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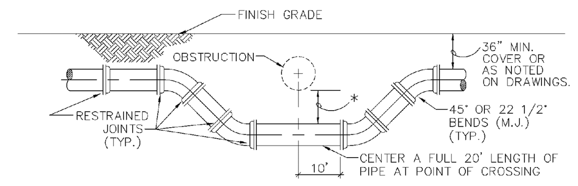
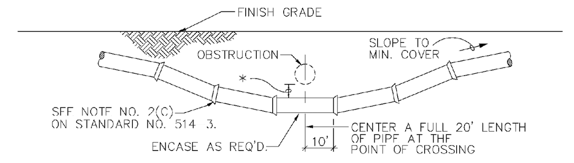
04/03/2024



SPECIAL UTILITY CROSSING – FITTING TYPE

* 12" MINIMUM CLEARANCE REQUIRED FOR PRESSURE TYPE SANITARY SEWER, WASTEWATER OR STORMWATER FORCE MAIN OR REUSE WATER MAIN CROSSINGS. IF MINIMUM CLEARANCE CANNOT BE OBTAINED. REFER TO "PROTECTION OF POTABLE WATER SUPPLY" FOR WATER MAIN CROSSINGS. SEE NOTE 2(B), ON STANDARD NO. 514–3

6" MINIMUM CLEARANCE REQUIRED FOR WATER AND STORMWATER, SEWER MAIN CROSSINGS. SEE NOTE 2(A), ON STANDARD NO. 514–3



STANDARD UTILITY CROSSING – DEFLECTION TYPE

NOTES:
1. THE DEFLECTION TYPE CROSSING SHALL BE USED WHEREVER POSSIBLE. ONLY UNDER SPECIFIC ORDERS BY THE ENGINEER SHALL THE FITTING TYPE CROSSING BE ALLOWED.
2. CONSTRUCT STANDARD CROSSING USING NO MORE THAN 75% OF MANUFACTURERS' MAXIMUM JOINT DEFLECTION.
3. FOR POTABLE WATER MAINS, REFER TO "PROTECTION OF POTABLE WATER SUPPLY".

UTILITY CROSSINGS

ENGINEERING STANDARDS 2022

REVISIONS | BY: S.S. | DATE: 1/19/12
ENGINEERING DIVISION
CITY OF POMPANO BEACH
SCALE: N.T.S.
UTILITY CROSSINGS
DATE: MAY 2022
DWG. NO. 514-1

PROTECTION OF POTABLE WATER SUPPLY NOTES

A. GENERAL
IN ADDITION TO THESE REQUIREMENTS, ALL POTABLE WATER MAINS CONSTRUCTED IN THE VICINITY OF STORM SEWERS, SANITARY SEWERS OR FORCE MAINS SHALL COMPLY WITH THE APPLICABLE PROVISIONS OF FLORIDA ADMINISTRATIVE CODE CHAPTER 62–555, GREAT LAKES–UPPER MISSISSIPPI RIVER BOARD OF STATE SANITARY ENGINEERS (GLUMRB) "RECOMMENDED STANDARDS FOR WATER WORKS", AND GLUMRB "RECOMMENDED STANDARDS FOR WASTEWATER FACILITIES".

B. DEFINITIONS
FOR THE PURPOSES OF THIS SPECIFICATION, THE WORDS "OTHER PIPE" OR "OTHER PIPES" SHALL MEAN SANITARY SEWER MAIN, SEWAGE FORCE MAIN, STORMWATER MAIN OR ANY COMBINATION THEREOF.

C. CROSS CONNECTIONS PROHIBITED
THERE SHALL BE NO PHYSICAL CONNECTIONS BETWEEN A PUBLIC OR PRIVATE POTABLE WATER SUPPLY SYSTEM AND ANY OTHER PIPE OR APPURTENANCE THERETO WHICH WOULD PERMIT THE PASSAGE OF ANY WASTEWATER, POLLUTED WATER, OR ANY OTHER WATER INTO THE POTABLE SUPPLY. NO WATER PIPE SHALL PASS THROUGH OR COME INTO CONTACT WITH ANY PART OF A SANITARY SEWER MANHOLE OR STORMWATER MANHOLE.

D. RELATION OF OTHER PIPES TO POTABLE WATER MAINS

1. HORIZONTAL SEPARATION
A. NEW OR RELOCATED, UNDERGROUND WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST THREE FEET BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF ANY EXISTING OR PROPOSED STORM WATER, STORM WATER FORCE MAIN, OR PIPELINE CONVEYING REUSE WATER NOT REGULATED UNDER PART III OF CHAPTER 62–610,F.A.C.
B. NEW OR RELOCATED, UNDERGROUND WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST THREE FEET, AND PREFERABLY TEN FEET, BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF ANY EXISTING OR PROPOSED VACUUM TYPE SANITARY SEWER.
C. NEW OR RELOCATED, UNDERGROUND WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST SIX FEET, AND PREFERABLY TEN FEET, BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF ANY EXISTING OR PROPOSED GRAVITY–OR PRESSURE–TYPE SANITARY SEWER, WASTEWATER FORCE MAIN, OR PIPELINE CONVEYING REUSE WATER NOT REGULATED UNDER CHAPTER 62–610, F.A.C. THE MINIMUM HORIZONTAL SEPARATION DISTANCE BETWEEN WATER MAINS AND GRAVITY TYPE SEWERS SHALL BE REDUCED TO THREE FEET WHERE THE BOTTOM OF THE WATER IS LAID AT LEAST SIX INCHES ABOVE THE TOP OF THE SEWER.

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D. NEW OR RELOCATED, UNDERGROUND WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST TEN FEET BETWEEN THE OUTSIDE OF THE WATER MAIN AND ALL PARTS OF ANY EXISTING OR PROPOSED "ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEM".

2. VERTICAL SEPARATION
A. NEW OR RELOCATED, UNDERGROUND WATER MAINS CROSSING ANY EXISTING OR PROPOSED GRAVITY–OR VACUUM–TYPE SANITARY SEWER OR STORM SEWER SHALL BE LAID SO THE OUTSIDE OF THE WATER MAIN IS AT LEAST SIX INCHES, AND PREFERABLY 12 INCHES, ABOVE OR AT LEAST 12 INCHES BELOW THE OUTSIDE OF THE OTHER PIPELINE. HOWEVER, IT IS PREFERABLE TO LAY THE WATER MAIN ABOVE THE OTHER PIPELINE.
B. NEW OR RELOCATED, UNDERGROUND WATER MAINS CROSSING ANY EXISTING OR PROPOSED PRESSURE–TYPE SANITARY SEWER, WASTEWATER OR STORM WATER FORCE MAIN, OR PIPELINE CONVEYING REUSE WATER SHALL BE LAID SO THE OUTSIDE OF THE WATER MAIN IS AT LEAST 12 INCHES, ABOVE OR BELOW THE OUTSIDE THE OTHER PIPELINE. HOWEVER, IT IS PREFERABLE TO LAY THE WATER MAIN ABOVE THE OTHER PIPELINE.
C. AT THE UTILITY CROSSINGS DESCRIBED IN PARAGRAPHS (A) AND (B) ABOVE, ONE FULL LENGTH OF WATER MAIN PIPE SHALL BE CENTERED ABOVE OR BELOW THE OTHER PIPELINE SO THE WATER MAIN JOINTS WILL BE AS FAR AS POSSIBLE FROM THE OTHER PIPELINE. ALTERNATIVELY, AT SUCH CROSSINGS, THE PIPES SHALL BE ARRANGED SO THAT ALL WATER MAIN JOINTS ARE AT LEAST THREE FEET FROM ALL JOINTS IN VACUUM–TYPE SANITARY SEWERS, STORM SEWERS, STORM WATER FORCE MAINS, OR PIPELINES CONVEYING REUSE WATER REGULATED UNDER PART III 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 REUSE WATER NOT REGULATED UNDER PART III OR CHAPTER 62–610, F.A.C.

WHERE THE HORIZONTAL CAN BEING LOCATED LESS THAT THE REQUIRED MINIMUM DISTANCES FROM JOINTS IN THE OTHER PIPELINE OR THE HORIZONTAL IS LESS THAT THREE FEET FROM ANOTHER PIPELINE OR THE UNDER GROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND IS LESS THAN THE REQUIRED MINIMUM VERTICAL DISTANCE FROM THE OTHER PIPELINE, THE CONTRACTOR SHALL CONTACT THE ENGINEER IMMEDIATELY FOR RECOMMENDED SOLUTIONS TO MEET THE FLORIDA OF DEPARTMENT OF ENVIRONMENTAL PROTECTION REQUIREMENTS PER CHAPTER 62–555, F.A.C.

PROTECTION OF POTABLE WATER SUPPLY NOTES

ENGINEERING STANDARDS 2022

REVISIONS | BY | DATE
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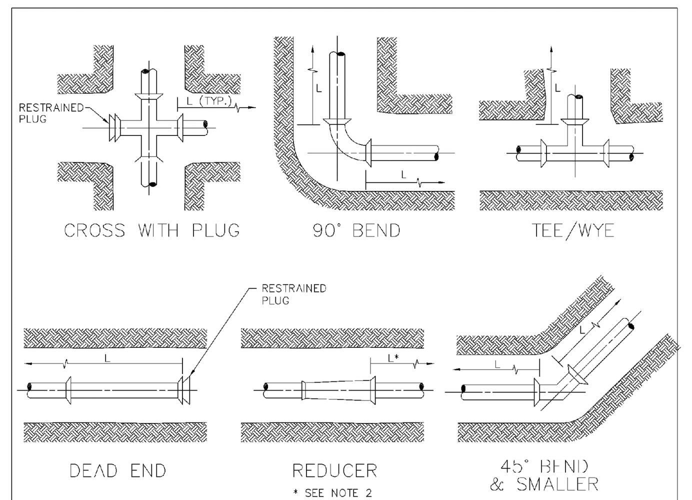
CITY OF POMPANO BEACH
SCALE: N.T.S.
GENERAL WATER SUPPLY NOTES
DATE: MAY 2022
DWG. NO. 514-3



GENERAL NOTES:
1. VALUES IN TABLE ARE BASED ON 3' OF COVER, 100 PSI INTERNAL PRESSURE, FOR FORCE MAINS, 150 PSI REUSE WATER LINES, ANSI/AWWA C605 & C150/A21.50 LAYING CONDITION 3, ASTM D2487 SAND SILT SP SOIL TYPE, AND SAFETY FACTOR OF 2.0. RESTRAINED LENGTHS WERE COMPUTED PER DIPRA "THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE" AND "PVC PIPE THRUST RESTRAINT DESIGN HANDBOOK," EBAA IRON, INC.
2. CONFIRM THE EXACT LENGTH OF RESTRAINING REQUIRED FOR REDUCERS, PIPE ENCASED IN POLYETHYLENE AND ENCROACHING RESTRAINED LENGTHS WITH THE DESIGN ENGINEER.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPER INSTALLATION OF THE RESTRAINED JOINTS TO PREVENT MOVEMENT OF THE PIPE & FITTINGS.
4. IN THE EVENT OF A CONFLICT BETWEEN RESTRAINED LENGTHS SHOWN ON THE TABLE AND RESTRAINED LENGTHS SHOWN ON THE DRAWINGS, THE LONGEST RESTRAINED LENGTH SHALL BE USED.

ENGINEERING STANDARDS 2022

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PVC HORIZONTAL BENDS AND VERTICAL UP BENDS

RESTRAINED JOINT LENGTH L (MINIMUM DISTANCE IN FEET FROM FITTING – EACH WAY)

PIPE SIZE (IN.)	BENDS 90°	45°	22.5°	11.25°	CROSS WITH PLUG / DEAD END / TEE/WYE
6	26	11	6	3	53
8	33	14	7	4	68
12	46	19	10	5	96

PVC VERTICAL DOWN BEND

RESTRAINED JOINT LENGTH L (MINIMUM DISTANCE IN FEET FROM FITTING – EACH WAY)

PIPE SIZE (IN.)	BENDS 90°	45°	22.5°	11.25°	
6	26	11	6	3	
8	33	14	7	4	
12	46	19	10	5	

DIP HORIZONTAL BENDS AND VERTICAL UP BENDS

RESTRAINED JOINT LENGTH L (MINIMUM DISTANCE IN FEET FROM FITTING EACH WAY)

PIPE SIZE (IN.)	BENDS 90°	45°	22.5°	11.25°	CROSS WITH PLUG / DEAD END / TEE/WYE
12"	68	28	14	7	144
24"	119	49	24	12	258

DIP VERTICAL DOWN BEND

RESTRAINED JOINT LENGTH L (MINIMUM DISTANCE IN FEET FROM FITTING – EACH WAY)

PIPE SIZE (IN.)	BENDS 90°	45°	22.5°	11.25°	
12"	144	60	29	14	
24"	258	107	51	25	

RESTRAINED JOINT INFORMATION

ENGINEERING STANDARDS 2022

REVISIONS | BY | DATE
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CITY OF POMPANO BEACH
SCALE: N.T.S.
RESTRAINED JOINT INFORMATION
APPROVED BY:
CITY ENGINEER
DATE: MAY 2022
DWG. NO. 515-2

MIN. LENGTH OF PIPE (FEET) TO BE RESTRAINED
(SOURCES: EBAA IRON RESTRAINT LENGTH CALCULATION PROGRAM FOR PVC PIPE, RELEASE 3.1. AND DIPRA THRUST RESTRAINT FOR DUCTILE IRON PIPE, RELEASE 3.2)

FITTING TYPE		PIPE SIZE 4"	6"	8"	10"	12"	16"	20"	24"	200psi 30"	36"	42"	48"
90° HORIZ. BEND		14	20	25	30	35	45	54	62	98	112	124	135
45° HORIZ. BEND		6	8	11	13	15	19	22	26	41	46	51	56
22.5° HORIZ. BEND		3	4	5	6	7	9	11	12	19	22	25	27
11.25° HORIZ. BEND		1	2	3	3	4	4	5	6	10	11	12	13
90° VERT. OFFSET	UPPER BEND	29	41	53	64	74	95	115	134	214	246	276	304
	LOWER BEND	7	10	13	16	19	25	30	35	57	66	74	83
45° VERT. OFFSET	UPPER BEND	12	19	24	29	34	39	48	56	89	102	114	126
	LOWER BEND	3	4	6	7	8	10	12	15	23	27	31	34
22.5° VERT. OFFSET	UPPER BEND	6	9	12	14	17	19	23	27	43	49	55	60
	LOWER BEND	1	2	4	4	4	5	6	7	11	13	15	16
11.25° VERT. OFFSET	UPPER BEND	3	4	6	7	8	9	11	13	21	24	27	30
	LOWER BEND	1	1	1	2	2	2	3	3	6	6	7	8
PLUG (DEAD END)		32	45	59	70	83	107	129	151	214	246	276	304
IN–LINE VALVE		32	45	45	45	45	56	65	80	110	125	140	155
TEE (BRANCH RESTRAINT)	4"x Ø	23	–	–	–	–	–	–	–	–	–	–	–
	6"x Ø	21	35	–	–	–	–	–	–	–	–	–	–
	8"x Ø	18	34	47	–	–	–	–	–	–	–	–	–
	10"x Ø	16	32	46	58	–	–	–	–	–	–	–	–
	12"x Ø	13	30	44	57	69	–	–	–	–	–	–	–
	16"x Ø	7	26	41	55	67	90	–	–	–	–	–	–
	20"x Ø	1	21	38	52	65	88	109	–	–	–	–	–
	24"x Ø	1	16	34	49	62	86	108	129	–	–	–	–
	30"x Ø	1	8	28	44	58	83	106	127	208	–	–	–
	36"x Ø	1	1	22	39	54	80	103	124	206	240	–	–
	42"x Ø	1	1	15	33	49	77	100	122	205	239	270	–
	48"x Ø	1	1	7	27	44	73	97	120	203	238	269	298
REDUCER (LARGER PIPE RESTRAINT)	6"x Ø	23	–	–	–	–	–	–	–	–	–	–	–
	8"x Ø	38	25	–	–	–	–	–	–	–	–	–	–
	10"x Ø	57	43	24	–	–	–	–	–	–	–	–	–
	12"x Ø	72	60	44	41	–	–	–	–	–	–	–	–
	16"x Ø	99	90	78	75	45	–	–	–	–	–	–	–
	20"x Ø	123	116	107	105	81	45	–	–	–	–	–	–
	24"x Ø	146	140	132	131	111	82	45	–	–	–	–	–
200psi	30"x Ø	209	204	197	188	177	153	116	75	–	–	–	–
	36"x Ø	243	236	233	226	217	196	168	135	74	–	–	–
	42"x Ø	273	270	265	259	252	234	211	183	133	72	–	–
	48"x Ø	301	298	294	289	283	268	249	226	183	131	71	–

NOTES:
1. THE DATA IN THE ABOVE TABLE ARE BASED UPON THE FOLLOWING INSTALLATION CONDITIONS:
SOIL TYPE–SAND TEST PRESSURE–150 PSI/200 PSI DEPTH OF BURY–3'
TRENCH TYPE–3 SAFETY FACTOR–1.5 VERTICAL OFFSET–3'
MINIMUM PIPE LENGTH ALONG TEE RUN–5'
2. THE RESTRAINED PIPE LENGTHS APPLY TO DUCTILE IRON AND PVC PIPE.
3. ALL JOINTS BETWEEN UPPER AND LOWER BENDS SHALL BE RESTRAINED.
4. RESTRAINED PIPE LENGTHS APPLY TO PIPE ON BOTH SIDES OF VALVES AND FITTINGS.

RESTRAINED JOINT INFORMATION

ENGINEERING STANDARDS 2022

REVISIONS | BY | DATE
ENGINEERING DIVISION
CITY OF POMPANO BEACH
SCALE: N.T.S.
RESTRAINED JOINT INFORMATION
DATE: FEBRUARY 2022
DWG. NO. 515-3

APPROVED PRODUCT LIST

Valve Boxes & Risers: Valve boxes shall either be a **Tyler** or **Turnbull** riser specified or an Approved equal which shall meet the following standards:

- The gap between the cover/lid and the ring that is visible when installed must be no greater than 0.11 inches.
- The wall thickness of the ring that encircles the cover/lid shall have a wall thickness of no less than 0.65 inches.
- The valve box top shall weigh no less than 22 pounds.
- The valve box bottom shall weigh no less than 27 pounds.
- The valve box lid shall weigh no less than 11 pounds.
- The 1" riser shall weight 6 pounds, 2" 9.5 pound, 3" 14 pounds and 4" 20 pounds.
- The valve box lid shall be a non - locking design with two indentations to allow for easy removal.
- The brand of valve box bid shall have an option extension kit. The weight of the extension kits shall be +/- 29 lbs for 14 inches, +/- 30 lbs for 18 inches and +/- 37 lbs for 24 inches.
- Recognizing that some manufacturers may make conforming and non-conforming boxes, or risers vendors bidding such a manufacturer are advised to avoid shipping the incorrect part. The City reserves the right to return ***at any time*** any box delivered that is non-conforming. If the non-conforming box was installed, the vendor will be responsible for the cost of removal and installation of the conforming box. Depending on the severity and frequency of this type of oversight bidders may be restricted from future bids.

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SCALE: N.T.S.
APPROVED PRODUCT LIST
DATE: SEP 2022
DWG. NO. 520-1

DIP Fittings: Mega lugs and their accessory kits shall be as manufactured by **EBAA Iron, Inc.** or an approved equal which shall meet the following Standards:

- Each gland shall include one mechanical restraining gland as manufactured by EBAA Iron, Inc, Series 1100, or equal, sacrificial zinc anode hex head caps of one - half of the number of T- head bolts in each gland pack, one rubber gasket and the proper number of T - head bolts and nuts for the mechanical joint sizes shown on the order.
- For sizes 4 to 12 inches, package all gland materials to make one joint and mark each package to specify its weight and contents.
- Each gland shall be clearly marked with a "batch serial number". The "batch serial number" will allow the utility to identify the date of manufacture, plant and identify what ladle of metal was used to cast the gland. The vendor must be able to provide metallurgical reports for any specific gland based on the "batch serial number" that must be cast into the gland. The "batch serial number" must not be encoded and easily converted using common methods, such as the Julian Day.
- Each restraining gland shall have the following weights and have no less than the number wedges listed below. All wedges will be "auto - torquing" or designed such that the nut on the actuating bolt will separate at the manufacturers intended torque for to properly set the wedge. After being set, the actuating bolts will have a smaller remaining head that will allow for the disassembly of the joint.

Size	Minimum Weight	Number of Wedges	¾" Bolt Length
4	7	2	4
6	12	3	4
8	16	3	4.5
10	24	6	4.5
12	33	8	4.5

- The restraining gland shall be properly prepared and coated with a TGIC polyester - based coating. The gripping wedges and actuating bolts shall be properly prepared and coated with a Xylan Flourpolymer coating.

ENGINEERING STANDARDS 2022

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APPROVED PRODUCT LIST
DATE: SEP 2022
DWG. NO. 520-2

Offsets, Couplings etcetera shall be as manufactured by **Tyler Products**
Or an approved equal which shall meet the following standards:

The equivalent to the ELLS, 45, offsets, couplings, etcetra that are called for in various bids shall be the Tyler Product line. Equivalents shall have the same dimensions, bolt counts and certifications as the Tyler product line.

Flange Adapters shall be as manufactured by Uniflang or EZ Flange or
An approved equal whish shall meet the following standards:

- Each fitting shall be clearly marked with a "batch serial number. The "batch serial number" will allow the utility to identify the date of manufacture, plant and identify what ladle of metal was used to cast the gland. The vendor must be able to provide metallurgical reports for any specific fitting based on the "batch serial number" that must be cast into the gland. The "batch serial number" must not be encoded and easily converted using common methods, such as the Julian Day.
- Each restraining fitting shall have the weights listed below.
- Set bolts will be "auto - torquing" or designed such that the nut on the actuating bolt will separate at the manufacturers intended torque for to properly set the wedge. After being set, the actuating bolts will have a smaller remaining head that will allow for the disassembly of the joint.

Size	Minimum Weight
4	6.3
6	8.8
8	12.9
10	23.1
12	29.5

- The fitting shall be properly prepared and coated with a TGIC polyester - based coating. The gripping wedges and actuating bolts shall be properly prepared and coated with a Xylan Flourpolymer coating.

ENGINEERING STANDARDS 2022

REVISIONS | BY | DATE
ENGINEERING DIVISION
CITY OF POMPANO BEACH
SCALE: N.T.S.
APPROVED PRODUCT LIST
DATE: MAY 2022
DWG. NO. 520-3

Stephen Botek
Digitally signed by Stephen Botek
Date: 2024.02.27 13:16:42 -05'00'

BTE REF DATE: 2-21-2024

REVISIONS
\# | DATE

STEPHEN F. BOTEK
LICENSE No. 55335
STATE OF FLORIDA
PROFESSIONAL ENGINEER
February 27, 2024

THIS DOCUMENT HAS BEEN DIGITALLY SIGNED AND SEALED BY STEPHEN F. BOTEK, P.E. ON THE DATE ADJACENT TO THE SEAL.

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

2006 2021 Celebrating 15 Years

WATER AND SANITARY SEWER DETAILS

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101 SOUTH OCEAN BOULEVARD
POMPANO BEACH, FL

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3409 NW 9th Avenue, Suite 1102, Ft. Lauderdale, FL 33309
www.botekthurlow-eng.com p: 954-568-0888 f: 954-568-0757

BTE PROJECT #: 23-0701

PROJECT DATE: 09-05-2023

SHEET #: C-7