



ENGINEERING STANDARDS 2022			
REVISONS		ENGINEERING DIVISION CITY OF POMPANO BEACH	UNDERGROUND VALVE IDENTIFICATION MARKER
BY	DATE		
S.S.	JUNE 2005		
T.W.	11-2007		
T.W.	02-2008		
S.S.	1-24-12	SCALE: N.T.S.	DATE: FEB. 2022 DWG. NO.
			115-1



ENGINEERING STANDARDS 2022			
REVISIONS		ENGINEERING DIVISION CITY OF POMPANO BEACH	TF550 INSTALLATION AND SPECIFICATION
BY	DATE		
S.S.	FEB. 2006		
T.W.	11-2007		
T.W.	07-2008		
SCALE: N.T.S.		DATE: MAY 2022	DWG. NO. 117-2



ENGINEERING STANDARDS 2022			
REVISIONS		ENGINEERING DIVISION CITY OF POMPANO BEACH	RESTRAINED JOINT INFORMATION
BY	DATE		
SCALE: N.T.S.		DATE: MAY 2022 DWG. NO.	118-1

PVC HORIZONTAL BENDS AND VERTICAL UP BENDS					
		RESTRAINED JOINT LENGTH L (MINIMUM DISTANCE IN FEET FROM FITTING - EACH WAY)			
PIPE SIZE (IN.)	BENDS				CROSS WITH PLUG DEAD END TEE /W/
	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				
	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				CROSS WITH PLUG DEAD END TEE/WYE
	90°	45°	22.5°	11.25°	
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		ENGINEERING DIVISION CITY OF POMPANO BEACH	RESTRAINED JOINT INFORMATION
BY	DATE		
		SCALE: N.T.S.	DATE: MAY 2022 DWG. NO. <b>118-2</b>

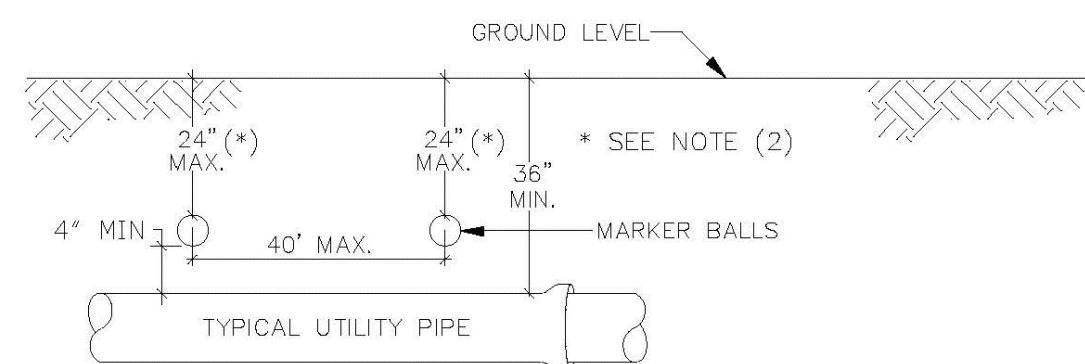
MIN. LENGTH OF PIPE (FEET) TO BE RESTRAINED (SOURCES: EBAA IRON RESTRAINT LENGTH CALCULATION PROGRAM FOR P&P PIPE, RELEASE 3.1, AND DPMR THRUST RESTRAINT FOR DUCTILE IRON PIPE RELEASE 3.2)													
FITTING TYPE	PIPE SIZE										200psi		
	4"	6"	8"	10"	12"	16"	20"	24"	30"	36"	48"	60"	144"
90° HORIZ. BEND	14	20	25	30	35	45	54	62	68	112	124	136	156
45° HORIZ. BEND	6	8	11	13	15	19	22	26	41	46	51	55	63
22.5° HORIZ. BEND	3	4	5	6	7	9	11	12	15	22	25	28	32
11.25° HORIZ. BEND	—	—	—	—	—	4	4	5	6	10	11	12	13
90° VERT. OFFSET	UPPER BEND	29	41	53	64	74	85	115	134	214	246	276	304
	LOWER BEND	7	10	13	16	19	23	30	37	66	74	83	93
45° VERT. OFFSET	UPPER BEND	12	19	24	29	34	39	48	55	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	48	55	60
	LOWER BEND	1	2	4	4	5	6	7	11	13	15	16	18
11.25° VERT. OFFSET	UPPER BEND	3	4	6	7	8	9	11	13	21	24	27	30
	LOWER BEND	—	—	—	—	—	—	—	—	—	—	—	—
PLUG (END OF PIPE)	30	45	58	70	85	107	128	151	214	246	276	304	348
IN-LINE VALVE	30	45	58	70	85	107	128	151	214	246	276	304	348
TEE (BRANCH RESTRAINT)	6" Ø	23	—	—	—	—	—	—	—	—	—	—	—
	8" Ø	21	35	—	—	—	—	—	—	—	—	—	—
	10" Ø	18	34	47	—	—	—	—	—	—	—	—	—
	12" Ø	16	30	38	58	—	—	—	—	—	—	—	—
	15" Ø	13	30	45	57	69	—	—	—	—	—	—	—
	18" Ø	7	28	41	55	67	80	—	—	—	—	—	—
	20" Ø	1	21	36	52	65	88	108	—	—	—	—	—
	24" Ø	—	16	24	37	50	63	84	109	129	—	—	—
	30" Ø	—	1	8	24	34	54	83	104	127	206	—	—
	36" Ø	—	1	1	22	30	48	80	103	124	206	240	—
42" Ø	—	1	1	15	33	48	77	100	125	203	238	270	
48" Ø	—	1	7	27	44	73	97	120	203	238	269	298	
6" Ø	23	—	—	—	—	—	—	—	—	—	—	—	
REDUCER (LARGER PIPE RESTRAINT)	10" Ø	37	45	—	—	—	—	—	—	—	—	—	—
	8" Ø	28	43	24	—	—	—	—	—	—	—	—	—
	12" Ø	7	22	60	41	—	—	—	—	—	—	—	—
	15" Ø	6	19	60	38	25	—	—	—	—	—	—	—
	20" Ø	103	116	107	105	81	45	—	—	—	—	—	—
	24" Ø	146	140	132	131	111	80	45	—	—	—	—	—
	30" Ø	209	204	197	188	177	153	116	75	—	—	—	—
	36" Ø	243	236	228	216	207	168	144	116	75	—	—	—
	42" Ø	273	270	263	259	253	234	211	183	133	72	—	—
	48" Ø	304	294	284	280	273	266	246	228	163	131	71	—
200psi													

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		ENGINEERING DIVISION CITY OF POMPANO BEACH	RESTRAINED JOINT INFORMATION
BY	DATE		
SCALE: N.T.S.		DATE: MAY 2022 DWG. NO.	118-3

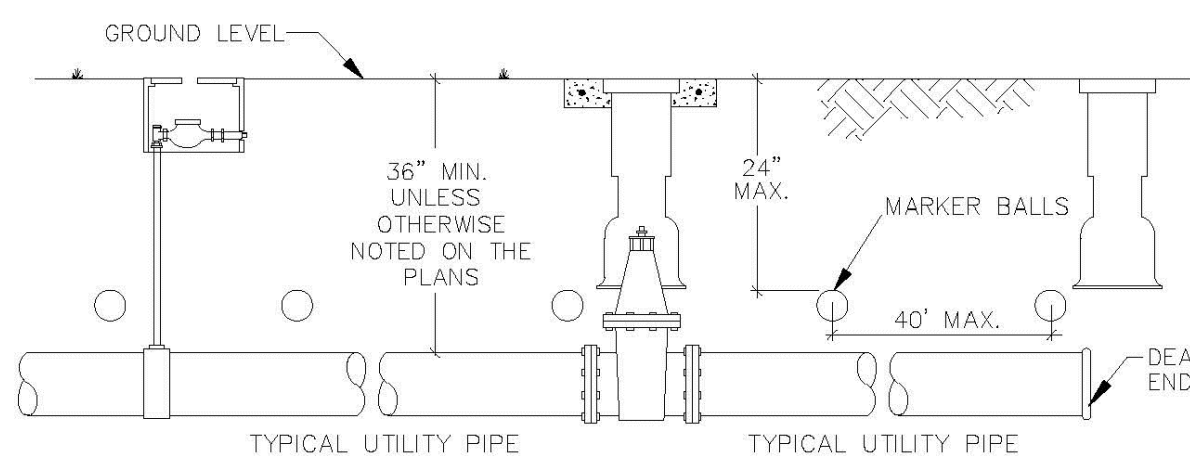


GENERAL NOTES:

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 \*

## WATER PIPE IDENTIFICATION

ENGINEERING STANDARDS 2022			
REVISONS		ENGINEERING DIVISION CITY OF POMPANO BEACH	WATER PIPE IDENTIFICATION
BY	DATE		
S.S.	01/12		
S.S.	06/16		
SCALE: N.T.S.		DATE: JAN. 2022	119-1
		DWG. NO.	

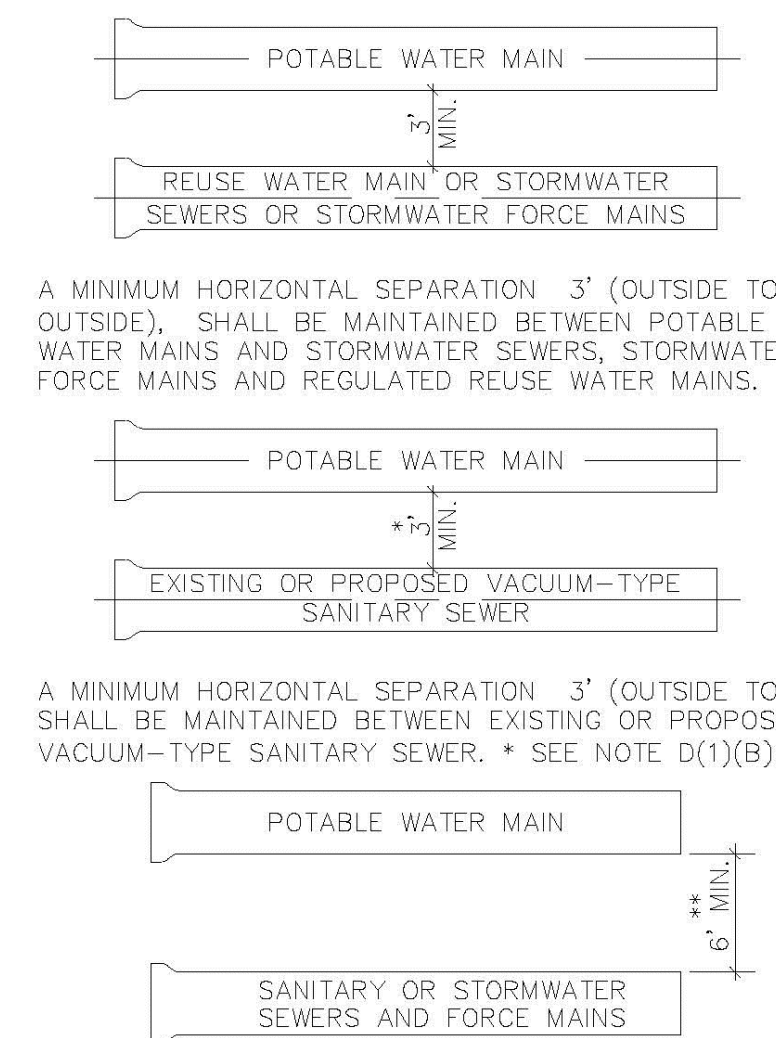


GENERAL NOTES:

1. ALL NONMETALLIC PIPE SHALL BE INSTALLED WITH 12 THHN 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

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



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).

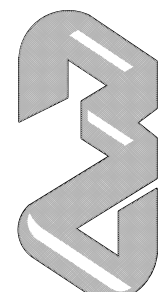
## MINIMUM HORIZONTAL SEPARATION REQUIREMENTS FOR POTABLE WATER, REUSE, STORMWATER AND SEWER LINES

ENGINEERING STANDARDS 2022			
REVISIONS		ENGINEERING DIVISION CITY OF POMPANO BEACH	MIN. HORIZONTAL SEPARATION FOR POTABLE WATER
BY	DATE		
S.S.	01/12		
SCALE: N.T.S.			DATE: JAN. 2022 DWG. NO. 121

**P&Z**

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**CAULFIELD & WHEELER, INC.**  
CIVIL ENGINEERING - LAND PLANNING  
LANDSCAPE ARCHITECTURE - SURVEYING  
7900 GLADES ROAD - SUITE 100  
BOCA RATON, FLORIDA 33434  
PHONE (561) 392-1991 / FAX (561) 750-1452



# OAKS @ PALM AIRE

## WATER DISTRIBUTION & SANITARY SEWER DETAILS

POMPAÑO REACH, FLORIDA

DATE	06/12/23
DRAWN BY	RHT
F.B./ PG.	N/A
SCALE	n.t.s.

RYAN D. WHEELER  
PROFESSIONAL ENGINEER  
LICENSE NO. 71477  
STATE OF FLORIDA  
- FOR THE FIRM -  
DATE May 20, 2025

JOB #10326  
SHT.NO.  
**WS.04**  
OF 8 SHEETS