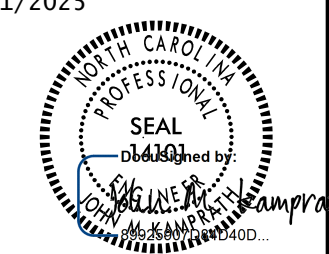
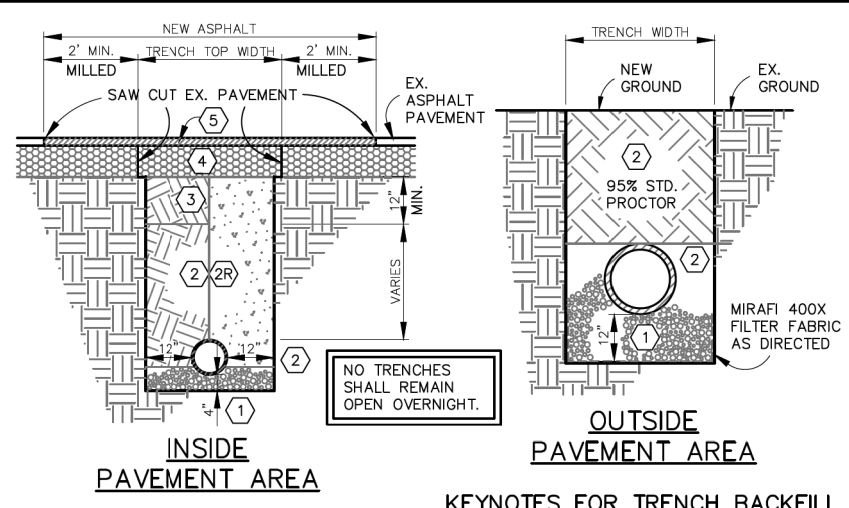


# PROJECT TYPICAL DETAILS

PROJECT REFERENCE NO.	SHEET NO.
U-6187	UC-3A
DESIGNED BY: JMK	
DRAWN BY: JMK	
CHECKED BY:	
APPROVED BY: JMK	
REVISED:	5/1/2025
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



**TRENCH BACKFILL FOR WATER**

CONTRACTOR SHALL COMPLY WITH ALL OSHA REGULATIONS FOR TRENCH SHORING AND SLOPING. A "COMPETENT PERSON" AS DEFINED BY OSHA SHALL BE ON SITE AT ALL TIMES WHEN ANY WORKER IS IN A TRENCH.

SEE EMBEDED SOIL MATERIAL CLASSIFICATIONS TABLE FOR SOIL CLASSES. ADD WATER TO EACH LAYER AS NEEDED OR DIRECTED FOR COMPACTION AND MECHANICAL JOINT RESTRAINTS.

**KEYNOTE FOR BEDDING PIPE**

1. PROVIDE CLASS I, II, III OR IV SOIL FOR BEDDING. DIG BELL HOLES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

A. PLACE PIPE ON COMPETENT SOIL BOTTOM. B. FOR NON-COMPETENT TRENCH BOTTOM, PLACE PIPE ON 12" BEDDING OVER MRAP1 400K FILTER FABRIC AS DIRECTED BY ENGINEER.

**KEYNOTES FOR TRENCH BACKFILL**

1. PROVIDE CLASS I, II, III OR IV SOIL BACKFILL. COMPACT SOIL IN 6" LAYERS TO 100% STANDARD PROCTOR DENSITY FOR ALL OTHER AREAS.

2. PROVIDE FLOWABLE FILL FOR HEAVY DUTY ASPHALT REPAIR. SEE PAVING DESIGN TABLE FOR SUBGRADE.

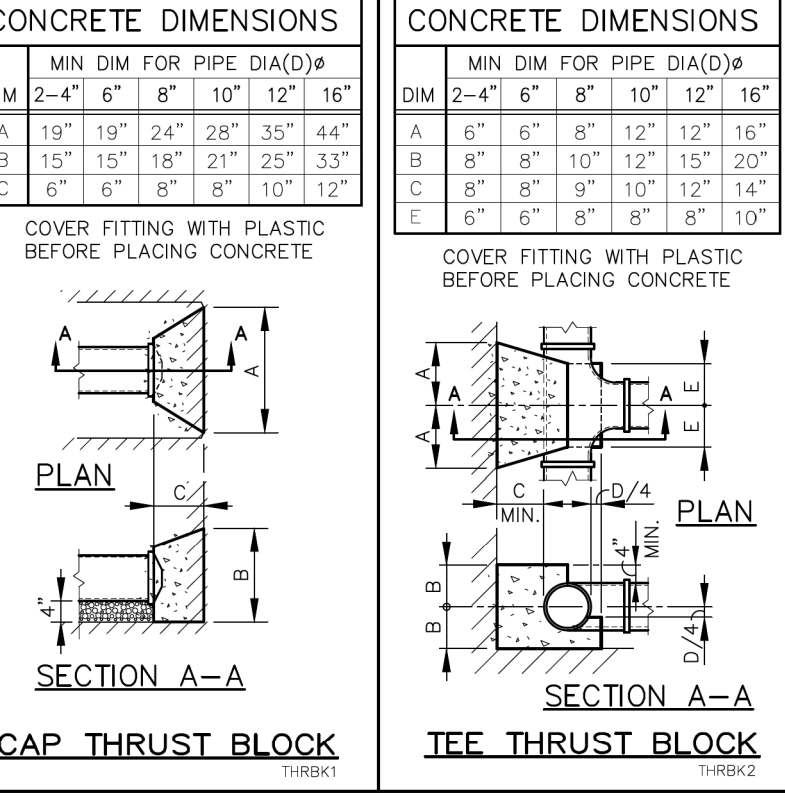
3. PROVIDE CLASS I, II, III OR IV SOIL BACKFILL. COMPACT SOIL IN 6" LAYERS TO 100% STANDARD PROCTOR DENSITY FOR TOP 1 FT OF SUBGRADE.

4. SEE PAVING DESIGN TABLE FOR PAVING.

5. SEE PAVING DESIGN TABLE FOR SURFACE COURSE.

**TRENCH BACKFILL**

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**CONCRETE DIMENSIONS**

DIM	2'-4"	6"	8"	10"	12"	16"
A	19"	19"	24"	28"	35"	44"
B	15"	15"	18"	21"	25"	33"
C	6"	6"	8"	8"	10"	12"

COVER FITTING WITH PLASTIC BEFORE PLACING CONCRETE

**CONCRETE DIMENSIONS**

DIM	2'-4"	6"	8"	10"	12"	16"
A	6"	6"	8"	12"	12"	16"
B	8"	8"	10"	12"	15"	20"
C	8"	8"	9"	10"	12"	14"
E	6"	6"	8"	8"	8"	10"

COVER FITTING WITH PLASTIC BEFORE PLACING CONCRETE

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**WATER MAIN GENERAL NOTES:**

- STANDARD WATER MAIN SHALL BE DR14 305 PSI C900 PVC WITH DUCTILE IRON FITTINGS OR CEMENT LINED ASPHALTIC COATED DUCTILE IRON FOR PUSH CLASS 50 AND MJ CLASS 51.
- NOODT PER SECTION 0904 REQUIRES PVC WATER MAIN TO HAVE 30" MINIMUM GROUND COVER.
- NOODT REQUIRES 36" MINIMUM COVER IN ROADWAY AREA.
- DUCTILE IRON PIPE SHALL BE USED IF WATER MAIN DOES NOT MEET OR EXCEED THE FOLLOWING SEPARATION:
  - 18" VERTICAL ABOVE CROSSING STORM OR SANITARY SEWER PIPE.
  - 10" HORIZONTAL SEPARATION FROM PARALLEL SEWER PIPE.
  - 10" HORIZONTAL FROM STREAM, LAKE OR WATER IMPOUNDMENTS.
- CENTER ONE 20' SECTION OF DUCTILE IRON PIPE AT ALL CULVERT PIPE CROSSINGS. MAINTAIN 18" VERTICAL CLEARANCE BETWEEN NEW WATER LINE AND EXISTING PIPES.
  - A. BE SOLID NO.12 COPPER WITH 30 MILS BLUE HOPE INSULATION.
  - B. BE FASTENED AT 10 FT INTERVALS TO THE PIPE WITH 2# TIES.
  - C. HAVE CONTINUOUS ELECTRICAL CONNECTION.
- PROVIDE A CONTINUOUS WARNING TAPE 12" ABOVE THE PIPE.
- DISINFECT, FLUSH AND PRESSURE TEST WATER MAIN UNDER UTILITY INSPECTION AS FOLLOWS:
  - A. DISINFECT SYSTEM BY MAINTAINING DISINFECTANT AT 50 PPM IN SYSTEMS FOR 24 HOURS.
  - B. FLUSH SYSTEM THOROUGHLY TO 0 PPM. TAKE SAMPLE FROM FLUSHED SYSTEM AND SEND TO LAB FOR BACTERIOLOGICAL TEST.
  - C. PRESSURE TEST THE SYSTEM AT 175 PSI OR GREATER. MAINTAIN FOR AT LEAST 3 HOURS. ADD SUFFICIENT WATER TO BRING BACK TO STARTING PRESSURE. WATER ADDED SHALL NOT EXCEED THE GPM/1000 FT OF LINE TESTED PER THE TABLE. PRESSURE TESTING MUST BE OBSERVED BY THE A UTILITY REPRESENTATIVE AND DOCUMENTED IN THE CONSTRUCTION RECORDS BY THE CONTRACTOR.

Pipe Dia.	Allowable Leakage Gal/1000 ft			Gals of Water Added for D & H inches
	1 hr	2 hrs	3 hrs	
4	0.33	0.66	0.99	004 x D <sup>2</sup> H
6	0.5	1.00	1.50	004 x D <sup>2</sup> H
8	0.67	1.34	2.01	004 x D <sup>2</sup> H
12	1	2.00	3.00	0.875 x D <sup>2</sup> H

**SUPPLEMENTAL SPECIFICATIONS**

THE FOLLOWING SPECIFICATIONS SHALL APPLY TO THE DETAILS PROVIDED BY DAVE COUNTY.

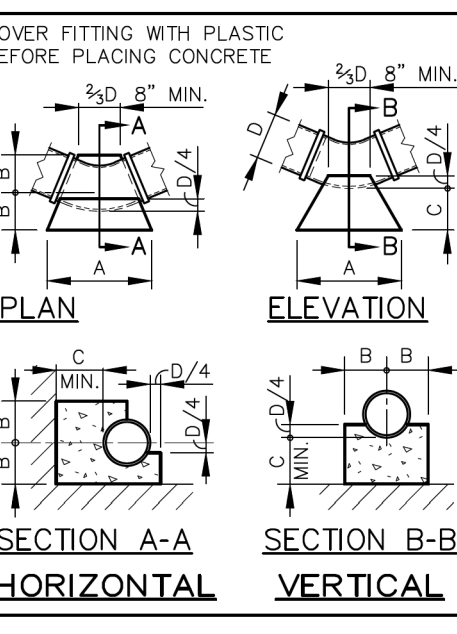
- WATER DISTRIBUTION MATERIALS MUST BE MANUFACTURED TO AND MEET THE APPROPRIATE AWWA STANDARDS, SECTION C OR AHS/ANSI STANDARD 61, DRINKING WATER SYSTEM COMPONENTS.
- PVC PIPES AND FITTINGS SHALL MEET THE LATEST AWWA C900 STANDARDS.
- DUCTILE IRON PIPE & APPURTENANCES SHALL MEET, BASED ON DEVICE, THE LATEST AWWA C100 SERIES STANDARDS.
- FIRE HYDRANTS SHALL MEET THE LATEST AWWA C502 STANDARDS.
- GATE VALVES SHALL MEET THE LATEST AWWA C509 STANDARDS.
- METERS MUST MEET THE LATEST AWWA C700 STANDARDS.
- SEWER CONNECTIONS SHALL MEET THE LATEST AWWA C605 STANDARDS.
- INSTALLATION OF PVC PIPES AND FITTINGS SHALL MEET THE LATEST AWWA C900 STANDARDS.
- INSTALLATION OF DUCTILE IRON PIPE AND APPURTENANCES SHALL MEET THE LATEST AWWA C900 STANDARDS.
- NEW WATER MAINS SHALL BE DISINFECTED AS OUTLINED IN RULE 1001 AND RULE 1003.
- HYDROSTATIC PRESSURE TESTING SHALL BE COMPLETED ON ANY PRESSURE PIPES CARRYING LIQUIDS AND BE COMPLETED PER THE LATEST AWWA C600 OR AWWA C605 STANDARDS.
- AFTER DISINFECTING, WATER STORAGE OR DISTRIBUTION FACILITIES SHALL NOT BE PLACED INTO SERVICE UNTIL BACTERIOLOGICAL TEST RESULTS OF REPRESENTATIVE WATER SAMPLES SHALL BE ANALYZED BY A STATE CERTIFIED LABORATORY PER RULE 1001.

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**PIPE CONSTRUCTION NOTES:**

- FITTINGS SHALL BE CLASS 51 DUCTILE IRON MECHANICAL JOINTS WITH AN APPROPRIATE TRANSITION GASKET TO PVC WHERE APPLICABLE.
- WHEN CONNECTING DUCTILE IRON PIPE TO PVC PIPE, USE AN APPROPRIATE TRANSITION GASKETS TO PVC BELL END AND A SLEEVE WITH APPROPRIATE GASKETS AT THE PLAIN END.
- DEFLECTION AT THE JOINTS SHALL NOT EXCEED 14" FOR LENGTH OF PIPE OR 80% OF MANUFACTURER'S RECOMMENDATION, WHICHEVER IS LESS.
- CASING PIPES SHALL BE BORED UNLESS OTHERWISE NOTED. SEE CASING PIPE SPACERS DETAIL.
- FOR JURISDICTIONAL DRAINAGE CROSSINGS, USE PIPE CROSSING STREAM INSTALLATION DETAIL AND JURISDICTIONAL STREAM CROSSING DETAIL.
- FOR NON-JURISDICTIONAL DRAINAGE CROSSING, USE PIPE CROSSING STREAM INSTALLATION DETAIL, AND DITCH CROSSING DETAIL.
- PROVIDE JOINT RESTRAINT AT ALL BENDS, TEES AND CAPS. JOINT RESTRAINT SHALL BE A COMBINATION OF CONCRETE THRUST BLOCKS ACCORDING TO DETAILS SHOWN AND MECHANICAL JOINT RESTRAINT AS APPROVED BY THE ENGINEER. MECHANICAL JOINT RESTRAINTS SHALL BE PLACED AT MULTIPLE LOCATIONS ON EACH SIDE OF FITTINGS ACCORDING TO MANUFACTURER'S RECOMMENDATION.
- MECHANICAL JOINT RESTRAINT SHALL BE:
  - A. FOR DI PIPE TO M.J. CLOW MJ FIELD LOK, MEGLUG #1100, MIDCO #4 RESTRAINT, SMITH-BLAIR #981 OR STAR PIPE #3000, #3000S.
  - B. FOR C900 PIPE TO M.J. CLOW MJ FIELD LOK, MEGLUG #2000PV, MIDCO #4 RESTRAINT, SMITH-BLAIR #981 OR STAR PIPE #4000, #1000C, #1200.
  - C. FOR SDR-21 PIPE TO M.J. MEGLUG #2000PV MIDCO #4 RESTRAINT, SMITH-BLAIR #981 OR STAR PIPE #4000, #1000S. NOT APPLICABLE TO NEW PROJECTS.
  - D. FOR PIPE BELL/SPOOT RESTRAINT: SMITH-BLAIR #932, STAR PIPE #4100S, #1100.
- CONCRETE THRUST BLOCK RESTRAINT AND SUBSURFACE SUPPORT SHALL BE 4000 PSI CLASS 'B' CONCRETE WITH 5% AIR ENTRAINMENT, 0.45 WATER/CEMENT RATIO AND PLACED AT A SLUMP NO GREATER THAN 3".
- CONTRACTOR SHALL SUBMIT TO ENGINEER THE MODEL, MANUFACTURER AND TYPICAL PLACEMENT OF RESTRAINT SYSTEM TO BE USED ON PROJECT.

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**CONCRETE DIMENSIONS**

BEND DEG	DIM	2'-4"	6"	8"	10"	12"	16"
1/2	A	6"	6"	8"	10"	12"	16"
11/4	B	7"	7"	8"	9"	10"	12"
	C	7"	7"	7"	8"	8"	9"
1/2	A	9"	9"	12"	18"	21"	27"
22 1/2	B	7"	7"	7"	8"	10"	12"
	C	8"	8"	9"	10"	11"	14"
1/2	A	15"	15"	20"	25"	30"	40"
45	B	7"	7"	8"	9"	11"	15"
	C	8"	8"	9"	10"	11"	15"
3/4	A	18"	18"	24"	31"	38"	49"
90	B	8"	8"	12"	14"	16"	21"
	C	9"	9"	10"	11"	12"	16"

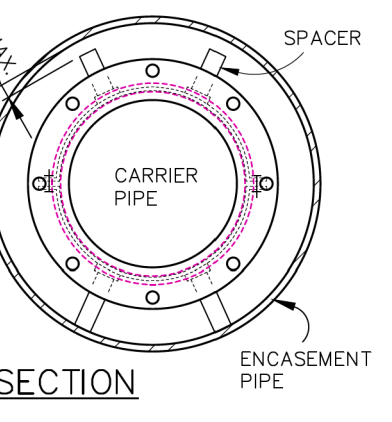
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**MATERIAL:**

- ENCASEMENT PIPE: STEEL PIPE ASTM A139 GRADE B WITH DIAMETER AND WALL THICKNESS PER TABLE OR NOTE. SEE NDDOT ENCASEMENT PROVISIONS FOR ADDITIONAL REQUIREMENTS.
- CARRIER PIPE: DUCTILE IRON MJ RESTRAINT.
- SPACERS: CASCADE MFG CCS-ER. PROVIDE FOR RADIAL RESTRAINT OF CARRIER PIPE INSIDE ENCASEMENT PIPE.
- END SEALS: CASCADE MFG MODEL CCS.

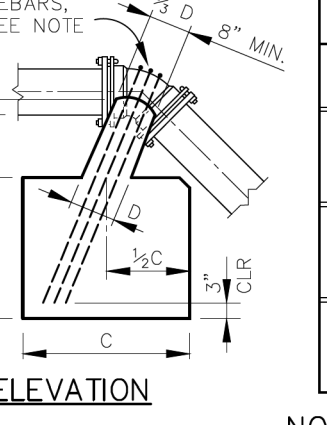
**INSTALLATION:**

- INSTALL (3) THREE SPACERS PER JOINT OF DUCTILE IRON PIPE: (1) ONE AT EACH END AND (1) ONE IN THE MIDDLE OF PIPE.



**ENCASEMENT PIPE & SPACER DETAIL**

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**CONCRETE DIMENSIONS**

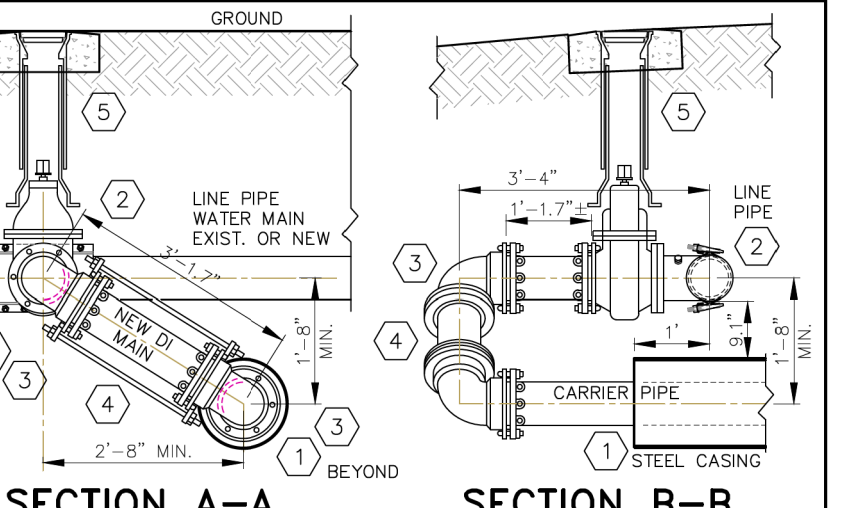
BEND DEG	DIM	2'-4"	6"	8"	10"	12"	16"
1/2	A	16"	18"	17"	36"	42"	
11/4	B	15"	15"	21"	15"	24"	
	C	21"	24"	30"	33"	36"	48"
1/2	A	20"	24"	40"	44"	48"	52"
22 1/2	B	21"	21"	27"	30"	30"	30"
	C	27"	30"	32"	46"	48"	66"
1/2	A	24"	30"	36"	48"	54"	62"
45	B	30"	30"	33"	36"	42"	48"
	C	30"	36"	48"	54"	57"	78"

**NOTES:**

- EMBED 3-#6 REINFORCING STEEL MIN. OF 20" STRAIGHT OR 10" W/ 180° STD. HOOK
- COVER FITTING WITH PLASTIC BEFORE PLACING CONCRETE

**TENSION THRUST BLOCKS ANCHORAGE AT BENDS**

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**KEYNOTES:**

- STEEL CASING PIPE
- ROMAC SST TAPPING SLEEVE/TEE, GATE VALVE & VALVE BOX: SEE PLAN FOR SIZE
- UPPER & LOWER 90° BEND MJ RESTRAINED
- TWO(2) 3/4" SS THREADED RODS WITH SS NUTS TYP. EA. SPOOL PIECE
- VALVE BOX & COLLAR/PAD, SEE DTL 2.31

**NOTE:** ALL FITTINGS SHALL BE MJ RESTRAINED.

**STD. 'U' CONNECTION**

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