MINIMUM LENGTH (FT) TO BE RESTRAINED ON EACH SIDE OF FITTING(S). *										
PVC:C-900/905	PIPE SIZE									
	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
90° BEND	33	44	56	66	78	–	98			
45° BEND	15	18	23	27	32	–	41			
22-1/2° BEND	8	9	11	14	15	–	9			
11-1/4° BEND	5	5	6	6	8	–	9			
PLUG OR BRANCH OF TEE	68	90	66	141	164	–	210			

NOTES:

1. FITTINGS SHALL BE RESTRAINED JOINT TYPE.
2. INSTALL FULL LENGTHS OF PIPE WITH TOTAL LENGTH CONTAINING ONLY RESTRAINED JOINTS EQUAL TO OR GREATER THAN LENGTH SHOWN IN TABLE.
3. WHERE TWO OR MORE FITTINGS ARE TOGETHER, USE FITTING WHICH YIELDS GREATEST LENGTH OF RESTRAINED PIPE.
4. IN LINE VALVES AND THROUGH RUN OF TEES OUTSIDE LIMITS OF RESTRAINED JOINTS FROM OTHER FITTINGS NEED NOT BE RESTRAINED UNLESS OTHERWISE INDICATED.
5. LENGTHS SHOWN IN THE TABLE HAVE BEEN CALCULATED IN ACCORDANCE WITH THE PROCEDURE OUTLINED IN "THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE" AS PUBLISHED BY DIPRA, WITH THE FOLLOWING ASSUMPTIONS:
   - * TYPE OF PIPE:_____PVC_____ _____HDPE_____
   - * WORKING PRESSURE:_____P.S.I._____ P.S.I.
   - * SOIL DESIGNATION:_____ _____
   - * LAYING CONDITIONS:_____ _____
   - * TO BE COMPLETED BY THE ENGINEER

RESTRAINED PIPE TABLE (PVC-HDPE)

CITY OF SANFORD	1999	FIG. 104A

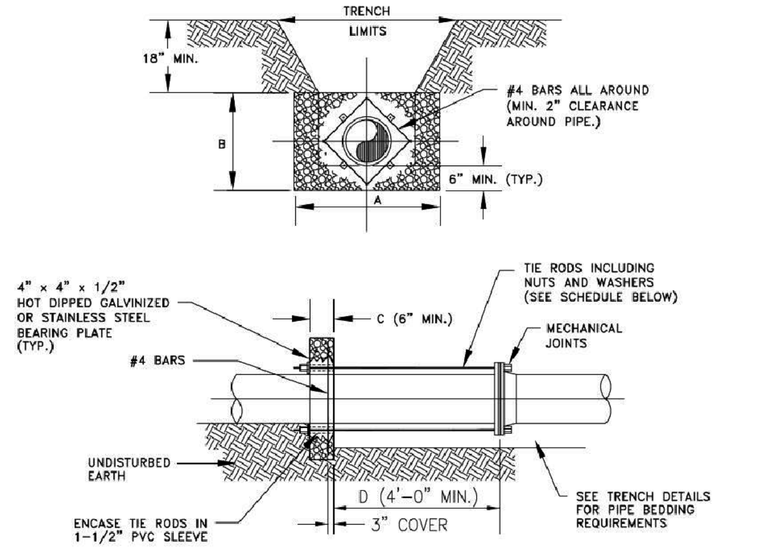
MINIMUM LENGTH (FT) TO BE RESTRAINED ON EACH SIDE OF FITTING(S). *										
DIP: CL350	PIPE SIZE									
	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
90° BEND	22	29	37	44	52	–	65			
45° BEND	10	12	15	18	21	–	27			
22-1/2° BEND	5	6	7	9	10	–	13			
11-1/4° BEND	3	3	4	4	5	–	6			
PLUG OR BRANCH OF TEE	45	60	44	94	109	–	140			

NOTES:

1. FITTINGS SHALL BE RESTRAINED JOINT TYPE.
2. INSTALL FULL LENGTHS OF PIPE WITH TOTAL LENGTH CONTAINING ONLY RESTRAINED JOINTS EQUAL TO OR GREATER THAN LENGTH SHOWN IN TABLE.
3. WHERE TWO OR MORE FITTINGS ARE TOGETHER, USE FITTING WHICH YIELDS GREATEST LENGTH OF RESTRAINED PIPE.
4. IN LINE VALVES AND THROUGH RUN OF TEES OUTSIDE LIMITS OF RESTRAINED JOINTS FROM OTHER FITTINGS NEED NOT BE RESTRAINED UNLESS OTHERWISE INDICATED.
5. LENGTHS SHOWN IN THE TABLE HAVE BEEN CALCULATED IN ACCORDANCE WITH THE PROCEDURE OUTLINED IN "THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE" AS PUBLISHED BY DIPRA, WITH THE FOLLOWING ASSUMPTIONS:
   - * TYPE OF PIPE:_____DIP_____
   - * WORKING PRESSURE:_____P.S.I.
   - * SOIL DESIGNATION:_____
   - * LAYING CONDITIONS:_____
   - * TO BE COMPLETED BY THE ENGINEER
6. FOR HDPE PIPE OR PIPE ENCASED IN POLYETHYLENE, USE VALUES GIVEN IN PARENTHESES OR INCREASE THE GIVEN VALUE BY A FACTOR OF 1.5.

RESTRAINED PIPE TABLE (DIP)

CITY OF SANFORD	1999	FIG. 104B



NOTES:

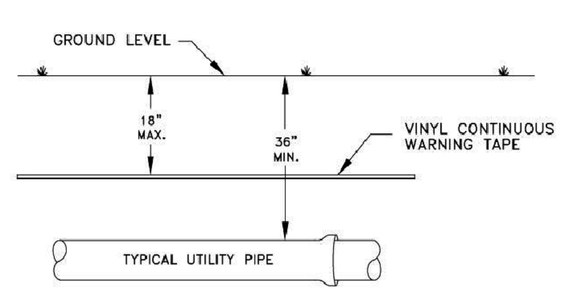
1. ADDITIONAL REINFORCEMENTS SHALL BE AS SPECIFIED BY THE ENGINEER.
2. MINIMUM COMPRESSIVE STRENGTH FOR CONCRETE SHALL BE 3000 P.S.I.
3. BEDDING, BACKFILL, AND COMPACTION SHALL BE AS SPECIFIED ELSEWHERE IN THE STANDARD DRAWINGS.
4. ALL FORM BOARDS SHALL BE REMOVED PRIOR TO BACKFILL.
5. NO ALLOWANCE SHALL BE MADE FOR FRICTION BETWEEN THE PIPE WALL AND THE THRUST COLLAR.
6. DESIGN PRESSURE:__200__P.S.I.*

SCHEDULE OF DIMENSIONS AND MATERIALS *						
PIPE SIZE (INCHES)	DIMENSIONS (ft.)				TIE RODS REQ'D	
	A	B	C	D	DIA.	NO.
6	2.5	2.5	1.0	6.0	3/4"	2
10	4.0	4.0	1.0	6.0	3/4"	2

NOTE: THRUST BLOCK AREAS TO BE COMPUTED ON BASIS OF 2000 LBS. PER SQ. FT. SOIL RESTRAINT BEARING. (1,500 MIN) SEE NOTE 5
* TO BE COMPLETED BY ENGINEER.

WATER MAIN THRUST COLLAR DETAIL

CITY OF SANFORD	1999	FIG. 105



GENERAL NOTES:

A. ALL UTILITY PIPES SHALL BE INSTALLED WITH 6 INCH WIDE VINYL CONTINUOUS NON-METALLIC TAPE, FOR IDENTIFICATION AND WARNING PURPOSES, BURIED ABOVE THE PIPE AT A MAXIMUM DEPTH OF 18 INCHES OR AS APPROVED BY THE CITY. IT SHALL BE COLOR CODED AND WORDED AS FOLLOWS:

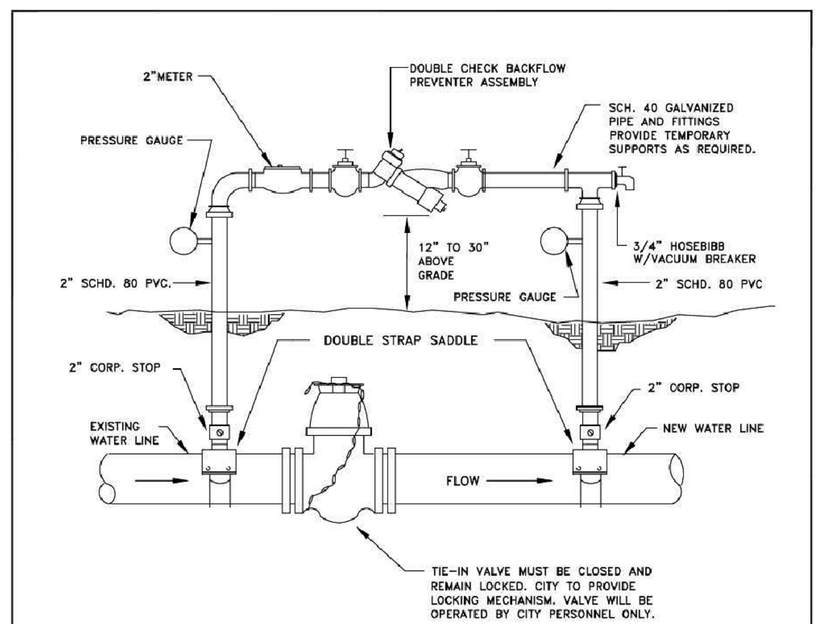
1. POTABLE WATER
   - A. COLOR: BLUE WITH BLACK LETTERING.
   - B. LETTERING: "CAUTION: WATER LINE BURIED BELOW" OR SIMILAR WORDING.
2. RECLAIMED WATER
   - A. COLOR:PURPLE WITH BLACK LETTERING.
   - B. LETTERING: "CAUTION: RECLAIMED WATER LINE BURIED BELOW" OR SIMILAR WORDING.
3. GRAVITY SEWER
   - A. COLOR: GREEN WITH BLACK LETTERING.
   - B. LETTERING: "CAUTION: SEWER LINE BURIED BELOW" OR SIMILAR WORDING.
4. SEWER FORCE MAIN
   - A. COLOR: BROWN WITH BLACK LETTERING.
   - B. LETTERING: "CAUTION: SEWER FORCE MAIN BURIED BELOW" OR SIMILAR WORDING.

B. A COLOR-CODED 14 GAUGE CONTINOUS INSULATED LOCATING WIRE SHALL BE INSTALLED ALONG ALL PRESSURIZED MAINS. THE WIRES SHALL BE LOOPED AND TIED TO ALL VALVE BOXES. (SEE FIG. 400)

UTILITY PIPE WARNING TAPE

(SEWER, POTABLE WATER, AND RECLAIMED WATER)

CITY OF SANFORD	1999	FIG. 111



NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MATERIALS, ASSEMBLY, AND THE INSTALLATION OF THE DEVICE.

TEMPORARY JUMPER CONNECTION

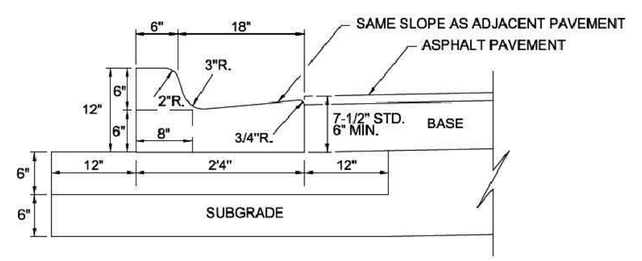
CITY OF SANFORD	1999	FIG. 504A

TEMPORARY JUMPER CONNECTION NOTES:

1. A temporary jumper connection is required at all connections between existing active water mains and proposed new water main improvements.
2. The detail above is to be used for filling any new water main of any size from existing active water mains and for flushing of new mains up to 8 INCHES IN DIAMETER (2.5 FPSminimum velocity) and for pulling bacteriological samples from any new water main of any size. The jumper connection shall be maintained until after filling, flushing, testing and disinfection of the new main has been successfully completed and clearance for use from the Florida Department of Environmental Protection (FDEP) and other pertinent agencies have been received. The jumper connection shall also be used to maintain a minimum pressure of 20 psi in the new mains after disinfection and until the FDEP clearance letter is obtained adequate. Thrust blocking and/or restraints shall be provided temporarily, as required. Pipe and fittings used for connecting the new pipe to the existing pipe shall be disinfected prior to installation in accordance with AWWA C651, 1992 edition. The tapping sleeve and the exterior of the main to be tapped shall be disinfected by spraying or swabbing per section II of AWWA C651-92.
3. Flushing of 10 inches in diameter and larger water mains may be done through the tie-in valve under very controlled conditions. The following procedures shall be followed:
   - A. The tie-in valves shall be operated and pressure tested in the presence of the utility company and engineer to verify water tightness prior to tie-in. Valves which are not water tight shall be replaced with a new valve installed immediately adjacent to the leaking valve.
   - B. The temporary jumper connection shall be constructed as detailed. The jumper connection shall be used to fill the new water main and for providing water for bacteriological sampling of the new main as required by the FDEP permit.
   - * Flushing shall not be attempted during peak demand hours of the existing water mains.
   - * All downstream valves in the system must be open prior to opening the tie-in valve.
   - * Provide for and monitor the pressure in the tie-in point. The pressure in the existing main must not drop below 35 psi.
   - * The tie-in valve shall be opened a few turns only, ensuring a pressure drop across the valve is greater than 10 psi.
   - C. The tie-in valve shall be locked closed by the utility company until flushing begins.
   - D. The tie-in valve shall be opened only for flushing of the new main. The procedure shall be directed by the utility company and observed by the engineer.
   - E. After flushing, the tie-in valve shall be closed and locked in the closed position by the utility company.
4. The contractor shall provide documentation demonstrating that the double check backflow prevention device has been tested and is in good working order at the time of installation.
5. Except as required to flush lines of greater than 8 inches in diameter, the tie-in valve shall remain closed and shall be locked in the closed position by the utility company. The tie-in valve shall remain locked closed until the new system has been cleared for use by FDEP and all other pertinent agencies.
6. Upon receipt of clearance for use from FDEP and all other pertinent agencies, the contractor shall remove the temporary jumper connection. The corporation stops are to be closed and plugged with 2 inch brass plugs.
7. All installation and maintenance of the temporary jumper connection and associated backflow prevention device, fittings, valve, etc. shall be the responsibility of the contractor.

TEMPORARY JUMPER CONNECTION

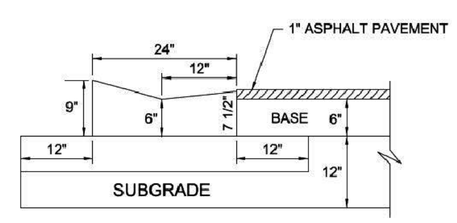
CITY OF SANFORD	1999	FIG. 504B



NOTE:

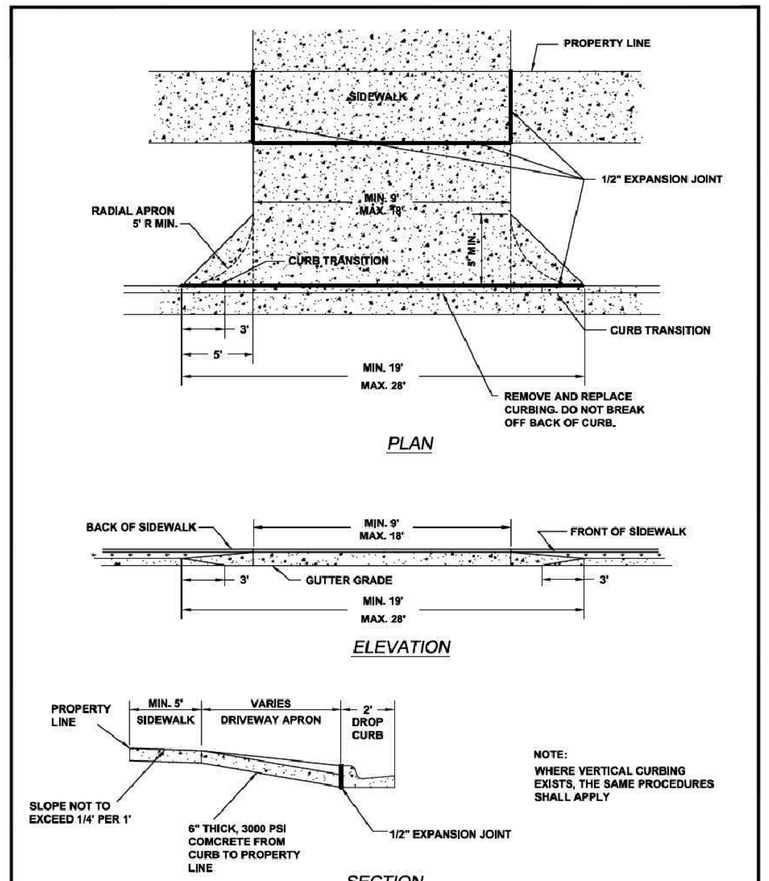
WHEN USED ON HIGH SIDE OF ROADWAYS, THE CROSS SLOPE OF THE GUTTER SHALL MATCH THE CROSS SLOPE OF THE ADJACENT PAVEMENT AND THE THICKNESS OF THE LIP SHALL BE 6", UNLESS OTHERWISE SHOWN ON PLANS.

STANDARD CURB AND GUTTER (F.D.O.T. TYPE F)



MIAMI CURBING

City of Sanford Department of Planning & Development Services	ALTERNATE CURB SECTIONS	FIGURE N-6
	Date: Drawn By:	



City of Sanford Department of Planning & Development Services	DRIVEWAY DETAIL WITH CURB & GUTTER	FIGURE N-9
	Date: Drawn By:	

Engineering Consultants, Inc.
9505 Kingsbury Court, Windermere, Florida 34786
TRANSPORTATION LAND DEVELOPMENT PUBLIC WORKS

CITY OF SANFORD
UTILITIES DEPARTMENT
SANFORD AVE. WATER MAIN EXTENSION

PROJECT #:	
DRAWN: JW	
APPROVED: JEM	
DATE: 03/26/2011	

James E. Myers, P.E.
P.E.# 44751
AUTHORIZATION# 27205

SHEET
C-11