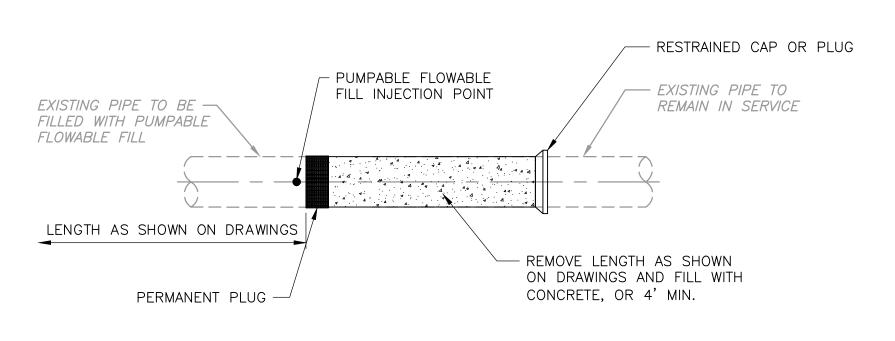
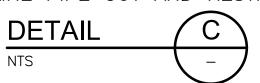
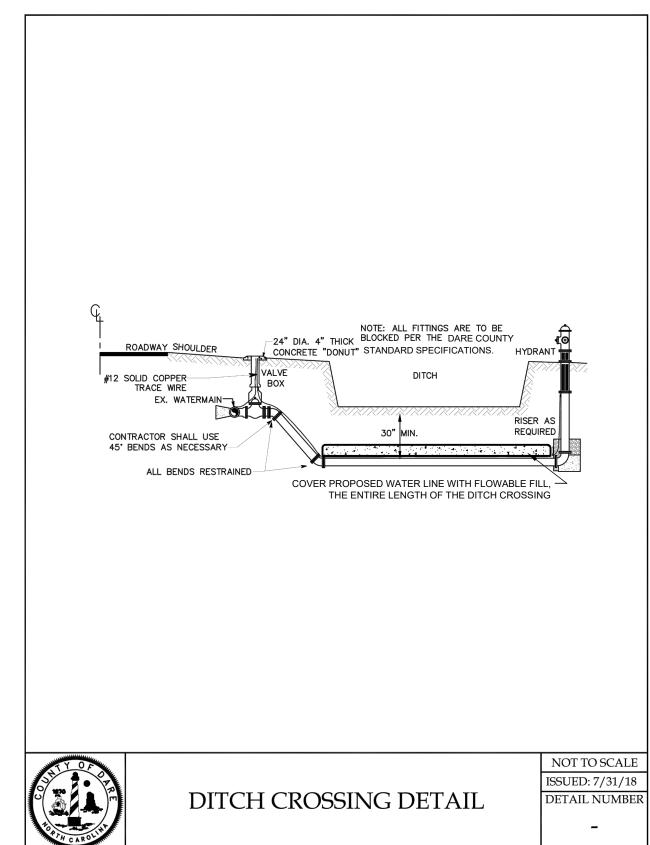


TYPICAL IN-LINE PIPE CUT AND PLUG

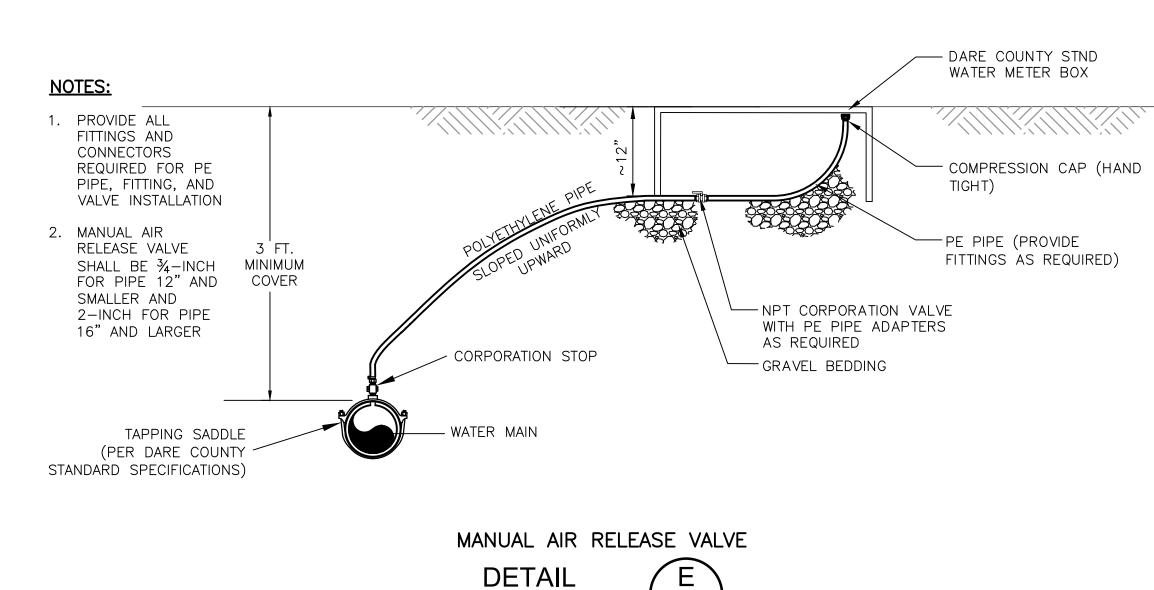


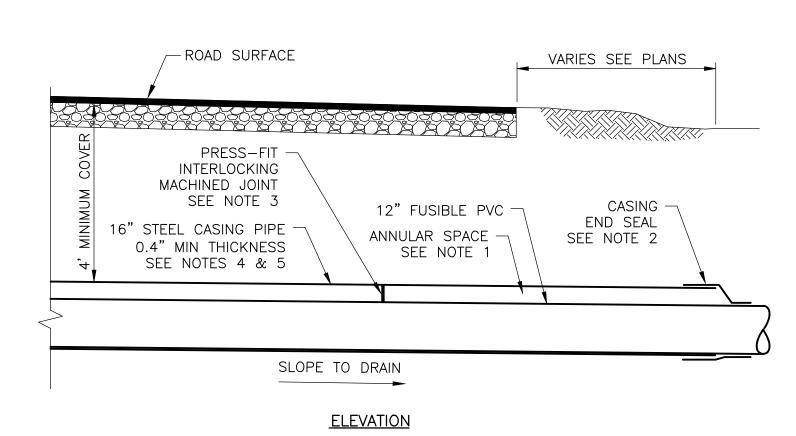
TYPICAL IN-LINE PIPE CUT AND RESTRAINED PLUG





**DETAIL** 





PROJECT REFERENCE NO.

R-5014

JDB

UTILITY CONSTRUCTION

**DOCUMENT NOT CONSIDERED FINAL** 

**UNLESS ALL SIGNATURES COMPLETED** 

DESIGNED BY: DMD

DRAWN BY: DMD/MNG

APPROVED BY: CMT

NORTH CAROLINA

TRANSPORTATION

UTILITIES ENGINEERING SEC.

PHONE: (919)707-6690 FAX: (919)250-4151

DEPARTMENT OF

CHECKED BY:

**REVISED:** 

UC-3D

TH CARO

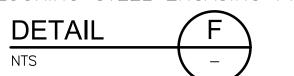
UTILITY CONSTRUCTION

PLANS ONLY

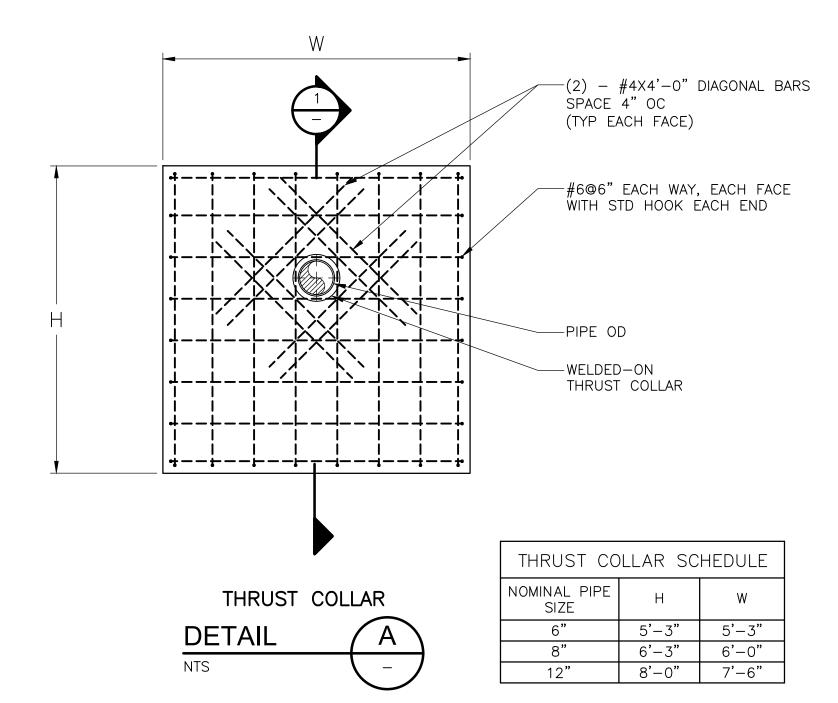
# NOTES:

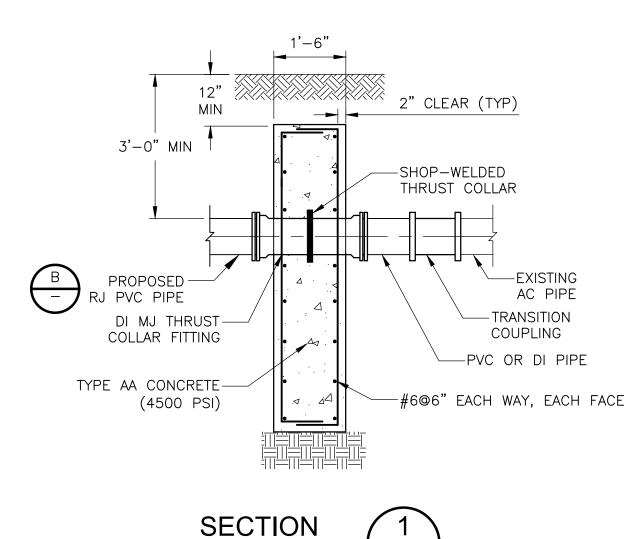
- 1. ANNULAR SPACE TO REMAIN OPEN AND SHALL NOT BE FILLED OR GROUTED.
- 2. INSTALL CASING END SEALS WITH STAINLESS STEEL BANDS AS MANUFACTURED BY PIPELINE SEAL AND INSULATOR, INC., ADVANCE PRODUCTS & SYSTEMS, LLC, WESTATLANTIC TECH, OR APPROVED EQUAL.
- 3. MACHINED JOINT SHALL BE PERMALOK AB JOINT BY NORTHWEST PIPE COMPANY, TRI-LOC BY TRINITY PRODUCTS, OR APPROVED EQUAL. MACHINED JOINT SHALL BE LEAK RESISTANT UTILIIZING A SILICONE SEALANT OR APPROVED EQUAL.
- 4. CASING PIPE TO BE INSTALLED VIA OPEN CUT ACCORDANCE WITH SPECIFICATIONS AND DETAIL F ON SHEET UC-3C.
- 5. MINIMUM ENCASEMENT PIPE THICKNESS MAY ONLY BE MODIFIED WITH STRUCTURAL DESIGN CALCULATIONS PREPARED AND STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NORTH CAROLINA. THE CALCULATIONS SHALL CERTIFY A DURABILITY AND A DESIGN LIFE OF 100 YEARS. THE CALCULATIONS SHALL INCLUDE A RATE OF CORROSION FOR STEEL PIPE BASED ON THE SUBSURFACE CONDITIONS AT EACH ENCASEMENT LOCATION. THE SUBSURFACE CONDITIONS AND RATE OF CORROSION FOR STEEL PIPE SHALL BE OBTAINED FROM SUBSURFACE TESTING AT EACH LOCATION PERFORMED AND CERTIFIED BY A GEOTECHNICAL SERVICES FIRM LICENSED IN THE STATE OF NORTH CAROLINA.

### INTERLOCKING STEEL ENCASING PIPE



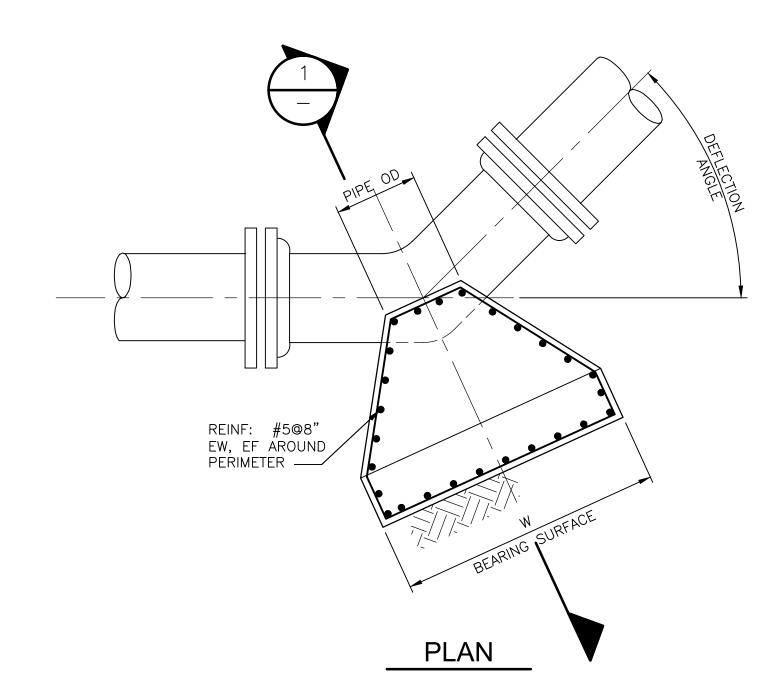


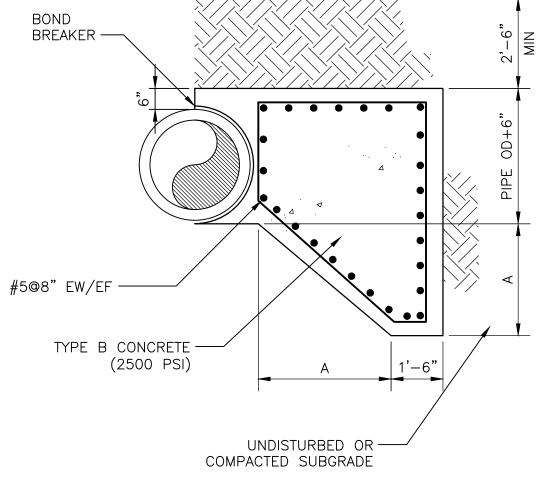




# THRUST COLLAR AND THRUST BLOCK NOTES

- 1. IF OPEN—CUT EXCAVATION IS TO BE USED FOR THE CONSTRUCTION OF A THRUST BLOCK OR COLLAR, ENGINEERED FILL SHALL BE USED AS THE BACKFILL MATERIAL. THE FOLLOWING BACKFILL RECOMMENDATIONS SHALL BE CONSIDERED A MINIMUM:
  - ENGINEERED FILL SHOULD BE UNIFORMLY COMPACTED IN 10—INCH MAXIMUM LIFTS TO AT LEAST 98 PERCENT OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY (ASTM D1557).
  - THE MOISTURE CONTENT OF THE FILL SOILS AT THE TIME OF COMPACTION SHOULD BE WITHIN 2 PERCENT OF THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY ASTM D698.
  - FLOWABLE FILL IS AN ACCEPTABLE ALTERNATIVE TO THE COMPACTION REQUIREMENTS ABOVE.
- 2. ASSUMPTIONS: PVC PIPE, SAFETY FACTOR=1.5, MAX TEST PRESSURE=200 PSI, SOIL = SP,  $\gamma$  = 100 lb/ft<sup>3</sup>, MAX BEARING STRENGTH = 1,000 LB/FT<sup>2</sup>, TOP 2' OF SOIL NEGLECTED IN CALCULATION OF SOIL BEARING CAPACITY.
- 3. THE ENTIRE THRUST BLOCK OR THRUST COLLAR SHALL BE A MONOLITHIC CONCRETE POUR WITH NO JOINTS IN THE STRUCTURE.
- -4. SONTRACTOR SHALL EMGACE AS CEOTECHMICAL SERVICES FIRM LICENSED IM THE STATES OF SHORTH CAROLINA AMD HAVES A
  -SONL BORING PERFORMED MITHINS COF EACH PROPOSED THRUST BLOCK OR COLLAR LOCATION CONTRACTOR TO SUBMIT
  -CERTIFIED BORING LOCS PERFORMED AT EACH OF THE THRUST BLOCK LOCATIONS TO THE ENGINEER: MIM DERTH OF >-20'-
- -5.^BORINGS\MUST\BE\RECEMED\PRIOR\TO\ARPROVAL\OF\CONCRETE\OR\REMINOROMIC\STEEL\SHOP\DRAWINGS!\THE\TABLE\\--SHOWW\N\DETAIL\A\MAV\MOT\BE\UTUKOBY\WITHROUT\WRITTEW\APPROVAL\FROM\THZ\ENGMERE\.
- 6. THE DIMENSIONS AND REINFORCING SHOWN ARE THE BASE BID AND MAY BE MODIFIED BY THE ENGINEER TO SUIT FIELD CONDITIONS.
- -2MYCHMAS/MINION/SOCIAL PARTINES/SOCIAL PARTINES/SOCIAL PARTINES/SOCIAL PORTINES/SOCIAL PARTINES/SOCIAL PARTIN
- ~3HTVGROOJR/GNAV3ROZMVORZMVORZAV.20HILIRGVROV3MITVTA/HOHTAVBIJB/RBHAWGHUOROV3FASIGNH/LIAHRV2SOIJVSHIROBV.8^-~23JOH/JROB/JHTVSHILIHJAVSBR/JROPJBB/JLAHRMOS/SI/SHILIHRD/RBITAK/RUOH/JHOO/TBAJI/TAA/JBVJI/RJTAMBHUORS-
- 9. THRUST COLLAR AND THRUST BLOCK SHALL HAVE DEVELOPED 70% OF THE SPECIFIED CONCRETE STRENGTH PRIOR TO PRESSURIZING THE PIPELINE.
- 10. ALL PIPE JOINTS BETWEEN THRUST COLLARS OR THRUST BLOCKS AND GATE VALVE SHALL BE RETRAINED, AND PIPE JOINTS PAST THE GATE VALVE SHALL BE RESTRAINED AS SPECIFIED IN DETAIL A ON SHEET UC-3G.





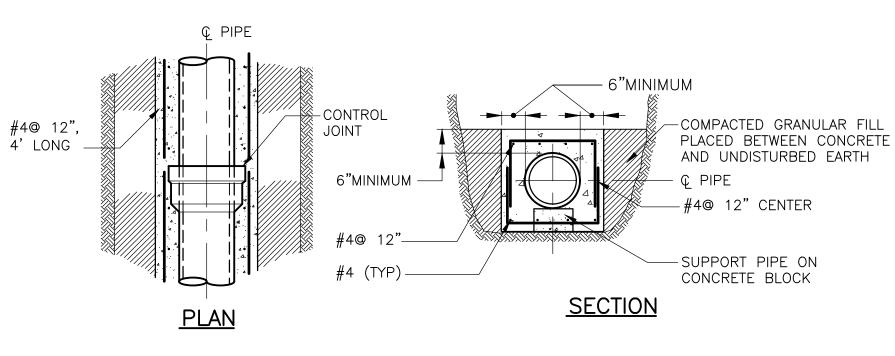
UC-3E R-5014 DESIGNED BY: DMD DRAWN BY: DMD/MNO LESSION ! CHECKED BY: SEAL APPROVED BY: CMT 036223 **REVISED:** ¿NGINEES NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. UTILITY CONSTRUCTION PHONE: (919)707-6690 FAX: (919) 250-4151 PLANS ONLY UTILITY CONSTRUCTION

PROJECT REFERENCE NO.

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SECTION	$\overline{1}$
NTS	

THRUST BLOCK DIMENSIONS										
NOMINAL PIPE SIZE	11.25 DEG		22.5 DEG		45 DEG		90 DEG		TEE/DEAD END	
	Α	W	Α	W	Α	W	Α	W	Α	W
4"	1'-5"	2'-0"	1'-11"	2'-9"	2'-8"	3'-3"	3'-5"	4'-0"	2'-11"	3'-6"
6"	1'-9"	2'-9"	2'-6"	3'-3"	3'-6"	4'-3"	4'-6"	5'-3"	3'-9"	4'-6"
8"	2'-0"	3-3"	3'-0"	4'-0"	4'-0"	5'-0"	5'-3"	6'-3"	4'-6"	5'-6"
12"	2'-8"	4-0"	3'-8"	5'-3"	5'-2"	6'-6"	6'-8"	8'-3"	5'-11"	7'-3"

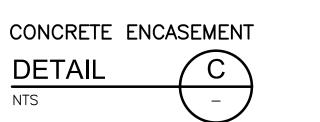


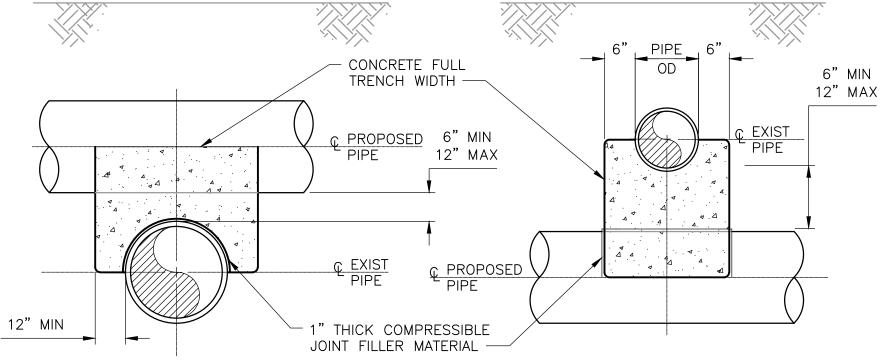
THRUST BLOCKS

DETAIL

### NOTES:

- 1. CONTROL JOINTS SHALL COINCIDE WITH PIPE JOINTS, MAXIMUM DISTANCE BETWEEN CONTROL JOINTS SHALL BE 24' +/-
- 2. CONCRETE BLOCK SUPPORT SIZE AND SPACING SHALL BE PER MANUFACTURERS RECOMMENDATIONS.
- 3. ENCASEMENT SHALL BE CAST IN NO LESS THAN TWO POURS. INITIAL CAST SHALL BE CURED FOR 12 HOURS BEFORE CASTING THE NEXT POUR
- 4. DEPTH OF INITIAL POUR SHALL BE SELECTED TO PREVENT FLOTATION OF THE PIPE. THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO PREVENT FLOTATION OF THE PIPE DURING CASTING.





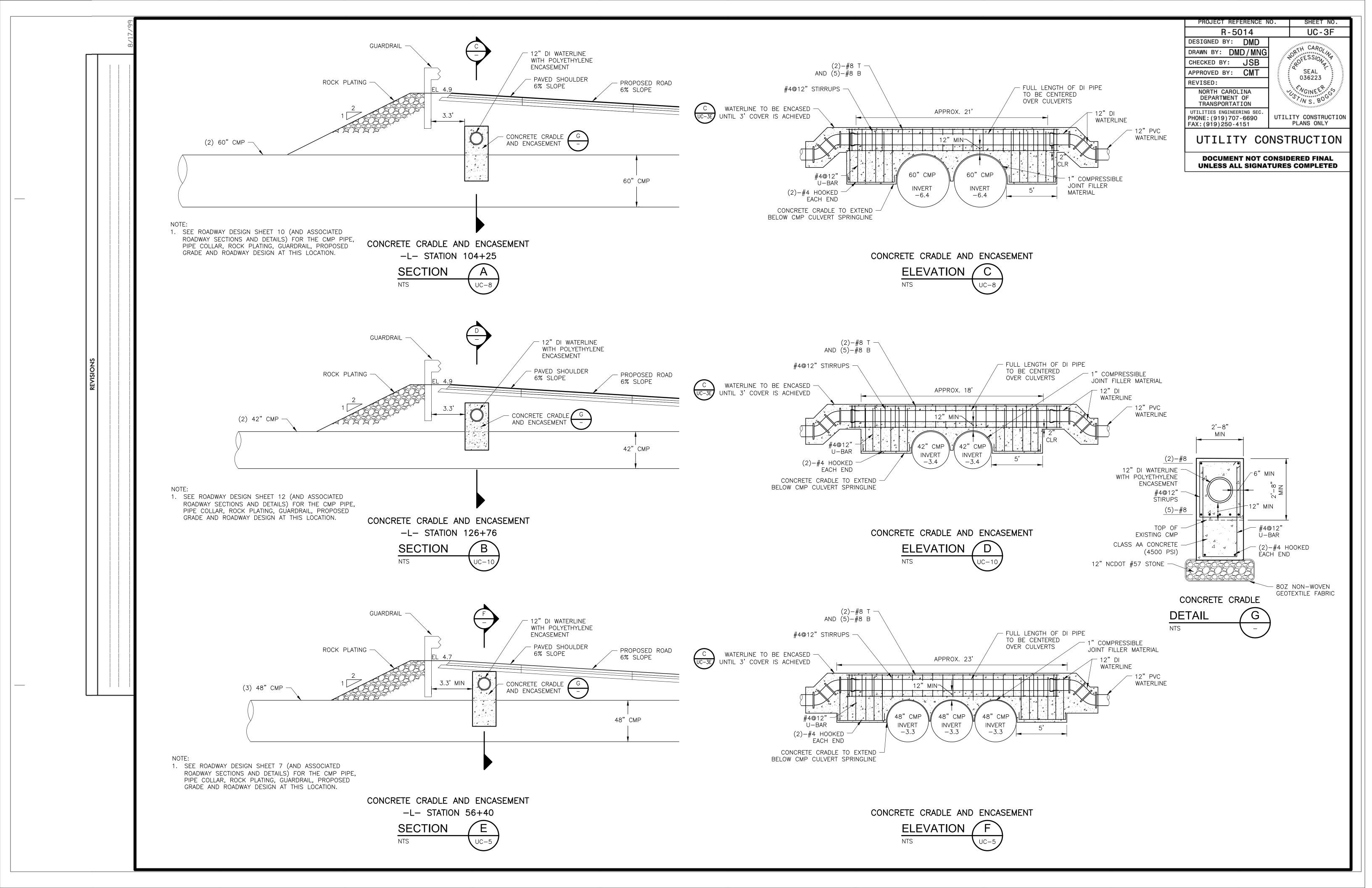
PROPOSED PIPELINE OVER EXISTING PIPE

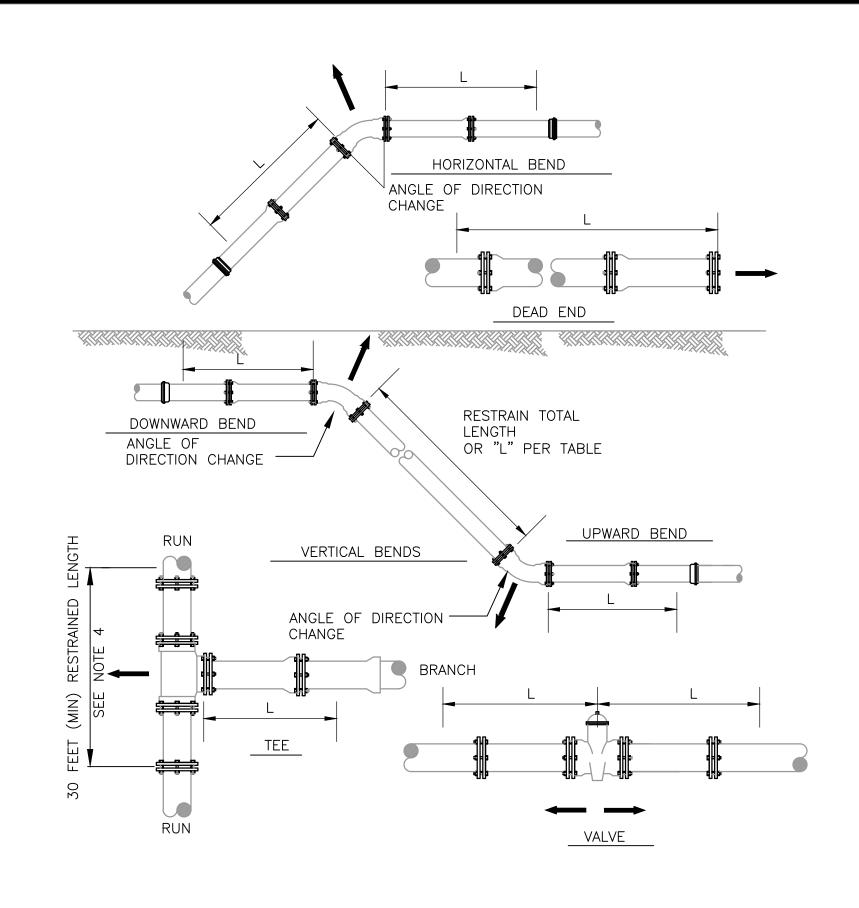
PROPOSED PIPELINE UNDER EXISTING PIPE

CONCRETE PIPE CRADLE

DETAIL

D





	HORIZO		NDS AND V	ERTICAL	VERTICAL DOWNWARD BENDS				VALVES OR DEADENDS
NOMINAL PIPE SIZE (IN)	90° BENDS L (FT)	45° BENDS L (FT)	22.5° BENDS L (FT)	11.25° BENDS L (FT)	90° BENDS L (FT)	45° BENDS L (FT)	22.5° BENDS L (FT)	11.25° BENDS L (FT)	L (FT)
4	153	64	30	15	153	64	30	15	153
6	220	91	44	22	220	91	44	22	220
8	287	119	57	28	287	119	57	28	287

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**SUMMARY TABLE - PVC PIPE RESTRAINED JOINT LENGTHS** 

REDU	ICERS		TEES		
SIZE	L (FT)	RUN SIZE	BRANCH SIZE	L (FT)	
12X10	122	4" TO 12"	4"	144	
12X8	221	6" TO 12"	6"	201	
12X6	303	8" TO 12"	8"	255	
10X8	118	10" TO 12"	10"	304	
10X6	216	12"	12"	351	
8X6	120				
8X4	206				
6X4	113				

70

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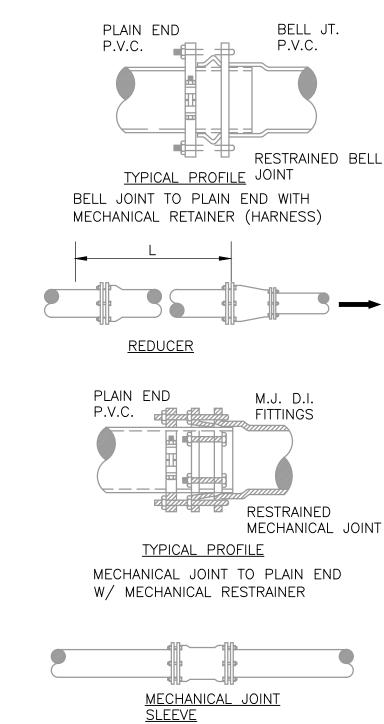
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PVC PIPE RESTRAINED JOINT SCHEDULE





#### **PVC PIPE RESTRAINT NOTES:**

- 1. THIS SCHEDULE SHALL BE UTILIZED ON ALL PVC PIPING.
- 2. ASSUMPTIONS: PVC PIPE, SAFETY FACTOR=1.5, TEST PRESSURE=200 PSI, SOIL = SP, TRENCH TYPE 5, DEPTH OF COVER=36". CALCULATIONS DONE IN ACCORDANCE WITH AWWA M23 AND M41 MANUALS.
- 3. BENDS AND VALVES: SHALL BE RESTRAINED ON EACH SIDE OF FITTING.
- 4. TEES: TOTAL LENGTH BETWEEN FIRST JOINTS OR RESTRAINED LENGTH ON EITHER SIDE OF TEE (RUN) SHALL BE A TOTAL DISTANCE OF 30 FEET (MIN). SEE SCHEDULE FOR RESTRAINT LENGTH ON TEE "BRANCH" LINE.
- 5. CONTRACTOR SHALL USE FULL (20 FT NOMINAL) LENGTH JOINTS OF PVC PIPE INTO AND OUT OF EACH FITTING UNLESS OTHERWISE DIRECTED. WHERE SHORTER JOINTS ARE REQUIRED ON EITHER SIDE OF A FITTING ADDITIONAL JOINT RESTRAINT MAY BE REQUIRED BY USE OF HARNESS ASSEMBLIES.
- 6. FIRST JOINT BEYOND LENGTH SPECIFIED IN SCHEDULE SHALL BE RESTRAINED IN ACCORDANCE WITH THE SPECIFICATIONS. FOR EXAMPLE, IF 23 FEET OF RESTRAINT IS REQUIRED, FITTING AND NEXT TWO PIPE JOINTS SHALL BE RESTRAINED (ASSUMING 20 FOOT NOMINAL LENGTH OF ONE JOINT OF PIPE), FOR A TOTAL RESTRAINED LENGTH OF 40 FEET.
- 7. WHERE NON-STANDARD CIRCUMSTANCES ARISE IN THE FIELD CONSULT THE ENGINEER PRIOR TO INSTALLATION OF RESTRAINT SYSTEMS. FAILURE TO CONSULT THE ENGINEER MAY REQUIRE EXCAVATION AND ADJUSTMENT TO THE RESTRAINED JOINT ASSEMBLIES.
- 8. ALL FITTINGS USED ON 4" AND LARGER PVC PIPING SHALL BE DUCTILE IRON MECHANICAL JOINT FITTINGS.
- 9. FITTINGS SHALL BE RESTRAINED BY USE OF A MECHANICAL JOINT RETAINER GLAND DESIGNED FOR USE WITH PVC PIPING. PIPE JOINTS SHALL BE RESTRAINED BY USE OF HARNESSED JOINT ASSEMBLIES DESIGNED FOR USE WITH PVC PIPE.
- 10. THE INSTALLATION OF BELL HARNESS RESTRAINTS AT PVC JOINTS SHALL BE COMPLETED PER THE MANUFACTURERS RECOMMENDATION, WHICH INCLUDES NOT OVER TIGHTENING THE PARALLEL RODS/NUTS. THESE NUTS SHOULD ONLY BE SNUG TIGHT. THE HOME MARKS ON THE PIPE SHOULD ALWAYS BE VISIBLE AFTER THE RESTRAINT IS INSTALLED.
- 11. WHERE ADJACENT OR OFFSET BENDS HAVE OVERLAPPING RESTRAINED LENGTH, ALL PIPE BETWEEN THE BENDS SHALL BE RESTRAINED.
  RESTRAINED LENGTH FOR THE OUTERMOST BEND(S) SHALL BE TWICE THE STANDARD LENGTH SHOWN IN THIS DETAIL.
- 12. IF FIELD CONDITIONS REQUIRE LESS THAN 3 FEET OF COVER, CONTRACTOR SHALL COORDINATE WITH ENGINEER TO DETERMINE REQUIRED RESTRAINT LENGTH.
- 13. ALL CARRIER PIPE SHALL BE RESTRAINED WITHIN AN ENCASEMENT PIPE.
  RESTRAINED PIPE WITHIN AN ENCASEMENT PIPE SHALL NOT COUNT
  TOWARDS THE REQUIRED RESTRAINED LENGTH.

PROJECT REFERENCE NO. UC-3G R-5014 DESIGNED BY: DMD DRAWN BY: DMD/MNG JDB CHECKED BY: APPROVED BY: CMT REVISED: NGINEER. NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. UTILITY CONSTRUCTION PHONE: (919)707-6690 FAX: (919)250-4151 PLANS ONLY

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