cleaned and the rubber gasket shall be liberally
36 lubricated with the vegetable oil soap supplied by the manufacturer
37 and compatible with potable water use. The lubricated gasket will
38 then be seated and a uniform tension along its length shall be
39 required. The spigot end shall then be inserted in the bell and
40 driven home. Prior to being fully seated the position of the gasket
41 shall be checked by means of the feeler gauge supplied by the
42 manufacturer. If in position, full seating shall be completed.
43 However, should the gasket be out of position the pipe shall be
44 separated and the full procedure be repeated.
45
46

POTABLE WATER MAIN PIPING AND APPURTENANCES
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1 specified herein. The Contractor's attention is particularly directed to the
2 requirements of the particular municipal or private owner or Department of
3 Public Works having jurisdiction over the highways/railroads whether
4 through permit, verbal or other directions.
5
6 B. The construction shall not be started until the necessary permits have
7 been obtained, a copy is at the job site, and proper notice and approval for
8 construction has been obtained from the owner of the highway/railroad
9 and the Engineer.
10
11 C. All necessary materials, equipment, labor and traffic protection devices
12 shall be on the job site before requesting permission to start the work.
13
14 D. Steel casings and the installation thereof required for highway/railroad
15 crossings shall be in accordance with the standards and requirements of
16 the Florida Department of Transportation (FDOT) or railroads or AASHTO
17 Standards and the Specifications outlined herein. All work of this nature
18 shall be performed by qualified Contractors regularly engaged in that type
19 of work and shall be subject to approval by the Engineer.
20
21 E. All work shall be in accordance with Specification 35 05 20, Jacking and
22 Boring.
23
24 3.08 FITTINGS
25
26 A. All fittings shall be restrained by means of restraining devices such as
27 restrainer glands, restraining gaskets, etc.
28
29 B. Fittings shall be set and joined to the pipe and each type of joint as
30 specified for pipe.
31
32 C. Trenching and backfilling for all fittings shall also be in accordance with
33 Section 31 23 33, Excavation and Backfill for Pipes.
34
35 D. The use of thrust blocks in new lines is prohibited and shall be limited to
36 areas in which a new fitting has been installed in an existing line and is not
37 feasible to restrain joints or when directed by the Engineer.
38
39 E. The use of "reverse dead-man" shall be as described under Standard
40 Details for dead-end valves or in circumstances that the Engineer deems it
41 necessary and shall be performed under his direction.
42
43 3.09 VALVES
44
45 A. Valves shall be set and joined to the pipe and each type of joint as
46 specified for pipe.

POTABLE WATER MAIN PIPING AND APPURTENANCES
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1 3. After the pipe has been driven completely home and has been set
2 at grade the diaphragm should be slipped over the joint and fastened in
3 position by means of the steel strapping attached into its edges. A
4 mix of 1:2 mortar grout of sufficiently liquid consistency to flow
5 easily is to be poured into the diaphragm and "rodded" or "puddled" to
6 insure complete filling of the recess. The Contractor shall use and
7 furnish approved equipment for mixing grout and shall use
8 approved equipment and methods to force the pipe home.
9
10 E. Jointing Push-On Ductile Iron, Steel and PVC Pipe
11
12 1. The inside of the bell and the outside of the spigot end shall be
13 thoroughly cleaned to remove dirt, grit, oil or excess coatings and
14 other foreign matter. The rubber gasket shall be flexed inward and
15 inserted in the gasket recess of the bell socket. A thin film of
16 gasket lubricant shall be applied to either the inside surface of the
17 gasket or the spigot ends, care will be taken to avoid contact with
18 the ground. The joint shall be completed by forcing the plain end to
19 the bottom of the socket with a forked tool or jacking device or other
20 approved method. All pipe shall have depth mark prior to insertion.
21 Pipe cut in the field shall be filed to resemble the spigot end of
22 manufactured pipe.
23
24 2. When deflection is required the joint shall be completed prior to
25 setting the deflection. The deflection shall conform to applicable
26 AWWA Standards or manufacturer's recommendation with prior
27 Engineer's approval.
28
29 F. Jointing Mechanical Joint Pipe and Fittings
30
31 1. The inside of the socket, the outside of the spigot end and the
32 gland shall be thoroughly cleaned and or washed with an approved
33 solution to remove dirt, grit, oil or excess coatings and foreign
34 matter to improve gasket seating. The gland shall then be placed
35 on the plain end of the pipe with the lip extension toward the plain
36 end, followed by the gasket with the narrow edge of the gasket
37 toward the plain end of the pipe. The pipe shall be inserted into the
38 socket and the gasket pressed firmly and evenly into the gasket
39 recess. The joint shall be kept straight during the assembly and
40 any deflection required shall be done after the joint has been
41 assembled but prior to tightening the bolts.
42
43 G. Jointing Flanged Ductile Iron and Flanged Steel Pipe and Fittings
44

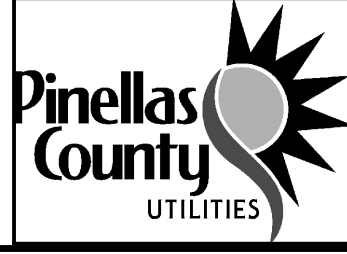
POTABLE WATER MAIN PIPING AND APPURTENANCES
33 11 01 - 10

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1 B. Trenching and backfilling for all valves shall also be in accordance with
2 31 23 33, Excavation and Backfill for Pipes.
3
4 C. Cast iron valve boxes shall be firmly supported, maintained centered and
5 plumb over the operating nut of the valve. Outside of paved areas, valve
6 boxes shall be set in a 2' x 2' x 5" thick concrete collar, along with a brass
7 ID tag, as shown in the Standard Details. The box cover shall be flush
8 with the surface of the finished pavement. All box lids shall be painted
9 OSHA safety blue and shall have the word "WATER" cast in the lid.
10
11 D. All reasonable effort must be made to locate valves/valve boxes behind
12 the back of curb, in grass areas and at street corners, whenever possible.
13 Valves should be kept in clusters within two feet of the tee, when
14 possible.
15
16 E. Valve boxes in areas that will require sod at a later date must be left 1'-2"
17 above existing grade (to allow for sod thickness).
18
19 F. All valves/boxes shall be located by means of a perpendicular 6" x 2' blue
20 stripe across the curb. The distance from the back of the curb to the valve
21 shall be stenciled on the curb with numbers four inches high, painted blue,
22 by the Contractor. This information will be referenced on the pavement if
23 no curbs are to be installed. The fire hydrant valves shall be stenciled (in
24 the same manner) with the letters H.V. All valve box tops shall be painted
25 blue. All valves must be centered over the operating nut/wheel and all
26 valves after being fully opened, will be backed off one-quarter of a turn to
27 prevent them from being jammed open.
28
29 G. All dead end valves shall be restrained with a reverse deadman, per the
30 Standard Details.
31
32 H. Should the operating nut be more than three feet below the final grade, an
33 extension shall be supplied and installed by the Contractor. The extension
34 shall bring the nut to within twelve inches of final grade.
35
36 I. Installation of Valves on Existing Mains
37
38 1. When installing valves in existing mains (cutting-in) the Contractor
39 shall insure that the pipe is kept clean at all times and no debris,
40 ground water, mud, oil, etc. will make their way into the pipe.
41
42 2. The Contractor shall notify customers of water service shut-down
43 and shall insure that such is held to a minimum.
44
45 3. The lid shall fit flush in the top of the box without forcing and shall
46 not rock, tip or rattle. Roadway boxes for bypass valves shall be
marked "BYPASS". Valve box lids shall be painted blue and
referenced to the closest curb by stenciling the distance and by

POTABLE WATER MAIN PIPING AND APPURTENANCES
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DESIGNED	J.V.K.		PROJECT:	IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)	DESCRIPTION:	UTILITIES 14 S. FT. HARRISON AVE., CLEARWATER, FL 33756	APPROVED BY:	WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605	DATE	4/3/17
DRAWN	S.A.T								PROJECT NO.	17.PC-07
CHECKED	W.G.R.								SHEET:	12 OF 18
REV. NO.	DATE	DESCRIPTION	REV. BY							

\\AED-SERVER\Shared_Folders\CADD\Municipal\Pinellas County\17-PC-07 (T) Sunset Beach Phase VI WM Design\Cadd\Current\PC-07-C07-C16.dwg, Nov 14, 2017 - 8:33am

1 D. Disinfection and pressure testing shall be completed on all the new
2 sections of water mains, including the fittings and valves. This shall be
3 determined as being up to the first O.S. & Y, the valve upstream of the
4 back-flow device/water meter or the end(s) of the newly installed water
5 main(s) as applicable.
6
7 E. All blow-off standpipes and injection points shall be removed upon
8 satisfactory completion of sampling and testing. Corporation stop shall
9 remain in the line. Water mains smaller than six inches, or mains without
10 fire hydrants or permanent blowoffs, the temporary blowoff and sample
11 points shall remain installed until such time as the main is cleared and has
12 been flushed before being placed into service.
13
14 F. Teflon tape will be required on all threaded joints to avoid contamination
15 (No pipe dope will be allowed).
16
17 G. It is the Contractor's responsibility to place blow-off and sample points
18 where designated by the approved plan as agreed upon by the Engineer,
19 County and review & permit authorities.
20
21 H. The County at their discretion shall have the authority to modify this policy
22 according to field conditions in coordination with the Contractor.
23
24 3.02 FLUSHING
25
26 A. All pipelines shall be flushed to remove the lighter solids in the line.
27 Because flushing cannot be relied on to remove heavy material allowed to
28 get into pipeline during installation, every precaution shall be made to
29 protect the pipeline against entrance of foreign material during the
30 installation process.
31
32 B. Every new pipeline shall be flushed at a minimum velocity of 2.5 feet per
33 second (fps) to ensure that the lighter solids are removed from the pipe
34 interior. (Note that it may be difficult to obtain scouring velocities in a pipe
35 over two hundred (200) feet in length.) Discharge velocity can be
36 determined by a simple field procedure involving the "trajectory" method.
37 For any size pipe discharging horizontally three feet above the ground, a
38 stream of water traveling at twelve (12) feet per second will strike the
39 ground six feet away. Similarly, a stream of water traveling at five feet per
40 second will strike the ground more than two feet from the end of the pipe.
41 This test must be made thru an open-ended pipe; it must not end with a
42 valve or fitting, which would be smaller than the inside diameter of the
43 pipe.
44
45 C. All pipelines eight inches in diameter or greater, or pipelines suspected of
46 having heavy foreign material in them, shall be subjected to open end

DISINFECTION OF POTABLE WATER MAINS
7/07/15 33 13 01 - 4 PC-ST5

1 H. Bacteriological test results for new and altered public drinking water mains
2 will be considered invalid if the pressure in the mains is not maintained at
3 20 psi or greater after the samples are collected.
4
5 I. Flushing and sampling shall be repeated, as required, if total coliform is
6 detected in a water sample. If necessary, the main shall be re-chlorinated.
7
8
9
10 3.06 ACTIVATION OF NEW WATER MAINS
11
12 A. No section of any main shall be put into service without the written
13 permission of the County and after the (FDEP) has cleared such main for
14 use.
15
16 B. After the Final or Partial "Letter of Clearance" has been issued by the
17 (FDEP) for a newly constructed water main and Pinellas County Utilities
18 Engineering is ready to authorize its activation, the water main(s) needs to
19 be thoroughly flushed before it is actually placed into service.
20
21 C. To achieve this flushing, fire hydrants may be utilized on 6-inch and larger
22 water mains. On water mains less than 6-inches, a permanent blow-off
23 may be used if provided. Otherwise the temporary blow-offs setup for the
24 flushing, chlorination and main clearance sampling procedures must be
25 utilized.
26
27 D. Before activation, new water mains should be flushed until the water runs
28 clean and clear. In addition, after the water main has been flushed, field
29 tests for Total Chlorine should be taken to ensure disinfection residuals
30 are similar to and representative of the source water. If the flushing has
31 been thoroughly completed, and a Total Chlorine residual greater than 1.5
32 to 1.8 is not detected, Pinellas County Utilities Water Quality Management
33 should be notified for additional follow up.
34
35 E. If a water main tie-in is involved or if the pressure in the main was not
36 maintained at 20 psi or greater, Pinellas County Utilities Water Quality
37 Management should be notified and water samples for bacteriological
38 analysis should be collected.
39
40
41
42
43
44
45
46

TABLE 1
DISINFECTION OF POTABLE WATER MAINS
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1 flushing to remove any foreign material from the pipeline. Pigging is
2 required in addition to open-end flushing.
3
4 D. A velocity of 5.0 fps is desirable and a velocity of 12 fps may be needed to
5 remove sand from river undercrossings and other subsurface inverts.
6
7 E. Table 1, provided at the end of this Specification, outlines the number and
8 size of flushing assemblies required.
9
10 F. During the flushing process, a clean white cup shall be used at all
11 sampling points to visually check for water clarity. When all the sample
12 points are clear, meaning there is no background sediment, and the
13 system chloramines residual is present, the line is ready to schedule for
14 chlorination.
15
16 G. In the case of mains twenty-four (24) inch and larger, preliminary flushing
17 may be replaced by stringent measures for removal of dirt and sediment
18 from the pipe and the thorough cleaning of its interior prior to filling with
19 the high chlorine solution. Swabbing with a chlorine solution may be
20 required at the discretion of the Engineer.
21
22 3.03 CHLORINATION
23
24 A. Upon satisfactory completion of all testing and flushing, the Contractor
25 shall furnish all materials and labor necessary to disinfect all water mains
26 in accordance with the applicable sections of AWWA C-601.
27
28 B. Prior to chlorine injection the following shall be ensured:
29
30 1. That the source water tap valve for the water mains to be
31 chlorinated has been shut off.
32
33 2. That all blow offs and sample points involved in the Project are
34 open.
35
36 3. That there are no open valves to activate water mains tied into the
37 water mains to be chlorinated.
38
39 4. That there is a uninterrupted supply of potable water or adequate
40 number of barrels to assure there is no interruption once the
41 injection process begins.
42
43 C. Disinfection of water mains shall be completed in accordance with
44 ANSI/AWWA C651 standards and shall include the following: preflushing
45 or cleaning of the water mains before the application of chlorine,
46 disinfecting the mains with the prescribed chlorine dose for the disinfection

DISINFECTION OF POTABLE WATER MAINS
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1 REQUIRED OPENINGS TO FLUSH PIPELINES (40 PSI RESIDUAL PRESSURE)
2 (For information purposes only)
3

Pipe Size	Flow (gpm Required to Produce 2.5 fps Velocity)	Orifice Size (in.)	Number of Hydrant Outlet Nozzles	Size (in.) of Hydrant Outlet Nozzles
2	25	2	1	2-1/2
4	100	2	1	2-1/2
6	220	2	1	2-1/2
8	390	2	1	2-1/2
10	610	2-5/16	1	2-1/2
12	880	2-13/16	1	2-1/2
14	1200	3-1/4	2	2-1/2
16	1565	3-5/8	2	2-1/2
18	1980	4-3/16	2	2-1/2

4
5
6 Note: A 2 1/2-inch hydrant outlet nozzle will discharge approximately 1,000 gpm and a
7 4 1/2-inch hydrant outlet nozzle will discharge approximately 2,500 gpm with 40 psi
8 residual pressure.
9
10
11 END OF SECTION

DISINFECTION OF POTABLE WATER MAINS
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1 method being utilized, allow for the proper amount of chlorine holding or
2 contact time, ensuring that the applicable chlorine residual was maintained
3 for the duration of the disinfection period, and final flushing and clearing of
4 the heavily chlorinated water with the disposal and treatment of the heavily
5 chlorinated water in accordance with applicable dechlorination methods.
6 All sampling points shall be at sites as designated by the approved plan or
7 (500) feet intervals or as agreed upon by the County as conditions dictate.
8 Satisfactory bacteriological analysis shall be determined by the results of
9 samples collected by the County Water Quality Management and
10 analyzed by the Pinellas County state certified lab in accordance with
11 Pinellas County Operating Procedures.
12
13 D. The County shall furnish the Contractor with sufficient water to perform the
14 disinfection required. As the chlorine solution is being injected the
15 chlorine residual at the closest sample point to the injection point shall be
16 tested with a high Cl₂ test kit or OTO reagent as applicable. Pinellas
17 County Utilities has set 50 mg/l as the targeted free chlorine residual for
18 new water main clearances as measured at the end of pipeline discharge.
19 The water flow or solution strength shall be adjusted as necessary to
20 achieve the recommended minimum chlorine strength.
21
22 E. As the high chlorine solution reaches each successive sample point, the
23 valve at the sample point shall be closed. Prior to closing the valve at the
24 last sample point, the following water main shut down process shall take
25 place in sequence:
26 1. The source water control valve shall be closed.
27 2. The injection pump should be shut off and its valve closed.
28 3. The last blow off/ sample point valve should be closed.
29
30 ALL BLOW-OFF VALVES SHALL NEVER BE CLOSED BEFORE THE
31 SOURCE WATER VALVE IS CLOSED.
32
33 F. The initial chlorine solution shall be no less than 50 ppm and not more
34 than 1000 ppm in concentration and shall be left standing in the main for a
35 period of not less than twenty-four (24) hours and not more than forty-
36 eight (48) hours. There must be a chlorine residual of 10 ppm at the
37 standpipe hose bib after twenty-four (24) hours. After this period, the high
38 chlorine water shall be drained and/or flushed from the system.
39
40 3.04 DRAINING, FLUSHING AND NEUTRALIZATION
41
42 A. Draining and/or flushing the solution from the main shall be the
43 responsibility of the Contractor and shall be performed so as not to cause
44 damage to the environment or create a nuisance to the owners of adjacent
45 property. The Contractor shall inform the Engineer of the proposed

DISINFECTION OF POTABLE WATER MAINS
7/07/15 33 13 01 - 6 PC-ST5

1 SECTION 33 35 01
2 RECLAIMED WATER MAIN PIPING AND APPURTENANCES
3
4
5 PART 1 - GENERAL
6
7 1.01 SCOPE OF WORK
8
9 A. The Contractor shall furnish all plant, labor, materials, equipment and tools
10 and perform all operations in connection with the construction of the
11 effluent or reclaimed water mains and appurtenances, including
12 excavation, trenching, backfilling, testing, clearing and clean-up.
13
14 1.02 MAINTAINING SERVICE AND SHUT DOWNS
15
16 A. The Contractor's attention is called to the fact that the existing system
17 must be kept in operation at all times. Where connections are made to
18 existing mains or other shutdowns are necessary, permission must be
19 obtained and arrangements must be made with the Utilities Department
20 before removing from service those mains that will be affected.
21 Shutdowns must be held to a minimum in number and duration.
22
23 B. No valve or other control device on the existing system shall be operated
24 by the Contractor without first obtaining approval from the Utilities
25 Department. The Contractor shall, at least forty-eight (48) hours in
26 advance, notify citizens subject to interruption of service by means of door
27 hangers or any other approved method of the starting time and duration of
28 such interruption.
29
30 1.03 SUBMITTALS
31
32 A. Unless waived by the Engineer, cut sheets for the entire reclaimed water
33 main shall be submitted by the Contractor to the Engineer for approval at
34 least two days prior to construction. This requirement will not relieve the
35 Contractor of the responsibility to accurately record the "as-built" locations
36 (horizontal and vertical) of piping, valving and appurtenances. Contractor
37 shall submit to the County the Continuity Testing Results per Section 3.04
38 Item 6.g.
39
40 1.04 LAYING PIPE
41
42 A. All roads and curbs shall be installed prior to reclaimed water main
43 installation. On a road where there is no curb, the paving must be done
44 prior to installing the reclaimed water main. Any deviation from this must
45 be approved in writing by the Engineer or his designated representative.
46

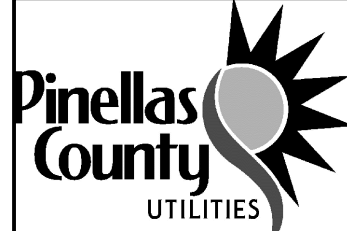
RECLAIMED WATER MAIN PIPING AND APPURTENANCES
7/07/15 33 35 01 - 1 PC-ST5

1 methods of disposal of the high chlorine solution and shall secure any
2 permits that may be necessary to dispose of such material.
3
4 B. Where applicable flushed water shall be treated to remove the chlorine
5 residual from the water being discharged that has the potential to impact
6 storm sewer, retention pond, lake, bay, gulf, or any other body of water,
7 chemicals for dechlorinating the water shall be as specified above. See
8 AWWA Standard C651, Disposal of Heavily Chlorinated Water, Appendix
9 C for additional details. This process shall be followed each time water is
10 discharged.
11
12 3.05 SAMPLING
13
14 A. The Contractor shall schedule bacteriological sampling through the
15 Pinellas County Inspector. A representative from the County Water
16 Quality Management shall meet with the Pinellas County Inspector and/or
17 the Contractor as applicable.
18
19 B. Before the water samples are collected, the Contractor shall ensure that
20 all the blow off(s) and sample point(s) are opened and that the source
21 water control valve is open.
22
23 C. Bacteriological sampling shall be conducted in accordance with Florida
24 Administrative Code (F.A.C.) 62-555.340. Samples may be collected after
25 first reducing the disinfection residual to no more than 4 mg/L or the
26 representative disinfection residual of the source water. Disinfection
27 residuals shall be measured and recorded. Bacteriological samples shall
28 be collected and analyzed on two or more consecutive business days
29 each taken at least six (6) hours apart. Samples shall be analyzed for the
30 presence of total coliform by the Pinellas County state certified lab.
31
32 D. Prior to initiating sampling, the WQM specialist will check for the Total
33 Chlorine Residual at the last sample point and confirm that the residual is
34 representative of the incoming source water.
35
36 E. If the Total Chlorine Residuals are satisfactory, the specialist will begin
37 water sample collection.
38
39 F. After the sampling is completed, the Contractor shall initiate the shut down
40 process using the following sequence:
41 1. Turn off blow off(s) and sample point(s).
42 2. Shut off the control valve.
43
44 G. Main Clearance Sampling is completed when each sample site has two
45 consecutive day satisfactory (Total Coliform Absent) results.
46

DISINFECTION OF POTABLE WATER MAINS
7/07/15 33 13 01 - 7 PC-ST5

1 In any case, reclaimed water facilities will not be accepted or tested until
2 curb and/or roads are complete, thus preventing possible relocation or
3 adjusting and retesting of newly installed pipes.
4
5 B. All joints, fittings and other appurtenances shall not be covered until
6 inspected by the County Inspector. Non-compliance will require
7 excavation of all joints and fittings.
8
9 C. The pipe and fittings shall be constructed as shown on the approved
10 Plans. All pipe four inches and larger in diameter may be deflected, but
11 not bent. PVC pipe two inches in diameter may be bent around cul-
12 deacs that have a radius of thirty-seven (37) feet or larger, if the trench is
13 left open until the County Inspector is onsite to document that this
14 guideline is fully complied with. The use of fittings not shown on the
15 "Contractor Copy" construction Plan must have the prior concurrence of
16 the County Inspector.
17
18 1.05 ABANDONMENT OF EXISTING MAINS BEING TAKEN OUT OF SERVICE
19
20 A. In general, pipe six inches and smaller abandoned within Pinellas County
21 rights-of-way shall be capped at both ends and abandoned in place.
22 Grouting is not required unless specifically required by the Engineer or the
23 County.
24
25 B. Abandoned pipes eight inches and larger shall be filled with grout or
26 flowable fill unless otherwise directed by the County or the Engineer.
27
28 C. Pipe abandoned in rights-of-way owned by municipalities other than
29 Pinellas County shall be subject to the requirements of the agency having
30 jurisdiction.
31
32 D. All pipes shall be abandoned in a manner which results in the abandoned
33 pipeline not being pressurized.
34
35 PART 2 - PRODUCTS
36
37 2.01 GENERAL
38
39 A. Materials, equipment and supplies furnished and permanently
40 incorporated into the Project shall be of first quality in every respect, shall
41 be constructed and finished to high standards of workmanship, and shall
42 be the product of an approved reputable manufacturer. Material shall be
43 suitable for the service intended, shall reflect modern design and
44 engineering and shall be fabricated in a first-class workmanlike manner.
45 All materials, equipment and supplies shall be new and not have been in
46

RECLAIMED WATER MAIN PIPING AND APPURTENANCES
7/07/15 33 35 01 - 2 PC-ST5

DESIGNED	J.V.K.		PROJECT:	IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)	DESCRIPTION:	UTILITIES 14 S. FT. HARRISON AVE., CLEARWATER, FL 33756	APPROVED BY:	WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605	DATE:	4/3/17
DRAWN	S.A.T								PROJECT NO.	17.PC-07
CHECKED	W.G.R.									SHEET:
REV. NO.	DATE	DESCRIPTION	REV. BY							

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1 service at any time previous to installation, except as required in tests or
2 incident to installation.
3 B. Materials and construction pertaining to restoration and construction of
4 roads and structures shall be in accordance with the latest edition of
5 Florida Department of Transportation (DOT) Standard Specifications for
6 Road and Bridge Construction or as called for on the Plans.
7
8 C. All ductile iron or cast iron pipe, fittings and valves and that portion of fire
9 hydrants that is underground, are to be encased in lavender polyethylene
10 material, conforming to the requirements of the County's Materials
11 Specification Manual. Polyethylene film shall be supplied in tube form
12 suitable for use in Installation Method 'A' per AWWA C105.
13
14 D. All piping and appurtenances used shall be color coded lavender with the
15 exception of ductile iron pipe. That shall be encased in lavender
16 polyethylene wrap, or if not available, encased in clear polywrap and shall
17 be marked by means of three four-inch wide painted lavender lines along
18 the length of the pipe at opposite locations around the pipe.
19
20 E. All PVC piping and ductile iron mains partially constructed of PVC or
21 HDPE between valves shall be installed with locator wires as specified
22 below.
23
24 F. Reclaimed water mains shall be buried with purple metallic locator tape.
25 All locator tape shall be placed twelve (12) inches above buried pipe.
26
27 G. No glued joints will be allowed. Mechanical restrainers are the only
28 acceptable method of restraint.
29
30 2.02 MATERIALS
31
32 A. All pipe and appurtenant materials used in the Pinellas County Reclaimed
33 Water System shall be as specified in the latest version of the Pinellas
34 County Utilities Material Specification Manual at the time of Plan approval.
35
36 PART 3 - EXECUTION
37
38 3.01 HANDLING
39
40 A. All materials, unless otherwise directed, shall be unloaded as nearby as
41 possible to the location of installation by the Contractor. Materials shall be
42 handled with care to avoid damage.
43
44 B. Materials shall be lifted by hoists or slid or rolled on skidways in such
45 manner as to avoid shock. Under no circumstances shall materials be
46 dropped. Pipe handled on skidways must not be allowed to roll against

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33 35 01 - 3

1 h. The locator wire shall be tested by the Contractor at the time
2 of pressure testing. If this test fails, the Contractor is
3 responsible for repairing the locator wire and the pressure
4 test will be rescheduled when the wire will pass.
5
6 7. Tracer Wire for Long Side Services
7
8 d. Each long side service or any service over 40 feet shall have
9 one (1) locator wire duct taped to top center of pipe.
10
11 e. The locator wire shall have colored insulation matching the
12 type of service provided in the service and be acceptable for
13 direct burial.
14
15 f. All splices of the wire shall be made with watertight
16 connections per material specification manual.
17
18 g. The wire shall be continuous along the service line.
19
20 h. The locator wire shall have one end sealed off and buried
21 within 12-inches of the connection to the main with the other
22 end stubbed off in the service box with enough slack
23 provided to extend 10 to 12-inches out of each service box.
24
25 8.. Contractor shall perform a tone test on each long side service using
26 a wire and cable locator. The locator wire system shall pass the
27 tone test prior to final acceptance of the service line. Any cuts or
28 breaks in the wire shall be repaired by the Contractor at his
29 expense.
30
31 B. Piggging, Flushing and Cleaning
32
33 1. All mains shall be pigged, cleaned and flushed to remove all sand
34 and other foreign matter. The Contractor shall be responsible for
35 developing a piggging and flushing plan to be submitted to the
36 Project Representative for approval prior to piggging and flushing.
37 The Contractor shall dispose of all water used piggging and for
38 flushing without causing nuisance or property damage, in
39 accordance with state and local requirements. Any permits or fees
40 required for the disposal of flushing water shall be the responsibility
41 of the Contractor.
42
43 2. Flushing water used by the Contractor shall be taken from an
44 approved metered source. The water utility will provide the meter
45 and designate the source. Potable and reclaimed flushing water
46 shall be at the Contractor's expense.

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1 pipe already on the ground. The Contractor shall be responsible for the
2 safe handling of all materials. Damaged materials shall not be installed.
3 C. All materials found during the progress of work to have flaws, cracks, or
4 other defects will be rejected by the Engineer regardless of whether or not
5 it has been installed and shall be replaced by and at the expense of the
6 Contractor.
7
8 D. All PVC pressure pipe, upon delivery to the site and until such time as it is
9 placed in the trench, shall be shielded from the weather and direct sunlight
10 to prevent pipe deterioration.
11
12 E. Materials shall not be stacked or placed under materials in such a manner
13 that damage could result.
14
15 F. Slings, hooks, or tongs used for lifting shall be padded in such a manner
16 as to prevent damage to exterior surfaces, interior linings and
17 components. If any part of the coating, lining or components is damaged,
18 the repairs or replacement shall be made by the Contractor at his expense
19 and in a manner satisfactory to the Engineer prior to attempting
20 installation.
21
22 G. In the event that materials supplied by the County are defective, the
23 Contractor shall notify the Engineer immediately so arrangements can be
24 made for replacing such devices.
25
26 3.02 FIELD LAYOUT AND MODIFICATIONS
27
28 A. The Contractor, unless directed otherwise, shall be responsible for setting
29 construction layout stakes and/or offsets required to complete the
30 designated Work. The Contractor shall insure that those stakes and/or
31 offsets are protected and any re-staking, due to work stoppage, shall be
32 included and no additional compensation to the Contractor will be made.
33
34 B. The Engineer has the right to make any modifications as he deems
35 necessary due to field conditions, conflicts with other utilities or to protect
36 other properties.
37
38 3.03 EXCAVATION, ALIGNMENT AND GRADE
39
40 A. Trench excavation and backfill shall be in accordance with Specification
41 31 23 33, Excavation and Backfill for Pipes.
42
43 B. All mains shall be laid and maintained at the required lines and grades
44 with fittings, valves and appurtenances at the described locations. All pipe
45 shall be laid to the depth as shown on the Plans, or when a depth is not
46 indicated, with a minimum cover of thirty (30) inches outside of the

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1 a. Reclaimed water should be used for reclaimed water mains.
2
3 b. Potable water can be used for all service types.
4
5 3. The cleaning of the new piping system shall be accomplished by the
6 controlled and pressurized passage of a series of hydraulic or
7 pneumatic polyurethane plugs of varying dimensions coatings, and
8 densities, which shall be selected by the pipe cleaning Contractor.
9 The Contractor shall provide a means to enter the pig into the
10 system, control and regulate flow, monitor flows and pressures, and
11 to remove the pig from the system. The Contractor shall maintain a
12 constant surveillance of the system and immediately report to the
13 proper authority any in-line problems encountered or any
14 malfunctions discovered in the piping system. A record of pig
15 models, sizes, styles, and other pertinent information shall be kept
16 by the Contractor and turned over to the County.
17
18 4. The Contractor shall furnish pig launching and retrieval equipment
19 to minimize additional valving, fittings and auxiliary water supplies.
20 Valves and blowoff assemblies, which are installed as part of the
21 project, shall be used as much as possible to minimize the number
22 of temporary ports required for proper flushing and cleaning.
23
24 5. All materials used shall be specifically manufactured for flushing
25 and cleaning pressure pipes, bends and valves. The pigs shall be
26 able to go through bends, open valves and fittings, and provide
27 adequate cleaning of the pipe.
28
29 6. Cost of Piggging Services- The cost to complete the requirements
30 under this section shall be included in the contract items provided in
31 the proposal sheet. There is no separate pay item for this work.
32
33 C. Jointing HDPE Pipe and Fittings
34
35 1. HDPE pipe shall be jointed by the butt-fusion process in
36 accordance with pipe manufacturer's directions. Contractor shall
37 provide butt-fusion technicians who are trained and certified by the
38 P.E. pipe manufacturer to complete the project. The date of
39 technician certification shall not exceed 12 months before
40 commencing construction.
41
42 2. Butt-fusion means the butt-joining of the pipe by softening the
43 aligned faces of the pipe ends in a suitable apparatus and pressing
44 them together under controlled pressure.
45
46

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1 roadway, and thirty-six (36) inches under the roadway. Grade lines shall
2 be set by the Engineer. The tolerance of such grades shall be more
3 than that specified on the drawings. When no tolerance is indicated a
4 tolerance of 0.5 foot shall be used. All other realignments must be
5 approved by the Engineer. The Contractor shall have suitable survey
6 equipment on the site at all times.
7
8 C. The Work shall at all times progress with caution to prevent damage to
9 underground obstructions, both known and unknown. Should an
10 obstruction not shown on the Plans be encountered, the Engineer shall be
11 immediately notified and he shall be responsible for alteration to the Plan,
12 should realignment be necessary. The Contractor shall notify the
13 Engineer far enough in advance to allow the realignment to be
14 accomplished by deflection in the pipe joints.
15
16 3.04 LAYING AND JOINING BURIED RECLAIMED WATER MAINS
17
18 A. General
19
20 1. Prior to installation, all pipe shall be inspected for defects and all
21 lump or excess coatings shall be removed. The inside of the bell
22 and outside of the spigot shall be cleaned prior to joining of all pipe.
23 Caution shall be taken to prevent damage to the pipe during
24 lowering into the trench. Caution shall be taken to prevent foreign
25 matter from entering the pipe during installation. The Engineer may
26 require covering of the end of the pipe to prevent debris from
27 entering. No debris, tools, clothing or other material shall be placed
28 in the pipe.
29
30 2. After placement in the trench, the spigot end of the pipe shall be
31 centered in the bell and the pipe shall be driven home and then
32 brought to the proper line and grade by tamping approved backfill
33 material under it, except for the bell. Joint deflection shall not
34 exceed manufacturer's limit.
35
36 3. During the time that the pipe is in the trench, but no work is in
37 progress, the end shall be closed by a water-tight plug. This shall
38 include the noon hour, as well as overnight. If there is water in the
39 trench upon beginning work, this plug shall remain in place until the
40 trench has been pumped dry, unless otherwise approved by the
41 Engineer.
42
43 4. Standard plugs shall be inserted into all dead end pipes, tees or
44 crosses; spigot ends shall be capped; flanged ends shall have blind
45 flanges, or sheet metal or plywood caps. Plugs installed for

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33 35 01 - 5

1 3. The internal and external beads resulting from the butt-fusion
2 process shall be visible and examined for penetration 360 degrees
3 around the pipe diameter.
4
5 4. All fittings for HDPE pipe (4" and larger), except for D.I./HDPE
6 Mechanical Joint Adaptors, shall be ductile iron mechanical joint
7 fittings per material specification manual and shall be joined to the
8 pipe using a butt fused restrained mechanical joint adapter.
9
10 5. The D.I./HDPE mechanical joint adapter shall be connected to the
11 HDPE pipe by a heat-fused joint on one end, and connected to a
12 ductile iron pipe valve, or fitting with a mechanical joint on the other
13 end.
14
15 6. Solvent epoxy cementing, electro-fusion couplings and
16 mechanical jointing with bolt on wrap around clamps or mechanical
17 joints with out an adapter shall not be used for connections.
18
19 7. Short pieces of pipe between valves and fittings shall be DIP with
20 all joints restrained for sizes 3-inches and larger. For 2-inch, the
21 short pieces shall be brass or Sch. 80 with IP threads and DI,
22 HDPE or brass fittings and all joints restrained.
23
24 D. Jointing Push-On Ductile Iron, Steel and PVC Pipe
25
26 1. The inside of the bell and the outside of the spigot end shall be
27 thoroughly cleaned to remove dirt, grit, oil or excess coatings and
28 other foreign matter. The rubber gasket shall be flexed inward and
29 inserted in the gasket recess of the bell socket. A thin film of
30 gasket lubricant shall be applied to either the inside surface of the
31 gasket or the spigot ends, care will be taken to avoid contact with
32 the ground. The joint shall be completed by forcing the plain end to
33 the bottom of the socket with a forked tool or jacking device or other
34 approved method. All pipe shall have depth mark prior to insertion.
35 Pipe cut in the field shall be filed to resemble the spigot end of
36 manufactured pipe.
37
38 2. When deflection is required, the joint shall be completed prior to
39 setting the deflection. The deflection shall conform to applicable
40 AWWA Standards or manufacturer's recommendation, with prior
41 Engineer's approval.
42
43 E. Jointing Mechanical Joint Pipe and Fittings
44
45 1. The inside of the socket, the outside of the spigot end and the
46 gland shall be thoroughly cleaned and or washed with an approved

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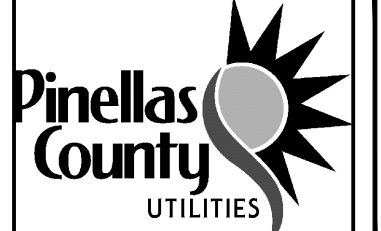
1 pressure testing shall be fully secured and blocked to withstand the
2 test pressure.
3
4 5. Where plugging is required, because of Contract division or
5 phasing for later connection, the ends of such lines shall be
6 equipped with a permanent type cast iron or ductile iron plug/cap or
7 blind flange with or without a blowoff cock, as shown on the
8 Drawings. Installation or removal of such plugging shall be
9 considered incidental to the Work and no payment shall be
10 expected for this work by the Contractor.
11
12 6. Tracer Wire For PVC, HDPE and Non-Continuous Ductile Iron
13 Mainlines
14
15 a. Tracer wire shall be installed on all mainline pipe. Mainline
16 pipe installed by open cut method shall have two (2) 14-
17 gauge minimum solid copper or two (2) 12-gauge copper-
18 clad steel tracer wires lapped to the top center of the pipe.
19 Mainline pipe installed by horizontal directional drill shall
20 have two (2) 12-gauge copper-clad steel tracer wires
21 installed with the pipe. All tracer wire shall be as specified in
22 the material specification manual.
23
24 b. The locator wires shall have colored insulation matching the
25 type of service provided in the main and be acceptable for
26 direct burial.
27
28 c. All splices of the wires shall be made with watertight
29 connections per material specification manual.
30
31 d. The wires shall each be continuous throughout the project.
32
33 e. The wire is to be tied to all valves, tees and elbows
34
35 f. The locator wires shall be brought up into all valve boxes
36 with enough slack provided to extend 10 to 12-inches out of
37 each box and installed as shown in the Standard Details.
38
39 g. Contractor shall perform a 12-volt DC electrical continuity
40 test on each of the wires. No more than one volt of loss per
41 1000 feet of mainline pipe will be acceptable. The locator
42 wire system shall pass the 12-volt DC electrical continuity
43 test for at least one wire prior to final acceptance of the
44 pipeline. Any cuts or breaks in the wire shall be repaired by
45 the Contractor at his expense.
46

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1 solution to remove dirt, grit, oil or excess coatings and foreign
2 matter to improve gasket seating. The gland shall then be placed
3 on the plain end of the pipe with the lip extension toward the plain
4 end, followed by the gasket with the narrow edge of the gasket
5 toward the plain end of the pipe. The pipe shall be inserted into the
6 socket and the gasket pressed firmly and evenly into the gasket
7 recess. The joint shall be kept straight during the assembly and
8 any deflection required shall be done after the joint has been
9 assembled, but prior to tightening the bolts.
10
11 F. Jointing Flanged Ductile Iron and Flanged Steel Pipe
12
13 1. Flanged joints are intended mostly for above ground use and the
14 underground use of this joint is generally not desirable because of
15 the rigidity of the joint.
16
17 2. The flanges shall be thoroughly cleaned to remove dirt, oil or
18 foreign matter. The flanged joints shall be fitted so that the contact
19 faces bear uniformly on the gasket and are tightened in a crisscross
20 order with a relatively uniform bolt stress.
21
22 3. The gaskets shall be installed in a manner that water tightness is
23 achieved without over torquing the bolts and as recommended by
24 the manufacturer. If, after tightening the bolts to the specified
25 torque, water continues to leak, the joint shall be disassembled and
26 properly reassembled.
27
28 4. The Contractor shall be very careful to prevent bending or torsional
29 strains from being applied to flanges, flanged fittings or flanged
30 appurtenances. Flanged pipe shall be properly anchored,
31 supported or restrained to prevent breakage of fittings and flanges.
32
33 5. Bolt requirements are as follows:
34

Pipe Size (inches)	Number Per Joint	Bolt Size (inches)	Threads per inch	Torque Ft-lbs
4	8	5/8 x 3	11	80
6	8	3/4 x 3 1/2	10	100
8	8	3/4 x 3 1/2	10	100
10	12	7/8 x 4	9	160
12	12	7/8 x 4	9	160
16	16	1 x 4 1/2	8	245
20	20	1 1/8 x 3	7	390
24	20	1 1/4 x 5 1/2	7	545
30	28	1 1/4 x 6 1/2	7	545
36	32	1 1/2 x 7	6	875

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DESIGNED	J.V.K.		PROJECT:	IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)		DESCRIPTION:	UTILITIES 14 S. FT. HARRISON AVE., CLEARWATER, FL 33756		APPROVED BY:	WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605	DATE:	4/3/17
DRAWN	S.A.T			TECHNICAL SPECIFICATIONS						PROJECT NO.	17.PC-07	
CHECKED	W.G.R.										SHEET:	15 OF 18
REV. NO.	DATE	DESCRIPTION	REV. BY									

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1	42	36	1 1/2 x 7 1/2	6	875
2	48	44	1 1/2 x 8	6	875
3	54	44	1 3/4 x 8 1/2	5	1550
4	G. Jointing Special Joint Ductile Iron Pipe				
5	1. Other special joint pipe shall be assembled or installed per manufacturer's recommendations or directed by the Engineer. The Contractor shall insure that the joint is thoroughly cleaned by removing all dirt, oil, grit, excess coatings and foreign matter to insure a tight joint.				
6	3.05 TEMPORARY AND PERMANENT PLUGGING				
7	A. Temporary plugging of pipes shall be performed at the time of construction when the work is interrupted due to lunch breaks, end of shift or any other reason that require work to stop for more than half an hour.				
8	B. Permanent plugs shall be inserted into the bells of all dead-ends of pipe, tees, or crosses and plain ends shall be capped. All plugs and caps shall be properly restrained as called for on the Plans or Standard Details.				
9	3.06 REMOVAL OF OUT OF SERVICE PIPE				
10	A. Due to certain permit requirements, pipe that is to be removed from service will have to be physically taken out of the ground. The limits of pipe to be removed shall be specifically called for in the Plans or shall be approved in writing by the Engineer. Any other removal not specifically called for, shall be considered incidental to construction of other items in the Contract and the Contractor will not receive compensation for such work.				
11	B. When removing pipe, the Contractor shall excavate a trench wide enough to dislodge the pipe from the surrounding soil, and long enough to be able to handle the pipe without causing any damage to nearby utilities, structures or adjacent property.				
12	C. The removed pipe, fitting and appurtenances will become the Contractor's property and he shall be responsible for proper disposal and any required permits thereof.				
13	D. Refer to Specification 01 35 00, Special Project Procedures, for removal of asbestos cement (AC) pipe.				
14	RECLAIMED WATER MAIN PIPING AND APPURTENANCES				
15	7/07/15	33 35 01 - 11	PC-ST5		

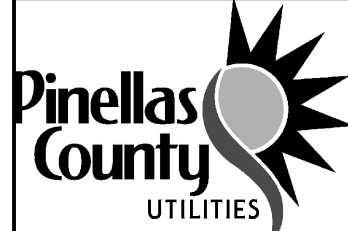
1	3.12 SERVICE METERS AND ACCESSORIES				
2	A. Unless specified to be furnished by the Contractor under a separate pay item, all meters, reduced pressure devices, double check valves, etc., will be supplied by the Utilities Department. The Contractor shall pick-up such devices, where directed, and shall inspect them thoroughly and shall insure that they are in proper working order.				
3	B. The Contractor shall install meters, backflow devices, double check valves, etc. at locations called for in the Plans, as sketched out or as directed by the Engineer. No meter or accessory is to be installed outside of the right-of-way unless easements have been secured or as specifically directed by the Engineer.				
4	C. When relocating meters, the Contractor shall insure that the meter is operational. If the meter or accessories are damaged, he shall bring this to the attention of the Engineer. Meter boxes shall be replaced, as well as brass fittings and pipe inserts, and shall be considered incidental to the cost of relocating meters.				
5	D. All meter, backflow, reduced pressure device, etc., installations shall be made in accordance with Pinellas County Utilities Department Standard Construction Details.				
6	3.13 SERVICE LINES AND SERVICE CASINGS				
7	A. Service line casings shall be installed on all long side services. Casings may be installed using the pneumatic bullet method, subject to the requirements of the entity having jurisdiction for the roadway.				
8	B. Service casings for one-inch services casings shall be Schedule 80 PVC or SDR-9 HDPE two inches in diameter for single services three inches in diameter for double services.				
9	C. All casings shall be marked on both sides of the road with a six inch wide lavender stripe running across the curb in the direction of the casing. A single strand of lavender tracer wire shall be installed with the casing and extend up the 2 x 4 that is required at the end of the casing. The 2 x 4 will be six feet in length and painted lavender.				
10	D. The depth to the top of the casings shall be thirty (30) inches to thirty-six (36) inches. Casings that are installed deeper than thirty-six (36) inches shall be removed and installed at the correct depth. Casings shall extend a minimum of five feet beyond the existing back-of-curb or edge of roadway. Exceptions to this requirement due to physical constraints shall require prior approval by the Engineer.				
11	RECLAIMED WATER MAIN PIPING AND APPURTENANCES				
12	7/07/15	33 35 01 - 15	PC-ST5		

1	3.07 INSTALLATION OF PIPE UNDER DRIVEWAYS				
2	A. At the Engineer's discretion, the Contractor will be required to auger pipes under driveways, structures or trees to avoid removal or expensive restoration of those structures. The Contractor will be allowed to utilize an auger machine and to push or pull the carrier pipe into the bore without the need of a casing.				
3	B. The Contractor shall install the water pipe within the bore hole on a line and grade to allow connection to open cut piping adjacent to the bore hole within pipe jointing alignment limits defined for the pipe in question. The completed installation shall not result in settlement of soil under the driveway.				
4	3.08 INSTALLATION OF PIPE UNDER HIGHWAYS AND RAILROADS				
5	A. The Contractor shall furnish and install protective steel pipe casings and/or carrier pipe under highways/railroads in the pipe size, thickness, length, location and details as shown on the Drawings and as specified herein. The Contractor's attention is particularly directed to the requirements of the particular municipal or private owner or Department of Public Works having jurisdiction over the highways/railroads, whether through permit, verbal or other directions.				
6	B. The construction shall not be started until the necessary permits have been obtained, a copy is at the job site, and proper notice and approval for construction has been obtained from the owner of the highway/railroad and the Engineer.				
7	C. All necessary materials, equipment, labor and traffic protection devices shall be on the job site before requesting permission to start the Work.				
8	D. Steel casings and the installation thereof required for highway/railroad crossings shall be in accordance with the standards and requirements of the Florida Department of Transportation (FDOT) or railroads or AASHTO Standards and the Specifications outlined herein. All work of this nature shall be performed by qualified Contractors regularly engaged in that type or work and shall be subject to approval by the Engineer.				
9	E. All work shall be in accordance with Specification 33 05 20, Jacking and Boring.				
10	RECLAIMED WATER MAIN PIPING AND APPURTENANCES				
11	7/07/15	33 35 01 - 12	PC-ST5		

1	E. Reclaimed water service line shall be (1") one-inch minimum size.				
2	3.14 INSTALLATION OF BOLTS ON MECHANICAL JOINTS				
3	A. Align bolt holes and insert bolts, with bolt heads behind the bell flange, and tighten opposite nuts to keep the gland square with the socket. Tighten the nuts in accordance with following table:				
4		Bolt Diameter (inches)	Torque (ft-lb)		
5		5/8	45-60		
6		3/4	75-90		
7		1	85-100		
8		1 1/4	105-120		
9	3.15 PAINTING				
10	A. All above ground installations shall be painted OSHA safety precaution lavender. Paint application shall be in accordance with the paint manufacturer's recommendation.				
11	B. Paint shall be as specified in the County Materials Specification Manual.				
12	C. Guard post shall be painted OSHA safety yellow.				
13	D. All painting shall be in accordance with Section 09 91 00, Painting.				
14	3.16 PRESSURE TESTING				
15	A. All reclaimed water mains shall be tested in accordance with Specification 01 45 17, Pipeline Pressure and Leakage Testing Requirements.				
16	END OF SECTION				
17	RECLAIMED WATER MAIN PIPING AND APPURTENANCES				
18	7/07/15	33 35 01 - 16	PC-ST5		

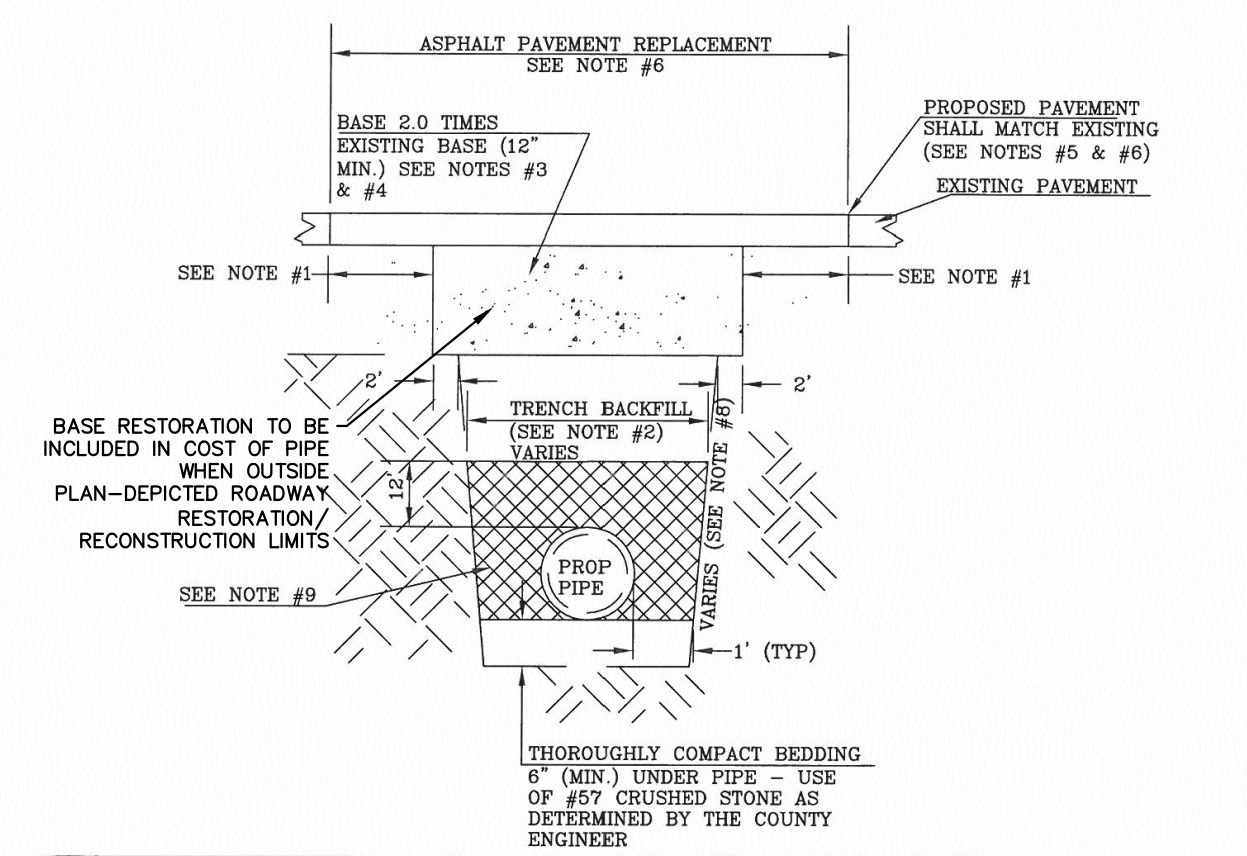
1	3.09 FITTINGS				
2	A. All fittings shall be restrained by means of restraining devices such as restainer glands, restraining gaskets, etc.				
3	B. Fittings shall be set and joined to the pipe and each type of joint as specified for pipe.				
4	C. Trenching and backfilling for all fittings shall also be in accordance with Section 31 23 33, Excavation and Backfill for Pipes.				
5	D. The use of thrust blocks in new lines is prohibited and shall only be limited to areas in which a new fitting has been installed in an existing line and is not feasible to restrain joints or when directed by the Engineer.				
6	E. The use of "reverse dead-man" shall be as described under Standard Details for dead-end valves or in circumstances that the Engineer deems it necessary and shall be performed under his direction.				
7	3.10 VALVES				
8	A. Valves shall be set and joined to the pipe and each type of joint as specified for pipe.				
9	B. Trenching and backfilling for all valves shall also be in accordance with Specification 31 23 33, Excavation and Backfill for Pipes.				
10	C. Cast iron valve boxes shall be firmly supported, maintained centered and plumb over the operating nut of the valve. Outside of paved areas, valve boxes shall be set in a 2' x 2' x 6" thick concrete collar, along with a brass ID tag, as shown in Standard Details. The box cover shall be flush with the surface of the finished pavement. All box lids shall be painted lavender and shall have the word "RECLAIMED WATER" OR "RECLAIMED" cast in the lid.				
11	D. All reasonable effort must be made to locate valves/valve boxes, back of curb, in grass areas and at street corners, whenever possible. Valves should be kept in clusters within two feet of the tee, when possible.				
12	E. Valve boxes in areas that will require sod at a later date, must be left one to two inches above existing grade (to allow for sod thickness).				
13	F. All valves/boxes shall be located by means of a perpendicular 6" x 2" lavender stripe across the curb. The distance from the back of the curb to the valve will be stenciled on the curb with numbers four inches high, painted lavender, by the Contractor. This information will be referenced on the pavement if no curbs are to be installed. All valve box tops shall be				
14	RECLAIMED WATER MAIN PIPING AND APPURTENANCES				
15	7/07/15	33 35 01 - 13	PC-ST5		

1	painted lavender. All valves must be centered over the operating nut/wheel and all valves, after being fully opened, will be backed off one-quarter turn to prevent them from being jammed open. This procedure should take place only after the main has passed pressure testing and has been accepted by the County.				
2	G. All dead end valves shall be restrained with a reverse deadman, per the Standard Details.				
3	H. Should the operating nut be more than three feet below the final grade, an extension shall be supplied and installed by the Contractor. The extension shall bring the nut to within twelve (12) inches of final grade.				
4	I. Installation of Valves on Existing Mains				
5	1. When installing valves in existing mains (cutting-in), the Contractor shall insure that the pipe is kept clean at all times and no debris, ground water, mud, oil, etc. will make their way into the pipe.				
6	2. The Contractor shall notify customers of reclaimed water service shut-down and shall insure that such is held to a minimum.				
7	3. The lid shall fit flush in the top of the box without forcing and shall not rock, tip or rattle. Roadway boxes for bypass valves shall be marked "BYPASS". Valve box lids shall be painted lavender and referenced to the closest curb by stenciling the distance and by painting a six inch wide by two feet long stripe perpendicular to the curb of the roadway.				
8	J. Removal and Disposal of Existing Valves				
9	1. Any valve, unless otherwise specified, that is removed from the System shall become the property of the Contractor and he shall ensure proper disposal.				
10	3.11 TAPPING OF MAINS				
11	A. The Contractor, after installing the sleeve and prior to making the tap, shall insure that the sleeve is providing a watertight joint by means of pressure testing with pressures in accordance with Specification 01 45 17, Pipeline Testing Requirements. If leaks are present, the Contractor will be required to repair them to the satisfaction of the Engineer.				
12	RECLAIMED WATER MAIN PIPING AND APPURTENANCES				
13	7/07/15	33 35 01 - 14	PC-ST5		

DESIGNED	J.V.K.		PROJECT:	IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)	DESCRIPTION:	UTILITIES 14 S. FT. HARRISON AVE., CLEARWATER, FL 33756	APPROVED BY:	WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605	DATE:	4/3/17
DRAWN	S.A.T								PROJECT NO.	17-PC-07
CHECKED	W.G.R.									SHEET:
REV. NO.	DATE	DESCRIPTION	REV. BY	CHECKED						

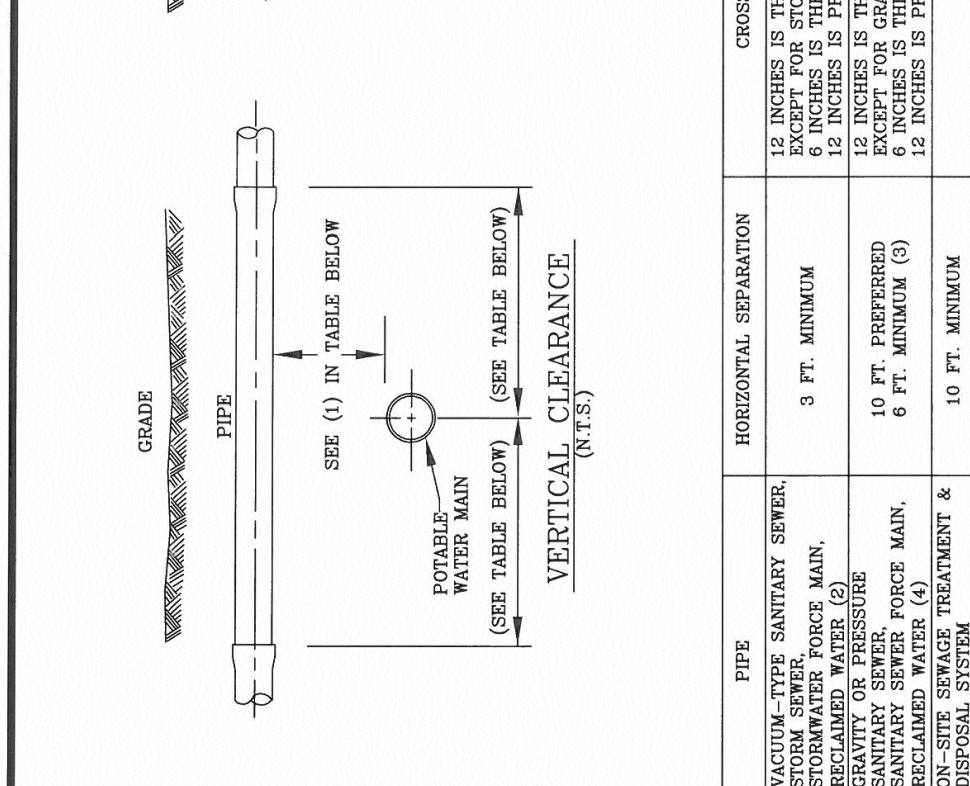
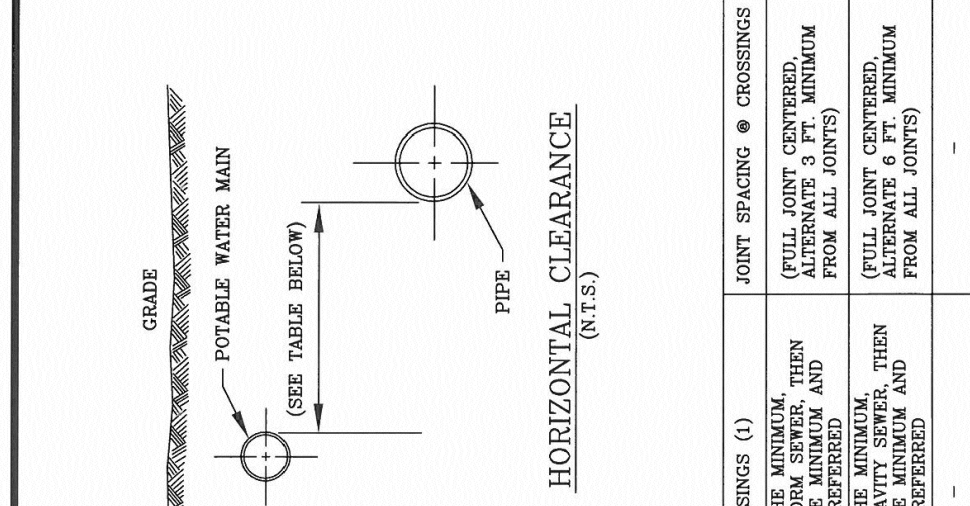
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- NOTES:**
- MILING AND RESURFACING LIMITS: 3'-0" FOR RESIDENTIAL ROADS, 25'-0" FOR ALL OTHER TYPES OF ROADS.
 - BACKFILL FOR TRENCH SHALL BE PLACED IN 6" COMPACTED LAYERS TO 100% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99. (EXCAVATION FLOWABLE FILL OPTION IS SUBJECT TO COUNTY ENGINEER'S APPROVAL). TEST REPORTS ARE REQUIRED AND SHALL BE SUBMITTED TO PINELLAS COUNTY.
 - BASE MATERIAL SHALL BE LIME ROCK OR CRUSHED CONCRETE (MIN. 100) AND SHALL BE PLACED IN 6" COMPACTED LAYERS TO 98% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-100 (MODIFIED) (TEST REPORTS ARE REQUIRED AND SHALL BE SUBMITTED TO PINELLAS COUNTY).
 - AS AN ALTERNATIVE TO COMPACTED BASE AND IN WET AREAS, FULL-DEPTH ASPHALTIC CONCRETE, FINE TRAFFIC LEVEL, C TYPES SP-9.5 OR 12.5, SHALL BE PLACED IN 2" COMPACTED LAYERS WITH A MINIMUM THICKNESS EQUAL TO THE EXISTING BASE (6" MIN).
 - ASPHALTIC CONCRETE PAVEMENT JOINTS SHALL BE SAW-CUT AND ALL SURFACES TACK COATED.
 - ASPHALT SURFACE SHALL BE CONSISTENT WITH EXISTING GRADE. IN ACCORDANCE WITH PINELLAS COUNTY SPECIFICATIONS, THE FOLLOWING ROADWAY CLASSIFICATION TYPE/THICKNESS ARE REQUIRED: ARTERIAL-3" MIN. TYPE SP-12.5 FINE TRAFFIC LEVEL "C", COLLECTOR-2" MIN. TYPE SP-12.5 FINE TRAFFIC LEVEL "C", RESIDENTIAL-18" MIN. TYPE SP-9.5 TRAFFIC LEVEL "C" (TEST REPORTS ARE REQUIRED AND SHALL BE SUBMITTED TO PINELLAS COUNTY).
 - OVERLAY OF CONSTRUCTION SCARS TO PAVEMENT AND TRENCH SHALL BE REQUIRED AS DIRECTED BY THE COUNTY ENGINEER.
 - EXCAVATION SHALL COMPLY WITH THE TRENCH SAFETY ACT REQUIREMENTS.
 - INSTALL DRY COMPACTABLE MATERIAL AROUND THE PIPE.
 - ALL MATERIAL, WORK AND TESTING SHALL MEET PINELLAS COUNTY STANDARD SPECIFICATIONS.
 - CONTRACTOR SHALL RESTORE PAVEMENT TO MATCH THE GRADES THAT EXISTED PRIOR TO CONSTRUCTION. ANY ADDITIONAL SURVEY NECESSARY TO ENSURE THAT THIS REQUIREMENT IS MET SHALL BE PERFORMED AT THE CONTRACTOR'S EXPENSE.



PINELLAS COUNTY
DEPARTMENT OF ENVIRONMENT AND INFRASTRUCTURE
(D.E.I.)
PAVEMENT CUTS, EXCAVATION AND RESTORATION

DETAIL INDEX T.O.: 1291
DATE: SEPTEMBER/2012
DIV. DIRECTOR OF ENV. TECH. SUPPORT
REVISION: [Signature]



PIPE	CROSSINGS (1)	JOINT SPACING @ CROSSINGS (FULL JOINT CENTERED, FROM ALL JOINTS)
12" DIA. SANITARY SEWER	3 FT. MINIMUM	12 INCHES TO THE MINIMUM AND ALTERNATE 8 FT. MINIMUM (FROM ALL JOINTS)
18" DIA. SANITARY SEWER	5 FT. MINIMUM	12 INCHES TO THE MINIMUM AND ALTERNATE 8 FT. MINIMUM (FROM ALL JOINTS)
24" DIA. SANITARY SEWER	10 FT. MINIMUM	12 INCHES TO THE MINIMUM AND ALTERNATE 8 FT. MINIMUM (FROM ALL JOINTS)

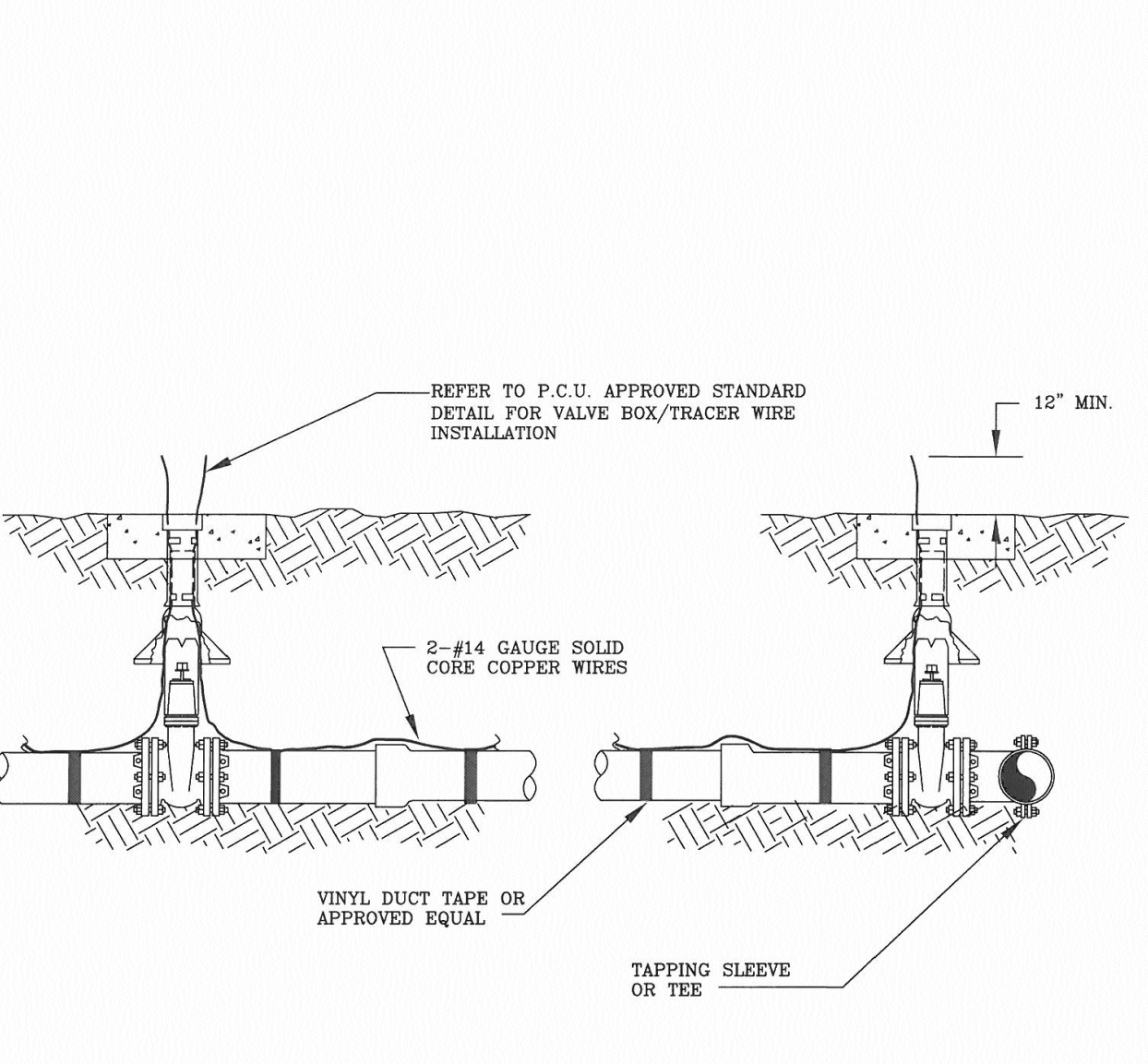
NOTES: (IN ACCORDANCE WITH E.A.C. RULE 62-555.04)

- POTABLE WATER MAIN SHOULD CROSS ABOVE OTHER PIPE WHEN POTABLE WATER MAIN MUST BE BELOW OTHER PIPE. THE MINIMUM SEPARATION IS 12 INCHES.
- MINIMUM SEPARATION IS 12 INCHES.
- 3 FT. FOR GRAVITY SANITARY SEWER WHERE THE BOTTOM OF THE WATER MAIN IS 12 INCHES ABOVE THE BOTTOM OF THE SANITARY SEWER.
- RECLAIMED WATER NOT REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C. SPECIFICATIONS MANUAL.

PINELLAS COUNTY
DEPARTMENT OF ENVIRONMENT AND INFRASTRUCTURE
(D.E.I.)
MAIN CLEARANCES
DETAIL

DETAIL INDEX T.O.: PCU GD 2
DATE: SEPTEMBER/2012
DIV. DIRECTOR OF ENV. TECH. SUPPORT
REVISION: [Signature]

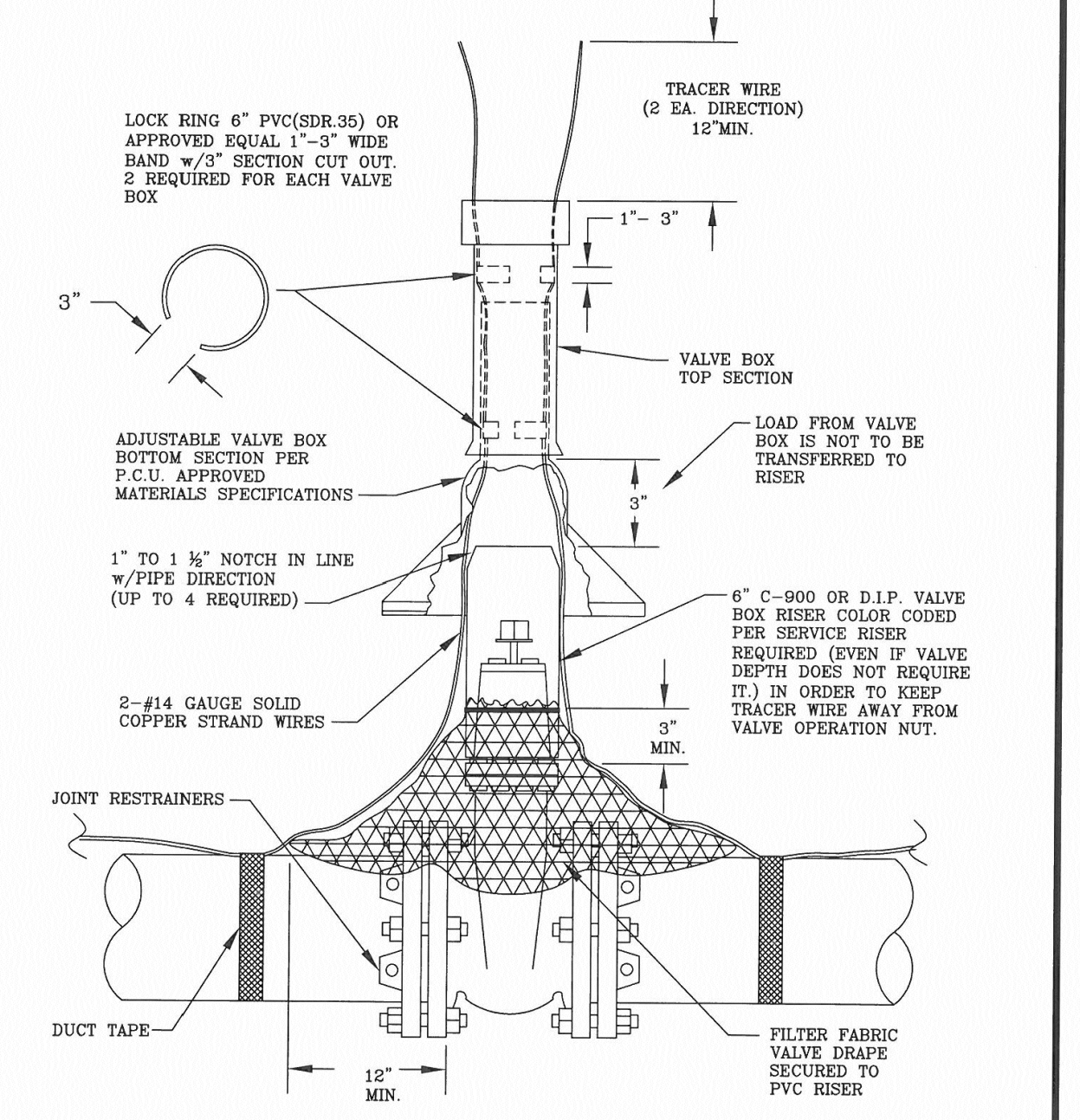
- NOTES:**
- ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.
 - USE 2-#14 GAUGE (MINIMUM), SOLID CORE COPPER WIRE WITH COLOR CODED INSULATION PER SERVICE.
 - TRENCH SHALL BE SUFFICIENT DEEP TO EXTEND A MIN. OF 12" ABOVE VALVE BOX.
 - WIRE IS TO CONTINUE THROUGH TEES ON MAIN LINE WHERE NO VALVES EXIST.
 - ATTACH WIRE TO TOP CENTER LINE OF MAIN USING DUCT TAPE OR APPROVED EQUAL @ 2'-0" INTERVALS.
 - DUMMY BOXES ARE TO CONSIST OF A TOP SECTION OF A VALVE BOX ASSEMBLY ENCASED IN A CONCRETE VALVE BOX COLLAR PER P.C.U. APPROVED STANDARD DETAIL.



PINELLAS COUNTY
DEPARTMENT OF ENVIRONMENT AND INFRASTRUCTURE
(D.E.I.)
TRACER WIRE INSTALLATION
DETAIL

DETAIL INDEX T.O.: PCU GD 3a
DATE: SEPTEMBER/2012
DIV. DIRECTOR OF ENV. TECH. SUPPORT
REVISION: [Signature]

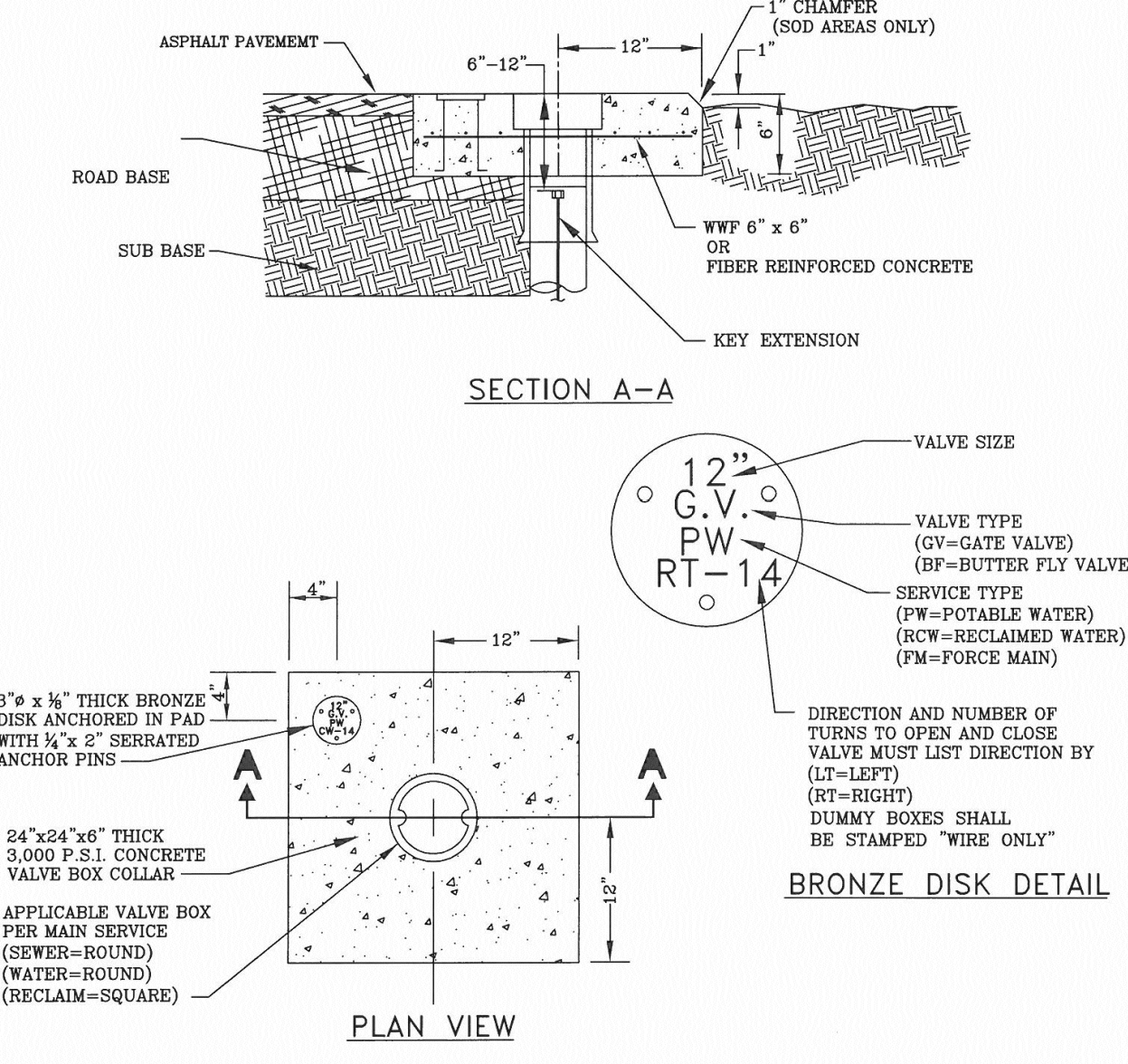
- NOTES:**
- ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.
 - FILTER FABRIC REQUIRED ON VALVES WHEN PIPE LINE HAS 6" OR MORE OF COVER. VALVE KEY EXTENSION REQUIRED ON VALVES WITH OPERATOR NOT OVER 3' DEEP. COLOR CODED POLY WRAP REQUIRED ON ALL BURIED VALVES AND FITTINGS.



PINELLAS COUNTY
DEPARTMENT OF ENVIRONMENT AND INFRASTRUCTURE
(D.E.I.)
VALVE BOX/TRACER WIRE INSTALLATION
DETAIL

DETAIL INDEX T.O.: PCU GD 4
DATE: SEPTEMBER/2012
DIV. DIRECTOR OF ENV. TECH. SUPPORT
REVISION: [Signature]

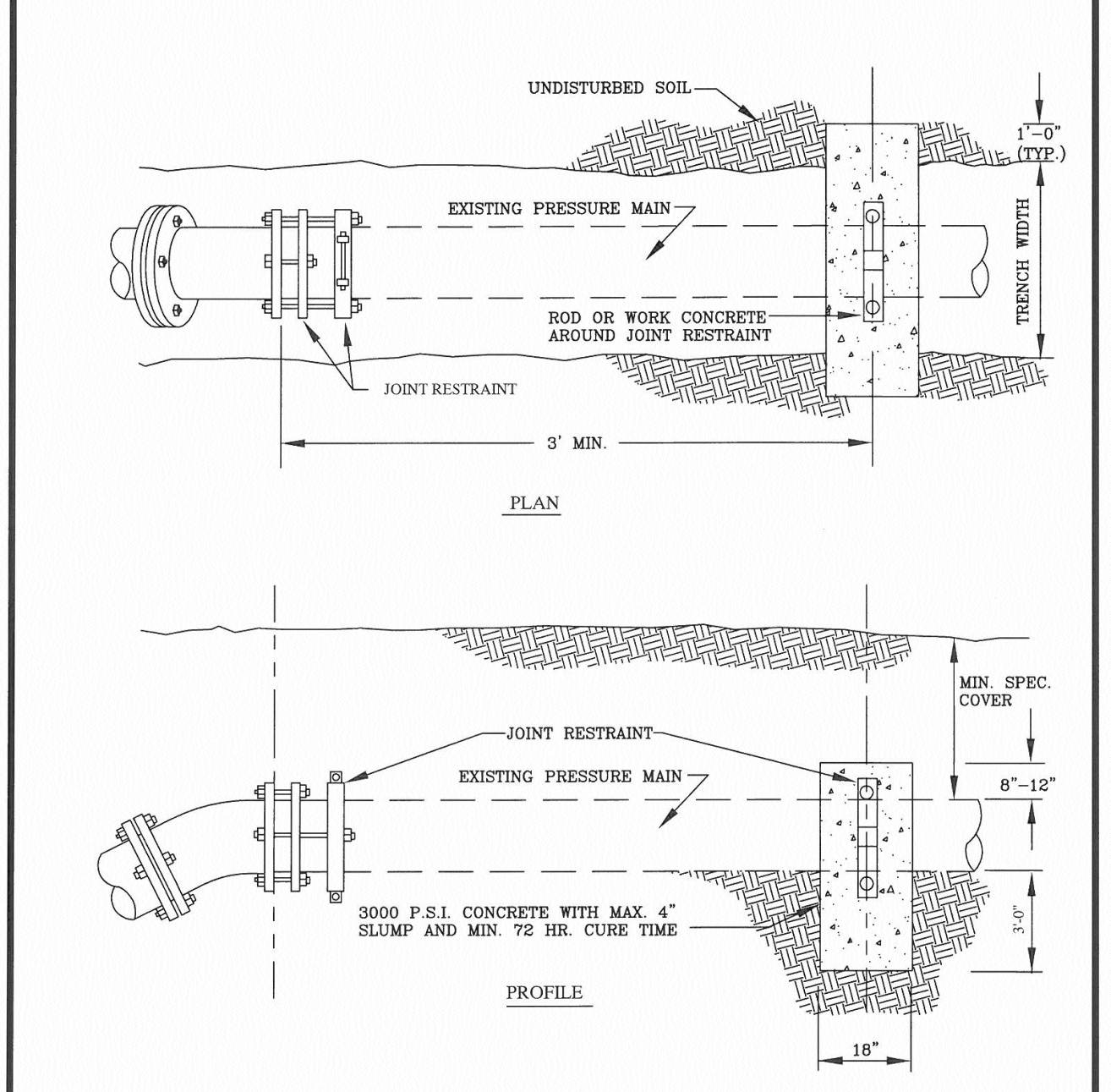
- NOTES:**
- ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.
 - IF VALVE IS LOCATED WITHIN A SIDEWALK CONCRETE COLLAR MAY BE ELIMINATED AND DISK SET FLUSH DIRECTLY IN SIDEWALK.
 - BRONZE DISK REQUIRED: FOR ALL VALVES, AND DUMMY BOXES.
 - THE 24"x24"x8" THICK CONCRETE VALVE BOX COLLAR CAN BE INSTALLED BELOW THE FRICTION COARSE AND THE BRONZE DISK ANCHORED IN A WEAR-BY CURB OR SIDEWALK.
 - ALL VALVES/BOXES SHALL BE LOCATED BY MEANS OF A PERPENDICULAR 6"x2" BLUE STRIPE ACROSS THE CURB. THE DISTANCE FROM THE BACK OF THE CURB TO THE VALVE SHALL BE STENCILED ON THE CURB WITH NUMBERS FOUR INCHES HIGH PAINTED BLUE, BY THE CONTRACTOR.



PINELLAS COUNTY
DEPARTMENT OF ENVIRONMENT AND INFRASTRUCTURE
(D.E.I.)
CONCRETE VALVE BOX AND COLLAR
DETAIL

DETAIL INDEX T.O.: PCU GD 5
DATE: SEPTEMBER/2012
DIV. DIRECTOR OF ENV. TECH. SUPPORT
REVISION: [Signature]

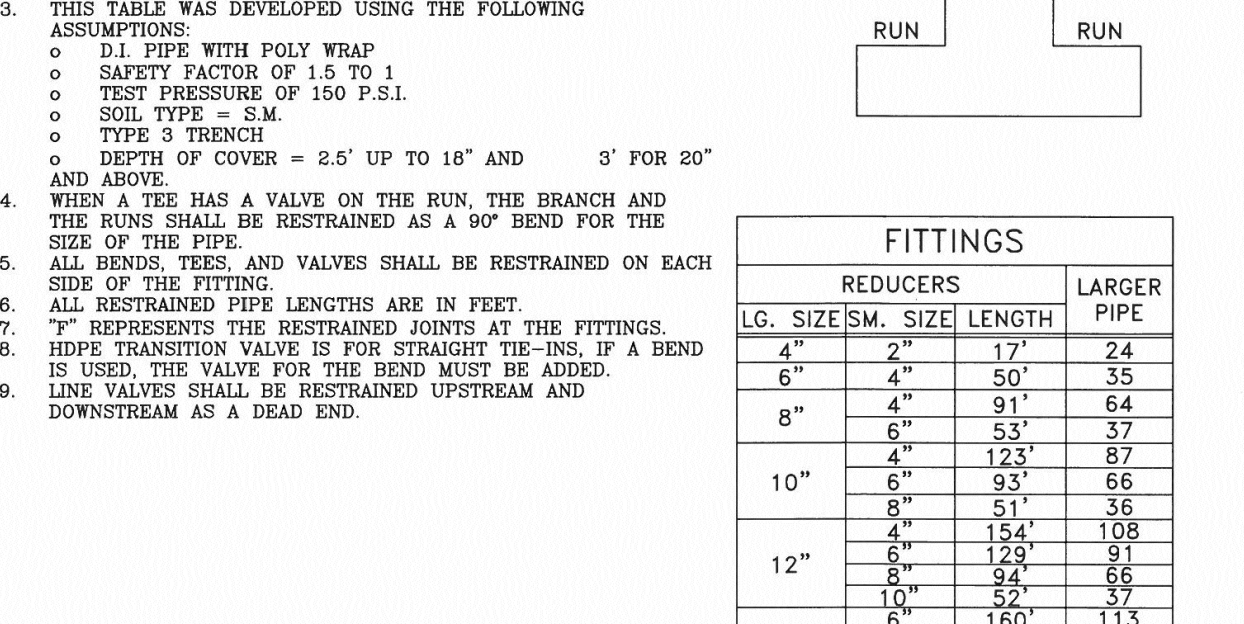
- NOTES:**
- ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.
 - FITTING CONNECTION TO EXISTING PIPE AND REVERSE DEADMAN MUST BE PART OF ONE INTEGRAL JOINT OF PIPE.
 - REVERSE DEADMAN FOR 16" AND LARGER PIPES SHALL BE DESIGNED BY ENGINEER.



PINELLAS COUNTY
DEPARTMENT OF ENVIRONMENT AND INFRASTRUCTURE
(D.E.I.)
REVERSE DEADMAN RESTRAINT
DETAIL

DETAIL INDEX T.O.: PCU GD 6
DATE: SEPTEMBER/2012
DIV. DIRECTOR OF ENV. TECH. SUPPORT
REVISION: [Signature]

- NOTES:**
- ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.
 - MANUAL THIS TABLE SHALL BE UTILIZED FOR ALL PRESSURE MAIN INSTALLATIONS. ALL FITTINGS SHALL BE RESTRAINED TO THE LENGTHS INDICATED, AT A MINIMUM.
 - THIS TABLE WAS DEVELOPED USING THE FOLLOWING ASSUMPTIONS:
 - D.I. PIPE WITH POLY WRAP
 - SAFETY FACTOR OF 1.5 TO 1
 - TEST PRESSURE OF 150 P.S.I.
 - SOIL TYPE = S.M.
 - TYPE 3 TRENCH
 - DEPTH OF COVER = 2.5' UP TO 18" AND 3' FOR 20" AND ABOVE
 - WHEN A TEE HAS A VALVE ON THE RUN, THE BRANCH AND THE RUNS SHALL BE RESTRAINED AS A 90° BEND FOR THE SIZE OF THE PIPE.
 - ALL BENDS, TEES, AND VALVES SHALL BE RESTRAINED ON EACH SIDE OF THE FITTING.
 - ALL RESTRAINED PIPE LENGTHS ARE IN FEET.
 - "T" REPRESENTS THE RESTRAINED JOINTS AT THE FITTINGS.
 - HOPE TRANSITION VALVE IS FOR STRAIGHT TEES-INS. IF A BEND IS USED, THE VALVE FOR THE BEND MUST BE ADDED.
 - LINE VALVES SHALL BE RESTRAINED UPSTREAM AND DOWNSTREAM AS A DEAD END.

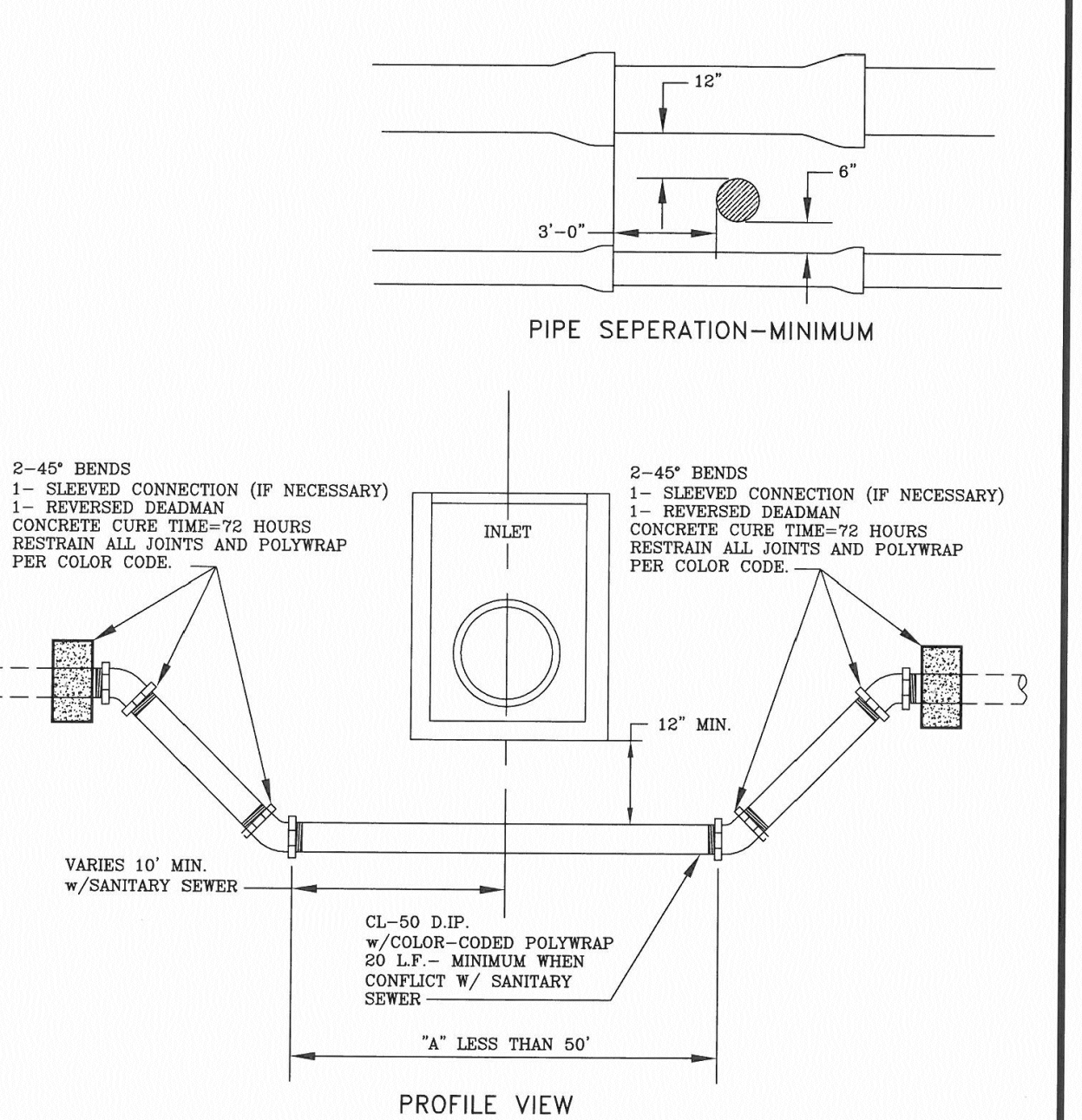


PIPE SIZE	FITTINGS				
	TEE	BRANCH ONLY	90°	45°	22 1/2°
2"	F	40	17	F	40
4"	19	49	20	10	5
6"	33	69	28	14	7
8"	58	88	37	18	9
10"	76	107	44	21	11
12"	93	125	52	25	12
14"	110	142	59	28	14
16"	127	159	66	32	16
18"	143	175	73	35	17
20"	132	164	68	33	16
24"	159	192	79	38	19
30"	195	229	95	46	23
36"	230	264	109	53	26

PINELLAS COUNTY
DEPARTMENT OF ENVIRONMENT AND INFRASTRUCTURE
(D.E.I.)
PRESSURE MAIN RESTRAINED JOINT
DETAIL

DETAIL INDEX T.O.: PCU GD 11
DATE: SEPTEMBER/2012
DIV. DIRECTOR OF ENV. TECH. SUPPORT
REVISION: [Signature]

- NOTES:**
- ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL AND TECHNICAL SPECIFICATIONS.
 - ALL WORK SHOWN ON THIS DRAWING SHALL BE PAID FOR UNDER THE OFFSET PAY-ITEM FOR THE APPLICABLE SIZE OF THE EXISTING PIPE TO BE RELOCATED DUE TO CONFLICT; NO SEPARATE PAYMENT SHALL BE MADE UNDER INDIVIDUAL PAY-ITEMS UNLESS "A" IS GREATER THAN 50'.

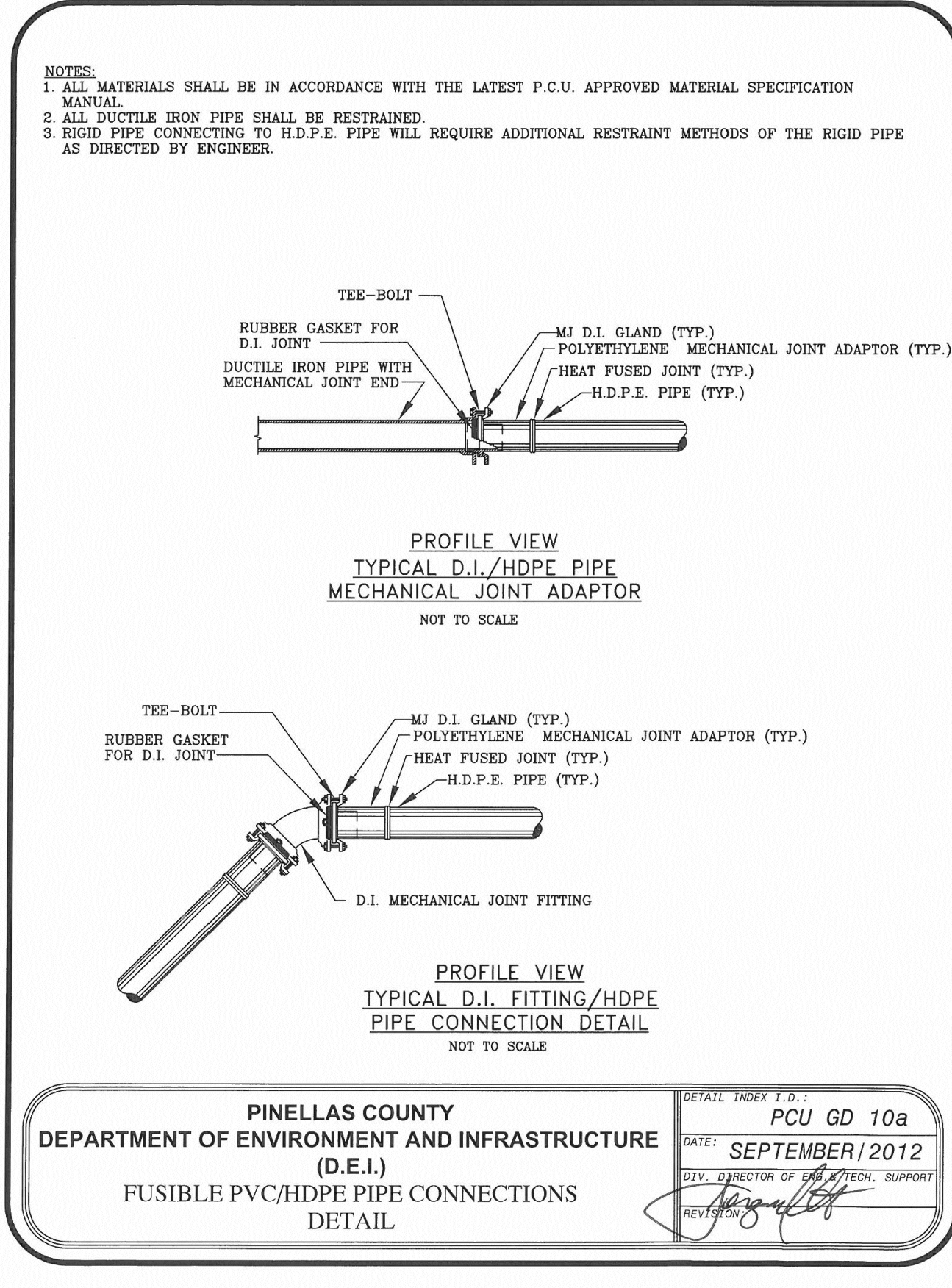
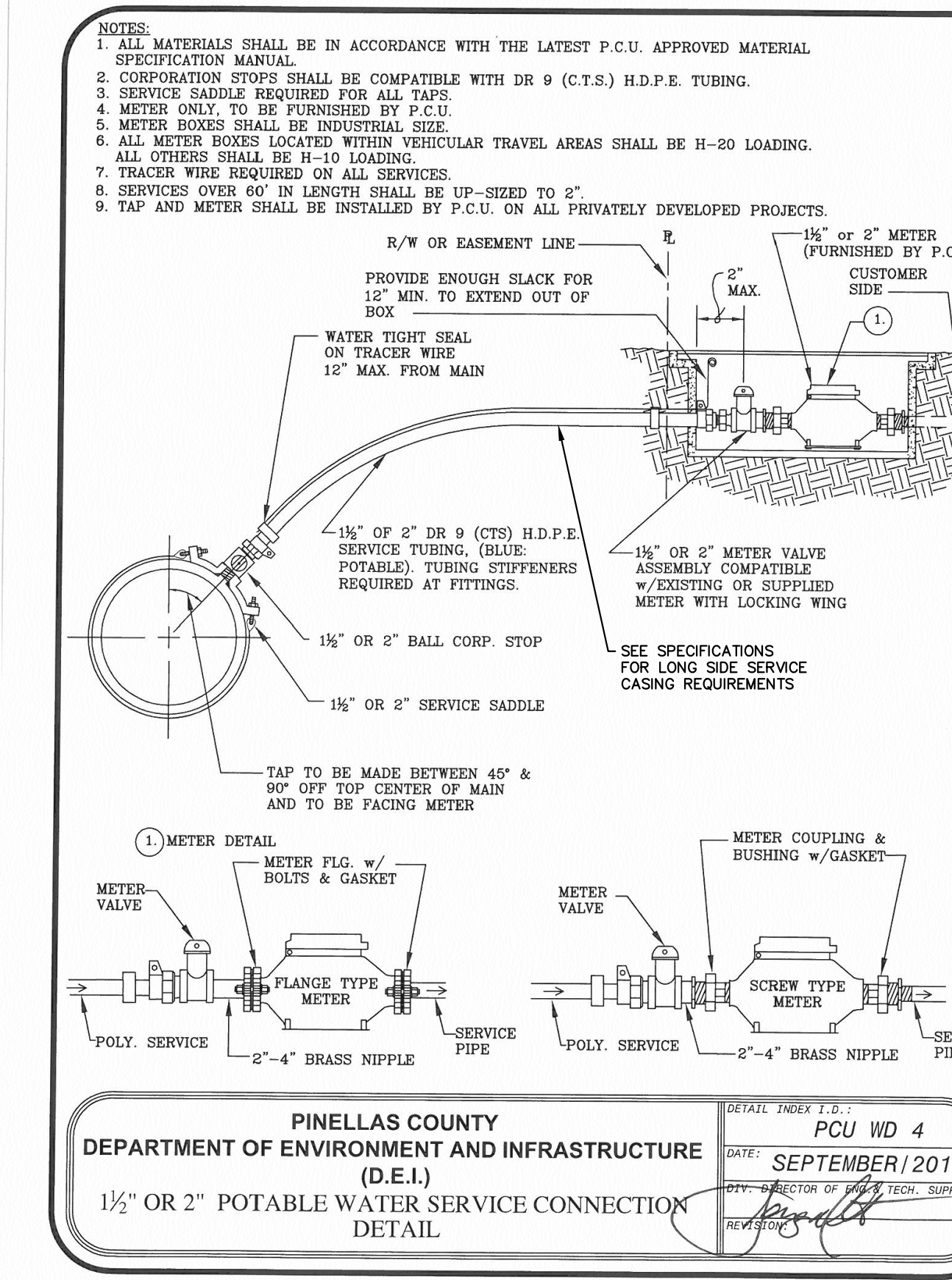
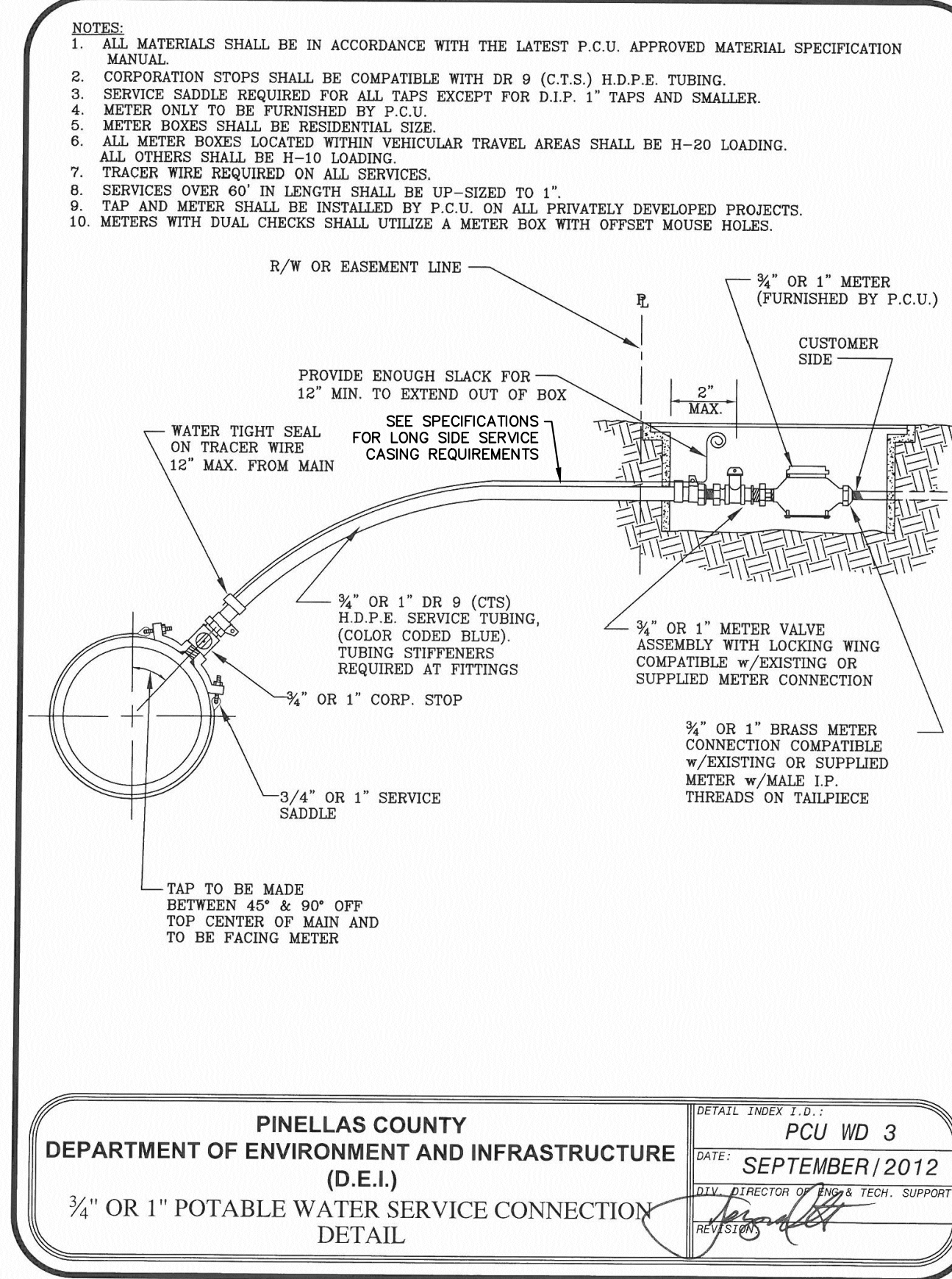
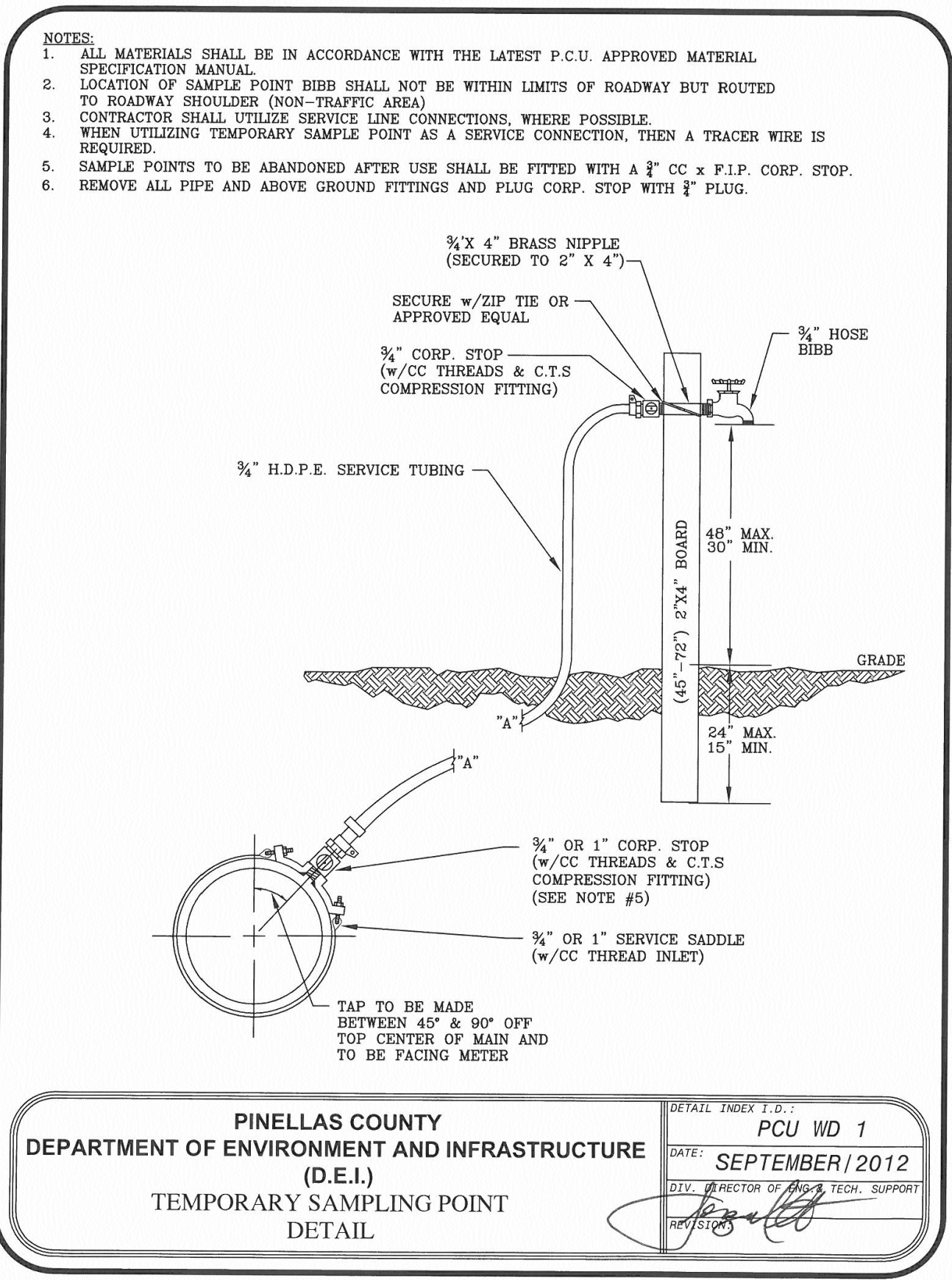
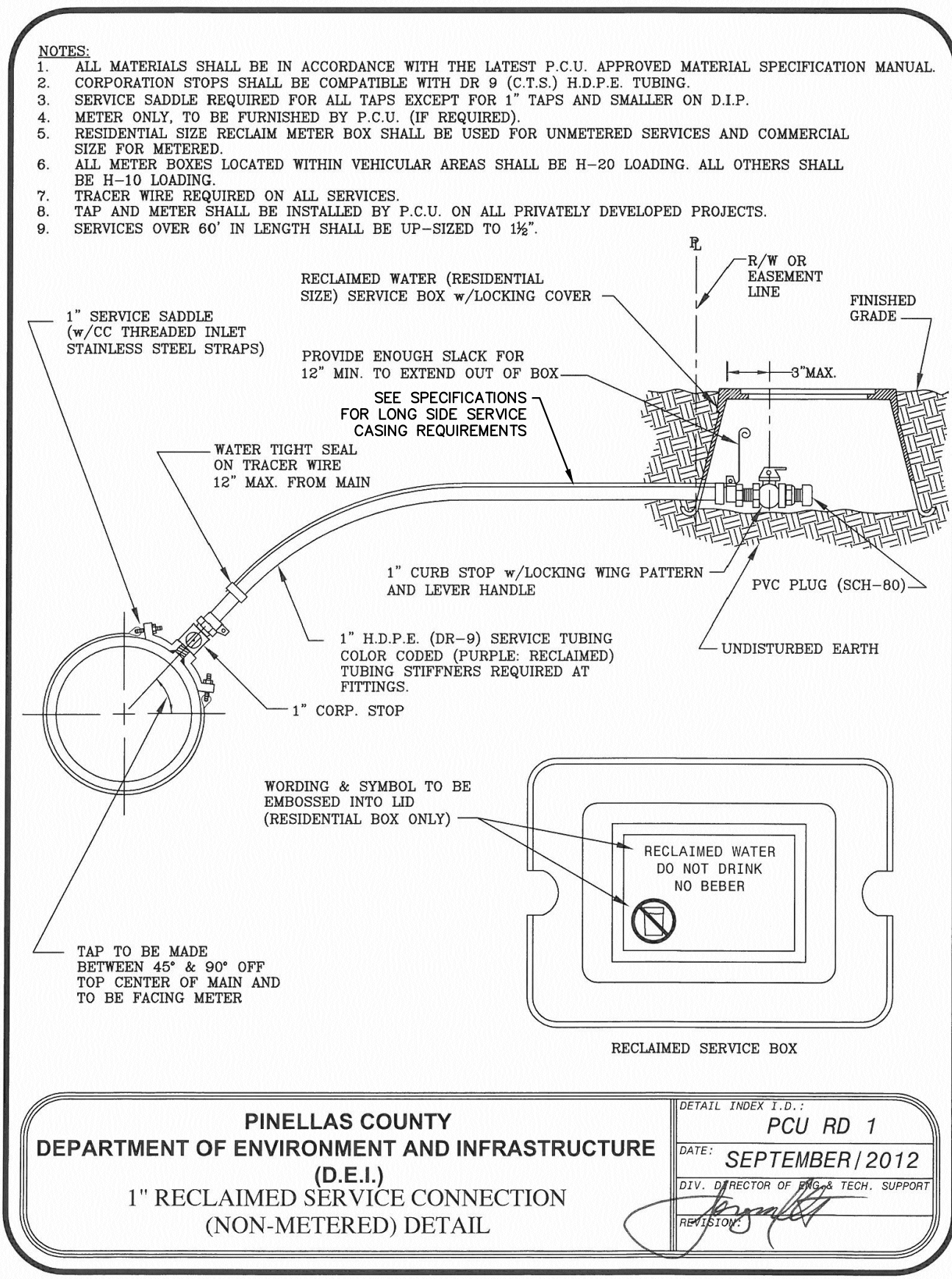


PINELLAS COUNTY
DEPARTMENT OF ENVIRONMENT AND INFRASTRUCTURE
(D.E.I.)
TYPICAL PRESSURE LINE
OFFSET RELOCATION DETAIL

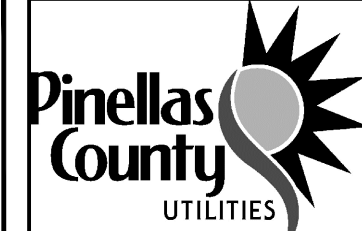
DETAIL INDEX T.O.: PCU GD 13
DATE: SEPTEMBER/2012
DIV. DIRECTOR OF ENV. TECH. SUPPORT
REVISION: [Signature]

DESIGNED	J.V.K.		PROJECT:	IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)	DESCRIPTION:	UTILITIES 14 S. FT. HARRISON AVE., CLEARWATER, FL 33756	APPROVED BY:	WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605	DATE:	4/3/17
DRAWN	S.A.T				GENERAL DETAILS				PROJECT NO.	17.PC-07
CHECKED	W.G.R.								DATE	
REV. NO.	DATE	DESCRIPTION	REV. BY						SHEET:	17 OF 18

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DESIGNED J.V.K.
 DRAWN S.A.T.
 CHECKED W.G.R.



PROJECT: IMPLEMENTATION OF BMPs WITHIN THE SUNSET BEACH WATERSHED (PHASE VI)(N674)

DESCRIPTION: UTILITIES GENERAL DETAILS

14 S. FT. HARRISON AVE., CLEARWATER, FL 33756

APPROVED BY: WILLIAM G. REIDY, P.E. FLA. LIC. NO 35605

DATE: 4/3/17
 PROJECT NO. 17.PC-07
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REV. NO.	DATE	DESCRIPTION

REV. BY	CHECKED