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Scale:	Date
N.T.S.	01/27/25
Job No.	Plot Date
24-1832.00	04/22/26
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ENGINEERING STANDARDS 2025			
REVISIONS	ENGINEERING DIVISION	WATER PIPE IDENTIFICATION	
BY DATE	CITY OF POMPAO BEACH		
S.S. 01/12			DATE: JAN. 2022
S.S. 06/16			DWG. NO.
	SCALE: N.T.S.		119-1

GENERAL NOTES:

1. ALL UTILITY PIPE SHALL BE INSTALLED WITH 4"Ø MARKING BALLS PLACED EVERY 40' AND AT EVERY FITTING, FOR IDENTIFICATION AND WARNING PURPOSES, BURIED ABOVE THE PIPE AT A MAXIMUM DEPTH OF 24 INCHES OR AS APPROVED BY THE OWNER. IT SHALL BE COLOR CODED AND WORDED AS FOLLOWS:

POTABLE WATER.  
A. COLOR: BLUE PER 62-555.320(21)(b)(3) F.A.C.  
B. LETTERING: WATER  
C. FREQUENCY OF MARKER BALLS SHALL BE 145.7 Khz.  
D. THE MARKER BALLS CAN BE BURIED IN ANY ORIENTATION.

THE MARKER BALLS SHALL BE DETECTABLE BY STANDARD METAL DETECTION EQUIPMENT AND SHALL BE MANUFACTURED BY TEMPO OR 3M LOCATOR SYSTEM OR EQUIVALENT (FREQUENCY 145.7 Khz.)

2. FOR LARGE DIAMETER PIPE INSTALLED AT DEPTHS BELOW 4'-0" MARKER BALLS SHALL BE PLACED AT A MAXIMUM DEPTH OF 4'-0" BELOW GRADE \*.

TYPICAL UTILITY PIPE

GROUND LEVEL

24" (") MAX.

36" (") MIN.

\* SEE NOTE (2)

MARKER BALLS

4" MIN.

40' MAX.

WATER PIPE IDENTIFICATION

ENGINEERING STANDARDS 2025			
REVISIONS	ENGINEERING DIVISION	RESTRAINED JOINT INFORMATION	
BY DATE	CITY OF POMPAO BEACH		
S.S. 01/12			DATE: MAY 2022
S.S. 06/16			DWG. NO.
	SCALE: N.T.S.		118-3

MIN. LENGTH OF PIPE (FEET) TO BE RESTRAINED

(SOURCES: EBA IRON RESTRAINT LENGTH CALCULATION PROGRAM FOR PVC PIPE, RELEASE 3.1, AND DIPRA THRUST RESTRAINT FOR DUCTILE IRON PIPE, RELEASE 3.2)

FITTING TYPE	4"	6"	8"	10"	12"	14"	16"	20"	24"	30"	36"	42"	48"
90° HORIZ. BEND	14	20	25	30	35	45	54	62	68	112	124	135	
45° HORIZ. BEND	8	9	11	13	15	19	23	28	41	46	51	56	
22.5° HORIZ. BEND	3	4	5	6	7	9	11	13	19	22	25	27	
11.25° HORIZ. BEND	1	2	3	3	4	4	5	6	10	11	12	13	
90° VERT. OFFSET	29	41	53	64	74	95	115	134	214	246	278	304	
45° VERT. OFFSET	7	10	13	16	19	25	30	35	57	68	74	83	
22.5° VERT. OFFSET	12	19	24	29	34	39	48	58	89	102	114	126	
11.25° VERT. OFFSET	3	4	6	7	8	10	12	15	23	27	31	34	
PUBLIC (SEWER) CHD	26	43	56	71	85	107	128	151	214	246	278	304	
IN-LINE VALVE	25	43	45	45	45	56	65	85	110	125	140	153	

TEE (BRANCH RESTRAINT)

TEE (BRANCH RESTRAINT)	4"x 8"	6"x 8"	8"x 8"	10"x 8"	12"x 8"	14"x 8"	16"x 8"	18"x 8"	20"x 8"	24"x 8"	30"x 8"	36"x 8"	42"x 8"	48"x 8"
4"x 8"	23	-	-	-	-	-	-	-	-	-	-	-	-	-
6"x 8"	21	35	-	-	-	-	-	-	-	-	-	-	-	-
8"x 8"	18	34	47	-	-	-	-	-	-	-	-	-	-	-
10"x 8"	16	32	46	58	-	-	-	-	-	-	-	-	-	-
12"x 8"	13	30	44	57	69	-	-	-	-	-	-	-	-	-
14"x 8"	7	26	41	55	67	80	-	-	-	-	-	-	-	-
16"x 8"	1	21	36	52	65	86	109	-	-	-	-	-	-	-
18"x 8"	1	18	34	48	62	86	108	129	-	-	-	-	-	-
20"x 8"	1	8	28	44	58	83	108	127	208	-	-	-	-	-
24"x 8"	1	1	22	38	54	80	103	124	208	240	-	-	-	-
30"x 8"	1	1	15	33	49	67	100	123	228	238	-	-	-	-
36"x 8"	1	1	7	27	44	73	97	123	203	238	268	298	-	-
42"x 8"	1	1	1	27	44	73	97	123	203	238	268	298	-	-
48"x 8"	1	1	1	27	44	73	97	123	203	238	268	298	-	-

REDUCER (LARGER RESTRAINT)

REDUCER (LARGER RESTRAINT)	10"x 8"	12"x 8"	14"x 8"	16"x 8"	18"x 8"	20"x 8"	24"x 8"	30"x 8"	36"x 8"	42"x 8"	48"x 8"
10"x 8"	57	43	24	-	-	-	-	-	-	-	-
12"x 8"	72	60	44	41	-	-	-	-	-	-	-
14"x 8"	99	90	78	75	43	-	-	-	-	-	-
16"x 8"	123	118	107	105	81	45	-	-	-	-	-
18"x 8"	146	140	132	131	101	62	45	-	-	-	-
20"x 8"	228	224	197	188	177	153	118	75	-	-	-
24"x 8"	243	238	233	228	217	196	166	135	74	-	-
30"x 8"	273	270	265	259	252	234	211	183	153	72	-
36"x 8"	301	298	294	289	283	268	249	226	193	71	-

200gpi

NOTES:

1. THE DATA IN THE ABOVE TABLE ARE BASED UPON THE FOLLOWING INSTALLATION CONDITIONS:  
SOIL TYPE: SAND TEST PRESSURE: 150 PSI/2000 PSI DEPTH OF BURY: 3' VERTICAL OFFSET: 3'  
MINIMUM PIPE LENGTH ALONG TEE RUN: 6'

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 2025			
REVISIONS	ENGINEERING DIVISION	RESTRAINED JOINT INFORMATION	
BY DATE	CITY OF POMPAO BEACH		
S.S. 01/12			DATE: MAY 2022
S.S. 06/16			DWG. NO.
	SCALE: N.T.S.		118-2

PVC HORIZONTAL BENDS AND VERTICAL UP BENDS

PIPE SIZE (IN.)	RESTRAINED L (MINIMUM DISTANCE IN FEET FROM FITTING - EACH WAY)				
90°	45°	22.5°	11.25°		
6	26	11	6	3	53
8	33	14	7	4	68
12	46	19	10	5	96

PVC VERTICAL DOWN BEND

PIPE SIZE (IN.)	RESTRAINED L (MINIMUM DISTANCE IN FEET FROM FITTING - EACH WAY)			
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

PIPE SIZE (IN.)	RESTRAINED L (MINIMUM DISTANCE IN FEET FROM FITTING - EACH WAY)				
90°	45°	22.5°	11.25°		
12"	68	28	14	7	144
24"	119	49	24	12	258

DIP VERTICAL DOWN BEND

PIPE SIZE (IN.)	RESTRAINED L (MINIMUM DISTANCE IN FEET FROM FITTING - EACH WAY)			
90°	45°	22.5°	11.25°	
12"	144	60	29	14
24"	258	107	51	25

RESTRAINED JOINT INFORMATION

ENGINEERING STANDARDS 2025			
REVISIONS	ENGINEERING DIVISION	RESTRAINED JOINT INFORMATION	
BY DATE	CITY OF POMPAO BEACH		
S.S. 01/12			DATE: MAY 2022
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	SCALE: N.T.S.		118-1

CROSS WITH PLUG

90° BEND

TEE/WYE

DEAD END

REDUCER

45° BEND & SMALLER

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," EBA IRON, INC.

2. CONFIRM THE EXACT LENGTH OF RESTRAINING REQUIRED FOR REDUCERS, PIPE ENCASED IN POLYETHYLENE AND ENCRANCHING 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.

RESTRAINED JOINT INFORMATION

ENGINEERING STANDARDS 2025			
REVISIONS	ENGINEERING DIVISION	MIN. HORIZONTAL SEPARATION FOR POTABLE WATER	
BY DATE	CITY OF POMPAO BEACH		
S.S. 01/12			DATE: JAN. 2022
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	SCALE: N.T.S.		121-1

POTABLE WATER MAIN

REUSE WATER MAIN OR STORMWATER SEWERS OR STORMWATER FORCE MAINS

A MINIMUM HORIZONTAL SEPARATION: 3' (OUTSIDE TO OUTSIDE), SHALL BE MAINTAINED BETWEEN POTABLE WATER MAINS AND STORMWATER SEWERS, STORMWATER FORCE MAINS AND REGULATED REUSE WATER MAINS.

POTABLE WATER MAIN

EXISTING OR PROPOSED VACUUM-TYPE SANITARY SEWER

A MINIMUM HORIZONTAL SEPARATION: 3' (OUTSIDE TO OUTSIDE), SHALL BE MAINTAINED BETWEEN EXISTING OR PROPOSED VACUUM-TYPE SANITARY SEWER. \* SEE NOTE D(1)(6).

POTABLE WATER MAIN

SANITARY OR STORMWATER SEWERS AND FORCE MAINS

A MINIMUM HORIZONTAL SEPARATION OF 6' (OUTSIDE TO OUTSIDE), SHALL BE MAINTAINED BETWEEN POTABLE WATER MAINS AND EXISTING OR PROPOSED GRAVITY-OR PRESSURE-TYPE SANITARY SEWER, WASTEWATER FORCE MAIN OR NOT REGULATED REUSE WATER MAIN. \*\* SEE NOTE D(1)(C).

MINIMUM HORIZONTAL SEPARATION REQUIREMENTS FOR POTABLE WATER, REUSE, STORMWATER AND SEWER LINES

ENGINEERING STANDARDS 2025			
REVISIONS	ENGINEERING DIVISION	UTILITY CROSSINGS	
BY DATE	CITY OF POMPAO BEACH		
S.S. 01/12			DATE: JAN. 2022
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	SCALE: N.T.S.		122-1

FINISH GRADE

OBSTRUCTION

RESTRAINED JOINTS (TYP.)

36" MIN. COVER OR AS NOTED ON DRAWINGS.

45° OR 22 1/2° BENDS (L./.) (TYP.)

10' CENTER A FULL 20' LENGTH OF PIPE AT POINT OF CROSSING

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. 122-3.

6" MINIMUM CLEARANCE REQUIRED FOR WATER AND STORMWATER, SEWER MAIN CROSSINGS. SEE NOTE 2(A), ON STANDARD NO. 122-3.

FINISH GRADE

OBSTRUCTION

SLOPE TO MIN. COVER

10' CENTER A FULL 20' LENGTH OF PIPE AT THE POINT OF CROSSING

ENCASE AS REQ'D.

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 2025			
REVISIONS	ENGINEERING DIVISION	POTABLE WATER SUPPLY NOTES	
BY DATE	CITY OF POMPAO BEACH		
S.S. 01/12			DATE: JAN. 2022
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	SCALE: N.T.S.		122-2

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 (CLUMBS) "RECOMMENDED STANDARDS FOR WATER WORKS", AND CLUMBS' "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.

POTABLE WATER SUPPLY NOTES

ENGINEERING STANDARDS 2025			
REVISIONS	ENGINEERING DIVISION	UTILITY PIPE AND MARKER BALLS LOCATION	
BY DATE	CITY OF POMPAO BEACH		
S.S. 01/12			DATE: JAN. 2022
S.S. 06/16			DWG. NO.
	SCALE: N.T.S.		120-1

GROUND LEVEL

36" MIN. COVER OR OTHERWISE NOTED ON THE PLANS

24" MAX.

MARKER BALLS

40' MAX.

DEAD END

TYPICAL UTILITY PIPE

TYPICAL UTILITY PIPE

GENERAL NOTES:

1. ALL NONMETALLIC PIPE SHALL BE INSTALLED WITH 12 THIN SOLID COPPER TRACING WIRE.

2. THE MARKER BALLS MUST BE INSTALLED DIRECTLY ABOVE THE PIPE.

3. MARKER BALLS SHALL BE INSTALLED AT 40' O.C.

4. BALL COLOR CODING:  
POTABLE WATER SYSTEM: BLUE PER 62-555.320(21)(b)(3) F.A.C.

UTILITY PIPE AND MARKER BALLS LOCATION