

# Construction Plans and Specifications Of MIDWAY ROAD 24" WATER MAIN AND 2" FIBER OPTIC EXTENSION For The City of Port St. Lucie Utility Systems Department Lying In Secs. 1-2,6, Twp. 36 S., Rng. 39 E. St. Lucie County, Florida



**LOCATION MAP**

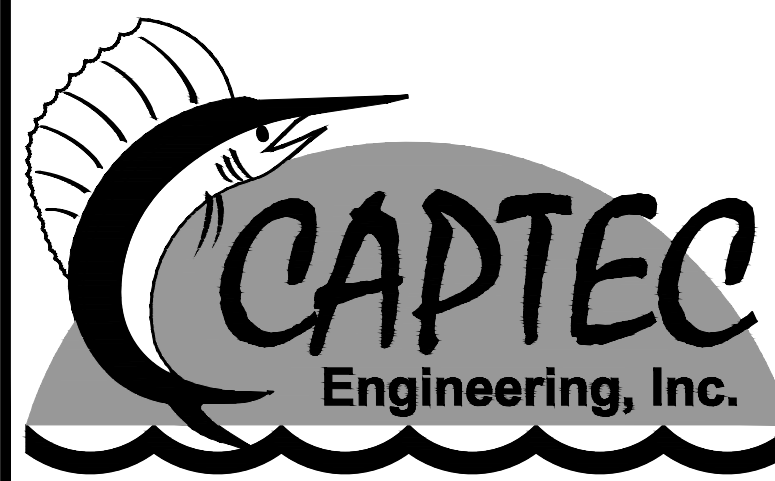
**NOTES:**  
 THESE PLANS ARE IN ENGLISH UNITS  
 ALL ELEVATIONS HEREIN REFERENCE N.A.V.D. 1988 DATUM.  
 ADD 1.489 FEET TO CONVERT TO N.G.V.D. 1929 DATUM.  
 ALL CONSTRUCTION IS TO BE IN ACCORDANCE WITH  
 FLORIDA DEPARTMENT OF TRANSPORTATION STANDARDS  
 AND SPECIFICATIONS, 2016 EDITION.

**CLIENT**

**LANEY SOUTHERLY, P.E.**  
**CITY OF PORT ST. LUCIE**  
**UTILITY SYSTEMS DEPARTMENT**  
**121 SW PORT ST. LUCIE BLVD.**  
**PORT ST. LUCIE, FL 34984**  
**PHONE: (772) 873-6442**

**ENGINEER**

**JOSEPH W. CAPRA, P.E.**  
**CAPTEC ENGINEERING, INC.**  
**301 N.W. FLAGLER AVENUE**  
**STUART, FLORIDA 34994**  
**PHONE: (772) 692-4344**

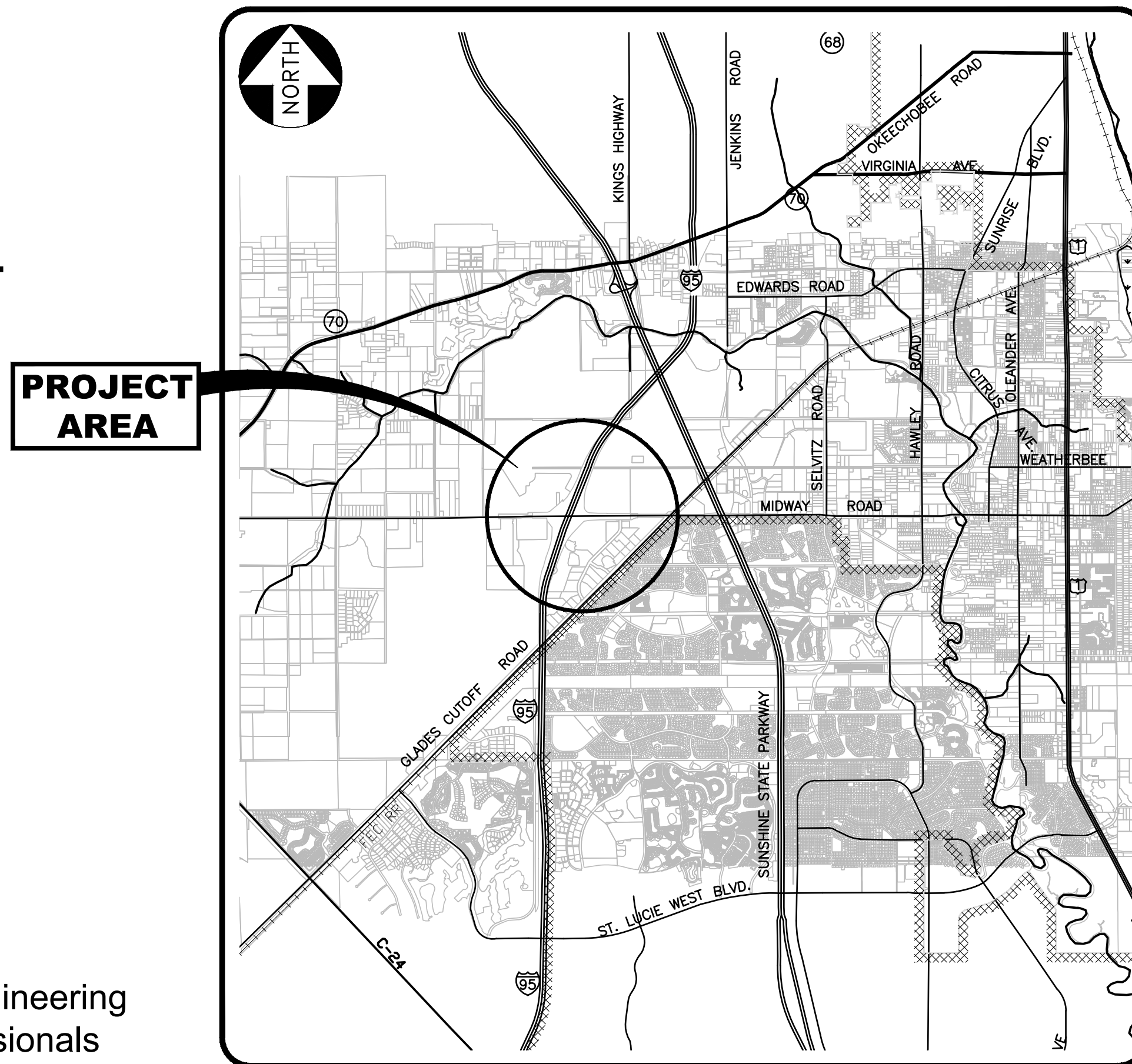


Civil Engineering  
Professionals

Civil Engineering Professionals

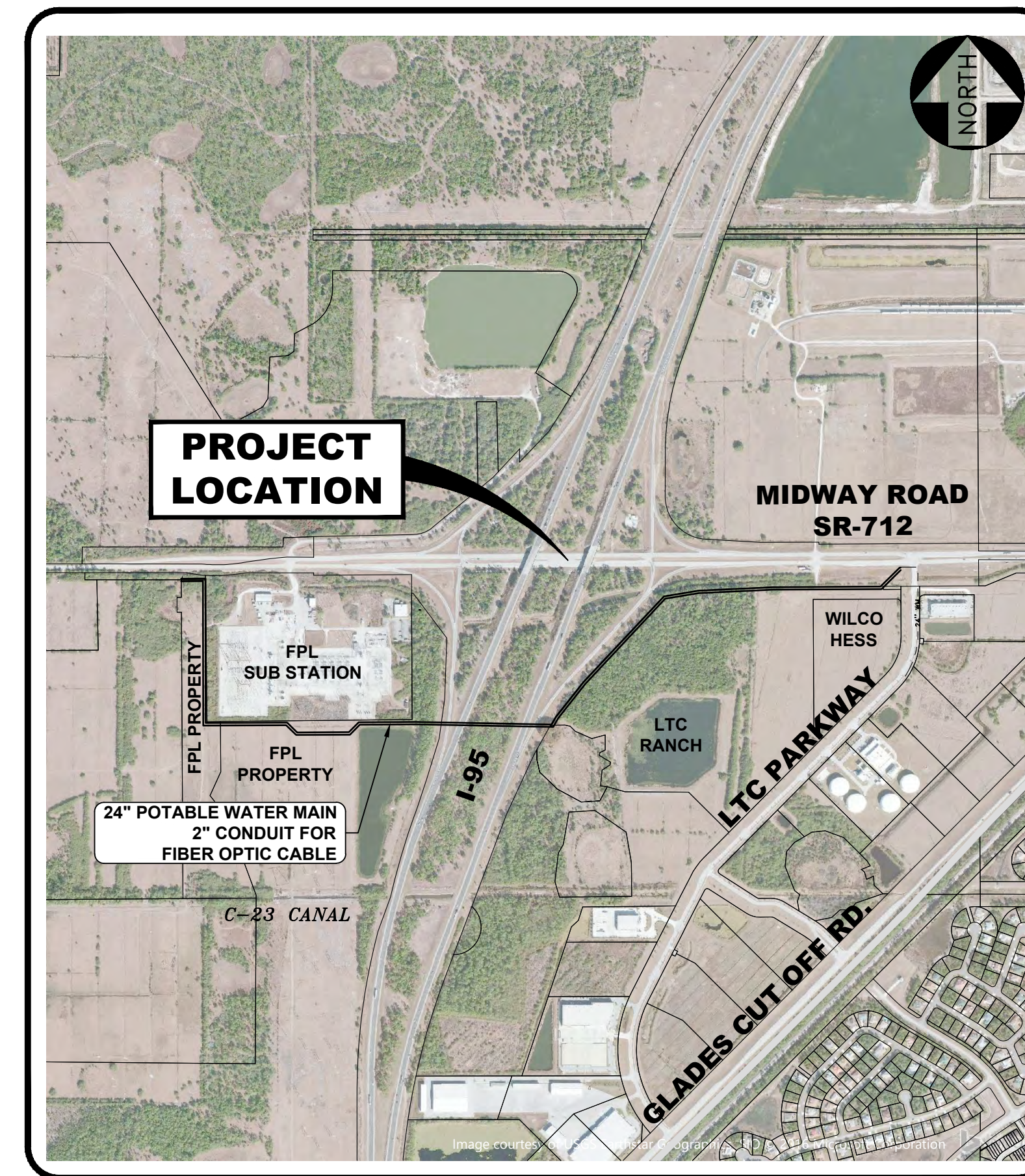
301 N.W. Flagler Avenue  
 Stuart, Florida 34994  
 Phone: (772) 692-4344  
 Fax: (772) 692-4341

Engineering Business  
 No. EB-0007657



**Vicinity Map**

N.T.S.



**Site Map**

N.T.S.

**SHEET INDEX**

SHEET NUMBER	SHEET TITLE/DESCRIPTION
1	COVER
2	PROJECT LAYOUT
3-6	PLAN AND PROFILE
7	PLAN AND PROFILE I-95 CROSSING
8-11	PLAN AND PROFILE
12-13	DETAILS
14	GENERAL NOTES

**3-23-20**

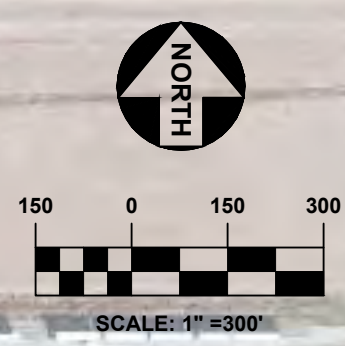
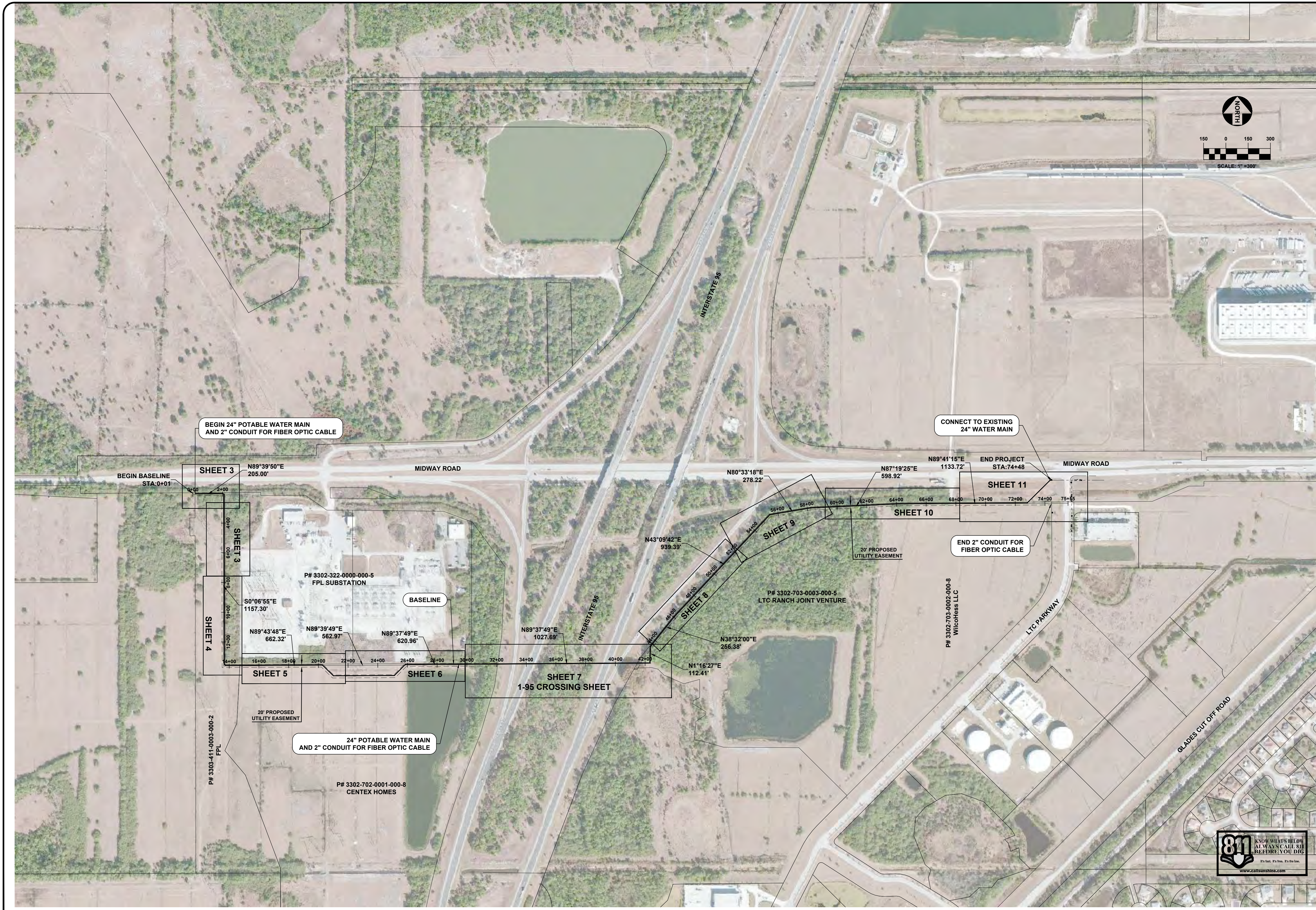



PSL Project No. 12-0029

Project No. 1682.1 MIDWAY ROAD POTABLE WATER MAIN EXTENSION

Project No. 1682.1 MIDWAY ROAD POTABLE WATER MAIN EXTENSION






  
 CAPTEC Engineering, Inc.  
 Civil Engineering Professionals

DATE: 11/22/2016

DRAWN BY:	MDB
DESIGNED BY:	JWC
CHECKED BY:	JWC
PROJECT No.:	1682.1
HORIZ. SCALE:	1" = 300'
VERT. SCALE:	1882.1 OVERALL

NO.	DATE	BY	REVISIONS
01	12-8-17	MDB	REVISED BORE DEPTH SHEET NUMBERS
02	2-14-18	MDB	REVISED PER DEP
03	2-14-18	MDB	PERMIT PLAN
04	2-14-18	MDB	ADDED 45' BENDS SOUTH PL
05	8-18-19	MDB	ADDED 30' RAW WATER MAIN W FIBER CONDUIT
06	3-23-20	MDB	REMOVED 30' RAW WATER MAIN

SCALE VERIFICATION

1	SOLID BAR IS EQUAL ORIGINAL DRAWING DIMENSIONS ACCORDINGLY
0	ADJUST ALL SCALED DIMENSIONS ACCORDINGLY

**MIDWAY ROAD 24" WATER MAIN AND 2" FIBER OPTIC EXTENSION**  
 City of Port St. Lucie  
**PROJECT LAYOUT**

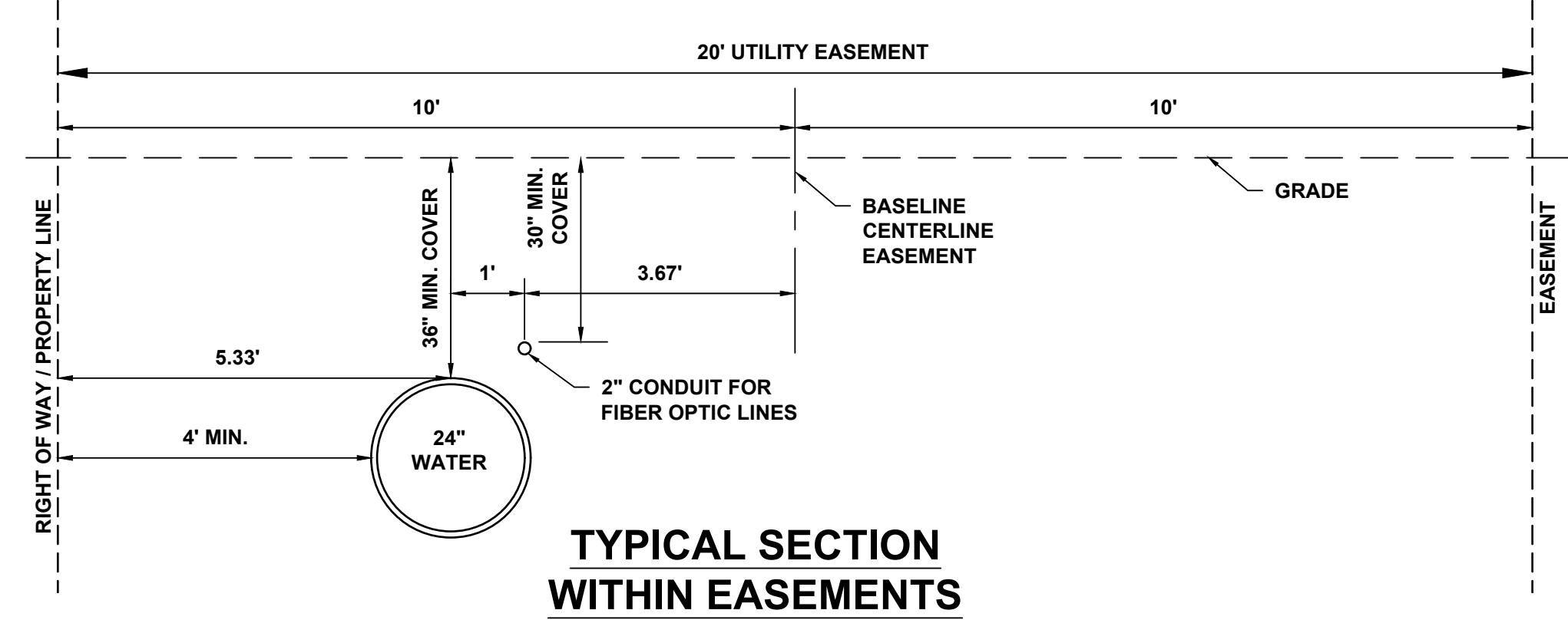
Joseph W. Capra  
 301 N.W. Flagler Ave.  
 Stuart, Florida 34994  
 P.E. No. 37638

Printed Date:

JOB No.: **1682.1**  
 SHEET  
**2 OF 14**

P:\16821\6821 - CPSL Midway Road Water Main\DWG\16821.dwg 3/21/2020 11:33:29 AM DWG To PDF.pc3





**ABBREVIATIONS**

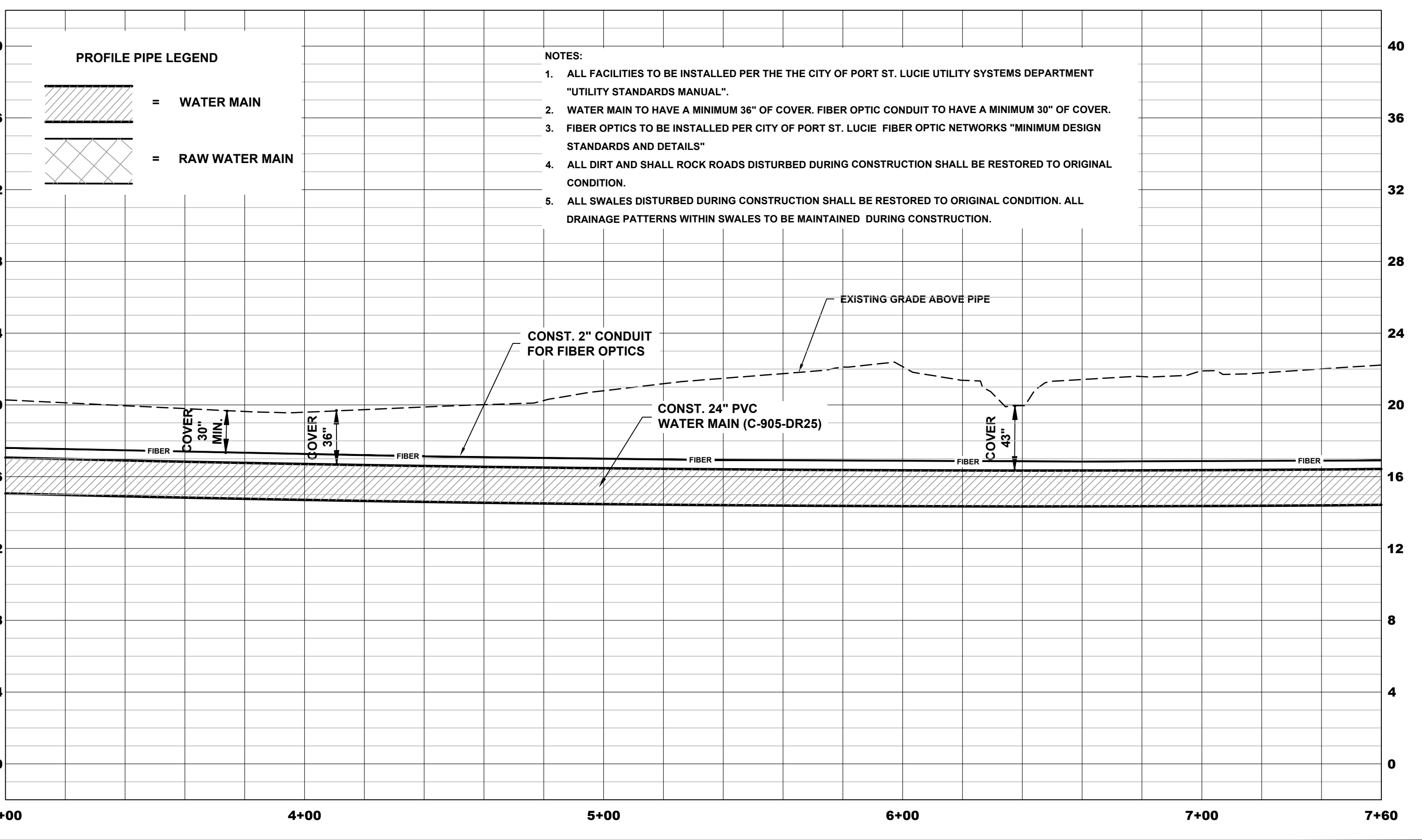
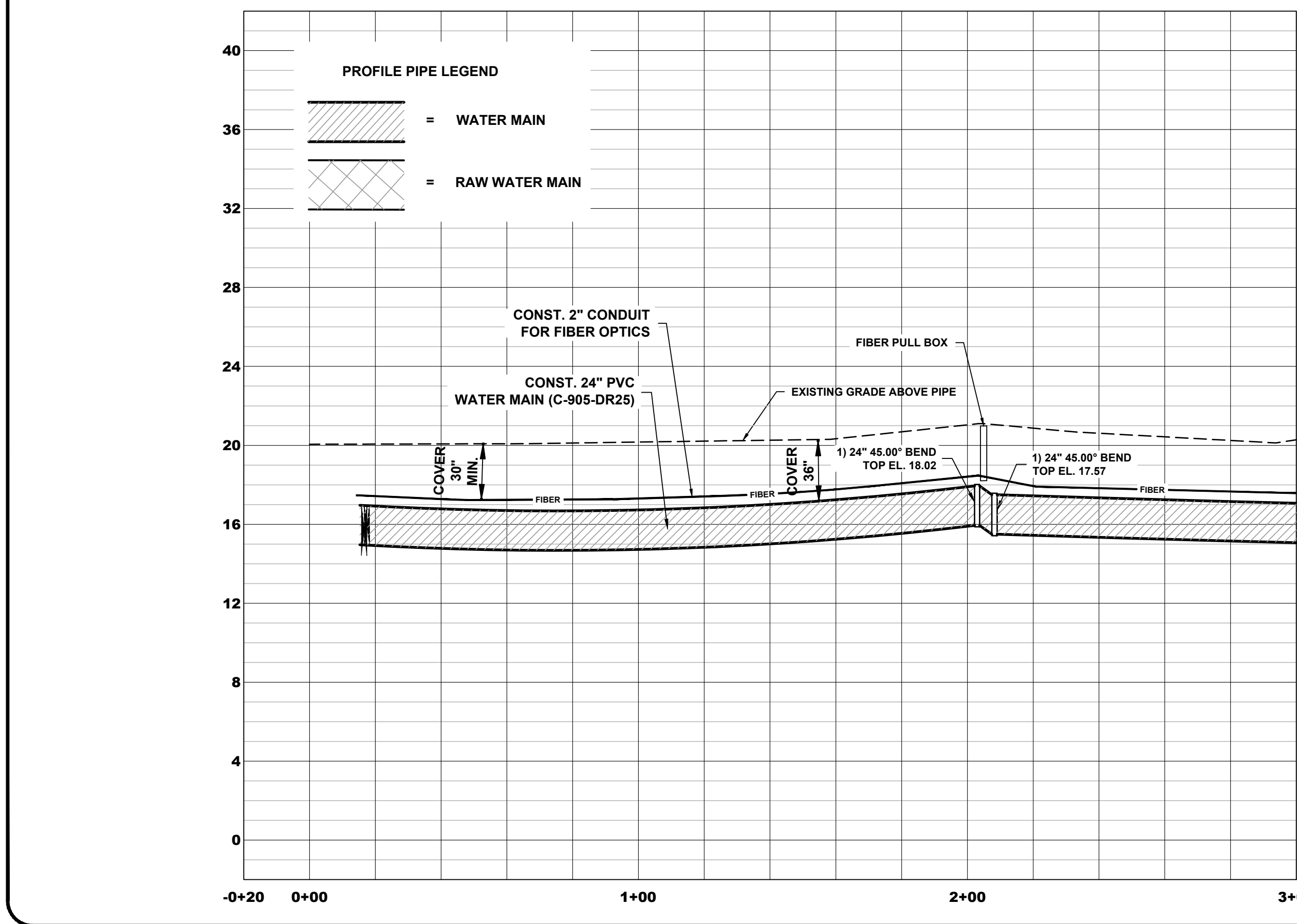
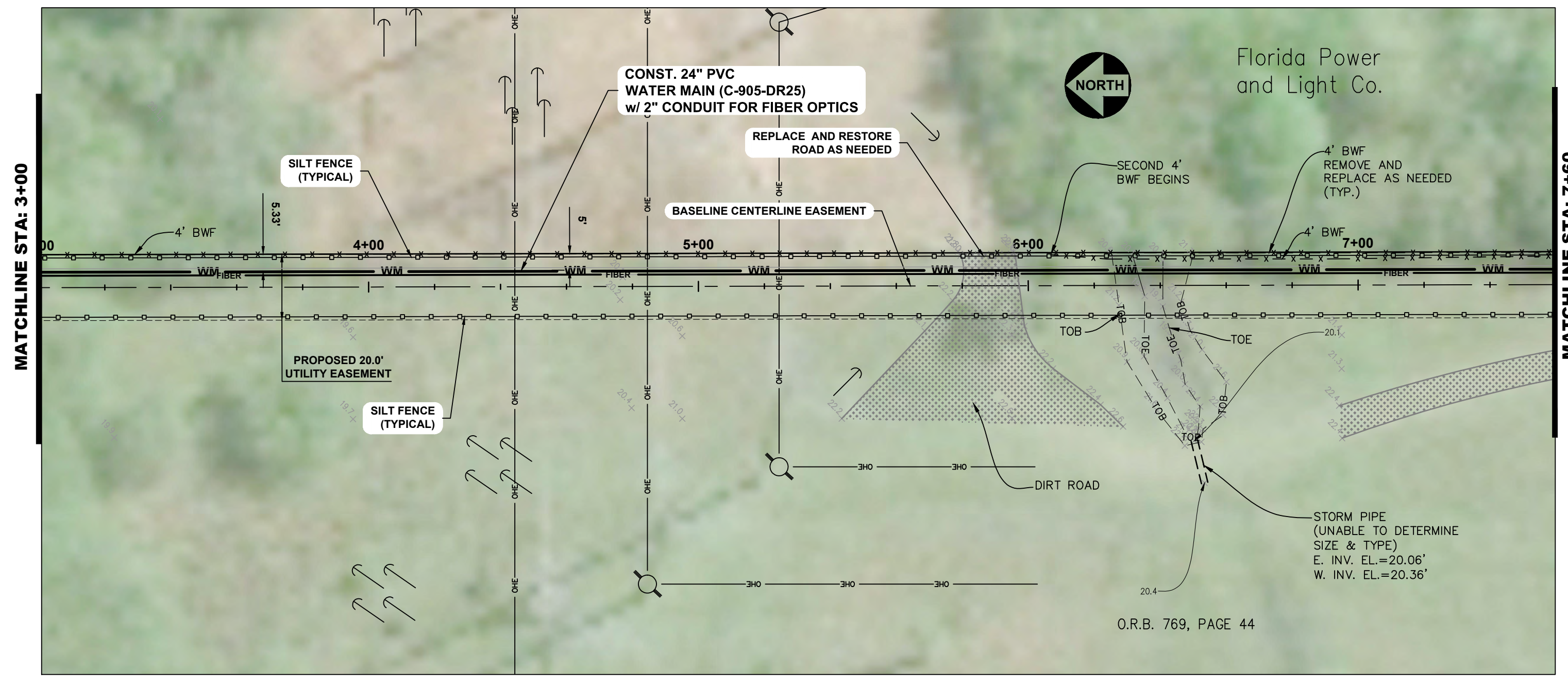
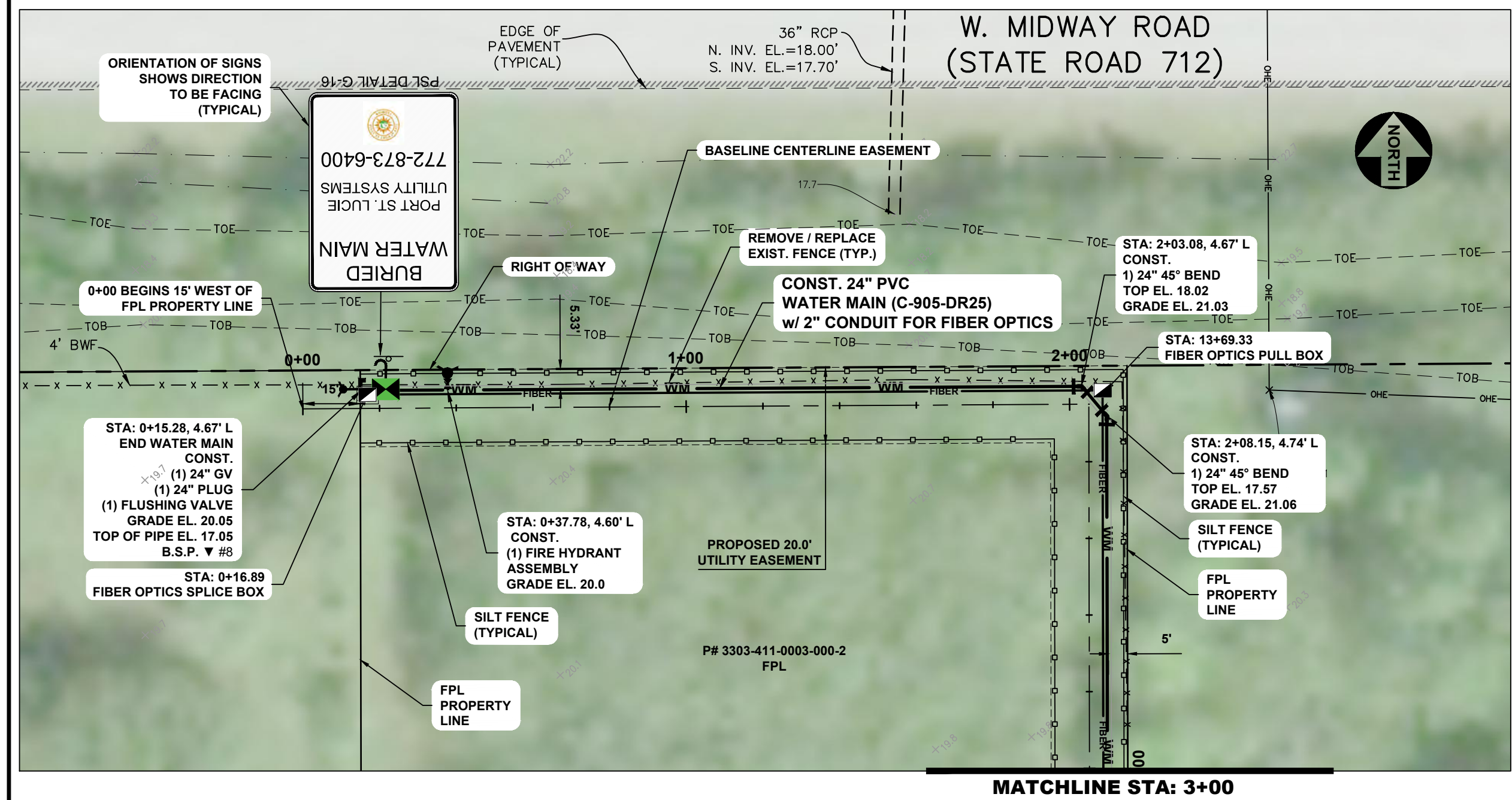
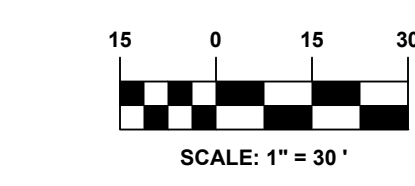
- BWF BARBED WIRE FENCE
- CBS CONCRETE BLOCK STRUCTURE
- CLF CHAIN LINK FENCE
- CM CONCRETE MONUMENT
- CMP CORRUGATED METAL PIPE
- CONC. CONCRETE
- CP CONCRETE POWER POLE
- CP FOUND. FOUND.
- EL. ELEVATION
- FOL FIBER OPTIC LINE
- FB FIBER OPTIC RISER/MARKER
- INVERT INVERT
- IR&C IRON ROD & CAP
- L LENGTH
- LB LICENSED BUSINESS
- MPP METAL POWER POLE
- NO. NUMBER
- OHE OVERHEAD ELECTRIC LINE
- O.R.B. OFFICIAL RECORDS BOOK
- P.T. POINT
- P.S.M. PROFESSIONAL SURVEYOR & MAPPER
- R RADIUS
- RCP REINFORCED CONCRETE PIPE
- TOB TOP OF BANK
- TOE TOE OF SLOPE
- TRAV TRAVERSE
- WPB WIRING PULL BOX
- WPP WOOD POWER POLE

**SYMBOL LEGEND**

- FIELD LOCATED POINT WITH ELEVATION (NATURAL GROUND, GRADE BREAKS, TOP OF BANK, TOE OF SLOPE, ETC.)
- METAL LIGHT POLE
- ELECTRIC MANHOLE
- WIRING PULL BOX
- GUY WIRE & ANCHOR
- FIBER OPTIC RISER/MARKER
- TELEPHONE RISER
- GATE VALVE
- SIGN (SINGLE SUPPORT POLE)
- SIGN (DOUBLE SUPPORT POLE)
- CONCRETE POWER POLE
- WOOD POWER POLE
- EDGE OF VEGETATION

**LEGEND:**

- PROPOSED FIRE HYDRANT ASSEMBLY TEE / VALVE / HYDRANT
- PROPOSED WATER MAIN
- PROPOSED RAW WATER MAIN
- PROPOSED GATE VALVE
- PROPOSED PLUG
- PROPOSED SILT FENCE
- EXISTING WATER MAIN
- EXISTING BARBED WIRE FENCE
- EXISTING CHAIN LINK FENCE
- EXISTING TOP OF BANK
- EXISTING TOE OF SLOPE
- EXISTING DIRT ROAD
- BACTERIOLOGICAL SAMPLE POINT
- AIR RELEASE VALVE
- FIBER PULL BOX



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E-mail: info@capteceng.com  
No. EB-0007657

NO.	DATE	BY	REVISIONS
01	11/22/16	MDB	1002 PLAN AND PROFILE
02		HJT	
03		JWC	
04		MDB	
05		MDB	

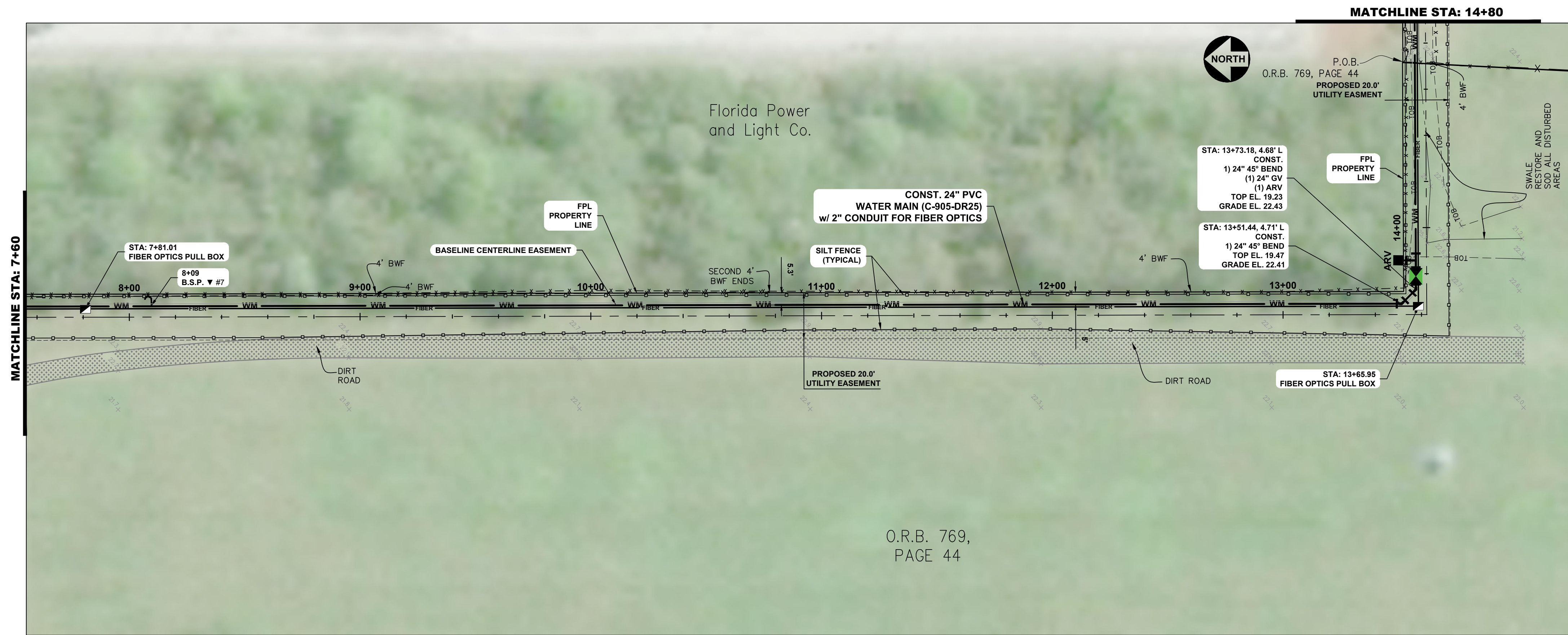
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03		MDB	PERMIT PLAN
04		MDB	ADDED 45' BENDS SOUTH PL
05		MDB	ADDED 30\"/>

**MIDWAY ROAD 24\"/>**

City of Port St. Lucie  
**PLAN AND PROFILE**  
Printed Date:  
JOB No.: 1682.1  
SHEET 3 OF 14

P:\16801\1682.1 - CPFL Midway Road Water Main\DWG\1682.1 PLAN AND PROFILE.dwg 3/23/2020 11:33:54 AM DWG To PDF.plt





**ABBREVIATIONS**

BWF	BARBED WIRE FENCE
CBS	CONCRETE BLOCK STRUCTURE
CLF	CHAIN LINK FENCE
CM	CONCRETE MONUMENT
CMF	CORRUGATED METAL PIPE
CONC.	CONCRETE
CPP	CONCRETE POWER POLE
EL	ELEVATION
FOL	FIBER OPTIC LINE
FND.	FOUND
GB	GRADE BREAK
INV.	INVERT
IR&C	IRON ROD & CAP
L	LENGTH
LB	LICENSED BUSINESS
MPP	METAL POWER POLE NUMBER
NO.	NUMBER
-OHE-	OVERHEAD ELECTRIC LINE
O.R.B.	OFFICIAL RECORDS BOOK
PT.	POINT
P.S.M.	PROFESSIONAL SURVEYOR & MAPPER
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
TOB	TOP OF BANK
TOE	TOE OF SLOPE
TRAV	TRAVERSE
WPB	WIRING PULL BOX
WPP	WOOD POWER POLE

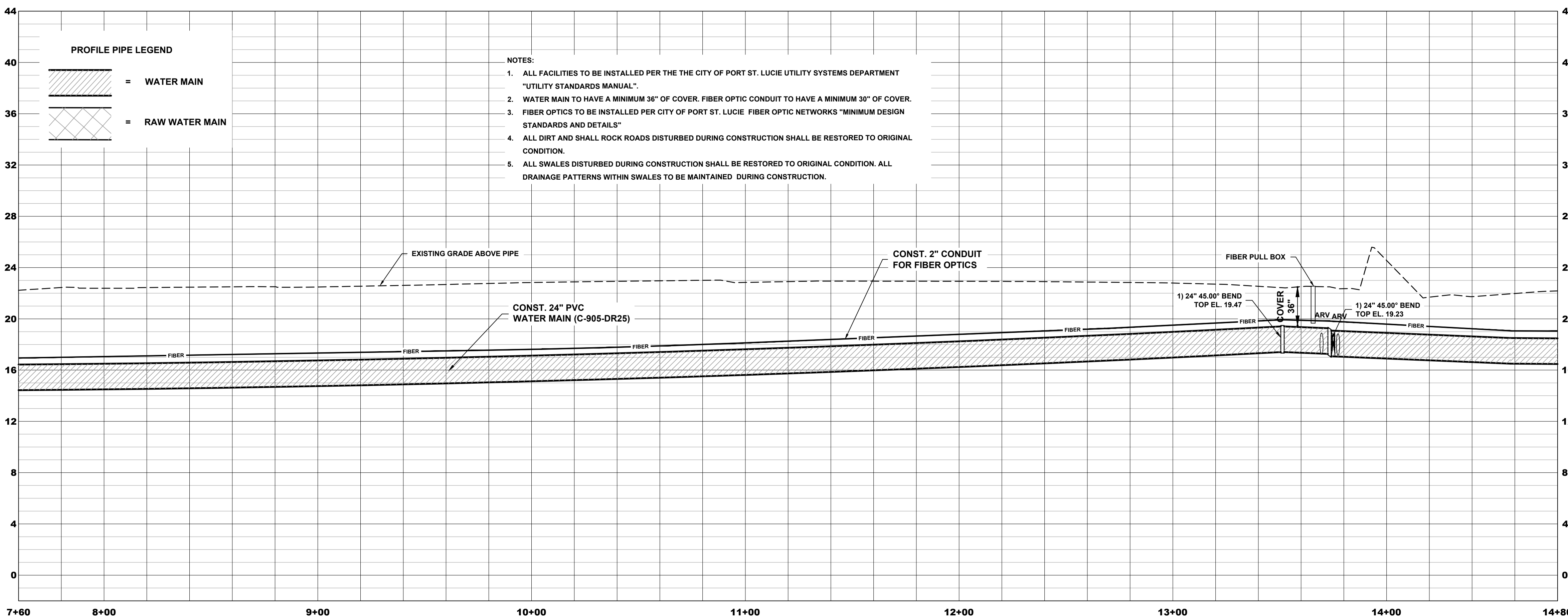
**SYMBOL LEGEND**

+	FIELD LOCATED POINT WITH ELEVATION (NATURAL GROUND, GRADE BREAKS, TOP OF BANK, TOE OF SLOPE, ETC.)
⊙	METAL LIGHT POLE
⊕	ELECTRIC MANHOLE
⊞	WIRING PULL BOX
— —	GUY WIRE & ANCHOR
⊞	FIBER OPTIC RISER/MARKER
⊞	TELEPHONE RISER
⊞	GATE VALVE
⊞	SIGN (SINGLE SUPPORT POLE)
⊞	SIGN (DOUBLE SUPPORT POLE)
⊞	CONCRETE POWER POLE
⊞	WOOD POWER POLE
⊞	EDGE OF VEGETATION

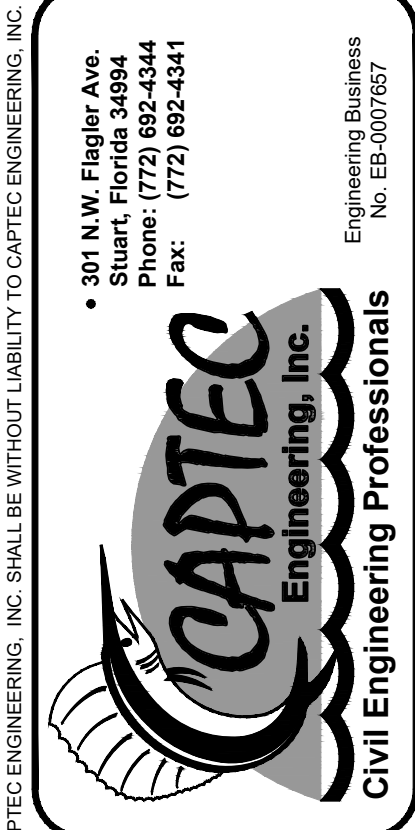
**LEGEND:**

PROPOSED FIRE HYDRANT ASSEMBLY TEE / VALVE/ HYDRANT

WM	PROPOSED WATER MAIN
RAW	PROPOSED RAW WATER MAIN
⊞	PROPOSED GATE VALVE
⊞	PROPOSED PLUG
⊞	PROPOSED SILT FENCE
⊞	EXISTING WATER MAIN
⊞	EXISTING BARBED WIRE FENCE
⊞	EXISTING CHAIN LINK FENCE
⊞	EXISTING TOP OF BANK
⊞	EXISTING TOE OF SLOPE
⊞	EXISTING DIRT ROAD
⊞	BACTERIOLOGICAL SAMPLE POINT
⊞	AIR RELEASE VALVE
⊞	FIBER PULL BOX



- NOTES:**
1. ALL FACILITIES TO BE INSTALLED PER THE CITY OF PORT ST. LUCIE UTILITY SYSTEMS DEPARTMENT "UTILITY STANDARDS MANUAL".
  2. WATER MAIN TO HAVE A MINIMUM 36" OF COVER. FIBER OPTIC CONDUIT TO HAVE A MINIMUM 30" OF COVER.
  3. FIBER OPTICS TO BE INSTALLED PER CITY OF PORT ST. LUCIE FIBER OPTIC NETWORKS "MINIMUM DESIGN STANDARDS AND DETAILS".
  4. ALL DIRT AND SHALL ROCK ROADS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION.
  5. ALL SWALES DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION. ALL DRAINAGE PATTERNS WITHIN SWALES TO BE MAINTAINED DURING CONSTRUCTION.



DATE:	11/20/16
DRAWN BY:	MDB
DESIGNED BY:	HJT
CHECKED BY:	JWC
PROJECT NO.:	1682.1
HORIZ. SCALE:	1" = 30'
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**SCALE VERIFICATION**

1  
0

SOLID BAR IS EQUAL ORIGINAL DRAWING. ADJUST ALL SCALED DIMENSIONS ACCORDINGLY.

**MIDWAY ROAD 24" WATER MAIN AND 2" FIBER OPTIC EXTENSION**

City of Port St. Lucie

**PLAN AND PROFILE**

Joseph W. Capra  
301 N.W. Flagler Ave.  
Stuart, Florida 34954  
P.E. No. 37638

Printed Date:

JOB No.: 1682.1  
SHEET  
4 OF 14



PSL Project No. 12-0029

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**ABBREVIATIONS**

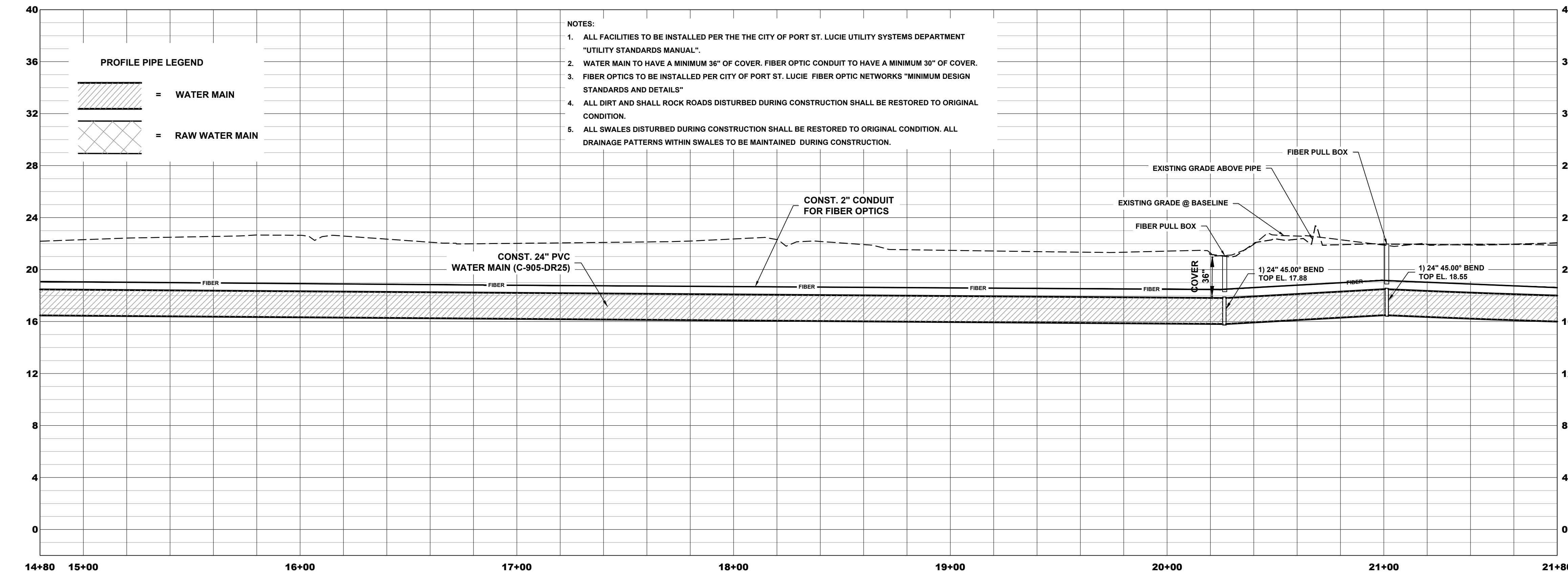
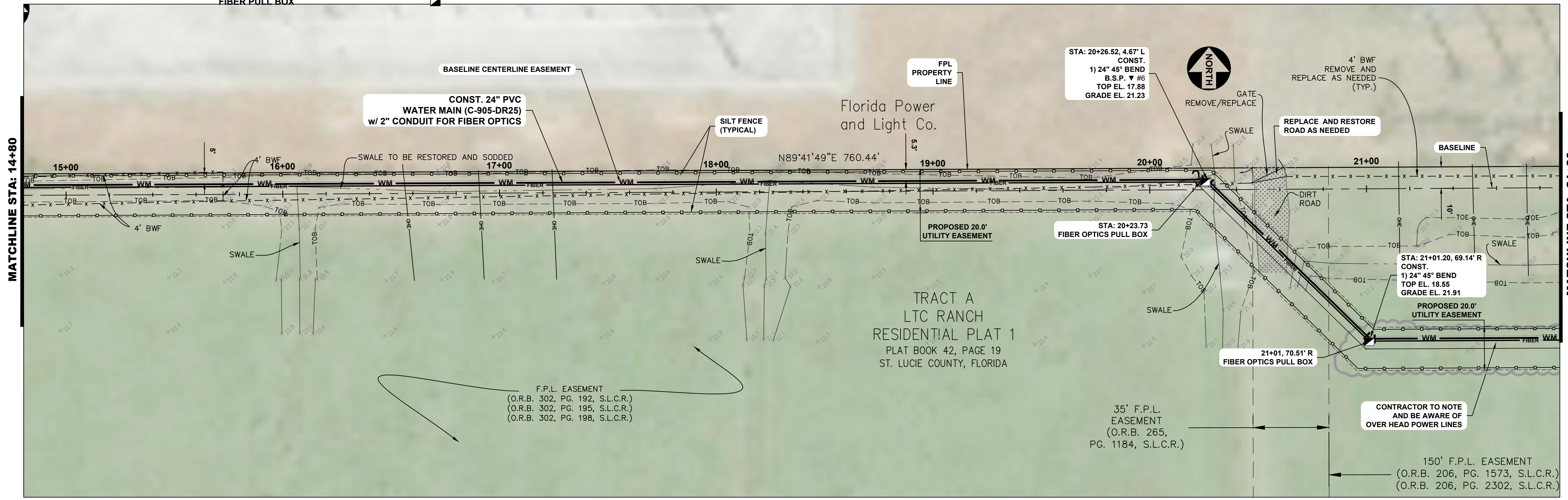
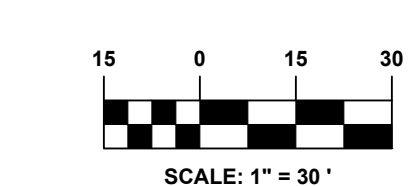
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CONC.	CONCRETE
CPP	CONCRETE POWER POLE
EL	ELEVATION
-FO-	FIBER OPTIC LINE
FND.	FOUND
GB	GRADE BREAK
INV.	INVERT
IR&C	IRON ROD & CAP
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MPP	LICENSED BUSINESS METAL POWER POLE
NO.	NUMBER
-OHE-	OVERHEAD ELECTRIC LINE
O.R.B.	OFFICIAL RECORDS BOOK
PT.	POINT
P.S.M.	PROFESSIONAL SURVEYOR & MAPPER
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
TOB	TOP OF BANK
TOE	TOE OF SLOPE
TRAV	TRAVERSE
WPB	WIRING PULL BOX
WPP	WOOD POWER POLE

**SYMBOL LEGEND**

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	METAL LIGHT POLE
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	TELEPHONE RISER
	GATE VALVE
	SIGN (SINGLE SUPPORT POLE)
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	EDGE OF VEGETATION

**LEGEND:**

	PROPOSED FIRE HYDRANT ASSEMBLY TEE / VALVE / HYDRANT
	PROPOSED WATER MAIN
	PROPOSED RAW WATER MAIN
	PROPOSED GATE VALVE
	PROPOSED PLUG
	PROPOSED SILT FENCE
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	EXISTING BARBED WIRE FENCE
	EXISTING CHAIN LINK FENCE
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**PROFILE PIPE LEGEND**

	= WATER MAIN
	= RAW WATER MAIN

DATE: 11/22/2016  
 DRAWN BY: MDB  
 DESIGNED BY: HLT  
 CHECKED BY: JWC  
 PROJECT NO.: 1682.1  
 HORZ. SCALE: 1" = 30'  
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 1182.1 PLAN AND PROFILE

301 N.W. Flagler Ave.  
 Stuart, Florida 34994  
 Phone: (772) 892-4344  
 Fax: (772) 892-4341

**CAPTEC**  
 Engineering, Inc.  
 Civil Engineering Professionals

Engineering Business  
 No. EB-000767

NO.	DATE	BY	REVISIONS
01	12-28-17	MDB	REVISED BORE DEPTH SHEET NUMBERS
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**SCALE VERIFICATION**

1  
 0

SOLID BAR IS EQUAL ORIGINAL DRAWING. ADJUST ALL SCALED DIMENSIONS ACCORDINGLY.

**MIDWAY ROAD 24" WATER MAIN AND 2" FIBER OPTIC EXTENSION**

City of Port St. Lucie

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Printed Date:

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 SHEET  
**5** OF **14**

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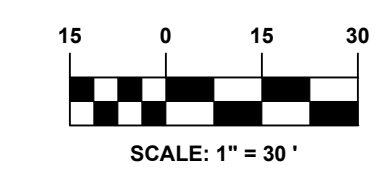
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TOE	TOE OF SLOPE
TRAV	TRAVERSE
WFS	WIRING PULL BOX
WPP	WOOD POWER POLE

**SYMBOL LEGEND**

	FIELD LOCATED POINT WITH ELEVATION (NATURAL GROUND, GRADE BREAKS, TOP OF BANK, TOE OF SLOPE, ETC.)
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1682.PLAN AND PROFILE	

NO.	DATE	BY	REVISIONS
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3			ADDED 45' BENDS SOUTH PL
4			PERMIT PLAN
5			REVISED PER DEP
6			REVISED BORE DEPTH SHEET NUMBERS

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City of Port St. Lucie

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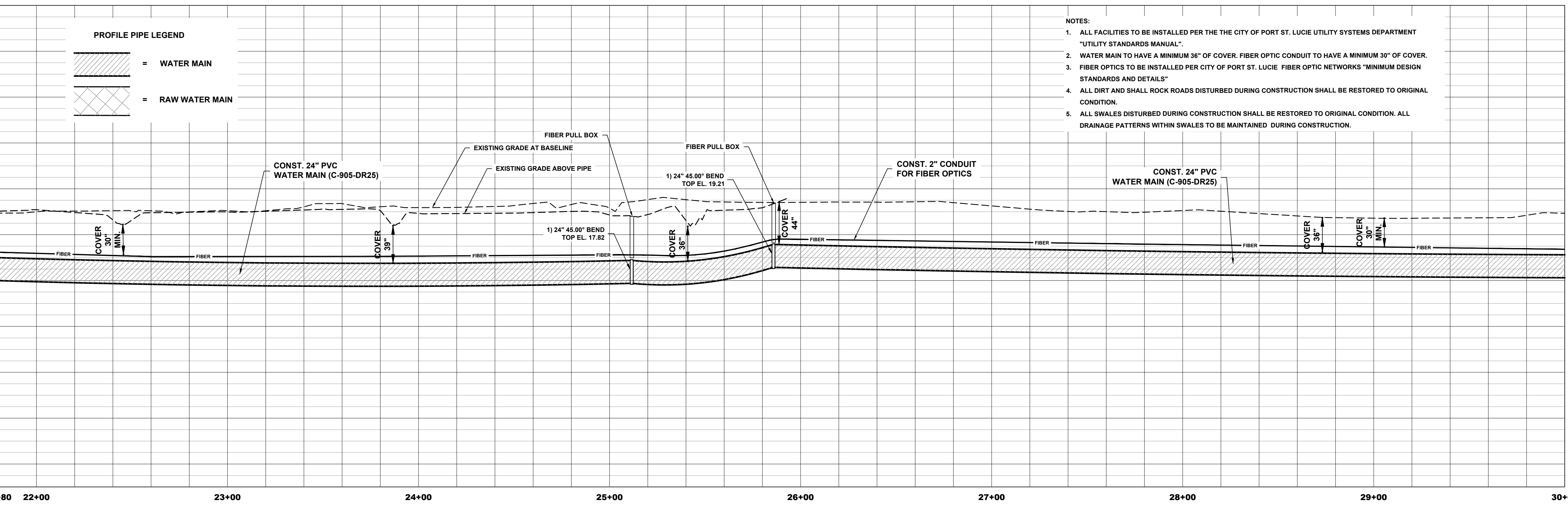
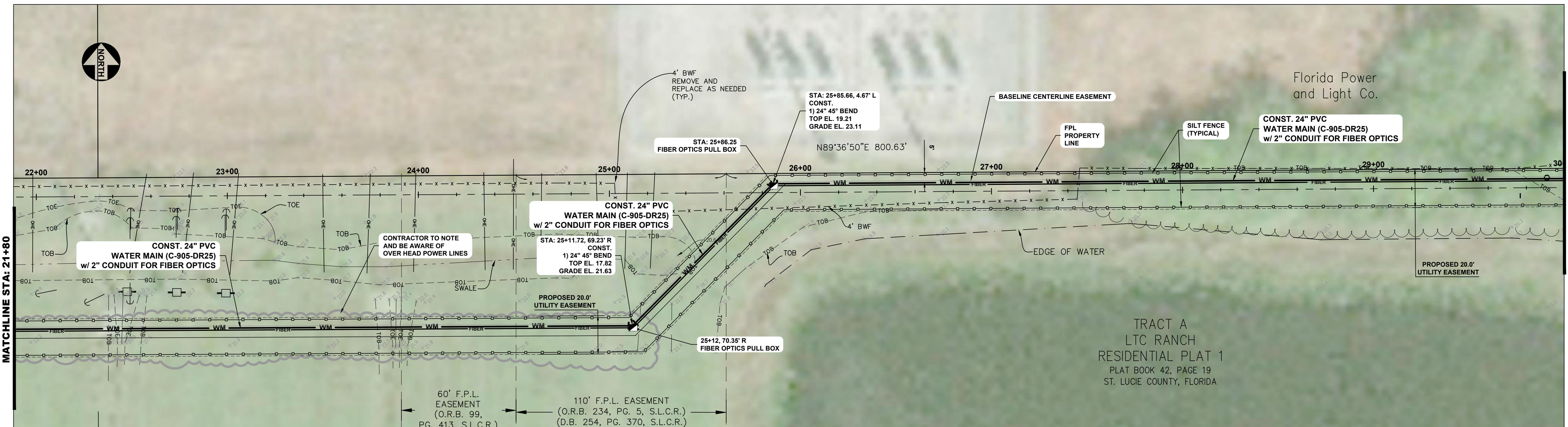
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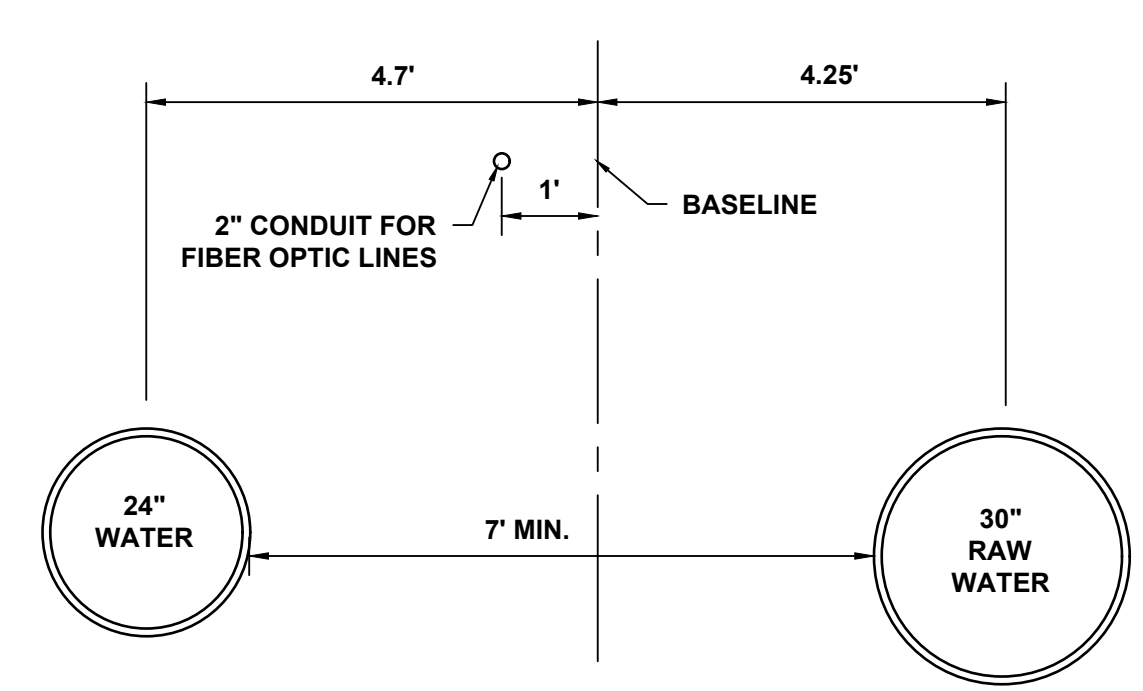
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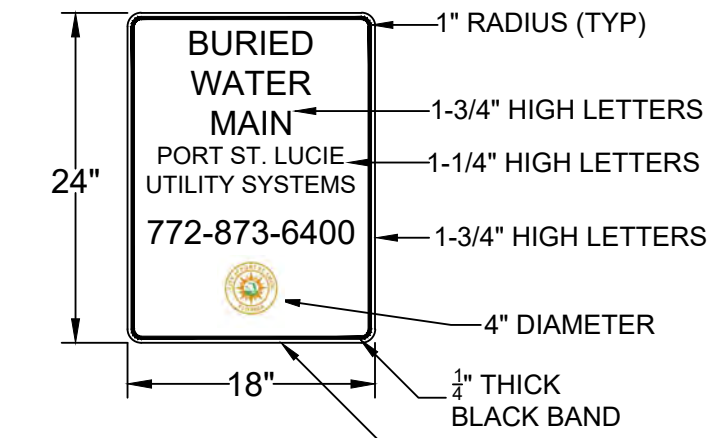


- NOTES:**
- ALL FACILITIES TO BE INSTALLED PER THE CITY OF PORT ST. LUCIE UTILITY SYSTEMS DEPARTMENT "UTILITY STANDARDS MANUAL".
  - WATER MAIN TO HAVE A MINIMUM 36" OF COVER. FIBER OPTIC CONDUIT TO HAVE A MINIMUM 30" OF COVER.
  - FIBER OPTICS TO BE INSTALLED PER CITY OF PORT ST. LUCIE FIBER OPTIC NETWORKS "MINIMUM DESIGN STANDARDS AND DETAILS"
  - ALL DIRT AND SHALL ROCK ROADS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION.
  - ALL SWALES DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION. ALL DRAINAGE PATTERNS WITHIN SWALES TO BE MAINTAINED DURING CONSTRUCTION.





TYPICAL SECTION CROSSING

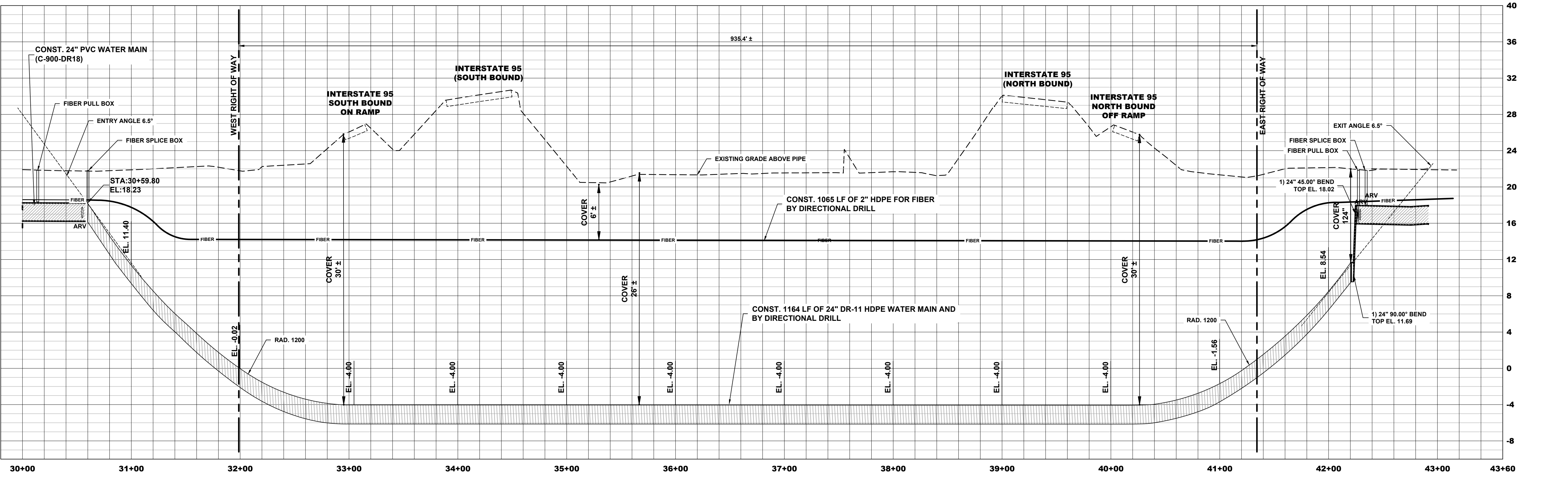
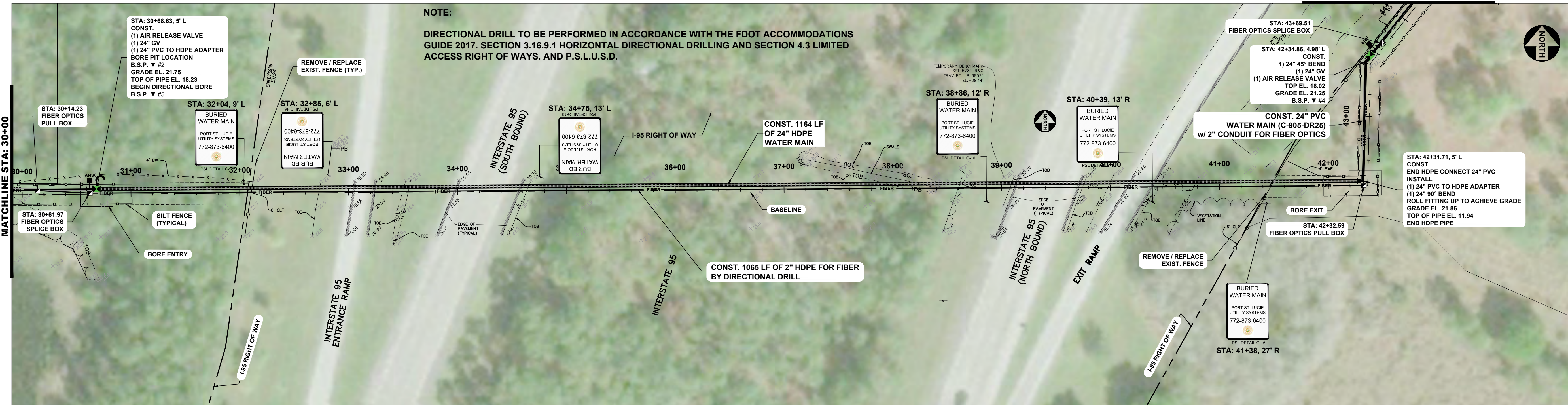
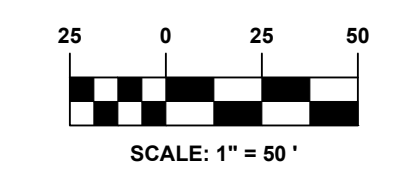


NOTES:  
 1. SIGNS SHALL BE PLACED AS REQUIRED UNDER THE PROVISIONS OF PERMIT ISSUED BY PERMITTING AGENCY.  
 2. THE SIGN SHALL BE 0.080 ALUMINUM WITH REFLECTIVE WHITE BACKGROUND AND BLACK LETTERING WITH COLOR LOGO.  
 3. THE SIGN SHALL BE MOUNTED ON 1.75" x 1.75", 12 GAUGE GALVANIZED SQUARE TUBE PERFORATED SIGN POST WITH STAINLESS STEEL HARDWARE, 48" FROM BOTTOM AND PARALLEL TO CANAL.

- ABBREVIATIONS**
- BWF BARBED WIRE FENCE
  - CBS CONCRETE BLOCK STRUCTURE
  - CLF CHAIN LINK FENCE
  - CM CONCRETE MONUMENT
  - CMP CORRUGATED METAL PIPE
  - CONC. CONCRETE
  - CPP CONCRETE POWER POLE
  - EL ELEVATION
  - FO FIBER OPTIC LINE
  - FND FOUND
  - GB GRADE BREAK
  - INV. INVERT
  - IR&C IRON ROD & CAP
  - L LENGTH
  - LB LICENSED BUSINESS
  - MPP METAL POWER POLE
  - NO. NUMBER
  - OHE OVERHEAD ELECTRIC LINE
  - O.R.B. OFFICIAL RECORDS BOOK
  - PT. POINT
  - P.S.M. PROFESSIONAL SURVEYOR & MAPPER
  - RCP REINFORCED CONCRETE PIPE
  - TOB TOP OF BANK
  - TOE TOE OF SLOPE
  - TRAV TRAVERSE
  - WPB WIRING PULL BOX
  - WPP WOOD POWER POLE

- SYMBOL LEGEND**
- FIELD LOCATED POINT WITH ELEVATION (NATURAL GROUND, GRADE BREAKS, TOP OF BANK, TOE OF SLOPE, ETC.)
  - METAL LIGHT POLE
  - ELECTRIC MANHOLE
  - WIRING PULL BOX
  - GUY WIRE & ANCHOR
  - FIBER OPTIC RISER/MARKER
  - TELEPHONE RISER
  - GATE VALVE
  - SIGN (SINGLE SUPPORT POLE)
  - SIGN (DOUBLE SUPPORT POLE)
  - CONCRETE POWER POLE
  - WOOD POWER POLE
  - EDGE OF VEGETATION

- LEGEND:**
- PROPOSED FIRE HYDRANT ASSEMBLY TEE / VALVE/ HYDRANT
  - PROPOSED WATER MAIN
  - PROPOSED RAW WATER MAIN
  - PROPOSED GATE VALVE
  - PROPOSED PLUG
  - PROPOSED SILT FENCE
  - EXISTING WATER MAIN
  - EXISTING BARBED WIRE FENCE
  - EXISTING CHAIN LINK FENCE
  - EXISTING TOP OF BANK
  - EXISTING TOE OF SLOPE
  - EXISTING DIRT ROAD
  - BACTERIOLOGICAL SAMPLE POINT
  - AIR RELEASE VALVE
  - FIBER PULL BOX



DATE: 11/22/16  
 DRAWN BY: MDB  
 DESIGNED BY: HLT  
 CHECKED BY: JWC  
 PROJECT NO.: 1682.1  
 HORZ. SCALE: 1" = 50'  
 VERT. SCALE: 1" = 8'  
 1162 PLAN AND PROFILE

NO.	DATE	BY	REVISIONS
01	12-8-17	MDB	REVISED BORE DEPTH SHEET NUMBERS ACCORDINGLY
02	2-14-18	MDB	REVISED PER DEP
03	2-14-18	MDB	PERMIT PLAN
04	2-11-19	MDB	ADDED 45' BENDS SOUTH PL
05	8-18-19	MDB	ADDED 30\"/>

**SCALE VERIFICATION**

1  
 0  
 SOLID BAR IS EQUAL TO ORIGINAL DRAWING. ADJUST ALL SCALED DIMENSIONS ACCORDINGLY.

**MIDWAY ROAD 24\"/>**

Joseph W. Capra  
 301 N.W. Flagler Ave.  
 Stuart, Florida 34994  
 P.E. No. 37638

Printed Date:  
 JOB No.: 1682.1  
 SHEET 7 OF 14

PSL Project No. 12-0029  
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301 N.W. Flagler Ave.  
 Stuart, Florida 34994  
 Phone: (772) 882-4344  
 Fax: (772) 882-4341

**CAPTEC**  
 Engineering, Inc.  
 Civil Engineering Professionals

Engineering Business  
 No. EB-0007657



**ABBREVIATIONS**

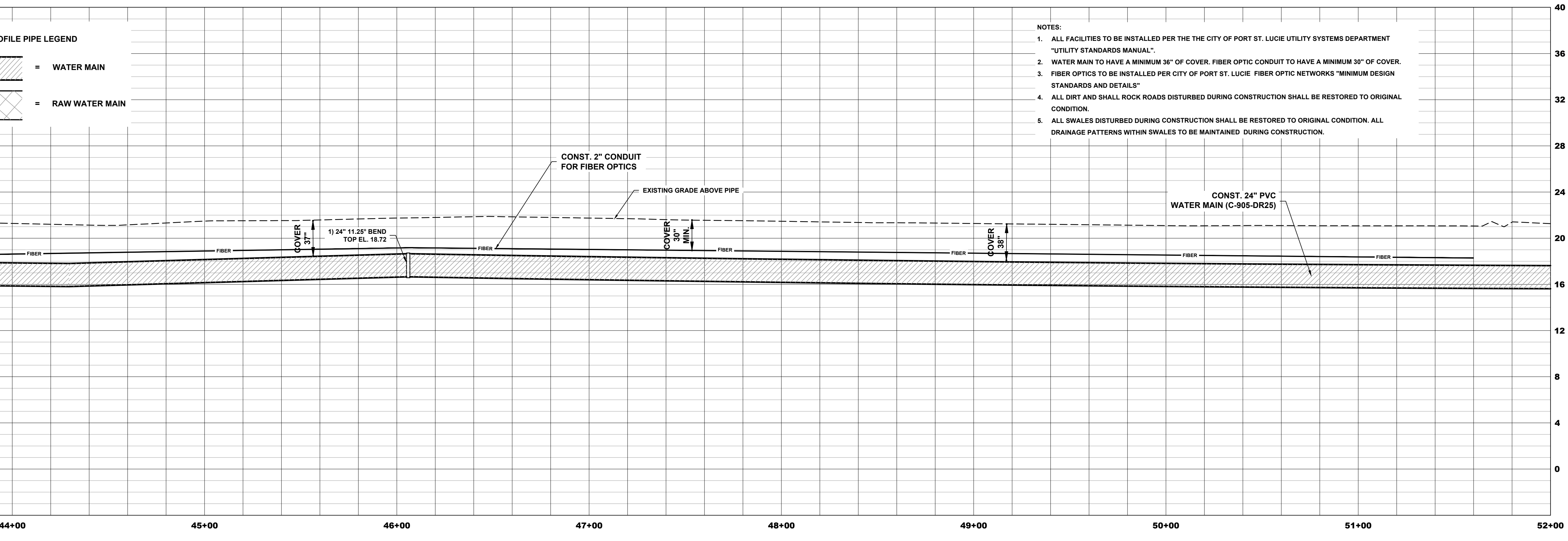
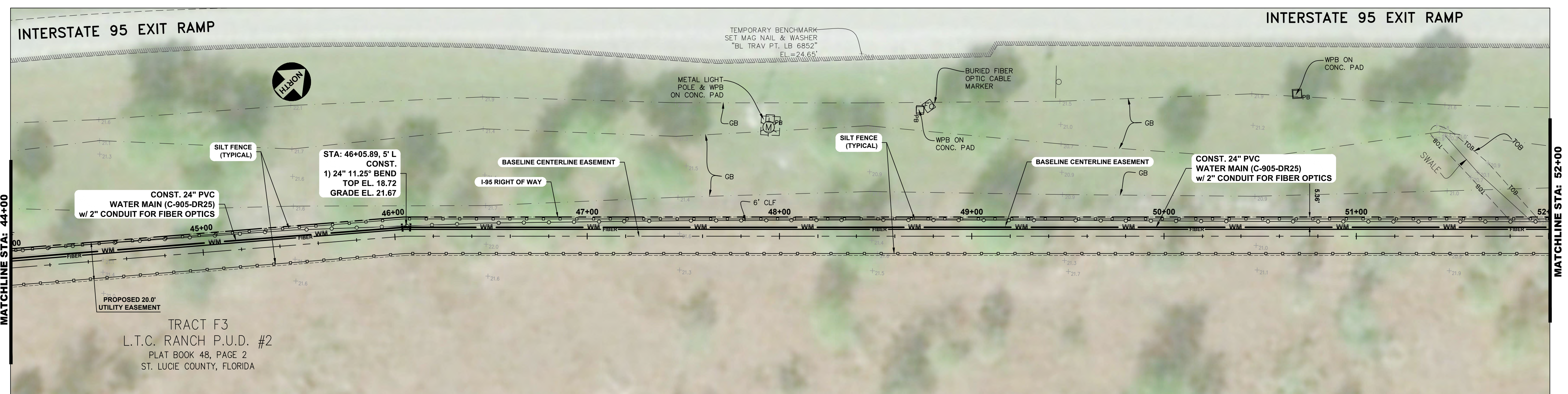
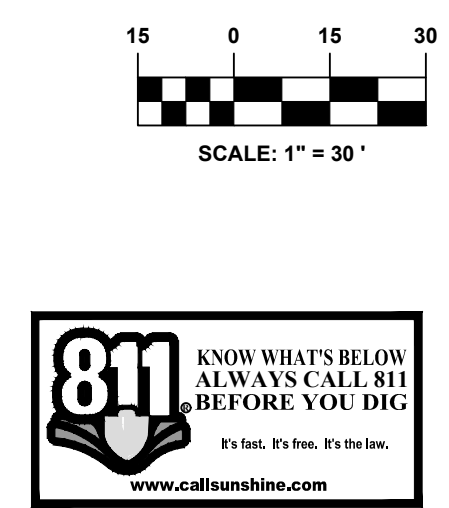
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NO.	NUMBER
-OHE-	OVERHEAD ELECTRIC LINE
O.R.B.	OFFICIAL RECORDS BOOK
PT.	POINT
P.S.M.	PROFESSIONAL SURVEYOR & MAPPER
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TOB	TOP OF BANK
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TRAV	TRAVERSE
WPB	WIRING PULL BOX
WPP	WOOD POWER POLE

**SYMBOL LEGEND**

	FIELD LOCATED POINT WITH ELEVATION (NATURAL GROUND, GRADE BREAKS, TOP OF BANK, TOE OF SLOPE, ETC.)
	METAL LIGHT POLE
	ELECTRIC MANHOLE
	WIRING PULL BOX
	GUY WIRE & ANCHOR
	FIBER OPTIC RISER/MARKER
	TELEPHONE RISER
	GATE VALVE
	SIGN (SINGLE SUPPORT POLE)
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	EDGE OF VEGETATION

**LEGEND:**

	PROPOSED FIRE HYDRANT ASSEMBLY TEE / VALVE / HYDRANT
	PROPOSED WATER MAIN
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	PROPOSED GATE VALVE
	PROPOSED PLUG
	PROPOSED SILT FENCE
	EXISTING WATER MAIN
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301 N.W. Flagler Ave.  
Stuart, Florida 34984  
Phone: (772) 892-4344  
Fax: (772) 892-4341  
Engineering Business  
No. EB-0007657

DATE:	11/22/2016
DRAWN BY:	MDB
DESIGNED BY:	HJT
CHECKED BY:	JWC
PROJECT NO.:	1682.1
HORIZ. SCALE:	1" = 30'
VERT. SCALE:	1" = 5'
1682.PLAN AND PROFILE	

NO.	DATE	BY	REVISIONS
01	3-23-20	MDB	REMOVED 30" RAW WATER MAIN
02	8-18-19	MDB	ADDED 30" RAW WATER MAIN W/ FIBER CONDUIT
03	2-11-19	MDB	ADDED 45' BENDS SOUTH PL
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05	2-14-18	MDB	REVISED PER DEP
06	12-8-17	MDB	REVISED BORE DEPTH SHEET NUMBERS

SCALE VERIFICATION	1
SOLID BAR IS EQUAL ORIGINAL DRAWING	0
ADJUST ALL SCALED DIMENSIONS ACCORDINGLY	

**MIDWAY ROAD 24" WATER MAIN AND 2" FIBER OPTIC EXTENSION**  
City of Port St. Lucie  
**PLAN AND PROFILE**

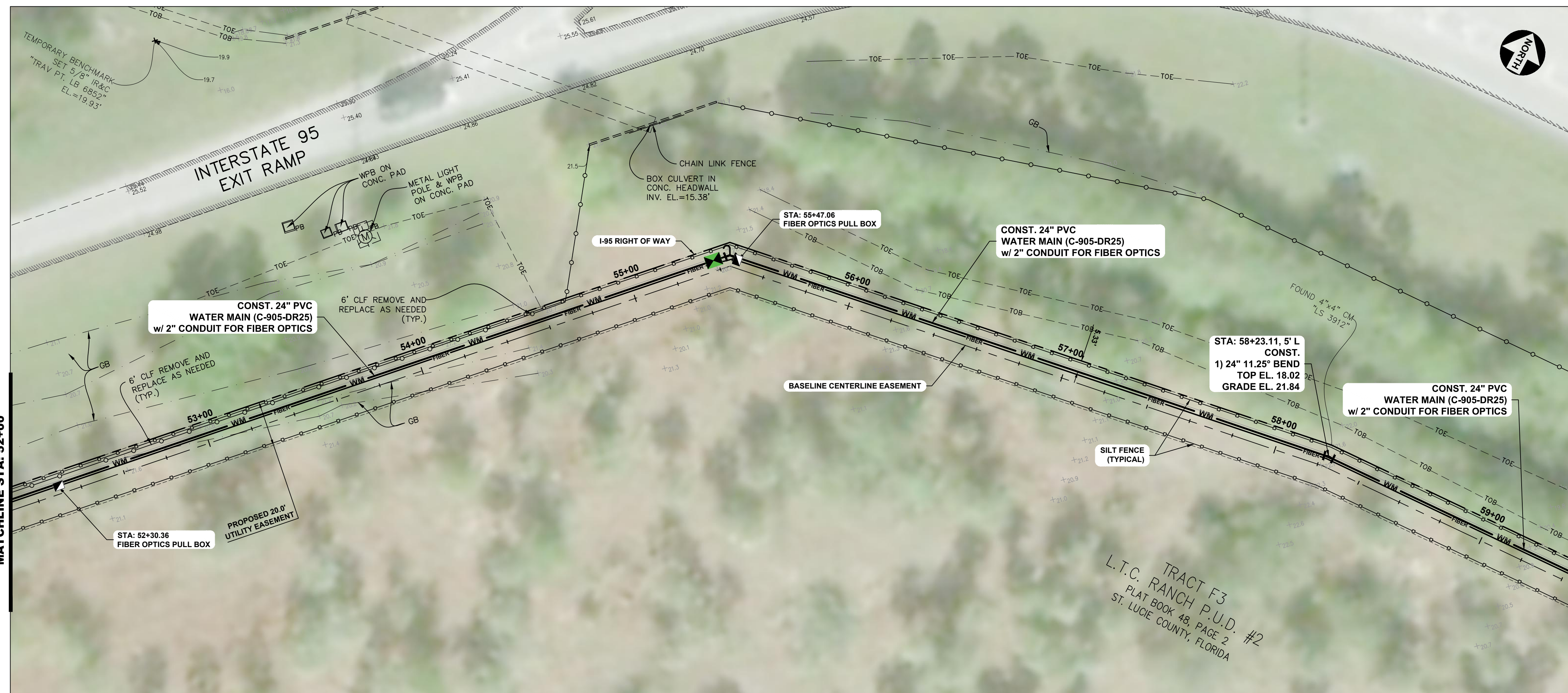
Joseph W. Capra  
301 N.W. Flagler Ave.  
Stuart, Florida 34984  
P.E. No. 37638

Printed Date:  
JOB No.: **1682.1**  
SHEET **8** OF **14**

PSL Project No. 12-0029

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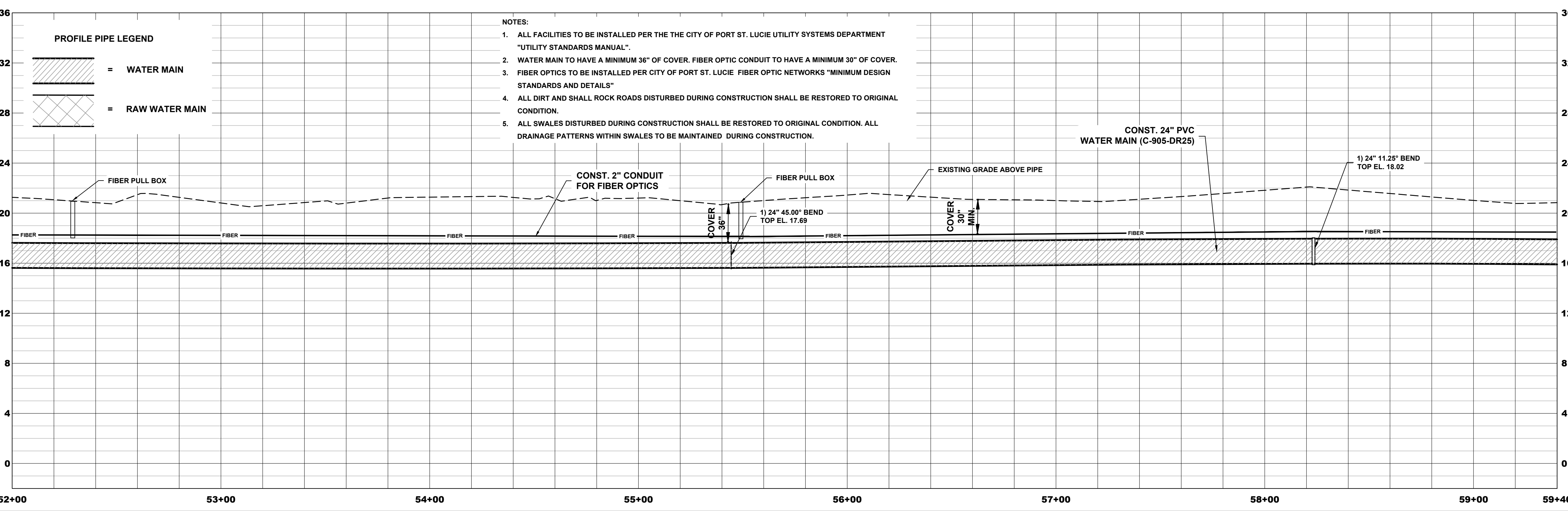




- LEGEND:**
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  - P.T. POINT
  - P.S.M. PROFESSIONAL SURVEYOR & MAPPER
  - R RADIUS
  - RCP REINFORCED CONCRETE PIPE
  - TOB TOP OF BANK
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  - TRAV TRAVERSE
  - WPB WIRING PULL BOX
  - WPP WOOD POWER POLE

- SYMBOL LEGEND**
- + 2.5 FIELD LOCATED POINT WITH ELEVATION (NATURAL GROUND, GRADE BREAKS, TOP OF BANK, TOE OF SLOPE, ETC.)
  - ⊙ METAL LIGHT POLE
  - ⊙ ELECTRIC MANHOLE
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  - ⊙ WOOD POWER POLE
  - ⊙ EDGE OF VEGETATION



- PROFILE PIPE LEGEND**
- ▨ = WATER MAIN
  - ▧ = RAW WATER MAIN

- NOTES:**
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Civil Engineering Professionals

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Stuart, Florida 34954  
Phone: (772) 892-4344  
Fax: (772) 892-4341

Engineering Business  
No. EB-0007657

DATE:	11/22/2016
DRAWN BY:	MDB
CHECKED BY:	JWC
PROJECT NO.:	1682.1
HORIZ. SCALE:	1" = 30'
VERT. SCALE:	1" = 5'
1682.1 PLAN AND PROFILE	

NO.	DATE	BY	REVISIONS
1			REMOVED 30" RAW WATER MAIN
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4			PERMIT PLAN
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6			REVISED BORE DEPTH SHEET NUMBERS

**MIDWAY ROAD 24" WATER MAIN AND 2" FIBER OPTIC EXTENSION**

City of Port St. Lucie

**PLAN AND PROFILE**

Joseph W. Capra  
301 N.W. Flagler Ave.  
Stuart, Florida 34954  
P.E. No. 37638

Printed Date:

JOB No.: 1682.1  
SHEET 9 OF 14

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**ABBREVIATIONS**

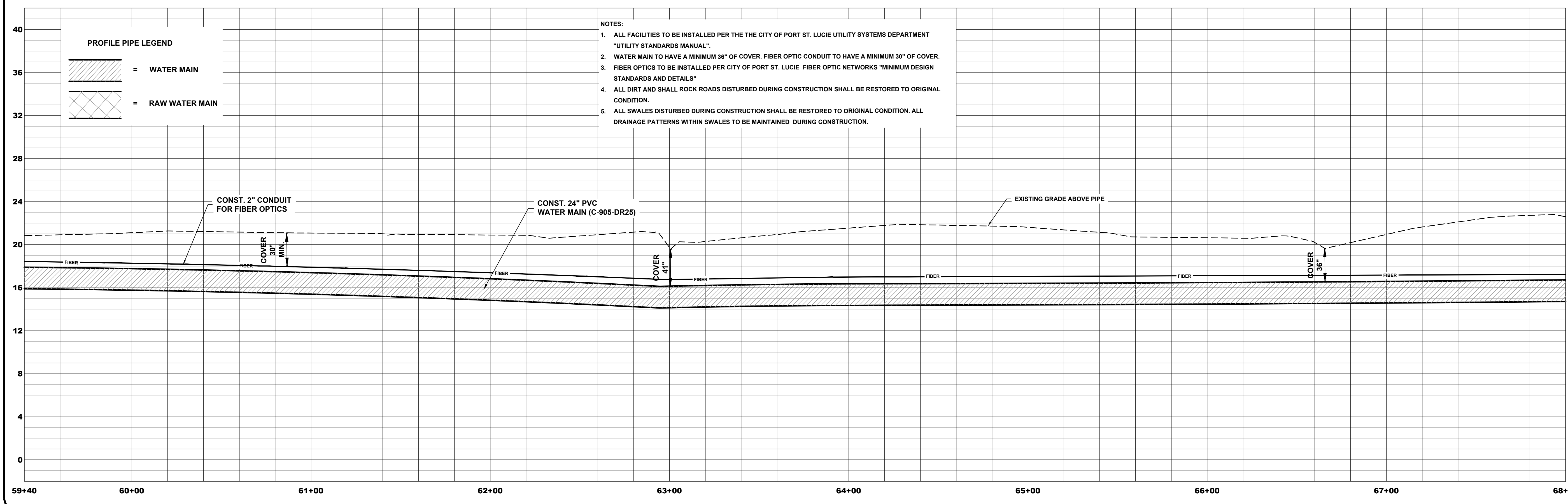
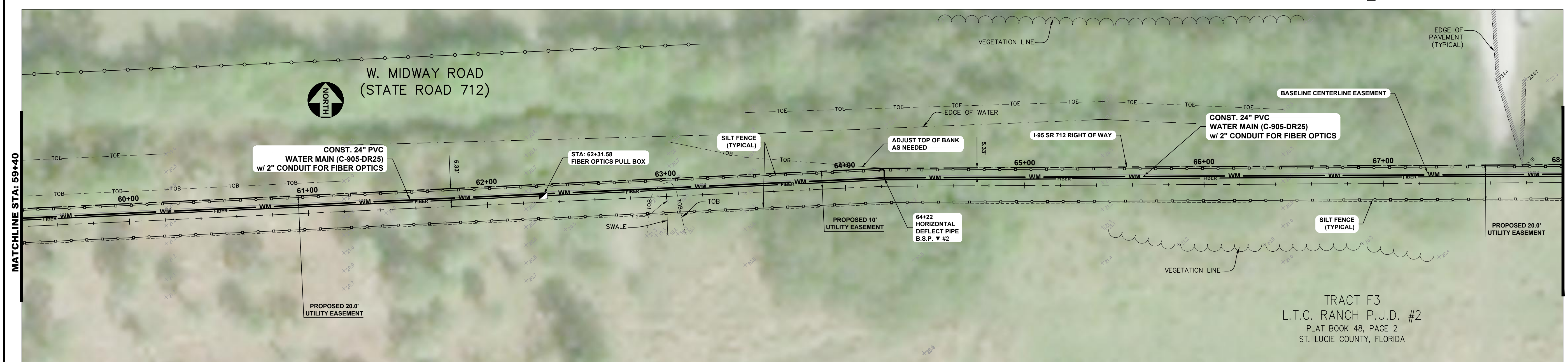
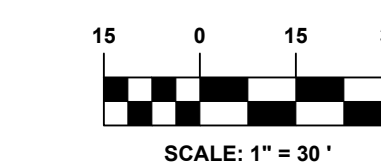
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P.S.M.	PROFESSIONAL SURVEYOR & MAPPER
R	RADIUS
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TOB	TOP OF BANK
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**SYMBOL LEGEND**

	FIELD LOCATED POINT WITH ELEVATION (NATURAL GROUND, GRADE BREAKS, TOP OF BANK, TOE OF SLOPE, ETC.)
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	ELECTRIC MANHOLE
	WIRING PULL BOX
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**LEGEND:**

	PROPOSED FIRE HYDRANT ASSEMBLY TEE / VALVE HYDRANT
	PROPOSED WATER MAIN
	PROPOSED RAW WATER MAIN
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	PROPOSED PLUG
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**CAPTEC**  
Engineering, Inc.  
Civil Engineering Professionals

Engineering Business  
No. EB-0007657

DATE: 11/22/2016

DRAWN BY:	MDB
DESIGNED BY:	JWC
CHECKED BY:	JWC
PROJECT NO.:	1682.1
HORIZ. SCALE:	1" = 30'
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06	3-23-20	MDB	REMOVED 30' RAW WATER MAIN

**SCALE VERIFICATION**

1	SOLID BAR IS EQUAL ORIGINAL DRAWING DIMENSIONS ACCORDINGLY
0	SOLID BAR IS EQUAL ORIGINAL DRAWING DIMENSIONS ACCORDINGLY

**MIDWAY ROAD 24" WATER MAIN AND 2" FIBER OPTIC EXTENSION**

City of Port St. Lucie

**PLAN AND PROFILE**

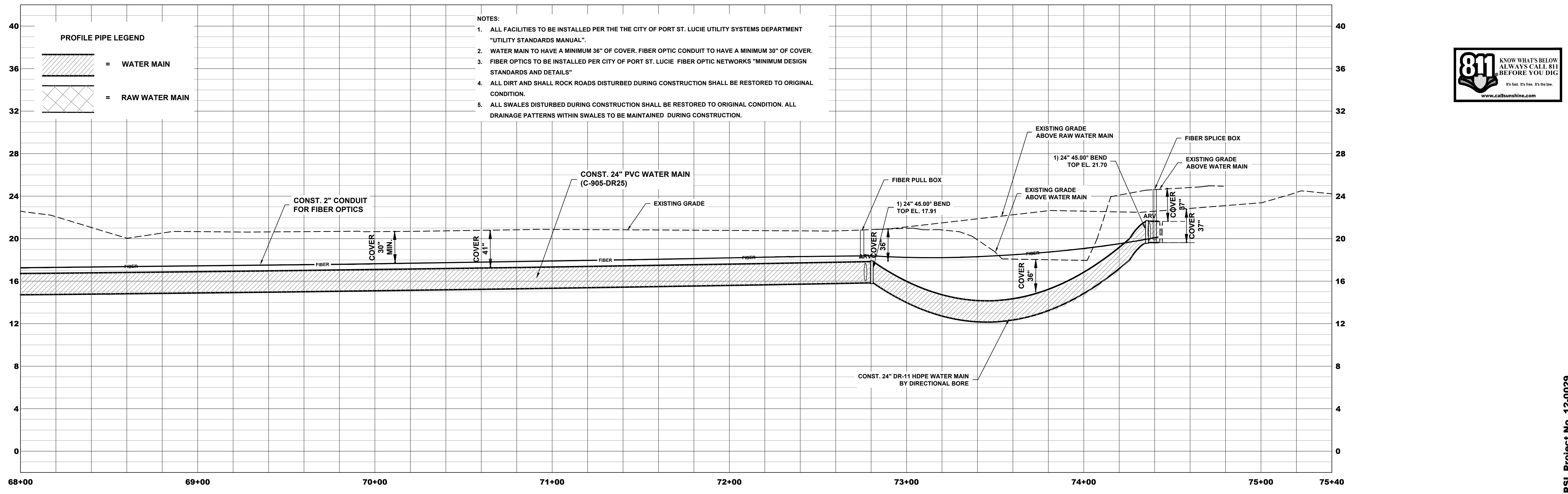
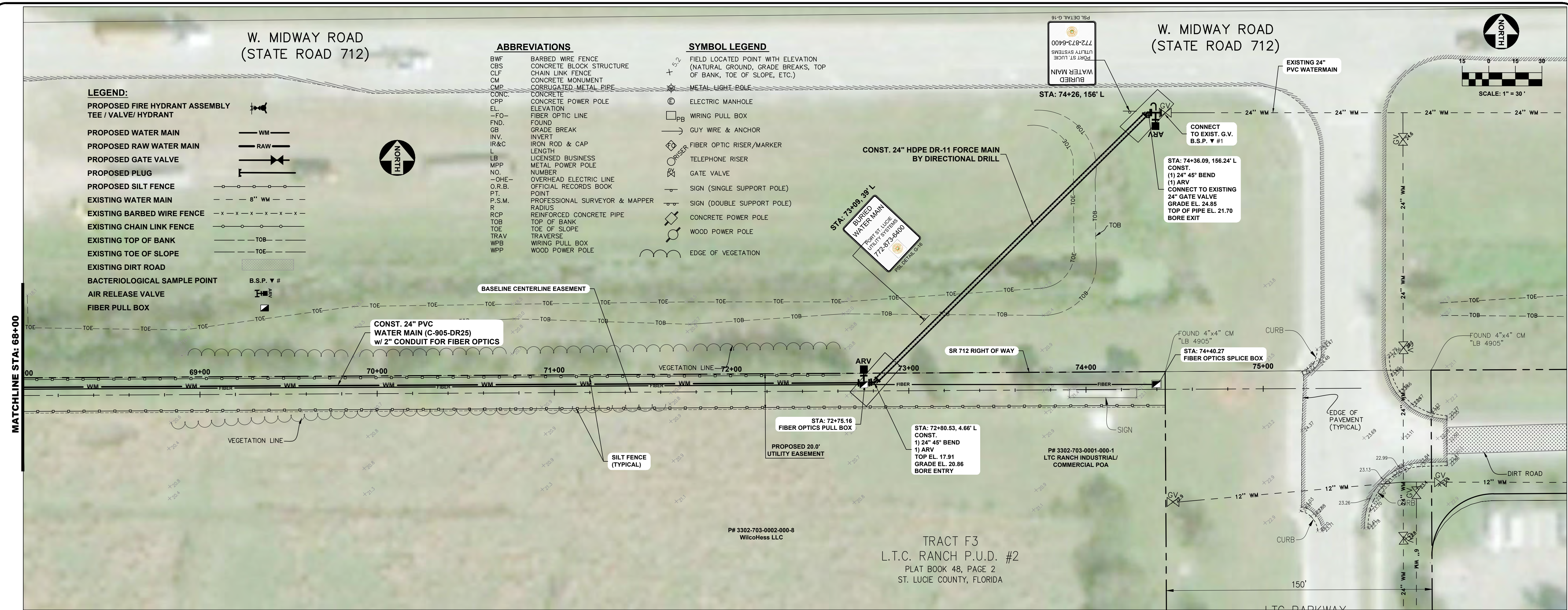
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SHEET OF 14





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**SCALE VERIFICATION**

1  
0

SOLID BAR IS EQUAL ORIGINAL DRAWING. ADJUST ALL SCALED DIMENSIONS ACCORDINGLY.

**811** KNOW WHAT'S BELOW ALWAYS CALL 811 BEFORE YOU DIG  
www.call811.com

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City of Port St. Lucie

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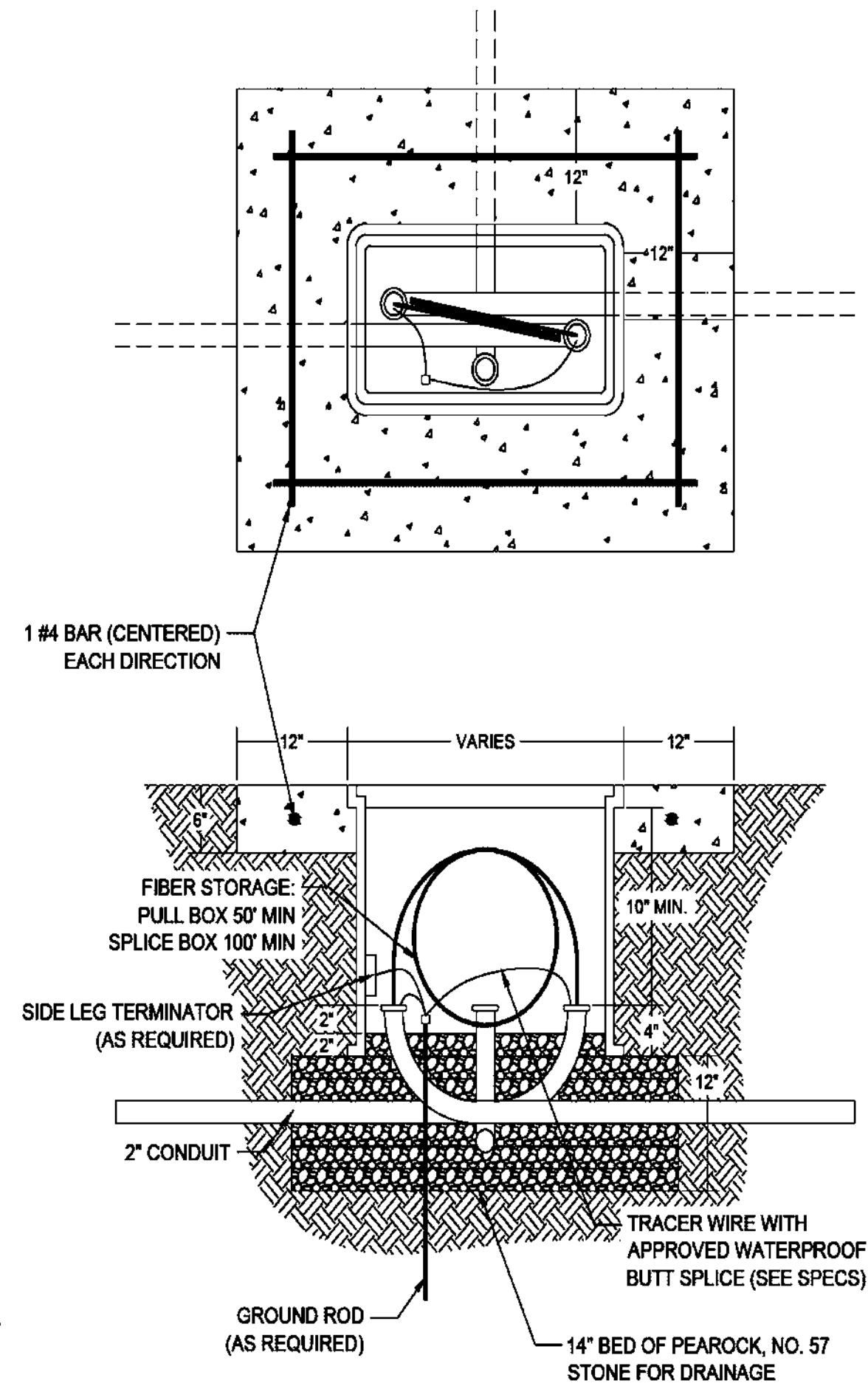
JOB No.: **1682.1**  
SHEET **11** OF **14**

PSL Project No. 12-0029

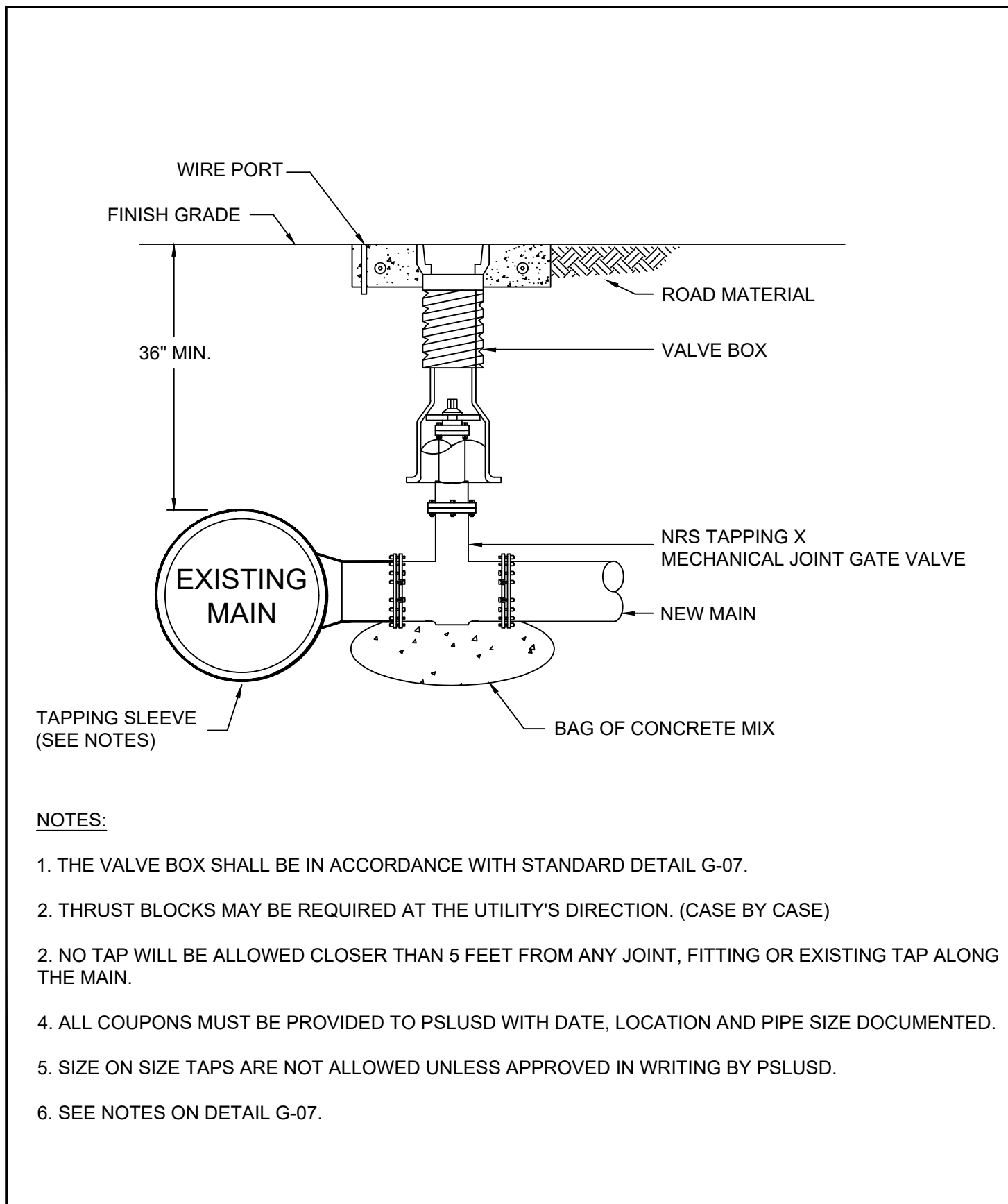
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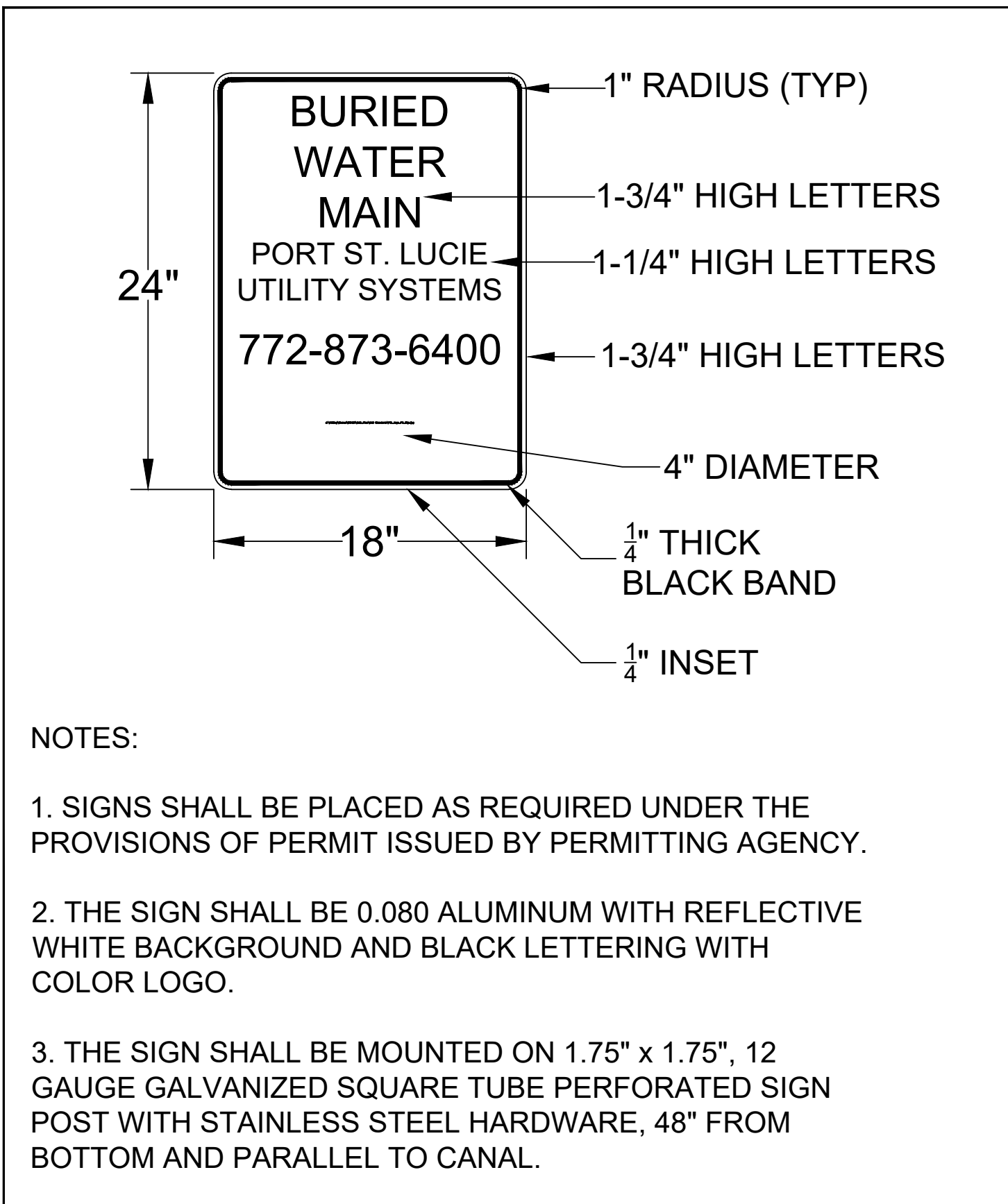
- Fiber optic boxes shall not be installed in roadways or driveways.
- The fiber optic box shall be one of the products included on the FDOT Approved List of Traffic Control Signals and Devices Product List, Pull Box and Cover, Latest Edition.
- Fiber optic boxes shall be installed flush with the finished grade surface.
- Fiber optic box length (long side) shall be parallel to the roadway.
- City of Port St Lucie standard Kevlar pull (mule) tape shall be installed in the empty conduits for future use.
- Fiber optic boxes shall contain only Fiber Optic Cable, Conduit and Locate Wire. Fiber Optic boxes shall not contain electrical conduit or conductor. Electrical conduit and conductors shall be installed in separate boxes from each other.
- Conduit center line shall be aligned to top edge of box to facilitate cable pulling.
- All fiber optic boxes shall have 1'-0" wide (min) x 6" deep concrete aprons sloped away from box. Apron concrete shall have a minimum strength of 28 days of  $f'c = 3000$  psi with 1-#4 bar in each direction. Apron is to be included in the cost of each box.
- Fiber optic boxes shall meet FM 5-539 test procedure.
- Fiber optic boxes shall be equipped with a nonskid cover secured by self-cleaning auger bolts and any other miscellaneous stainless steel hardware required for installation or as shown in the plans. All hardware shall be stainless steel.
- Fiber optic boxes shall be made of polymer concrete and be designed, tested and certified to meet tier 15 vertical test load. The fiber optic boxes shall be marked "Fiber Optic" and identify the "tier 15" load.
- All splices shall be properly weatherproofed by approved method.
- The size and type of fiber optic communications conduit shall be shown on the plans.
- The use of ground rods shall be shown in the plans. Ground rods shall be a minimum of 10' deep.
- Refer to the PSLUSD Design Standards Section 11 Fiber Optic Cable, Latest Edition, for splice requirements, box requirements, fiber optic cable, ground rods and other pertinent information.



**PSL FIBER OPTIC PULL BOX**

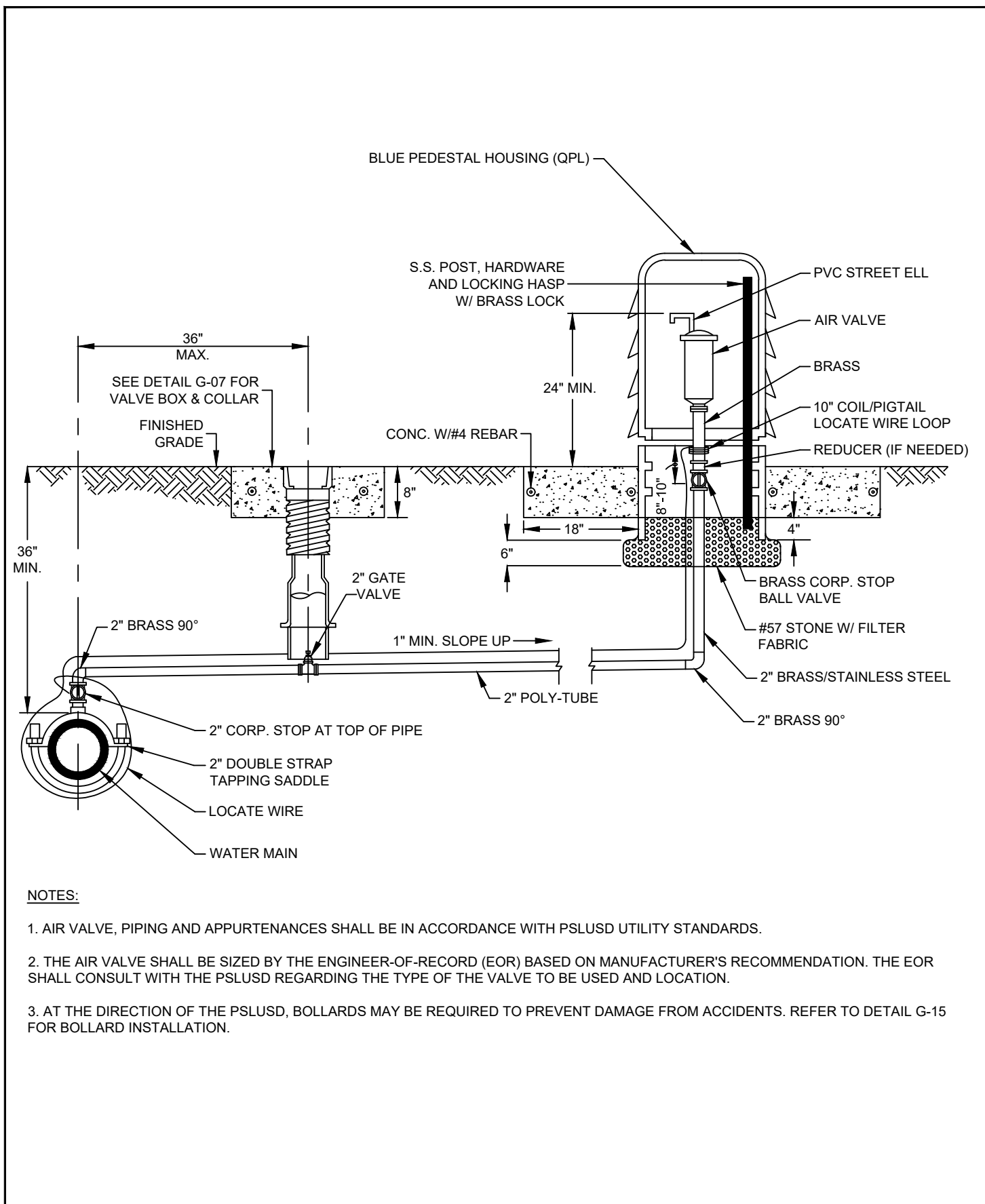


**TAPPING SLEEVE AND VALVE ASSEMBLY**  
 MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE  
 900 S.E. OGDEN LANE  
 PORT ST. LUCIE, FL 34983  
 PHONE (772) 873-6400 FAX (772) 873-6433  
 DETAIL: G-10  
 DATE: 2019  
 SCALE: N.T.S.  
 SHEET: 1 OF 1

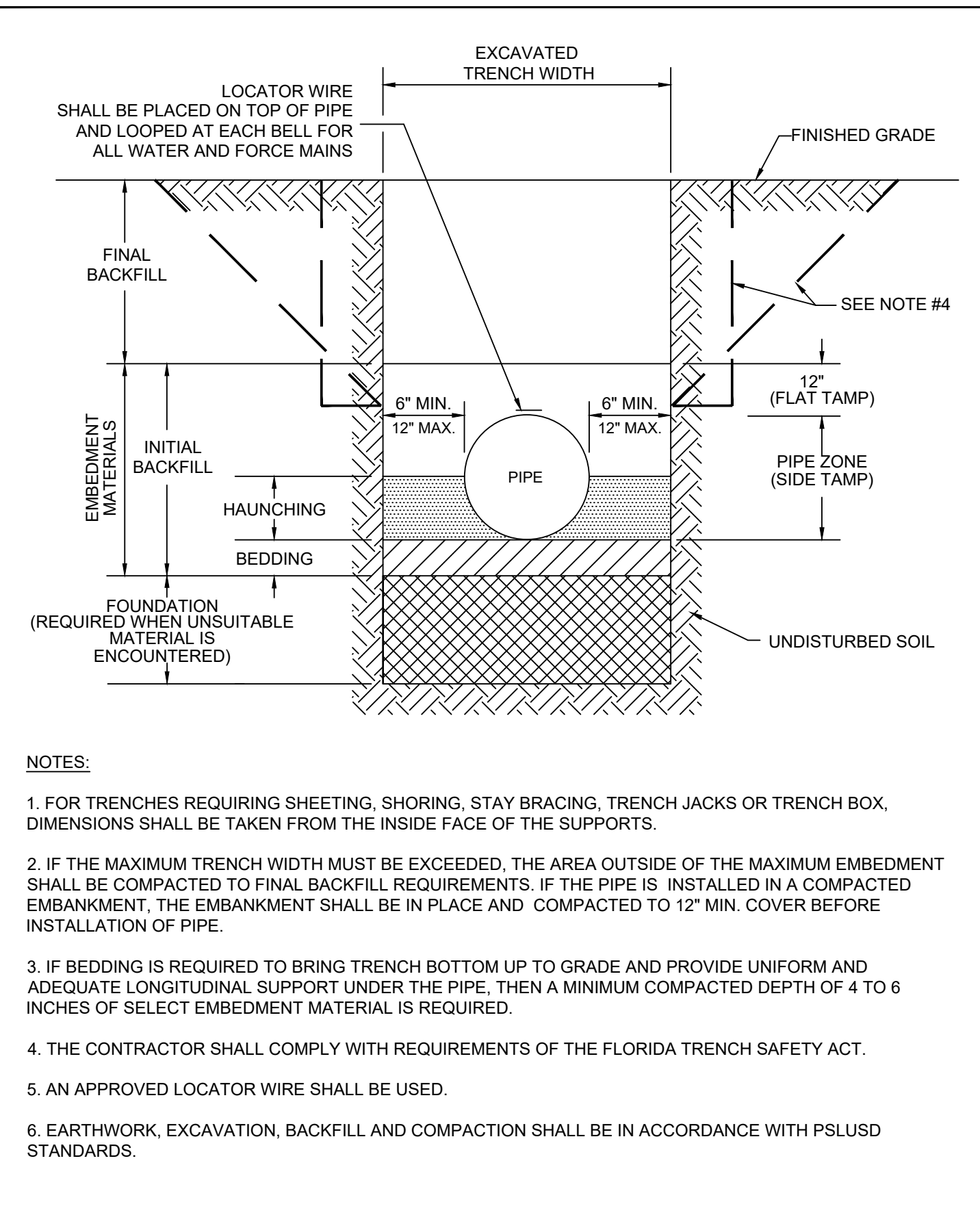


**CANAL CROSSING SIGN**  
 MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE  
 900 S.E. OGDEN LANE  
 PORT ST. LUCIE, FL 34983  
 PHONE (772) 873-6400 FAX (772) 873-6433  
 DETAIL: G-16  
 DATE: 2019  
 SCALE: N.T.S.  
 SHEET: 1 OF 1

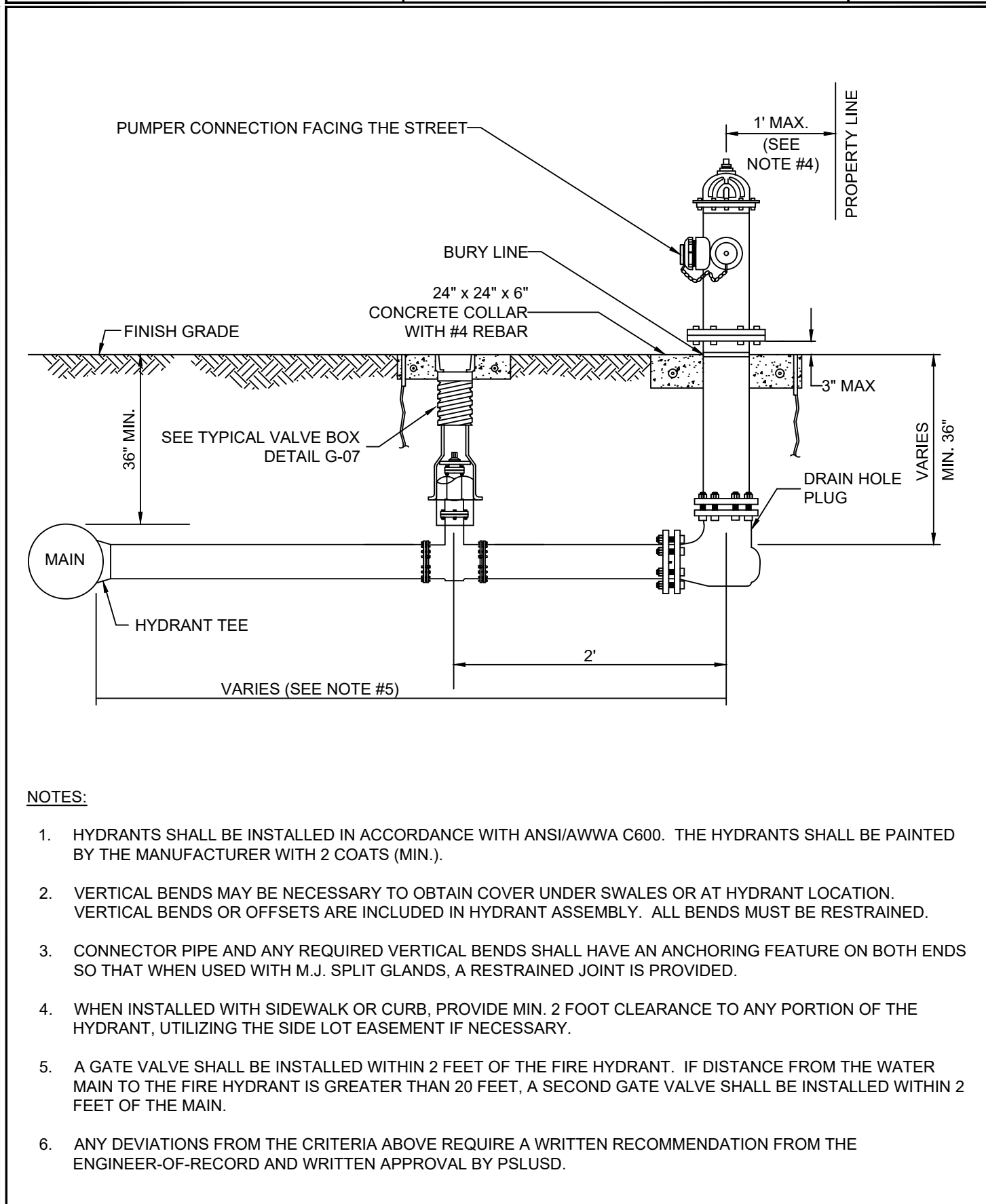
- NOTES:
- SIGNS SHALL BE PLACED AS REQUIRED UNDER THE PROVISIONS OF PERMIT ISSUED BY PERMITTING AGENCY.
  - THE SIGN SHALL BE 0.080 ALUMINUM WITH REFLECTIVE WHITE BACKGROUND AND BLACK LETTERING WITH COLOR LOGO.
  - THE SIGN SHALL BE MOUNTED ON 1.75" x 1.75", 12 GAUGE GALVANIZED SQUARE TUBE PERFORATED SIGN POST WITH STAINLESS STEEL HARDWARE, 48" FROM BOTTOM AND PARALLEL TO CANAL.



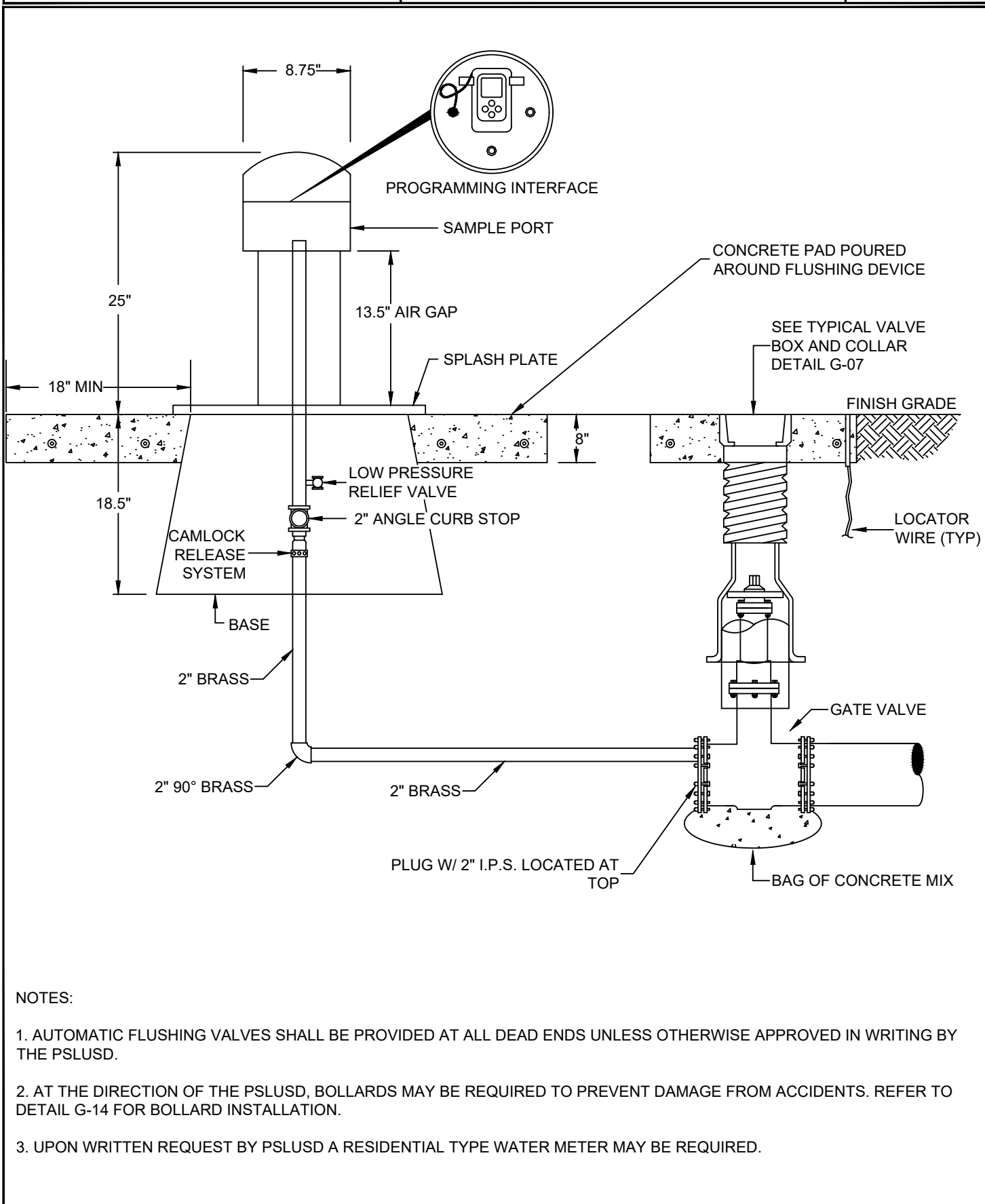
**AUTOMATIC AIR RELEASE VALVE FOR WATER MAINS**  
 MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE  
 900 S.E. OGDEN LANE  
 PORT ST. LUCIE, FL 34983  
 PHONE (772) 873-6400 FAX (772) 873-6433  
 DETAIL: W-10  
 DATE: 2019  
 SCALE: N.T.S.  
 SHEET: 1 OF 1



**STANDARD PIPE TRENCH CROSS SECTION**  
 MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE  
 900 S.E. OGDEN LANE  
 PORT ST. LUCIE, FL 34983  
 PHONE (772) 873-6400 FAX (772) 873-6433  
 DETAIL: G-04  
 DATE: 2019  
 SCALE: N.T.S.  
 SHEET: 1 OF 1



**FIRE HYDRANT ASSEMBLY**  
 MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE  
 900 S.E. OGDEN LANE  
 PORT ST. LUCIE, FL 34983  
 PHONE (772) 873-6400 FAX (772) 873-6433  
 DETAIL: W-06  
 DATE: 2019  
 SCALE: N.T.S.  
 SHEET: 1 OF 1

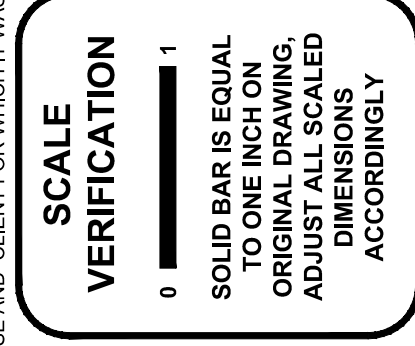


**AUTOMATIC FLUSHING VALVE FOR WATER MAINS**  
 MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE  
 900 S.E. OGDEN LANE  
 PORT ST. LUCIE, FL 34983  
 PHONE (772) 873-6400 FAX (772) 873-6433  
 DETAIL: W-11  
 DATE: 2019  
 SCALE: N.T.S.  
 SHEET: 1 OF 1

**CAPTEC Engineering, Inc.**  
 Civil Engineering Professionals  
 301 N.W. Flagler Ave.  
 Stuart, Florida 34984  
 Phone: (772) 692-4344  
 Fax: (772) 692-4341

DATE:	11/22/16
DRAWN BY:	MDB
DESIGNED BY:	HJT
CHECKED BY:	JWC
PROJECT NO.:	1682.1
HORIZ. SCALE:	
VERT. SCALE:	1682.1 DETAILS

NO.	DATE	BY	REVISIONS
06	3-22-20	MDB	REMOVED 30" RAW WATER MAIN
05	9-16-19	MDB	ADDED 30" RAW WATER MAIN w/ FIBER CONDUIT
04	2-11-19	MDB	ADDED 45' BENDS SOUTH PL
03	2-14-18	MDB	PERMIT PLAN
02	2-14-18	MDB	REVISED PER DEP
01	12-14-17	MDB	REVISED BORE DEPTH SHEET NUMBERS



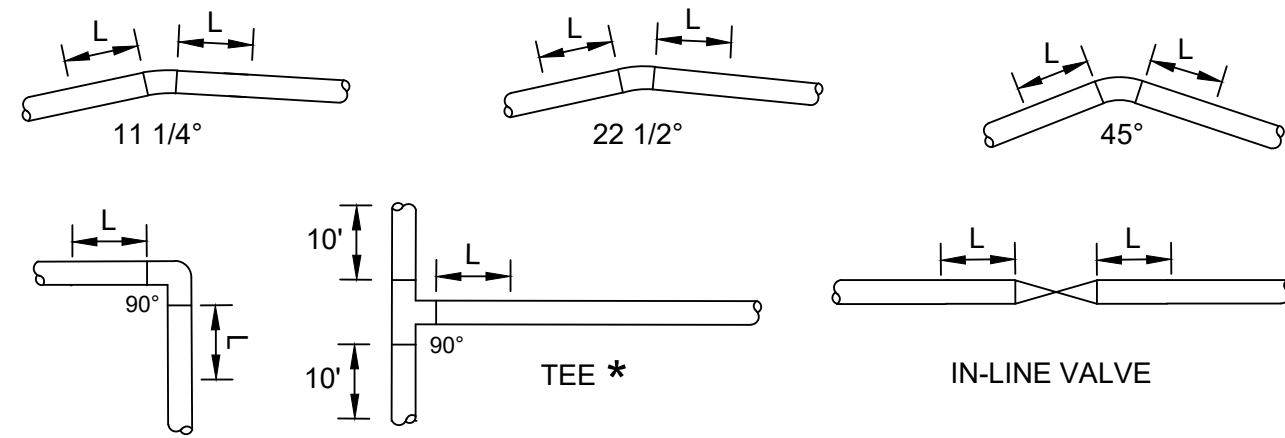
**MIDWAY ROAD 24" WATER MAIN AND 2" FIBER OPTIC EXTENSION**  
 City of Port St. Lucie  
**DETAILS**

Joseph W. Capra  
 301 N.W. Flagler Ave.  
 Stuart, Florida 34994  
 P.E. No. 37638

P:\1682.1 - CPS Midway Road Water Main\DWG\1682.1 DETAILS.dwg, 3/23/2020 11:34:17 AM, DWG To PDF.pc3



**HORIZONTAL BENDS**



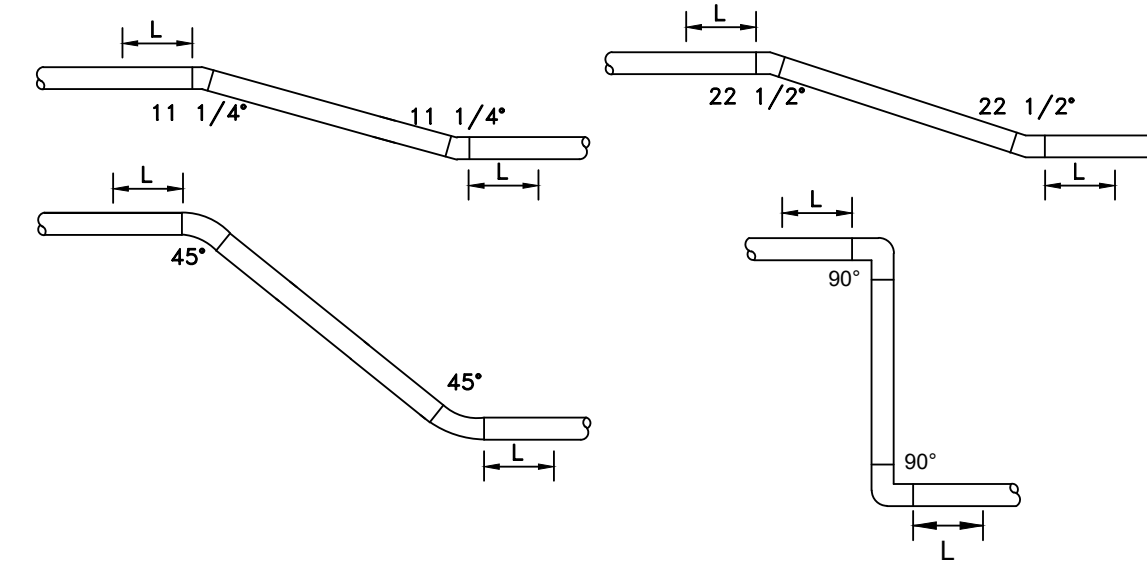
HORIZONTAL - L (FEET)						
DIAMETER	11-1/4°	22-1/2°	45°	90°	TEE* (BRANCH)	VALVES OR DEAD END
4"	2	4	8	16	20	39
6"	3	5	11	25	36	55
8"	4	7	14	33	52	72
10"	4	8	16	39	65	87
12"	5	9	19	45	80	102
14"	5	11	21	51	93	116
16"	6	12	24	57	107	131
18"	7	13	26	63	120	145
20"	7	14	29	68	133	159
24"	8	16	33	79	157	185
30"	10	19	39	93	192	222
36"	11	21	44	106	225	257
42"	12	24	49	117	254	289
48"	13	26	53	128	283	321

**NOTES:**

- THE REQUIREMENTS SET FORTH ABOVE WERE CALCULATED FOR PVC PIPE BASED UPON THE FOLLOWING ASSUMPTIONS:
  - SOIL CONDITIONS: SILTY SAND (SM)
  - TRENCH TYPE: 3 (PIPE BEDDED IN 4" MINIMUM OF LOOSE SOIL WITH BACKFILL LIGHTLY COMPACTED)
  - MINIMUM COVER: 3 FT
  - SAFETY FACTOR: 1.5
  - TEST PRESSURE: 150 PSI
  - \* SIZE ON TEE & 5' LENGTH ALONG RUN
- IF FIELD CONDITIONS DIFFER FROM THE ABOVE, THE ENGINEER-OF-RECORD (EOR) SHALL SUBMIT CALCULATIONS BASED ON THE FIELD CONDITION FOR REVIEW AND APPROVAL OF PLSUSD.

MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE 900 S.E. OGDEN LANE PORT ST. LUCIE, FL 34983 PHONE (772) 873-6400 FAX (772) 873-6433	<b>PIPELINE RESTRAINT REQUIREMENTS (HORIZONTAL)</b>	DETAIL: G-09 DATE: 2019 SCALE: N.T.S. SHEET: 1 OF 3
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**VERTICAL BENDS**



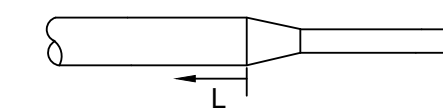
VERTICAL OFFSET - L (FEET)						
DIAMETER	11-1/4°		22-1/2°		45°	
	UPPER BEND	LOWER BEND	UPPER BEND	LOWER BEND	UPPER BEND	LOWER BEND
4"	4	2	8	3	17	5
6"	6	2	11	4	23	7
8"	8	2	15	4	30	9
10"	9	3	18	5	36	10
12"	11	3	21	6	43	12
14"	12	4	24	7	49	14
16"	13	4	27	8	55	16
18"	15	4	29	8	60	17
20"	16	5	32	9	66	19
24"	19	6	37	11	77	22
30"	22	7	45	13	92	26
36"	26	8	52	15	107	30
42"	29	8	58	16	120	34
48"	32	9	64	18	133	37

**NOTES:**

- THE REQUIREMENTS SET FORTH ABOVE WERE CALCULATED FOR PVC PIPE BASED UPON THE FOLLOWING ASSUMPTIONS:
  - SOIL CONDITIONS: SILTY SAND (SM)
  - TRENCH TYPE: 3 (PIPE BEDDED IN 4" MINIMUM OF LOOSE SOIL WITH BACKFILL LIGHTLY COMPACTED)
  - UPPER SIDE MINIMUM COVER: 3 FT
  - LOWER SIDE MINIMUM COVER: 5 FT
  - SAFETY FACTOR: 1.5
  - TEST PRESSURE: 150 PSI
- WHEN CONDITIONS DIFFER FROM THE ABOVE, THE ENGINEER-OF-RECORD (EOR) SHALL SUBMIT CALCULATIONS FOR REVIEW AND APPROVAL OF PLSUSD.
- ALL JOINTS BETWEEN UPPER AND LOWER BENDS SHALL BE RESTRAINED.

MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE 900 S.E. OGDEN LANE PORT ST. LUCIE, FL 34983 PHONE (772) 873-6400 FAX (772) 873-6433	<b>PIPELINE RESTRAINT REQUIREMENTS (VERTICAL)</b>	DETAIL: G-09 DATE: 2019 SCALE: N.T.S. SHEET: 2 OF 3
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**REDUCER**

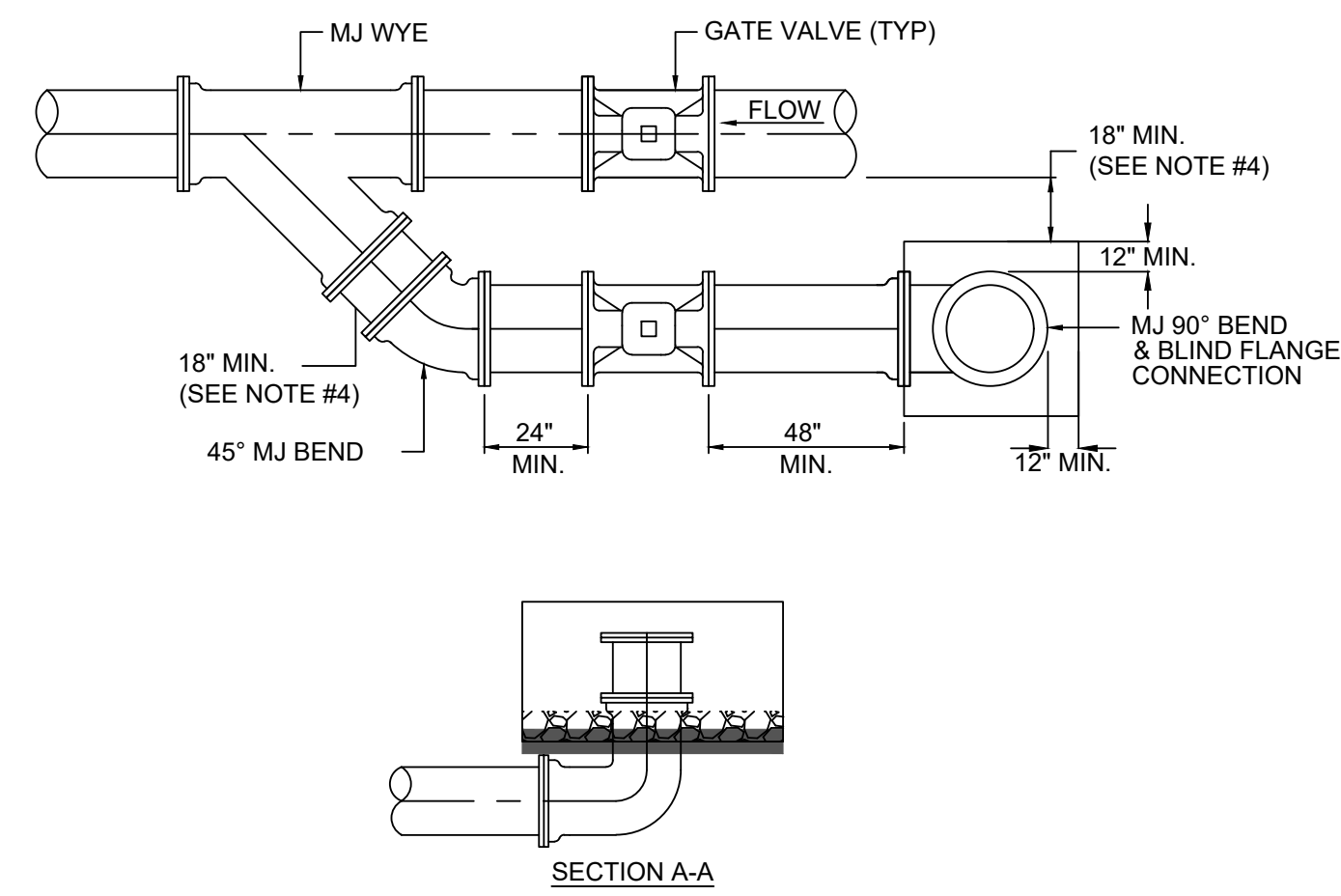


L = RETAINED LENGTH AT LARGER SIZE OF REDUCER (FEET)												
DIAMETER	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"	36"
4"	29	52	71	89	105	121	136	151	179	217	253	285
6"		31	53	74	93	111	127	143	172	211	249	282
8"			29	54	76	96	114	131	163	204	243	277
10"				30	55	78	98	117	151	195	235	271
12"					30	56	79	100	137	184	226	263
14"						30	56	79	120	171	216	255
16"							30	56	101	156	204	245
18"								30	80	140	190	233
20"									56	121	175	221
24"										78	141	192
30"											78	140
36"												75
42"												

**NOTES:**

- THE REQUIREMENTS SET FORTH ABOVE WERE CALCULATED FOR PVC PIPE BASED UPON THE FOLLOWING ASSUMPTIONS:
  - SOIL CONDITIONS: SILTY SAND (SM)
  - TRENCH TYPE: 3 (PIPE BEDDED IN 4" MINIMUM OF LOOSE SOIL WITH BACKFILL LIGHTLY COMPACTED)
  - MINIMUM COVER: 3 FT
  - SAFETY FACTOR: 1.5
  - TEST PRESSURE: 150 PSI
- IF FIELD CONDITIONS DIFFER FROM THE ABOVE, THE ENGINEER-OF-RECORD (EOR) SHALL SUBMIT CALCULATIONS BASED ON THE FIELD CONDITION FOR REVIEW AND APPROVAL OF PLSUSD.

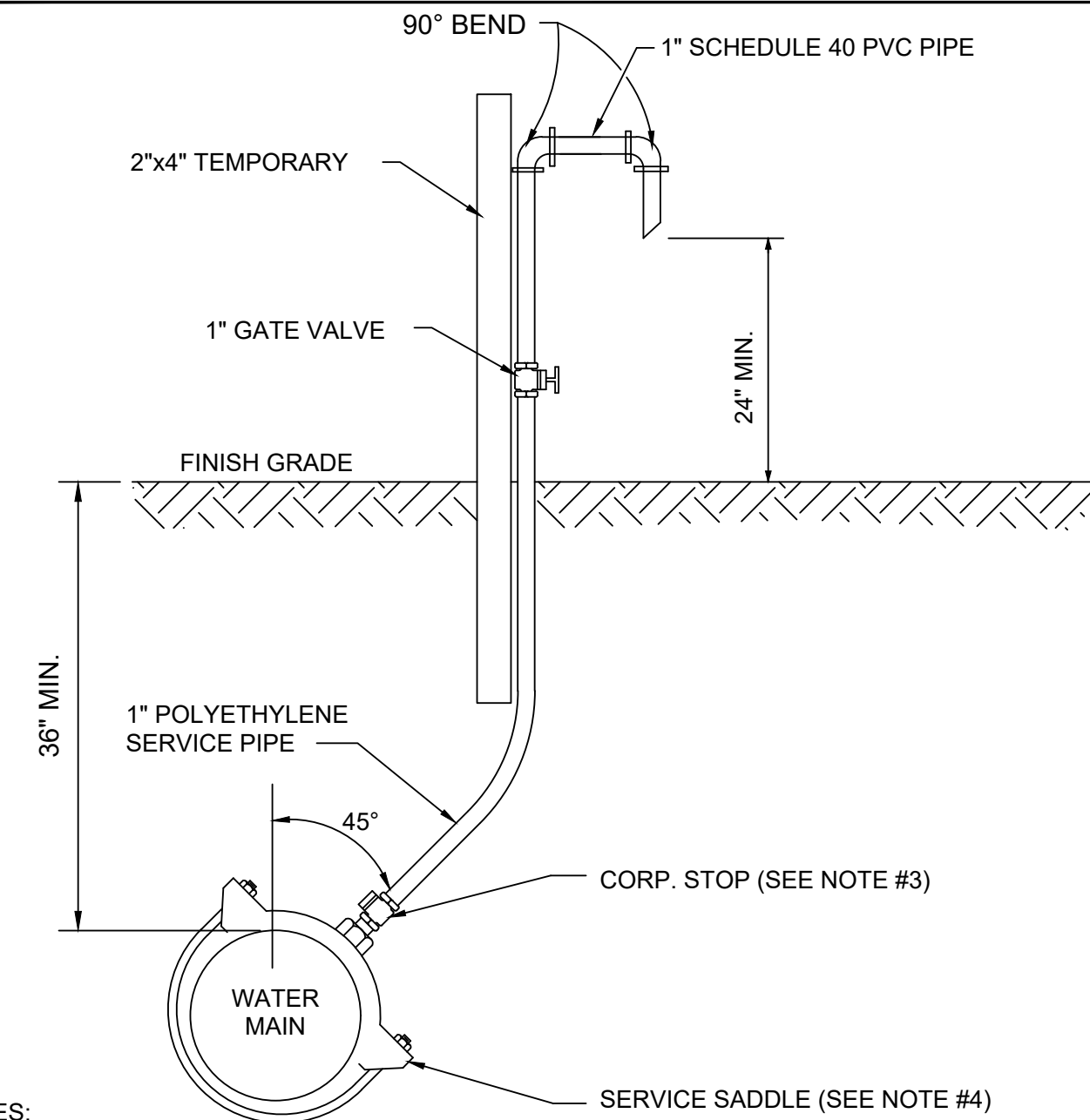
MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE 900 S.E. OGDEN LANE PORT ST. LUCIE, FL 34983 PHONE (772) 873-6400 FAX (772) 873-6433	<b>PIPELINE RESTRAINT REQUIREMENTS (REDUCER)</b>	DETAIL: G-09 DATE: 2019 SCALE: N.T.S. SHEET: 3 OF 3
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**NOTES:**

- THE ABOVE DETAIL IS FOR A TYPICAL PIG LAUNCHING / RECOVERY STATION. THE ENGINEER-OF-RECORD SHALL SUBMIT DRAWING DETAILS FOR THE PIG LAUNCHING STATION WITH DIMENSIONS FOR THE CONTAINMENT BOX, PIPE SIZES & LENGTH, AND SPECIFICATIONS FOR ALL COMPONENTS AND FITTINGS.
- PIG RECOVERY STATION WILL BE REVERSE TO FLOW.
- CONTAINMENT BOX SIZE VARIES TO ALLOW ACCESSIBILITY TO BOLTS OF PLUG. PER QUALIFIED PRODUCT LIST.
- VARIES WITH MAIN SIZE IN ORDER TO OFFSET CONTAINMENT BOX FROM MAIN LINE.
- THE BOTTOM OF CONTAINMENT BOX SHALL BE COVERED WITH 8 INCHES OF #57 STONE OVER FILTER FABRIC.
- ALL FITTINGS BELOW-GROUND SHALL BE MECHANICAL JOINT.

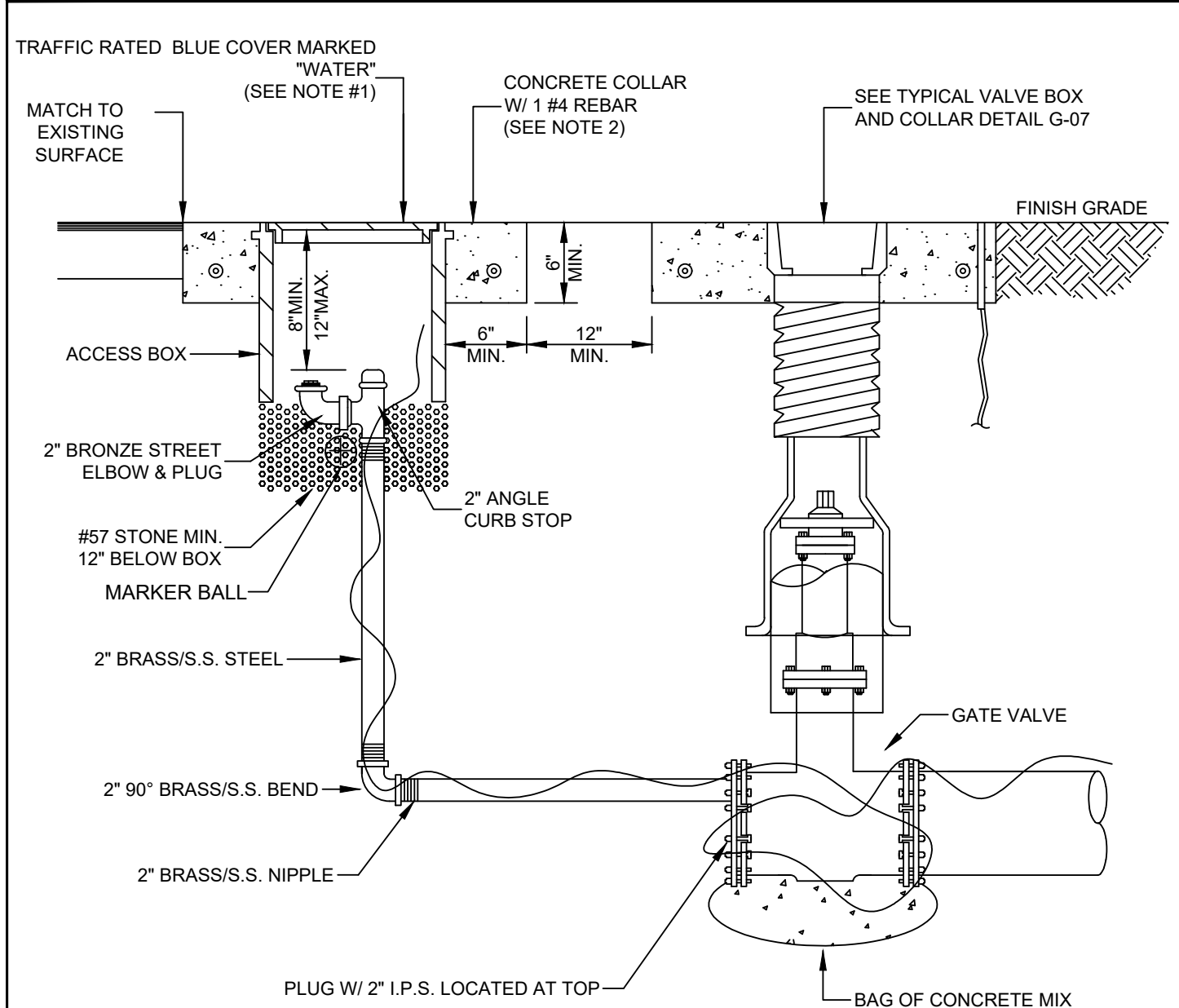
MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE 900 S.E. OGDEN LANE PORT ST. LUCIE, FL 34983 PHONE (772) 873-6400 FAX (772) 873-6433	<b>PIG LAUNCHING / RECOVERY STATION</b>	DETAIL: G-12 DATE: 2019 SCALE: N.T.S. SHEET: 1 OF 1
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**NOTES:**

- SAMPLING POINTS SHALL BE LOCATED AS SHOWN ON PLANS APPROVED BY PLSUSD AND AS REQUIRED BY FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION. A SAMPLE POINT MAP (SINGLE SHEET PDF) SHALL BE SUBMITTED TO PLSUSD FOR REVIEW PRIOR TO DISINFECTION.
- THE EXCAVATED HOLE FOR THIS INSTALLATION SHALL BE BACKFILLED TO FINISHED GRADE PRIOR TO DISCHARGING ANY WATER ON THE GROUND.
- AFTER BACTERIOLOGICAL CLEARANCE IS RECEIVED, THE CONTRACTOR SHALL TURN CORPORATION STOP OFF, REMOVE TUBING AND PLUG CORPORATION STOP WITH BRASS/CAP.
- NO DIRECT TAPS SHALL BE PERMITTED.

MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE 900 S.E. OGDEN LANE PORT ST. LUCIE, FL 34983 PHONE (772) 873-6400 FAX (772) 873-6433	<b>WATER SAMPLING POINT</b>	DETAIL: W-05 DATE: 2019 SCALE: N.T.S. SHEET: 1 OF 1
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**NOTES:**

- COVER SHALL BE PAINTED BLUE FOR "WATER".
- NO CONCRETE COLLAR IF LOCATED IN ASPHALT OR CONCRETE.
- LOCATE WIRE NOT REQUIRED IF SEPARATION BETWEEN THE VALVE BOX AND ACCESS BOX IS 6' OR LESS.

MINIMUM CONSTRUCTION STANDARDS FOR CITY OF PORT ST. LUCIE 900 S.E. OGDEN LANE PORT ST. LUCIE, FL 34983 PHONE (772) 873-6400 FAX (772) 873-6433	<b>BLOW-OFF ASSEMBLY</b>	DETAIL: W-04 DATE: 2019 SCALE: N.T.S. SHEET: 1 OF 1
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301 N.W. Flagler Ave.  
 Stuart, Florida 34994  
 Phone: (772) 892-4344  
 Fax: (772) 892-4341

CAPTEC Engineering, Inc.  
 Civil Engineering Professionals  
 No. EB-007857

DATE: 11/22/16  
 DRAWN BY: MDB  
 DESIGNED BY: HLT  
 CHECKED BY: JWC  
 PROJECT No.: 1682.1  
 HORIZ. SCALE:  
 VERT. SCALE: 1/8"=1'-0"

NO.	DATE	BY	REVISIONS
06	3-23-20	MDB	REMOVED 3/4" RAW WATER MAIN
05	8-19-19	MDB	ADDED 3/4" RAW WATER MAIN w/ FIBER CONDUIT
04	2-11-19	MDB	ADDED 3/4" BENDS SOUTH PL
03	2-14-18	MDB	PERMIT PLAN
02	2-14-18	MDB	REVISED BORE DEPTH
01	12-8-17	MDB	REVISED BORE DEPTH SHEET NUMBERS

**SCALE VERIFICATION**  
 0 1  
 SOLID BAR IS EQUAL TO ONE INCH ON ORIGINAL DRAWING. ALL DIMENSIONS SHALL BE ACCORDINGLY.

**MIDWAY ROAD 24" WATER MAIN AND 2" FIBER OPTIC EXTENSION**  
 City of Port St. Lucie  
**DETAILS**

Joseph W. Capra  
 301 N.W. Flagler Ave.  
 Stuart, Florida 34994  
 P.E. No. 37638

Printed Date:

JOB No.: 1682.1  
 SHEET  
 13 OF 14



DESIGN, SPECIFICATIONS AND CONSTRUCTION STANDARDS

A. GENERAL

- 1. The standards set forth in this manual are intended to provide a basis for design and construction. Applicable federal, state and local laws and regulations should be considered concurrently with this text. Any variation from these standards shall be specifically requested by the Engineer of Record (EOR) and requires a written approval from the PSLUSD prior to construction plan submittal. Approval of construction plans by the PSLUSD does not constitute written approval of deviations from the utility standards.
2. All references to stainless steel shall refer to grade 316 unless otherwise noted.
3. Water, wastewater and reclaimed water lines shall not be constructed without first obtaining an approval or permit, as applicable, from the PSLUSD.
4. All construction shall be in accordance with this manual, the City of Port St. Lucie Code of Ordinances, and with all applicable Florida Department of Environmental Protection (FDEP) rules and regulations. If any conflict exists between the standards, the more stringent governs, as determined by the PSLUSD. Copies of City Code of Ordinances are available with the City Clerk's office and can also be accessed online at www.cityofpsl.com. The FDEP rules are available online at www.dep.state.fl.us.
5. Construction shall be in accordance with the utility standards in effect at the time the project was approved by the PSLUSD and will not be subject to changes in the standards during the life of the project. However, if utility construction has not been initiated within one year of execution of the utility service agreement or inspections by the PSLUSD indicate that utility construction activity has not occurred for a period of 12 months, a re-approval of the project is required.
6. Wastewater discharge shall be subject to Port St. Lucie wastewater system user rules in accordance with the City of Port St. Lucie Code of Ordinances - Title VI.
7. All abandoned mains and service lines shall be removed or filled with cement grout. Asbestos cement pipe (ACP) must be handled in compliance with applicable federal, state and local regulations. All cutting, removal, and disposal of ACP shall be performed by a Florida licensed Asbestos Abatement Contractor.
8. The design and construction of privately owned fire lines shall conform to the St. Lucie County Fire District standards (www.slcfd.com) pertaining to dedicated fire sprinkler systems; the District has final jurisdiction on all hydrant and fire sprinkler line requirements. A plan approved by the District is required to be submitted at the pre-construction meeting with any revision that relocates a hydrant or a fire line connection.
9. Cross connection control shall be provided in compliance with City of Port St. Lucie Code of Ordinances - Title VI and FDEP regulations.
10. Permits shall be obtained for sub-aqueous and aerial pipe crossings canals and other surface waters from jurisdictional agencies and construction shall be in accordance with the permitted plans and conditions.

D. SEPARATION BETWEEN PSLUSD MAINS AND OTHER UTILITIES

The minimum separation between PSLUSD mains and other utilities, as measured from the outside of each pipe, shall be as follows:

- 1. Water mains shall be located a minimum of 10' from a gravity sewer, force main and reclaimed water main. The vertical separation shall be at least 18" with the water main crossing over the other pipes.
2. All PSLUSD pipes shall have a minimum horizontal separation of 5' from all other underground utilities and a vertical separation of at least 18".
3. When gravity sewer is to be installed parallel to a drainage pipe greater than 15" in diameter, a minimum horizontal separation of 15" shall be maintained. A greater separation may be required for drainage pipes larger than 24" in diameter, as determined by PSLUSD.
4. When force main or reclaimed water main is to be installed parallel to a drainage pipe, a minimum horizontal separation of 8' shall be maintained. A greater separation may be required for drainage pipes larger than 48" in diameter.

CONSTRUCTION COORDINATION, INSPECTIONS AND TESTING

A. GENERAL

- 1. The Engineer of Record (EOR) shall have a pre-construction meeting with the PSLUSD and the contractor prior to starting construction. The meeting shall be held at the Utility Department Office.
2. The EOR shall coordinate all construction and inspections on the project and shall be the point of contact with PSLUSD. Testing shall be conducted by or at the direction of the EOR in the presence of a PSLUSD inspector.
3. The contractor shall contact the EOR, the appropriate governmental jurisdictional agency, and all utility companies at least 48 hours prior to commencement of construction for coordination of any utilities.
4. There shall be no field changes or deviations from design without prior written approval of the PSLUSD and EOR.
5. All materials, construction methods, testing, and disinfection shall conform to the requirements of the PSLUSD and AWWA current standards.
6. Density test results shall be submitted to the PSLUSD no later than 7 calendar days from the date the test was taken. The inspections required in this Chapter shall not be scheduled by PSLUSD, as noted in Section B.2.d, until such time as the density test results have been approved by the PSLUSD.
7. It is the EOR's responsibility to coordinate the installation of other public utilities near the PSLUSD facilities.
8. The contractor shall strictly adhere to the horizontal and vertical separation requirements specified in the PSLUSD utility standards and applicable standard detail. All crossings between PSLUSD facilities as well as with other utilities shall be left exposed until observed by a PSLUSD inspector.
9. Contractor shall adhere to the approved Maintenance of Traffic Plan at all times where work is in progress. Traffic control, barricades, etc., shall be in accordance with applicable permits, local regulations and Florida Department of Transportation and OSHA standards.
10. Contractor shall repair any damage caused to existing utilities by construction activity in accordance with applicable standards.
11. No pollution or erosion caused by this project will be allowed off site or in the stormwater drainage system. The contractor shall install any devices necessary to prevent pollution or erosion and comply with the City's code for erosion and sediment control standards. The cost of pollution and erosion control shall be incidental to the cost of construction.

B. INSPECTIONS & TESTING

The EOR shall perform inspections, observations, and tests necessary to assure compliance with utility standards; complete the required PSLUSD forms for inspections and testing; and certify completion of the utility facilities. The contractor shall not cover newly constructed facilities prior to a required inspection being conducted by the EOR and the PSLUSD. If any construction is covered before an inspection by PSLUSD, the contractor shall be required to uncover it at his expense. All work that has been rejected or condemned shall be repaired, or if it cannot be satisfactorily repaired, shall be removed and replaced at the contractor/developer's expense. Materials not conforming to the requirements of the specifications shall be removed immediately from the site of work and replaced with satisfactory material by the contractor/developer. The PSLUSD shall have the right to require additional inspections, certifications and/or testing to confirm that the deficient work has been corrected.

1. PSLUSD INSPECTOR'S AUTHORITY

a. The PSLUSD inspections are intended to make observations for verification of compliance and do not relieve the EOR or contractor from fulfilling their responsibilities. Any items found to be deficient after PSLUSD has passed an inspection will still require correction at the contractor/developer's expense.

b. The PSLUSD inspector is not authorized to revoke, alter or waive any requirements of the specifications, but is authorized and expected to call to the attention of the EOR and/or contractor any failure of work or materials to conform to the plans or specifications. The PSLUSD inspector does NOT have the authority to make changes to the approved plans. The inspector shall have the authority to reject materials or suspend the work until questions of issue can be referred to and decided upon by the Utility Director or his designated representative.

c. The inspector shall in no case either act as foreman or perform other duties for the EOR and/or contractor nor interfere with the management of the work. Advice that the inspector may give shall in no way be construed as binding to the City of Port St. Lucie or releasing the developer, his engineer or contractor from performing according to the intent of the plans and minimum PSLUSD Standards.

2. SCHEDULING OF INSPECTIONS

a. It shall be the responsibility of the EOR to schedule inspections and their qualified representative shall be present at all scheduled tests and inspections. Pre-testing is encouraged to be completed prior to scheduled inspections, to minimize failures. A scheduled inspection will be cancelled, and a re-inspection fee assessed if one of the three following situations occurs:

- (1) Failure to show for inspection by the EOR or contractor,
(2) Cancellation of the inspection with less than 24 hours notice,
(3) A failing test result.

Re-inspection fees shall be assessed per scheduled hour of the inspection; the exception is for TV inspection of gravity sewer, for which the re-inspection fee will be assessed on the hours scheduled for the repairs and the TV inspection. The EOR will be notified or given a Failed Inspection Notice at the time of the failed inspection. All re-inspection fees shall be paid to the PSLUSD prior to any subsequent scheduling of further inspections.

b. The PSLUSD shall be provided with at least two (2) full working days notice for scheduled inspections. Inspectors will make unscheduled visits as needed to observe such items as ongoing work on site, restraints and clearances between conflicting lines.

c. Scheduled inspections will be conducted during normal business hours, Monday through Friday, except when service disruptions are anticipated. When progress of a project requires, for the convenience of the contractor, the periodic presence of a PSLUSD representative during after hours, weekends and/or city holidays, the contractor/developer shall accept the financial responsibility for the overtime hours (at overtime rates) with a minimum of four (4) hours, including travel time.

d.\* The required inspections for items marked with an asterisk below shall not be scheduled until such time as the density test results, as-built drawings, asset list, and easements have been submitted and approved by the PSLUSD.

3. REQUIRED INSPECTIONS (In no specific order)

- Materials Inspection
Connection to existing mains, tie-ins, wet taps, etc
Jack & Bores and installation of the carrier pipes, Directional Drilling, Directional Boring and any other type of bore.
Restraints & Conflicts
Flushing (Pigging)
Pressure/Leak Testing \*
Chlorination Test
Disinfection
Removal and plugging of sample points
Fire Hydrant Flow Test
Wire Trace Continuity and electronic marker verification
Any re-construction repairs and field changes, including lines that have not been turned over to the PSLUSD
Concrete pad formwork/rebar placement
Installation of the first manhole of the lift station and the first manhole to be installed TV Inspection (gravity sewer)
Infiltration/Ex-filtration Test Report (gravity sewer, manholes, pump stations and grease interceptory)\*
Spark testing manhole liners
Deflection Test
Installation of lift station/grinder structures/valve vault/grease interceptor
Electrical components of pump station
Pump Station Start-up
Any re-construction repairs and field changes, including lines that have not been turned over to the PSLUSD
Liner Welding and spark testing
Backflow Assembly Certification
Final Inspection

The PSLUSD forms for the scheduled inspections noted above shall be completed by the EOR and submitted to PSLUSD with a sealed and signed cover letter. The forms are can be downloaded from the city's website at http://www.cityofpsl.com/utility/commercial-development/utility-commercial-development.html.

All pipe restraints and crossings shall be left exposed until inspected and approved by the PSLUSD. Such inspections may be combined with scheduled inspections or will be conducted at a separate scheduled time.

4. REQUIRED TESTING

The testing for various components of the water, wastewater and reclaimed water system components shall be performed as detailed below. The EOR shall provide the PSLUSD with written test results on PSLUSD forms noted above in 3.a. & b. for each required test with a signed and sealed cover letter from the EOR in the Final Inspection package. During construction, the individual test reports shall be submitted to the City in pdf format, via email within 7 calendar days of the test.

a. Performance testing of pressure pipe

(1) Type of Testing

The following performance testing must be conducted:

- (a) Water Main: Hydrostatic, Leakage and Bacteriological Testing
(b) Force Main: Hydrostatic, and Leakage Testing
(c) Low Pressure Main: Hydrostatic, and Leakage Testing

(2) References - Testing shall be performed in accordance with the following references:

- (a) ANSIAWWA C600 - Standard for Ductile Iron Pipe Installation and Testing.
(b) ANSIAWWA C605 - Standard for Polyvinyl Chloride (PVC) Pipe Installation and Testing
(c) ANSIAWWA C651 - Standard for Disinfecting Water Mains.
(d) ANSIAWWA C900 - Standard for PVC Pipe, 4"-12" for Water Distribution.
(e) ANSIAWWA C905 - Standard for PVC Pipe 14" & above for Water Distribution.

(3) Regulations - No leak testing shall be performed until easements, as-built drawings, and density tests have been submitted and accepted by the City. Testing shall conform to PSLUSD requirements and FDEP regulations.

(4) Temporary Connection to PSLUSD Water Main

(a) A temporary jumper connection is required between an existing active water main and a newly constructed main until a clearance is obtained from the PSLUSD. The temporary connection shall be used at point (s) of filling in accordance with the standard details for potable and non-potable water jumper connection.

(b) The EOR shall contact the PSLUSD via e-mail at (inspectors@cityof.psl.com) regarding scheduling of required inspections listed in this chapter or any other inspections deemed necessary by the PSLUSD and shall strictly follow all procedures detailed in this chapter.

(c) The temporary jumper assembly (flange to flange) will be supplied, installed and tested by the PSLUSD, in coordination with the EOR and contractor. Other materials and installation required for the connection shall be responsibility of the contractor. The contractor shall disinfect the tapping sleeve and exterior of the main to be tapped by spraying and swabbing with chlorine in the presence of a PSLUSD inspector. The underground fittings shall be restrained mechanical joint type. All materials shall be per the PSLUSD approved Qualified Products List.

(d) The jumper connection shall be maintained by the contractor until filling, flushing, hydrostatic pressure/leakage testing, disinfection and bacteriological sampling have been satisfactorily completed by the contractor and the test results are in compliance with the PSLUSD and FDEP standards. Disinfection and bacteriological sampling is not required for newly constructed force mains and reclaimed water mains.

(e) A physical separation shall be maintained between an existing water main and the newly constructed water main, except as noted herein. If the new main is of a size or length that pigging/flushing cannot be effectively accomplished with the jumper connection, the PSLUSD may allow a physical connection under controlled conditions as follows:

- (i) The procedure will be conducted by the contractor in the presence of a PSLUSD inspector and the Engineer-of-Record (EOR) or representative.
(ii) The new valve(s) shown in this detail shall be pressure/leakage tested and replaced if leakage is observed. The valves will be kept closed by the PSLUSD and shall not be operated by any one other than PSLUSD personnel.
(iii) The jumper connection shall be used to fill the new main.
(iv) The contractor shall disinfect the pipe and fittings used to make the connection by spraying and swabbing with chlorine.
(v) All valves in the new system downstream of the jumper shall be opened by the contractor prior to flushing. The valves shown in the standard detail shall be opened by PSLUSD personnel only.
(vi) The pigging and flushing shall be performed by the contractor in the presence of a PSLUSD inspector. The valves will be closed by PSLUSD personnel after the main has been flushed.
(vii) The main shall be pressure tested after flushing and prior to disinfection. All valves shall be kept closed during the pressure test and will be opened by PSLUSD personnel if the test results are satisfactory.
(viii) Disinfection shall be conducted in accordance with AWWA C651. A minimum pressure of 20 psi shall be maintained in the new water main after disinfection.

(f) Bacteriological sampling and testing of the new water main shall be conducted per section B.4a.(8) of this Chapter and a clearance obtained from the PSLUSD or FDEP, as applicable. The sampling points shall be removed and plugged, and the permanent connection made by the contractor. The contractor shall disinfect the pipe and fittings used to make the connection by spraying and swabbing with chlorine.

(g) The PSLUSD will remove the jumper assembly (flange to flange) after the corporation stop valves to the jumper have been closed, the valves shall be plugged by the contractor after removal of the assembly.

(h) The contractor shall pay the PSLUSD for all the water used, based on the initial and final reading of the water meter.

(5) Cleaning/Flushing

(a) Flushing shall be conducted to clean the mains and remove all foreign matter.
(b) For water mains, flushing shall be conducted prior to disinfection. Hoses, fittings and temporary pipes in ditches shall be provided as required to dispose flushing water without damage to adjacent properties. Flushing velocities shall be at least 2.5 fps.

(c) All mains shall be cleaned using a poly-pig cleaning system as detailed in Chapter II, Section J.9. All equipment and piping shall be provided by the contractor. Testing shall be conducted to ensure proper cleanliness of the pipe as detailed in this section. PSLUSD will not accept any utility mains that do not pass the cleanliness test.

(d) Prior to the actual line flushing operation, the contractor shall properly notify the PSLUSD and EOR of such intended water use a minimum of 48 hours prior to flushing of mains up to 8" diameter, and at least 1 week prior to flushing of mains larger than 8". All flushing times will be limited to off peak times of water system demand and consumption. No flushing shall take place without the PSLUSD inspector and EOR being present.

(e) The contractor shall pay the PSLUSD for all water used.

(f) The flushing report shall be submitted by the EOR on PSLUSD form prior to disinfection.

(6) Hydrostatic and Leakage Testing

(a) Hydrostatic and leakage tests shall be made between valves and/or connectors for each section tested using the procedure outlined in ANSIAWWA C600 for DIP and C605 for PVC.

(b) The contractor shall provide all necessary equipment such as pumps, gauges and water measuring tanks and shall perform all work required for pipe pressure and leakage test. The gauge shall read in 2 pound increments.

(c) Hydrostatic testing shall be performed for a period of not less than two hours at 150 psi pressure for water force/reclaimed water mains and at 100 psi for low-pressure mains. The allowable rate of leakage shall be less than the number of gallons per hour determined by the following formula:

L = (SD x P) / 148,000

- L = Allowable leakage in gallons per hour.
S = Length of pipe tested in feet.
D = Nominal diameter of the pipe in inches.
P = Average test pressure maintained during the test in pounds per square inch gauge.

(d) The testing procedure shall include the continued application of the specified pressure to the test system for the two-hour period using a suitable pump connected to the pipeline. The pipeline shall be allowed to stabilize at the test pressure before conducting the hydrostatic test. The pressure shall not vary by more than +/- 5 psi from the required pressure for the duration of the test. Test pressure shall be maintained with this tolerance by adding makeup water through the pump into the pipeline. The amount of makeup water shall be accurately measured and shall not exceed the allowable leakage rate (L) as determined using the above formula. If at any point during the test the pressure loss exceeds 5 psi, the test is considered failed. Should the test fail, the contractor shall make necessary repairs and the test shall be repeated until satisfactory results are obtained.

(e) Any exposed pipe, fittings, valves, hydrants, and joints shall be examined during the test to ensure there are no visible leaks. Any damaged or defective pipe fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material, and the test shall be repeated.

(f) The pressure test report shall be submitted by the EOR on PSLUSD form prior to disinfection.

(7) Disinfection (Water Facilities Only)

(a) Disinfection of mains shall comply with AWWA C651. Each unit of completed water main and distribution system shall be thoroughly flushed and then disinfected with chlorine.

(b) Chemicals:

- (i) Sodium or calcium hypochlorite conforming to ANSIAWWA B300 shall be used.
(ii) Calcium hypochlorite intended for use in swimming pools shall not be used.
(iii) Chlorine tablets shall not be used unless specifically approved in writing by the PSLUSD.
(iv) Pure chlorine gas or liquid shall not be used

(c) The disinfection test report shall be submitted by the EOR on PSLUSD form prior to final inspection.

(8) Bacteriological Sampling & Testing (Water Facilities Only)

(a) The contractor shall verify that piping system has been cleaned and properly isolated. The maximum length of line to be tested as one section will be 2500'.

(b) Bacteriological testing shall not begin until after the pressure test has been passed.

(c) The contractor shall install sampling points required to take all necessary water samples at locations designated in the approved plans, and submit an 8-1/2 x 11" map of all sample points for review and approval prior to sampling.

(d) The contractor shall coordinate with a Florida Department of Health certified testing laboratory to take all water samples required for bacteriological tests and shall maintain continuous running bacteriological sample taps. Water mains being tested must remain under line pressure until release of system into service by the PSLUSD and FDEP.

(e) The test report shall include the following information:

- (i) Date issued, project name, and testing laboratory name, address, telephone number and State Certification Number.
(ii) Time and date of water sample collection
(iii) Name of person collecting samples
(iv) Test locations
(v) Coliform bacteria test results for each outlet tested
(vi) Certification that water conforms to bacterial standards
(vii) Bacteriologist's signature and authority

(f) The bacteriological test results shall be submitted to the PSLUSD with the Final Inspection Package, as required in Section C. of this chapter.

b. Fire Hydrant Flow Testing

(1) A flow test to verify the fire flow rates shall be performed by the EOR on all new fire hydrants prior to the project's final inspection. The gauges for the test will be provided by the PSLUSD. The flow tests shall be witnessed by the PSLUSD and contractor. The contractor shall make provisions for minimizing interruptions to traffic and for adequate drainage of water.

(2) Each hydrant shall be capable of delivering a minimum flow of 600 gpm for residential areas, and 1250 gpm for non-residential areas (or a higher flow as required by the Fire Chief), with a residual pressure of not less than 20 psi.

(3) The contractor shall provide one hydrant wrench, fire hydrant repair kits and maintenance manuals to the PSLUSD at the time of flow testing. One fire hydrant repair kit shall be provided per every five fire hydrants. If there are less than five hydrants, one kit will be required. These kits shall be turned over to the PSLUSD with the turnover package. Each kit shall include a sufficient quantity of parts and lubricant to facilitate quick repairs, and a copy of the maintenance manual. The repair kit items required for each approved manufacturer are mentioned on the Qualified Products List.

3. DIRECTIONAL BORING

a. GENERAL

(1) Portions of pressure mains shall be installed by the directional boring method within the limits indicated on the approved plans and as specified herein. Generally, as a minimum, the pressure main is to be located within the road right-of-way or easement and shall be installed by directional boring. Piping not designated for installation by a specific method may be installed by open trench or directional boring, as approved by the Engineer of Record (EOR) and the PSLUSD.

(2) The contractor shall be responsible for furnishing of all 1 labor, materials, equipment and incidentals required to perform trenchless installation of pressure mains, as shown on the approved plans and as specified herein.

(3) The contractor is required to bring to the attention of the EOR any known design discrepancies with actual tunneling methods that the contractor will be performing, no later than the pre-construction meeting.

b. CONTRACTOR'S EXPERIENCE

(1) The contractor must demonstrate expertise in trenchless methods by providing a list of ten utility references for which similar work has been performed in the last two years. The name and telephone number of the references shall be included so contact can be made to verify the contractor's capability. Also, the contractor must provide documentation showing completion of the projects used for reference. Conventional trenching experience is not sufficient to demonstrate expertise in trenchless methods.

(2) All supervisory personnel must be adequately trained and will have at least four years experience in directional boring. The contractor will have to submit the names and resumes of all supervisory field personnel prior to construction. In order to save time the contractor provide multiple experienced directional boring crews.

c. SUBMITTALS

- (1) Technical data must be submitted for equipment including clay slurry material, method of installation with working drawings, and proposed sequence of construction for approval by the EOR and PSLUSD.
(2) Prior to approval for directional boring, the contractor must submit the names of supervisory field personnel and historical information of directional boring experience. In addition, the contractor must submit for approval nameplate data for the drilling equipment, mobile spoils removal unit, and Material Safety Data Sheets (MSDS) information for the drilling slurry compounds.

d. INSTALLATION

(1) Installation shall be in accordance with APWA publication "Trenchless Technology Applications in Public Works" and in a trenchless manner producing continuous bores.

(2) The tunneling system shall be remotely steerable and permit electronic monitoring of tunnel depth and location. Accurate placement of pipe within a +/- 2" window is required both horizontally and vertically. Turning capability of 90° is required. Continuous monitoring of the boring head is required, including across open water if necessary.

(3) The directional boring contractor will be required to submit certification, by a Professional Engineer and a Professional Land Surveyor licensed in the State of Florida, that the directional boring has been performed in accordance with the approved plans, 1 and provide signed and sealed as-built drawings of the installation.

(4) Tunneling must be performed by a fluid-cutting process (high pressure-low volume) utilizing a liquid clay, i.e. bentonite. Liquid clay type colloidal drilling fluid shall consist of at least 10% high-grade, carefully processed bentonite to consolidate cuttings of the soil, to seal the walls of the hole, and to furnish lubrication for subsequent removal of cuttings. In addition, the clay fluid must be totally inert and contain no environmental risk.

(5) The contractor must have a mobile vacuum spoils recovery vehicle on-site to remove the drilling spoils from the access pits. The spoils must then be transported from the job site for proper disposal. Under no circumstances will the drilling spoils be permitted to be disposed of into sanitary or storm sewers, public or private drainage systems, and surface waters.

(6) Mechanical, pneumatic, or water-jetting methods will be considered unacceptable. After an initial bore has been completed, a reamer will be installed at the termination pit and the pipe will be pulled back to the starting pit. The reamer must also be capable of discharging liquid clay to facilitate the installation of the pipe into a stabilized and lubricated tunnel. Upon completion of boring and pipe installation, the contractor will remove all spoils from the starting and termination pits. All pits will be restored to their original condition.

e. RESTORATION OF PAVED, IMPROVED & UNIMPROVED AREAS

The shoulders, ditches, banks and slopes of roads and railroads crossed and paralleled shall be restored to their former condition and properly sealed to prevent erosion. Restoration shall be as required by the jurisdictional authority and as specified within the contract documents. Road and railroad crossings and parallel installations are to be continuously maintained until completion of the work.



Table with 2 columns: DATE, DRAWN BY, DESIGNED BY, CHECKED BY, PROJECT No., HORIZ SCALE, VERT. SCALE. Values include 11/22/16, MDB, HLT, JWC, 1682.1, 1682.1.

Table with 2 columns: DATE, BY, REVISIONS. Includes a grid for tracking changes to the drawing.

SCALE VERIFICATION table with 2 columns: SCALE, VERIFICATION. Includes a vertical scale bar and text: 'SCALE VERIFICATION 1 SOLID BAR IS EQUAL TO ONE INCH ON ORIGINAL DRAWING. DIMENSIONS SHALL BE ACCORDINGLY.'/>

MIDWAY ROAD 24" WATER MAIN AND 2" FIBER OPTIC EXTENSION. City of Port St. Lucie. GENERAL NOTES. Includes a vertical title block with project name and location.

Joseph W. Capra 301 N.W. Flagler Ave. Stuart, Florida 34994 P.E. No. 37638

Printed Date:

JOB No.: 1682.1 SHEET 14 OF 14