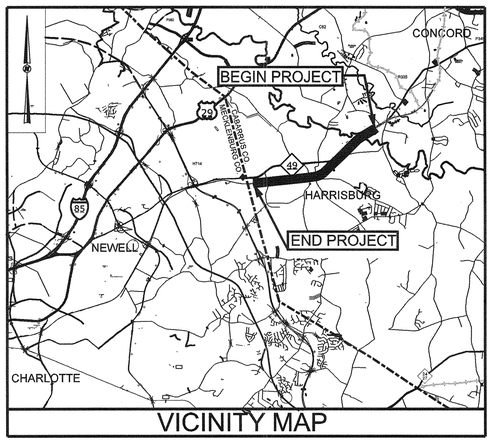
DGN 0041DEL_P10a1

TIP PROJECT: P-5208C



VICINITY MAP

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5208C	UC-1	8

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

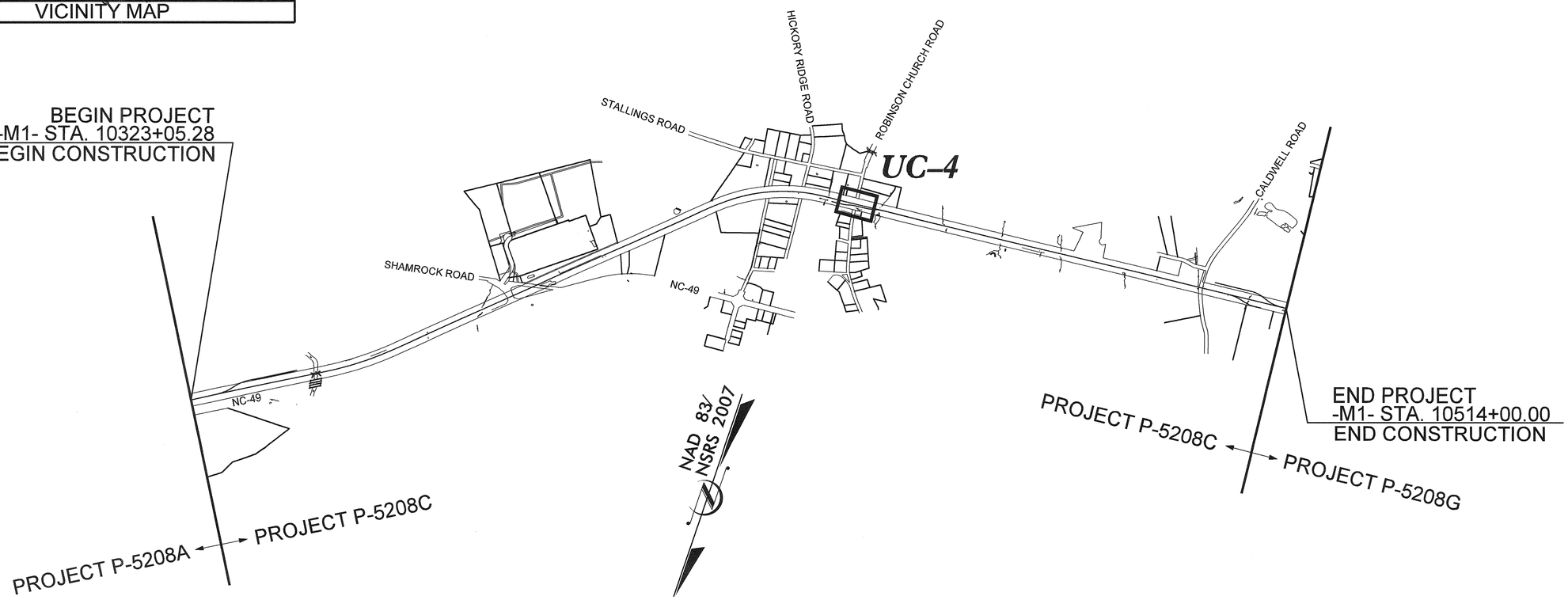
DATE: APRIL 4, 2013

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CABARRUS COUNTY

LOCATION: NCRR/NS MAINLINE – HAYDOCK TO JUNKER (MP 361.9 TO MP 365.5)

TYPE OF WORK: UTILITIES CONSTRUCTION



GRAPHIC SCALES

PLANS: 20 10 0 20 40

PROFILE (HORIZONTAL): 20 10 0 20 40

PROFILE (VERTICAL): 10 5 0 10 20

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UC–1	TITLE SHEET
UC–2	SYMBOLOGY SHEET
UC–3	GENERAL NOTES SHEET
UC–3A TO UC–3C	DETAILS
UC–4	PLAN SHEET
UC–5	WATER PROFILE

UTILITY OWNERS ON THIS PROJECT:

WATER – TOWN OF HARRISBURG

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027651 ENGINEER KEVIN C. ZOBS

2013-APR-08

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

RAIL DIVISION

UTILITY DESIGN BY:

MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Prepared for:

ENGINEERING & SAFETY BRANCH

MAIL:
1556 MAIL SERVICE CENTER
RALEIGH, NC 27699-1556

DELIVERY:
860 CAPITAL BOULEVARD
RALEIGH, NC 27603

PHONE: (919) 715-8803
FAX: (919) 715-8804

$$DATE$$
$$SYSTIME$$
$$DGN$$
$$USRNAME$$

Note: Not to Scale

***S.U.E. = Subsurface Utility Engineering**

STATE OF NORTH CAROLINA
RAIL DIVISION

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	UC-2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 027861 KEVIN C. ZDEB

2013-APR-08

UTILITIES PLAN SHEET SYMBOLS

Water

Item	Symbol
Proposed Back Flow Preventor	PBFP
Relocate Back Flow Preventor	RBFP
Existing Water Valve	
Proposed Valve	GV
Proposed Tapping Valve	TGV
Existing Water Meter	WM
Proposed Water Meter	PWM
Proposed Water Meter / Vault	PWM
Relocate Water Meter	RWM
Remove Water Meter	REM WM
Existing Hydrant	
Prop Hydrant	PFH
Relocate Hydrant	RFH
Remove Hydrant	REM FH

Item	Symbol
Proposed RPZ Back Flow Preventor	PRPZ
Relocate RPZ Back Flow Preventor	RRPZ
Water Cross	
Water Plug	
Water Reducer	
Water Tee	
Water Pump Station	PS(W)
Water Thrust Block	
Blow Off Valve	BO
Air Release Valve	AR
Water Line Stop	LS
Water Line Stop w Bypass	LS/BP

Utility By Other Symbols

Item	Symbol
Proposed Tel Pole	
Proposed Power Pole	
Proposed Joint Use Power, Tel Pole	
Proposed Joint Use Power, CATV Pole	
Proposed Joint Use Power, Tel, CATV Pole	
Proposed Joint Use Tel, CATV Pole	

Sewer

Item	Symbol
Existing Manhole	MH
Proposed UT Manhole	
Remove UT Manhole	REM UT MH
Abandon Utility Manhole	ABAND MH
Sewer Line Stop	LS
Sewer Line Stop w Bypass	LS/BP

Item	Symbol
Sewer Cross	
Sewer Plug	
Sewer Reducer	
Sewer Tee	
Sewer Pump Station	PS(SS)
Sewer Thrust Block	

Item	Symbol
PUE Monument	
Concrete Pier	CP
Steel Pile Pier	SP
Test Hole (SUE)	
Prop Utility Vault	UV

0041DEL P10a1
DCN
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HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 4, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	UC-3

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER KEVIN C. ZDEB

2013-APR-08

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

UTILITY CONSTRUCTION NOTES

GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2012.

2. THE EXISTING UTILITIES BELONG TO THE TOWN OF HARRISBURG. THE CONTACT PERSON IS MR. DEREK SLOCUM AND HE CAN BE REACHED VIA TELEPHONE AT 704-455-0728.

3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES, DIVISION OF ENVIRONMENTAL HEALTH. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, DIVISION OF WATER QUALITY. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.

4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.

5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPROTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.

6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITONAL COST TO THE DEPARTMENT.

7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.

8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.

9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

PROJECT SPECIFIC NOTES:

1. PROPOSED WATER LINE SHALL BE DUCTILE IRON RESTRAINED JOINT (D.I.R.J.) PIPE.

2. PROPOSED WATER LINE FITTINGS, 4-INCHES THROUGH 18-INCHES IN DIAMETER, SHALL BE DUCTILE IRON.

3. ALL FITTINGS (BENDS, TEES, CROSSES, REDUCERS, PLUGS, ETC.) SHALL BE ADEQUATELY RESTRAINED BY THE USE OF RESTRAINED JOINT CONSTRUCTION.

4. CONTRACTOR SHALL ADEQUATELY RESTRAIN THE EXISTING WATER LINE PIPE AT THE TIE-IN LOCATIONS BY THE USE OF BELL RESTRAINT CLAMPS, OR CONCRETE THRUST BLOCK AS DIRECTED BY THE RESIDENT ENGINEER.

5. CONTRACTOR'S ATTENTION IS DIRECTED TO SECTIONS 102, 107, AND 1550 OF THE STANDARD SPECIFICATIONS CONCERNING TRENCHLESS INSTALLATION. IT IS CONTRACTOR'S RESPONSIBILITY TO HAVE BORE PATH DESIGNED AND SEALED BY A LICENSED NORTH CAROLINA PROFESSIONAL ENGINEER. NO DAMAGE IS ALLOWED TO RIVER, WETLANDS, OR BUFFER ZONES.

DCN

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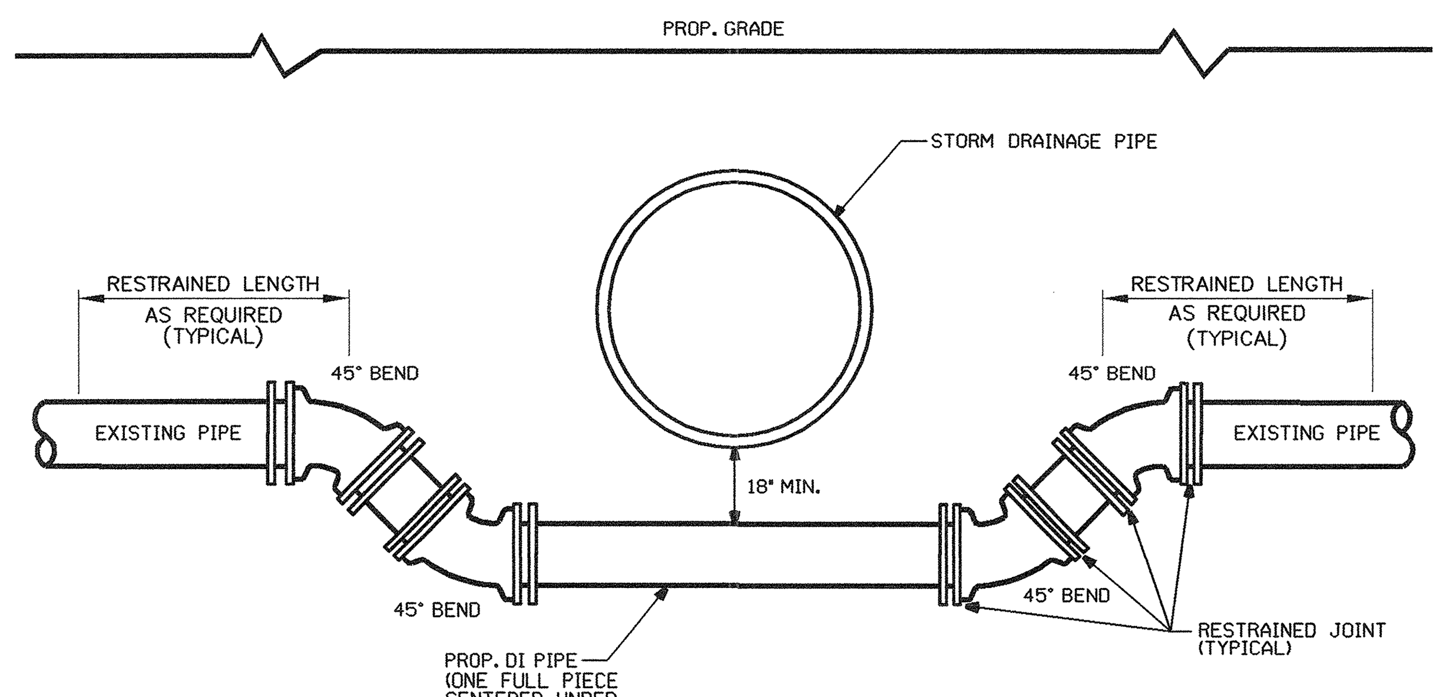
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 4, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	UC-3A

UTILITY DESIGN ENGINEER

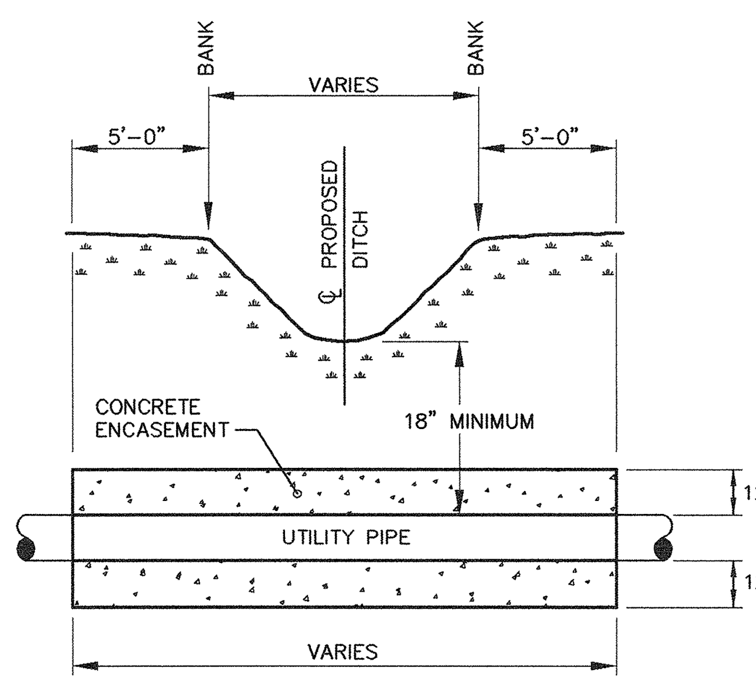
MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511



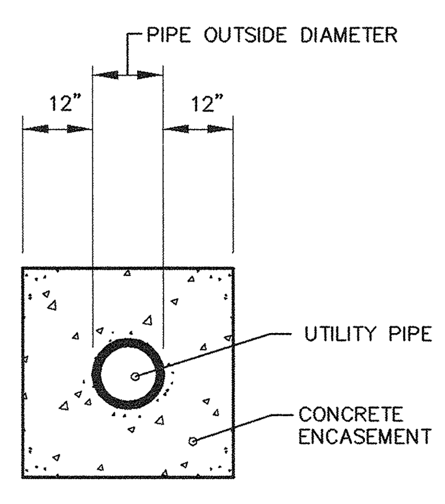
PROFILE
NTS

NOTES:
1. ALL FITTINGS AND JOINTS SHALL BE RESTRAINED JOINT DESIGN.
2. PROVIDE APPROPRIATE RESTRAINED LENGTH AS PER TABLE HEREIN.

WATER MAIN CROSSING UNDER STORM DRAINAGE PIPE



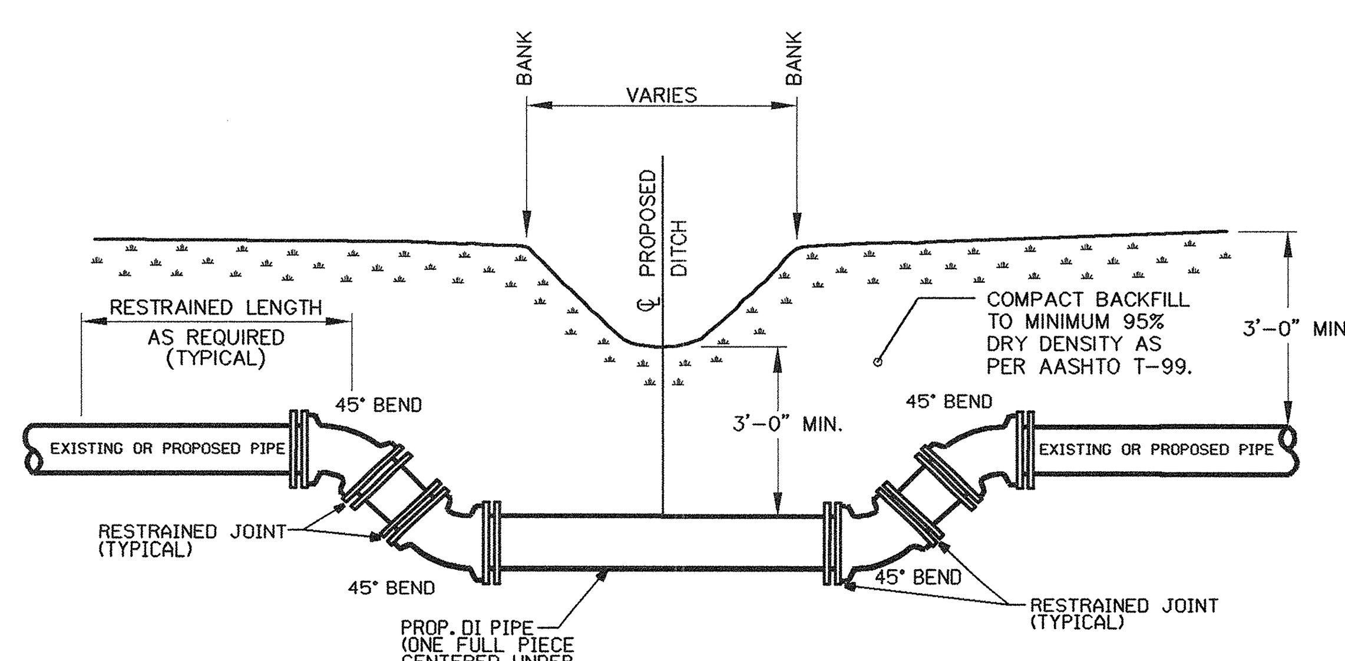
CROSS SECTION



END VIEW

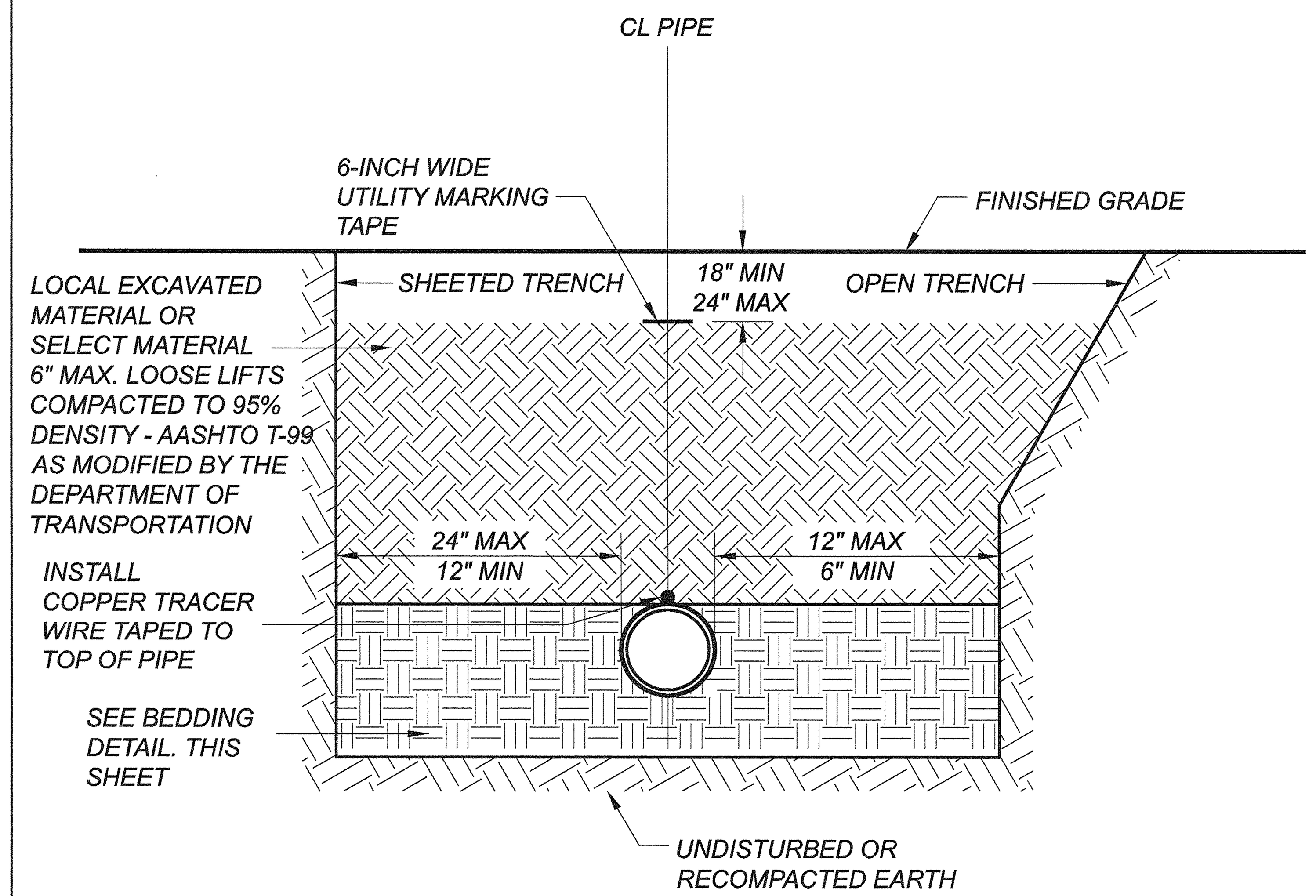
NOTES:
1. CONCRETE SHALL BE CLASS B – 2,500 P.S.I. MIN. COMPRESSIVE STRENGTH.
2. CONCRETE ENCASEMENT IS NOT REQUIRED WHEN PIPE IS AT LEAST THREE (3) FEET UNDER CENTERLINE OF CREEK BOTTOM.

UTILITY PIPE CONCRETE ENCASEMENT FOR DITCH/CREEK/STREAM CROSSING



CROSS SECTION

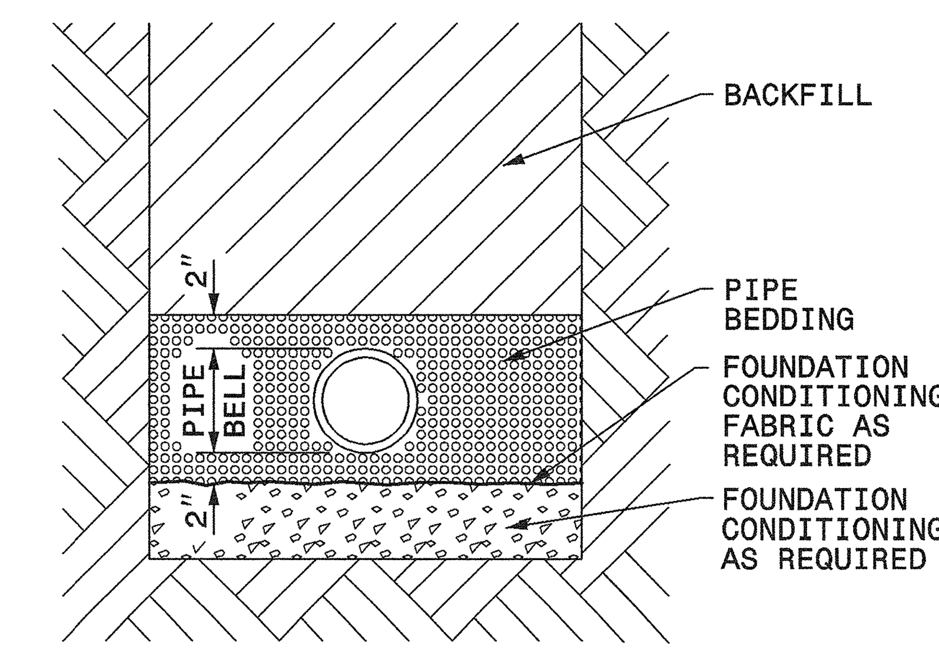
WATER LINE AT DITCH/STREAM/CREEK CROSSING



NOTES:
1. ALL SHORING & TRENCHING SHALL COMPLY WITH OSHA SAFETY STANDARDS FOR THE CONSTRUCTION INDUSTRY.
2. BELL HOLES NOT SHOWN.
3. ALL BACKFILL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH.

GENERAL TRENCH DETAIL
NTS

PIPE BEDDING DETAIL



PLACE FOUNDATION CONDITIONING MATERIAL BELOW BEDDING IF REQUIRED, AS DIRECTED BY ENGINEER. PIPE BEDDED IN SELECT MATERIAL, CLASS II (TYPE 1) OR CLASS III. TRENCH BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL IF APPROVED BY THE ENGINEER, OR SELECT MATERIAL. ALL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH. COMPACTION SHALL BE TO APPROXIMATELY 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

MAXIMUM TRENCH WIDTH
AT TOP OF PIPE

NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)	NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		

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HNTB NORTH CAROLINA, P.C.
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DATE: APRIL 4, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	UC-3B

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 027683 KEVIN C. ZDEB

2013-APR-08

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

BASED ON TEST PRESSURE OF 200 P.S.I.

HORIZONTAL RESTRAINT
(ALL AREAS GIVEN ARE IN SQUARE FEET)

PIPE SIZE	DEGREE OF BEND	LBS. STATIC THRUST *	ALLOWABLE SOIL BEARING (PSF) 1000	2000	3000	4000	5000	6000	7000	8000
4"	11 1/4°	616	1	1	1	1	1	1	1	1
	22 1/2°	1,225	1	1	1	1	1	1	1	1
	45°	2,405	2	1	1	1	1	1	1	1
	90°	4,444	4	2	1	1	1	1	1	1
	TEE/PLUG	3,143	3	2	1	1	1	1	1	1
6"	11 1/4°	1,385	2	1	1	1	1	1	1	1
	22 1/2°	2,758	3	2	1	1	1	1	1	1
	45°	5,409	5	3	2	2	1	1	1	1
	90°	9,999	10	5	3	3	2	2	2	1
	TEE/PLUG	7,068	7	4	3	2	2	1	1	1
8"	11 1/4°	2,464	3	1	1	1	1	1	1	1
	22 1/2°	4,904	5	3	2	1	1	1	1	1
	45°	9,619	10	5	3	3	2	2	2	1
	90°	17,775	18	9	6	4	4	3	3	2
	TEE/PLUG	12,568	13	6	4	3	3	2	2	2
10"	11 1/4°	3,846	4	2	2	1	1	1	1	1
	22 1/2°	7,661	8	4	3	2	2	2	2	1
	45°	15,028	15	8	5	4	3	3	2	2
	90°	27,768	28	14	9	7	6	5	4	3
	TEE/PLUG	19,636	20	10	7	5	4	3	3	2
12"	11 1/4°	5,543	6	3	2	2	1	1	1	1
	22 1/2°	11,037	11	6	4	3	2	2	2	2
	45°	21,641	22	11	7	5	4	4	3	3
	90°	39,987	40	20	13	10	8	7	6	5
	TEE/PLUG	28,274	28	14	9	7	6	5	4	4
14"	11 1/4°	7,544	8	4	3	2	2	2	1	1
	22 1/2°	15,016	15	8	5	4	3	3	2	2
	45°	29,455	29	15	10	7	6	5	4	4
	90°	54,426	54	27	18	14	11	9	8	7
	TEE/PLUG	38,485	38	19	13	10	8	6	5	5
16"	11 1/4°	9,854	10	5	3	3	2	2	2	2
	22 1/2°	19,612	20	10	7	5	4	3	3	3
	45°	38,471	38	17	13	10	8	6	5	5
	90°	71,085	71	36	24	18	14	12	10	9
	TEE/PLUG	50,265	50	25	17	13	10	8	7	6

* INCLUDES 1.25 SAFETY FACTOR

VERTICAL RESTRAINT
(ALL VOLUMES GIVEN ARE IN CUBIC YARDS)**

PIPE SIZE	RESTRAINING RODS NO.REQ'D	DIA.	DEGREE OF BEND 11 1/4°	22 1/2°	45°
4"	2	1/2"	0.25	0.50	0.75
6"	2	1/2"	0.50	1.0	1.75
8"	2	5/8"	0.75	1.50	3.0
10"	2	3/4"	1.25	2.25	4.50
12"	2	7/8"	1.75	3.25	6.50
14"	4	5/8"	2.25	4.50	8.75
16"	4	3/4"	3.0	6.0	11.50

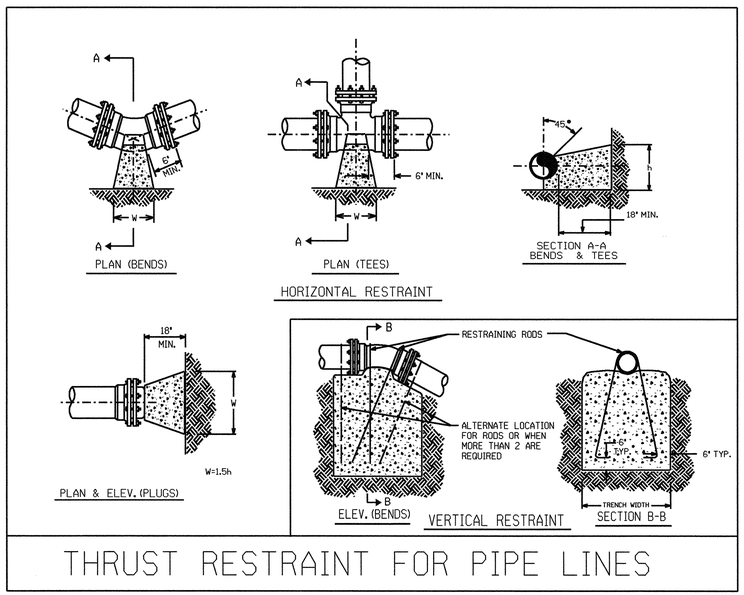
**INCLUDES 1.50 SAFETY FACTOR

GENERAL NOTES:
1. CONCRETE SHALL BE CLASS "B".
2. CONCRETE SHALL NOT CONTACT BOLTS ENDS OF MECHANICAL JOINT FITTINGS.
3. CONSULT WITH ENGINEER FOR CONCRETE REQUIREMENTS ON MAINS LARGER THAN 16 INCHES. (FOR VERTICAL & HORIZONTAL BENDS)
4. ALLOWABLE SOIL BEARING SHALL BE DETERMINED BY THE ENGINEER.

REVISIONS NO.	DATE	DESCRIPTION

THRUST RESTRAINT FOR WATER MAINS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
RALEIGH, N.C.



THRUST RESTRAINT FOR PIPE LINES

DUCTILE IRON PIPE RESTRAINED JOINT DESIGN TABLE

FITTING	REQUIRED RESTRAINED LENGTH (FT) OF BARE D.I. PIPE BY DEPTH OF COVER 3 FT	4 FT	5 FT	6 FT	7 FT	8 FT	9 FT	10 FT
HORIZONTAL BENDS								
6 INCH DIA - 11.25 DEG	3	2	2	2	2	1	1	1
6 INCH DIA - 22.5 DEG	5	4	4	3	3	3	3	2
6 INCH DIA - 45 DEG	11	9	8	7	7	6	5	5
6 INCH DIA - 90 DEG	26	22	19	17	16	14	13	12
VERTICAL DOWN BENDS	3 FT	4 FT	5 FT	6 FT	7 FT	8 FT	9 FT	10 FT
6 INCH DIA - 11.25 DEG	7	6	6	5	4	4	4	3
6 INCH DIA - 22.5 DEG	15	13	11	10	9	8	8	7
6 INCH DIA - 45 DEG	31	27	23	21	19	17	16	15
VERTICAL UP BENDS	3 FT	4 FT	5 FT	6 FT	7 FT	8 FT	9 FT	10 FT
6 INCH DIA - 11.25 DEG	3	2	2	2	2	1	1	1
6 INCH DIA - 22.5 DEG	5	4	4	3	3	3	3	2
6 INCH DIA - 45 DEG	11	9	8	7	7	6	5	5

ASSUMPTIONS

LAYING CONDITION = TYPE 4
SOIL DESIGNATION = GC = COHESIVE-GRANULAR
DESIGN PRESSURE = 200 PSI (TEST PRESSURE)
SAFETY FACTOR = 1.5

NOTES

1. RESTRAINED LENGTH IS MEASURED FROM THE CENTER OF THE BEND AS FOLLOWS:
   A. HORIZONTAL AND VERTICAL BENDS: ALONG EACH SIDE OF BEND.
   B. HORIZONTAL AND VERTICAL BENDS - OFFSET OR COMBINED: ALONG THE OUTER SIDE OF EACH BEND. ALL PIPE BETWEEN THE TWO BENDS SHALL BE RESTRAINED JOINT WHEN THE DISTANCE BETWEEN THEM IS EQUAL TO OR LESS THAN THE REQUIRED RESTRAINED LENGTH. WHEN THE DISTANCE BETWEEN BENDS IS LESS THAN REQUIRED, THE BALANCE OF THE REQUIRED RESTRAINED LENGTH SHALL BE ADDED ON TO THE LENGTH ALONG THE OUTSIDE OF EACH BEND RESPECTIVELY TO MAKE UP FOR THE DEFICIENCY IN THAT DIRECTION.
   HORIZONTAL BEND EXAMPLE...
   INSTALL A 8 INCH 45 DEG BEND AND A 22.5 DEG BEND WITH 10 FEET BETWEEN BENDS AND 4 FEET OF COVER. THE CONTRACTOR SHALL PROVIDE AN ADDITIONAL 1 FOOT OF RESTRAINED LENGTH BEYOND THE 45 DEGREE BEND (FOR A TOTAL OF 13 FEET) AND AN ADDITIONAL 7 FEET OF RESTRAINED LENGTH BEYOND THE 22.5 DEGREE BEND (FOR A TOTAL OF 13 FEET).
2. WHEN IT IS NOT POSSIBLE TO INSTALL THE RESTRAINED LENGTHS AS NOTED BY THIS TABLE, THE CONTRACTOR SHALL INSTALL THE APPROPRIATE CONCRETE THRUST RESTRAINTS AS PER THE DETAILS HEREIN.

4/3/2013
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HNTB
HNTB NORTH CAROLINA, P.C.
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UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER KEVIN C. ZDEB

2013-APR-08

MA Engineering CONSULTANTS, INC.
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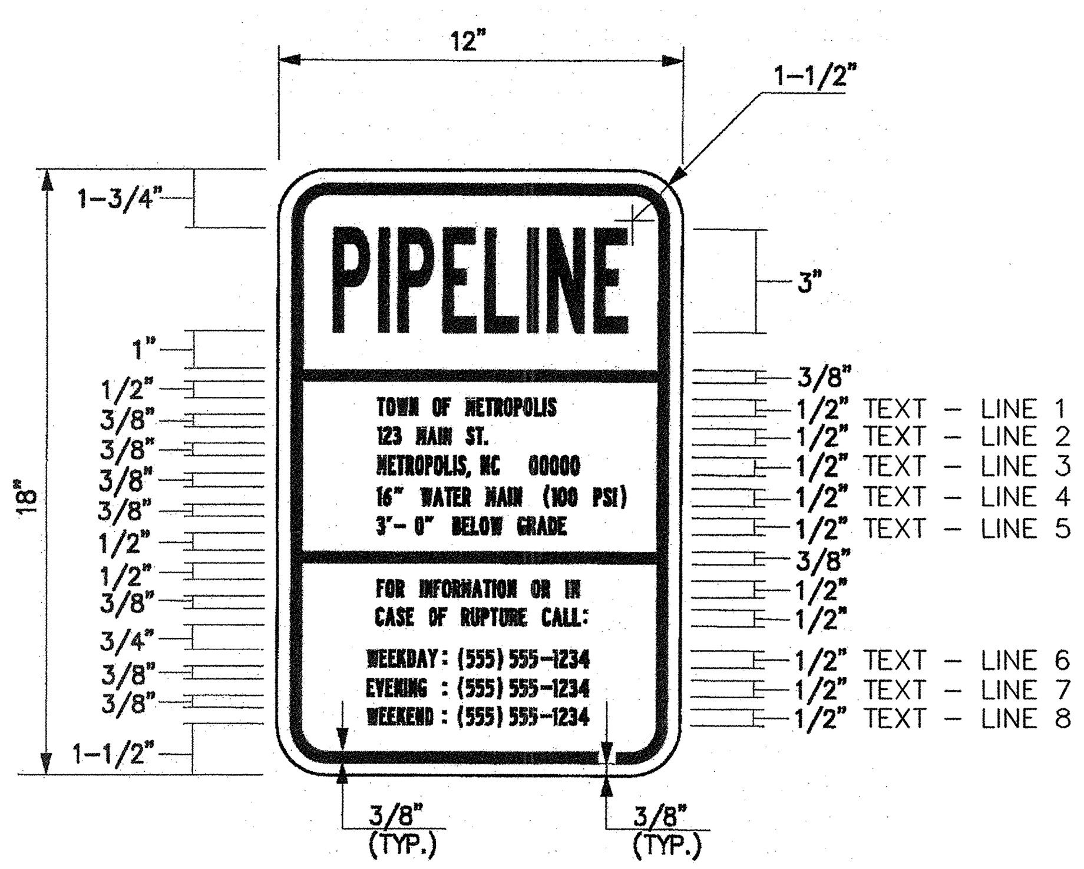


SIGN DATA:
- 1/8" ALUMINUM PANEL
- 3M SCOTCH LITE "ENGINEER GRADE" SHEETING OR APPROVED EQUAL.
- RED COPY ON WHITE BACKGROUND
- MOUNT SIGN PANEL 5' ABOVE GRADE (MIN.)
- USE 2 LB/FT U-CHANNEL POST (MIN.)
- MOUNT SIGNS BACK-TO-BACK ON POST.

TEXT NOTES FOR VARIOUS UTILITY OWNERS:

A. TOWN OF HARRISBURG
LINE 1: TOWN OF HARRISBURG
LINE 2: 4100 MAIN STREET
LINE 3: HARRISBURG, NC 28075
LINE 4: 6" WATER MAIN (150 PSI)
LINE 5: #'-#" BELOW GRADE
LINE 6: (704) 455-5614
LINE 7: (704) 784-6029
LINE 8: (704) 784-6029

NOTES:
1. LINE 5: CONTRACTOR SHALL NOTE THE AS-BUILT DEPTH (TO TOP OF CASING OR PIPE) AT THE SIGN LOCATION.

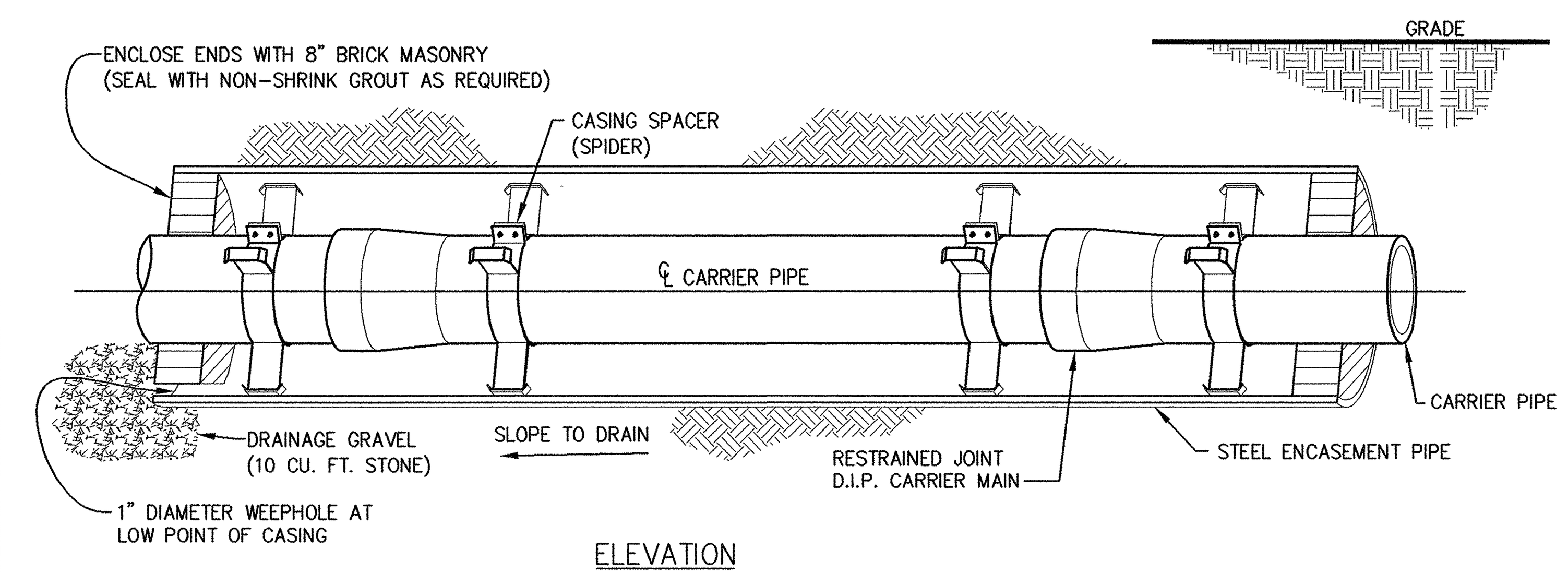
NOTES:

1. ALL PIPELINES (EXCEPT THOSE LOCATED UNDER STREETS) SHALL BE PROMINENTLY MARKED AT THE RIGHT-OF-WAY LINES (ON BOTH SIDES OF TRACK FOR CROSSINGS) BY DURABLE, WEATHERPROOF SIGNS LOCATED OVER THE CENTERLINE OF THE PIPE.

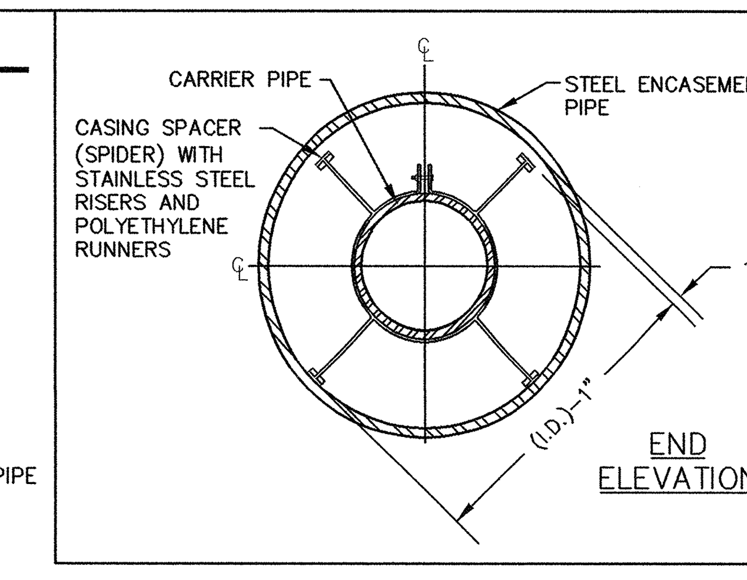
2. FOR PIPELINES RUNNING LONGITUDINALLY ON RR PROPERTY, SIGNS SHALL BE PLACED OVER THE PIPE (OR OFFSET AND APPROPRIATELY MARKED) AT ALL CHANGES IN DIRECTION OF THE PIPELINE. SIGNS SHALL BE LOCATED SO THAT THE NEXT ADJACENT MARKER IN EITHER DIRECTION IS VISIBLE WHEN STANDING AT ONE SIGN. SIGNS SHALL NOT BE PLACED MORE THAN 500 FEET APART UNLESS OTHERWISE SPECIFIED BY THE ENGINEERING REPRESENTATIVE FOR THE RR.

3. THE UTILITY OWNER MUST MAINTAIN ALL PIPE MARKER SIGNS LOCATED ON THE RR RIGHT-OF-WAY.

PIPE MARKER SIGN



ELEVATION



END ELEVATION

NOTES:

1. CASING SPACERS "SPIDERS" SHALL BE USED FOR SUPPORT OF THE CARRIER PIPE WITHIN THE STEEL ENCASEMENT PIPE. SPIDERS SHALL BE CENTERED AND RESTRAINED. SPIDERS SHALL HAVE A STAINLESS STEEL SHELL AND STAINLESS STEEL RISERS WITH POLYETHYLENE RUNNERS. MANUFACTURED BY CASCADE WATERWORKS MFG. COMPANY OR APPROVED EQUAL.

2. A MINIMUM SPACING OF 2 SPIDERS PER JOINT OF CARRIER PIPE SHALL BE REQUIRED IN ORDER TO PREVENT SAGGING OF CARRIER PIPE. REFER TO THE MANUFACTURER'S RECOMMENDATIONS FOR SPACING AND SIZE OF SPACERS BASED ON THE SIZE OF THE CARRIER PIPE.

3. THE SPIDERS SHALL BE SPACED EVENLY ALONG THE CARRIER PIPE SUCH THAT EACH SPIDER SUPPORTS THE SAME UNIT WEIGHT OF THE CARRIER PIPE.

4. STEEL ENCASEMENT PIPES SHALL EXTEND TO THE RAILROAD RIGHT-OF-WAY LINES OR AS SHOWN ON THE PLANS.

5. STEEL ENCASEMENT PIPES TO BE INSTALLED UNDER TRACK AND WITHIN 45 FEET OF THE CENTERLINE OF THE OUTERMOST EXISTING TRACK SHALL BE INSTALLED BY BORE AND JACK.

6. REFER TO PLAN SHEETS AND PROFILE SHEETS FOR LENGTH AND INSIDE DIAMETER OF PROPOSED STEEL ENCASEMENT PIPES FOR EACH CROSSING.

7. THE INSIDE DIAMETER OF THE ENCASEMENT PIPE SHALL BE: AT LEAST 2 INCHES GREATER THAN THE LARGEST OUTSIDE DIAMETER OF THE CARRIER PIPE JOINTS OR COUPLINGS FOR CARRIER PIPE LESS THAN 6 INCHES IN DIAMETER; AND AT LEAST 4 INCHES GREATER FOR CARRIER PIPE 6 INCHES AND LARGER IN DIAMETER.

8. ALL JOINTS BETWEEN THE SECTIONS OF ENCASEMENT PIPE SHALL BE FULLY WELDED AROUND THE COMPLETE CIRCUMFERENCE OF THE PIPE.

8. FOR EXISTING UTILITY PIPE INSTALLATIONS, THE STEEL ENCASEMENT PIPE SHALL BE A SPLIT STEEL ENCASEMENT PIPE MADE UP OF TWO (2) SEMI-CIRCULAR SECTIONS JOINED BY A CONTINUOUS WELD FROM ONE END TO THE OTHER WITHOUT ANY TRACEABLE VOIDS. JOINTS BETWEEN HORIZONTAL SECTIONS OF ENCASEMENT PIPE SHALL BE FULLY WELDED AROUND THE COMPLETE CIRCUMFERENCE OF THE PIPE.

9. STEEL ENCASEMENT PIPES SHALL BE SPIRAL WELDED STEEL AND HAVE A SPECIFIED MINIMUM YIELD STRENGTH OF AT LEAST 35,000 PSI IN ACCORDANCE WITH ASTM A139 AND A283.

10. UNCOATED AND UNPROTECTED STEEL ENCASEMENT PIPE WITH A MINIMUM COVER OF 5.5 FEET FROM BASE OF RAIL SHALL HAVE A MINIMUM WALL THICKNESS AS NOTED BELOW FOR THE FOLLOWING OUTSIDE DIAMETER OF PIPES:

0.188 INCH FOR 10" AND SMALLER	0.562 INCH FOR 38"
0.250 INCH FOR 12" AND 14"	0.594 INCH FOR 40"
0.312 INCH FOR 18"	0.625 INCH FOR 42"
0.344 INCH FOR 20" AND 22"	0.657 INCH FOR 44" AND 46"
0.375 INCH FOR 24"	0.688 INCH FOR 48"
0.406 INCH FOR 26"	0.719 INCH FOR 50"
0.438 INCH FOR 28"	0.750 INCH FOR 52"
0.469 INCH FOR 30"	0.781 INCH FOR 54"
0.500 INCH FOR 32"	0.812 INCH FOR 56" AND 58"
0.532 INCH FOR 34" AND 36"	0.844 INCH FOR 60"

STEEL ENCASEMENT PIPE UNDER RAILROADS

DGN 0041DEL_P10a1

HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554	PROJECT REFERENCE NO.	SHEET NO.
DATE: APRIL 4, 2013	P-5208C	UC-4

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027861 ENGINEER KEVIN C. ZOLER

2013-APR-08

MA Engineering CONSULTANTS, INC. 598 E. Chatham Street, Suite 137 Cary, N. C. 27511

UTILITY OWNERS ON THIS SHEET:
1. TOWN OF HARRISBURG
UTILITY: 6" WATER LINE
CONTACT: DEREK SLOCUM
PHONE: 704-455-0728

EXISTING VALVE TO REMAIN

BEGIN WATER LINE 1
PROP. 22.5° HORIZ. BEND
TIE-IN TO EXISTING
6" PVC WATER LINE
WL-1 STA 0+00.00
TRK STA 10440+34.32 LT 122.5'

EXISTING WATER METERS TO REMAIN

PROP. 22.5° HORIZ. BEND
WL-1 STA 0+12.46
TRK STA 10440+38.94 LT 111.0'

BEGIN ENCASEMENT PIPE
WL-1 STA 0+23.43
TRK STA 10440+38.74 LT 100.0'

PROP. 201 LF 6" WATER LINE
PROP. 165 LF 18" ENCASEMENT PIPE
PROP. 50 LF TRENCHLESS INSTALLATION OF 18" PIPE IN SOIL
PROP. 50 LF TRENCHLESS INSTALLATION OF 18" PIPE NOT IN SOIL

ABANDON 197 LF 6" UTILITY PIPE

PIPELINE MARKER

65 LF OPEN TRENCH

100 LF JACK AND BORE

18" ENCASEMENT

END ENCASEMENT PIPE
WL-1 STA 1+88.16
TRK STA 10440+35.64 RT 64.7'

PROP. 45° HORIZ. BEND
WL-1 STA 1+93.16
TRK STA 10440+35.54 RT 69.7'

PIPE LINE MARKER

EXISTING 8" SANITARY GRAVITY SEWER TO REMAIN

EXISTING WATER METERS AND HOT BOX TO REMAIN

EXISTING UTILITY MANHOLE AND VALVES TO REMAIN

END WATER LINE 1
PROP. 45° HORIZ. BEND
TIE-IN TO EXISTING
6" PVC WATER LINE
WL-1 STA 2+00.13
TRK STA 10440+30.49 RT 74.5'

10440+00

N 06°02'47" W 362.05'

S 06°05'42" E 361.35'

S 80°30'14" W

DB 8723 PG 8 JR

RAY HELMS DB 679 PG 292

DB 239 PG 35 TOWN OF HARRISBURG

N 05°36'05" W 97.35'

RAILROAD AVENUE AS DESCRIBED IN DB 418 PG 566 AND DB 4139 PG 3

WALTERS PG 62

NAD 83/ NSRS 2007

ROBINSON CHURCH RD SR1166 22' PAVED ROADWAY

SILO

BARN

LOG CABIN

CONC

32" BLK WALL

72" CHL W/3SBW

DILAPIDATED 48"WW ISBW

OVERHEAD LINE

CABLE GATE

DIRECTIONAL BOX

HOT BOX

MINATURE TRAIN TRACK

ISFB

MANHOLE PAVED OVER LOC APPROX NO INVERTS

INV=607.21'

INV=607.18'

INV=609.37'

INV=610.43'

TOP=613.15'

8" PVC

6" PVC

18" RCP

24" RCP

24"PLASTIC

RAILROAD AVENUE

OLD SPUR

SWITCH

30.00'

67.35'

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: APRIL 4, 2013

PROJECT REFERENCE NO.	SHEET NO.
P-5208C	UC-5

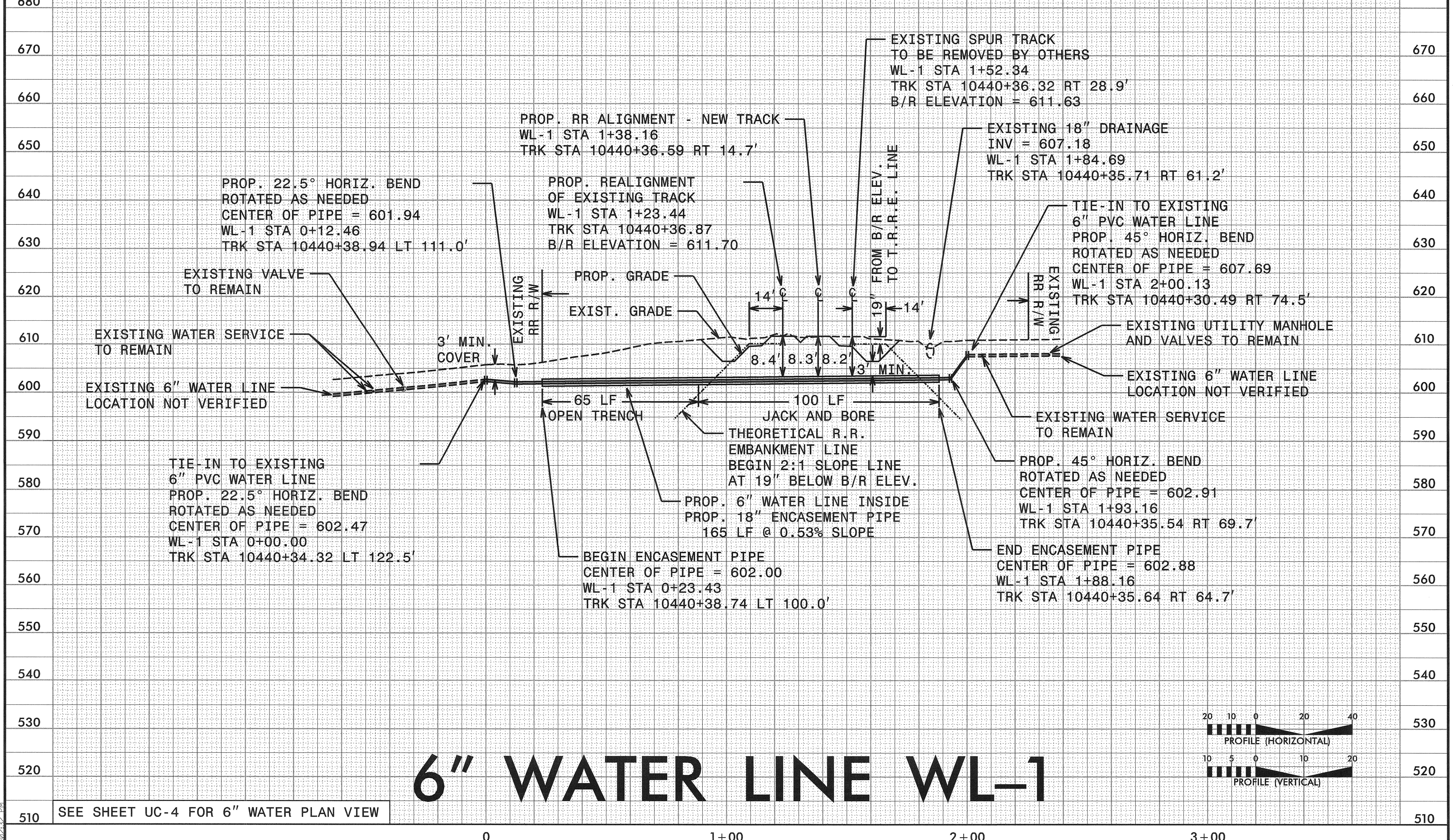
UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER KEVIN C. ZDEB

2013-APR-08

MA Engineering CONSULTANTS, INC. 598 E. Chatham Street, Suite 137 Cary, N. C. 27511

DGN 0041DEL_P10a1



700
690
680
670
660
650
640
630
620
610
600
590
580
570
560
550
540
530
520
510
EXISTING SPUR TRACK
TO BE REMOVED BY OTHERS
WL-1 STA 1+52.34
TRK STA 10440+36.32 RT 28.9'
B/R ELEVATION = 611.63
PROP. RR ALIGNMENT - NEW TRACK
WL-1 STA 1+38.16
TRK STA 10440+36.59 RT 14.7'
EXISTING 18" DRAINAGE
INV = 607.18
WL-1 STA 1+84.69
TRK STA 10440+35.71 RT 61.2'
PROP. 22.5° HORIZ. BEND
ROTATED AS NEEDED
CENTER OF PIPE = 601.94
WL-1 STA 0+12.46
TRK STA 10440+38.94 LT 111.0'
PROP. REALIGNMENT
OF EXISTING TRACK
WL-1 STA 1+23.44
TRK STA 10440+36.87
B/R ELEVATION = 611.70
19" FROM B/R ELEV. TO T.R.R.E. LINE
TIE-IN TO EXISTING
6" PVC WATER LINE
PROP. 45° HORIZ. BEND
ROTATED AS NEEDED
CENTER OF PIPE = 607.69
WL-1 STA 2+00.13
TRK STA 10440+30.49 RT 74.5'
EXISTING VALVE
TO REMAIN
PROP. GRADE
EXIST. GRADE
EXISTING RR R/W
14'
14'
EXISTING UTILITY MANHOLE
AND VALVES TO REMAIN
EXISTING WATER SERVICE
TO REMAIN
3' MIN.
COVER
8.4'
8.3'
8.2'
3' MIN.
EXISTING 6" WATER LINE
LOCATION NOT VERIFIED
65 LF
OPEN TRENCH
100 LF
JACK AND BORE
THEORETICAL R.R.
EMBANKMENT LINE
BEGIN 2:1 SLOPE LINE
AT 19" BELOW B/R ELEV.
TIE-IN TO EXISTING
6" PVC WATER LINE
PROP. 22.5° HORIZ. BEND
ROTATED AS NEEDED
CENTER OF PIPE = 602.47
WL-1 STA 0+00.00
TRK STA 10440+34.32 LT 122.5'
PROP. 45° HORIZ. BEND
ROTATED AS NEEDED
CENTER OF PIPE = 602.91
WL-1 STA 1+93.16
TRK STA 10440+35.54 RT 69.7'
PROP. 6" WATER LINE INSIDE
PROP. 18" ENCASEMENT PIPE
165 LF @ 0.53% SLOPE
BEGIN ENCASEMENT PIPE
CENTER OF PIPE = 602.00
WL-1 STA 0+23.43
TRK STA 10440+38.74 LT 100.0'
END ENCASEMENT PIPE
CENTER OF PIPE = 602.88
WL-1 STA 1+88.16
TRK STA 10440+35.64 RT 64.7'
0
1+00
2+00
3+00
20 10 0 20 40
PROFILE (HORIZONTAL)
10 5 0 10 20
PROFILE (VERTICAL)

6" WATER LINE WL-1

SEE SHEET UC-4 FOR 6" WATER PLAN VIEW

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