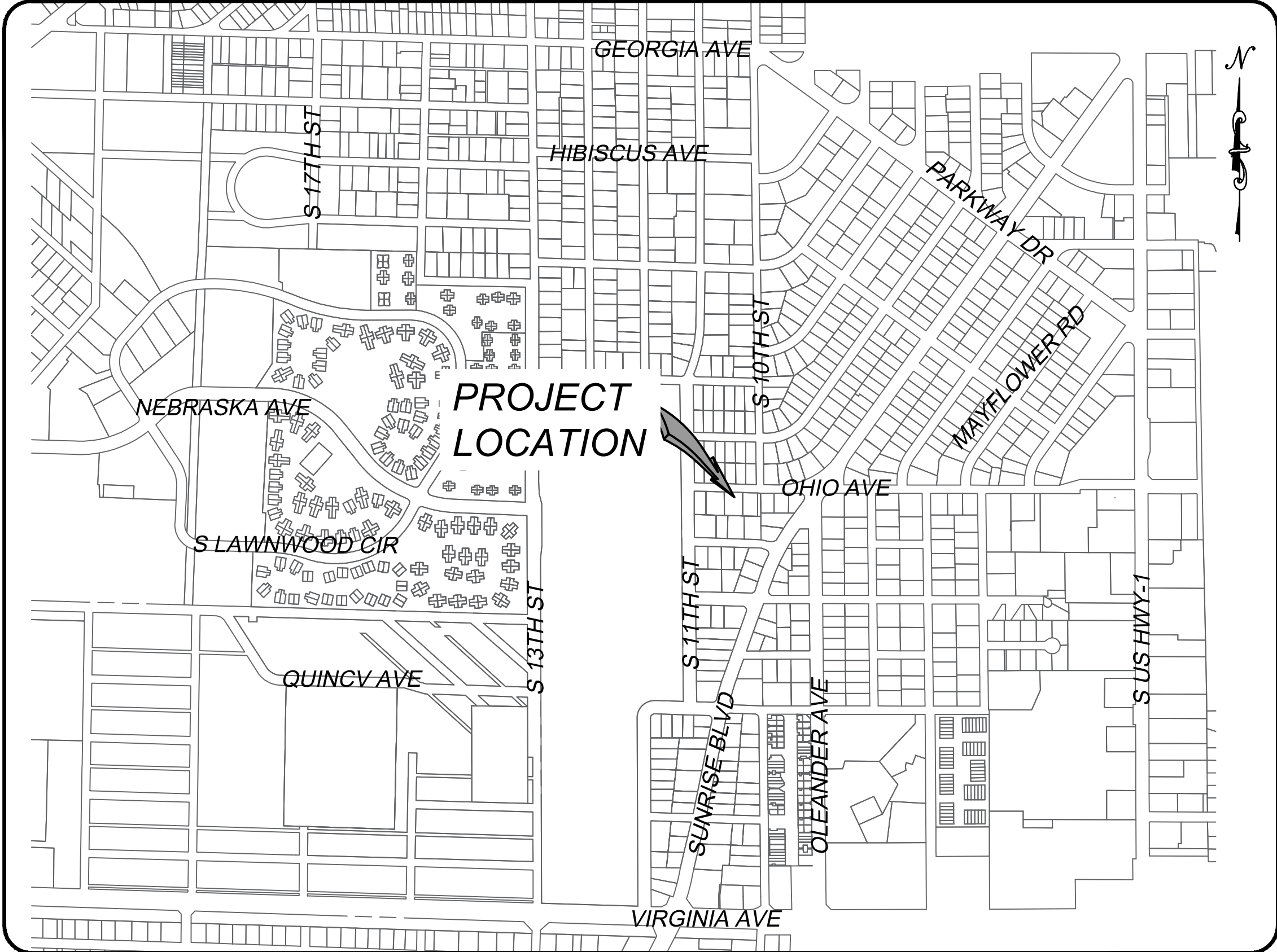


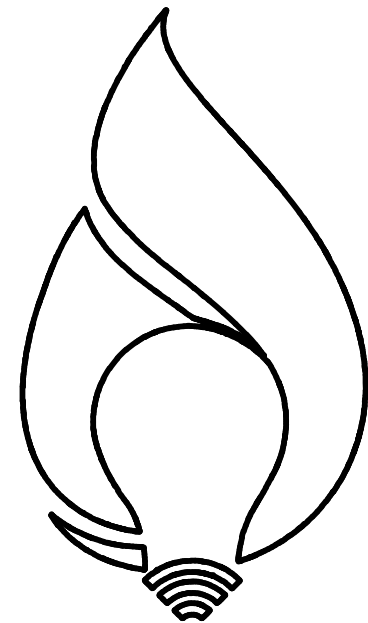
OHIO AVENUE UTILITY REPLACEMENT US 1 TO 11TH STREET

LOCATION MAP



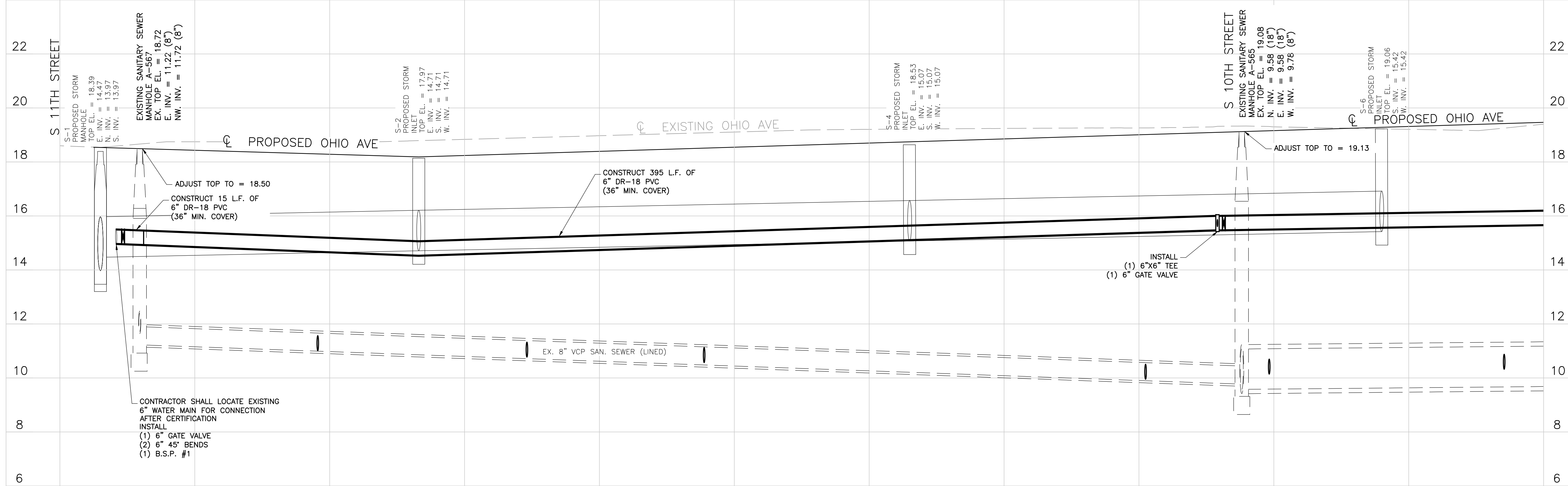
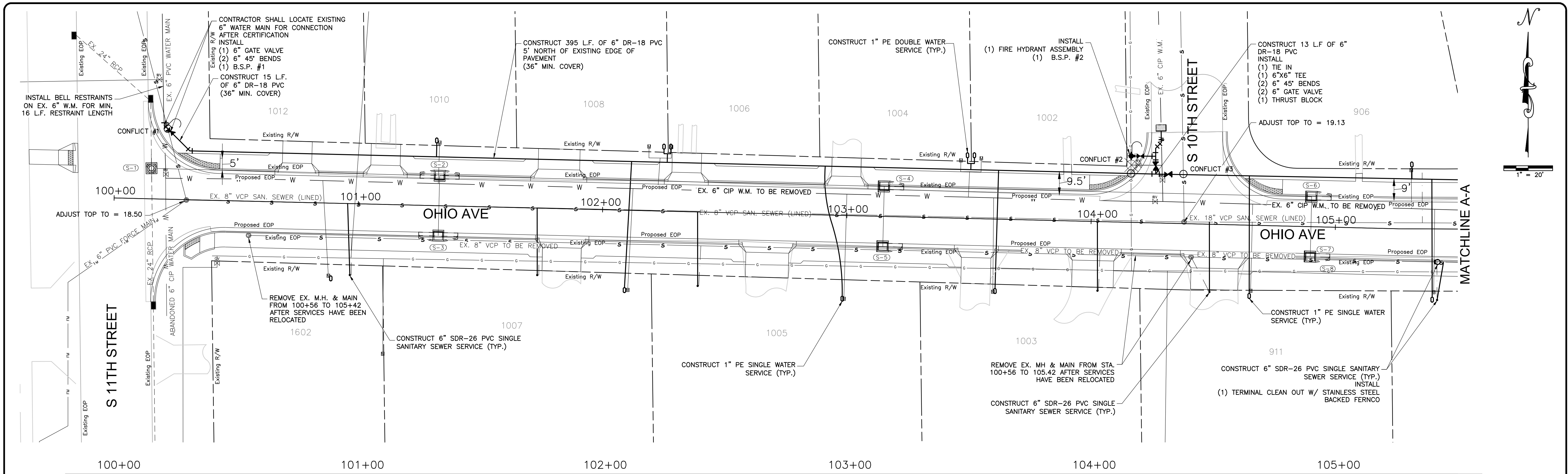
INDEX OF SHEETS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	COVER
2-7	PLAN
8-11	DETAILS



FPUA
COMMUNITY PROUD

FT. PIERCE UTILITIES AUTHORITY
WATER/WASTEWATER ENGINEERING
1701 SOUTH 37TH STREET
FT. PIERCE, FLORIDA 34947
772-466-1600



CONFLICT 1
6" PVC WATER MAIN OVER EX. 8" VCP SEWER MAIN. (12" MIN. SEPARATION)

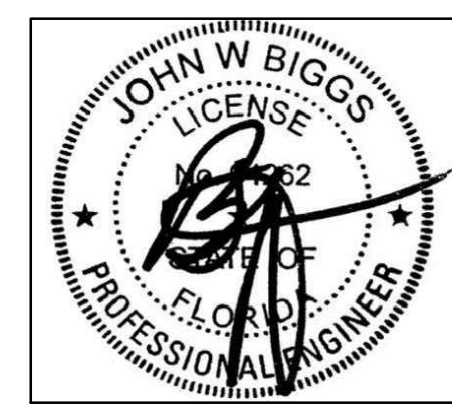
CONFLICT 2
6" PVC WATER MAIN UNDER EX. 4" STEEL GAS MAIN. (12" MIN. SEPARATION)

CONFLICT 3
6" PVC WATER MAIN OVER EX. 8" VCP SEWER MAIN. (12" MIN. SEPARATION)

S-3
PROPOSED STORM INLET
TOP EL. = 17.95
N. INV. = 14.76

S-5
PROPOSED STORM INLET
TOP EL. = 18.50
N. INV. = 15.12

S-7
PROPOSED STORM INLET
TOP EL. = 19.06
N. INV. = 15.47



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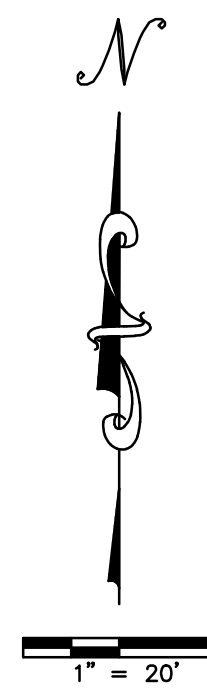
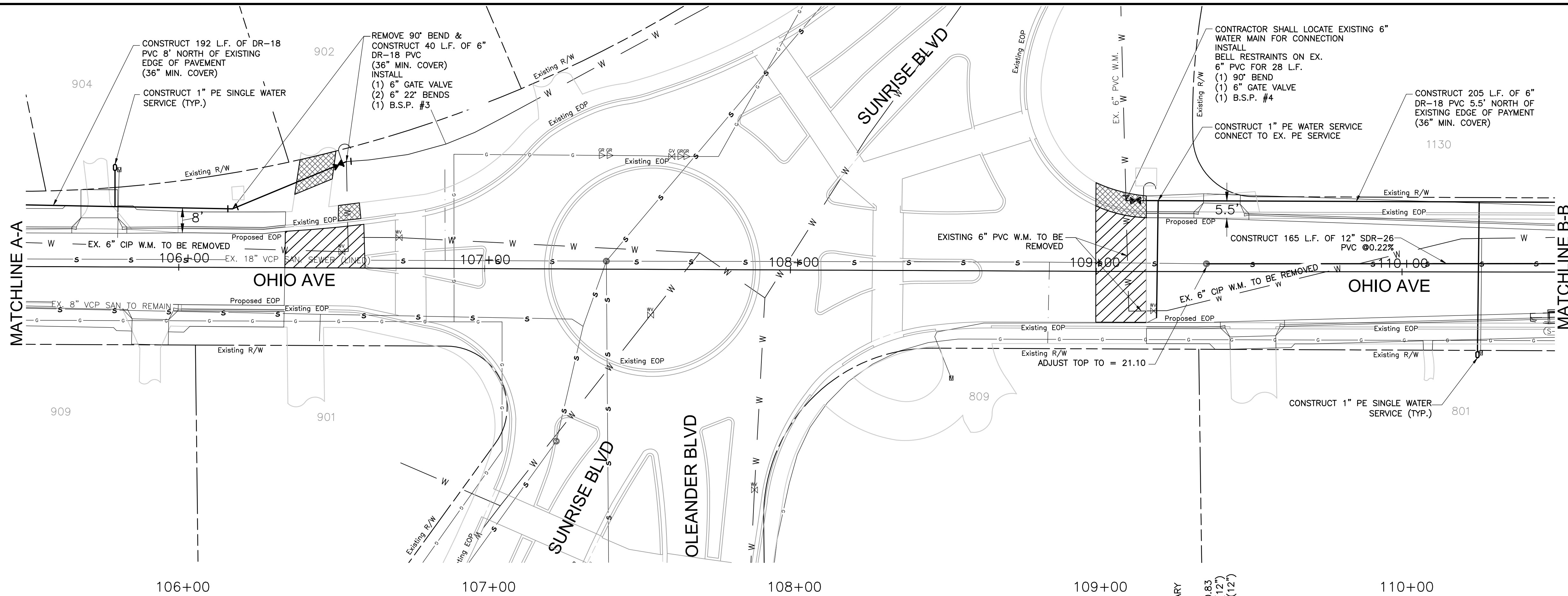


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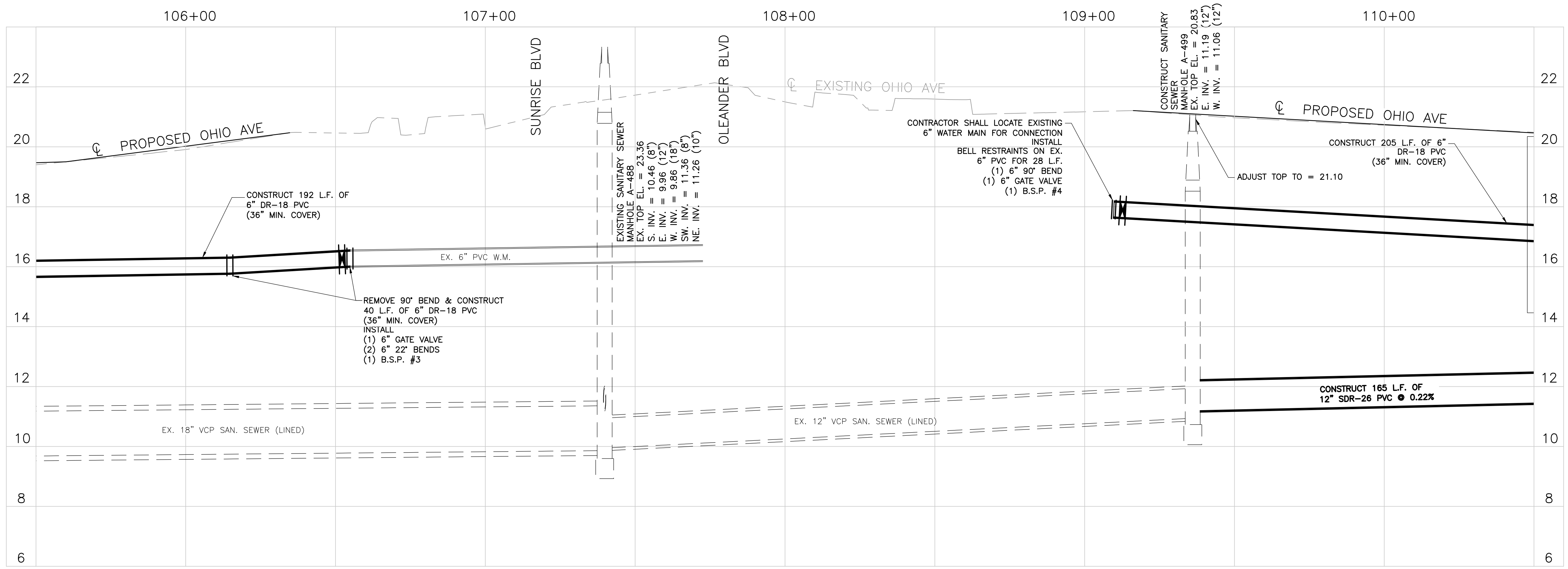
OHIO AVENUE UTILITY REPLACEMENT
WATER/WASTEWATER ENGINEERING

FT. PIERCE UTILITIES AUTHORITY
1701 SOUTH 37TH STREET
FT. PIERCE, FLORIDA 34947
(772) 466-1600 / FAX (772) 468-2414

SHEET TYPE: PLAN & PROFILE
SHEET # 2 OF 11



- CONCRETE RESTORATION
- ASPHALT RESTORATION



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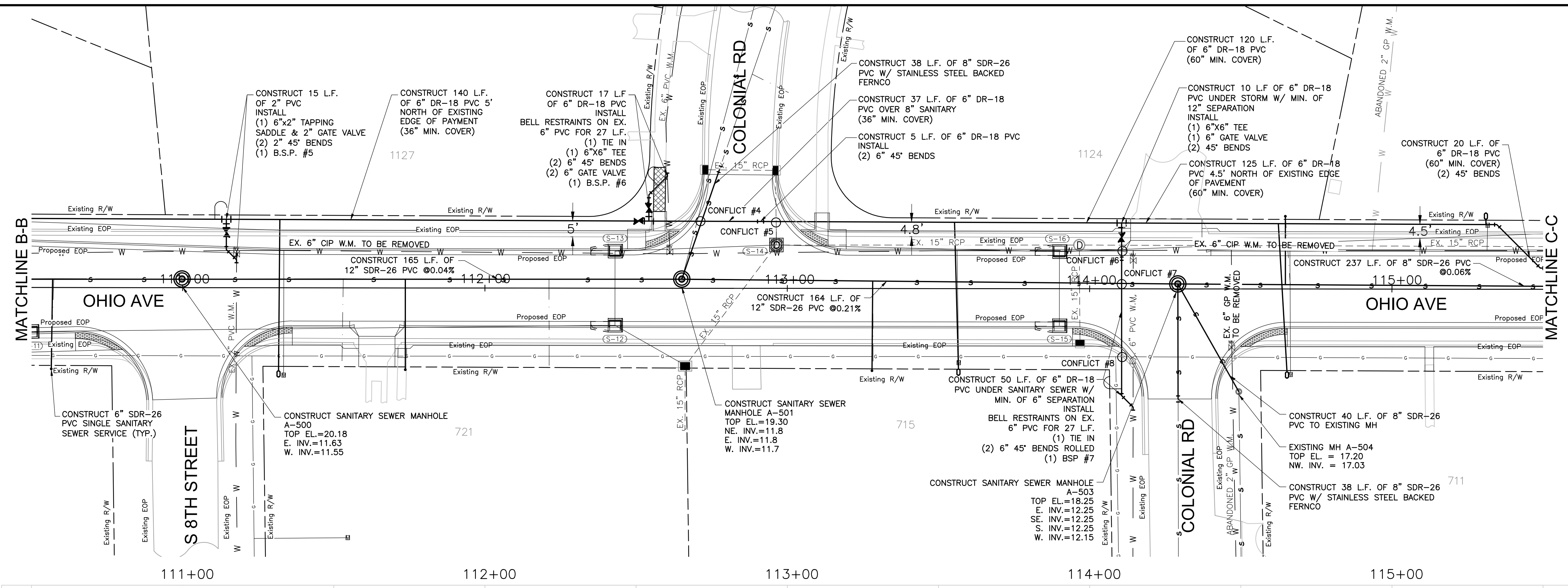
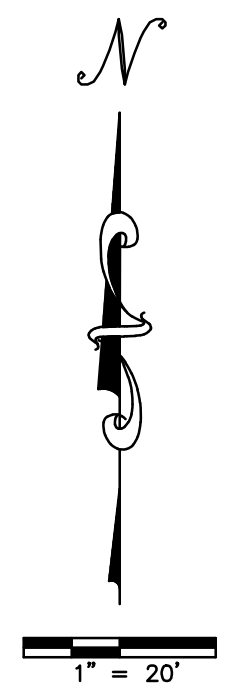
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APPROVED: JB	DATE

OHIO AVENUE
UTILITY REPLACEMENT

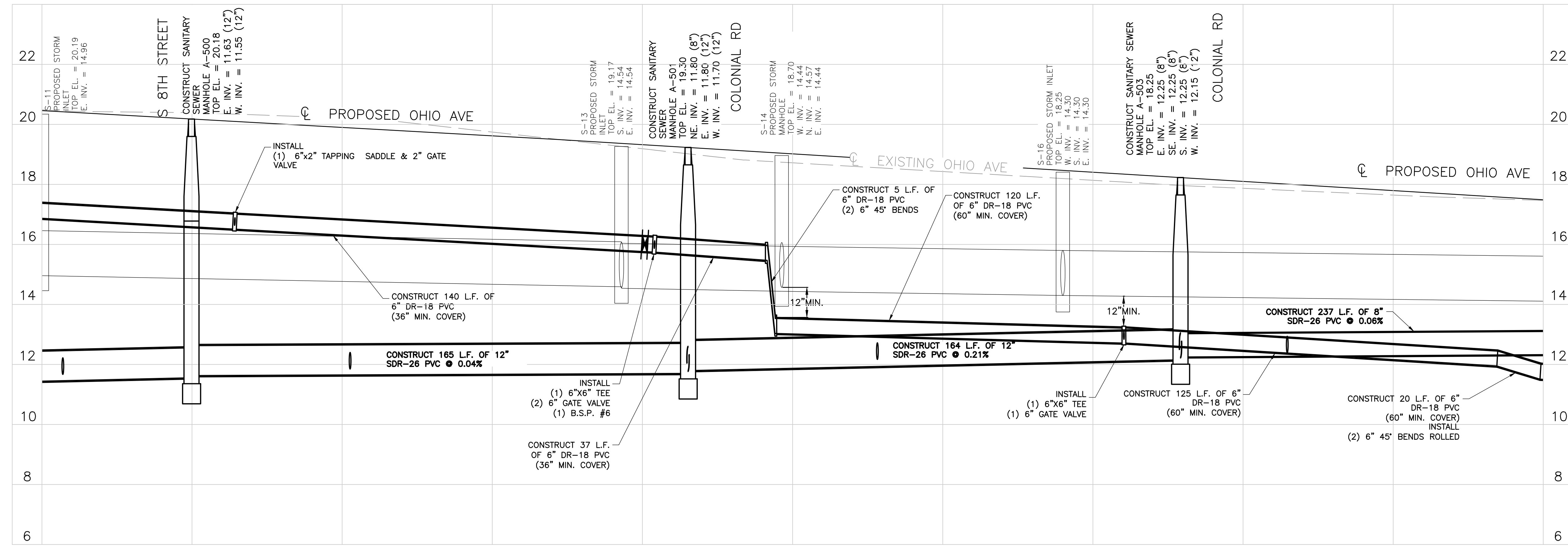
WATERWASTEWATER ENGINEERING

FT. PIERCE UTILITIES AUTHORITY
1701 SOUTH 37TH STREET
FT. PIERCE, FLORIDA 34947
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SHEET TYPE	SHEET #
PLAN & PROFILE	3 OF 11



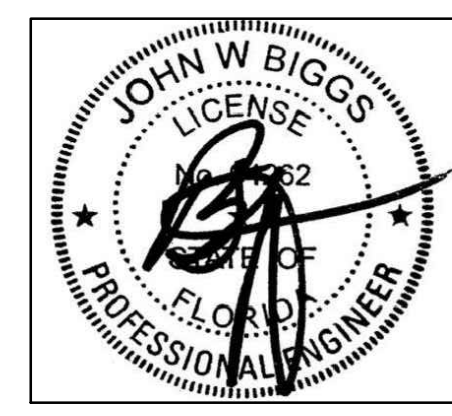
CONCRETE RESTORATION



S-12
 PROPOSED STORM INLET
 TOP EL. = 19.17
 N. INV. = 14.59
 W. INV. = 14.59
 SE. INV. = 15.60

S-15
 PROPOSED STORM INLET
 TOP EL. = 18.25
 N. INV. = 14.35

- CONFLICT 4**
 6" PVC WATER MAIN OVER 8" PVC SEWER MAIN. (12" MIN. SEPARATION)
- CONFLICT 5**
 6" PVC WATER MAIN UNDER EX. 15" RCP STORM SEWER. (12" MIN. SEPARATION)
- CONFLICT 6**
 6" PVC WATER MAIN UNDER EX. 15" RCP STORM SEWER. (12" MIN. SEPARATION)
- CONFLICT 7**
 6" PVC WATER MAIN UNDER 12" PVC SEWER MAIN. (6" MIN. SEPARATION)
- CONFLICT 8**
 6" PVC WATER MAIN UNDER EX. 2" STEEL GAS MAIN. (12" MIN. SEPARATION)



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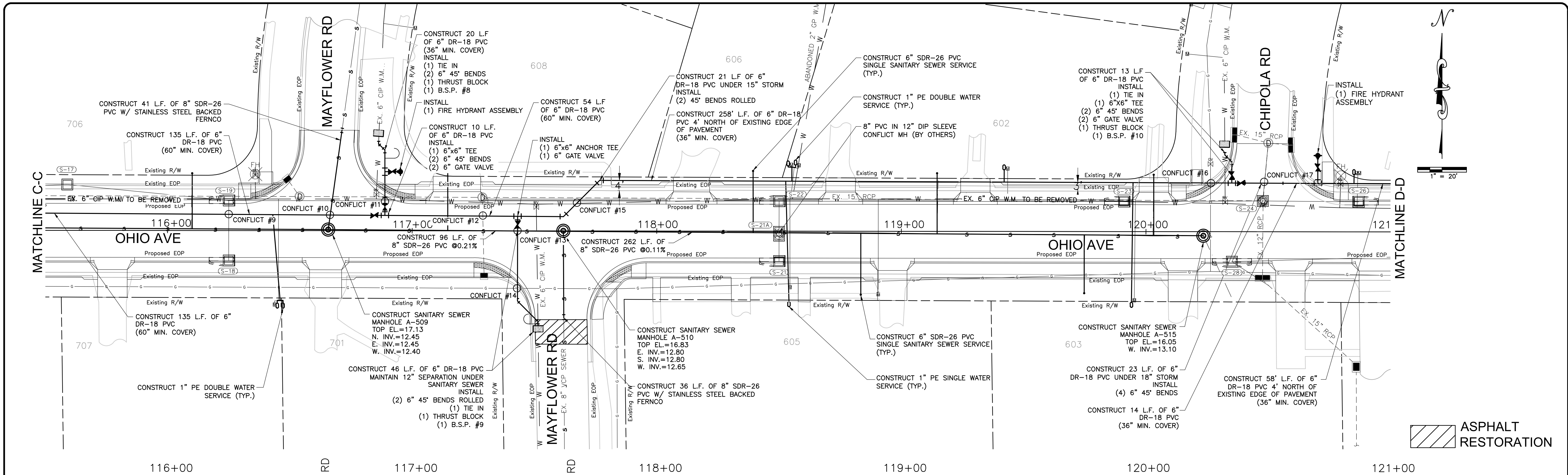
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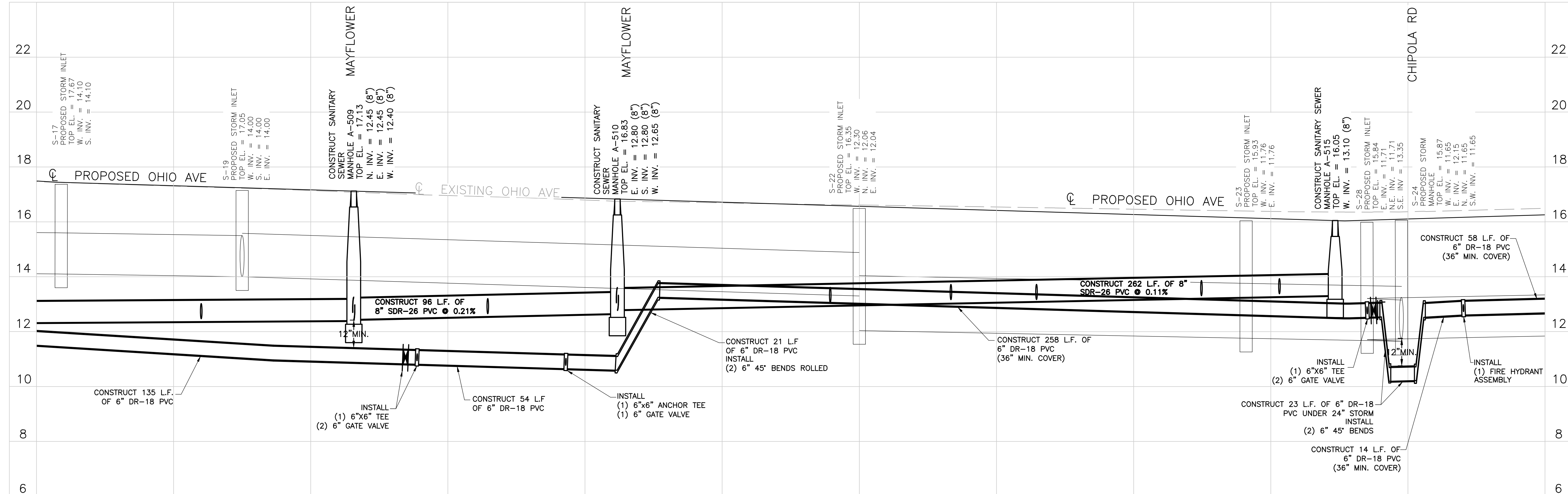
OHIO AVENUE UTILITY REPLACEMENT
 WATERWASTEWATER ENGINEERING

FT. PIERCE UTILITIES AUTHORITY
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SHEET TYPE: PLAN & PROFILE
 SHEET # 4 OF 11



ASPHALT RESTORATION



- CONFLICT 9**
6" PVC WATER MAIN UNDER 18" RCP STORM SEWER. (12" MIN. SEPARATION)
- CONFLICT 10**
6" PVC WATER MAIN UNDER 8" PVC SEWER MAIN. (12" MIN. SEPARATION)
- CONFLICT 11**
6" PVC WATER MAIN UNDER EX. 15" RCP STORM SEWER. (12" MIN. SEPARATION)
- CONFLICT 12**
6" PVC WATER MAIN UNDER EX. 15" RCP STORM SEWER. (12" MIN. SEPARATION)
- CONFLICT 13**
6" PVC WATER MAIN UNDER 8" PVC SEWER MAIN (12" MIN. SEPARATION)
- CONFLICT 14**
6" PVC WATER MAIN UNDER EX. 2" STEEL GAS MAIN. (12" MIN. SEPARATION)
- CONFLICT 15**
6" PVC WATER MAIN UNDER EX. 15" RCP STORM SEWER. (12" MIN. SEPARATION)
- CONFLICT 16**
6" PVC WATER MAIN UNDER EX. 2" STEEL GAS MAIN. (12" MIN. SEPARATION)
- CONFLICT 17**
6" PVC WATER MAIN UNDER EX. 15" RCP STORM SEWER. (12" MIN. SEPARATION)



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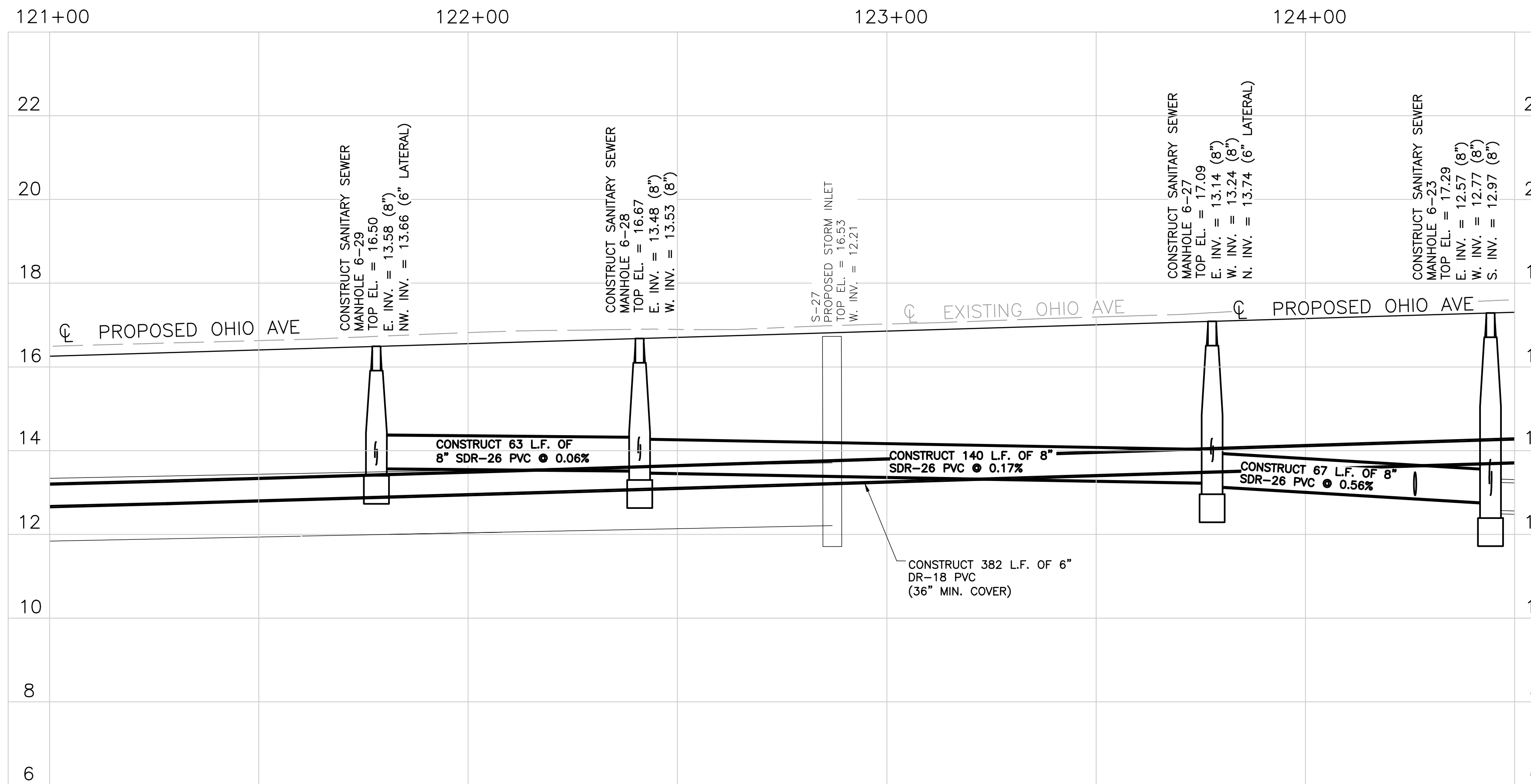
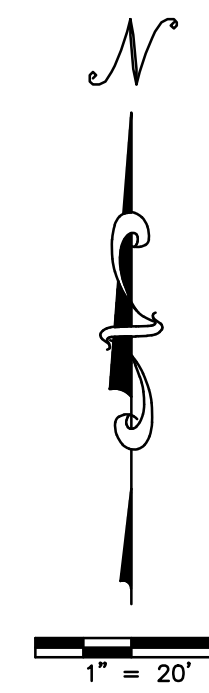
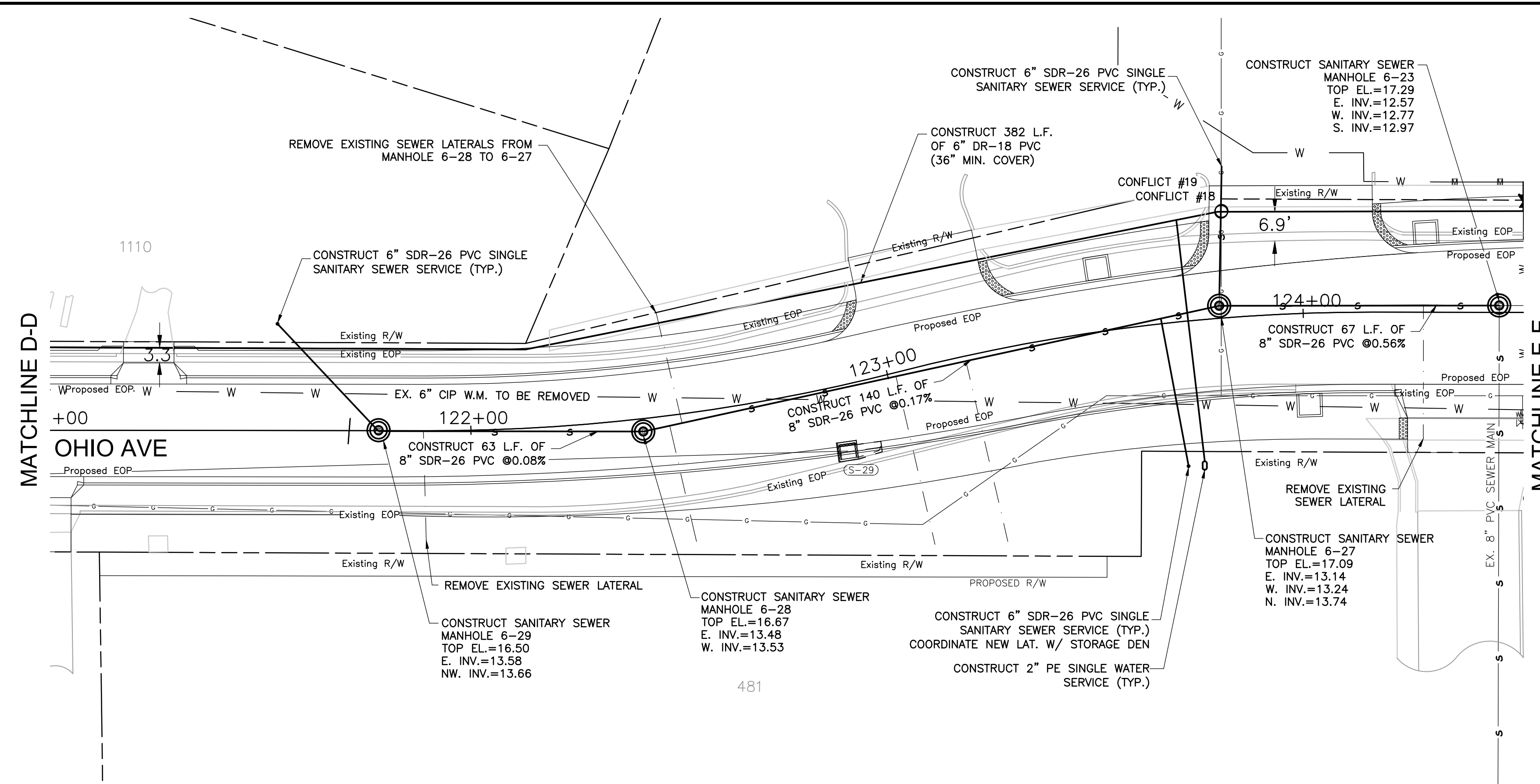


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**OHIO AVENUE
UTILITY REPLACEMENT**
WATER/WASTEWATER ENGINEERING

FT. PIERCE UTILITIES AUTHORITY
1701 SOUTH 37TH STREET
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(772) 466-1600 | FAX (772) 468-2414

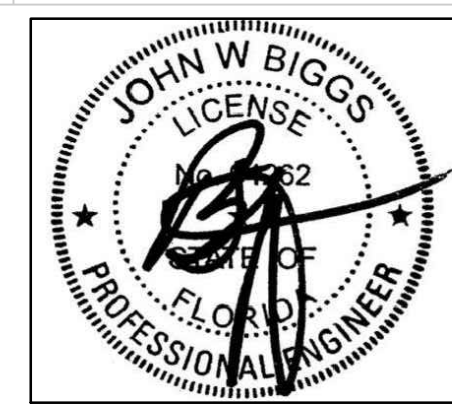
SHEET TYPE: PLAN & PROFILE
SHEET #: 5 OF 11



CONFLICT 18
6" PVC WATER MAIN OVER EX. 2" STEEL GAS MAIN. (12" MIN. SEPARATION)

CONFLICT 19
6" PVC WATER MAIN OVER 6" PVC SEWER MAIN. (12" MIN. SEPARATION)

S-29
PROPOSED STORM INLET
TOP EL. = 16.84
W. INV. = 12.21



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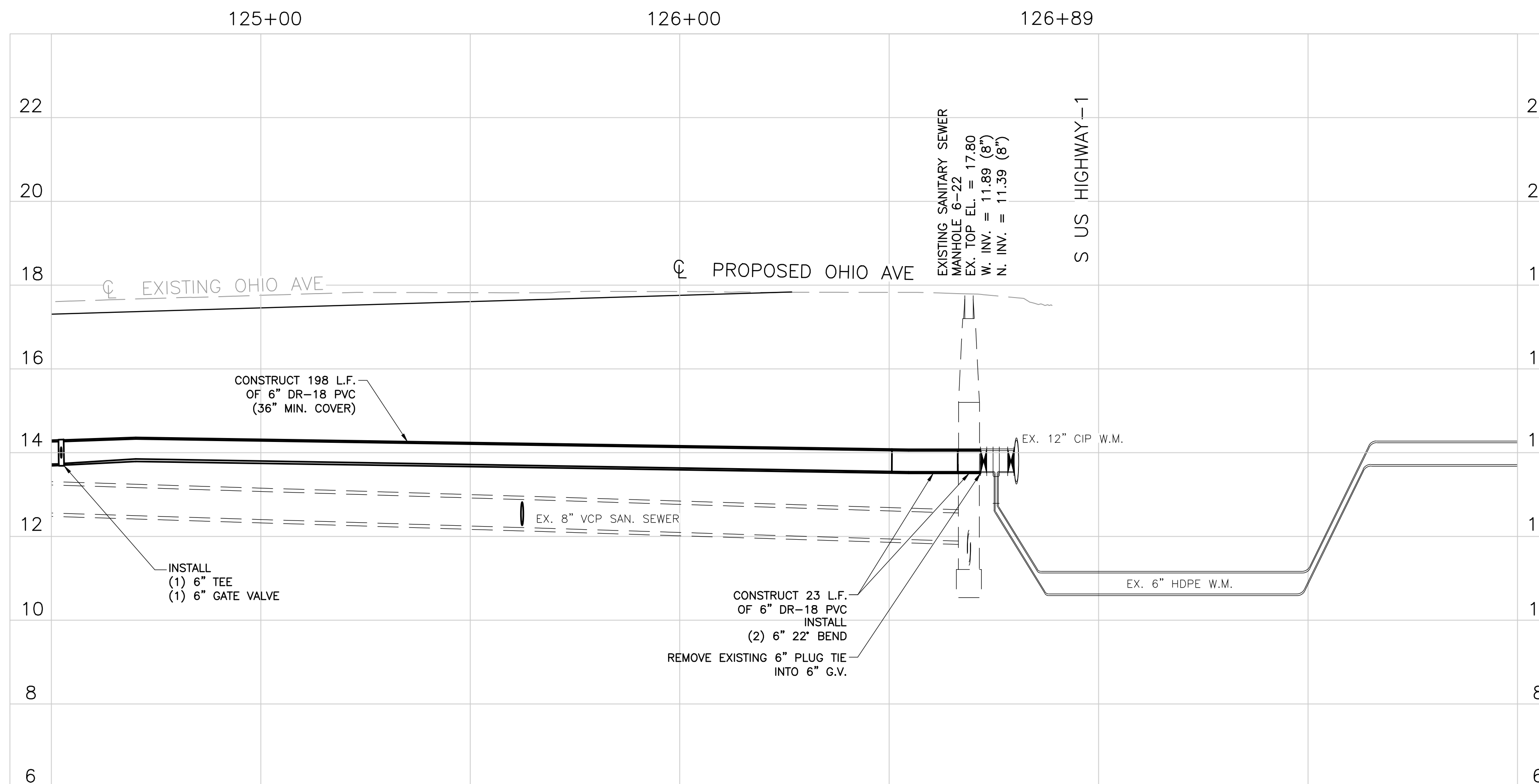
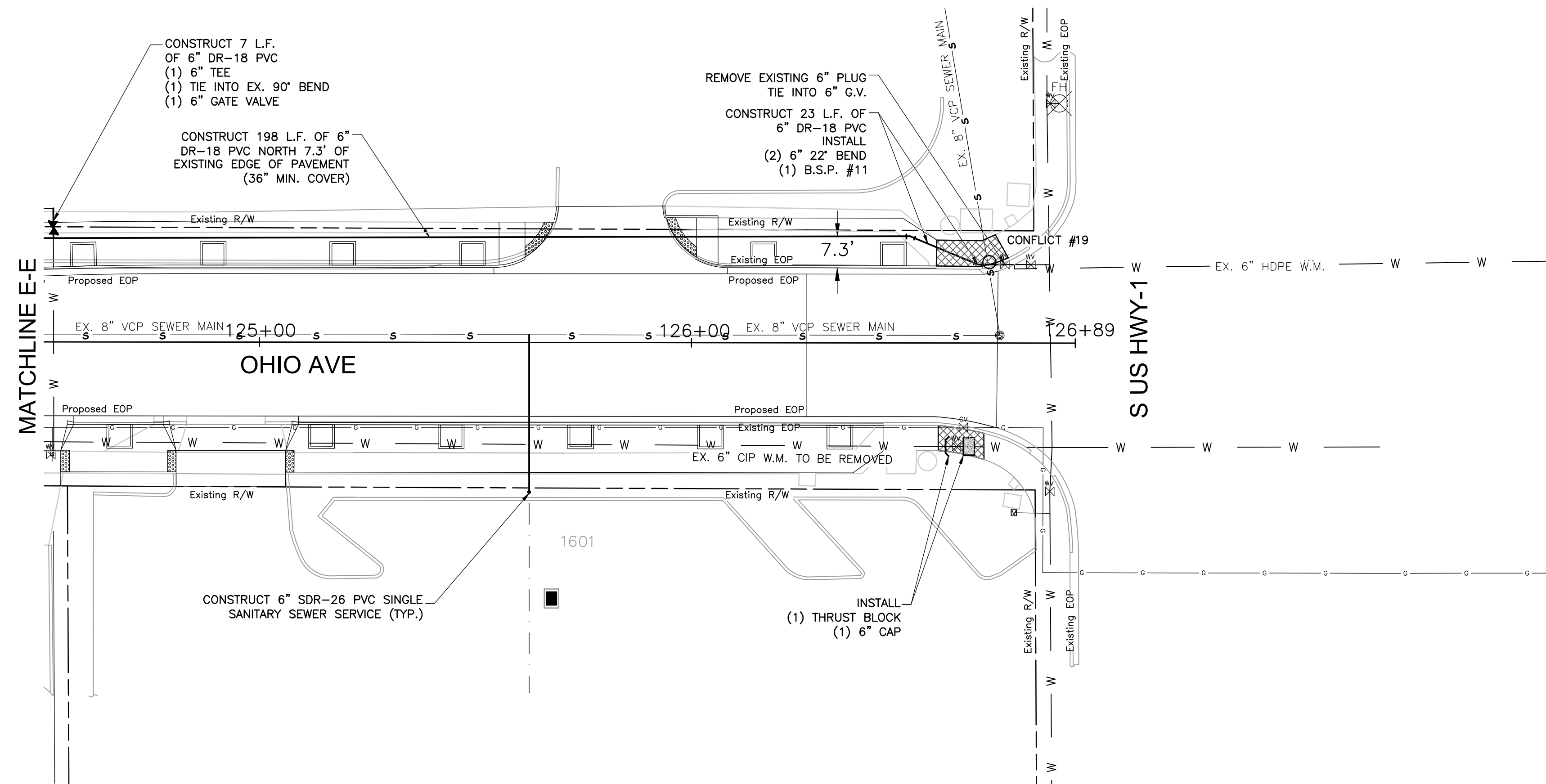
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DATE:

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OHIO AVENUE UTILITY REPLACEMENT	
WATER/WASTEWATER ENGINEERING	
FT. PIERCE UTILITIES AUTHORITY 1701 SOUTH 37TH STREET FT. PIERCE, FLORIDA 34947 (772) 466-1600 / FAX (772) 468-2414	
SHEET TYPE PLAN & PROFILE	SHEET # 6 OF 11



CONFLICT 19
 6" PVC WATER MAIN OVER EX. 8" VCP
 SEWER MAIN. (12" MIN. SEPARATION)



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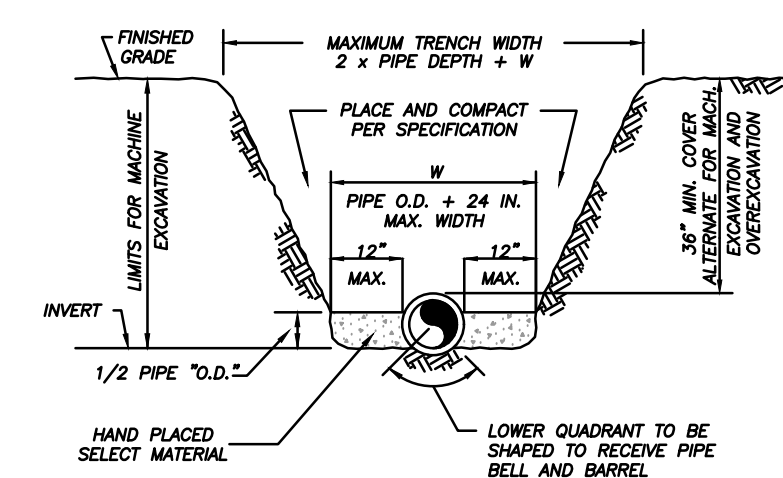
**OHIO AVENUE
 UTILITY REPLACEMENT**
 WATER/WASTEWATER ENGINEERING

FT. PIERCE UTILITIES AUTHORITY
 1701 SOUTH 37TH STREET
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SHEET TYPE: PLAN & PROFILE
 SHEET # 7 OF 11

**FORT PIERCE UTILITIES AUTHORITY
WATER DISTRIBUTION NOTES**

1. ALL CONSTRUCTION MATERIAL, INSTALLATION AND TESTING SHALL CONFORM TO THE STANDARD SPECIFICATIONS OF THE FORT PIERCE UTILITIES AUTHORITY.
2. WATER MAINS WHERE SPECIFIED AS POLYVINYL CHLORIDE (PVC) SHALL CONFORM TO ANMA C-900 OR C-905, PRESSURE CLASS 150, DR (18). WATER MAINS WHERE SPECIFIED AS POLYETHYLENE (PE) SHALL CONFORM TO ANMA C-901 OR C-906, STANDARD CODE DESIGNATION PEHOB, PIPE CLASS 200, DIMENSION RATIO (DR) 17 FOR DIRECT BURIAL, (DR) 11 FOR DIRECTIONAL BORING, AND (DR) 9 FOR 2 INCH AND SMALLER PIPELINES.
3. WATER MAIN, WHERE SPECIFIED AS DUCTILE IRON PIPE, SHALL CONFORM TO ANS/ANMA C151/A21.51 AND SHALL BE PRESSURE CLASS 250 (MINIMUM).
4. POLYVINYL CHLORIDE WATER MAIN SHALL BE BLUE IN COLOR OR WHITE IN COLOR WITH BLUE STRIPES. THE USE OF IDENTIFICATION TAPE ATTACHED TO THE TOP OF THE PIPE MAY BE USED IN LIEU OF MARKING ON THE PIPE. ALSO DIP PIPE SHALL REQUIRE THE USE OF IDENTIFICATION TAPE AND THIN WIRE.
5. FITTINGS SHALL BE DUCTILE IRON CONFORMING TO ANS/ANMA C-110/A21.10, CLASS 250 MIN., CEMENT LINED AND FACTORY COATED.
6. GATE VALVES SHALL BE MUELLER RESILIENT SEAT, KENNEDY KEN-SEAL, AMERICAN OR APPROVED EQUAL. VALVES SHALL CONFORM TO ANMA C-502.
7. WATER LINES SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH FPUA DESIGN AND CONSTRUCTION STANDARDS. THE CONTRACTOR SHALL SUBMIT CERTIFIED DENSITY TESTS AS REQUIRED BY FPUA ENGINEERING AND THE CITY, COUNTY, TPOD, IN CASES WHERE PAVED AREAS FALL WITHIN THE JURISDICTION OF LOCAL OR STATE AGENCIES. THE COMPACTON REQUIREMENTS SHALL NOT BE LESS THAN THE MINIMUM REQUIRED BY THE APPROPRIATE RESPONSIBLE AGENCY.
8. NO FIELD CHANGES OR DEVIATIONS FROM THE DESIGN SHALL BE MADE WITHOUT PRIOR APPROVAL OF THE FPUA ENGINEER AND CITY/COUNTY/TPOD ENGINEER.
9. THE CONTRACTOR SHALL NOTIFY FPUA ENGINEERING AND CITY/COUNTY/TPOD ENGINEERING 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
10. A PRE-CONSTRUCTION CONFERENCE BETWEEN THE ENGINEER, THE CONTRACTOR, FPUA, AND CITY/COUNTY/TPOD ENGINEER SHALL BE MANDATORY PRIOR TO COMMENCEMENT OF CONSTRUCTION.
11. TRAFFIC CONTROL, BARRICADES, ETC., SHALL BE IN ACCORDANCE WITH THE FLORIDA DEPARTMENT OF TRANSPORTATION STANDARDS AND APPROVED BY THE CITY ENGINEER.
12. MINIMUM COVER SHALL BE 36 INCHES EXCEPT AS APPROVED BY THE UTILITIES ENGINEER AND CITY/COUNTY/TPOD ENGINEERS. PIPES WITH COVER LESS THAN 30 INCHES SHALL BE CONSTRUCTED OF DUCTILE IRON OR IN PVC CASING.
13. DISTURBED AREAS SHALL BE RESTORED IN CONFORMANCE WITH THE APPLICABLE GOVERNING AGENCY REQUIREMENTS.
14. EXISTING UTILITIES AND DRAINAGE SHALL BE FIELD VERIFIED PRIOR TO CONSTRUCTION AND PROTECTED BY THE CONTRACTOR.
15. WATER MAINS SHALL BE TESTED AND DISINFECTED IN ACCORDANCE WITH THE APPLICABLE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ANMA C-851 FOR DISINFECTION.



NOTES:

- 1) THE CONTRACTOR SHALL COMPLY WITH REQUIREMENTS OF THE FLORIDA TRENCH SAFETY ACT.
- 2) INITIAL BACKFILL SHALL BE HAND PLACED TO 12" ABOVE THE PIPE. BACKFILL SHALL BE MECHANICALLY TAMPED TO A MINIMUM OF 100% OF MAX. DENSITY AS DETERMINED BY AASHTO METHOD T-99.

TYPICAL TRENCH DETAIL
N.T.S.

**FORT PIERCE UTILITIES AUTHORITY
WATER DISTRIBUTION NOTES
CONTINUED**

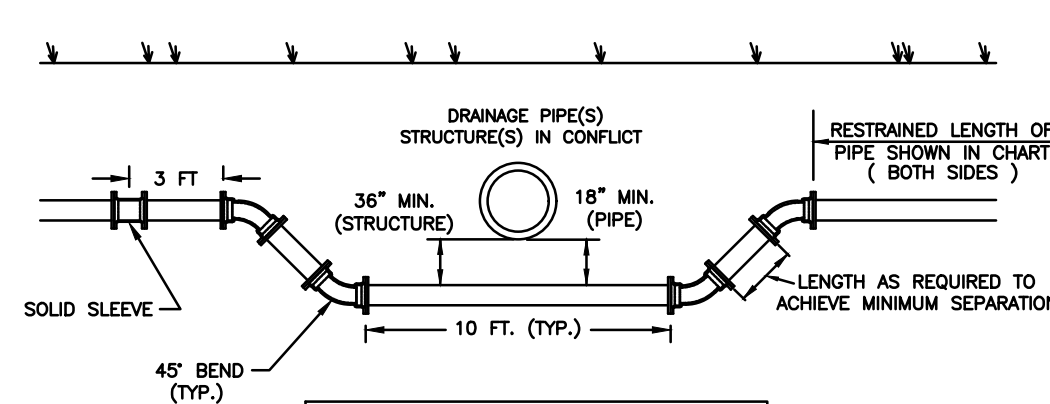
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING EXISTING UTILITIES AND DRAINAGE.
 17. THE CONTRACTOR SHALL FURNISH RECORD DRAWING INFORMATION TO THE ENGINEER INCLUDING LOCATIONS OF MALES, FITTINGS, SERVICE CONNECTIONS, BLOWOFFS, AIR RELEASE VALVES, AND ANY OTHER PERTINENT INFORMATION NECESSARY TO LOCATE ITEMS CONSTRUCTED UNDER THIS PROJECT, AS REQUIRED BY THE UTILITIES ENGINEER.
 18. THE CONTRACTOR SHALL TAP EXISTING LINES UNDER THE SUPERVISION OF THE FORT PIERCE UTILITIES AUTHORITY ONLY AFTER TESTING AND DISINFECTION HAS BEEN COMPLETED AND APPROVED ON THE TAPPING VALVE AND SLEEVE.
 19. WATER MAIN SHALL BE MARKED BY THE USE OF CONTINUOUS 10 GAUGE THIN MULTI STRANDED WIRE (BLUE IN COLOR) AND IDENTIFICATION TAPE WITH "WATER" MARKED ON TAPE, PERMANENTLY ATTACHED TO THE TOP OF THE WATER MAIN IN ACCORDANCE WITH THE FORT PIERCE UTILITIES AUTHORITY SPECIFICATIONS.
 20. SERVICE TAPS SHALL BE PLACED APPROXIMATELY TEN FEET AWAY FROM GATE VALVES, AS SHOWN, FOR TESTING. FOLLOWING TESTING AND STERILIZATION OF WATER LINE, CONTRACTOR SHALL PLACE A BRASS PLUG IN CORPORATION STOPS AND CURB STOPS SHALL BE REMOVED FROM TESTING LOCATIONS.
 21. MECHANICAL RESTRAINTS TO BE USED ON ALL FITTINGS AND PLACED IN ACCORDANCE WITH MANUFACTURER'S OR ENGINEER'S RECOMMENDATIONS (WHICHEVER IS MORE STRINGENT) AND FPUA REQUIREMENTS.
 22. ALL MAINS SHALL BE TESTED AT A MINIMUM OF 150 PSI. TESTING METHODS SHALL CONFORM TO ANMA C-600 - 2 HR MINIMUM TEST
- $L = \frac{SDVD}{14.800} \times \frac{1}{2}$
 $L =$ LEAKAGE IN GPH
 $S =$ LENGTH OF PIPE IN FEET
 $D =$ PIPE DIAMETER IN INCHES
 $P =$ TESTING PRESSURE IN PSI
23. PRIOR TO ANY TESTING, ALL MAINS 6" IN DIA. AND LARGER SHALL HAVE A SWAB PASSED THRU THE ENTIRE LENGTH OF THE LINE. NOTE: SWAB SHOULD BE PLACED IN THE JOINT OF NEW LINE. END OF MAIN SHOULD BE TURNED UP AT 45° AND EXTENDED SO THAT SWABBING AND A FULL BORE FLUSH CAN BE ACCOMPLISHED. BLOW-OFF ASSEMBLY CAN THEN BE PLACED. WHERE LINES BRANCH, SWABS WILL BE PLACED IN BRANCH LINES AND SEQUENTIALLY SWABBED AND FLUSHED.
 24. A MINIMUM SIX FEET AND PREFERABLY TEN FEET HORIZONTAL SEPARATION SHALL BE MAINTAINED BETWEEN THE WATER MAIN AND ANY WASTEWATER LINES. 6 INCHES MINIMUM VERTICAL SEPARATION IF WATER MAIN IS OVER WASTEWATER AND 12 INCHES IF WATER MAIN IS UNDER SHALL BE MAINTAINED BETWEEN THE WATER MAIN AND ANY WASTEWATER LINES. THE DISTANCE SHALL BE MEASURED FROM OUTSIDE OF PIPE TO OUTSIDE OF PIPE OR STRUCTURE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED THE CROSSING SHALL BE ARRANGED SO THAT THE WASTEWATER PIPE JOINTS AND THE WATER MAIN PIPE JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING, AND THE WATER MAIN SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE (DIP) AT THE CROSSING. SUFFICIENT LENGTHS OF DIP MUST BE USED TO PROVIDE A MINIMUM SEPARATION OF 10 FEET BETWEEN ANY TWO JOINTS. ALL JOINTS ON THE WATER MAIN WITHIN 20 FEET OF THE CROSSING MUST BE MECHANICALLY RESTRAINED. A MINIMUM VERTICAL CLEARANCE OF 6 INCHES MUST BE MAINTAINED AT ALL CROSSINGS.
 25. WHERE A WATER MAIN IS TO BE INSTALLED BELOW A STORM DRAIN PIPE, A MINIMUM OF 6 INCHES OF VERTICAL CLEARANCE BETWEEN PIPES SHALL BE CONSTRUCTED OF DIP AT THE CROSSING, AND SHALL BE MECHANICALLY RESTRAINED WITHIN 20 FEET OF THE CROSSING.
 26. CONTRACTOR SHALL COMPLY WITH FLORIDA TRENCH SAFETY ACT REQUIREMENTS.

NOTES:

- 1) IN CERTAIN SOIL CONDITIONS A FOUNDATION MAY BE REQUIRED.
- 2) BEDDING IS REQUIRED PRIMARILY TO BRING THE TRENCH BOTTOM UP TO GRADE. BEDDING MATERIALS SHALL PROVIDE A UNIFORM AND ADEQUATE LONGITUDINAL SUPPORT UNDER THE PIPE.
- 3) HAUNCHING MATERIAL SHALL BE HAND PLACED TO THE SPRINGLINE OF THE PIPE. MATERIAL SHALL BE CONSOLIDATED UNDER THE PIPE AND HAND TAMPED TO PROVIDE ADEQUATE SIDE SUPPORT.
- 4) INITIAL BACKFILL MATERIAL SHALL BE HAND PLACED TO 12" ABOVE THE TOP OF PIPE. THE SOIL SHALL BE COMPACTED TO 100% MAX. DENSITY (AASHTO T-99).
- 5) BACKFILL SHALL BE COMPACTED TO 100% OF MAX. DENSITY AS PER AASHTO T-99, TO A POINT 30" BELOW PROPOSED PROFILE GRADE OR EXISTING GRADE. THE FINAL 30" OF BACKFILL SHALL BE COMPACTED TO 98% OF MAX. DENSITY AS PER AASHTO T-192.
- 6) DENSITY TEST SHALL BE PERFORMED AT AREAS DETERMINED BY THE UTILITIES ENGINEER OR PERMIT AGENCY HAVING JURISDICTION, AT THE CONTRACTOR'S EXPENSE.
- 7) CONTRACTOR TO COMPLY WITH ALL FEDERAL, STATE AND LOCAL TRENCH SAFETY REGULATIONS.

FORT PIERCE UTILITIES AUTHORITY WASTEWATER CONSTRUCTION NOTES

1. ALL CONSTRUCTION MATERIAL, INSTALLATION AND TESTING SHALL CONFORM TO THE STANDARD SPECIFICATIONS OF THE FORT PIERCE UTILITIES AUTHORITY.
2. GRAVITY SEWER MAIN SHALL BE POLYVINYL CHLORIDE (PVC) 800-206, GREEN OR WHITE IN COLOR. GRAVITY SEWER MAIN SHALL HAVE LOCATOR TAPE WITH "SEWER" MARKED ON TAPE AND SHALL CONFORM TO ASTM D-3034.
3. THE MANHOLE BASE SHALL BE SET ON A FIRM, DRY AND STABLE OR COMPACTED BASE FOUNDATION. IF NECESSARY, THE CONTRACTOR SHALL UTILIZE ROCK TO PROVIDE A FIRM AND SUITABLE MANHOLE BASE FOUNDATION.
4. WASTEWATER LINES SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH FPUA DESIGN AND CONSTRUCTION STANDARDS. THE CONTRACTOR SHALL SUBMIT CERTIFIED DENSITY TESTS AS REQUIRED BY FPUA ENGINEERING AND THE CITY ENGINEERING DEPARTMENT. IN CASES WHERE PAVED AREAS FALL WITHIN THE JURISDICTION OF LOCAL OR STATE AGENCIES THE COMPACTON REQUIREMENTS SHALL NOT BE LESS THEN THE MINIMUM REQUIRED BY THE APPROPRIATE RESPONSIBLE AGENCY.
5. A 1% MINIMUM SLOPE SHALL BE MAINTAINED ON ALL SANITARY SERVICE LATERALS.
6. THE CONTRACTOR SHALL FURNISH RECORD DRAWING INFORMATION TO THE ENGINEER CONSISTING OF PIPE SIZES, LOCATION OF SERVICE TEE W/INS (DIAMETER OF SERVICES), LOCATION OF ANY FITTINGS, FINAL RIM AND INVERT ELEVATION OF ALL MANHOLES AND ANY OTHER PERTINENT INFORMATION NECESSARY TO LOCATE ITEMS CONSTRUCTED UNDER THIS PROJECT.
7. MAINTAIN SIX FEET AND PREFERABLY 10 FEET HORIZONTAL DISTANCE BETWEEN WATER MAINS AND SEWER MAINS AS A MINIMUM.
8. WASTEWATER FORCE MAINS, WASTEWATER COLLECTION LINES, AND STORM SEWERS SHOULD CROSS UNDERNEATH WATER MAINS. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, THE CROSSING SHALL BE ARRANGED SO THAT THE WASTEWATER PIPE JOINTS AND THE WATER MAIN PIPE JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING, AND THE WATER MAIN SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE (DIP) AT THE CROSSING. SUFFICIENT LENGTHS OF DIP MUST BE USED TO PROVIDE A MINIMUM SEPARATION OF 10 FEET BETWEEN ANY TWO JOINTS. ALL JOINTS ON THE WATER MAIN WITHIN 20 FEET OF THE CROSSING MUST BE MECHANICALLY RESTRAINED. A MINIMUM VERTICAL CLEARANCE OF 6 INCHES MUST BE MAINTAINED AT ALL CROSSINGS.
9. A PRE-CONSTRUCTION CONFERENCE BETWEEN THE ENGINEER, THE CONTRACTOR, AND FPUA/CITY/COUNTY/TPOD SHALL BE MANDATORY PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
10. NO FIELD CHANGES OR DEVIATIONS FROM THE DESIGN SHALL BE MADE WITHOUT PRIOR APPROVAL OF FPUA/CITY/COUNTY/TPOD ENGINEER.
11. TRAFFIC CONTROL, BARRICADES, ETC. SHALL BE IN ACCORDANCE WITH THE FLORIDA DEPARTMENT OF TRANSPORTATION STANDARDS.
12. CONTRACTOR SHALL NOTIFY FORT PIERCE UTILITIES AUTHORITY 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
13. WASTEWATER FORCE MAIN SHALL BE POLYVINYL CHLORIDE CONFORMING TO ANMA C-900, AND SHALL BE CLASS 150, DR-18.
14. WASTEWATER FORCE MAIN SHALL BE GREEN IN COLOR.
15. FITTINGS SHALL BE DUCTILE IRON, CONFORMING TO ANS/ANMA C-110/A21.10 CLASS 250 MIN. AND INTERIOR EPDM GASKETS.
16. WASTEWATER FORCE MAIN SHALL BE MARKED BY THE USE OF CONTINUOUS 10 GAUGE THIN WIRE (GREEN IN COLOR) PERMANENTLY ATTACHED TO THE TOP OF THE FORCE MAIN WITH LOCATOR TAPE MARKED "SEWER" ON TAPE IN ACCORDANCE WITH FPUA SPECIFICATIONS.
17. MINIMUM COVER SHALL BE 36 INCHES. PIPES WITH COVER LESS THAN 30 INCHES SHALL REQUIRE PRIOR APPROVAL OF THE UTILITIES ENGINEER AND SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE.
18. EACH SERVICE LATERAL WILL BE MARKED WITH A LOCATOR BALL AS MANUFACTURED BY 3M CORPORATION, OR APPROVED EQUAL AS REQUIRED BY FPUA ENGINEER.
19. ALL MANHOLES SHALL HAVE SEWER MAIN GUARDS INSTALLED AS REQUIRED BY FPUA ENGINEER.
20. THE CONTRACTOR SHALL COMPLY WITH THE FLORIDA TRENCH SAFETY ACT REQUIREMENTS.



PIPE SIZE	90° BEND	45° BEND
2"	48 FT.	21 FT.
4"	70 FT.	29 FT.
6"	99 FT.	41 FT.
8"	129 FT.	54 FT.

1. PROVIDE RESTRAINED JOINTS AT CHANGES IN DIRECTION OF ALL PIPE.
2. DISTANCES (FEET) SHALL APPLY TO LENGTHS OF PIPE ON EACH SIDE OF THE FITTING.
3. CONSIDER DEAD ENDS EQUIVALENT TO 90° BENDS.
4. TEE SHALL BE RESTRAINED ON BRANCH BASED ON SAME DISTANCE AS 90° BEND OF THE SIZE OF THE BRANCH.
5. DETAIL APPLIES TO BOTH HORIZONTAL AND VERTICAL DEFLECTIONS.
6. IF MULTIPLE PIPES/STRUCTURES ARE IN CONFLICT IN CLOSE PROXIMITY, EXTEND TO FEET TYPICAL PORTION OF CONFLICT DEFLECTION AS NEEDED TO MAINTAIN DEFLECTION SPACING.

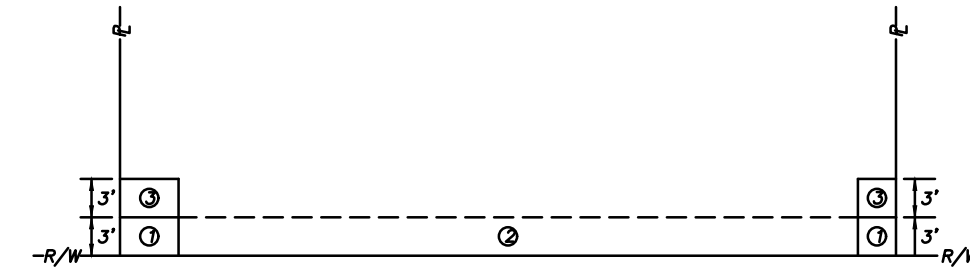
PIPE CONFLICT DETAIL
N.T.S.

**STANDARD SEPARATION STATEMENT FOR
WATER / SEWER CONFLICTS**

1. SANITARY SEWER, FORCE MAINS, AND STORM SEWERS SHOULD CROSS UNDER WATER MAINS WHENEVER POSSIBLE. SANITARY SEWERS, FORCE MAINS AND STORM SEWERS CROSSING UNDER WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 6 INCHES, PREFERABLY 12 INCHES BETWEEN THE INVERT OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE. WHEN ABOVE, AND AT LEAST 12 INCHES OF SEPARATION WHEN THE WATER MAIN IS BELOW.
- WHERE SANITARY SEWER, FORCE MAINS, STORM SEWERS MUST CROSS A WATER MAIN WITH LESS THAN 6 INCHES VERTICAL SEPARATION, BOTH THE SEWER AND WATER MAIN SHALL BE CONSTRUCTED OF DUCTILE IRON PIPE (DIP) CENTERED ON THE CROSSING. (DIP IS NOT REQUIRED FOR STORM SEWERS.) SUFFICIENT LENGTHS OF DIP MUST BE USED TO PROVIDE A MINIMUM SEPARATION OF 10 FEET BETWEEN TWO JOINTS. ALL JOINTS ON THE WATER MAIN WITHIN 20 FEET OF THE CROSSING MUST BE MECHANICALLY RESTRAINED.
- ALL CROSSINGS SHALL BE ARRANGED SO THAT THE SEWER PIPE JOINTS AND WATER MAIN PIPE JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING (PIPES CENTERED ON THE CROSSING). AT SUCH CROSSINGS PIPES SHALL BE ARRANGED SO THAT ALL WATER MAIN JOINTS ARE AT LEAST THREE FEET FROM ALL JOINTS IN VACUUM-TYPE SANITARY SEWERS, STORMWATER FORCE MAINS, OR PIPELINES CONVEYING RECLAIMED WATER REGULATED UNDER PART II OF CHAPTER 62-610, F.A.C., AND AT LEAST SIX FEET FROM ALL JOINTS IN GRAVITY OR PRESSURE TYPE SANITARY SEWERS, WASTEWATER FORCE MAINS, OR PIPELINES CONVEYING RECLAIMED WATER NOT REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.
- WHERE A NEW PIPE CONFLICTS WITH AN EXISTING PIPE WITH LESS THAN 6 INCHES VERTICAL CLEARANCE, THE NEW PIPE SHALL BE CONSTRUCTED OF DIP (EXCEPT STORM SEWERS) AND NEW PIPES SHALL BE ARRANGED TO MEET THE CROSSING REQUIREMENTS ABOVE.
- A MINIMUM 3'-FOOT HORIZONTAL SEPARATION SHALL BE MAINTAINED BETWEEN ANY TYPE OF STORM SEWER AND WATER MAIN IN PARALLEL INSTALLATIONS WHENEVER POSSIBLE.
- A MINIMUM 10'-FOOT HORIZONTAL SEPARATION SHALL BE MAINTAINED BETWEEN "ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEM" AND WATER MAIN IN PARALLEL INSTALLATIONS WHENEVER POSSIBLE.
- A MINIMUM 5'-FOOT, AND PREFERABLY 10'-FOOT HORIZONTAL SEPARATION SHALL BE MAINTAINED BETWEEN GRAVITY OR PRESSURE TYPE SANITARY SEWER, WASTEWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER AND WATER MAIN IN PARALLEL INSTALLATIONS WHENEVER POSSIBLE. THE MINIMUM HORIZONTAL SEPARATION DISTANCE BETWEEN WATER MAINS SHALL BE REDUCED TO 3 FEET WHERE THE BOTTOM OF THE WATER MAIN IS LAID AT LEAST SIX INCHES ABOVE THE TOP OF THE SEWER.
- IN CASES WHERE IT IS NOT POSSIBLE TO MAINTAIN A 10'-FOOT HORIZONTAL SEPARATION, THE WATER MAIN SHALL BE LAID IN A SEPARATE TRENCH OR ON A UNDISTURBED EARTH SHELF LOCATED ON ONE SIDE OF THE SEWER OR FORCE MAIN AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 6 INCHES ABOVE THE TOP OF THE SEWER.
- WHERE IT IS NOT POSSIBLE TO MAINTAIN A VERTICAL DISTANCE OF 6 INCHES IN PARALLEL INSTALLATIONS, THE WATER MAIN SHALL BE CONSTRUCTED OF DIP AND THE SEWER OR FORCE MAIN SHALL BE CONSTRUCTED OF DIP (EXCEPT STORM SEWER) WITH A MINIMUM VERTICAL DISTANCE OF 6 INCHES. THE WATER MAIN SHOULD ALWAYS BE ABOVE THE SEWER. JOINTS ON THE WATER MAIN SHALL BE LOCATED AS FAR AWAY AS POSSIBLE FROM JOINTS ON THE SEWER OR FORCE MAIN (STAGGERED JOINTS).
- ALL DIP SHALL BE PRESSURE CLASS 250 MIN. ADEQUATE PROTECTIVE MEASURES AGAINST CORROSION SHALL BE USED AS DETERMINED BY THE DESIGN ENGINEER.

GENERAL POLICY

WHERE COST JUSTIFIED AND OPERATIONALLY FEASIBLE, IT IS THE GENERAL POLICY OF THE F.P.U.A. TO PROVIDE WATER, ELECTRIC, SEWER AND GAS SERVICE FROM THE STREET SIDE OF A PIECE OF PROPERTY, DEPENDING ON FACTORS SUCH AS LOCATION OF EXISTING SUPPLY SOURCE FACILITIES, REAR OR SIDE LOT LINE SUPPLY MAY BE AUTHORIZED, BUT ONLY WITH PRIOR APPROVAL FROM THE F.P.U.A.



NOTES:

1. THE PREFERRED POINT OF CONNECTION TO THE F.P.U.A. WATER METER, AREA (A) SHALL BE LOCATED IN THE CORNER OF THE PROPERTY SELECTED BY THE F.P.U.A. AS THE BEST LOCATION FOR THE WATER METER. EVERY EFFORT WILL BE MADE TO SELECT THE CORNER WHERE TWO WATER SERVICES AND METERS CAN BE CONNECTED.
2. IF PHYSICAL BARRIERS OR OTHER OBSTACLES PREVENT THE CONNECTION OF THE BUILDING SERVICE LINE TO THE F.P.U.A. WATER SERVICE, WITHIN AREA (B), THE F.P.U.A. ENGINEERING DEPARTMENT MAY AUTHORIZE THE CONNECTION ALONG THE PORTION OF THE R/W LINE MARKED AREA (C), OR ALONG THE PROPERTY LINES MARKED AREA (D).
3. HORIZONTAL SEPARATION OF WATER AND WASTEWATER SERVICES SHOULD BE A MINIMUM OF 6 FEET AND PREFERABLY 10 FEET.
4. ALL METERS SHALL BE INSTALLED IN AN UNRESTRICTED AREA FOLLOWING EASE OF ACCESS AND PROVIDING ADEQUATE PROTECTION.
5. THE F.P.U.A. SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND REPAIR OF THE WATER LATERAL WITHIN THE EASEMENT OR RIGHT-OF-WAY UP TO THE POINT OF CONNECTION.

**WATER METER PLACEMENT
(N.T.S.)**

PIPE SIZE	AVERAGE O.D. (in)	PRESSURE (lb/in ²)	CALCULATED THRUST (lbf)	"A" (ft-in)	"B" (ft-in)	"C" (ft-in)	"D" (ft-in)	"E" (ft-in)	CONCRETE (yd ³)
6	6.9	100	3739	2'-0"	1'-0"	1'-0"	1'-3"	2'-6"	1.00
8	9.05	100	6433	2'-0"	1'-6"	1'-0"	1'-6"	3'-0"	1.75
10	11.1	100	9677	2'-6"	1'-6"	1'-6"	1'-10"	3'-0"	2.57
12	13.2	100	13685	2'-6"	2'-0"	1'-6"	1'-9"	4'-0"	3.95
16	17.4	100	23779	3'-0"	2'-0"	1'-6"	2'-6"	5'-0"	6.49
18	19.5	100	29865	3'-0"	2'-0"	1'-6"	2'-6"	6'-0"	8.09
20	21.6	100	36644	3'-0"	2'-6"	1'-6"	2'-6"	6'-6"	9.98
24	25.8	100	52279	3'-0"	2'-6"	2'-0"	2'-9"	7'-6"	14.00

NOTES:

1. THE USE OF RESTRAINT BLOCKS SHALL BE LIMITED TO SITUATIONS WHERE EXPOSING SEVERAL JOINTS OF PIPE IS NOT FEASIBLE OR AS DIRECTED BY FPUA ENGINEER.
2. ALL BEARING SURFACES TO BE CARRIED TO UNDISTURBED SOIL. WHERE TRENCH WALL HAS BEEN DISTURBED, EXCAVATE ALL LOOSE MATERIAL AND EXTEND RESTRAINT BLOCK TO UNDISTURBED MATERIAL.
3. RESTRAINT BLOCK SHALL BE INSTALLED A MINIMUM OF 4 FEET FROM ANY PIPE JOINT, FITTING OR VALVE. AT NO TIME SHALL A PIPE JOINT, FITTING OR VALVE BE ENCASED IN THE RESTRAINT BLOCK.
4. CONCRETE SHALL HAVE MINIMUM 28 DAYS COMPRESSIVE STRENGTH OF 3000 PSI.

DEAD MAN RESTRAINT BLOCK DETAIL
N.T.S.

JOHN W. BIGGS
LICENSE
PROFESSIONAL ENGINEER

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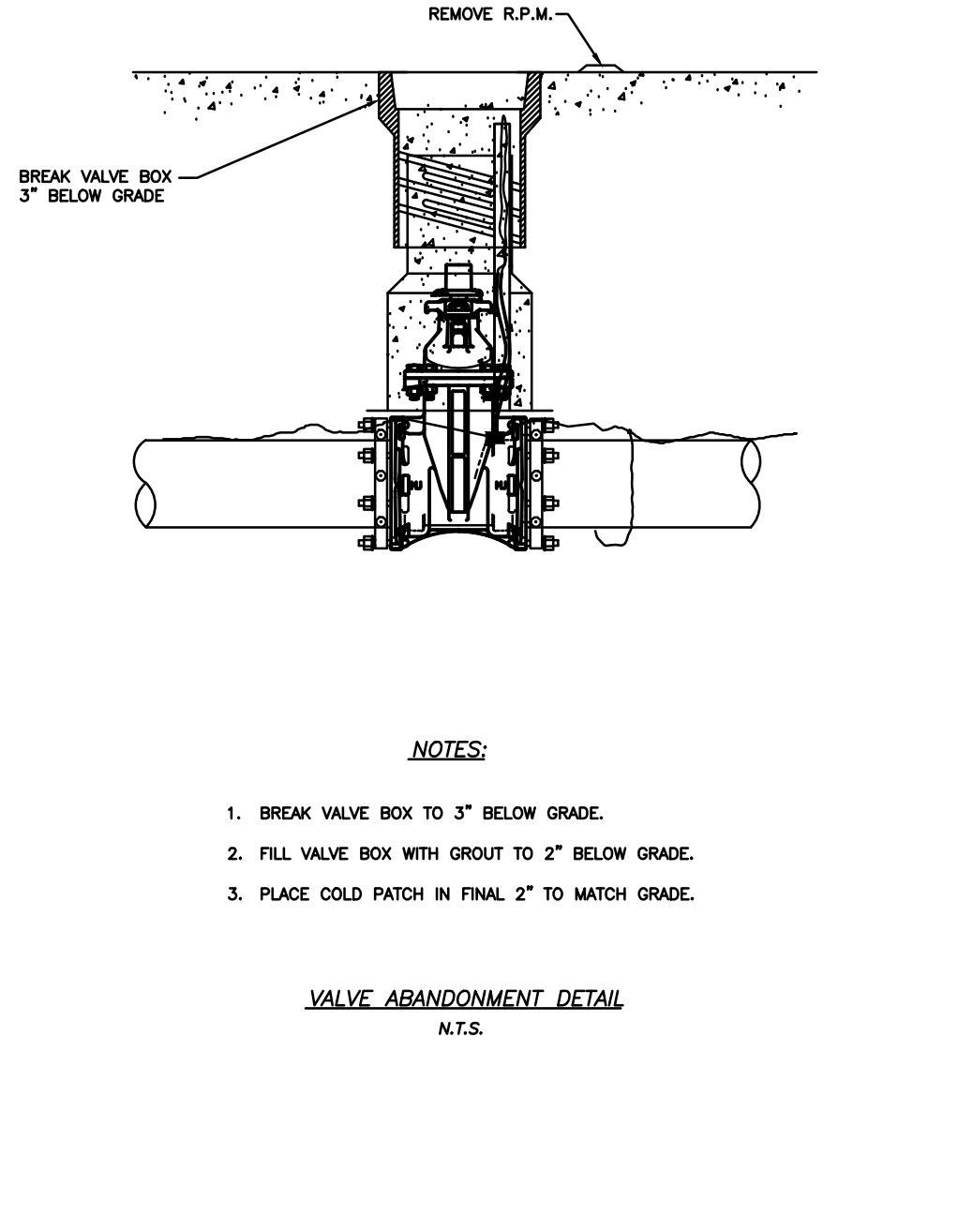
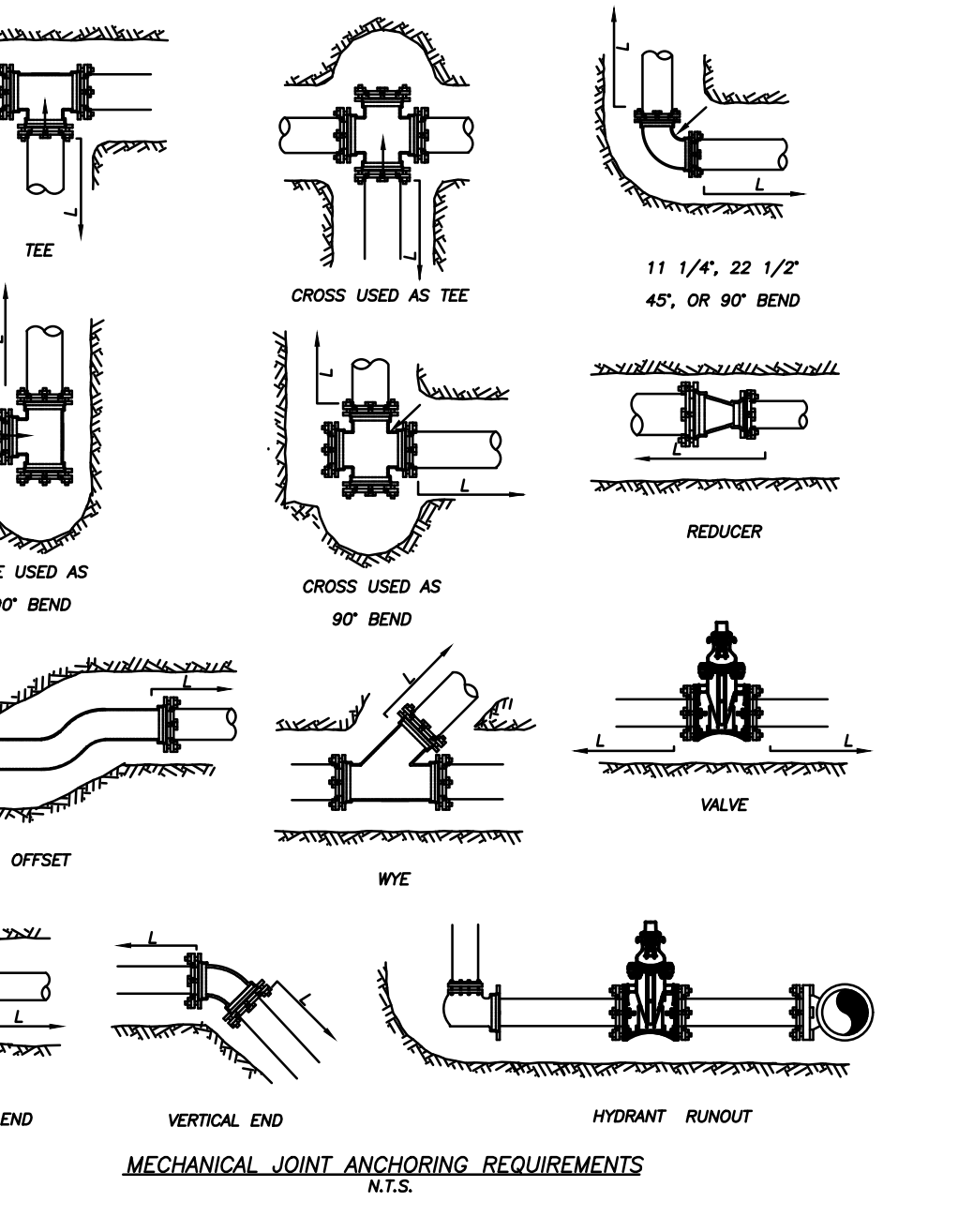
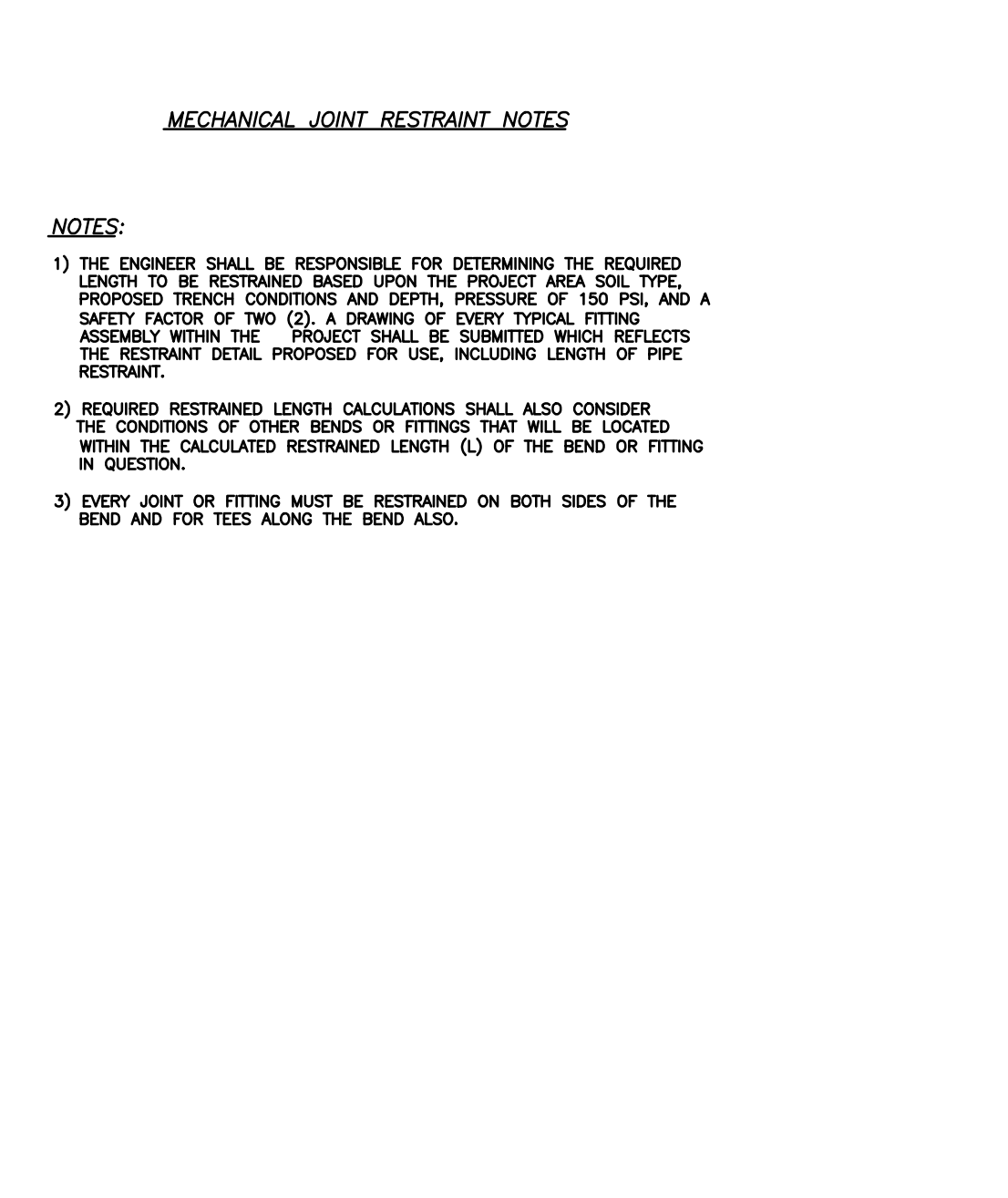
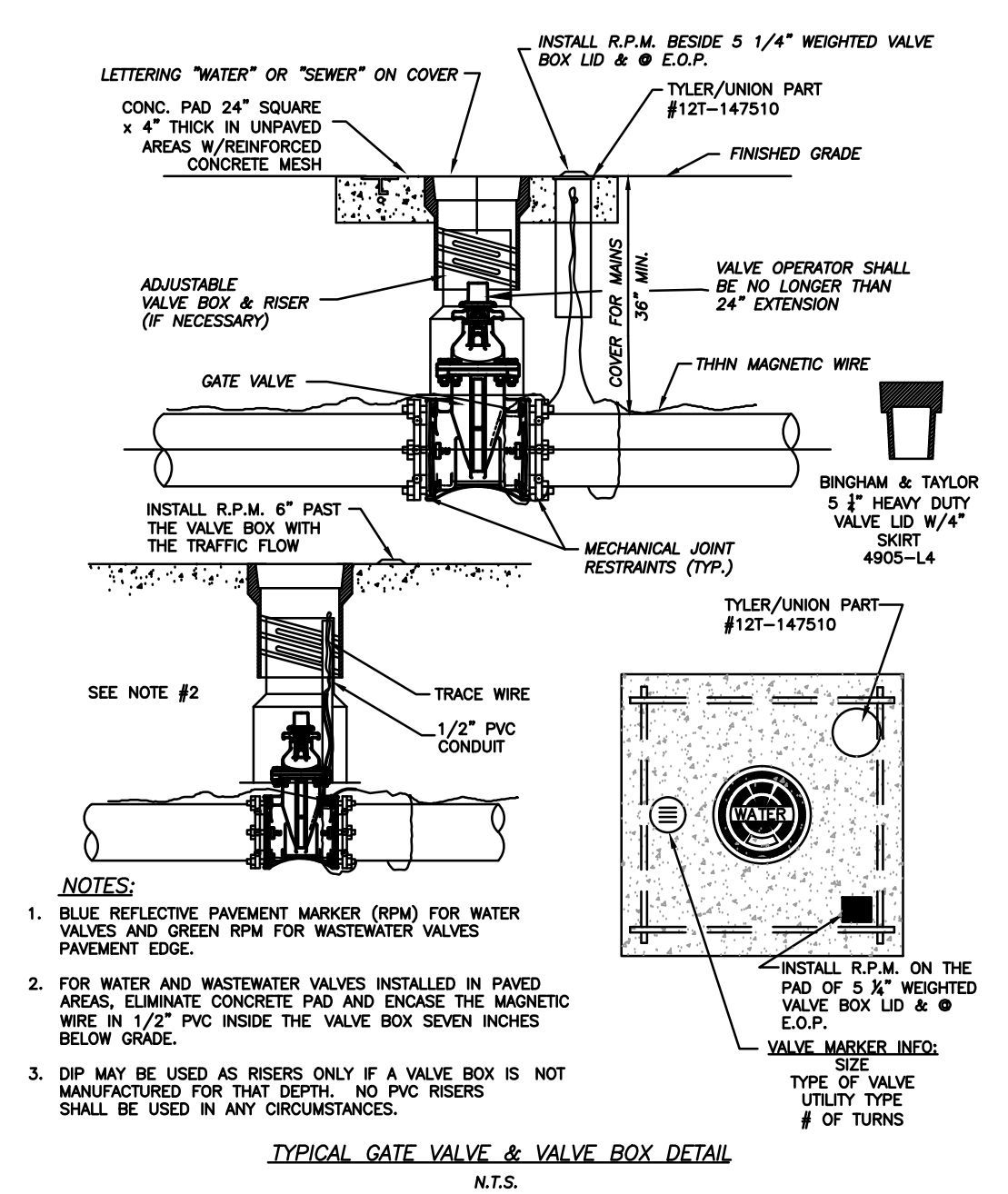
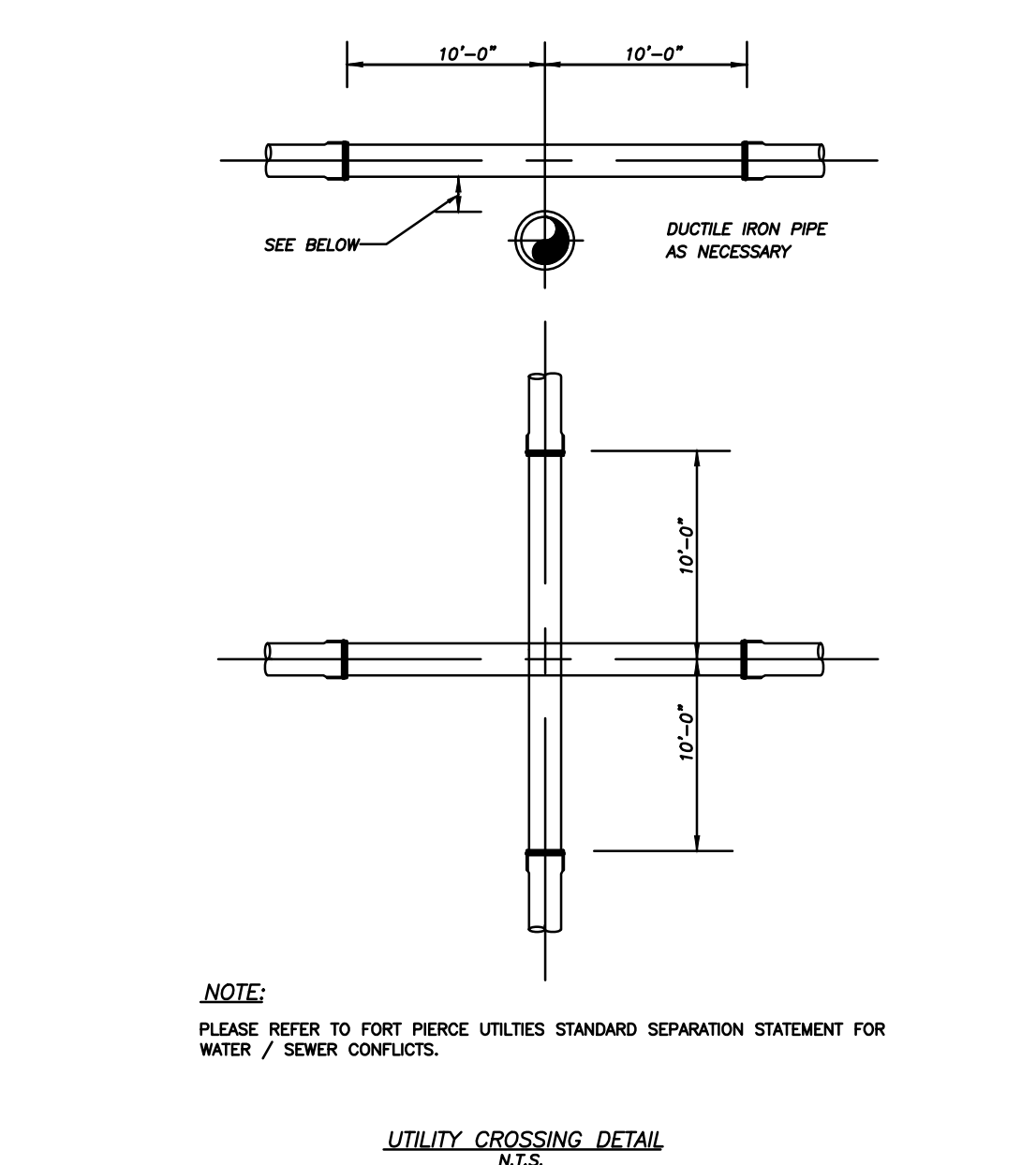
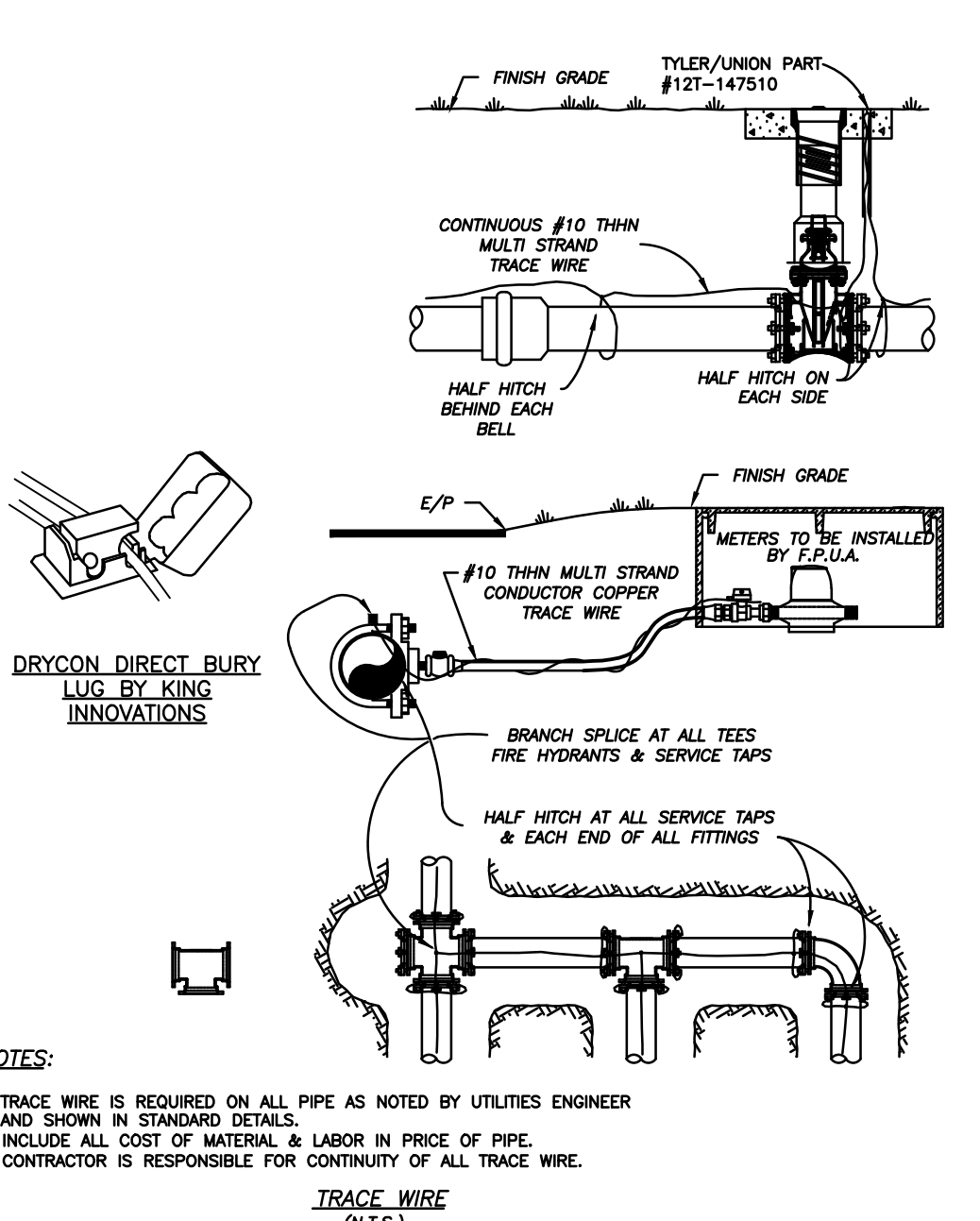
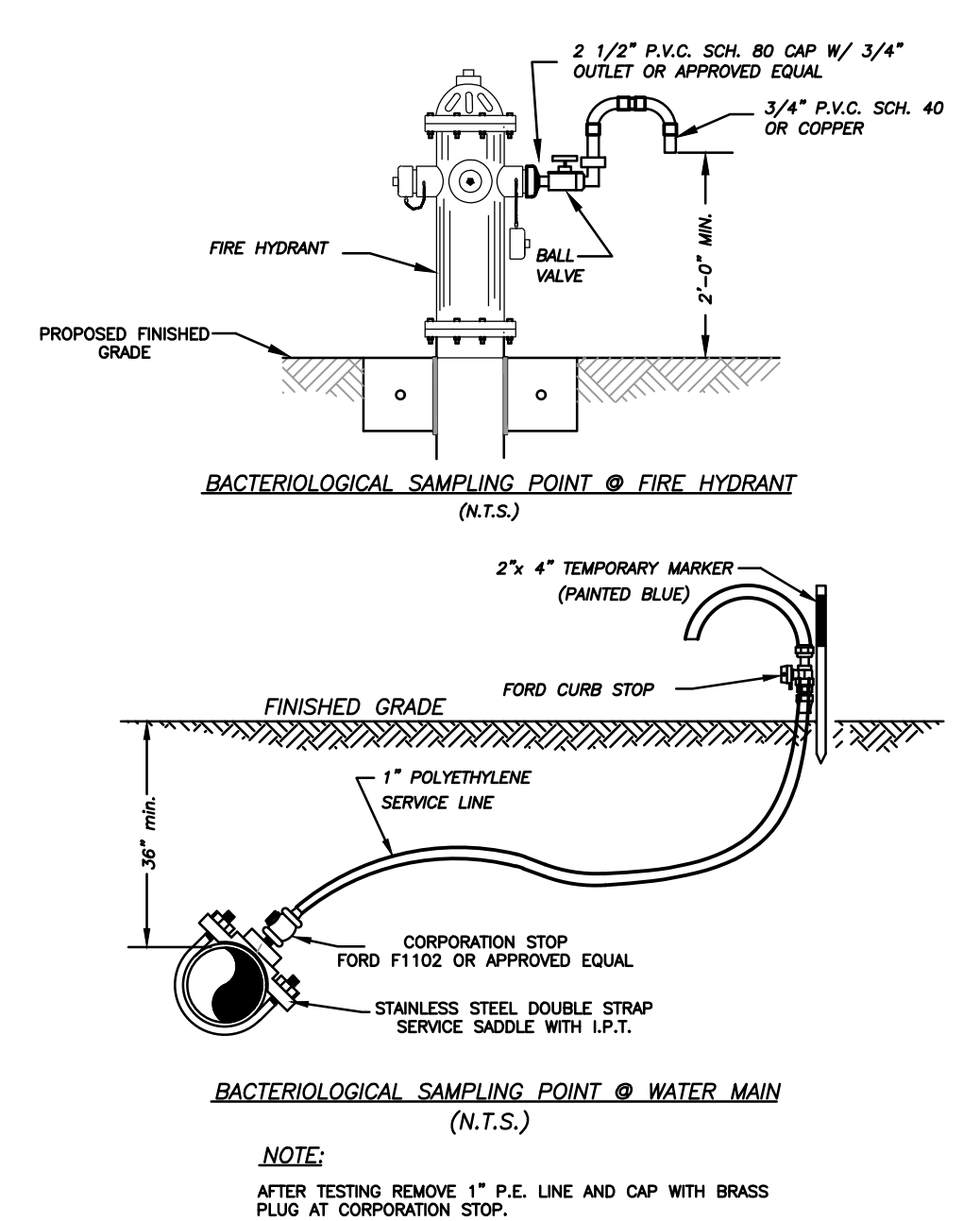
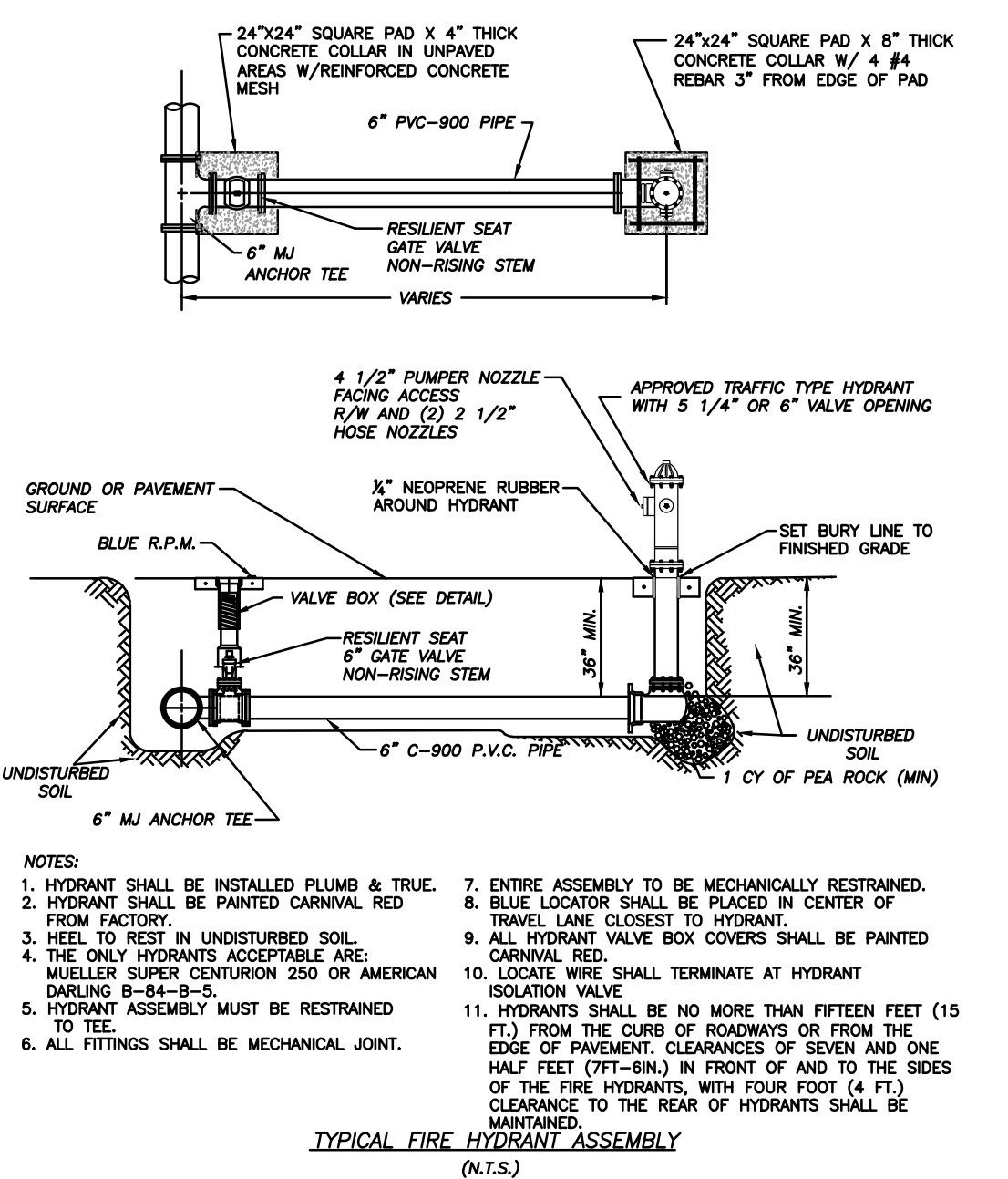
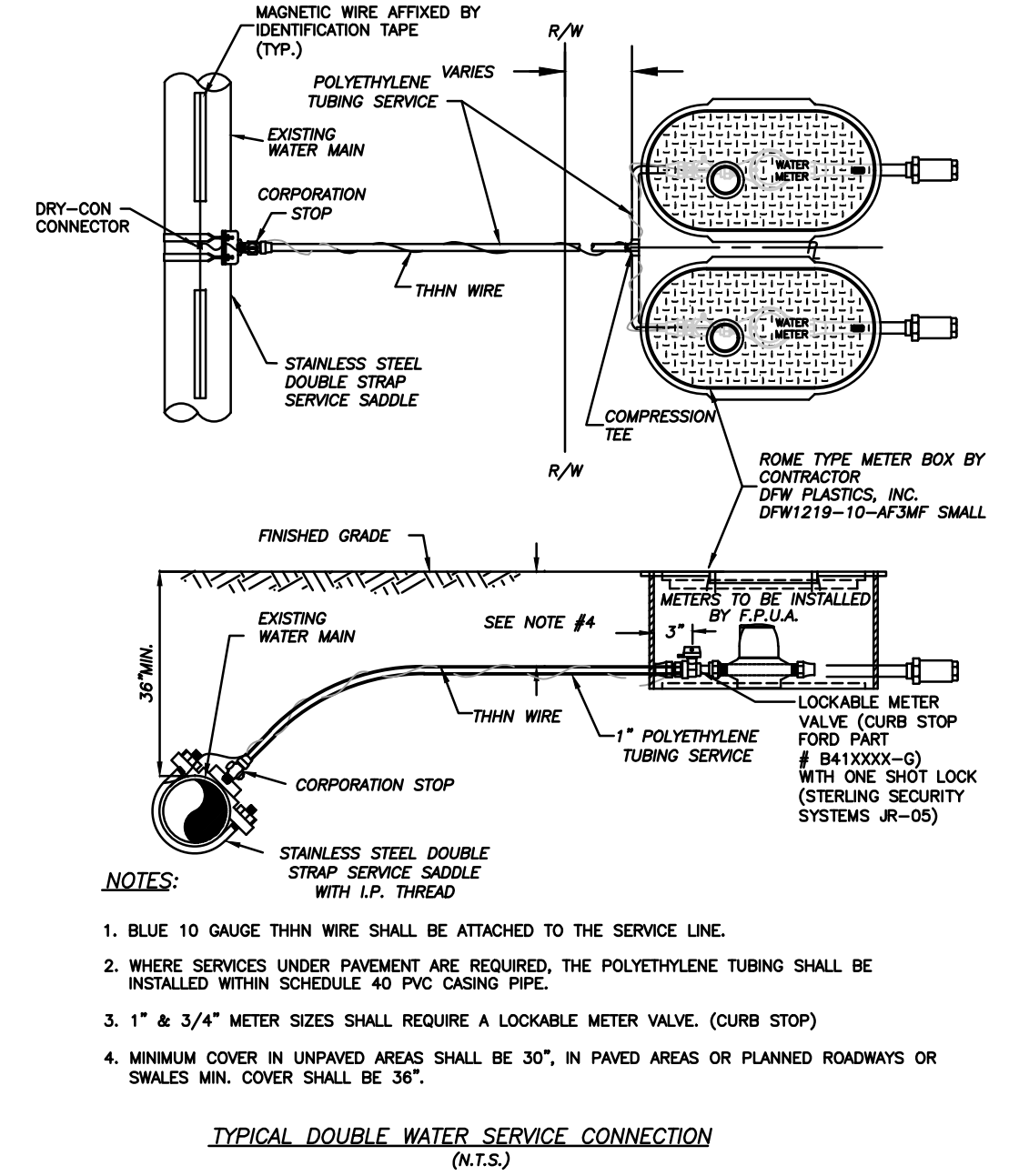
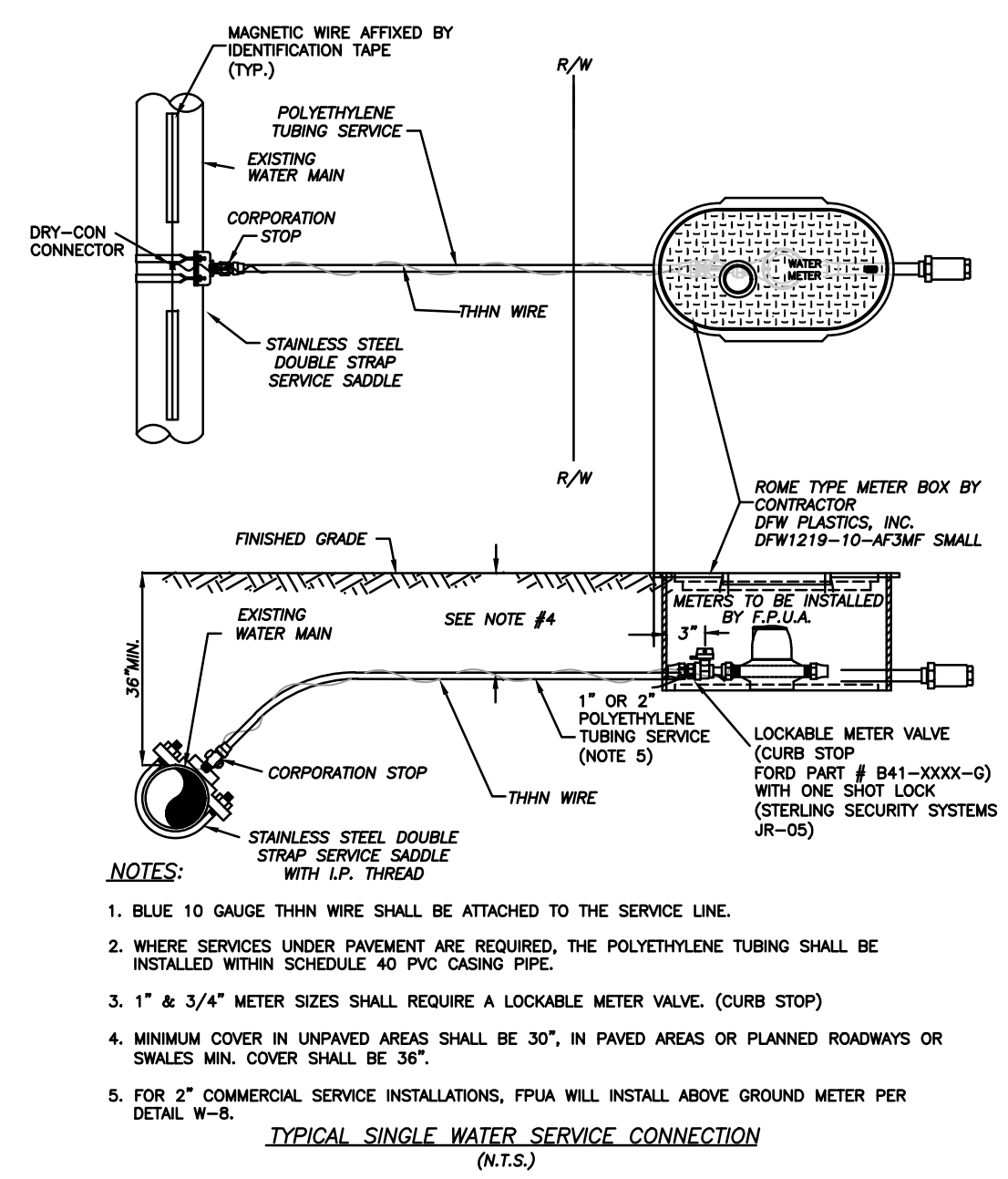
FPUA
COMMUNITY PROUD

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DRAWN BY: JT	SCALE: N.T.S.		
APPROVED: JB	DATE:		

**OHIO AVENUE
UTILITY REPLACEMENT**
WATER/WASTEWATER ENGINEERING

FT. PIERCE UTILITIES AUTHORITY
1701 SOUTH 37TH STREET
FT. PIERCE, FLORIDA 34947
(772) 466-1600 / FAX (772) 468-2414

SHEET TYPE: DETAILS SHEET # 8 OF 11



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