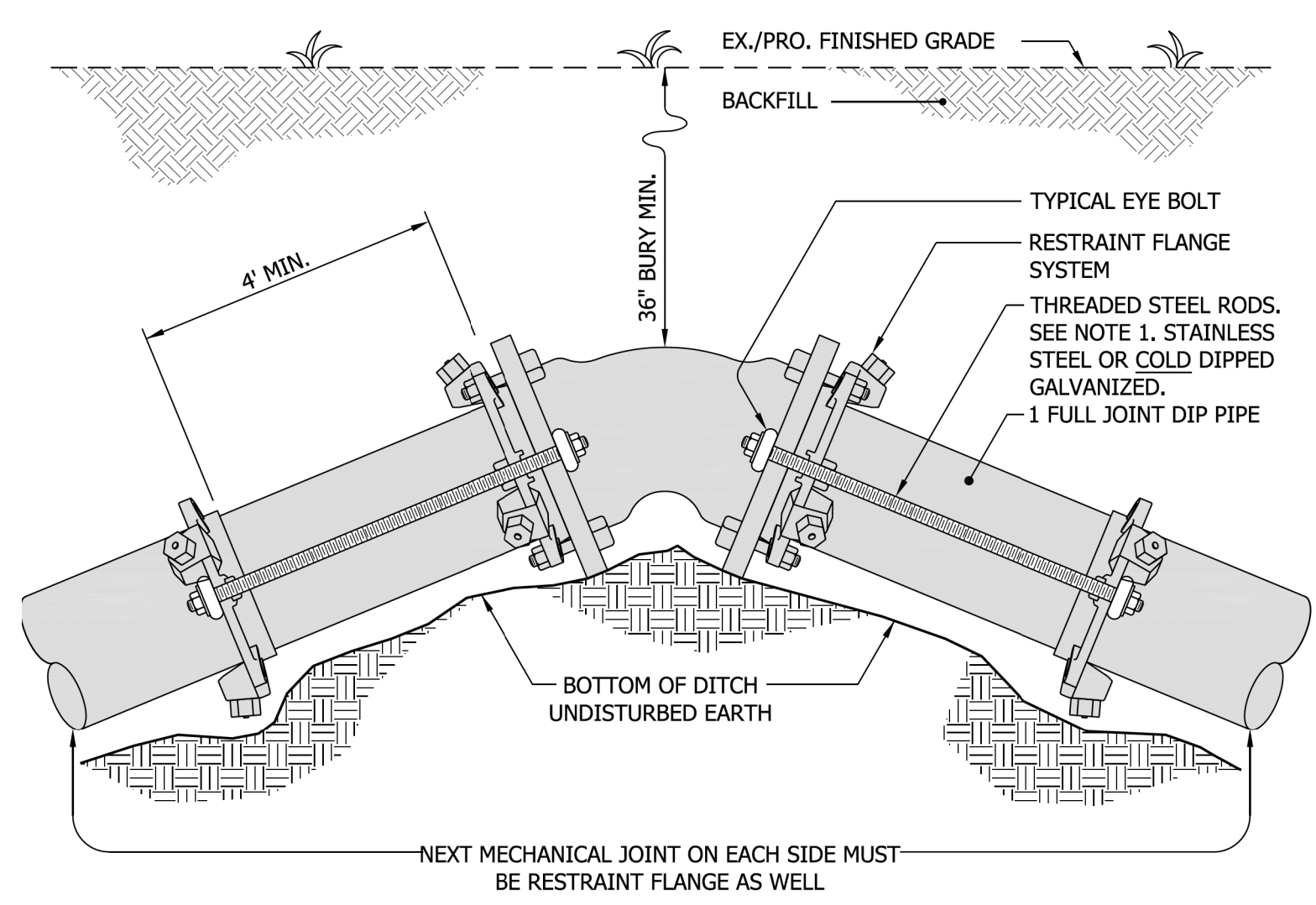


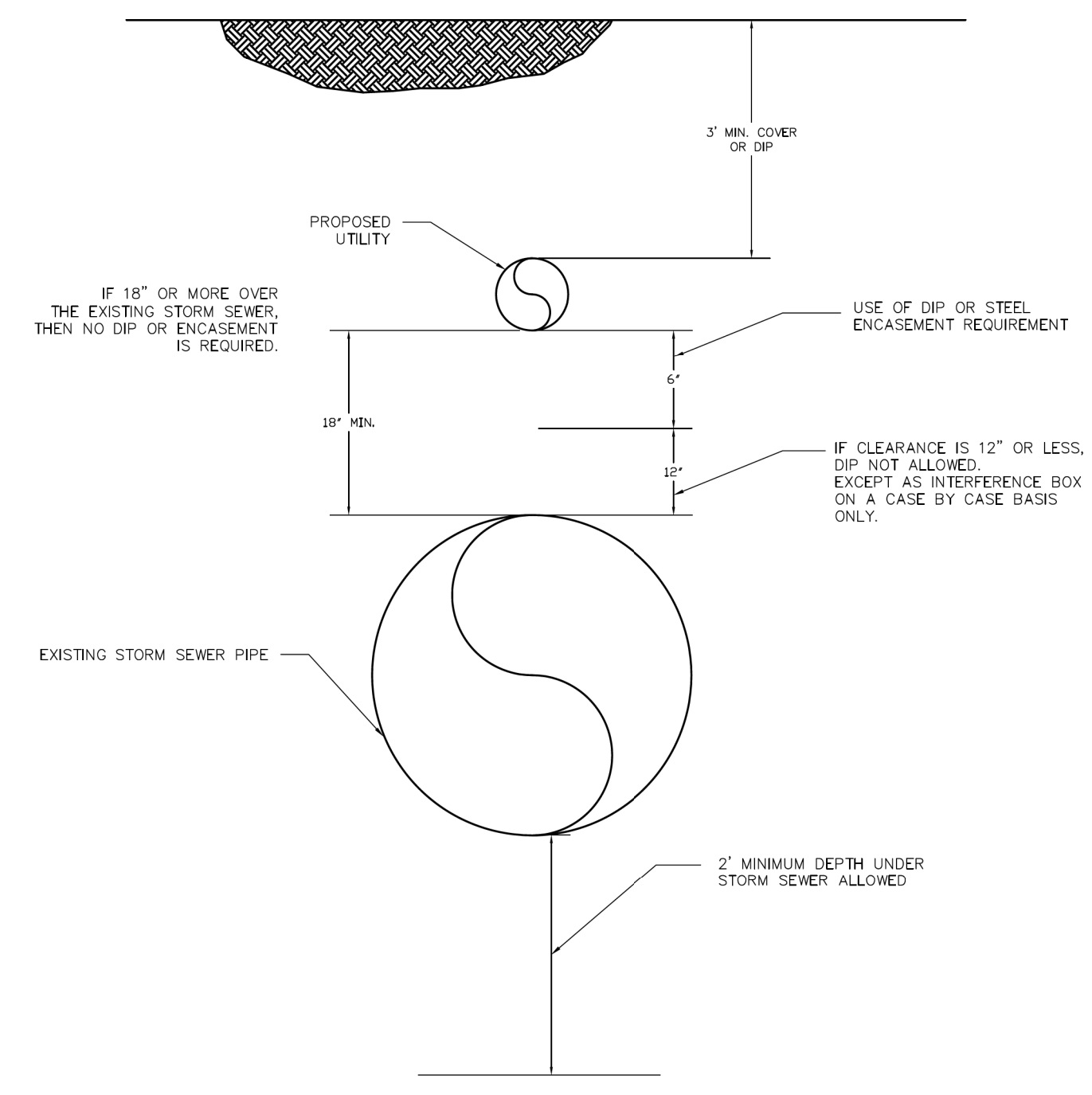
8/17/99

### TYPICAL EYE BOLT



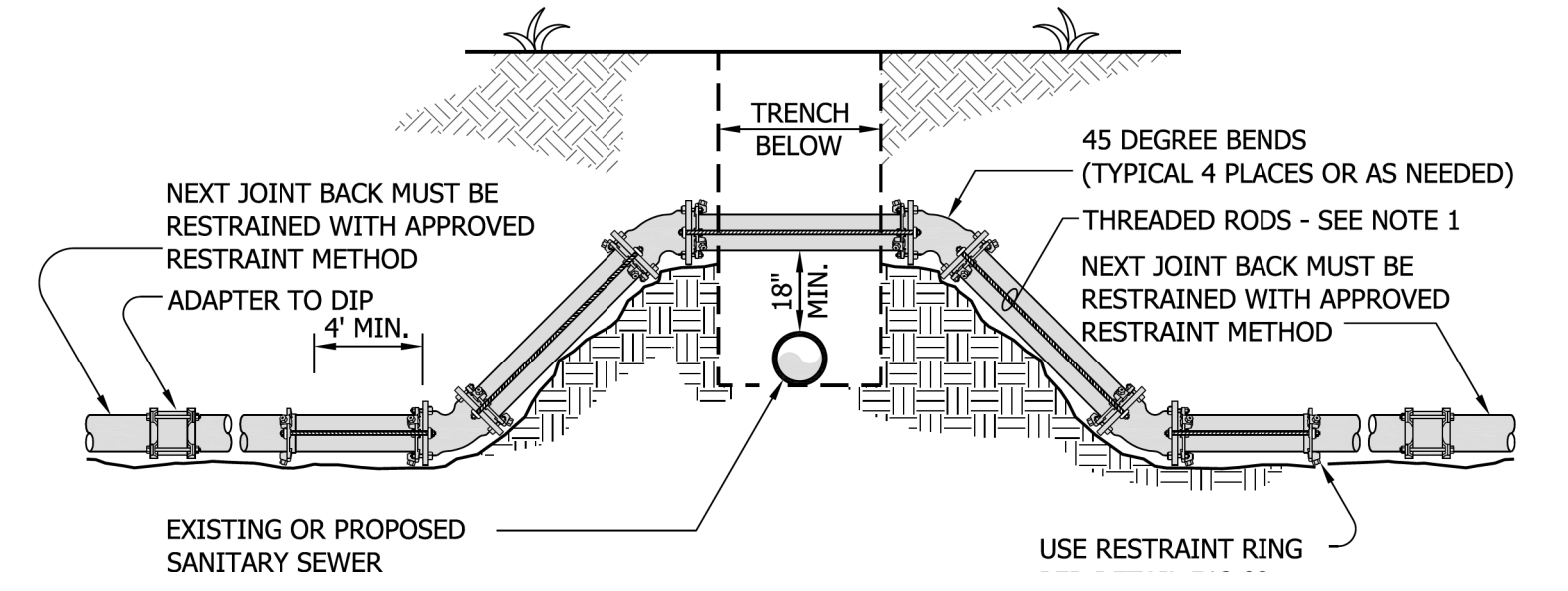
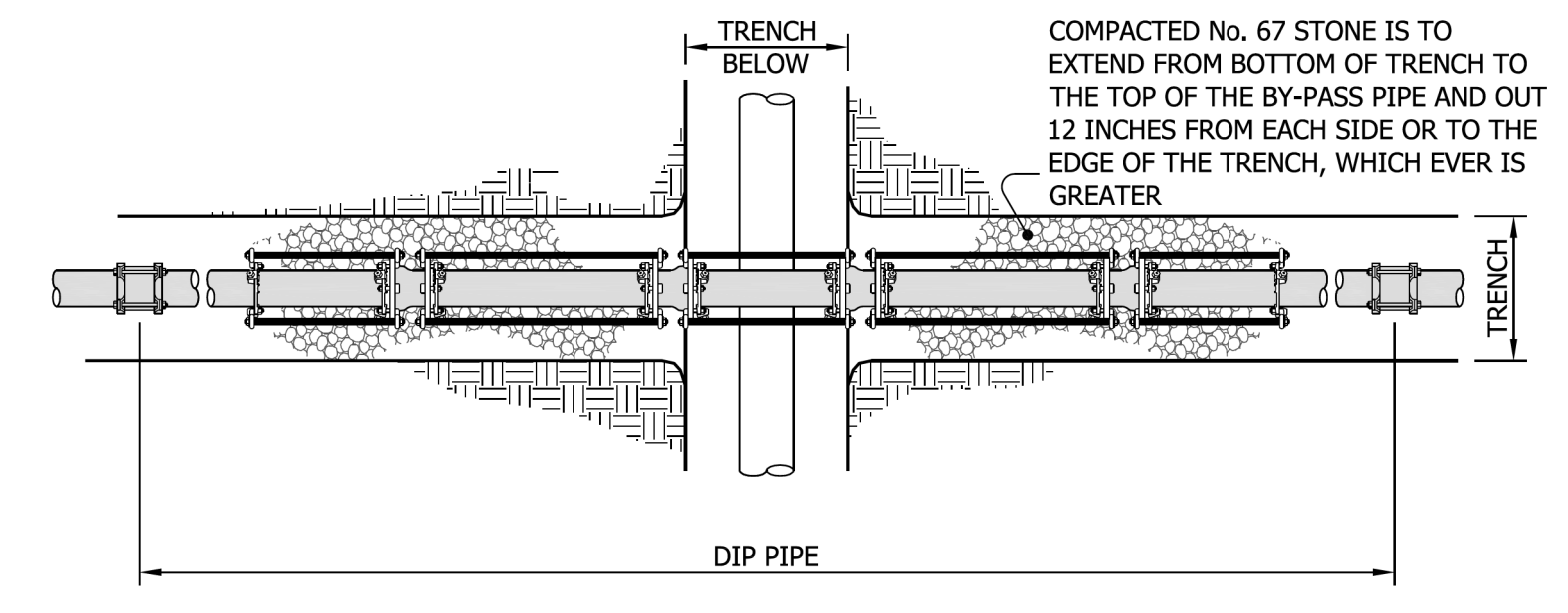
### PROFILE VIEW

- NOTES:
- USE OF GRIP RINGS IN LIEU OF RESTRAINT FLANGE SYSTEM SHALL BE PERMITTED ON A CASE BY CASE BASIS BY THE PUBLIC SERVICES DIRECTOR.



### PROPOSED UTILITY OVER EXISTING STORM SEWER

NOT TO SCALE



- NOTES:
- THE BYPASS IS TO BE ASSEMBLED ABOVE GROUND FIRST.
  - RECORD ALL AS-BUILT LENGTHS USING THE CENTER LINES OF THE PIPES OR BENDS AS REFERENCE POINTS.
  - ADAPTERS VARY IN TYPE ACCORDING TO THE MATERIAL OF THE EXISTING WATER MAIN.
  - USE OF GRIP RINGS IN LIEU OF RESTRAINT FLANGE SYSTEM SHALL BE PERMITTED ON A CASE BY CASE BASIS BY THE PUBLIC SERVICES DIRECTOR.

PROJECT REFERENCE NO. U-4906	SHEET NO. UC-3B
DESIGNED BY: SHF	
DRAWN BY: SHF	
CHECKED BY: KCZ	
APPROVED BY: KCZ	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151 UTILITY CONSTRUCTION PLANS ONLY	

### UTILITY CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**Weston Sampson** NC License: C-4647  
 WSE of North Carolina, PC  
 598 East Chatham Street Suite 137 Cary, NC 27511  
 Phone: 919.297.0220 Fax: 919.297.0221

TIE ROD ANCHORS DATUM		
PIPE SIZE (INCHES)	ROD DIAMETER	NUMBER OF A307 RODS REQUIRED
TEST PRESSURE = 150 PSI		
6	3/4"	2
8	3/4"	2
10	3/4"	2
12	3/4"	4
16	3/4"	6
20	3/4"	8
24	3/4"	8
30	1"	10
TEST PRESSURE = 200 PSI		
6	3/4"	2
8	3/4"	2
10	3/4"	4
12	3/4"	6
16	3/4"	8
20	3/4"	12
24	3/4"	10
30	1"	14

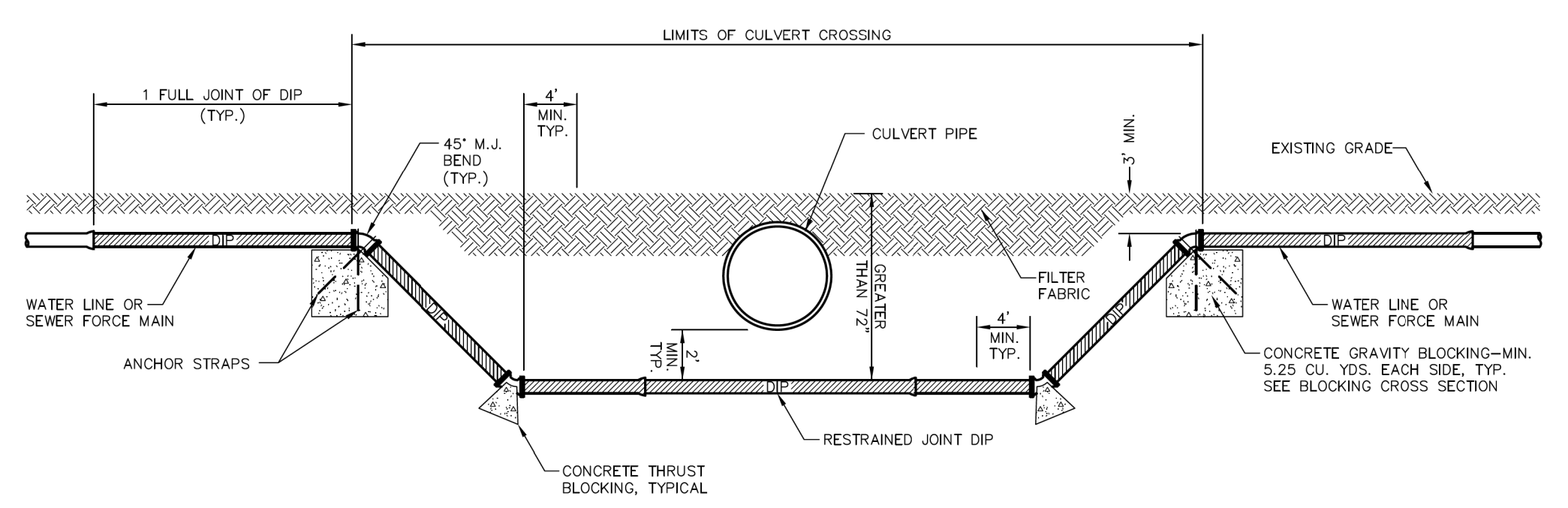
STAINLESS STEEL OR COLD-DIPPED GALVANIZED ASTM A307 TIE RODS

### STANDARD VERTICAL BEND DETAIL

NOT TO SCALE

### WATER BYPASS FOR DEEPLY BURIED WATER LINES

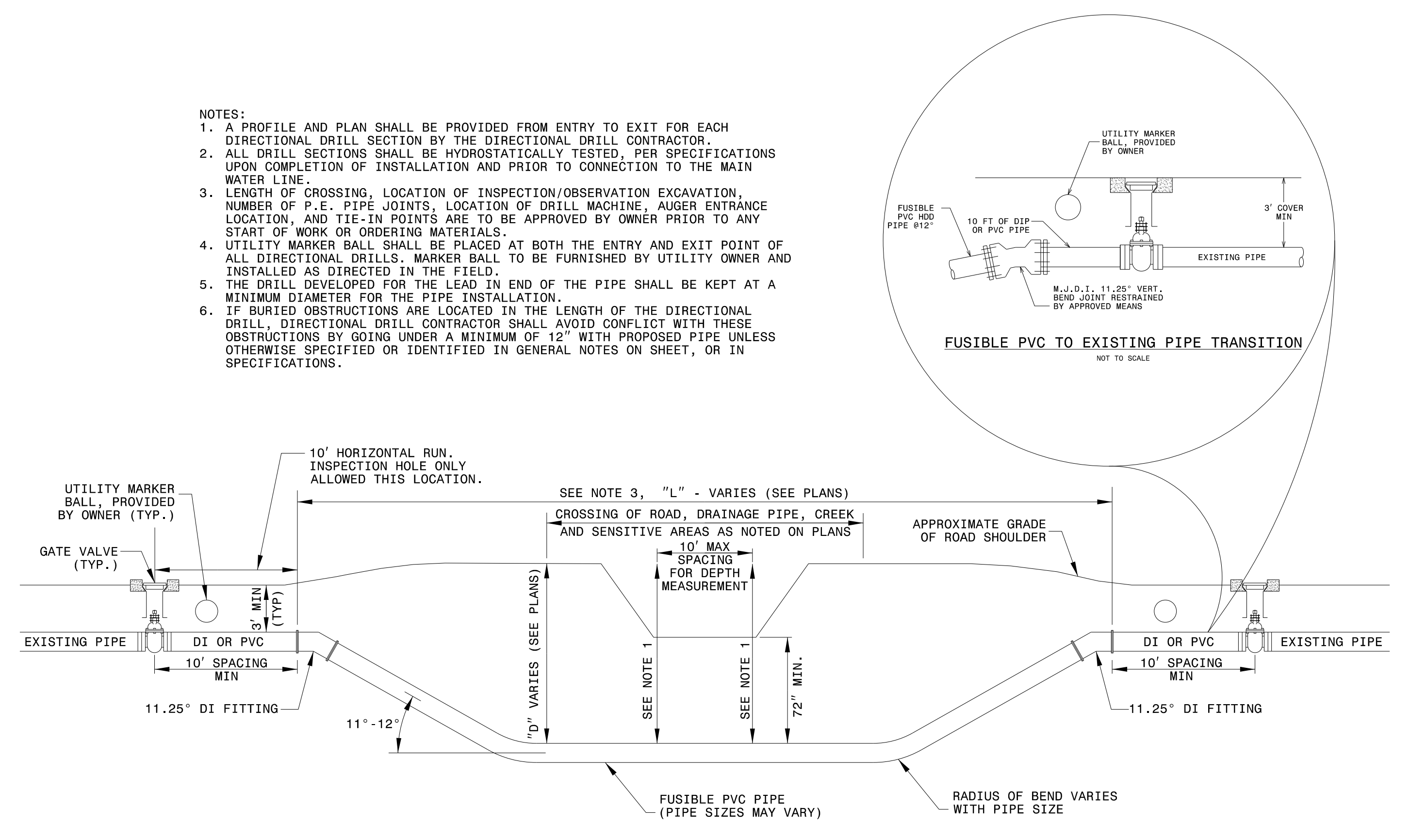
NOT TO SCALE



- NOTES:
- ONLY FULL 18" OR 20" JOINTS OF DUCTILE IRON PIPE SHALL BE USED ON EACH SIDE OF UPPER BENDS, UNLESS OTHERWISE APPROVED.
  - IF APPROVED FOR USE, RESTRAINING RODS SHALL BE STAINLESS STEEL OR GALVANIZED RODS WITH FIELD-APPLIED BITUMINOUS COATING.
  - PIPE UPSTREAM AND DOWNSTREAM OF UPPER BENDS, UNDER CREEK, AND BETWEEN UPPER BENDS TO BE RESTRAINED JOINT D.I.P.
  - THRUST AND GRAVITY BLOCKING NOT REQUIRED ON GRAVITY SEWER LINE.
  - EACH FITTING SHALL BE SECURED BY TWO FORMS OF RESTRAINT. RESTRAINING GLANDS AND CONCRETE THRUST BLOCKING ARE PREFERRED. WEDGE-ACTION RESTRAINT GLANDS (i.e. MEGALUGS) ARE APPROVED ONLY FOR USE ON DUCTILE IRON PIPE. FULL-CIRCUMFERENTIAL PIPE RESTRAINT GLANDS (i.e. GRIP RINGS) MAY BE USED ON PVC OR DUCTILE IRON PIPE. ALL RESTRAINT GLANDS SHALL BE SPECIFICALLY DESIGNED FOR USE ON THE TYPE OF PIPE FOR WHICH THEY ARE BEING INSTALLED. OTHER FORMS OF RESTRAINT SUCH AS THREADED ROD, BELL RESTRAINT, HARNESSSES, ETC. MAY BE APPROVED BY ONWASA ON A CASE-BY-CASE BASIS.

### CULVERT CROSSING GREATER THAN 72" OF COVER

NOT TO SCALE



### WATER HORIZONTAL DIRECTIONAL DRILL PROFILE

NOT TO SCALE

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DETAILS APPLY TO BOTH UTILITY OWNERS