

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/WYE
	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

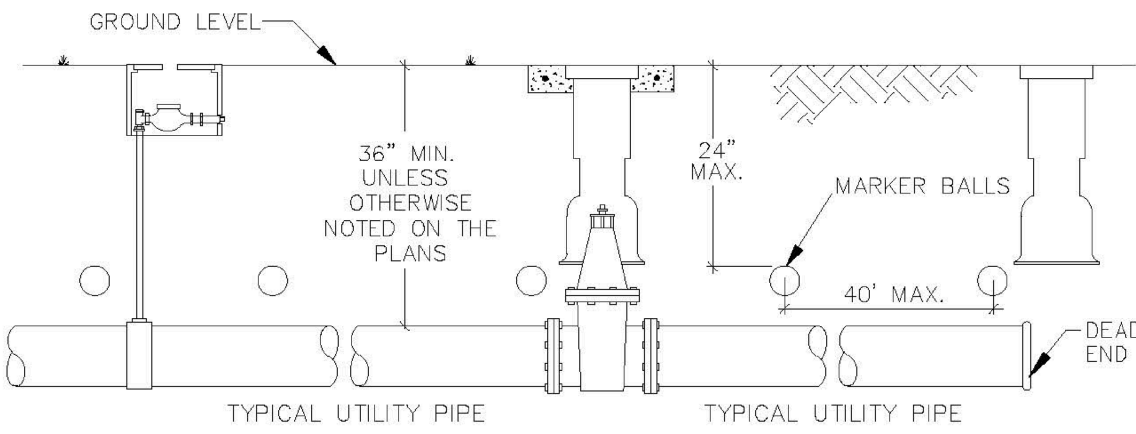
ENGINEERING STANDARDS 2022				
REVISIONS	ENGINEERING DIVISION		RESTRAINED JOINT INFORMATION	
BY DATE	CITY OF POMPAÑO BEACH		DATE: MAY 2022	
			DWG. NO.	
	SCALE: N.T.S.		118-2	

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										200psi						
	4"	6"	8"	10"	12"	16"	20"	24"	30"	36"	42"	48"					
90° HORIZ. BEND	14	20	30	30	35	45	54	62	68	112	124	136					
45° HORIZ. BEND	6	8	11	13	15	18	22	26	31	46	51	56					
22.5° HORIZ. BEND	3	4	5	6	7	9	11	12	13	22	24	27					
11.25° HORIZ. BEND	1	2	3	3	4	4	5	6	7	10	11	12					
90° VERT. OFFSET	UPPER BEND																
	29	41	53	64	74	95	116	134	154	246	276	304					
45° VERT. OFFSET	UPPER BEND																
	12	19	24	29	34	39	46	56	69	102	114	126					
22.5° VERT. OFFSET	UPPER BEND																
	3	4	6	7	8	10	12	15	16	23	27	31					
11.25° VERT. OFFSET	UPPER BEND																
	1	1	1	1	2	2	2	3	3	6	6	7					
PLUG (DEAD END)	UPPER BEND																
	32	45	59	70	83	107	129	151	174	246	276	304					
IN-LINE VALVE	32	45	45	45	45	56	65	86	110	125	140	155					
TEE (BRANCH RESTRAINT)	4" x 6"	0	23														
	6" x 6"	21	35														
	8" x 6"	18	34	47													
	10" x 6"	16	32	46	58												
	12" x 6"	13	30	44	57	69											
	15" x 6"	7	28	41	55	67	80										
	20" x 6"	1	31	38	52	65	88	109									
	24" x 6"	1	34	48	62	86	108	128									
	30" x 6"	1	8	28	44	58	83	106	127	208							
	36" x 6"	1	1	32	39	54	80	103	124	206	240						
	42" x 6"	1	1	15	33	49	77	100	125	205	238	270					
	48" x 6"	1	1	7	27	44	73	97	120	203	236	269	298				
REDUCED (LARGER PIPE RESTRAINT)	6" x 6"	33	-														
	8" x 6"	38	25	-													
	10" x 6"	57	43	54	-												
	12" x 6"	72	62	64	41	-											
	15" x 6"	89	80	78	75	45	-										
	20" x 6"	123	116	107	105	81	45	-									
200psi	24" x 6"	146	140	132	131	111	82	45	-								
	30" x 6"	209	204	197	186	177	153	118	75	-							
	36" x 6"	243	236	233	226	217	186	149	135	74	-						
	42" x 6"	273	270	265	259	252	234	211	163	133	72	-					
	48" x 6"	301	298	294	289	283	264	246	228	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 BURIAL-3'  
FRENCH TYPE-3 SAFETY FACTOR-1.5 MINIMUM PIPE LENGTH ALONG TEE RUN-5'  
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		RESTRAINED JOINT INFORMATION	
BY DATE	CITY OF POMPAÑO BEACH		DATE: MAY 2022	
			DWG. NO.	
	SCALE: N.T.S.		118-3	

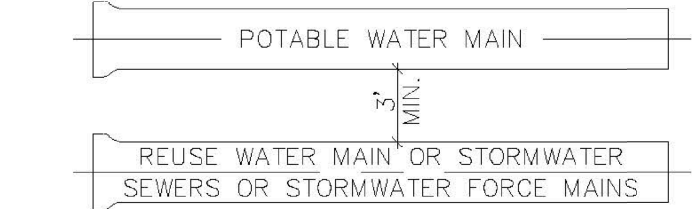


#### GENERAL NOTES:

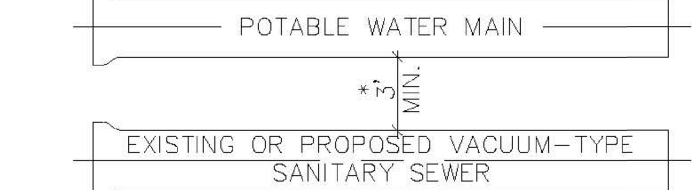
1. ALL NONMETALLIC PIPE SHALL BE INSTALLED WITH 12 THHN SOLID COPPER TRACING WIRE.
2. THE MARKER BALLS MUST BE INSTALLED DIRECTLY ABOVE THE PIPE.
3. MARKER BALLS SHALL BE INSTALLED AT 40" O.C.
4. BALL COLOR CODING:  
POTABLE WATER SYSTEM: BLUE PER 62-555.320(21)(b)(3) F.A.C.

### UTILITY PIPE AND MARKER BALLS LOCATION

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



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.



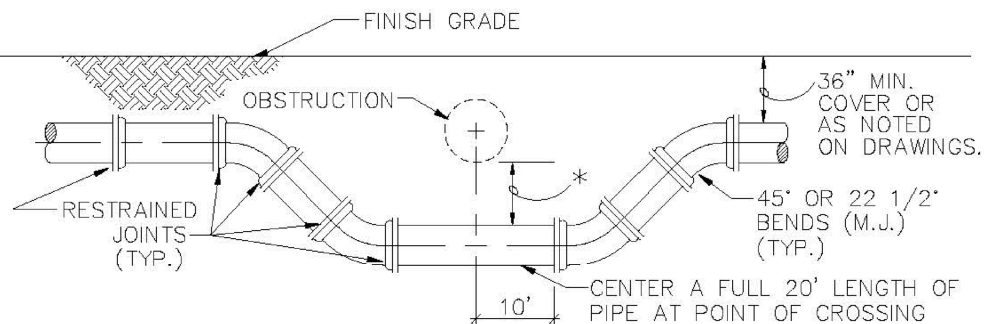
A MINIMUM HORIZONTAL SEPARATION, 3' (OUTSIDE TO OUTSIDE), SHALL BE MAINTAINED BETWEEN EXISTING OR PROPOSED VACUUM-TYPE SANITARY SEWER. \* SEE NOTE D(1)(B).



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

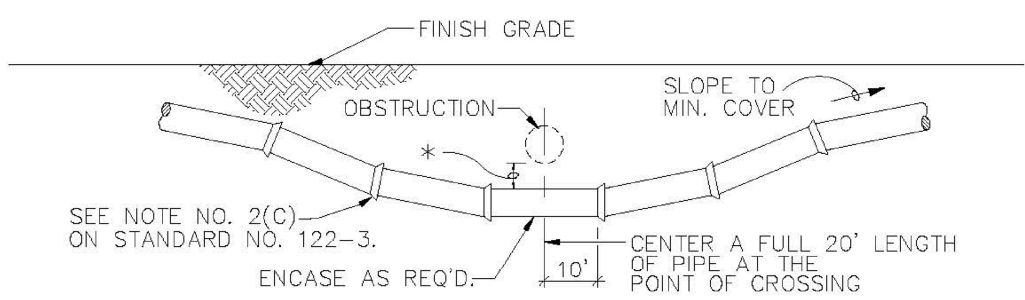
ENGINEERING STANDARDS 2022				
REVISIONS	ENGINEERING DIVISION		MIN. HORIZONTAL SEPARATION FOR POTABLE WATER	
BY DATE	CITY OF POMPAÑO BEACH		DATE: JAN. 2022	
S.S. 01/12			DWG. NO.	
	SCALE: N.T.S.		121-1	



#### 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.



#### 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	ENGINEERING DIVISION		UTILITY CROSSINGS	
BY DATE	CITY OF POMPAÑO BEACH		DATE: JAN. 2022	
S.S. 01/12			DWG. NO.	
	SCALE: N.T.S.		122-1	

### 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 THERE TO 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