

RELATION OF WATER MAINS TO SEWERS (TAKEN FROM 15A NCAC 18C SECTION .0906 AND 15A NCAC 2T):

LATERAL SEPARATION OF SEWERS AND WATER MAINS

- SEWER AND WATER MAINS SHALL HAVE AT LEAST A 10 FEET HORIZONTALLY SEPARATION MEASURED FROM OUTSIDE EDGE TO OUTSIDE EDGE OF PIPE.
- IF IT IS IMPOSSIBLE TO OBTAIN PROPER HORIZONTAL AND VERTICAL SEPARATION AS DESCRIBED ABOVE OR ANYTIME THE SEWER IS OVER THE WATER MAIN, BOTH THE WATER MAIN AND SEWER MUST BE CONSTRUCTED OF FERROUS PIPE COMPLYING WITH PUBLIC WATER SUPPLY DESIGN STANDARDS AND BE PRESSURE TESTED TO 150 PSI TO ASSURE WATERTIGHTNESS BEFORE BACKFILLING.
- A 24 INCH VERTICAL SEPARATION SHALL BE PROVIDED BETWEEN STORM SEWER AND SANITARY SEWER LINES OR FERROUS PIPE SPECIFIED.

CROSSING A WATER MAIN OVER A SEWER

- WHENEVER IT IS NECESSARY FOR A WATER MAIN TO CROSS OVER A SEWER, THE WATER MAIN SHALL BE LAID AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 24 INCHES ABOVE THE TOP OF THE SEWER, UNLESS LOCAL CONDITIONS OR BARRIERS PREVENT AN 24 INCH VERTICAL SEPARATION IN WHICH CASE BOTH THE WATER MAIN AND SEWER SHALL BE CONSTRUCTED OF FERROUS MATERIALS AND WITH JOINTS THAT ARE EQUIVALENT TO WATER MAIN STANDARDS FOR A DISTANCE OF 10 FEET ON EACH SIDE OF THE POINT OF CROSSING.

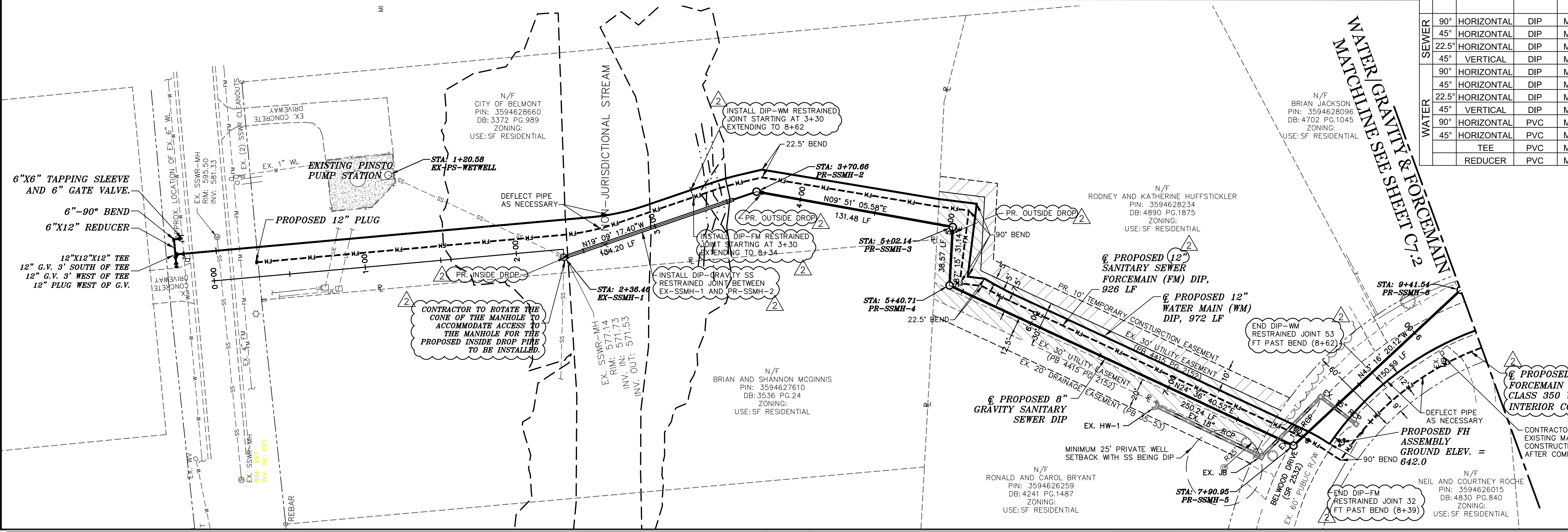
CROSSING A WATER MAIN UNDER A SEWER

- WHENEVER IT IS NECESSARY FOR A WATER MAIN TO CROSS UNDER A SEWER, BOTH THE WATER MAIN AND THE SEWER SHALL BE CONSTRUCTED OF FERROUS MATERIALS AND WITH JOINTS EQUIVALENT TO WATER MAIN STANDARDS FOR A DISTANCE OF 10 FEET ON EACH SIDE OF THE POINT OF CROSSING. A SECTION OF WATER MAIN PIPE SHALL BE CENTERED AT THE POINT OF CROSSING.

Mc² ENGINEERING
 ENGINEERING, INC.
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 CHARLOTTE, NC 28262
 PHONE 704.510.1979

Professional Engineer Seal
 License No. 29606
 Date: 9/14/19

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(R) RESTRAINED JOINT PIPE CALCULATIONS

SEWER	BEND	FITTING TYPE	PIPE MATERIAL	SOIL TYPE	SAFETY FACTOR	TRENCH TYPE	DEPTH OF BURY	TEST PRESSURE	NOMINAL SIZE	BRANCH SIZE	LENGTH ALONG RUN	RESTRAINED LENGTH
SEWER	90°	HORIZONTAL	DIP	ML	1.5	3	4'	150 PSI	12"			32 FT
	45°	HORIZONTAL	DIP	ML	1.5	3	4'	150 PSI	12"			14 FT
	22.5°	HORIZONTAL	DIP	ML	1.5	3	4'	150 PSI	12"			7 FT
	45°	VERTICAL	DIP	ML	1.5	3	4'	150 PSI	12"	HIGH SIDE 24' / LOW SIDE 14'		
WATER	90°	HORIZONTAL	DIP	ML	1.5	3	4'	200 PSI	12"			53 FT
	45°	HORIZONTAL	DIP	ML	1.5	3	4'	200 PSI	12"			22 FT
	22.5°	HORIZONTAL	DIP	ML	1.5	3	4'	200 PSI	12"			9 FT
	45°	VERTICAL	DIP	ML	1.5	3	4'	200 PSI	12"	HIGH SIDE 32' / LOW SIDE 18'		
	90°	HORIZONTAL	PVC	ML	1.5	3	3'	200 PSI	8"			53 FT
	45°	VERTICAL	PVC	ML	1.5	3	3'	200 PSI	8"			22 FT
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 SOUTH POINT ROAD
 BELMONT, NC

SHINNILLE RIDGE PARTNERS, LLC
 20607 BETHEL CHURCH ROAD
 CORNELIUS, NC 28031

WATER & SANITARY SEWER DISTRIBUTION PLAN

REVISIONS

NO.	DATE	COMMENTS
2	11/27/18	BELMONT COMMENTS

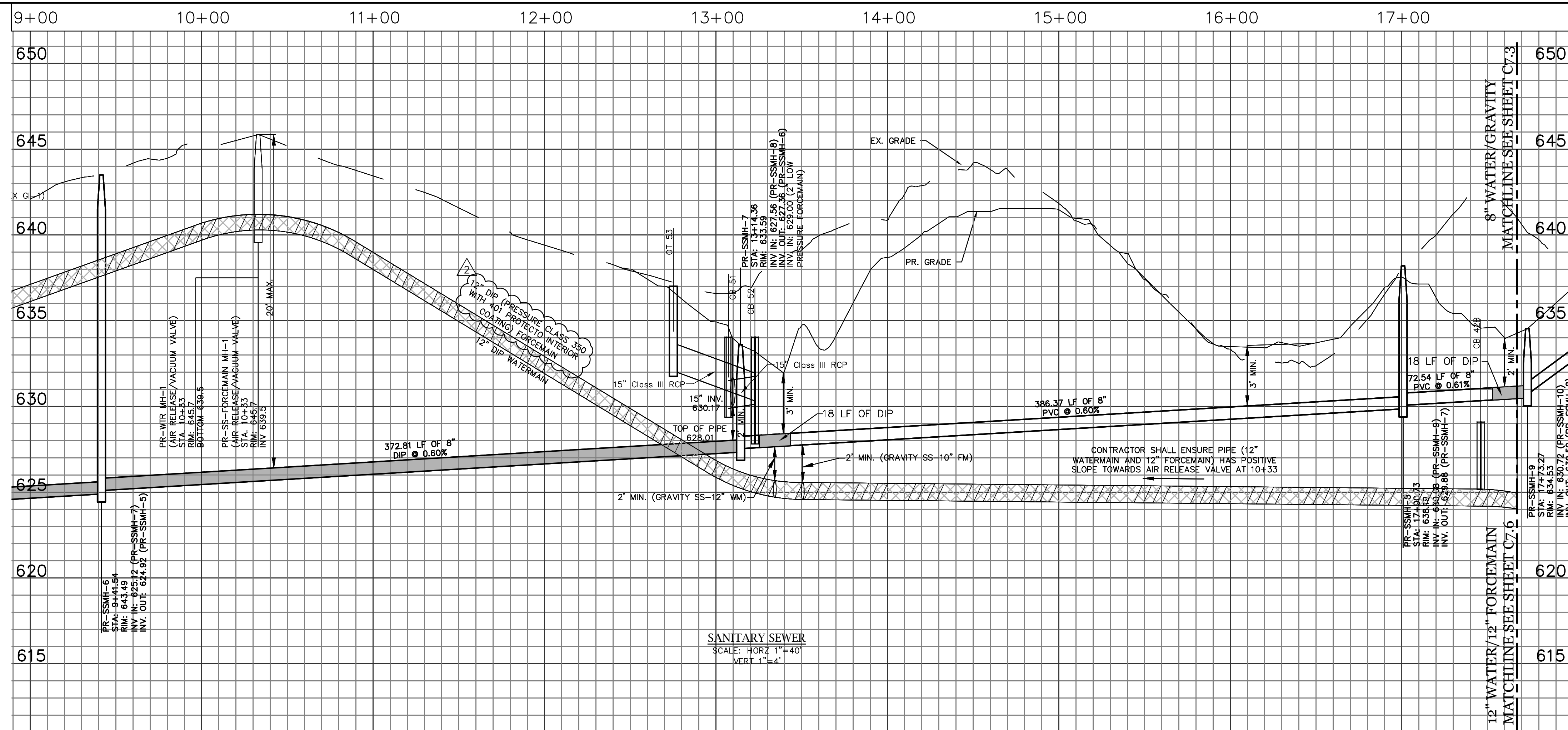
FINAL DRAWING FOR REVIEW PURPOSES ONLY

CAD FILE: 18-017 BASE.DWG
 PROJECT NO.: 18-017
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 REVIEWED BY: JDM
 DATE: OCTOBER 8, 2018

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GRAPHIC SCALE
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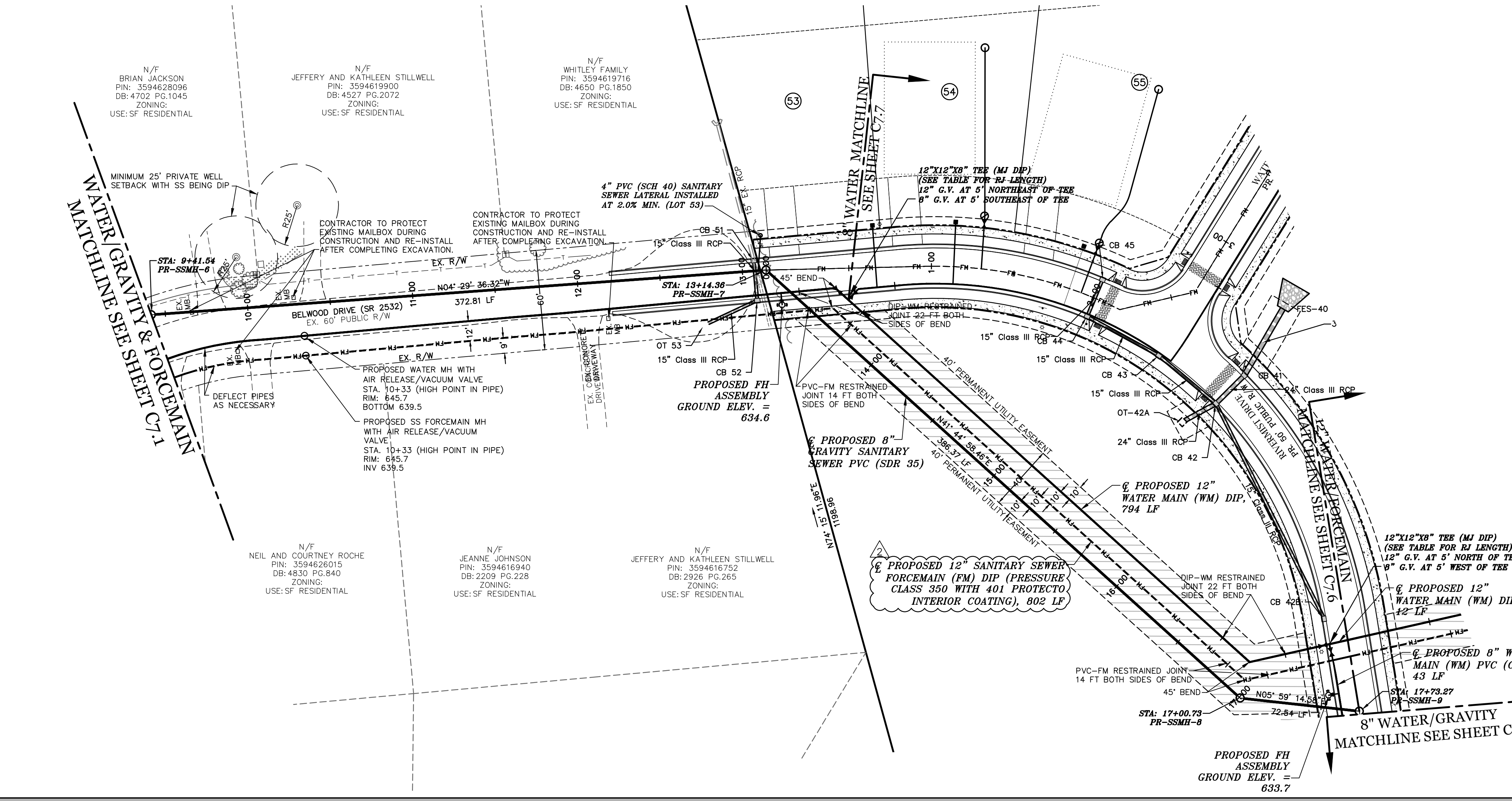
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IF 18" SEPARATION BETWEEN WATER AND STORM SEWER CONTRACTOR SHALL INSTALL PVC WATERMAIN WITH FULL LENGTH PIPE SEGMENT SO THAT THE CROSSING OCCURS AT THE MIDPOINT OF THE PIPE SEGMENT.

SANITARY SEWER LATERAL NOTE:
 ALL SANITARY SEWER LATERALS SHALL BE 4" PVC SCHEDULE 40 PIPE, OR 4" CAST IRON SOIL PIPE WHERE SEPARATIONS FROM WATER MAINS CANNOT BE MAINTAINED. SERVICES SHALL BE TERMINATED WITHIN THE 5 FOOT UTILITY EASEMENT LOCATED ACROSS THE FRONT OF THE PROPOSED LOTS. THE TERMINATION SHALL BE WITH A 4" CLEANOUT. THE SERVICE LINE SHALL BE PLUGGED AT THE CLEANOUT AND INCLUDED IN THE TESTING OF THE MAINLINE SANITARY SEWER LINE. THE CLEANOUT SHALL BE PROTECTED FROM DAMAGE WITH ORANGE FENCING DURING THE CONSTRUCTION OF THE STREET IMPROVEMENTS AND THE HOUSE. SEWER SERVICE LINES SHALL NOT BE LOCATED UNDER PROPOSED DRIVEWAY PAVEMENTS. IF UPON PERMITTING OF PROPOSED HOUSES IT IS DETERMINED THAT THE SERVICE WILL BE UNDER DRIVEWAY PAVEMENT, THE DEVELOPER WILL BE RESPONSIBLE FOR ABANDONING THE SEWER SERVICE IN ACCORDANCE WITH CITY REQUIREMENTS AND INSTALLING A NEW SEWER SERVICE IN THE CORRECT LOCATION.

WATER SERVICE NOTE:
 ALL WATER SERVICES SHALL BE 1" TYPE "K" COPPER PIPE. SERVICES INSTALLED UNDER THIS PROJECT SHALL INCLUDE THE WATER SERVICE SADDLE WITH STAINLESS STEEL STRAPS, CORPORATION STOP, COPPER PIPE, AND 1" X 3/4" REDUCING CURB STOP. THE CURB STOP SHALL BE LOCATED WITHIN THE 5 FOOT UTILITY EASEMENT LOCATED ACROSS THE FRONT OF THE PROPOSED LOTS. THE CURB STOP SHALL BE PROTECTED WITH A PLASTIC VALVE BOX AND ORANGE FENCING. WATER SERVICE LINES SHALL NOT BE LOCATED UNDER PROPOSED DRIVEWAY PAVEMENTS. IF UPON PERMITTING OF PROPOSED HOUSES IT IS DETERMINED THAT THE SERVICE WILL BE UNDER DRIVEWAY PAVEMENT, THE DEVELOPER WILL BE RESPONSIBLE FOR ABANDONING THE WATER SERVICE IN ACCORDANCE WITH CITY REQUIREMENTS AND INSTALL A NEW WATER SERVICE IN THE CORRECT LOCATION. ON A FEE BASIS, THE CITY OF BELMONT WILL INSTALLING THE METER YOKE, METER, AND METER BOX WHEN THE INDIVIDUAL LOT WATER SERVICE ACCOUNT IS ESTABLISHED. THE HOUSE BUILDER PLUMBER SHALL DIG UP AND EXPOSE THE CURB STOP AND MAKE SURE THAT THE CURB STOP IS AT THE PROPER ELEVATION PRIOR TO THE CITY INSTALLATION OF A METER.

- RELATION OF WATER MAINS TO SEWERS (TAKEN FROM 15A NCAC 18C SECTION 0906 AND 15A NCAC 21):
- LATERAL SEPARATION OF SEWERS AND WATER MAINS**
- SEWER AND WATER MAINS SHALL HAVE AT LEAST A 10 FEET HORIZONTAL SEPARATION MEASURED FROM OUTSIDE EDGE OF PIPE.
 - IF IT IS IMPOSSIBLE TO OBTAIN PROPER HORIZONTAL AND VERTICAL SEPARATION AS DESCRIBED ABOVE OR ANYTIME THE SEWER IS OVER THE WATER MAIN, BOTH THE WATER MAIN AND SEWER MUST BE CONSTRUCTED OF FERROUS PIPE COMPLYING WITH PUBLIC WATER SUPPLY DESIGN STANDARDS AND BE PRESSURE TESTED TO 150 PSI TO ASSURE WATERTIGHTNESS BEFORE BACKFILLING.
 - A 24 INCH VERTICAL SEPARATION SHALL BE PROVIDED BETWEEN STORM SEWER AND SANITARY SEWER LINES OR FERROUS PIPE SPECIFIED. CROSSING A WATER MAIN OVER A SEWER.
 - WHENEVER IT IS NECESSARY FOR A WATER MAIN TO CROSS OVER A SEWER, THE WATER MAIN SHALL BE LAID AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 24 INCHES ABOVE THE TOP OF THE SEWER UNLESS LOCAL CONDITIONS OR BARRIERS PREVENT AN 24 INCH VERTICAL SEPARATION IN WHICH CASE BOTH THE WATER MAIN AND SEWER SHALL BE CONSTRUCTED OF FERROUS MATERIALS AND WITH JOINTS THAT ARE EQUIVALENT TO WATER MAIN STANDARDS FOR A DISTANCE OF 10 FEET ON EACH SIDE OF THE POINT OF CROSSING. CROSSING A WATER MAIN UNDER A SEWER.
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Professional Engineer Seal for David M. McCallister, License No. 29606, State of North Carolina. Seal for North Carolina Professional Engineer Seal C-2630, License No. 2630, State of North Carolina.

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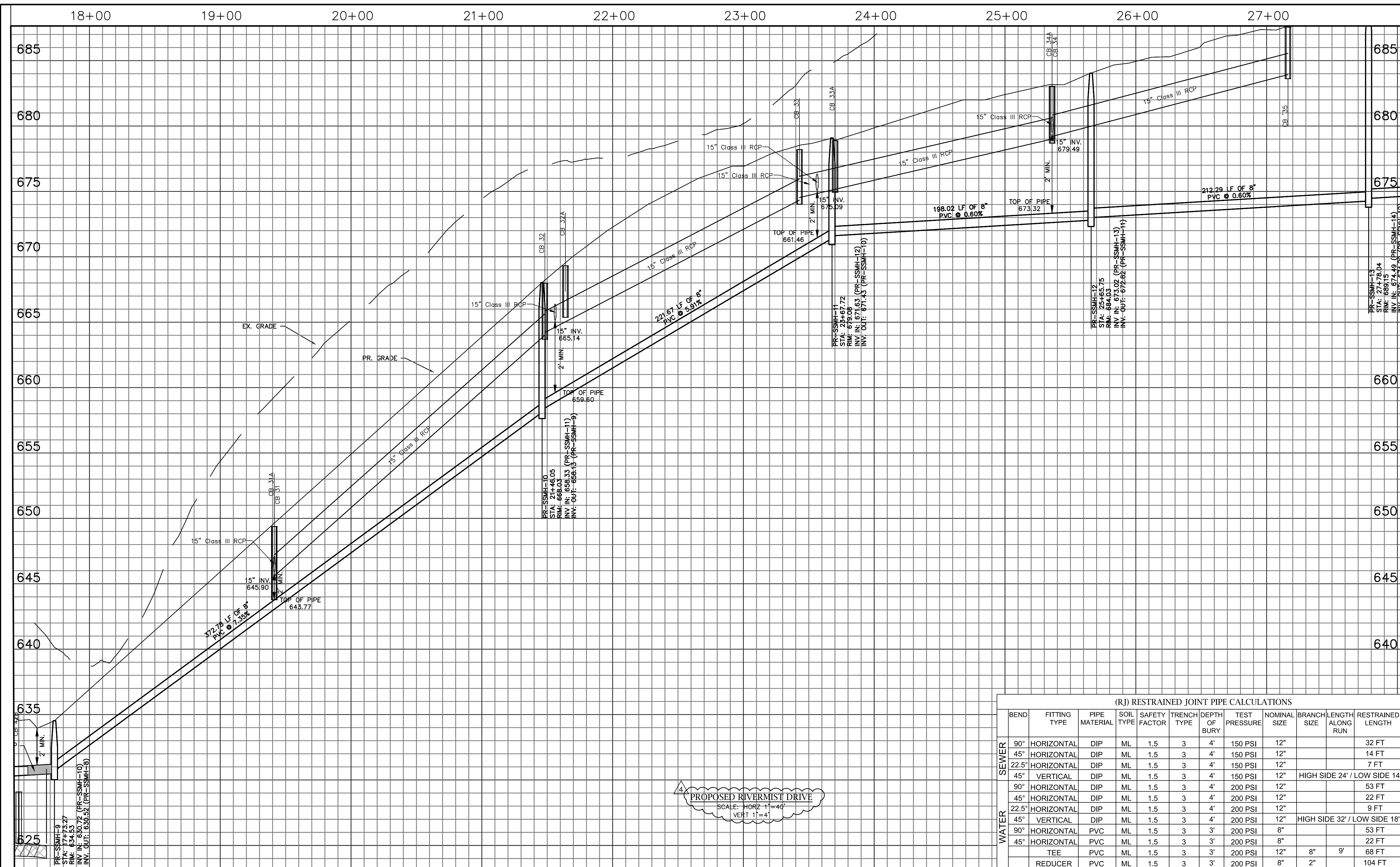
WATER & SANITARY SEWER DISTRIBUTION PLAN

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FINAL DRAWING FOR REVIEW PURPOSES ONLY
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 REVIEWED BY: JDM
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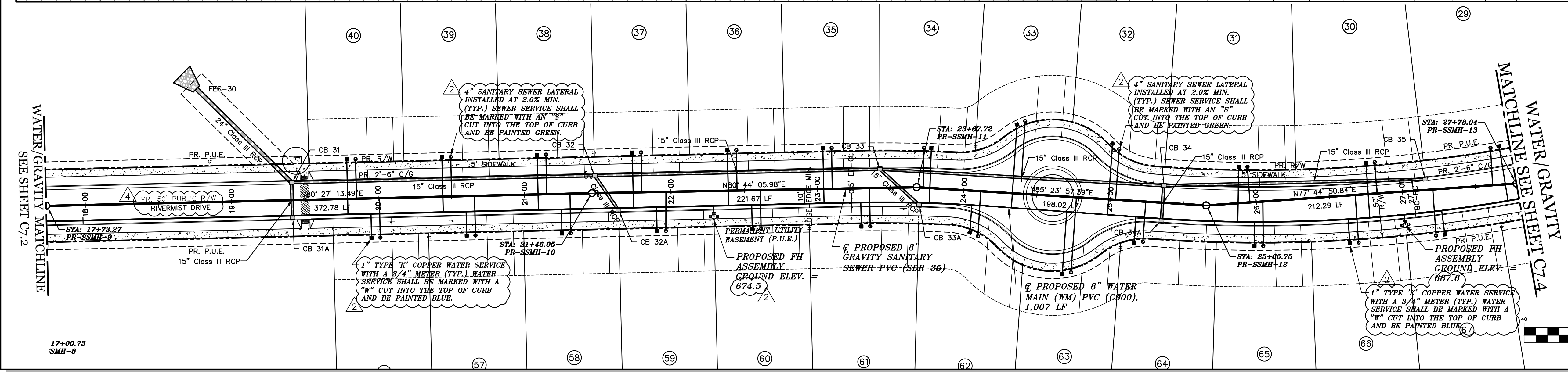
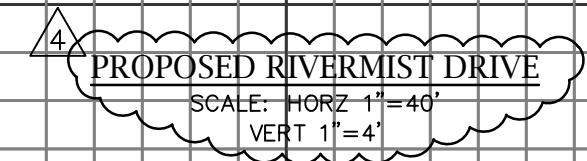
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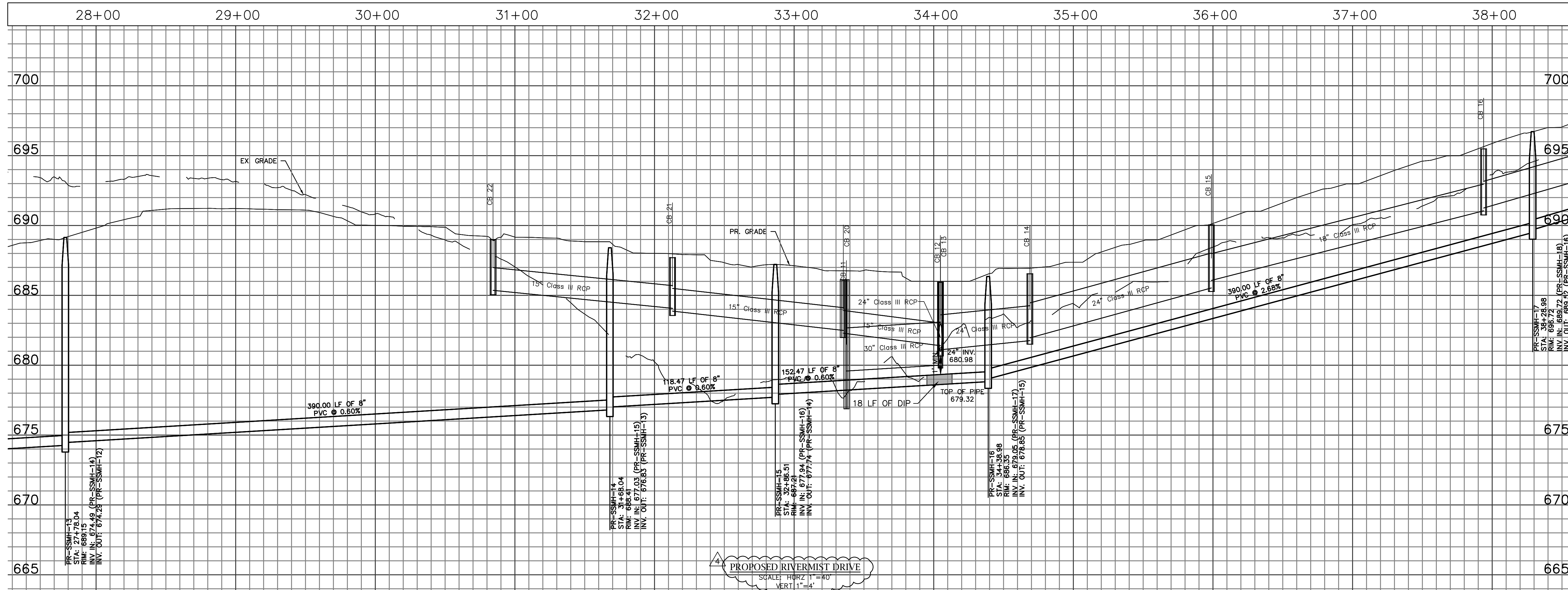
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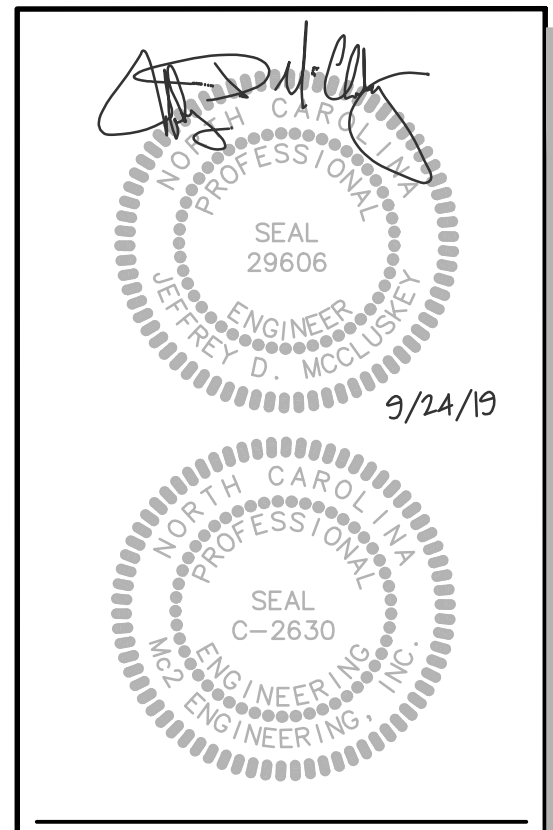
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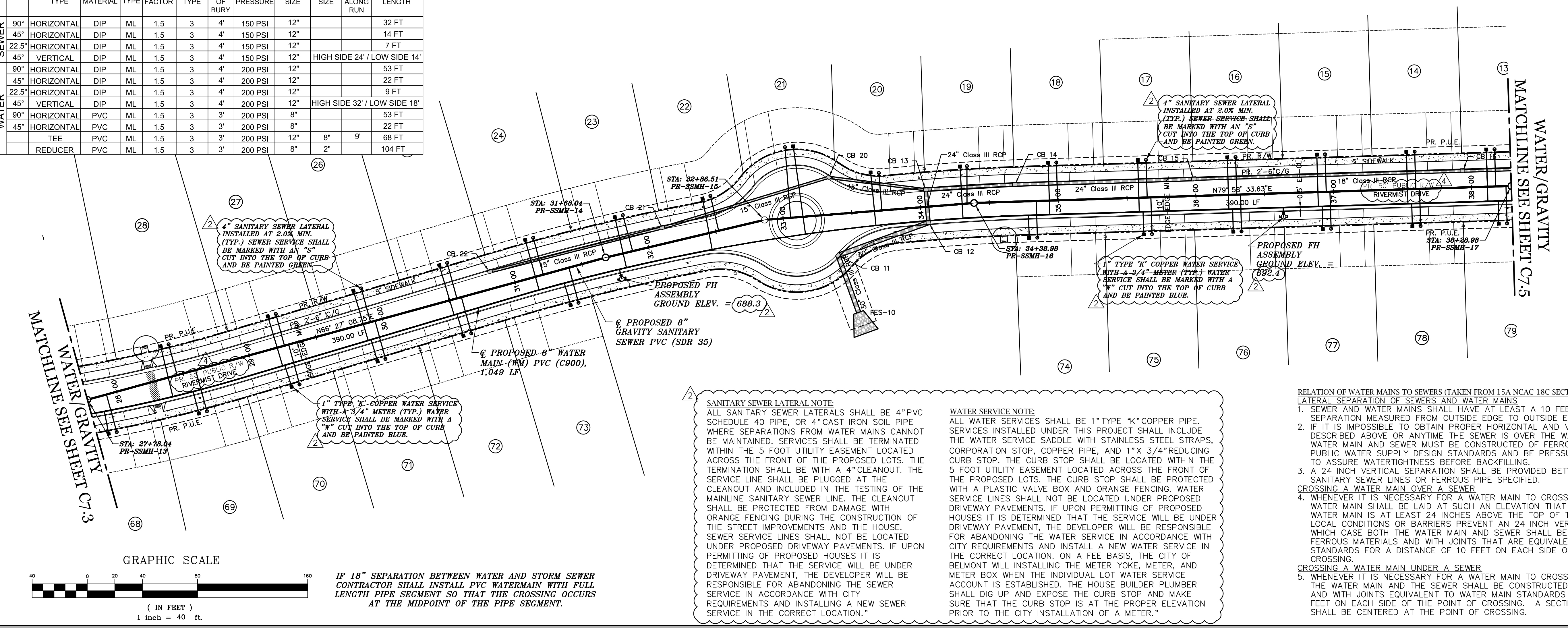
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 4. WHENEVER IT IS NECESSARY FOR A WATER MAIN TO CROSS OVER A SEWER, THE WATER MAIN SHALL BE LAID AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 24 INCHES ABOVE THE TOP OF THE SEWER, UNLESS LOCAL CONDITIONS OR BARRIERS PREVENT AN 24 INCH VERTICAL SEPARATION IN WHICH CASE BOTH THE WATER MAIN AND SEWER SHALL BE CONSTRUCTED OF FERROUS MATERIALS AND WITH JOINTS THAT ARE EQUIVALENT TO WATER MAIN STANDARDS FOR A DISTANCE OF 10 FEET ON EACH SIDE OF THE POINT OF CROSSING.
CROSSING A WATER MAIN UNDER A SEWER
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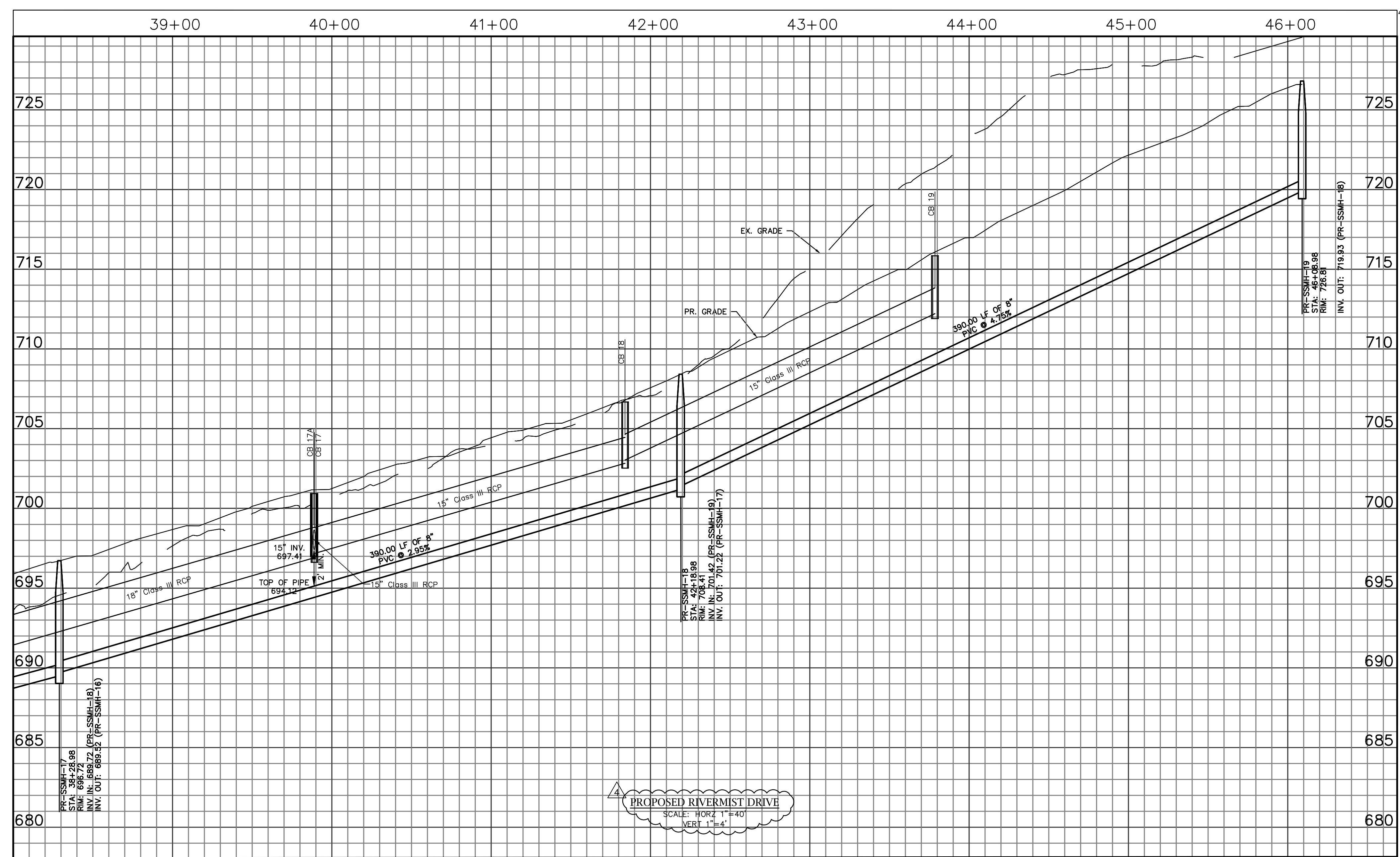
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2	11/27/18	BELMONT COMMENTS
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SANITARY SEWER LATERAL NOTE:
 ALL SANITARY SEWER LATERALS SHALL BE 4" PVC SCHEDULE 40 PIPE, OR 4" CAST IRON SOIL PIPE WHERE SEPARATIONS FROM WATER MAINS CANNOT BE MAINTAINED. SERVICES SHALL BE TERMINATED WITHIN THE 5 FOOT UTILITY EASEMENT LOCATED ACROSS THE FRONT OF THE PROPOSED LOTS. THE TERMINATION SHALL BE WITH A 4" CLEANOUT. THE SERVICE LINE SHALL BE PLUGGED AT THE CLEANOUT AND INCLUDED IN THE TESTING OF THE MAINLINE SANITARY SEWER LINE. THE CLEANOUT SHALL BE PROTECTED FROM DAMAGE WITH ORANGE FENCING DURING THE CONSTRUCTION OF THE STREET IMPROVEMENTS AND THE HOUSE. SEWER SERVICE LINES SHALL NOT BE LOCATED UNDER PROPOSED DRIVEWAY PAVEMENTS. IF UPON PERMITTING OF PROPOSED HOUSES IT IS DETERMINED THAT THE SERVICE WILL BE UNDER DRIVEWAY PAVEMENT, THE DEVELOPER WILL BE RESPONSIBLE FOR ABANDONING THE SEWER SERVICE IN ACCORDANCE WITH CITY REQUIREMENTS AND INSTALLING A NEW SEWER SERVICE IN THE CORRECT LOCATION.

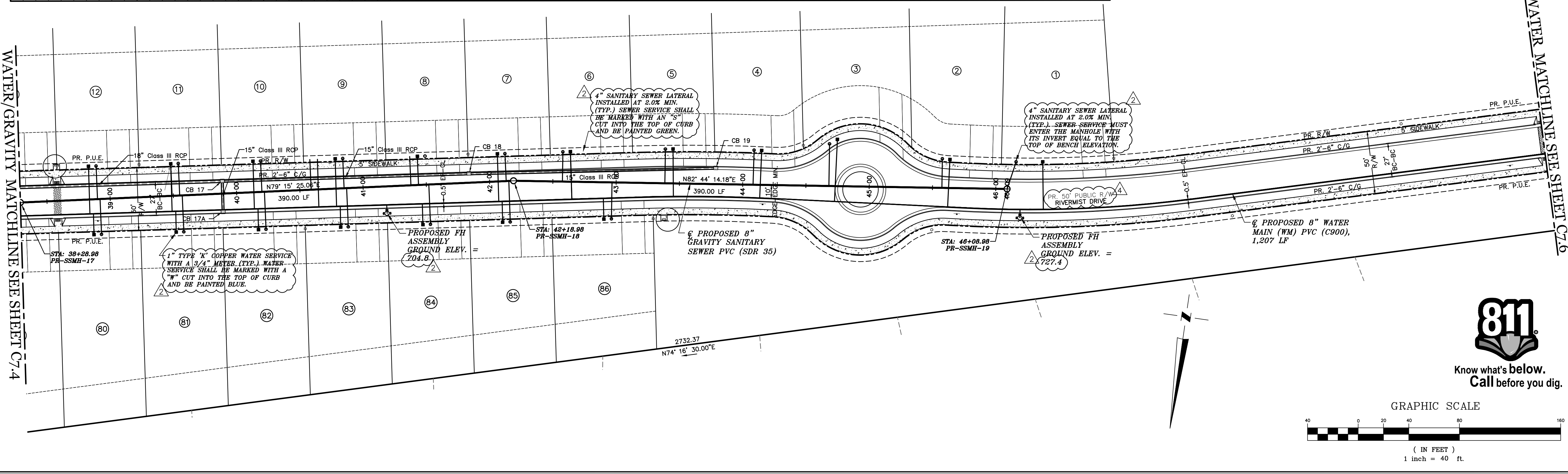
WATER SERVICE NOTE:
 ALL WATER SERVICES SHALL BE 1" TYPE "K" COPPER PIPE. SERVICES INSTALLED UNDER THIS PROJECT SHALL INCLUDE THE WATER SERVICE SADDLE WITH STAINLESS STEEL STRAPS, CORPORATION STOP, COPPER PIPE, AND 1" X 3/4" REDUCING CURB STOP. THE CURB STOP SHALL BE LOCATED WITHIN THE 5 FOOT UTILITY EASEMENT LOCATED ACROSS THE FRONT OF THE PROPOSED LOTS. THE CURB STOP SHALL BE PROTECTED WITH A PLASTIC VALVE BOX AND ORANGE FENCING. WATER SERVICE LINES SHALL NOT BE LOCATED UNDER PROPOSED DRIVEWAY PAVEMENTS. IF UPON PERMITTING OF PROPOSED HOUSES IT IS DETERMINED THAT THE SERVICE WILL BE UNDER DRIVEWAY PAVEMENT, THE DEVELOPER WILL BE RESPONSIBLE FOR ABANDONING THE WATER SERVICE IN ACCORDANCE WITH CITY REQUIREMENTS AND INSTALL A NEW WATER SERVICE IN THE CORRECT LOCATION. ON A FEE BASIS, THE CITY OF BELMONT WILL INSTALLING THE METER YOKE, METER, AND METER BOX WHEN THE INDIVIDUAL LOT WATER SERVICE ACCOUNT IS ESTABLISHED. THE HOUSE BUILDER PLUMBER SHALL DIG UP AND EXPOSE THE CURB STOP IS AT THE PROPER ELEVATION PRIOR TO THE CITY INSTALLATION OF A METER.

- RELATION OF WATER MAINS TO SEWERS (TAKEN FROM 15A NCAC 18C SECTION .0906 AND 15A NCAC 21.18 LATERAL SEPARATION OF SEWERS AND WATER MAINS)
- SEWER AND WATER MAINS SHALL HAVE AT LEAST A 10 FEET HORIZONTAL SEPARATION MEASURED FROM OUTSIDE EDGE TO OUTSIDE EDGE OF PIPE.
 - IF IT IS IMPOSSIBLE TO OBTAIN PROPER HORIZONTAL AND VERTICAL SEPARATION AS DESCRIBED ABOVE OR ANYTIME THE SEWER IS OVER THE WATER MAIN, BOTH THE WATER MAIN AND SEWER MUST BE CONSTRUCTED OF FERROUS PIPE COMPLYING WITH PUBLIC WATER SUPPLY DESIGN STANDARDS AND BE PRESSURE TESTED TO 150 PSI TO ASSURE WATERTIGHTNESS BEFORE BACKFILLING.
 - A 24 INCH VERTICAL SEPARATION SHALL BE PROVIDED BETWEEN STORM SEWER AND SANITARY SEWER LINES OR FERROUS PIPE SPECIFIED.
 - CROSSING A WATER MAIN OVER A SEWER**
 WHENEVER IT IS NECESSARY FOR A WATER MAIN TO CROSS OVER A SEWER, THE WATER MAIN SHALL BE LAID AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 24 INCHES ABOVE THE TOP OF THE SEWER, UNLESS LOCAL CONDITIONS OR BARRIERS PREVENT AN 24 INCH VERTICAL SEPARATION IN WHICH CASE BOTH THE WATER MAIN AND SEWER SHALL BE CONSTRUCTED OF FERROUS MATERIALS AND WITH JOINTS THAT ARE EQUIVALENT TO WATER MAIN STANDARDS FOR A DISTANCE OF 10 FEET ON EACH SIDE OF THE POINT OF CROSSING.
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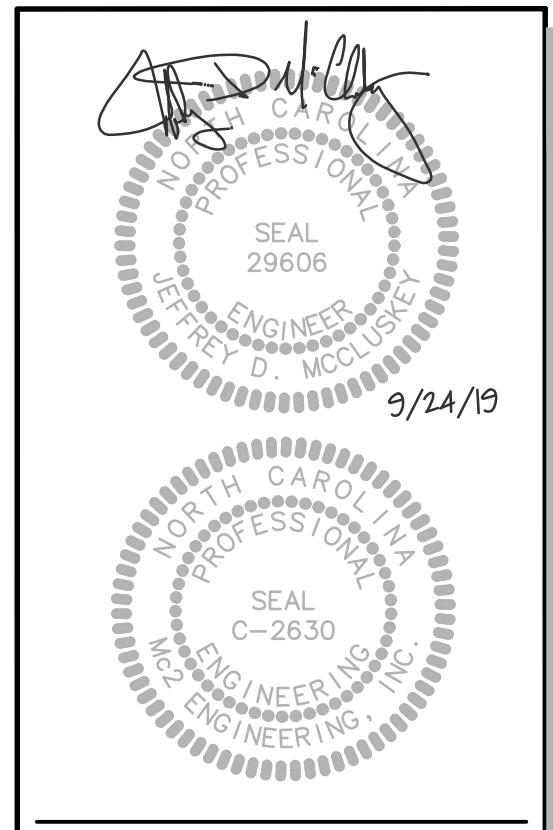
IF 18" SEPARATION BETWEEN WATER AND STORM SEWER CONTRACTOR SHALL INSTALL PVC WATERMAIN WITH FULL LENGTH PIPE SEGMENT SO THAT THE CROSSING OCCURS AT THE MIDPOINT OF THE PIPE SEGMENT.

(R) RESTRAINED JOINT PIPE CALCULATIONS

SEWER	BEND	FITTING TYPE	PIPE MATERIAL	SOIL TYPE	SAFETY FACTOR	TRENCH TYPE	DEPTH OF BURY	TEST PRESSURE	NOMINAL SIZE	BRANCH SIZE	LENGTH ALONG RUN	RESTRAINED LENGTH
SEWER	90°	HORIZONTAL	DIP	ML	1.5	3	4'	150 PSI	12"			32 FT
	45°	HORIZONTAL	DIP	ML	1.5	3	4'	150 PSI	12"			14 FT
	22.5°	HORIZONTAL	DIP	ML	1.5	3	4'	150 PSI	12"			7 FT
	45°	VERTICAL	DIP	ML	1.5	3	4'	150 PSI	12"	HIGH SIDE 24' / LOW SIDE 14'		
WATER	90°	HORIZONTAL	DIP	ML	1.5	3	4'	200 PSI	12"			53 FT
	45°	HORIZONTAL	DIP	ML	1.5	3	4'	200 PSI	12"			22 FT
	22.5°	HORIZONTAL	DIP	ML	1.5	3	4'	200 PSI	12"			9 FT
	45°	VERTICAL	DIP	ML	1.5	3	4'	200 PSI	12"	HIGH SIDE 32' / LOW SIDE 18'		
	90°	HORIZONTAL	PVC	ML	1.5	3	3'	200 PSI	8"			53 FT
	45°	HORIZONTAL	PVC	ML	1.5	3	3'	200 PSI	8"			22 FT
		TEE	PVC	ML	1.5	3	3'	200 PSI	12"	8"	9'	68 FT
		REDUCER	PVC	ML	1.5	3	3'	200 PSI	8"	2"		104 FT



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