

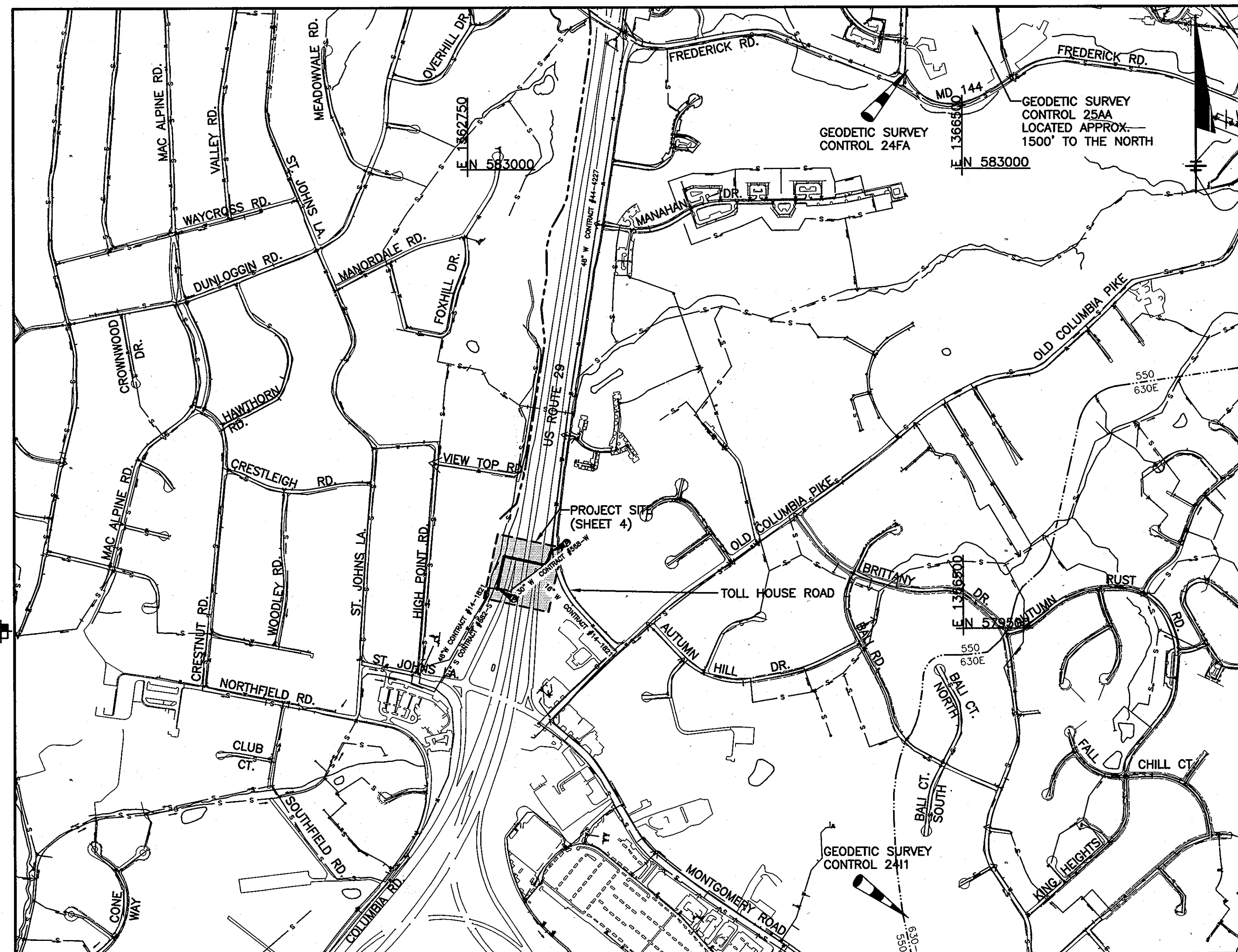
I:\HOWARD-CO-2343-TUNNEL-PROJECT\DWG\SHEETS\43844-001.DWG

**GENERAL NOTES:**

- THE LOCATIONS, ELEVATIONS, OR STATIONING SHOWN FOR EXISTING MAINS AND UTILITIES ARE APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE EXISTENCE (INCLUDING LOCATION AND ELEVATION) OF ALL BURIED UTILITIES. NOTE ALSO THAT OTHER EXISTING BURIED UTILITIES MAY EXIST WITHIN THE WORK AREA THAT ARE NOT SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING MAINS AND SERVICES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTOR'S EXPENSE.
- THIS DRAWING IS BASED ON A TOPOGRAPHIC SURVEY PERFORMED BY A. MORTON THOMAS AND ASSOCIATES ON OR ABOUT MARCH, 2004 AND JANUARY, 2009. SURVEY WITHIN THE US ROUTE 29 PAVED LIMITS WAS PROVIDED BY HOWARD COUNTY SURVEY DIVISION, SEPTEMBER, 2009. COORDINATES SHOWN ARE BASED ON THE MARYLAND STATE REFERENCE SYSTEM NAD 83/91 AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL MONUMENTS 24FA, 25AA, AND 2411.
- ALL VERTICAL CONTROLS ARE BASED ON NAVD 88.
- ALL PIPE ELEVATIONS SHOWN ARE INVERT ELEVATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
- CLEAR ALL UTILITIES BY A MINIMUM OF 12 INCHES. CLEAR ALL POLES BY 5'-0" MINIMUM OR TUNNEL AS REQUIRED UNLESS OTHERWISE NOTED. IN THE EVENT THE CONTRACTOR'S WORK REQUIRES THE BRACING OF POLES, ANY COST INCURRED BY THE OWNER FOR BRACING OF POLES OR DAMAGES SHALL BE DEDUCTED FROM MONIES OWED THE CONTRACTOR. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO SCHEDULE THE BRACING OF THE POLES.
- FOR DETAILS NOT SHOWN ON THE DRAWING, AND FOR MATERIALS AND CONSTRUCTION METHODS, USE HOWARD COUNTY DESIGN MANUAL, VOLUME IV, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION (LATEST EDITION). THE CONTRACTOR SHALL HAVE A COPY OF VOLUME IV ON THE JOB.
- 48-INCH WATER MAIN DESIGN CRITERIA:
  - THIS PROJECT MAY BE BID USING ONE OF THREE ALTERNATIVE PIPE MATERIALS FOR THE PROPOSED 48-INCH WATER MAIN (DUCTILE IRON, STEEL, OR PCCP).
  - THE EXISTING WATER MAIN IS DUCTILE IRON PIPE. CONNECTIONS OF PROPOSED STEEL AND PCCP PIPE TO THE EXISTING DUCTILE IRON PIPE SHALL INCLUDE INSULATION KITS TO PREVENT CORROSION DUE TO THE CONTACT OF DISSIMILAR METALS.
  - ALL FITTINGS AND PIPE JOINTS ON THE 48-INCH WATER MAIN SHALL BE RESTRAINED USING THE METHOD SHOWN ON SHEET 7 AND AS DESCRIBED IN THE SPECIFICATIONS.
  - IN ADDITION TO THE RESTRAINED PIPE JOINTS, CONCRETE BUTTRESSING AND ANCHOR COLLARS SHALL BE INSTALLED AT THE LOCATIONS SHOWN OR SPECIFIED.
- WHERE TEST PITS HAVE BEEN MADE ON EXISTING UTILITIES, THEY ARE NOTED BY THE SYMBOL AT THE LOCATIONS OF THE TEST PITS. A NOTE OR NOTES CONTAINING THE RESULTS OF THE TEST PITS IS INCLUDED ON THE DRAWINGS OR WITHIN THE SPECIFICATIONS. EXISTING UTILITIES IN THE VICINITY OF THE PROPOSED WORK FOR WHICH TEST PITS HAVE NOT BEEN DUG SHALL BE LOCATED BY THE CONTRACTOR TWO WEEKS IN ADVANCE OF CONSTRUCTION OPERATIONS AT HIS OWN EXPENSE.
- THE CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITY COMPANIES OR AGENCIES AT LEAST FIVE WORKING DAYS BEFORE STARTING WORK SHOWN ON THESE PLANS:
 

AT&T.....	1-800-252-1133
BGE (CONTRACTOR SERVICES).....	410-850-4820
BGE (UNDERGROUND DAMAGE CONTROL).....	410-787-9068
BUREAU OF UTILITIES.....	410-313-4900
COLONIAL PIPELINE COMPANY.....	410-795-1390
MISS UTILITY.....	1-800-257-7777
STATE HIGHWAY ADMINISTRATION.....	410-531-5533
VERIZON.....	1-800-743-0033/410-224-9210
MCI WORLDWIDE.....	1-800-624-9675

THE PERMITEE IS REQUIRED TO CONTACT THE DISTRICT 7 MAINTENANCE SECTION AT 301-624-8105 OF THE STATE HIGHWAY ADMINISTRATION FOR LOCATING ALL SHA UNDERGROUND FACILITIES AND ED RODENHIZER AT 410-787-7650 FOR LOCATING ALL SHA TRAFFIC FACILITIES AT LEAST 48 HOURS (TWO FULL WORKING DAYS) PRIOR TO STARTING ANY EXCAVATION WORK UNDER THE SHA PERMIT.
- TREES AND SHRUBS ARE TO BE PROTECTED FROM DAMAGE TO THE MAXIMUM EXTENT.
- CONTRACTOR SHALL REMOVE TREES, STUMPS, AND ROOTS ALONG LINE OF EXCAVATION. PAYMENT FOR SUCH REMOVAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONSTRUCTION OF THE MAIN.
- THE CONTRACTOR SHALL NOTIFY THE BUREAU OF HIGHWAYS, HOWARD COUNTY, AT (410)-313-7450 AT LEAST FIVE WORKING DAYS BEFORE OPEN CUTTING OR BORING/JACKING OF ANY COUNTY ROAD FOR LAYING WATER/SEWER MAINS OR HOUSE CONNECTIONS. THE APPROVAL OF THESE DRAWINGS WILL CONSTITUTE COMPLIANCE WITH DPW REQUIREMENTS PER SECTION 18.114(A) OF THE HOWARD COUNTY CODE.
- TOPS OF ALL WATER MAINS SHALL HAVE A MINIMUM OF 4'-0" OF COVER UNLESS OTHERWISE NOTED.
- THE CONTRACTOR SHALL NOT OPERATE ANY WATER MAIN VALVES ON THE EXISTING WATER SYSTEM.
- ALL TIE-INS TO EXISTING WATER MAINS SHALL BE COORDINATED WITH THE HOWARD COUNTY BUREAU OF UTILITIES AT LEAST 10 WORKING DAYS PRIOR TO SCHEDULING WORK. CONTRACTOR SHALL SUBMIT A DETAILED PLAN FOR THE SHUTDOWN OF EXISTING WATER MAINS FOR APPROVAL BY THE COUNTY.



WATER AND SEWER CODE FOR COUNTY USE ONLY:

WATER CODE NO.	F04
NO. OF CONNECTIONS	X
SEWER CODE NO.	N/A
NO. OF CONNECTIONS DRAINAGE AREA	0
TYPE OF BUILDING	PATAPSCO
NO. OF PARCELS	N/A

**VICINITY MAP**  
SCALE: 1" = 600'

# US ROUTE 29 WATER MAIN REPLACEMENT: TUNNEL CROSSING AT MONTGOMERY ROAD

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
HOWARD COUNTY, MARYLAND  
DEPARTMENT OF PUBLIC WORKS

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
BY: *[Signature]*

QUANTITIES				
ITEM	ESTIMATED QUANTITY	AS-BUILT	MATERIAL	SUPPLIER
<b>WATER MAINS</b>				
48" WATER (DUCTILE IRON, STEEL, OR PCCP) RJ (BY OPEN CUT METHODS)	445	L.F.	406	PCCP VIANINI
48" WATER (DUCTILE IRON, STEEL, OR PCCP) RJ (BY TUNNELING METHODS)	280	L.F.	300	PCCP VIANINI
72" ID CASING PIPE	280	L.F.	300	STEEL PERMALOCK
ACCESS/BLOW-OFF MANHOLE ASSEMBLY	1	EA.	1	PRECAST ATLANTIC

**GENERAL NOTES: CONT'D**

- EXISTING STORM DRAINS DISTURBED BY THE CONSTRUCTION SHALL BE REPLACED IN KIND AT THE SAME LINE, GRADE, AND SHAPE AS THE EXISTING STORM DRAINS OR SWALES, INCLUDING RIP-RAP LINING IF PREVIOUSLY EXISTING.
- ANY TREES, OUTSIDE OF EXISTING EASEMENTS, DISTURBED BY CONSTRUCTION SHALL BE REPLACED IN KIND. (3" CALIPER MINIMUM.)
- SALVAGEABLE VALVES AND APPURTENANCES TO BE REMOVED SHALL BE DELIVERED TO THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS - BUREAU OF UTILITIES AS DIRECTED BY THE ENGINEER OR COUNTY.
- THE CONTRACTOR MUST FOLLOW ALL CONDITIONS AND REQUIREMENTS AS SET FORTH IN THE REQUIRED PERMITS FOR THIS PROJECT.
- THE CONTRACTOR SHALL PROVIDE SURVEY CONSTRUCTION STAKEOUT FOR ALL NECESSARY LINES, GRADES AND ELEVATIONS OF THE PROPOSED FACILITIES.
- CONTRACTOR SHALL ABANDON EX. WATER MAIN AND APPURTENANCES IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS IN ORDER TO FACILITATE CONSTRUCTION OF THE PROPOSED WATER MAIN AS INDICATED IN THE DRAWINGS AND DETAILS HEREIN.
- PIPE TRENCHING SHALL BE PERFORMED IN ACCORDANCE WITH DETAILS ON SHEET 6.
- IN ACCORDANCE WITH 10 STATE STANDARD REQUIREMENTS - ALL CROSSINGS OF THE NEW WATER MAIN WITH EXISTING SANITARY OR STORM SEWER PIPING (RESULTING IN LESS THAN 18" OF SEPARATION) SHALL BE ACCOMPLISHED BY CENTERING A FULL LENGTH OF THE NEW WATER MAIN PIPING AT THE CROSSING TO MAXIMIZE THE DISTANCE OF ANY WATER MAIN JOINT FROM THE CROSSING.
- THE PROPOSED 48-INCH WATER MAIN SHALL BE LEAKAGE AND PRESSURE TESTED, AS WELL AS CHLORINATED, IN TWO CONFIGURATIONS:
  - THE FIRST SHALL BE 48-INCH WATER MAIN LOCATED WITHIN THE CASING, BETWEEN PIPE JOINTS LOCATED A MAXIMUM DISTANCE OF 3'-FEET BEYOND THE ENDS OF THE 72-INCH CASING PIPE. TEMPORARILY SEAL THE ENDS OF THIS PIPE SEGMENT WITH MJ DI CAPS RESTRAINED USING THE MEGALUG MJ RESTRAINT FITTING. ONCE CAPPED, PERFORM THE LEAKAGE AND PRESSURE TEST, DO NOT CHLORINATE AT THIS TIME.
  - THE FINAL TESTING SHALL BE PERFORMED AFTER THE 48-INCH WATER MAIN HAS BEEN EXTENDED FROM BOTH ENDS OF THE CASING, TO JUST SHORT OF THE ACTUAL CONNECTIONS. ONCE THE PROPOSED WATER MAIN IS INSTALLED TO THIS EXTENT, SEAL THE ENDS USING THE SAME TYPE OF RESTRAINED MJ CAP AND PERFORM THE LEAKAGE AND PRESSURE TEST OF THE ENTIRE SYSTEM. CHLORINATION SHALL BE PERFORMED FOLLOWING SUCCESSFUL TESTING OF THE PROPOSED SYSTEM.
- THE ENDS OF THE EXISTING WATER MAIN PIPING SHOWN TO BE ABANDONED, SHALL BE PERMANENTLY SEALED USING MJ DI CAPS WITH MEGALUG RESTRAINT BY EBAA IRON, INC. OR APPROVED EQUAL. THE CAPS SHALL INCLUDE A THREADED OR FLANGED OPENING FOR EXTENSION OF A STEEL PIPE TO GRADE, OF SUFFICIENT SIZE TO PUMP GROUT INTO THE PIPE FROM BOTH OR EITHER END, COMPLETELY FILLING THE PIPE.
- NO WATER SHALL BE DISCHARGED FROM THE EXISTING WATER MAIN TO THE ENVIRONMENT, WITHOUT FIRST DECHLORINATING. THE CONTRACTOR SHALL SUBMIT THE DECHLORINATION METHOD TO THE OWNER AND IT'S ENGINEER FOR REVIEW.

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**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

*[Signature]* 2/26/10  
DIRECTOR OF PUBLIC WORKS DATE

*[Signature]* 1/29/10  
CHIEF - BUREAU OF ENGINEERING DATE

*[Signature]* 3/5/10  
CHIEF, BUREAU OF UTILITIES DATE

*[Signature]* 1/28/10  
CHIEF, UTILITY DESIGN DIVISION DATE

**O'BRIEN & GERE ENGINEERS, INC.**

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Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 18923, EXPIRATION DATE DECEMBER, 2011

*[Signature]*  
PROFESSIONAL ENGINEER

DSN. BY: SSD				
DRN. BY: RPW				
CHK. BY: RJD				
DATE: JAN, 2010	RJD	1	RECORD DRAWING	10/11
BY NO.			REVISION	DATE

**COVER SHEET**

600' SCALE MAP NO. 24 BLOCK NO. 17

**US 29 WATER MAIN REPLACEMENT TUNNEL CROSSING AT MONTGOMERY ROAD**

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

I:\HOWARD-CO.2343-TUNNEL-PROJECT.DWG SHEETS 43844-002.DWG

### 48" DIA. WATER MAIN COORDINATE TABLE

STATION	ITEM	NORTHING	EASTING
0+00.00	EXISTING DEWATERING MANHOLE	579814.32	1362932.92
0+48.90	48" 90-DEGREE HB	579806.89	1362981.16
0+91.14	BEGIN HORIZONTAL DEFLECTION	579849.09	1362984.08
1+71.07	END HORIZONTAL DEFLECTION	579927.52	1362999.48
2+36.36	ACCESS/BLOW-OFF MANHOLE	579990.48	1363018.39
3.03.25	48" 90-DEGREE HB	580055.56	1363033.40
3+25.63	END OF CASING PIPE	580051.54	1363055.32
6+08.50	BEGINNING OF CASING PIPE	579991.19	1363331.71
6+22.44	48" 90-DEGREE HB	579988.97	1363345.34
7+04.20	48" 5.625-DEGREE HB	580068.58	1363363.51
7+23.36	48" CONNECTION COUPLING	580086.82	1363369.39

### SOIL BORING SCHEDULE

ID	STATION	DEPTH	NORTHING	EASTING
TB-1	6+20.60	48'	579986.98	1363346.58
TB-2	4+64.47	40'	580002.28	1363186.66
TB-3	3+02.76	30'	580058.38	1363027.35
B-8	*	20'	580078.51	1363333.33
B-9	*	6'	580117.64	1363040.85

\* BORINGS B-8 AND B-9 ARE TAKEN FROM A PREVIOUS GEOTECHNICAL STUDY AND ARE NOT LOCATED DIRECTLY ALONG THE PROPOSED ALIGNMENT. POSITIONS ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. BORINGS LOGS CAN BE FOUND IN THE CONTRACT SPECIFICATIONS.

### LEGEND (PLAN AND PROFILE SHEETS)

SIDEWALK

PAVEMENT (EDGE)

GRAVEL (EDGE)

CONCRETE (EDGE)

BUILDING

CENTERLINE

SHA THRU HIGHWAY RIGHT-OF-WAY

PROPERTY LINE/RIGHT-OF-WAY

GUARDRAIL

FENCE (WOOD)

FENCE IRON, RAIL

FENCE(CHAINLINK)

UNDERGROUND ELECTRIC LINE

UNDERGROUND TELEPHONE LINE

UNDERGROUND CABLE LINE

UNDERGROUND FIBER OPTIC LINE

OVERHEAD UTILITIES

SANITARY SEWER

STORM DRAIN

WATER MAIN

WETLANDS BOUNDARY

WETLANDS BUFFER BOUNDARY

PROPOSED WATER

GAS

DITCH

STREAM

WOODLINE

BUSH

RIP-RAP DITCH

MILL AND OVERLAY

BORING LOCATION

TEST PIT LOCATION

BM #

REBAR

FLY STATION

ABANDON IN PLACE EX. WM

MAIL BOX

VENT

STORM DRAIN MH

HEADWALL/ENDWALL

DROP INLET GRATE

DROP INLET

ROAD SIGN

TELE. JUNC. BOX

UTILITY POLE

LIGHT POLE

GUY WIRE

GROUND LIGHT

ELEC. TRANSFORMER

ELEC. MH

ELEC. JUNC. BOX

SPOT ELEVATION

CABLE BOX

SAN. SEW. MH

CLEAN OUT

WATER VALVE

RSG VALVE

WATER METER

WATER MAIN VALVE VAULT

IRRIGATION VALVE

FIRE HYDRANT

GAS VENT PIPE

GAS VALVE

GAS PUMP

GAS LINE MARKER

IRON PIPE FOUND

REBAR AND CAP

TRAVERSE STATION

POINT OF CONNECTION

DETAIL OR SECTION IDENTIFICATION

SHEET NO.

DETAIL IDENTIFICATION

SHEET THAT DETAIL IS LOCATED

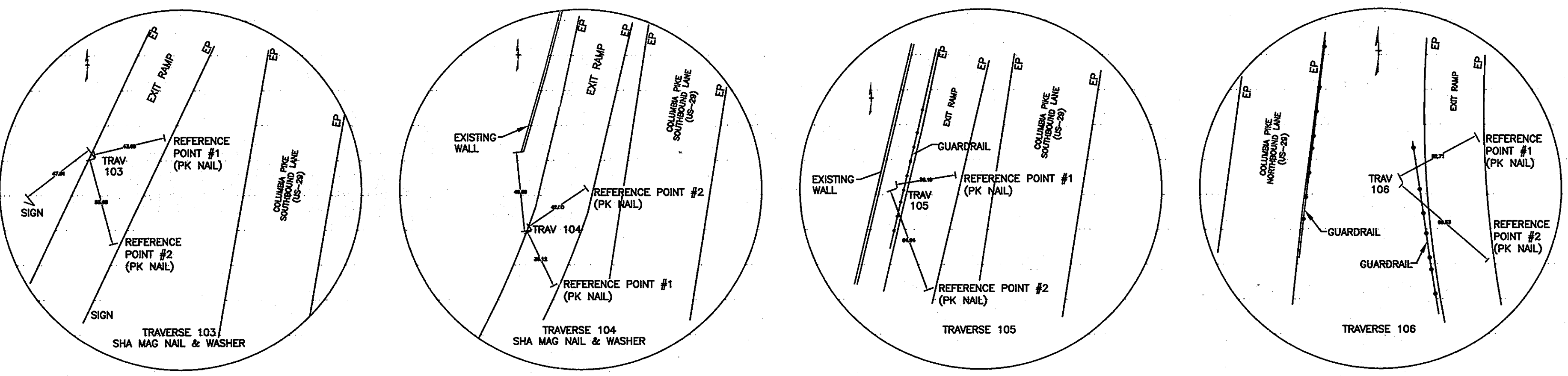
SHEET THAT DETAIL IS TAKEN FROM

**BENCHMARK CONTROL DATA:**

BENCHMARK	ELEVATION	DESCRIPTION
BM 3	364.88	SQUARE CUT AT LIGHT POLE BASE #9607250

**SURVEY CONTROL DATA:**

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
103	579455.239	1362870.851	402.758	MAG NAIL
104	579783.730	1363014.727	380.382	MAG NAIL
105	580133.731	1363095.602	365.181	REBAR AND CAP
106	580083.762	1363372.339	385.468	REBAR AND CAP



### ABBREVIATIONS:

APPROX.	APPROXIMATE
ARV MH	AIR RELEASE MANHOLE
BE	BURY ELEVATION
BFV	BUTTERFLY VALVE
BGE	BALTIMORE GAS & ELECTRIC
BL	BURY LENGTH
BLDG.	BUILDING
BOT.	BOTTOM
C&G	CURB AND GUTTER
CMC	CORRUGATED METAL PIPE
CONC.	CONCRETE
CONSTR.	CONSTRUCTION
CONTR.	CONTRACT
DEG.	DEGREE
DET OR DTL.	DETAIL
DIP	DUCTILE IRON PIPE
DRIVE	DRIVE
E OR ELEC	ELECTRIC
EA	EACH
ESMT	EASEMENT
EX	EXISTING
FH	FIRE HYDRANT
FLG	FLANGE
FMV	FLOW METER VAULT
G	GAS
GCS	GEODETIC CONTROL SYSTEM
GV	GATE VALVE
HB	HORIZONTAL BEND
HC	HOWARD COUNTY
HCR	HORIZONTAL CURVE RADIUS
HDP	HORIZONTAL DEFLECTION POINT
HDPE	HIGH DENSITY POLYETHYLENE
HORIZ	HORIZONTAL
INV	INVERT
JT	JOINT
LF	LINEAR FOOT
LOD	LIMIT OF DISTURBANCE
MAC	MACADAM
MER	MINIMUM BENDING RADIUS
MD	MARYLAND
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
NIC	NOT IN CONTRACT
NO	NUMBER
PC	POINT OF CURVE
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE
PE	PLANE END
PED	PEDESTAL
PO	POST OFFICE OR PUSH ON
PROP	PROPOSED
PT	POINT OR POINT OF TANGENCY
PVC	PVC PIPE OR POINT OF VERTICAL CURVATURE
PVD	POINT OF VERTICAL DEFLECTION
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
PVT	POINT OF VERTICAL TANGENCY
R/W	RIGHT OF WAY
RAD OR R	RADIUS
RCP	REINF. CONC. PIPE
RD	ROAD
REQD	REQUIRED
RJ	RESTRAINED JOINT
ROW	RIGHT-OF-WAY
RSGV	RESILIENT SEAT GATE VALVE
RSWV	RESILIENT WEDGE GATE VALVE
S	SEWER
SAN	SANITARY
SB	SOIL BORING
SD	STORM DRAIN
SHA	STATE HIGHWAY ADMINISTRATION
SHC	SEWER HOUSE CONNECTION
SHT	SHEET
S.S.	STAINLESS STEEL
STA	STATION
STD	STANDARD
TB RENO	TO BE RENOVATED (FUTURE)
TBR	TO BE REMOVED (FUTURE)
TELE	TELEPHONE
TEMP	TEMPORARY
TP	TEST PIT
TRANS	TRANSFORMER
UNF	UTILITY NOT FOUND
VB	VERTICAL BEND
VCR	VERTICAL CURVE RADIUS
VERT	VERTICAL
W	WATER
W/	WITH
WHC	WATER HOUSE CONNECTION
WM	WATER MAIN

### LANDSCAPING

APP	APPLE
BPE	BRADFORD PEAR
CH	CHERRY
DEC	DECIDUOUS
DOG	DOGWOOD
HEM	HEMLOCK
HIC	HICKORY
HOL	HOLLY
LOC	LOCUST
MAG	MAGNOLIA
MAP	MAPLE
MUL	MULBERRY
PN	PINE
POP	POPLAR
SPR	SPRUCE
SYC	SYCAMORE
WAL	WALNUT
WIL	WILLOW

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF BASED ON INFORMATION PROVIDED BY OTHERS. THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
BY: *[Signature]*

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

DATE: 1/29/10  
DATE: 1/28/10

CHIEF, BUREAU OF UTILITIES  
CHIEF, UTILITY DESIGN DIVISION

**O'BRIEN & GERE ENGINEERS, INC.**

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STATE OF MARYLAND  
ROBERT JOHN PERRY  
PROFESSIONAL ENGINEER

DSN. BY:	SSD			
DRN. BY:	RPW			
CHK. BY:	RJD			
DATE:	JAN, 2010			
BY:	RJD	RECORD DRAWING	10/11	
NO.		REVISION		

**LEGEND, ABBREVIATIONS, INDEX OF DRAWINGS, BENCHMARK DATA, AND SCHEDULES**

600' SCALE MAP NO. 24 BLOCK NO. 17

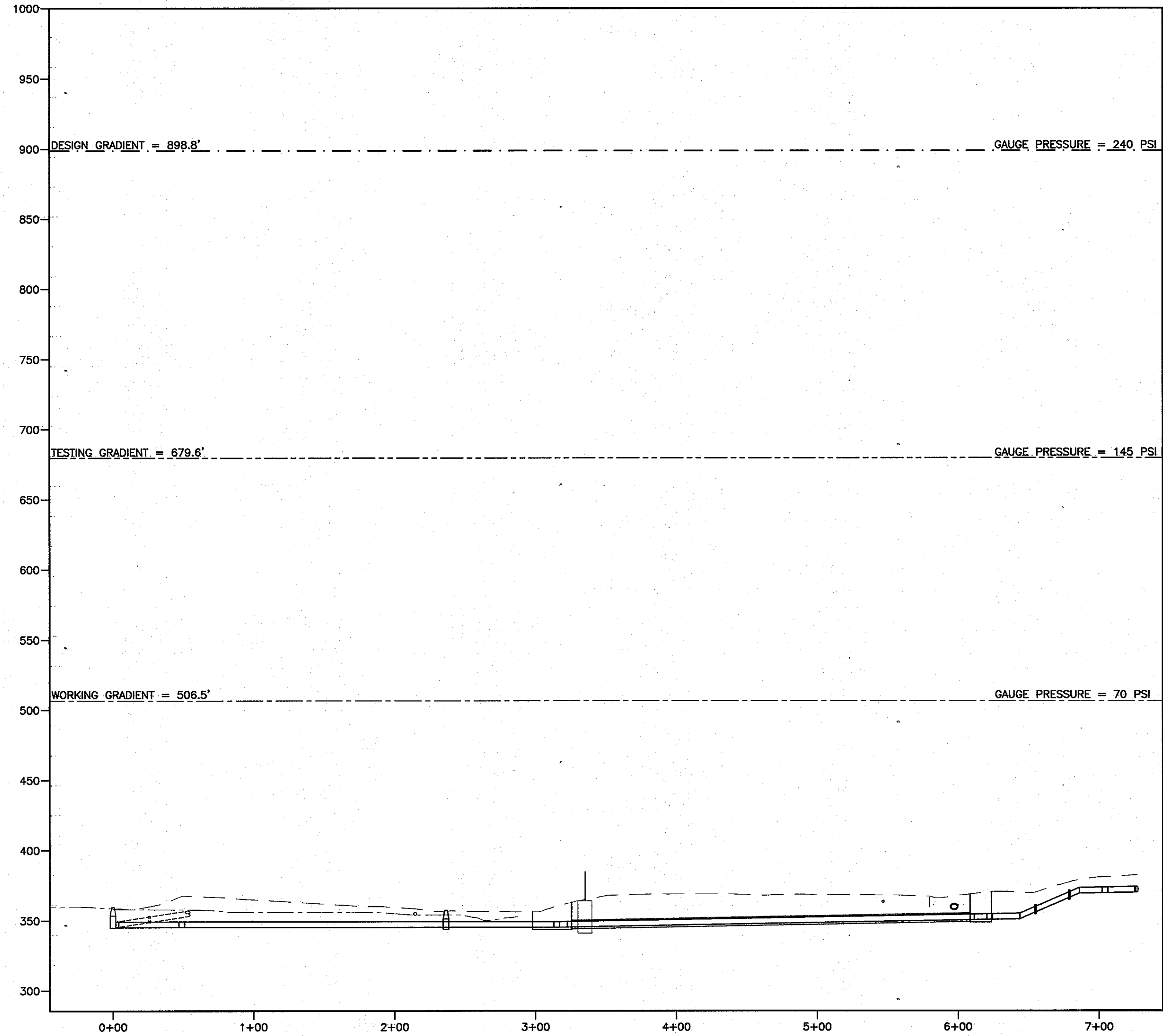
**US 29 WATER MAIN REPLACEMENT TUNNEL CROSSING AT MONTGOMERY ROAD**

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN

SHEET 2 OF 26

FILE NO. 43844-002F



GENERAL NOTES:

1. DESIGN GRADIENT IS THE PRESSURE USED FOR THE DESIGN OF THE CONCRETE THRUST BLOCKS AND THE RESTRAINED JOINT SYSTEMS.
2. TESTING GRADIENT IS THE PRESSURE USED FOR THE DESIGN OF THE PIPE PRESSURE RATING.

RECORD DRAWINGS  
TO THE BEST OF OUR KNOWLEDGE,  
INFORMATION AND BELIEF, BASED ON  
INFORMATION PROVIDED BY OTHERS, THESE  
RECORD DRAWINGS SUBSTANTIALLY REPRESENT  
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O'BRIEN & GERE  
ENGINEERS, INC.  
BY: *[Signature]*

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DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*[Signature]* 1/29/10  
DIRECTOR OF PUBLIC WORKS DATE

*[Signature]* 1/28/10  
CHIEF, BUREAU OF UTILITIES DATE

*[Signature]* 1/29/10  
CHIEF - BUREAU OF ENGINEERING DATE

*[Signature]* 1/28/10  
CHIEF, UTILITY DESIGN DIVISION DATE

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I HEREBY CERTIFY THAT  
THESE DOCUMENTS  
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APPROVED BY ME, AND  
THAT I AM A DULY  
LICENSED PROFESSIONAL  
ENGINEER UNDER THE  
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18523, EXPIRATION DATE  
DECEMBER, 2011



DSN. BY: SSD					
DRN. BY: RPW					
CHK. BY: RJD					
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HYDRAULIC PROFILE		
600' SCALE MAP NO.	24	BLOCK NO. 17

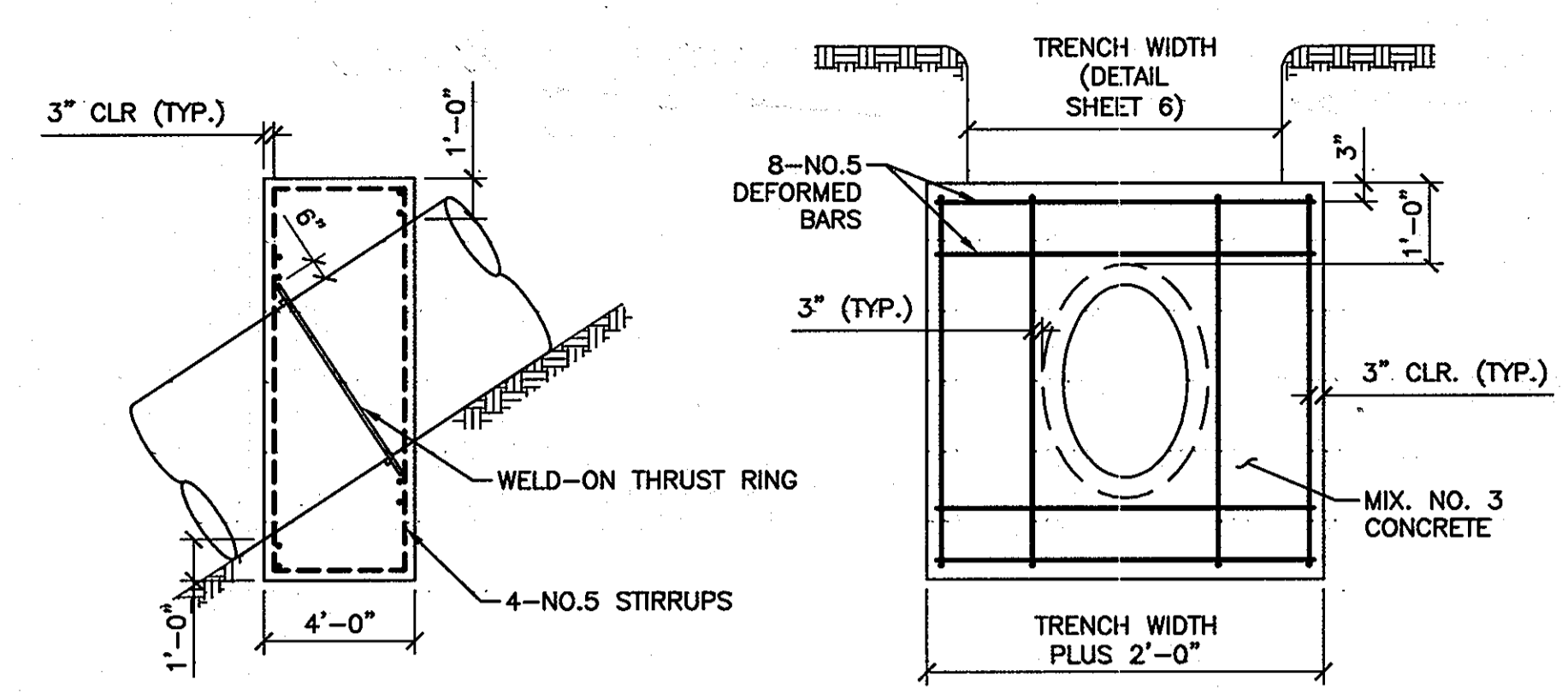
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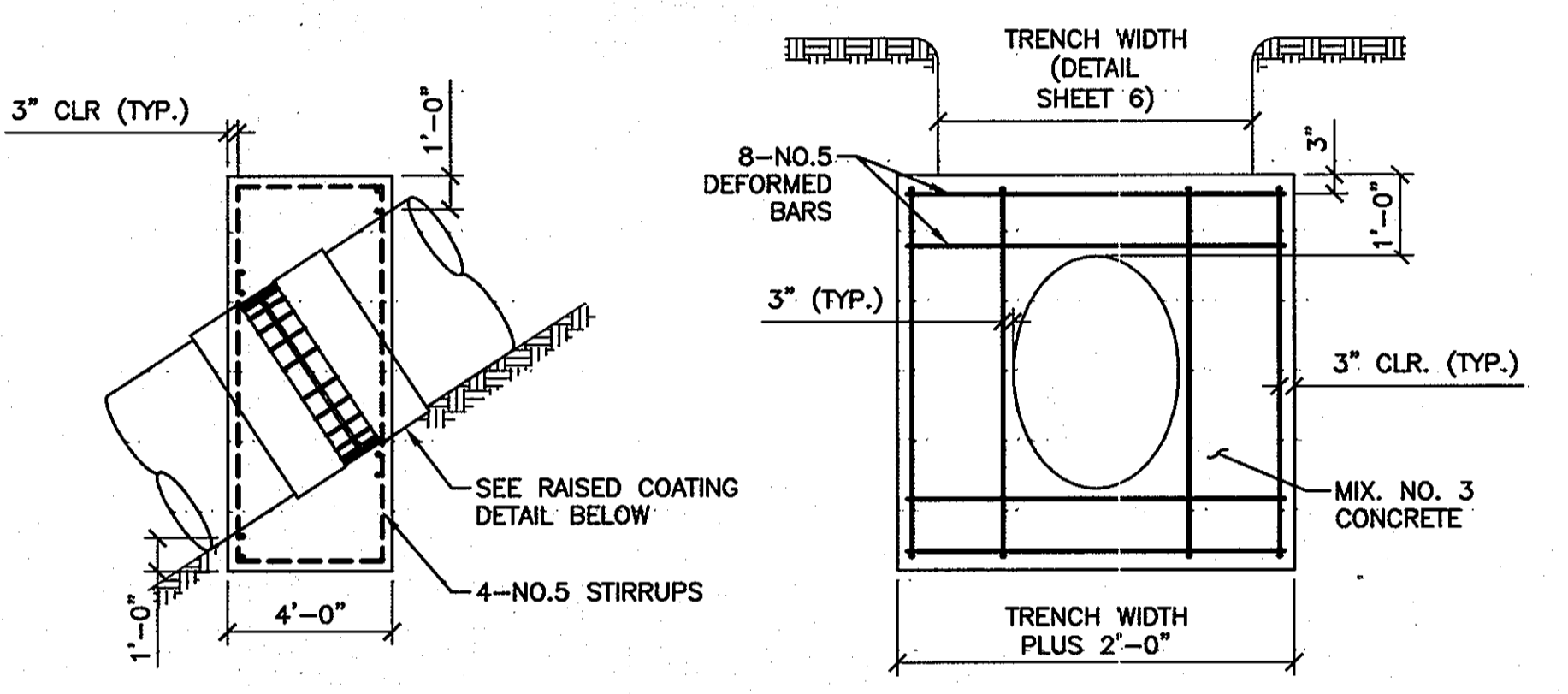
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AS  
SHOWN

SHEET  
3 OF 26

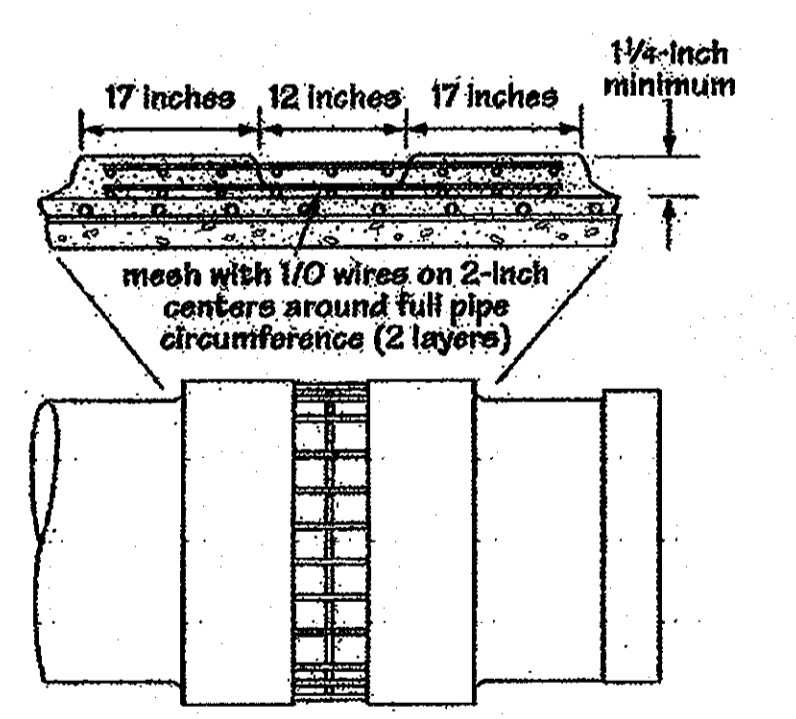
FILE NO.  
43844-003F



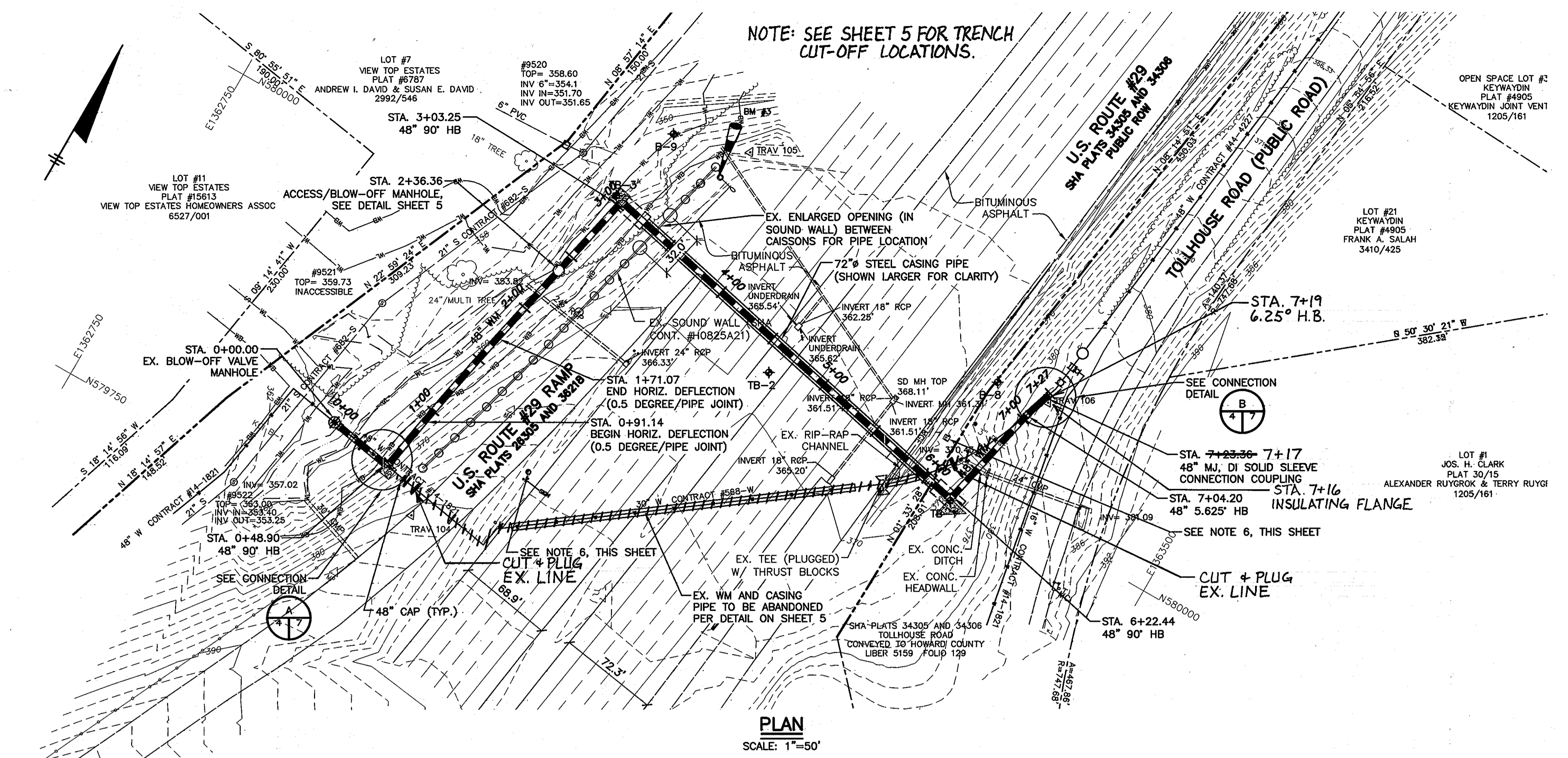
**STEEL PIPE CONCRETE SLOPE ANCHOR DETAIL**  
NOT TO SCALE



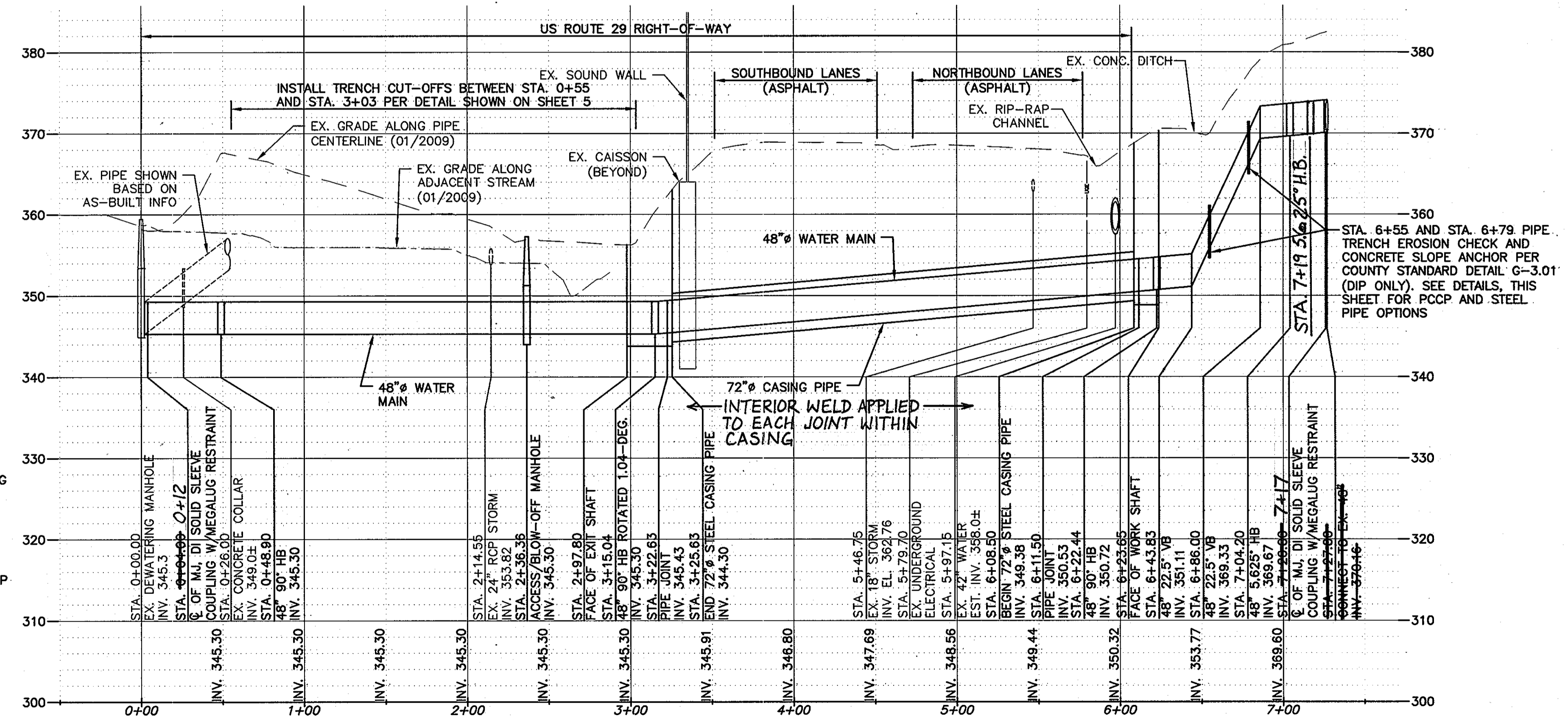
**PCCP CONCRETE SLOPE ANCHOR DETAIL**  
NOT TO SCALE



**PCCP RAISED COATING ANCHOR DETAIL**  
NOT TO SCALE



**PLAN**  
SCALE: 1"=50'

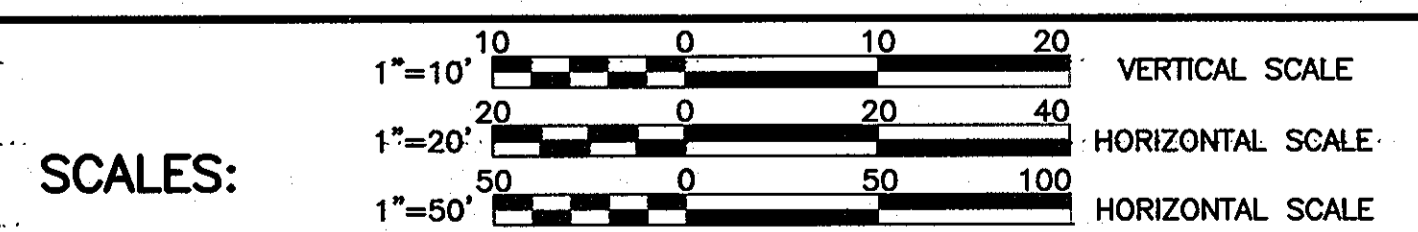


**PROFILE**  
SCALE: 1"=50' HORIZONTAL  
1"=10' VERTICAL

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

**O'BRIEN & GERE ENGINEERS, INC.**  
BY: *[Signature]*

- GENERAL NOTES:**
- 48" WM DESIGN WAS CONDUCTED USING A MAXIMUM DEFLECTION OF 0.5 DEGREES PER JOINT. CONTRACTOR SHALL CONSTRUCT WM UTILIZING A MAXIMUM DEFLECTION NOT MORE THAN 80% OF THE MANUFACTURER'S ALLOWABLE JOINT DEFLECTION.
  - ALL JOINTS SHALL BE RESTRAINED.
  - A DETAILED PROPOSED SEQUENCE OF CONSTRUCTION IS INCLUDED IN THE SPECIFICATIONS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR SEQUENCING OF WORK TO CONSTRUCT THE PROJECT IN CONFORMANCE WITH THE REQUIREMENTS AS STATED IN THE PROJECT DOCUMENTS.
  - CONTRACTOR SHALL PROVIDE TEMPORARY FACILITIES WITH CAPABILITY TO HANDLE STORM RUNOFF DURING INSTALLATION OF THE PROPOSED 48-INCH WATER MAIN SYSTEM AND UNTIL RESTORATION IS COMPLETED. THE TEMPORARY FACILITIES SHALL PROVIDE IN-KIND FLOW RATE/VOLUME. BACKUP OF STORM RUNOFF SHALL NOT BE ALLOWED.
  - CONTRACTOR IS RESPONSIBLE FOR PROTECTING THE SOUND WALL FROM LATERAL MOVEMENT ACCORDING TO THE SPECIAL PROVISIONS INCLUDED IN THE CONTRACT SPECIFICATIONS.
  - CONTRACTOR IS RESPONSIBLE FOR CONTACTING MD SHA TO DETERMINE THE LOCATION OF UNDERGROUND ELECTRICAL WIRES WITHIN THE US ROUTE 29 RIGHT-OF-WAY PRIOR TO CONSTRUCTION.
  - CONTRACTOR SHALL REPLACE TREES BETWEEN TOLLHOUSE ROAD AND US ROUTE 29 IN KIND. PLANTING SHALL BE AS DIRECTED BY THE ENGINEER AFTER ALL CONSTRUCTION HAS BEEN COMPLETED.



**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

*[Signature]* 1/22/10  
DIRECTOR OF PUBLIC WORKS DATE

*[Signature]* 1/22/10  
CHIEF - BUREAU OF ENGINEERING DATE

*[Signature]* 1/22/10  
CHIEF, BUREAU OF UTILITIES DATE

*[Signature]* 1/22/10  
CHIEF, UTILITY DESIGN DIVISION DATE

**O'BRIEN & GERE ENGINEERS, INC.**

8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 18223, EXPIRATION DATE DECEMBER, 2011

*[Signature]*  
REGISTERED PROFESSIONAL ENGINEER

DSN. BY: SSD	
DRN. BY: RPW	
CHK. BY: RJD	
DATE: JAN, 2010	
R/D NO. 1	RECORD DRAWING
BY NO.	REVISION
DATE	DATE

**PLAN AND PROFILE**

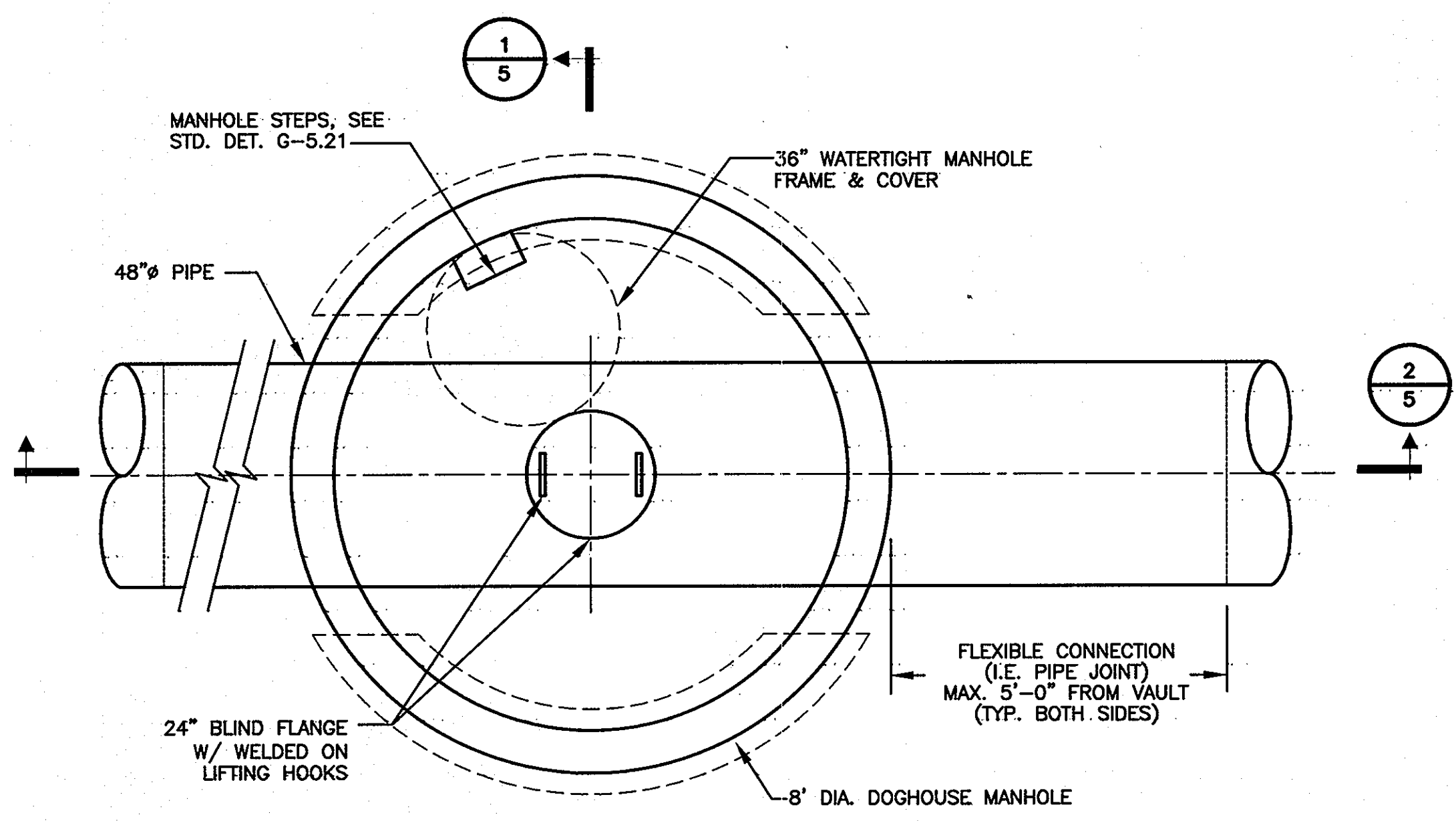
600' SCALE MAP NO. 24 BLOCK NO. 17

**US 29 WATER MAIN REPLACEMENT TUNNEL CROSSING AT MONTGOMERY ROAD**

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

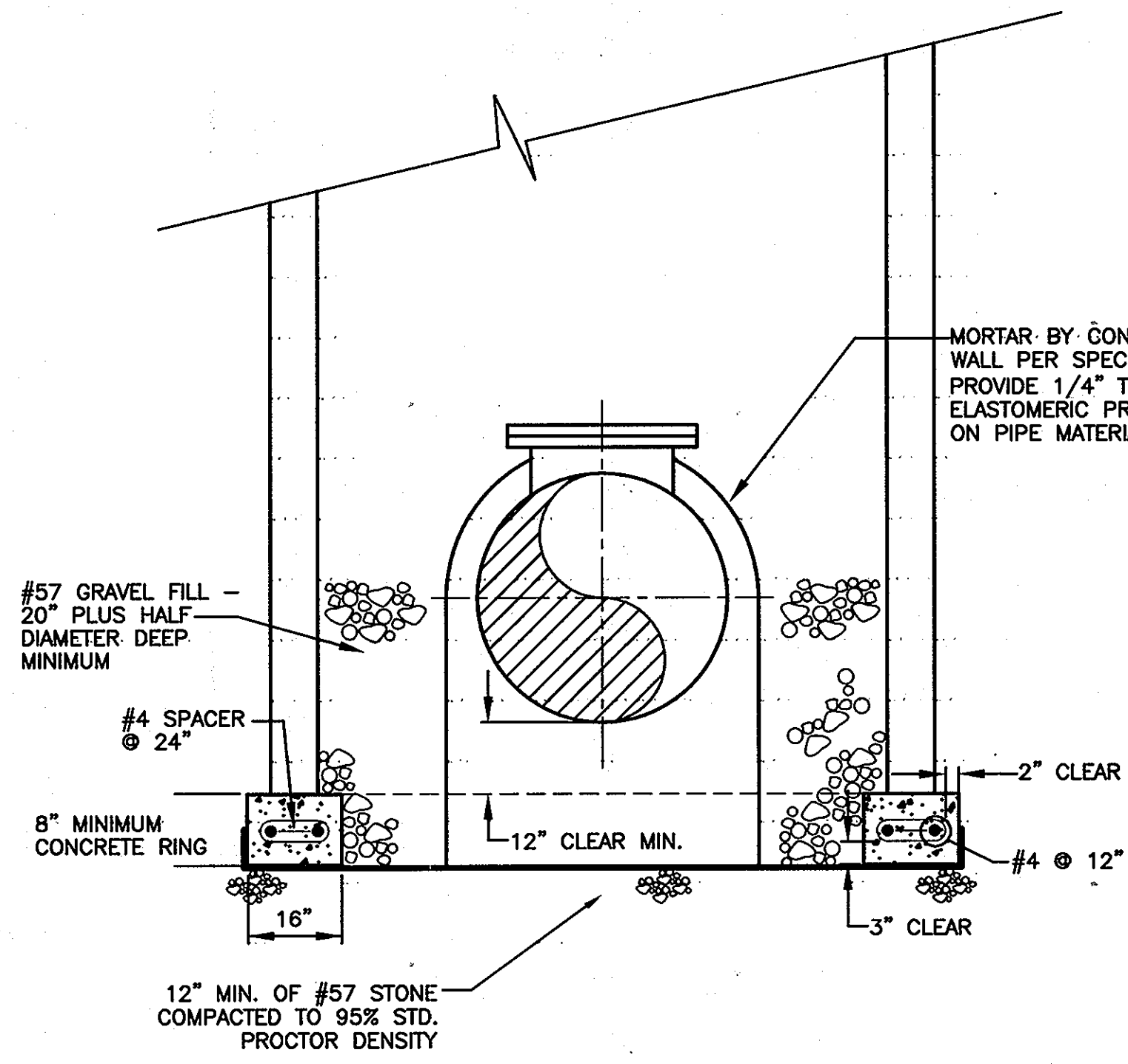
SCALE: AS SHOWN  
SHEET 4 OF 26  
FILE NO. 43844-004F

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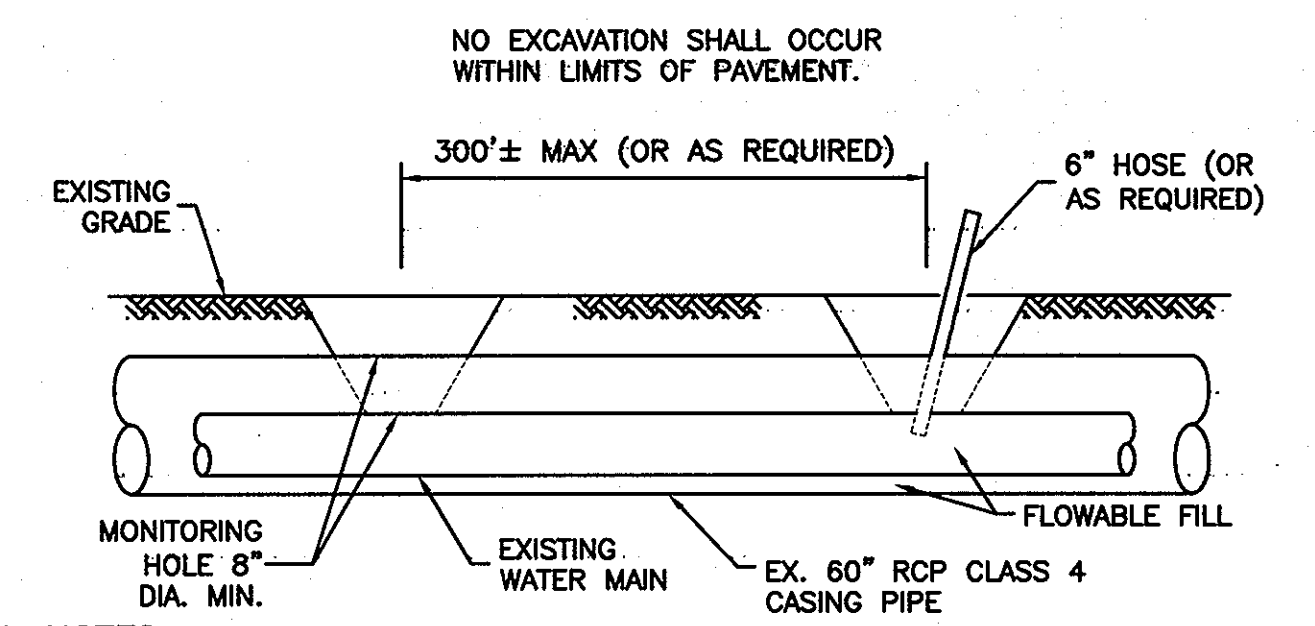


- DRAWING NOTES:**
1. COAT EXPOSED STEEL FITTINGS WITH 2 COATS OF ROYSTON R-28 MASTIC, PER MANUFACTURERS RECOMMENDATIONS.
  2. REGARDLESS OF REINFORCEMENT DEPICTED, MANHOLE SHALL BE FURNISHED WITH LIFTING EYES SUITABLE FOR LIFTING WITHOUT CRACKING OR DAMAGING MANHOLE. MANUFACTURER SHALL PROVIDE LIFTING HOOKS AND EMBEDMENT AS REQUIRED FOR LIFTING WITHOUT DAMAGE.

**ACCESS/BLOW-OFF MANHOLE - PLAN**  
SCALE: 1/2"=1'-0"

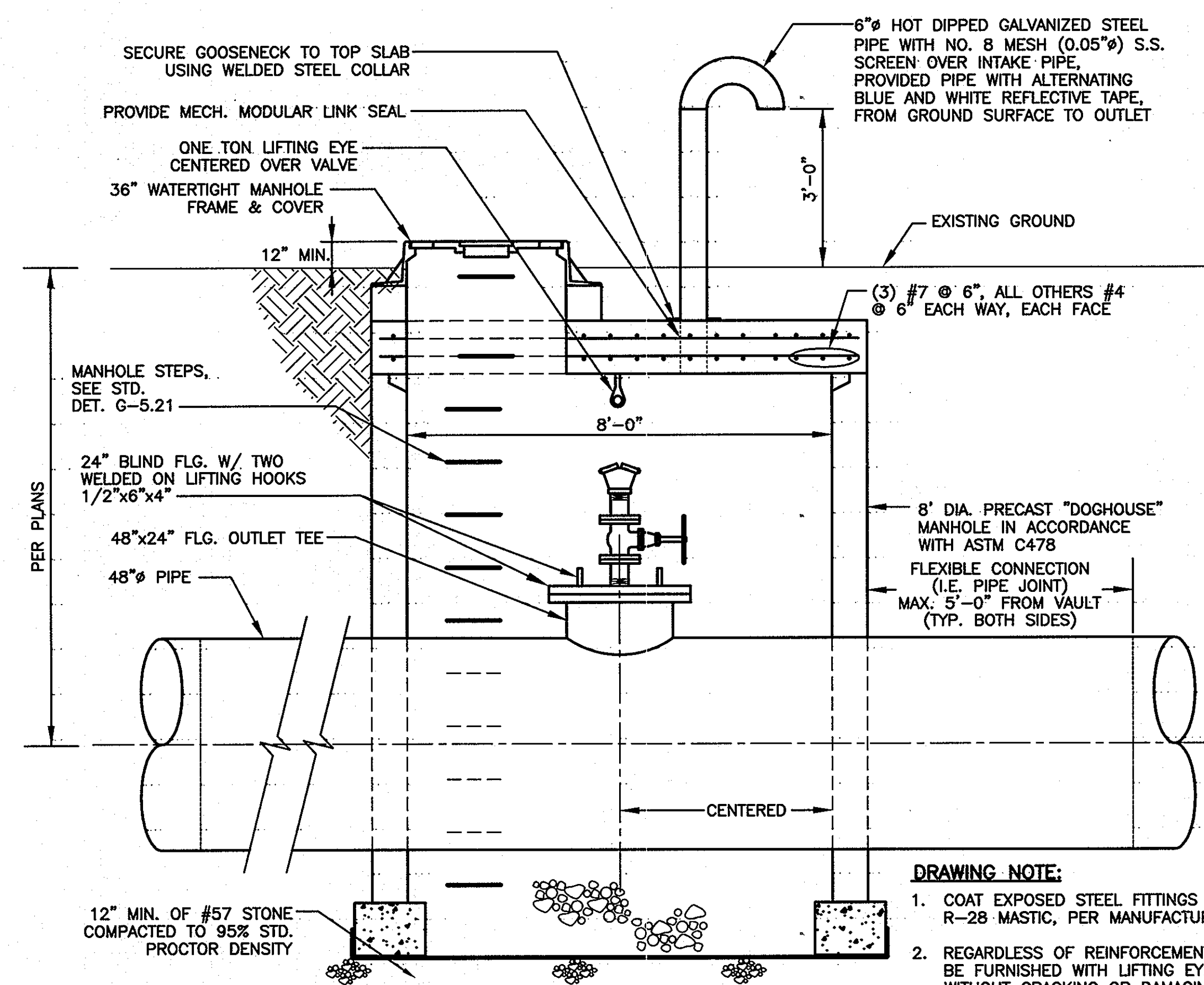


**SECTION 1**  
SCALE: 1/2"=1'-0"



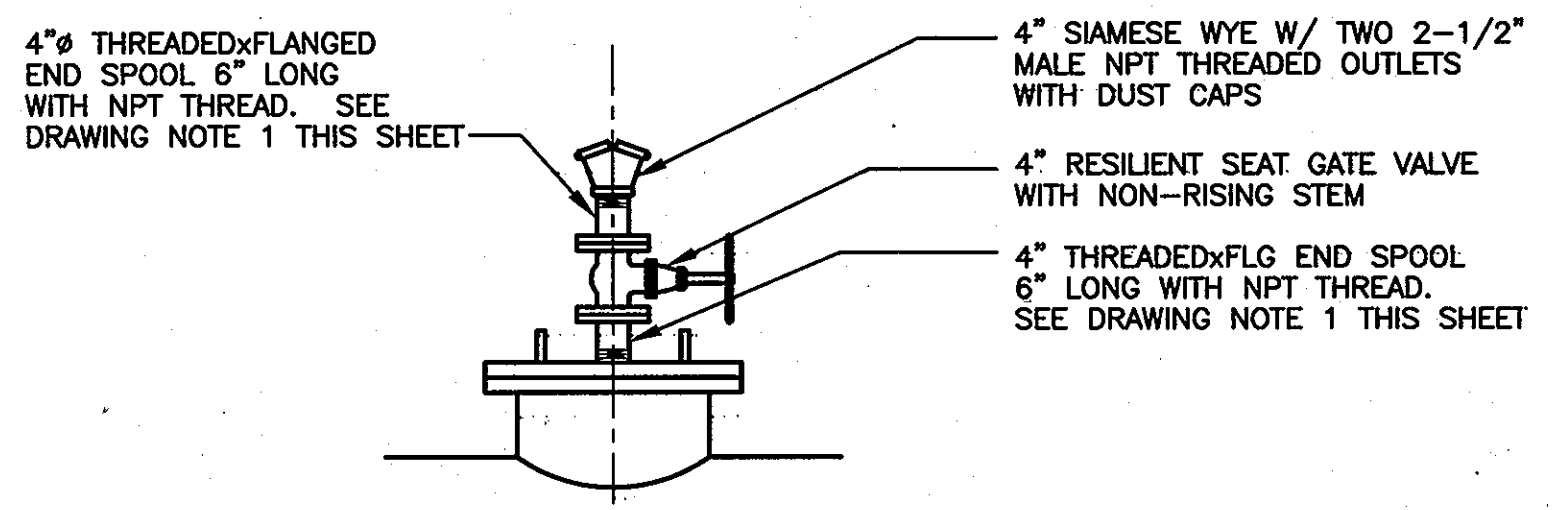
- GENERAL NOTES:**
1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND SUPPLIES TO ABANDON THE EXISTING WATER MAIN INCLUDING EXCAVATION AND BACKFILL, DEMOLITION AND SITE RESTORATION, ALL AS INDICATED, SPECIFIED AND/OR NECESSARY TO COMPLETE THE WORK.
  2. READY MIX FLOWABLE FILL (CDF) - SHALL CONSIST OF A MIXTURE OF PORTLAND CEMENT, FLY ASH AND SAND. MIXTURE SHALL CONSIST OF THE FOLLOWING APPROXIMATE QUANTITIES OF MATERIAL PER CUBIC YARD AND SHALL BE CAPABLE OF ACHIEVING A COMPRESSIVE STRENGTH OF 50 PSI.  
CEMENT - 100 LBS.  
FLY ASH - 300 LBS.  
SAND (SSD) - 2,576 LBS.  
WATER - 541 LBS. (65 GALLONS)
  3. EXISTING MAIN TO BE ABANDONED SHALL BE CUT AND CAPPED TO PREVENT EXIT OF FLOWABLE FILL OUTSIDE LIMITS OF PROPOSED TRENCH.
  4. PRIOR TO BEGINNING ABANDONMENT, ALL WATER REMAINING IN THE PIPELINE AND STRUCTURES, SHALL BE REMOVED.
  5. ABANDONMENT SHALL BE PAID FOR AS A SEPARATE BID ITEM.
  6. ALL VALVE BOXES, FIRE HYDRANTS, AIR RELEASE VALVES, BLOW-OFFS, AND ANY OTHER APPURTENANCES WHICH EXTEND TO OR ABOVE GRADE SHALL BE REMOVED DOWN TO THE ELEVATION OF THE PIPE. ITEMS TO BE SALVAGED ARE DEPICTED ON PLAN SHEETS.
  7. THE CONTRACTOR SHALL NOT OPEN CUT THE PAVEMENT FOR THE WATER MAIN ABANDONMENT. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR COMPLETING OPERATIONS IN ACCORDANCE WITH PERMIT REQUIREMENTS.
  8. HOSE SHALL EXTEND INTO EX. WATER MAIN PIPE DURING ABANDONMENT OF WATER MAIN PIPE AND INTO ANNULAR SPACE BETWEEN WATER MAIN PIPE AND CASING PIPE DURING ABANDONMENT OF CASING PIPE.
  9. MONITORING HOLES AND FILLING LOCATIONS FOR ABANDONMENT OF CASING PIPE SHALL BE LOCATED IN THE MEDIAN OF US 29 AND ON THE WEST SIDE OF US 29.

**WATER MAIN ABANDONMENT DETAIL**  
N.T.S.

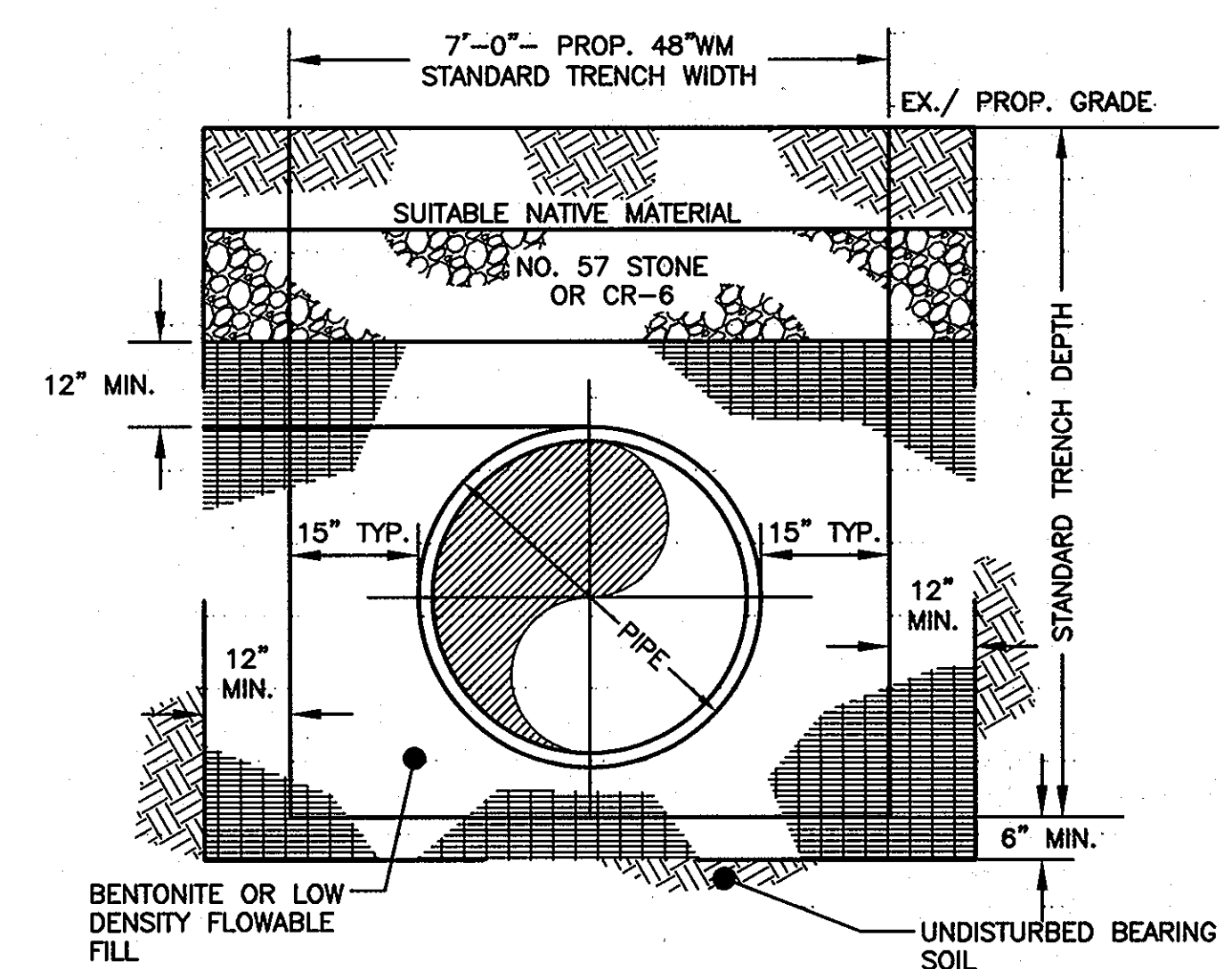


- DRAWING NOTE:**
1. COAT EXPOSED STEEL FITTINGS WITH 2 COATS OF ROYSTON R-28 MASTIC, PER MANUFACTURERS RECOMMENDATIONS.
  2. REGARDLESS OF REINFORCEMENT DEPICTED, MANHOLE SHALL BE FURNISHED WITH LIFTING EYES SUITABLE FOR LIFTING WITHOUT CRACKING OR DAMAGING MANHOLE. MANUFACTURER SHALL PROVIDE LIFTING HOOKS AND EMBEDMENT AS REQUIRED FOR LIFTING WITHOUT DAMAGE.

**SECTION 2**  
SCALE: 1/2"=1'-0"



**TYPICAL BLOW-OFF/ACCESS MANHOLE ASSEMBLY - DETAIL**  
SCALE: 1/2"=1'-0"



- TRENCH CUT-OFF DETAIL**  
N.T.S.
- DETAIL NOTES:**
1. EXTEND STANDARD TRENCH WIDTH BY 12" MIN EACH SIDE AND 6" BELOW STANDARD DEPTH OF BACKFILL.
  2. FILL TRENCH WITH BENTONITE OR LOW DENSITY FLOWABLE FILL TO 12" ABOVE PIPE. FOLLOW TRENCH DETAIL SHOWN ON SHEET 6 FOR THE REMAINING BACKFILL REQUIREMENTS. EXTEND 3' LONGITUDINALLY ALONG THE PIPE TRENCH.
  3. CUT-OFFS TO BE LOCATED ON THE WEST SIDE OF US ROUTE 29 AT STA. 0+53, 1+30, 2+05, AND 2+75.
  4. PLACE ONE CUT-OFF BEHIND THE STONE BACKFILL BEHIND THE THRUST BLOCK AT STATION 0+30. THE BLOCK SHALL BE CONSTRUCTED FIRST, WITH THE STONE PLACED BEHIND THE BLOCK, PER DETAIL ON SHEET 6. THE TRENCH CUT-OFF SHALL THEN BE CONSTRUCTED BEHIND THE STONE USING CONCRETE FORMS.

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
BY: [Signature]

SCALES 1/2"=1'-0" 0 1 2 3 4 5

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: [Signature] DATE: 1/29/10  
Chief, Bureau of Engineering: [Signature] DATE: 1/29/10  
Chief, Bureau of Utilities: [Signature] DATE: 1/28/10  
Chief, Utility Design Division: [Signature] DATE: 1/28/10

**O'BRIEN & GERE ENGINEERS, INC.**  
8401 Corporate Drive  
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FAX: (301) 577-4737

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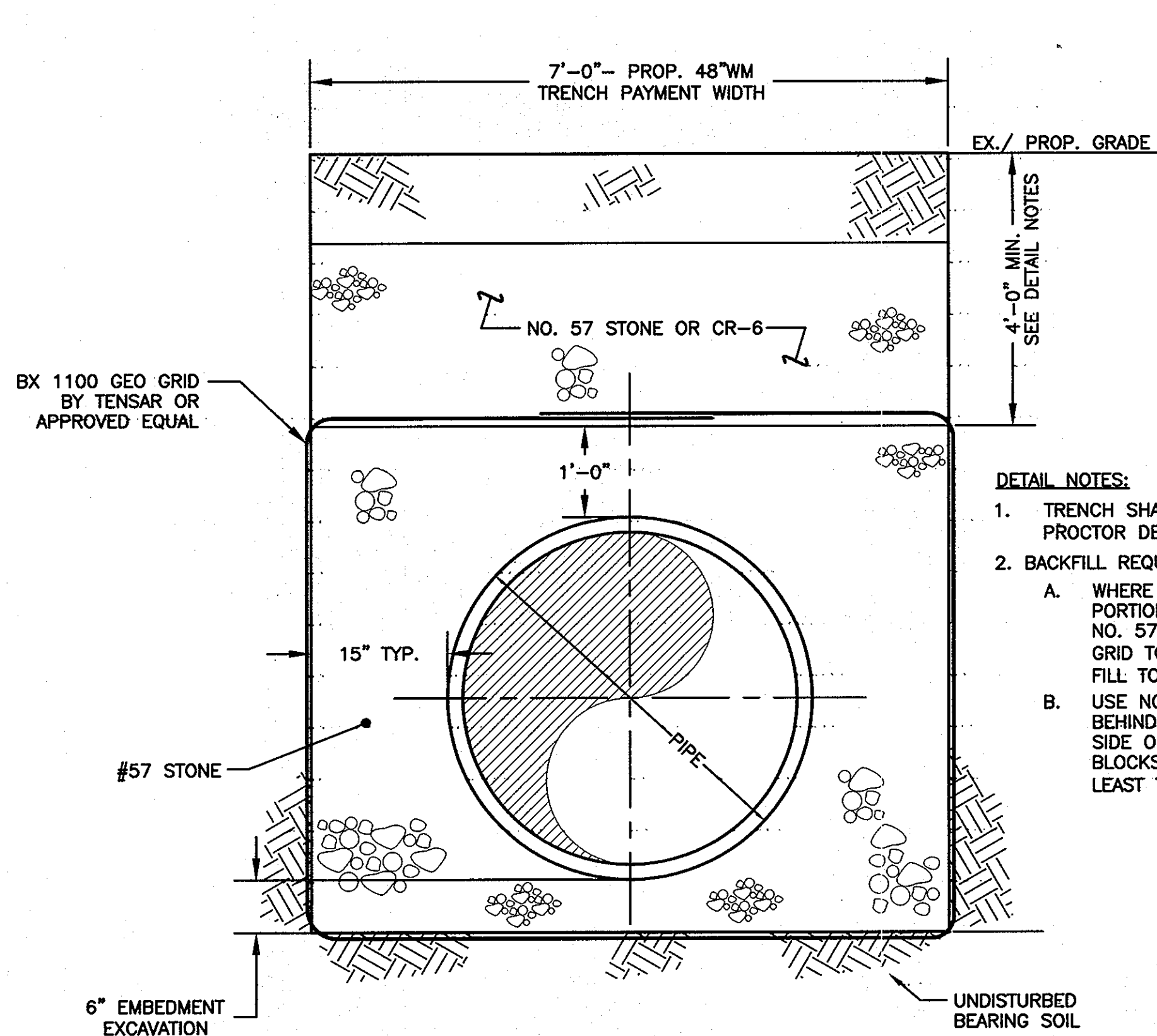
STATE OF MARYLAND  
ROBERT JOHN O'BRIEN  
LICENSED PROFESSIONAL ENGINEER

DSN. BY:	SSD				
DRN. BY:	RPW				
CHK. BY:	RJD				
DATE:	JAN, 2010				
BY:	RJD	1	RECORD DRAWING	10/11	
NO.:			REVISION		

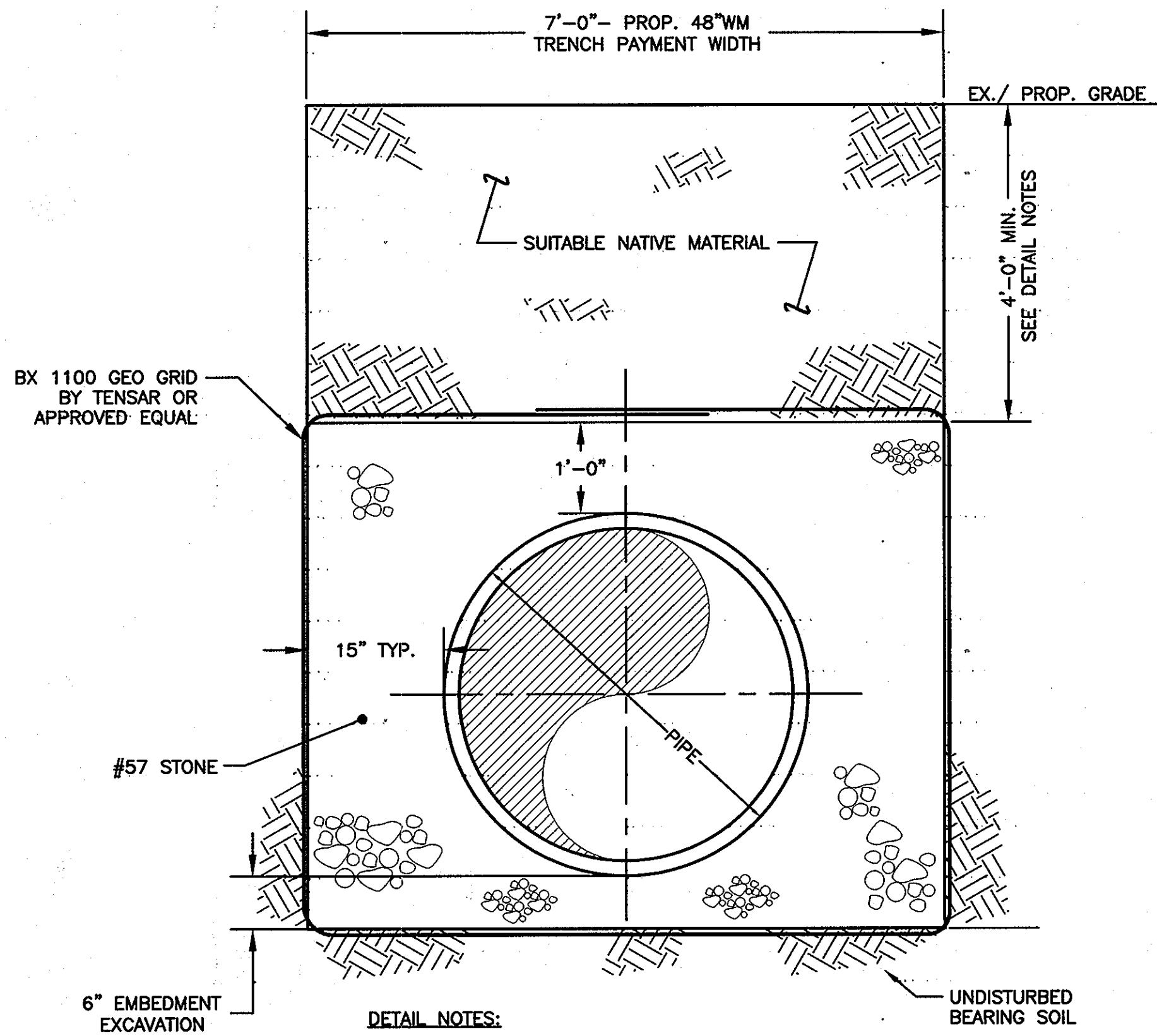
600' SCALE MAP NO. 24 BLOCK NO. 17

**US 29 WATER MAIN REPLACEMENT TUNNEL CROSSING AT MONTGOMERY ROAD**  
CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

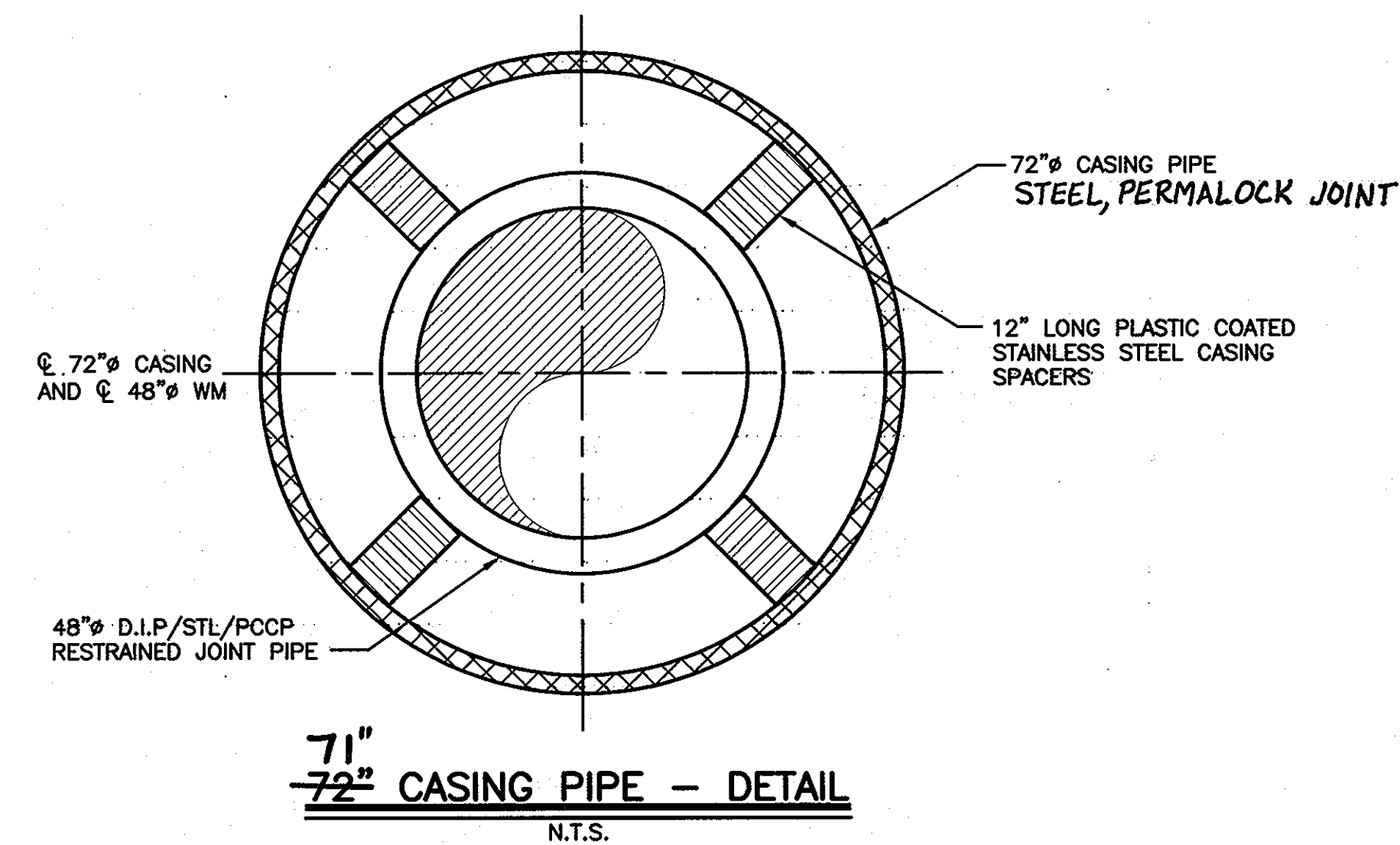
SCALE AS SHOWN  
SHEET 5 OF 26  
FILE NO. 43844-005F



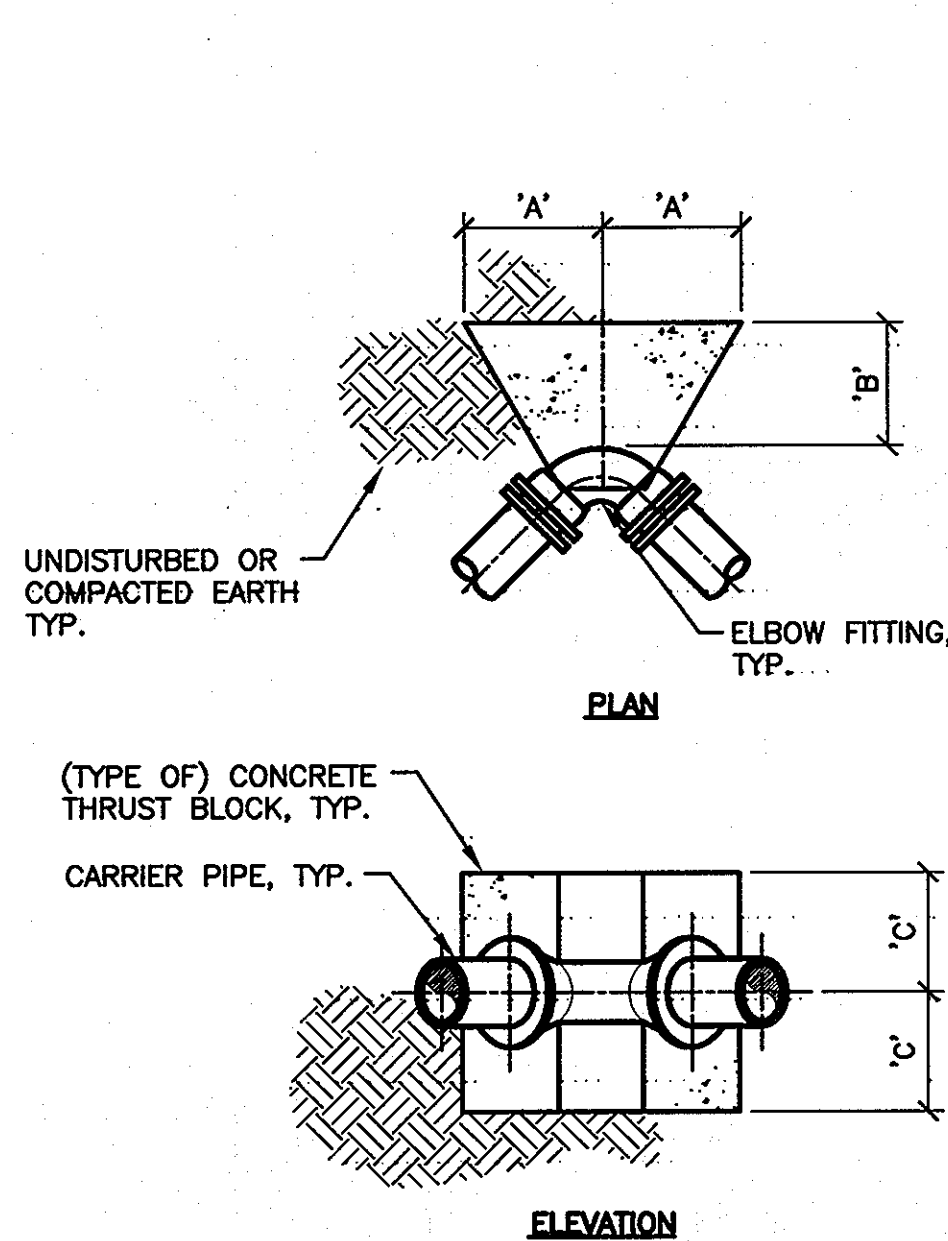
**TYPICAL PIPE TRENCH DETAIL**  
**(WEST SIDE OF RTE. 29)**  
N.T.S.



**TYPICAL PIPE TRENCH DETAIL (EAST SIDE OF RTE. 29)**  
N.T.S.



- DETAIL NOTES:**
- CASING TO BE SEALED ON BOTH ENDS WITH DUAL BRICK AND MORTAR COURSE.
  - PROVIDE PIPE JOINT 3-FOOT FROM EACH END OF CASING PIPE.
  - SPACERS SHALL BE CASCADE MODEL CCS-ER WITH A MIN. 14GA T-304 SS SHELL AND ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE PLASTIC COATED RUNNERS OR APPROVED EQUAL.
  - CASING SPACERS SHALL BE INSTALLED IN THE RESTRAINED CONFIGURATION PER THE MANUFACTURER'S RECOMMENDATIONS.
  - SPACERS SHALL BE PLACED WITHIN 6-INCHES OF CASING ENDS, 1-FOOT EITHER SIDE OF PIPE JOINTS, AND IN THE MIDDLE OF EACH PIPE SEGMENT (10 FOOT MAX. SPACING).



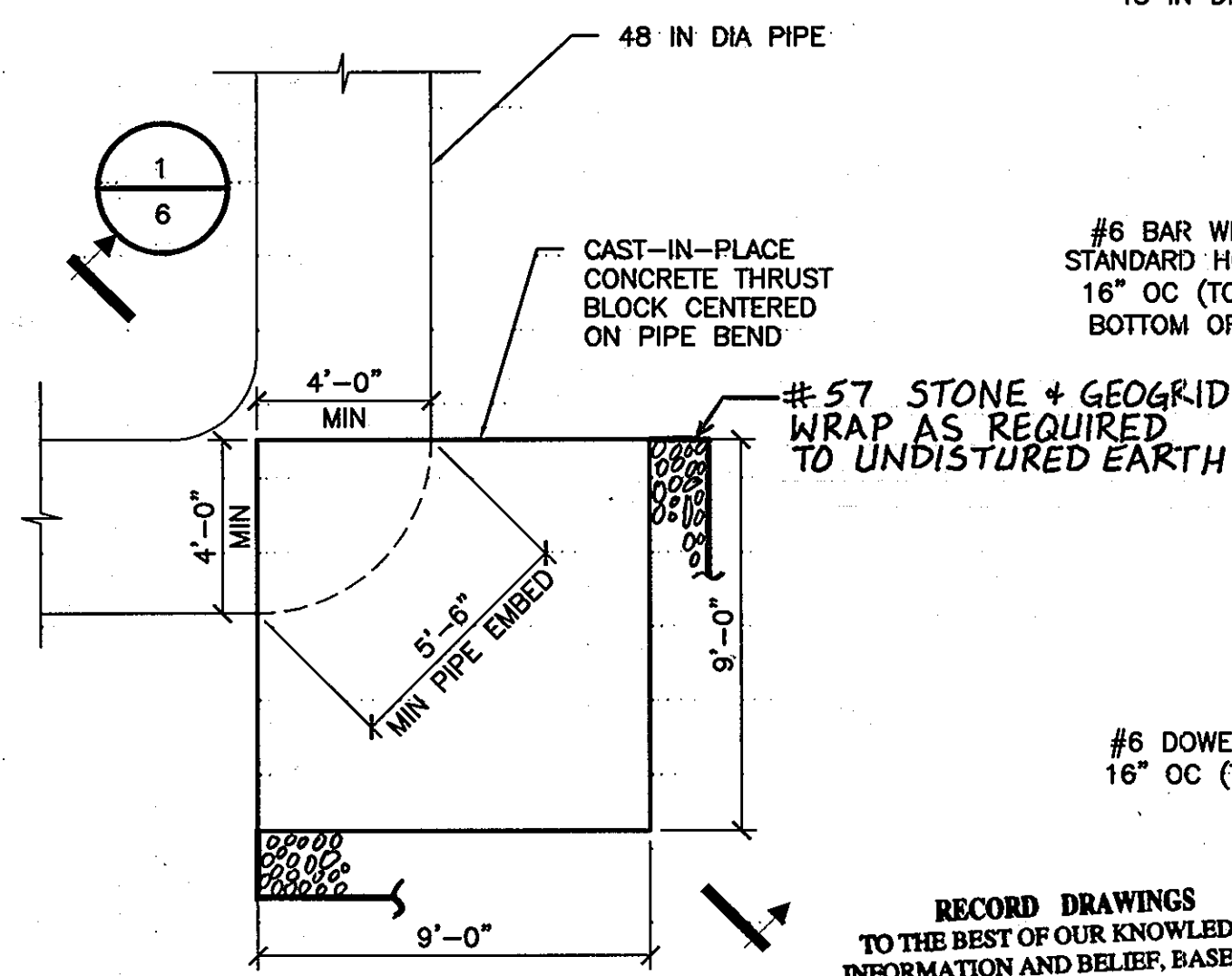
FITTING/SIZE	DIP			STEEL			PCCP		
	A	B	C	A	B	C	A	B	C
48" 90° ELBOW	11.0'	10.0'	11.0'	10.5'	10.0'	10.5'	12.25'	10'	10.5'

**90° THRUST BLOCK DETAIL**  
**(EAST SIDE OF US 29)**  
NOT TO SCALE

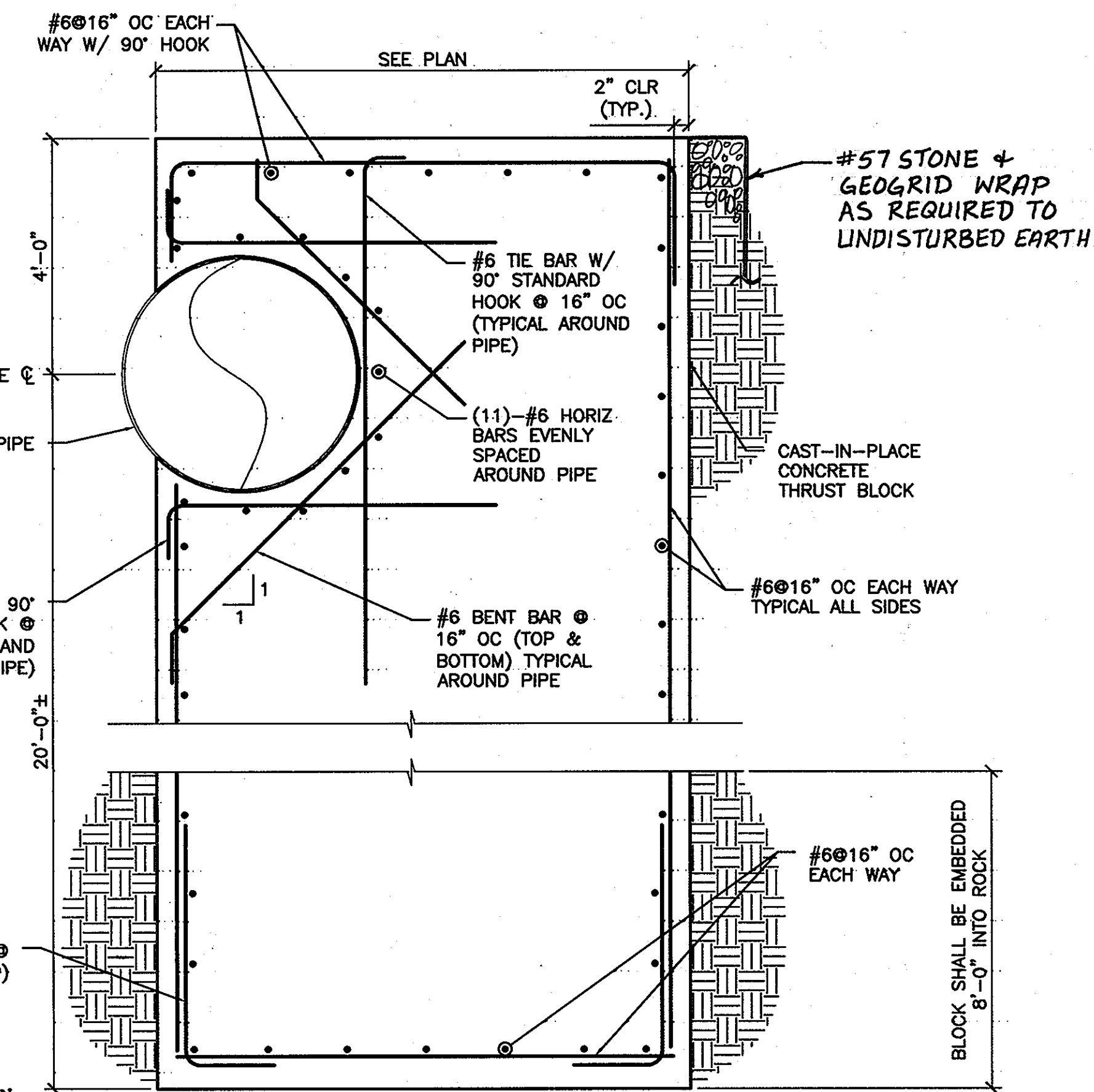
**90° THRUST BLOCK NOTES:**

- CONCRETE WORK SHALL CONFORM TO REQUIREMENTS OF THE AMERICAN CONCRETE INSTITUTE (A.C.I.) 301, "SPECIFICATIONS FOR STRUCTURAL CONCRETE", A.C.I. 318 "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE".
- CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
- PORTLAND CEMENT USED FOR CONCRETE WORK SHALL COMPLY WITH A.S.T.M. C-150 FOR TYPE II CEMENT (MODERATE HEAT OF HYDRATION) OR TYPE IP (MH) BLENDED CEMENT. BLENDED CEMENT SHALL CONSIST OF A MIXTURE OF A.S.T.M. C 150 TYPE II CEMENT AND ONE OF THE FOLLOWING: A.S.T.M. C 618 POZZOLAN (CLASS N). POZZOLAN CONTENT SHALL NOT EXCEED 25% BY WEIGHT OF TOTAL CEMENTITIOUS MATERIAL. MAXIMUM WATER/CEMENT RATIO = 0.45.
- NORMAL WEIGHT CONCRETE SHALL CONTAIN AGGREGATES COMPLYING WITH A.S.T.M. C-33, #3. THE MAXIMUM SIZE OF COARSE AGGREGATES SHALL BE 2 1/2".
- CONCRETE SHALL BE AIR-ENTRAINED TO 4-7% AIR CONTENT IN ACCORDANCE WITH A.S.T.M. C 260.
- PROPORTION AND DESIGN MIXES TO RESULT IN CONCRETE SLUMP NOT LESS THAN 1" BUT NOT MORE THAN 3" PRIOR TO ADDITION OF HIGH-RANGE WATER REDUCER (HRWR) AND A MAX SLUMP OF 8" AFTER ADDITION OF HRWR. ADDITION OF WATER TO READY-MIX CONCRETE IN THE FIELD SHALL NOT BE ALLOWED AFTER FINAL MIXING WATER HAS BEEN ADDED.
- PROVIDE HIGH-RANGE WATER REDUCER IN ACCORDANCE WITH A.S.T.M. C 494, TYPE F OR TYPE G (ADMIXTURE SHALL BE CALCIUM CHLORIDE FREE).
- CONCRETE MIX SHALL HAVE A TEMPERATURE OF 50°F AT TIME OF PLACEMENT. THE USE OF FINELY CHIPPED ICE IN PLACE OF WATER IS ACCEPTABLE.
- DEPOSIT CONCRETE IN A CONTINUOUS OPERATION UNTIL THE PLACING OF CONCRETE IS COMPLETE. IF THE POUR IS TO BE DISCONTINUED, CONTRACTOR SHALL PROVIDE A CONSTRUCTION JOINT BY TOPPING OUT LIFT AND PROVIDING A LEVEL SURFACE FREE OF PROTRUDING ROCKS, DEEP FOOTPRINTS, VIBRATOR HOLES AND OTHER SURFACE IRREGULARITIES. PRIOR TO PLACEMENT OF NEXT LIFT, SURFACE FILM AND CONTAMINATION SHOULD BE REMOVED BY WET BLASTING OR OTHER METHODS FOUND ACCEPTABLE BY THE ENGINEER. CONCRETE SURFACE SHALL BE CLEAN AND FREE OF SURFACE MOISTURE PRIOR TO PLACING NEW CONCRETE.
- CONTRACTOR SHALL EMPLOY METHODS IN ORDER TO MAINTAIN A MAXIMUM TEMPERATURE DIFFERENTIAL (MTD) OF 30°F BETWEEN THE INTERNAL CONCRETE AND THE SURFACE OF THE CONCRETE.
- CURING OF CONCRETE SHALL UTILIZE IMPERVIOUS SHEETING (A.S.T.M. C 171) OF WATERPROOF PAPER, CLEAR OR WHITE POLYETHYLENE SHEETING OR POLYETHYLENE-COATED BURLAP. COVERING SHEETING WITH A LAYER OF SAND OR OTHER MEANS SHOULD BE USED TO CONTROL CONCRETE TEMPERATURES.
- THE CONCRETE MIX DESIGN, REINFORCING STEEL AND ACCESSORIES, AS WELL PROPOSED METHODS FOR FORMING, PLACING AND CURING CONCRETE SHALL BE SUBMITTED BY THE CONTRACTOR TO ENGINEER FOR APPROVAL PRIOR TO STARTING WORK.
- REINFORCEMENT WORK OF DETAILING, FABRICATION AND ERECTION SHALL CONFORM TO BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (A.C.I. 318) AND "A.C.I. DETAILING MANUAL (SP-66-04)".
- STEEL REINFORCEMENT SHALL CONFORM TO A.S.T.M. A615 GRADE (Fy = 60,000 P.S.I.)

- MINIMUM CONCRETE PROTECTIVE COVER FOR REINFORCEMENT SHALL BE 3" FOR UNFORMED SURFACES CAST AGAINST AND PERMANENTLY IN CONTACT WITH EARTH AND 2" FOR ALL OTHER CONDITIONS.
- WHERE CONTINUOUS REINFORCEMENT IS CALLED FOR, IT SHALL BE EXTENDED CONTINUOUSLY AROUND CORNERS AND LAPPED AT NECESSARY SPLICES OR HOOKED AT DISCONTINUOUS ENDS.
- LAPS SHALL BE CLASS B TENSION LAP SPLICES, UNLESS NOTED OTHERWISE.
- WHERE REINFORCEMENT IS SHOWN IN SECTION, REINFORCEMENT IS CONSIDERED TYPICAL WHEREVER THE SECTION APPLIES.
- REINFORCEMENT SHALL NOT BE TACK WELDED OR HEATED FOR BENDING.
- CLEAN REINFORCING OF LOOSE RUST, MILL SCALE, DIRT, OR ANY OTHER FOREIGN MATERIAL. ACCURATELY POSITION, SUPPORT AND SECURE REINFORCEMENT.
- USE NO. 57 STONE WRAPPED IN GEO-GRID BEHIND THE THRUST BLOCKS ON THE WEST SIDE OF RTE 29 TO THE TOP OF THE BLOCKS, THEN NATIVE MATERIALS FOR AT LEAST THE TOP 6".



**90° THRUST BLOCK DETAIL**  
**(WEST SIDE OF RTE. 29)**  
SCALE: 1/4"=1'-0"



**SECTION**  
SCALE: 1/2"=1'-0"

SCALES 1/2"=1'-0" 1/4"=1'-0"

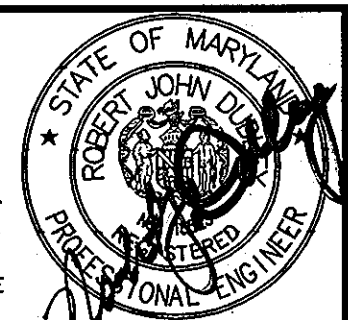
DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

DIRECTOR OF PUBLIC WORKS: *[Signature]* DATE: 1/29/10  
CHIEF - BUREAU OF ENGINEERING: *[Signature]* DATE: 1/28/10  
CHIEF, BUREAU OF UTILITIES: *[Signature]* DATE: 1/28/10

**O'BRIEN & GERE**  
ENGINEERS, INC.

8401 Corporate Drive  
Suite 400  
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DSN. BY: SSD  
DRN. BY: RPW  
CHK. BY: RJD  
DATE: JAN, 2010

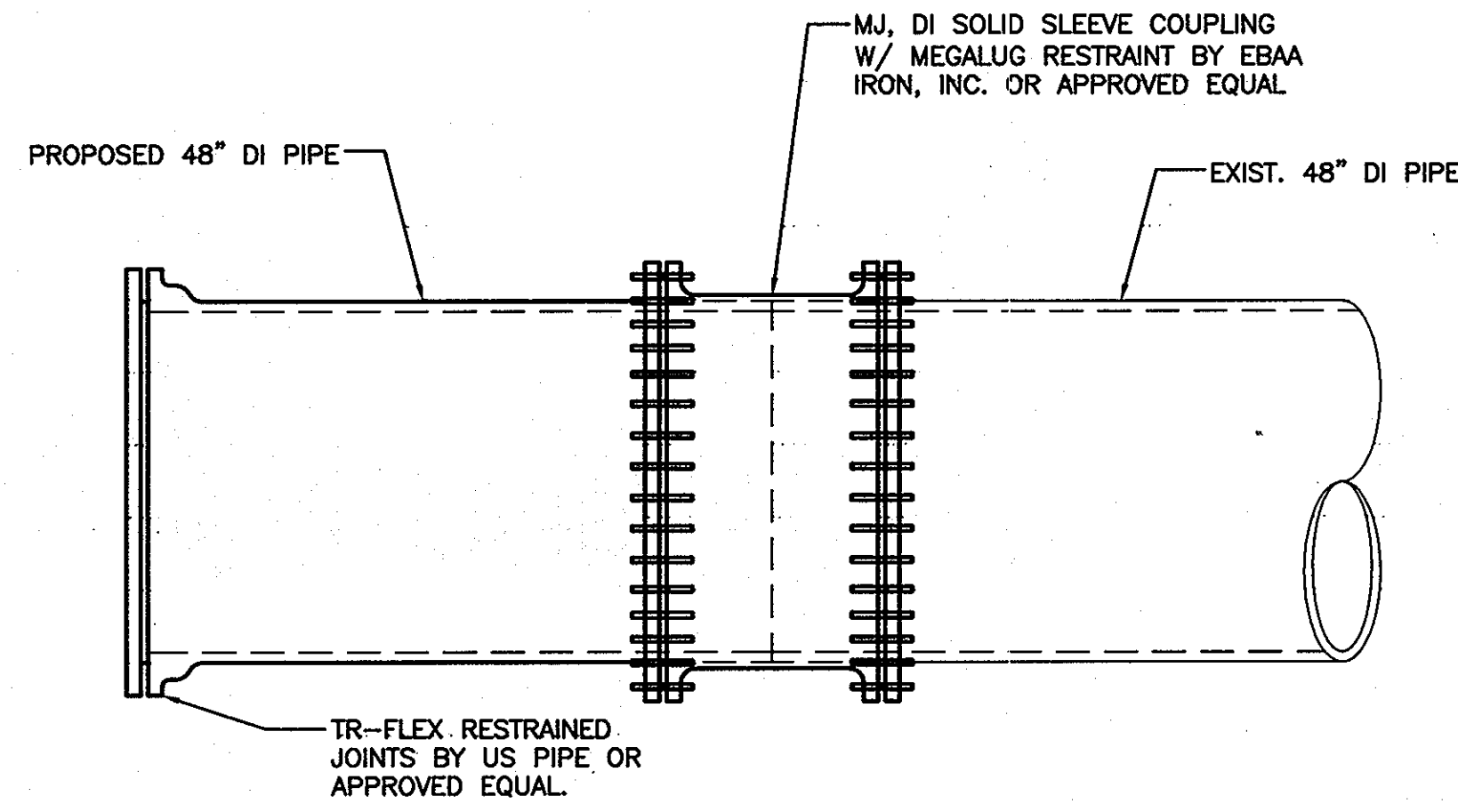
RJD 1 RECORD DRAWING 10/11  
BY NO. REVISION DATE

600' SCALE MAP NO. 24 BLOCK NO. 17

DETAILS

US 29 WATER MAIN REPLACEMENT  
TUNNEL CROSSING AT MONTGOMERY ROAD  
CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

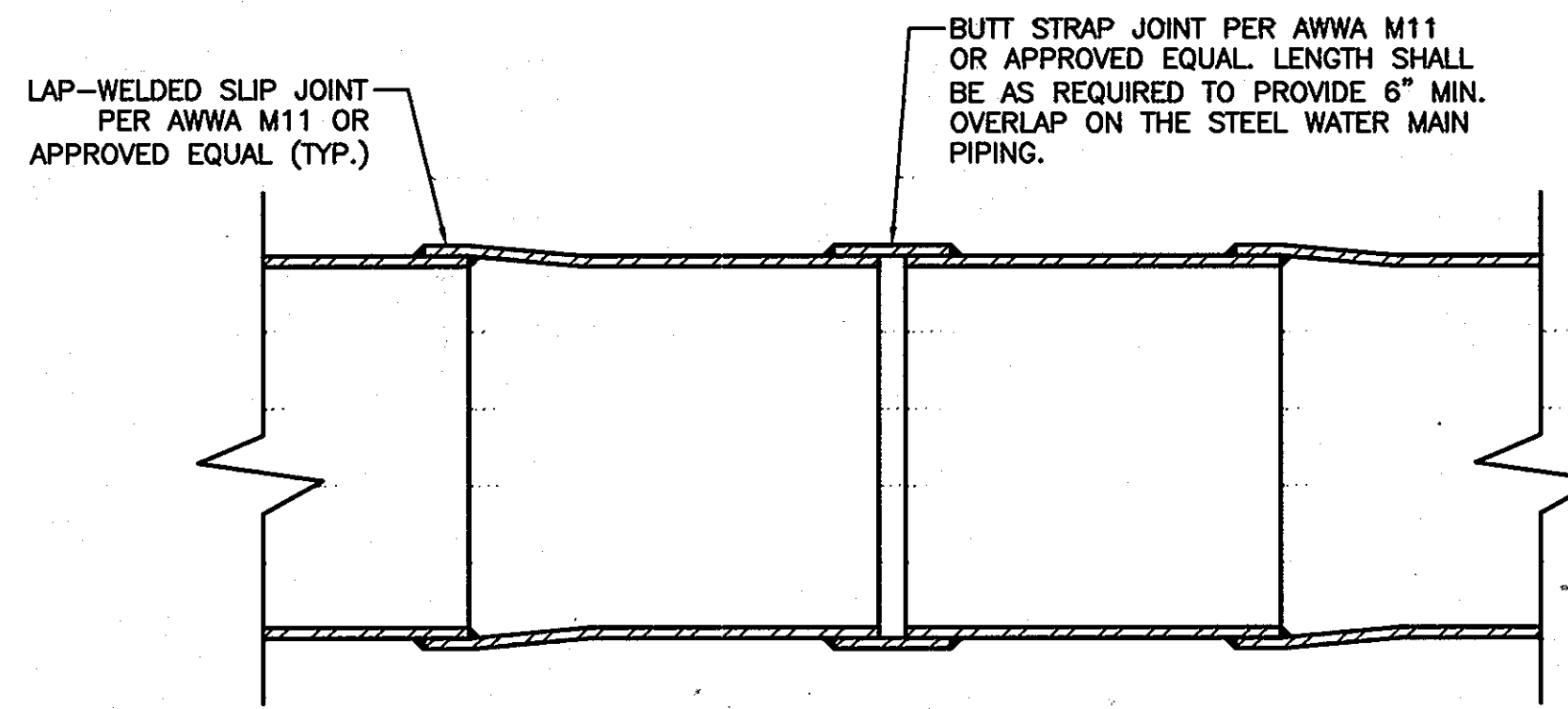
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SHEET 6 OF 26  
FILE NO. 43844-005F



**RESTRAINED JOINTS, CLOSURE PIECES, AND END CONNECTIONS**

**DI TO DI PIPE DETAIL**

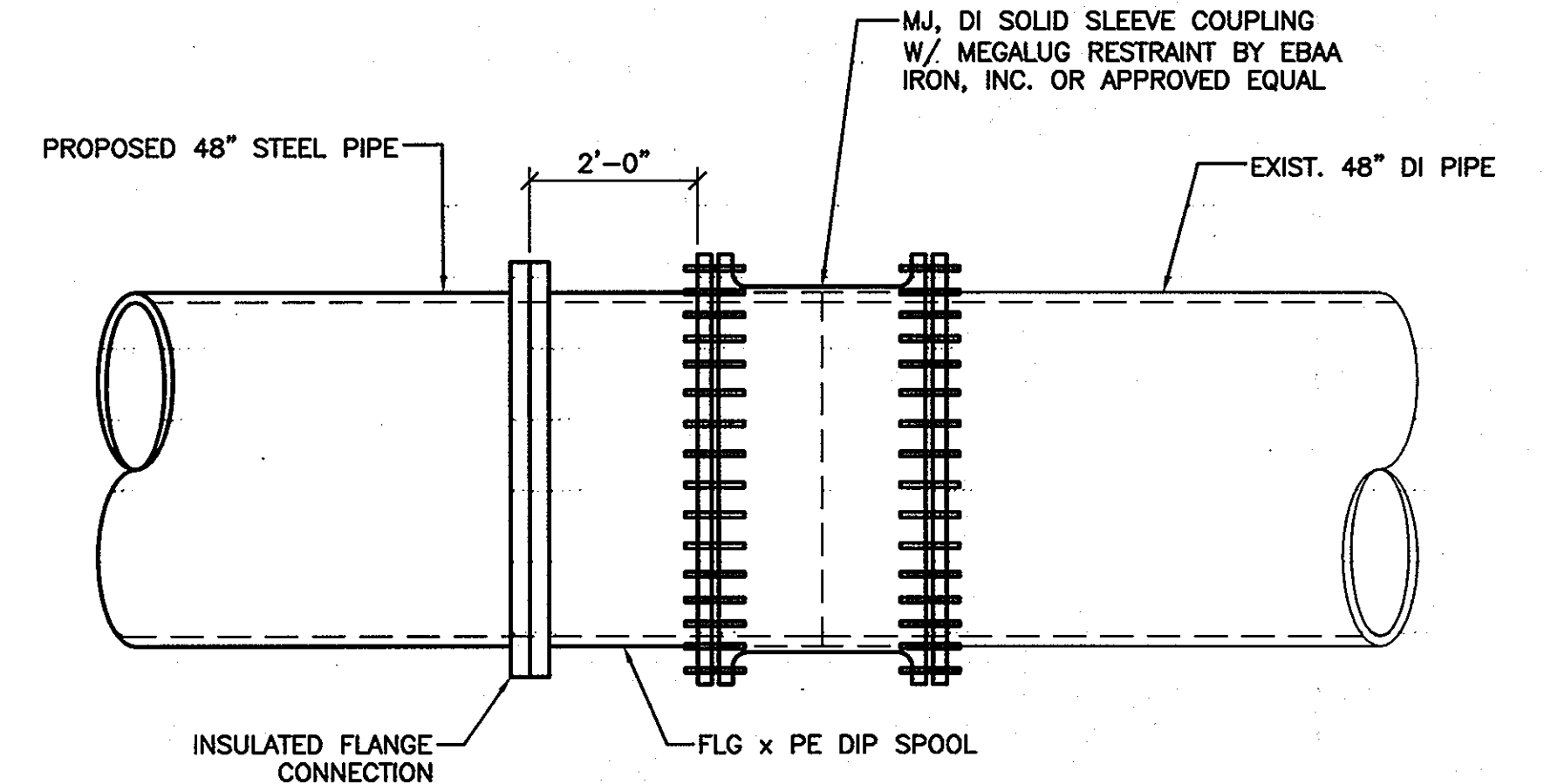
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**RESTRAINED JOINTS AND CLOSURE PIECES**

**STEEL TO STEEL PIPE DETAIL**

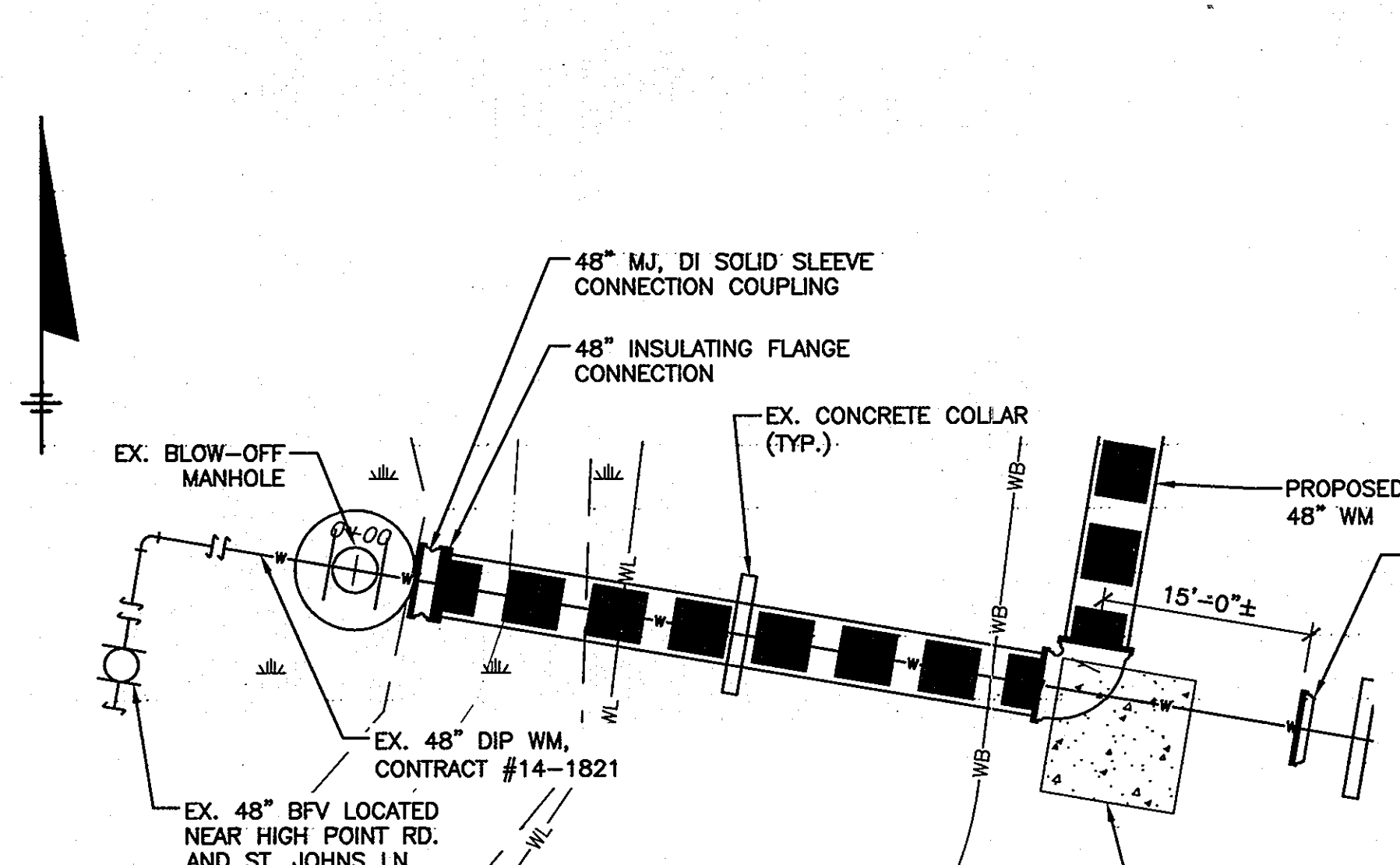
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**RESTRAINED END CONNECTIONS**

**STEEL TO DI PIPE DETAIL**

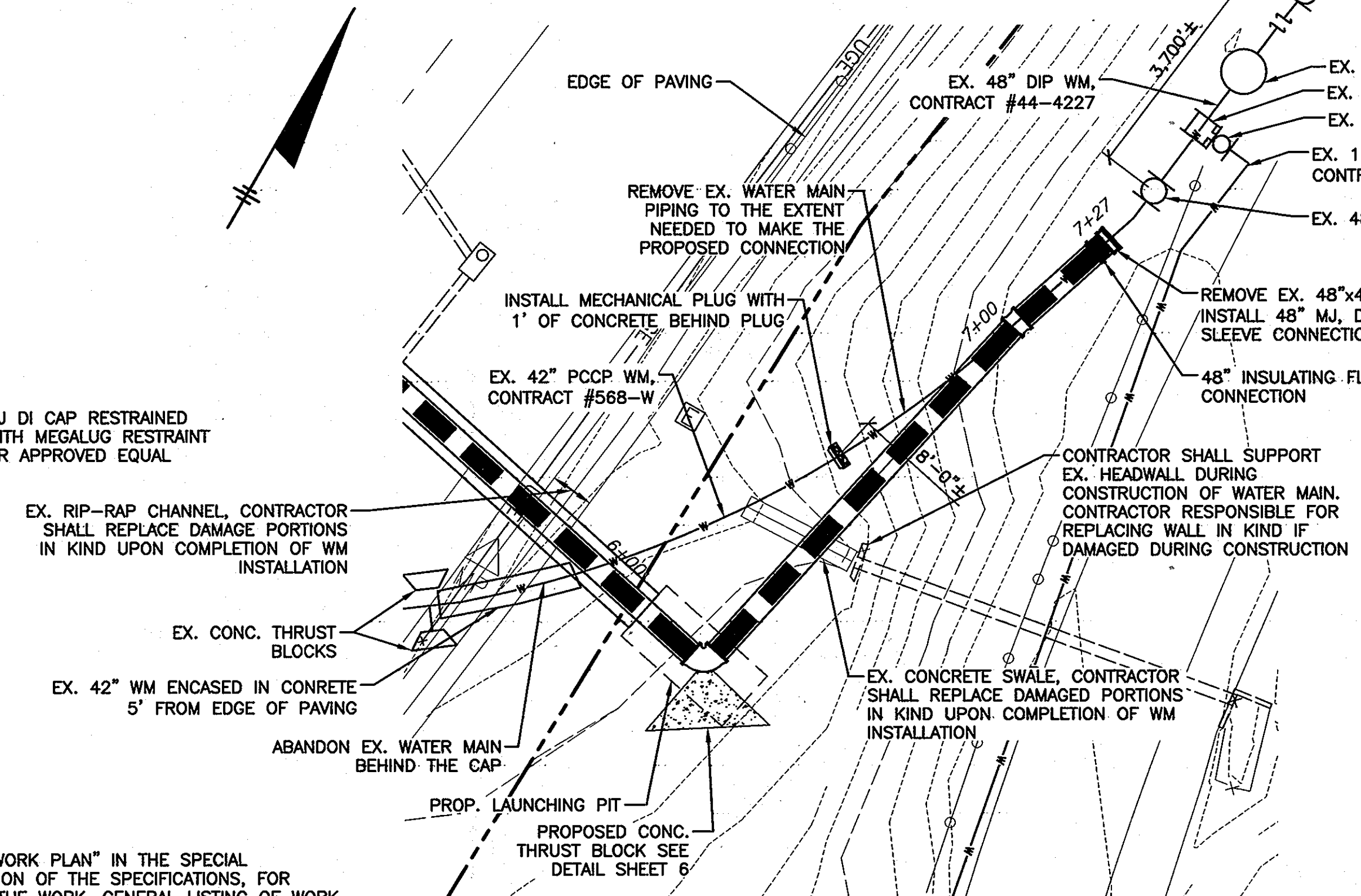
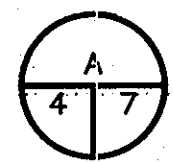
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**US 29 CONNECTION AT STATION 0+29.5**

**CONNECTION DETAIL**

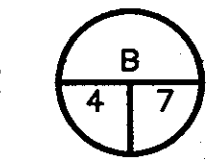
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**TOLL HOUSE ROAD CONNECTION AT STATION 7+27.0**

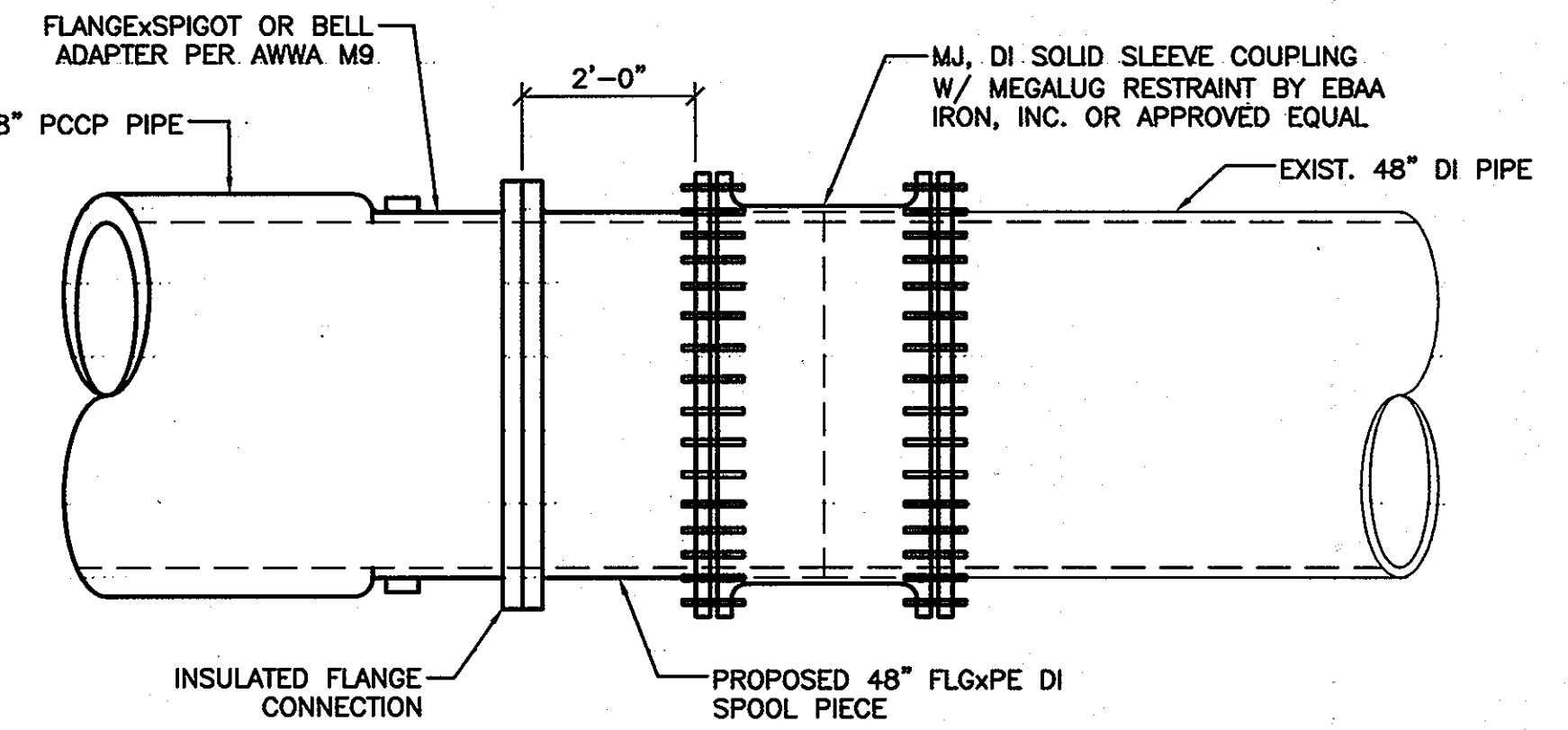
**CONNECTION DETAIL**

SCALE: 1"=20'



**DETAIL NOTES:**

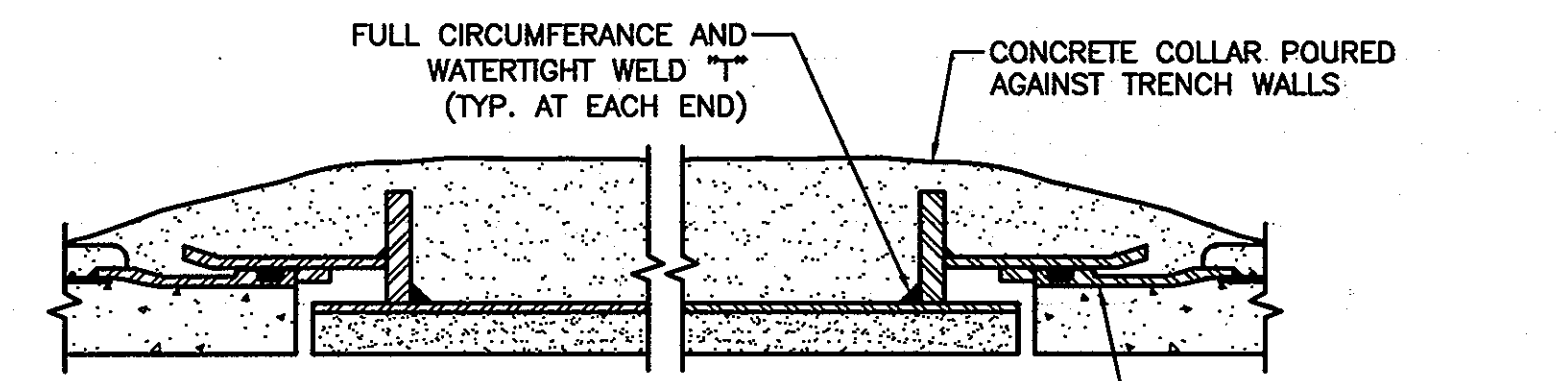
1. REFER TO THE "WORK PLAN" IN THE SPECIAL PROVISIONS SECTION OF THE SPECIFICATIONS, FOR SEQUENCING OF THE WORK, GENERAL LISTING OF WORK TASKS, THE MATERIAL REQUIREMENTS, AND THE COORDINATION THAT MUST TAKE PLACE BETWEEN THE CONTRACTOR AND THE COUNTY FOR COMPLETION OF THE ABOVE CONNECTIONS.
2. REFER TO THE GENERAL NOTES ON SHEET 1, THE CONCRETE THRUST BLOCK DETAILS ON SHEET 6, THE TRENCH EXCAVATION DETAILS ON SHEET 6, AS WELL AS THE TECHNICAL SECTIONS IN THE SPECIFICATIONS FOR FURTHER CONNECTION REQUIREMENTS.
3. TOLL HOUSE ROAD CONNECTION: REMOVE THE EXISTING 48"x42" REDUCER AND CONVEY TO A LOCATION DESIGNATED BY THE COUNTY (WITHIN 20 MILES OF THE PROJECT SITE).



**RESTRAINED END CONNECTIONS DETAIL**

**PCCP PIPE**

NOT TO SCALE



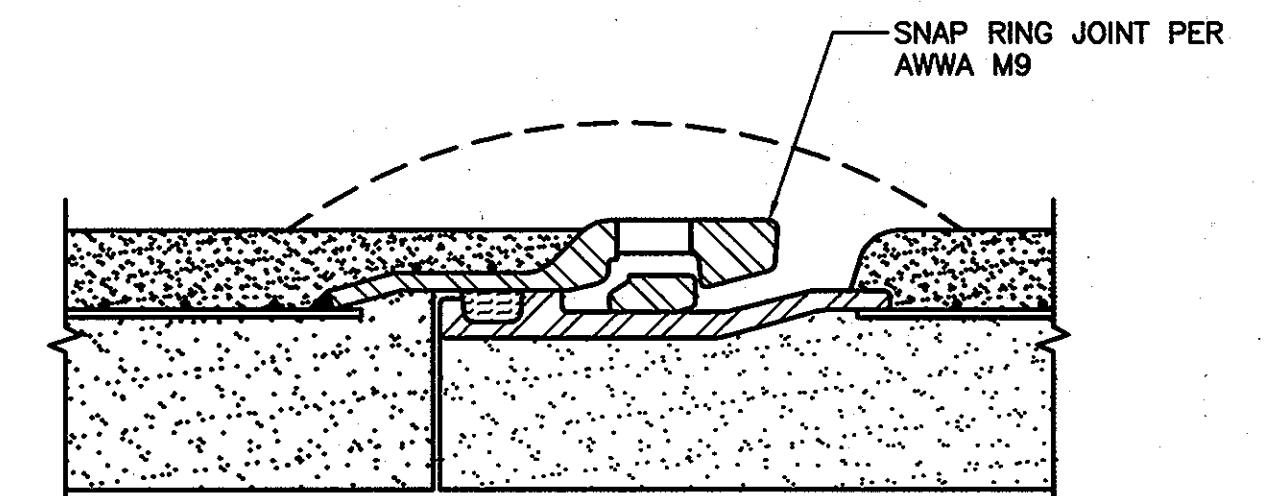
**DETAIL NOTES:**

1. CLOSURE INSTALLATION MUST BE PRESSURE TESTED BEFORE CONCRETE COLLAR IS CAST.
2. CLOSURE CYLINDER THICKNESS MUST BE EQUAL TO OR GREATER THAN FITTING PLATE THICKNESS LISTED ON DESIGN SHEET.

**RESTRAINED CLOSURE PIECES DETAIL**

**PCCP PIPE**

NOT TO SCALE



**EMBEDDED CYLINDER PIPE RESTRAINED JOINT DETAIL**

**PCCP PIPE**

NOT TO SCALE

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS. THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
BY: *[Signature]*

2010 © O'BRIEN & GERE, INC.

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

*[Signature]* 1/29/10  
DIRECTOR OF PUBLIC WORKS DATE

*[Signature]* 1/28/10  
CHIEF, BUREAU OF UTILITIES DATE

*[Signature]* 1/29/10  
CHIEF - BUREAU OF ENGINEERING DATE

*[Signature]* 1/28/10  
CHIEF, UTILITY DESIGN DIVISION DATE

**O'BRIEN & GERE ENGINEERS, INC.**

8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 18523. EXPIRATION DATE DECEMBER, 2011

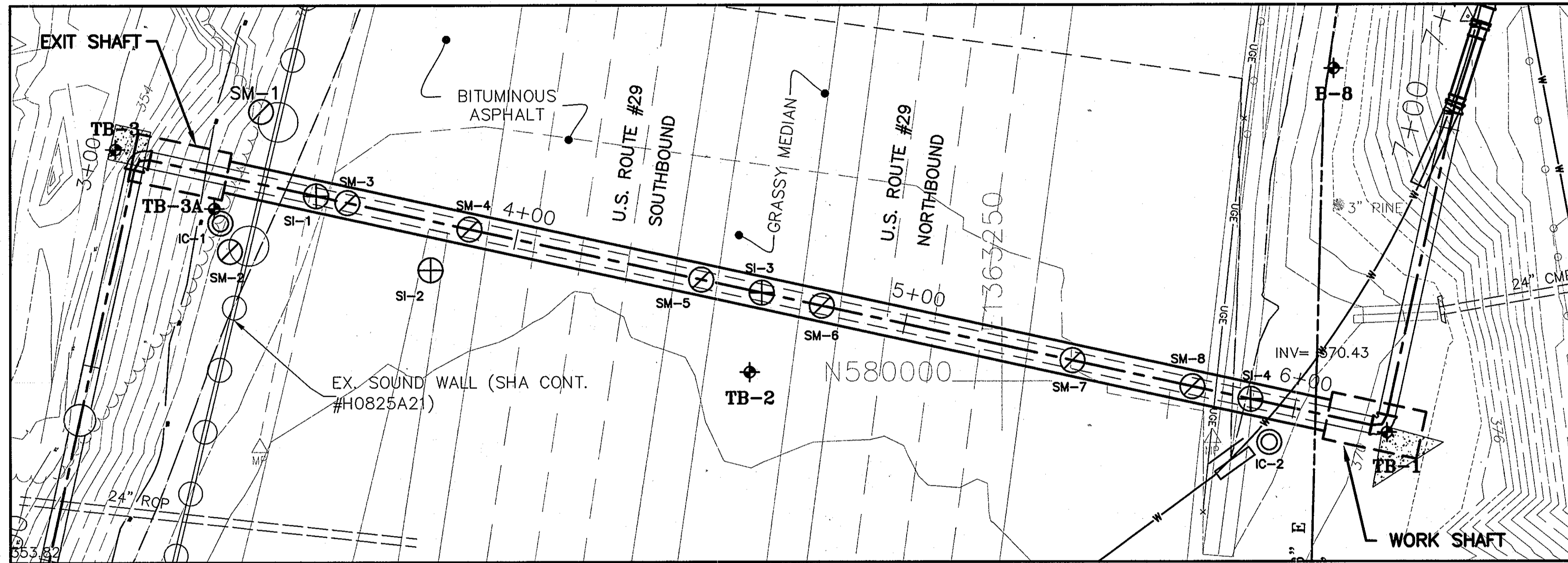
*[Professional Engineer Seal]*

DSN. BY: SSD					
DRN. BY: RPW					
CHK. BY: SSD					
DATE: JAN, 2010	RJD	1	RECORD DRAWING	10/11	
	BY	NO.	REVISION	DATE	

600' SCALE MAP NO.	24	BLOCK NO.	17
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**US 29 WATER MAIN REPLACEMENT TUNNEL CROSSING AT MONTGOMERY ROAD**

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND



PLAN  
SCALE: 1" = 20'

**ABBREVIATIONS**

- c/c - CENTER TO CENTER
- DIA - DIAMETER
- O.D. - OUTSIDE DIAMETER
- PCF - POUNDS PER CUBIC FOOT
- PSF - POUNDS PER SQUARE FOOT
- SS - STAINLESS STEEL
- TH - THICK

**LEGEND**

- ⊕ - BORING
- ⊙ (IC) - INCLINOMETER
- ⊕ (SI) - SUBSURFACE SHALLOW SETTLEMENT INDICATOR
- ⊙ (SM) - SURFACE SETTLEMENT MARKER

RECORD DRAWINGS  
TO THE BEST OF OUR KNOWLEDGE,  
INFORMATION AND BELIEF, BASED ON  
INFORMATION PROVIDED BY OTHERS, THESE  
RECORD DRAWINGS SUBSTANTIALLY REPRESENT  
THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE  
ENGINEERS, INC.  
BY: *[Signature]*

SCALES: 1"=20' SCALE IN FEET

**JEC** JENNY  
ENGINEERING  
CORPORATION  
CONSULTING ENGINEERS  
2401 W. 12th Street, Suite 200, Westborough, MA 01581  
Phone: 508-379-6667, Fax: 508-379-6774  
Website: www.jecinc.com

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8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5822  
FAX: (301) 577-4737

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ENGINEER UNDER THE  
LAWS OF THE STATE OF  
MARYLAND, LICENSE NO.  
28072, EXPIRATION DATE  
11/07/2010

DSN. BY:	KJG			
DRN. BY:	RS			
CHK. BY:	AEP			
DATE:	JAN. 2010	RJD	RECORD DRAWING	10/11
		BY	NO.	REVISION

TUNNEL INSTRUMENTATION PLAN	
600' SCALE MAP NO.	24
BLOCK NO.	17

US ROUTE 29 WATER MAIN REPLACEMENT:  
TUNNEL CROSSING AT MONTGOMERY ROAD  
CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 8 OF 26  
FILE NO. 43844-008F

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

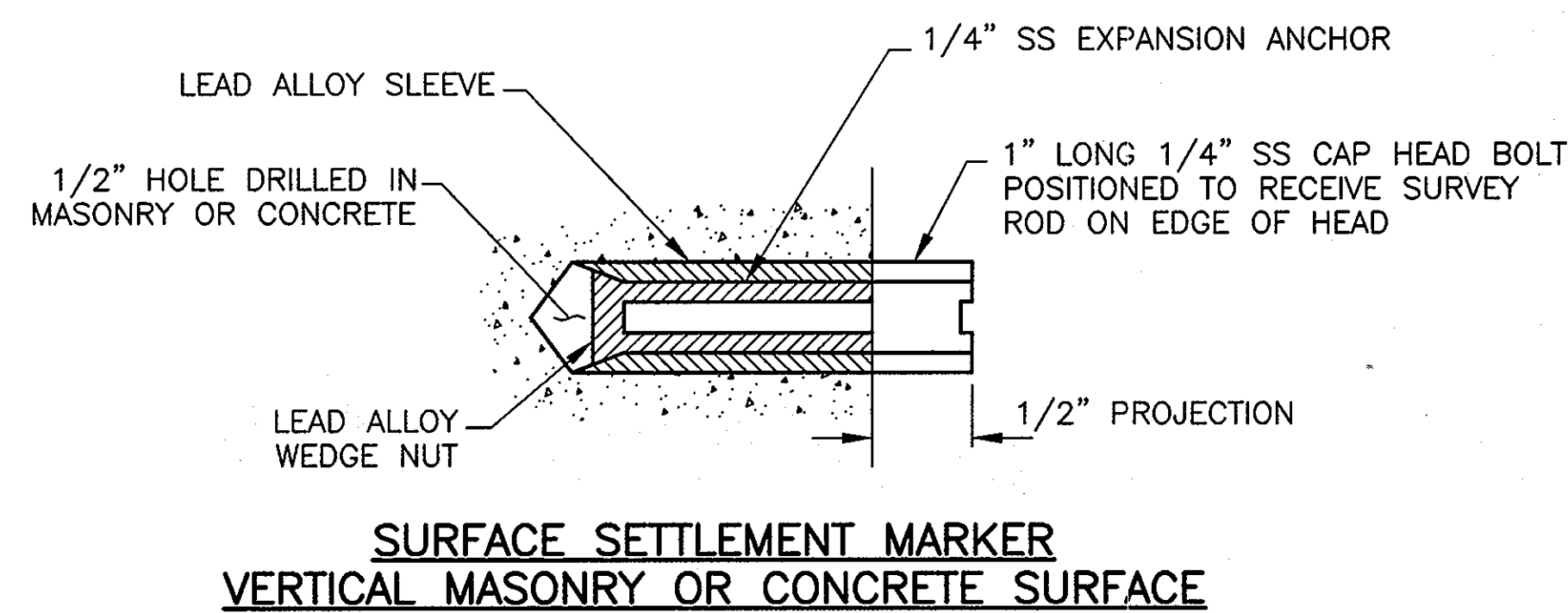
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DIRECTOR OF PUBLIC WORKS DATE

*[Signature]* 1/29/10  
CHIEF - BUREAU OF ENGINEERING DATE

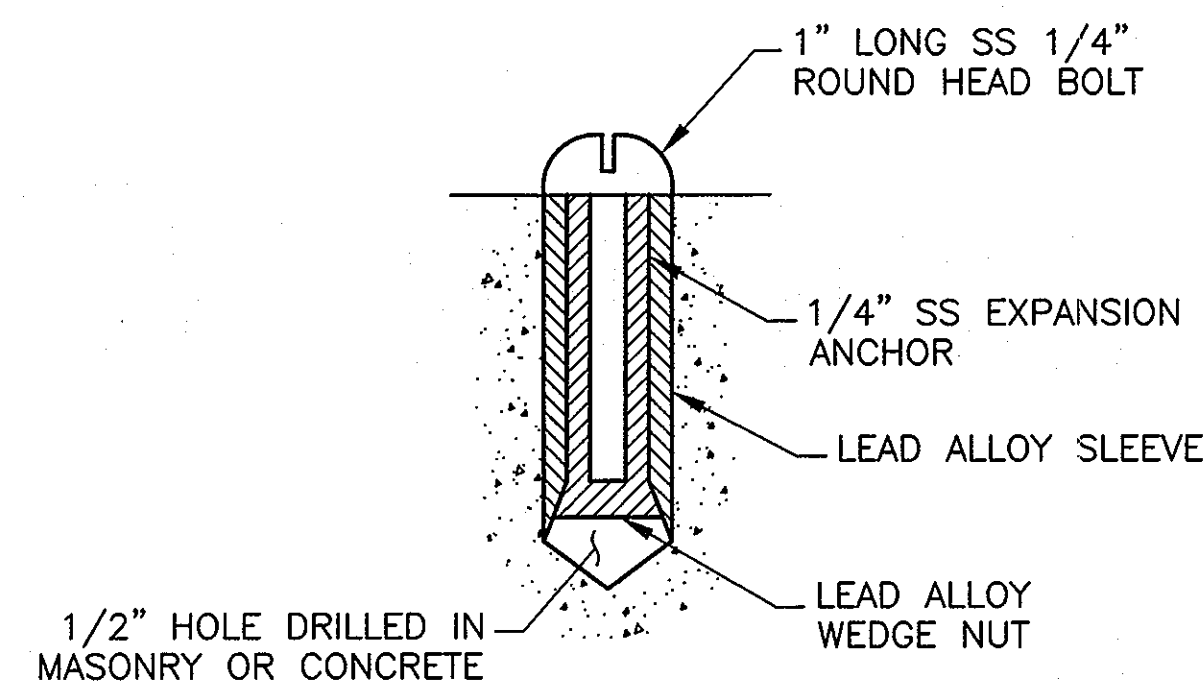
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CHIEF, BUREAU OF UTILITIES DATE

*[Signature]* 4/28/10  
CHIEF, UTILITY DESIGN DIVISION DATE



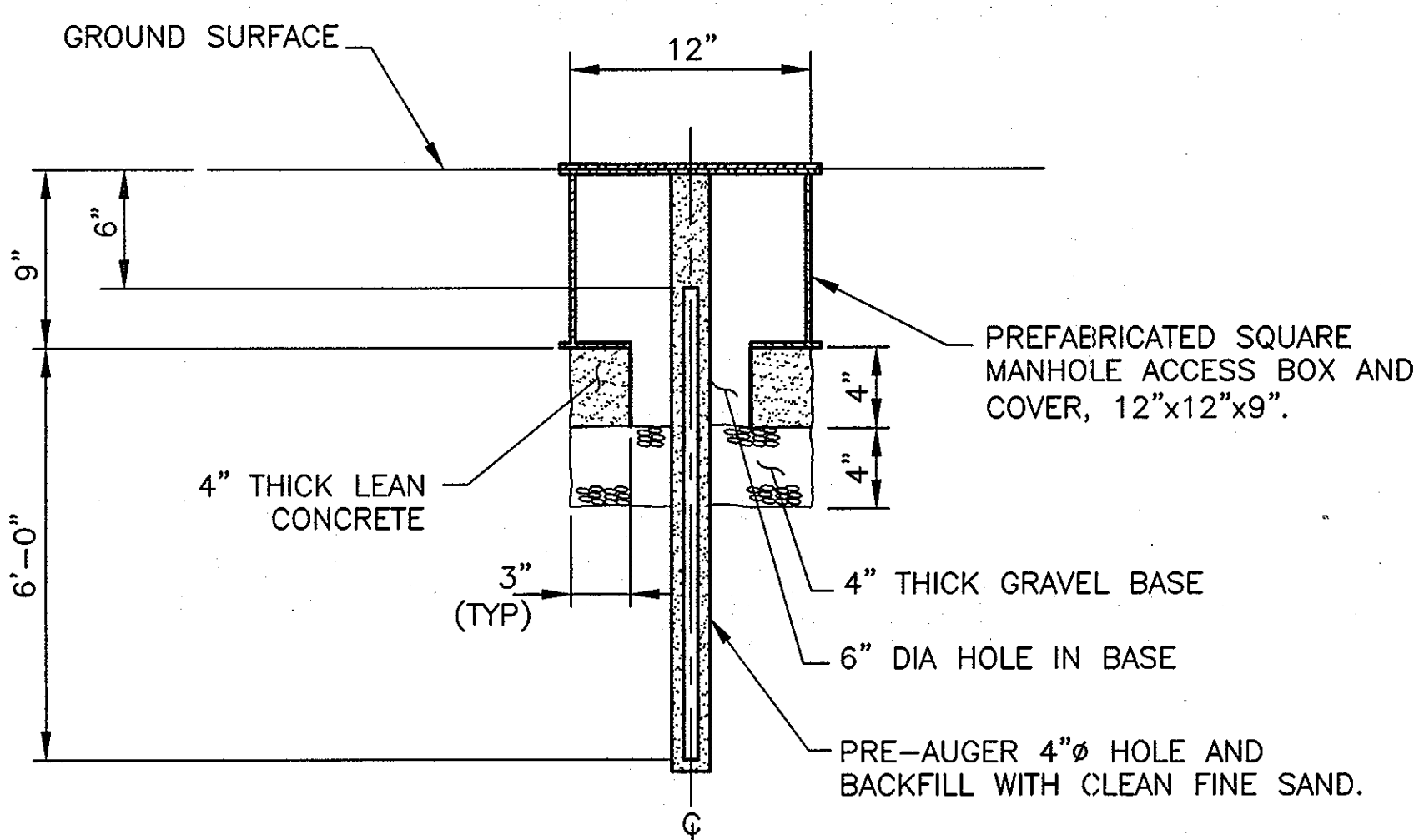


**SURFACE SETTLEMENT MARKER  
VERTICAL MASONRY OR CONCRETE SURFACE**



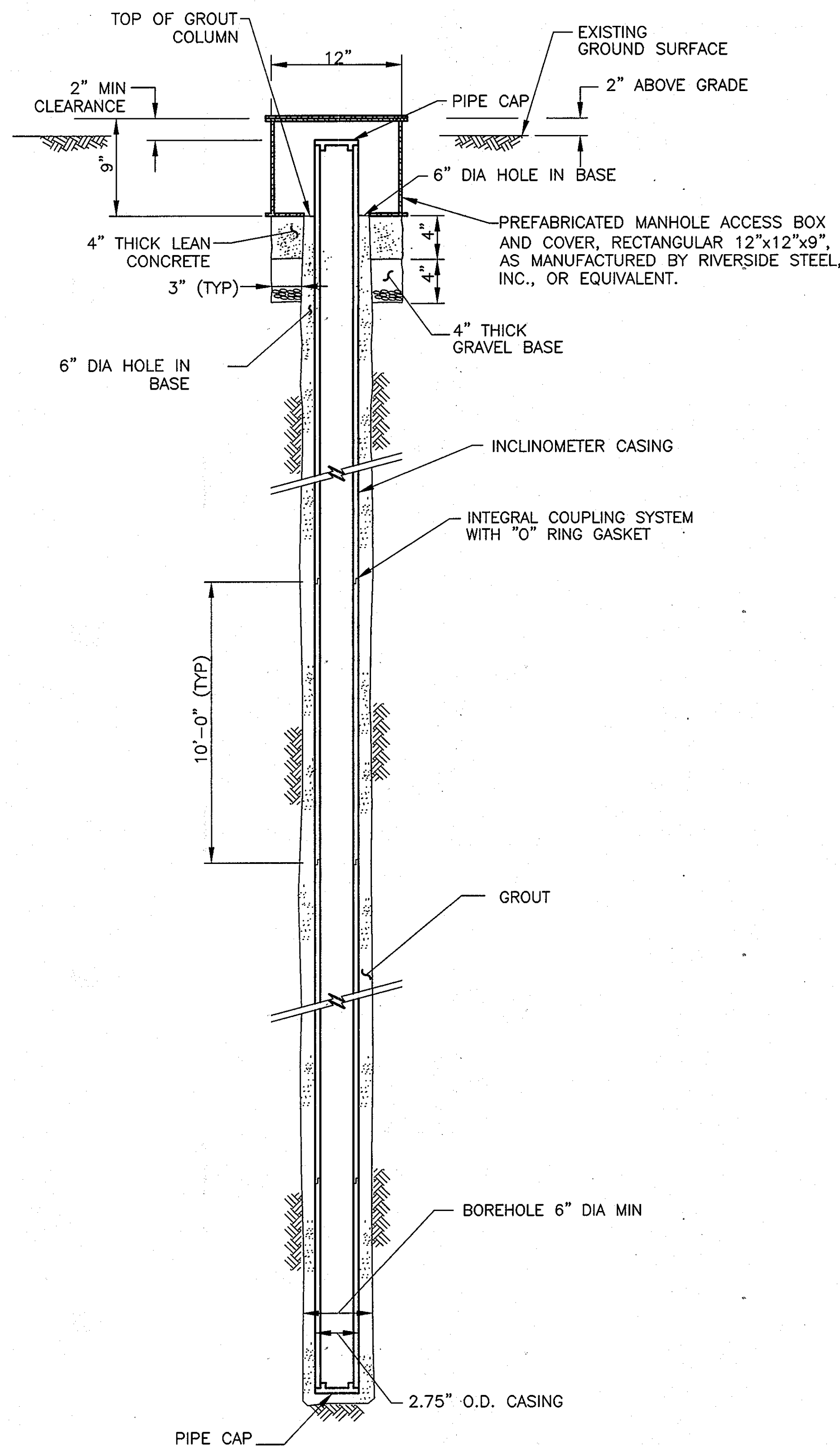
**SURFACE SETTLEMENT MARKER  
HORIZONTAL MASONRY, CONCRETE SURFACE OR PAVEMENT**

(SM)



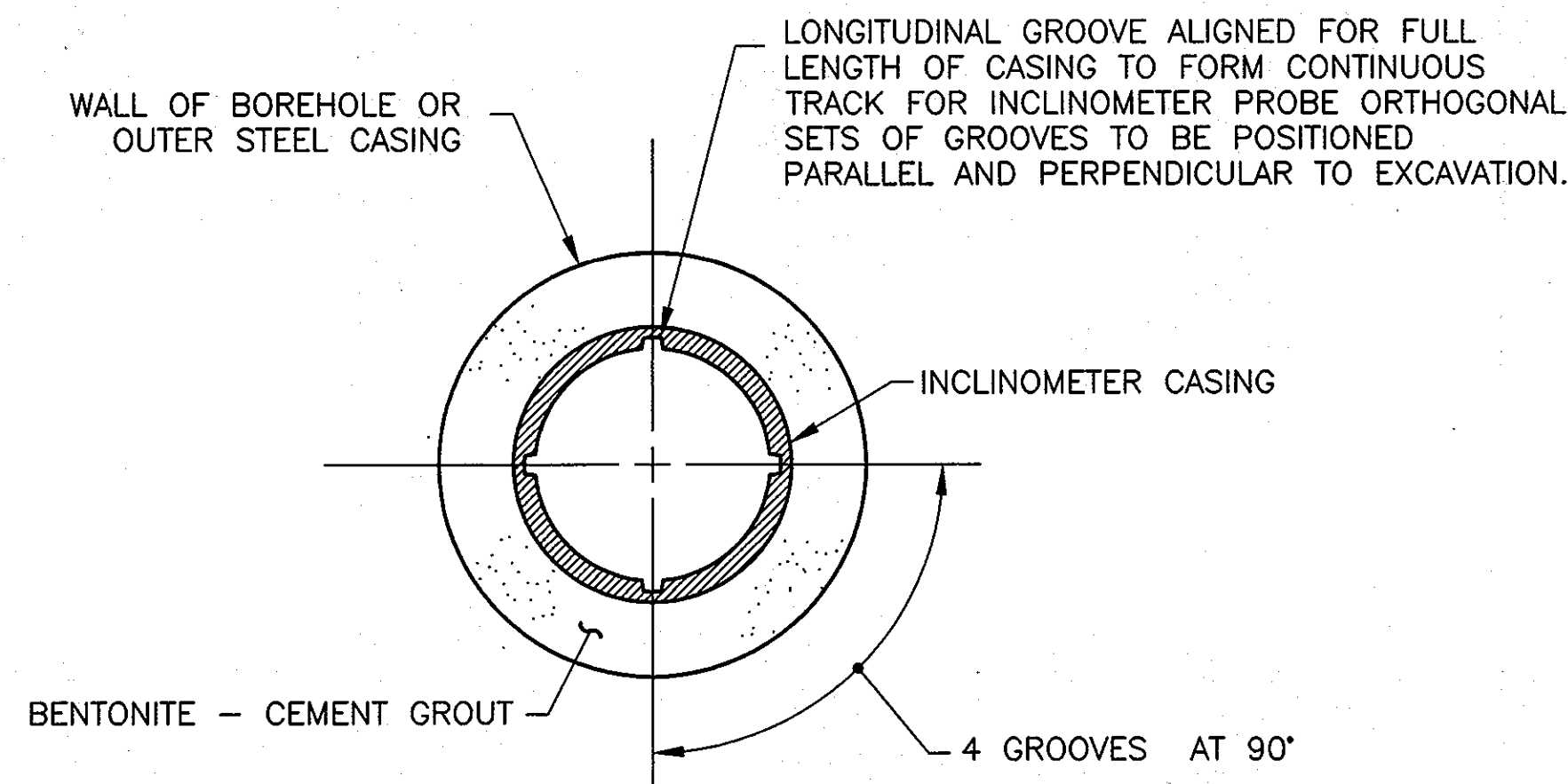
**SUBSURFACE SHALLOW SETTLEMENT INDICATOR**

(SI)



**INCLINOMETER CASING**

(IC)



**CROSS SECTION THROUGH  
INCLINOMETER CASING**

**SURFACE SETTLEMENT MARKERS SCHEDULE  
(SM)**

MARKER NUMBER	LOCATION		
	STA $\phi$	OFFSET (FT)	COMMENTS
SM-1	3+31	18 L	SOUND BARRIER POST
SM-2	3+30	18 R	SOUND BARRIER POST
SM-3	3+57	0	US Rt. 29 RAMP
SM-4	3+88	0	US Rt. 29
SM-5	4+48	0	US Rt. 29
SM-6	4+79	0	US Rt. 29
SM-7	5+43	0	US Rt. 29
SM-8	5+74	0	US Rt. 29 RAMP

**SUBSURFACE SHALLOW SETTLEMENT INDICATORS SCHEDULE  
(SI)**

INDICATOR NUMBER	LOCATION	
	STA $\phi$	OFFSET (FT)
SI-1	3+49	0
SI-2	3+81	12 R
SI-3	4+63	0
SI-4	5+89	0

**INCLINOMETERS SCHEDULE  
(IC)**

INCLINOMETER NUMBER	LOCATION		APPROXIMATE GROUND ELEVATION (FT)	MINIMUM BOTTOM ELEVATION (FT)
	STA $\phi$	OFFSET (FT)		
IC-1	3+27	12 R	364	334
IC-2	5+96	10 R	367	339

**LEGEND**

- ⊙ (IC) - INCLINOMETER
- ⊕ (SI) - SUBSURFACE SHALLOW SETTLEMENT INDICATOR
- ⊙ (SM) - SURFACE SETTLEMENT MARKER

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS. THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
BY: *[Signature]*

NOTE:

1. R AND L UNDER OFFSET HEADING INDICATE RIGHT AND LEFT OF THE TUNNEL CENTERLINE LOOKING UPSTATION.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*[Signature]* 1/29/10  
DIRECTOR OF PUBLIC WORKS DATE

*[Signature]* 1/28/10  
CHIEF, BUREAU OF UTILITIES DATE

*[Signature]* 1/29/10  
CHIEF - BUREAU OF ENGINEERING DATE

*[Signature]* 1/28/10  
CHIEF/UTILITY DESIGN DIVISION DATE

**JEC** JENNY ENGINEERING CORPORATION  
CONSULTING ENGINEERS  
25014 PLEASANTVILLE, NEW JERSEY 07065  
PHONE: 973-375-8829 FAX: 973-375-8774  
WEBSITE: www.jennyeng.com

**O'BRIEN & GERE ENGINEERS, INC.**  
8401 Corporate Drive Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 28072, EXPIRATION DATE 11/07/2010.

*[Signature]*

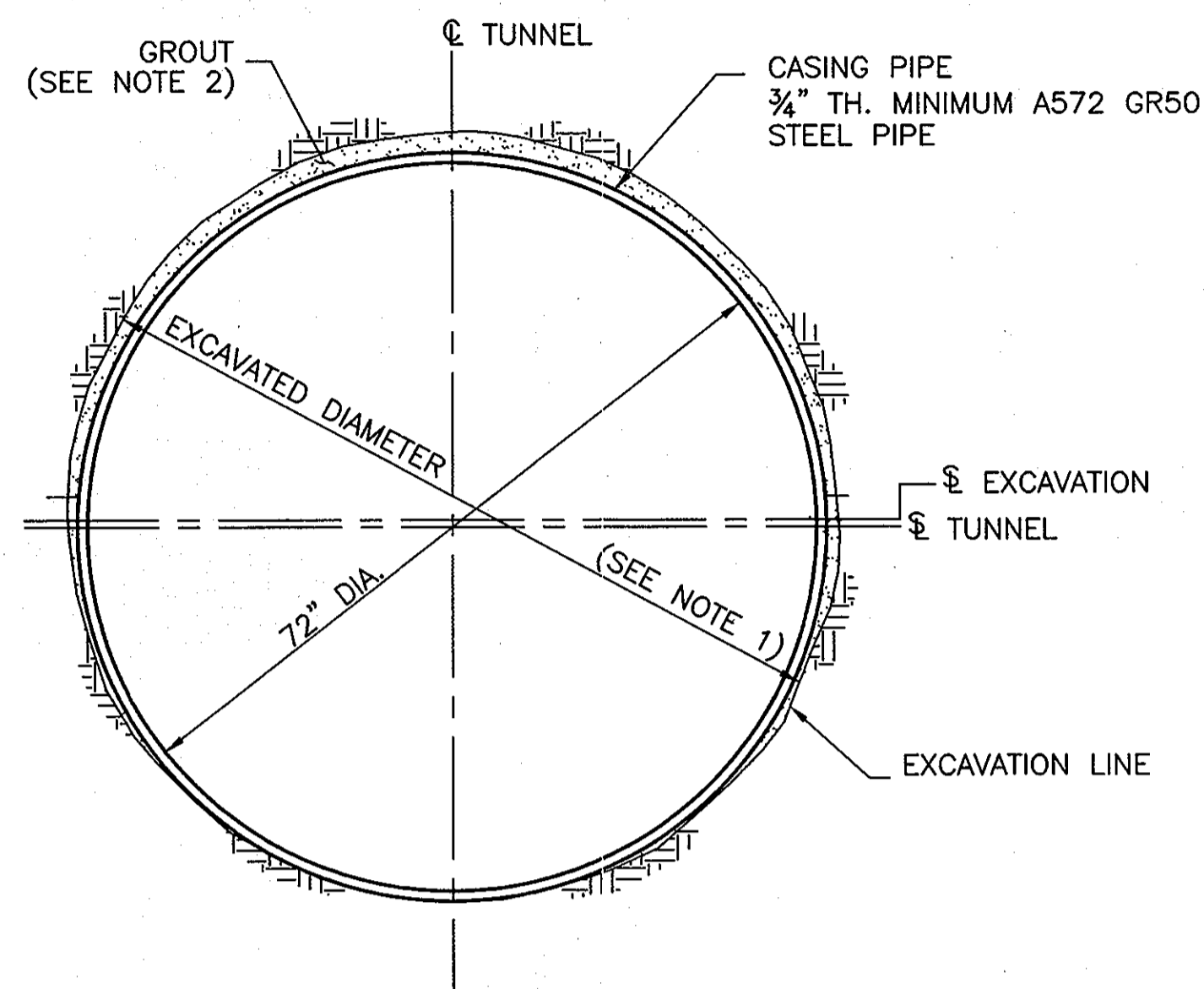
DSN. BY: KJG			
DRN. BY: RS			
CHK. BY: AEP			
DATE: JAN. 2010	RJD	RECORD DRAWING	10/11
BY NO.		REVISION	DATE

INSTRUMENTATION  
DETAILS, SCHEDULE AND LEGEND

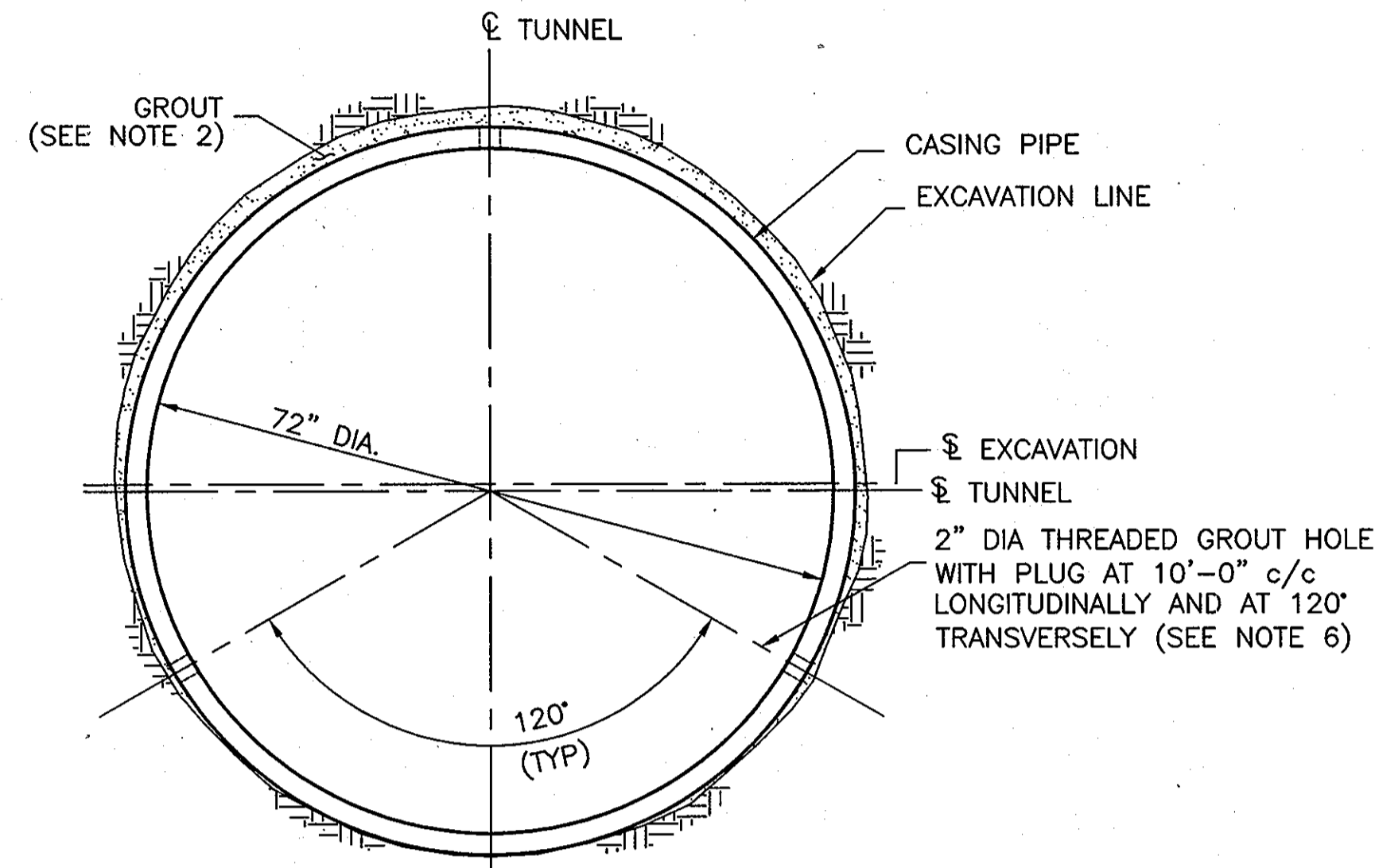
600' SCALE MAP NO. 24 BLOCK NO. 17

US ROUTE 29 WATER MAIN REPLACEMENT:  
TUNNEL CROSSING AT MONTGOMERY ROAD

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND



**TYPICAL TUNNEL SECTION - STEEL CASING PIPE**  
SCALE: 3/4"=1'-0"



**TYPICAL GROUTING DETAIL**  
N.T.S.

**NOTES:**

1. THE EXCAVATED DIAMETER SHALL BE SELECTED BY THE CONTRACTOR TO FACILITATE THE CONTRACTOR'S MEANS AND METHODS OF EXCAVATION AND CASING INSTALLATION.
2. GROUTING, AS SPECIFIED, SHALL BE UTILIZED TO FILL THE ANNULAR VOID OR IF OTHER VOIDS DEVELOP DURING MICROTUNNELING, GROUTING SHALL BE EMPLOYED TO FILL THOSE VOIDS.
3. THE CONTRACTOR SHALL SUBMIT DETAILS OF PIPE AND PIPE JOINT TO THE ENGINEER PRIOR TO COMMENCEMENT OF MICROTUNNELING.
4. THE CONTRACTOR SHALL VERIFY THAT THE PIPE AND PIPE JOINT HAVE THE CAPACITY TO CARRY JACKING FORCES ANTICIPATED BY THE CONTRACTOR AND SHALL PROVIDE SUPPORTING CALCULATIONS.
5. LUBRICATION OF PIPE EXTERIOR IS MANDATORY DURING MICROTUNNELING AND SHALL BE CONDUCTED CONTINUOUSLY UTILIZING BENTONITE SLURRY OR OTHER APPROVED MATERIAL.
6. DETAILS OF THE 2" DIA. GROUT HOLES SHALL BE PROVIDED BY THE CONTRACTOR FOR THE REVIEW AND APPROVAL BY THE ENGINEER.

**RECORD DRAWINGS**  
TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE  
ENGINEERS, INC.  
BY: *[Signature]*

SCALES: 3/4"=1'-0" SCALE IN FEET

**JEC** JENNY  
ENGINEERING  
CORPORATION  
CONSULTING ENGINEERS  
20000 Rockledge Dr., Suite 200  
Rockville, MD 20850  
Phone: (301) 374-4888 Fax: (301) 374-4774  
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8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 751-5622  
FAX: (301) 577-4737

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CERTIFICATION  
I HEREBY CERTIFY THAT  
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THAT I AM A duly  
LICENSED PROFESSIONAL  
ENGINEER UNDER THE  
LAWS OF THE STATE OF  
MARYLAND, LICENSE NO.  
28072, EXPIRATION DATE  
11/07/2010

DSN. BY:	KJG			
DRN. BY:	RS			
CHK. BY:	AEP			
DATE:	JAN 2010			
BY	NO.	REVISION	DATE	
		RJD   RECORD DRAWING	10/11	

TUNNEL SECTIONS AND DETAILS	
600' SCALE MAP NO.	24
BLOCK NO.	17

**US ROUTE 29 WATER MAIN REPLACEMENT:  
TUNNEL CROSSING AT MONTGOMERY ROAD**  
CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

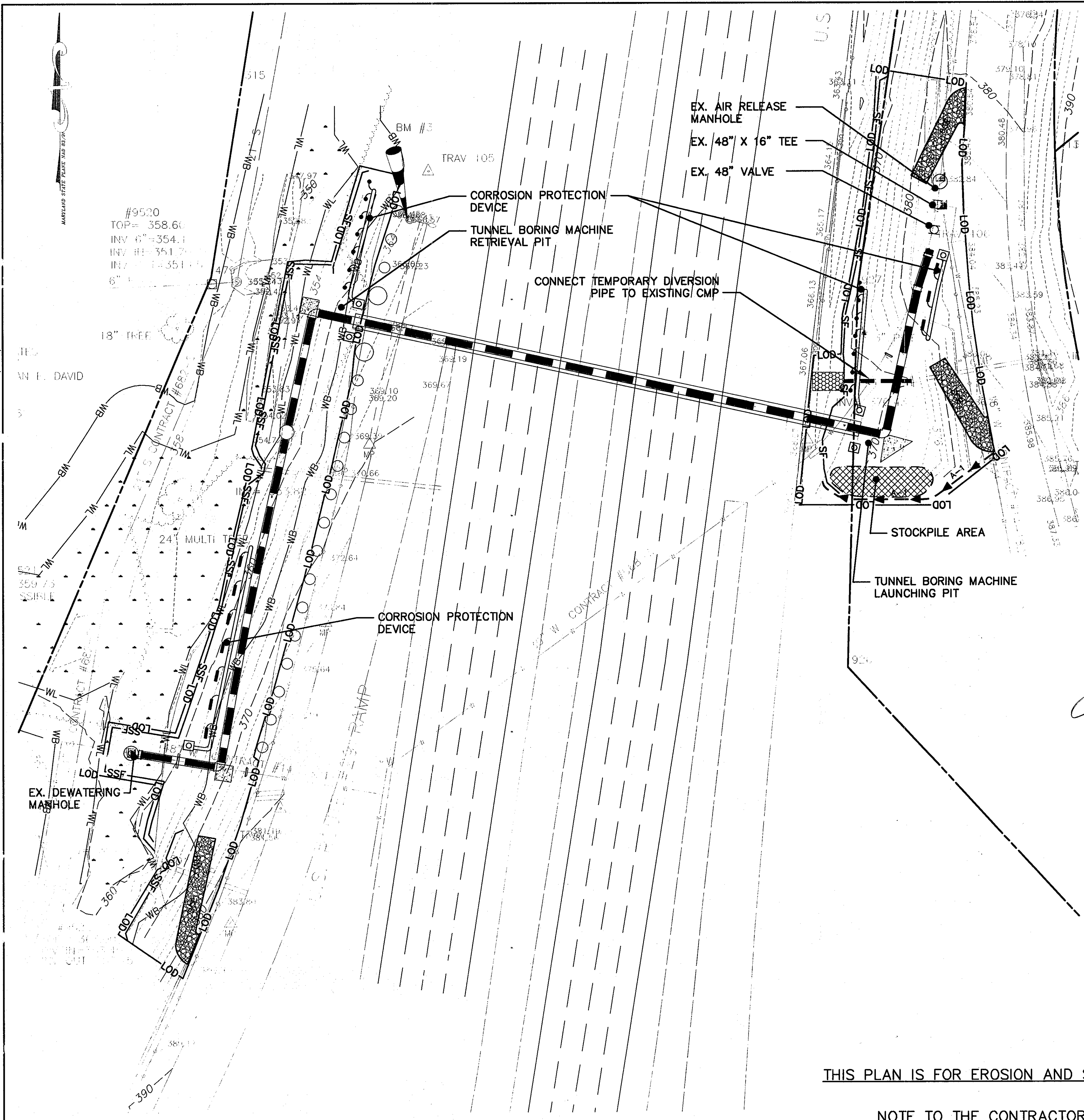
SCALE AS SHOWN  
SHEET 11 OF 26  
FILE NO. 43844-011F

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*[Signature]* 1/29/10  
DIRECTOR OF PUBLIC WORKS DATE

*[Signature]* 1/28/10  
CHIEF, UTILITY DESIGN DIVISION DATE

*[Signature]* 2/15/10  
CHIEF, BUREAU OF UTILITIES DATE



**LEGEND - SEDIMENT CONTROL**

- LIMIT OF DISTURBANCE — LOD —
- SILT FENCE — SF —
- EARTH DIKE — A-1 —
- STABILIZED CONSTRUCTION ENTRANCE [Symbol]
- TEMPORARY RIPRAP [Symbol]
- TEMPORARY DIVERSION PIPE - 24" HDPE [Symbol]

**GENERAL LEGEND**

- WL — WETLAND
- WB — WETLAND BUFFER

**NOTES:**

1. CONSTRUCTION OF THE WATER LINE SHALL BE LIMITED TO THAT WHICH CAN BE BACKFILLED AND STABILIZED AT THE END OF EACH WORK DAY.
2. ADDITIONAL INSTALLATION OF STABILIZED CONSTRUCTION ENTRANCE IF NEEDED, SHALL BE LOCATED BY THE HOWARD COUNTY SCD INSPECTOR.
3. FINAL UTILITY ACCESS AREAS TO BE DETERMINED IN THE FIELD WITH APPROVAL FROM THE HOWARD COUNTY SCD INSPECTOR.
4. THERE IS NO MAPPED FLOODPLAIN PER FEMA SHEET 2400440023B.
5. WHEN UNDERGROUND UTILITY LINES ARE INSTALLED IN OR NEAR STREAMS AND WETLANDS, BEDDING MATERIAL MUST NOT PROMOTE DRAINAGE OF STREAMS AND WETLANDS. CLAY PLUGS, IMPERVIOUS MEMBRANES, OR OTHER MATERIALS MUST BE PLACED IN THE TRENCHES TO ENSURE THAT THE TRENCH DOES NOT DRAIN STREAMS OR WETLANDS.

**BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS**

- 1) FOR UTILITY LINE INSTALLATION, STRIP, STOCKPILE AND MAINTAIN SEPARATELY THE TOP 6" OF SOIL MATERIAL FROM THE NONTIDAL WETLANDS AND BUFFER, TO BE REPLACED AS THE TOP LAYER OF BACKFILL MATERIAL.
- 2) NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
- 3) PLACE MATERIALS IN A LOCATION AND MANNER WHICH DOES NOT ADVERSELY IMPACT SURFACE OR SUBSURFACE WATER FLOW INTO OR OUT OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
- 4) DO NOT USE THE EXCAVATED MATERIAL AS BACKFILL IF IT CONTAINS WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE. IF ADDITIONAL BACKFILL IS REQUIRED, USE CLEAN MATERIAL FREE OF WASTE METAL PRODUCTS, UNSIGHTLY DEBRIS, TOXIC MATERIAL, OR ANY OTHER DELETERIOUS SUBSTANCE.
- 5) PLACE HEAVY EQUIPMENT ON MATS OR SUITABLY OPERATE THE EQUIPMENT TO PREVENT DAMAGE TO NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.
- 6) REPAIR AND MAINTAIN ANY SERVICEABLE STRUCTURE OR FILL SO THERE IS NO PERMANENT LOSS OF NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, OR WATERWAYS, OR PERMANENT MODIFICATION OF THE 100-YEAR FLOODPLAIN IN EXCESS OF THAT LOST UNDER THE ORIGINALLY AUTHORIZED STRUCTURE OR FILL.
- 7) RECTIFY ANY NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, OR 100-YEAR FLOODPLAIN TEMPORARILY IMPACTED BY ANY CONSTRUCTION.
- 8) ALL STABILIZATION IN THE NONTIDAL WETLAND AND NONTIDAL WETLAND BUFFER SHALL CONSIST OF THE FOLLOWING SPECIES: ANNUAL RYEGRASS (*LOLIUM MULTIFLORUM*), MILLET (*SETARIA ITALICA*), BARLEY (*HORDEUM SP.*), OATS (*UNIOLA SP.*), AND/OR RYE (*SECALE CEREALE*). THESE SPECIES WILL ALLOW FOR THE STABILIZATION OF THE SITE WHILE ALSO ALLOWING FOR THE VOLUNTARY REVEGETATION OF NATURAL WETLAND SPECIES. OTHER NON-PERSISTENT VEGETATION MAY BE ACCEPTABLE, BUT MUST BE APPROVED BY THE NONTIDAL WETLANDS AND WATERWAYS DIVISION, KENTUCKY 31 FESCUE SHALL NOT BE UTILIZED IN WETLAND OR BUFFER AREAS. THE AREA SHOULD BE SEEDED AND MULCHED TO REDUCE EROSION AFTER CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED.
- 9) AFTER UTILITY LINE INSTALLATION HAS BEEN COMPLETED, MAKE POST-CONSTRUCTION GRADES AND ELEVATIONS THE SAME AS THE ORIGINAL GRADES AND ELEVATIONS IN TEMPORARILY IMPACTED AREAS.
- 10) TO PROTECT AQUATIC SPECIES, IN-STREAM WORK IS PROHIBITED AS DETERMINED BY THE CLASSIFICATION OF THE STREAM:

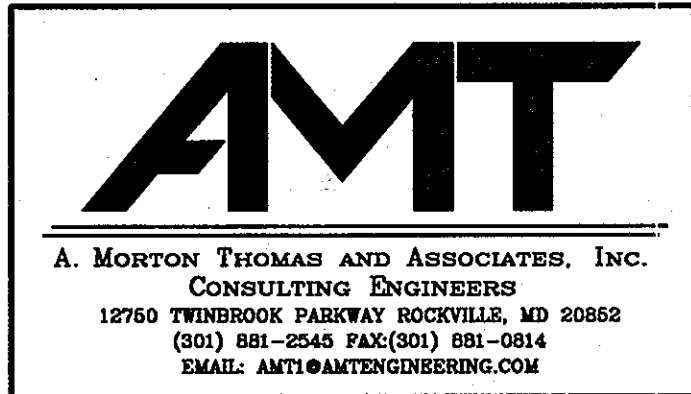
USE I WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH JUNE 15, INCLUSIVE, DURING ANY YEAR.  
 USE III WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD OCTOBER 1 THROUGH APRIL 30, INCLUSIVE, DURING ANY YEAR.  
 USE IV WATERS: IN-STREAM WORK SHALL NOT BE CONDUCTED DURING THE PERIOD MARCH 1 THROUGH MAY 31, INCLUSIVE, DURING ANY YEAR.

- 11) STORMWATER RUNOFF FROM IMPERVIOUS SURFACES SHALL BE CONTROLLED TO PREVENT THE WASHING OF DEBRIS INTO THE WATERWAY.
- 12) CULVERTS SHALL BE CONSTRUCTED AND ANY RIPRAP PLACED SO AS NOT TO OBSTRUCT THE MOVEMENT OF AQUATIC SPECIES, UNLESS THE PURPOSE OF THE ACTIVITY IS TO IMPOUND WATER.
- 13) NO REMOVAL OF VEGETATION, GRADING, FILLING, DRAINING OR OTHER ALTERATION OF THE NONTIDAL WETLANDS OR BUFFER OUTSIDE THE LIMITS OF DISTURBANCE SHALL OCCUR WITHOUT WRITTEN AUTHORIZATION FROM THE WATER MANAGEMENT ADMINISTRATION.

**"MISS UTILITY" NOTE**

CALL "MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDERGROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION.

**RECORD DRAWINGS**  
 TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.



**SEDIMENT CONTROL**

By the Developer:

"I/We certify that all development and construction will be done according to this plan, and that any responsible personnel involved in the construction project will have a Certificate of Attendance at a Department of the Environment approved Training Program for the Control of Sediment and Erosion before beginning the project. I also authorize periodic on-site inspection by the Howard Soil Conservation District."

*Enald G. Lapsen* 1/29/10  
 Signature of Developer Date  
 Print name below signature

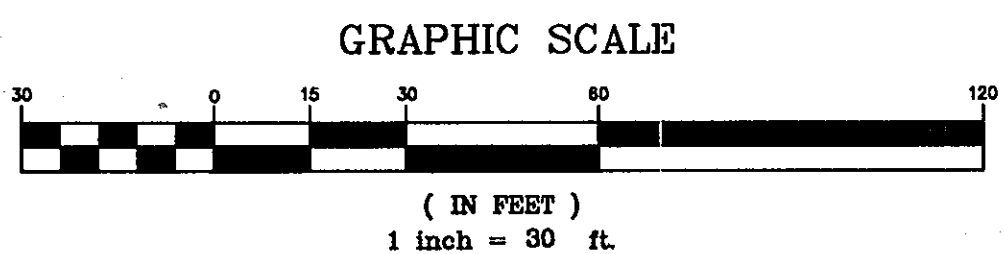
By the Engineer:

"I certify that this plan for erosion and sediment control represents a practical and workable plan based on my personal knowledge of the site conditions and that it was prepared in accordance with the requirements of the Howard Soil Conservation District."

*Max Kantzer* 1/18/10  
 Signature of Engineer Date  
 MAX KANTZER

This development plan is approved for soil erosion and sediment control by the HOWARD SOIL CONSERVATION DISTRICT.

*John K. Robertson* 2/23/10  
 HOWARD SOIL CONSERVATION DISTRICT. Date



**THIS PLAN IS FOR EROSION AND SEDIMENT CONTROL PURPOSES ONLY**

**NOTE TO THE CONTRACTOR: "EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED"**

**PLAN**  
 SCALE: 1"=30'

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND

*John A. Davids* 2/15/10  
 DIRECTOR OF PUBLIC WORKS DATE

*Paul G. Lapsen* 1/29/10  
 CHIEF - BUREAU OF ENGINEERING DATE

*John C. Cren* 2/15/10  
 CHIEF, BUREAU OF UTILITIES DATE

*John C. Cren* 1/28/10  
 CHIEF UTILITY DESIGN DIVISION DATE

**O'BRIEN & GERE ENGINEERS, INC.**  
 8401 Corporate Drive  
 Suite 400  
 Landover, Maryland 20785  
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 FAX: (301) 577-4737

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*Max Kantzer* 1/18/10  
 ENGINEER

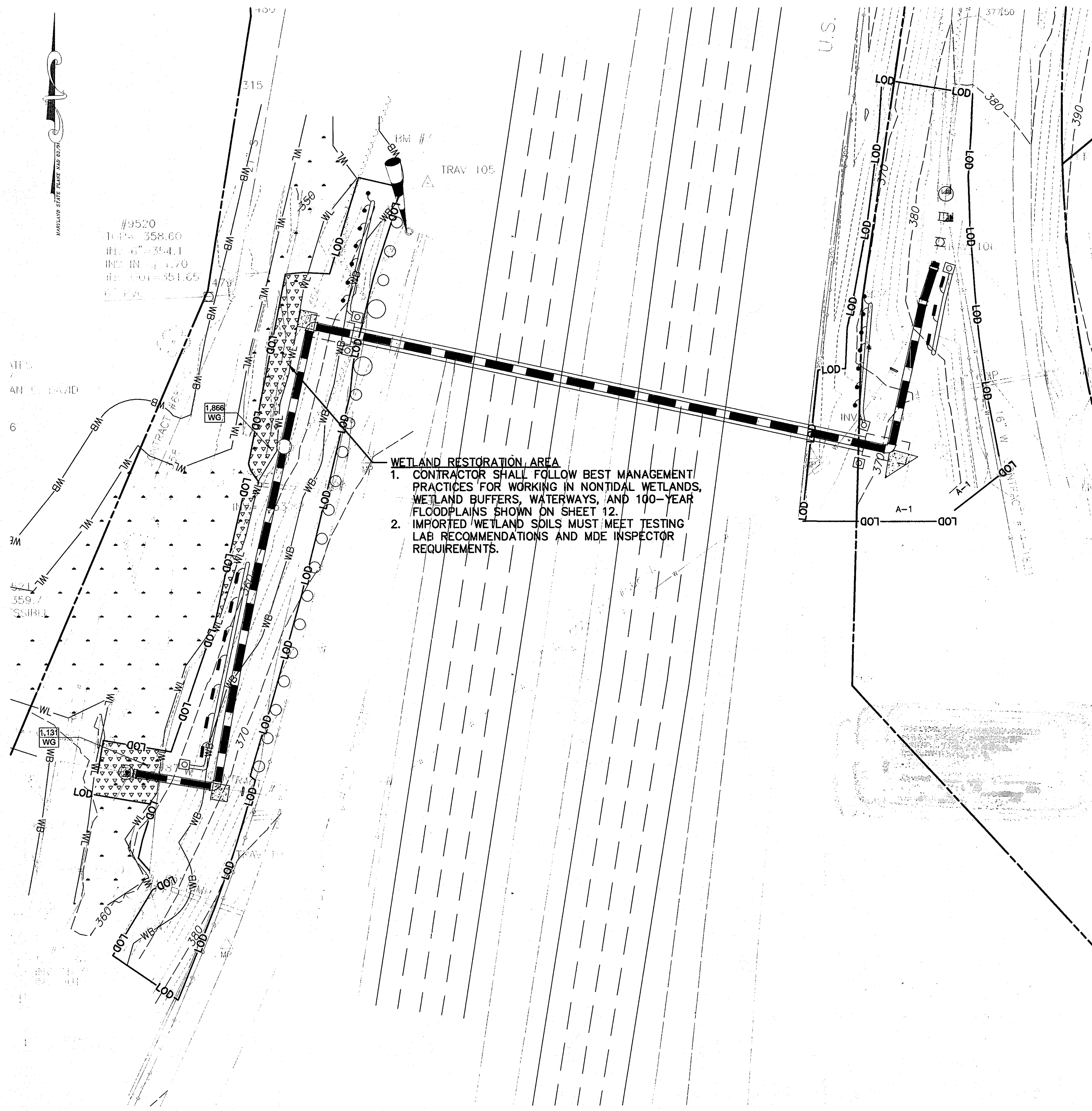
DSN. BY: AES				
DRN. BY: AES				
CHK. BY: GUJ				
DATE: JAN. 2010	RJD	1	RECORD DRAWING	10/11
	BY	NO.	REVISION	DATE

<b>SEDIMENT CONTROL PLAN</b>	
600' SCALE MAP NO. 24	BLOCK NO. 17

US 29 WATER MAIN REPLACEMENT  
 TUNNEL CROSSING AT MONTGOMERY ROAD

CAPITAL PROJECT: W-8243  
 CONTRACT NO.: 44-4630  
 ELECTION DISTRICT: 2  
 HOWARD COUNTY, MARYLAND

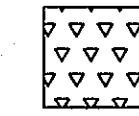
SCALE AS SHOWN
SHEET 12 OF 26



**WETLAND RESTORATION AREA**  
 1. CONTRACTOR SHALL FOLLOW BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS SHOWN ON SHEET 12.  
 2. IMPORTED WETLAND SOILS MUST MEET TESTING LAB RECOMMENDATIONS AND MDE INSPECTOR REQUIREMENTS.

**PLANT SCHEDULE**

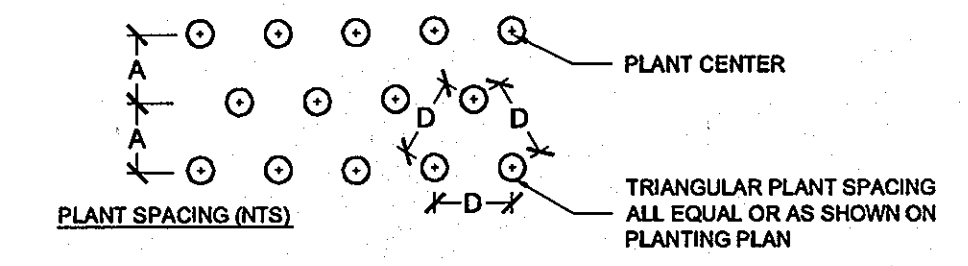
GROUND COVERS QTY BOTANICAL/COMMON CONT



2,997 WETLAND PLANTING MIX TUBELINGS/PLUGS @ 12" O.C.

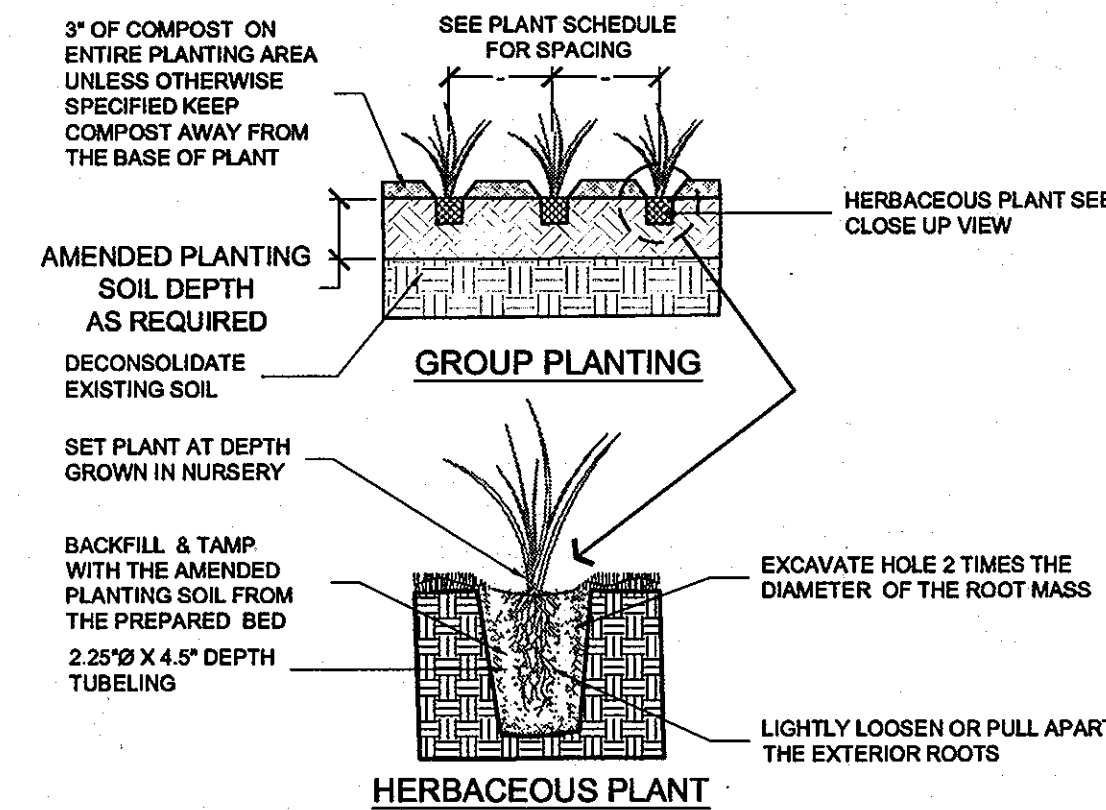
WETLAND PLANTING MIX - PLANT EACH SPECIES IN RANDOM GROUPS OF 4 TO 7 PLANTS

QTY (%)	Botanical Name	Common Name	Size
<b>PERENNIALS &amp; GRASSES</b>			
13%	Carex vulpinoidea	Fox Sedge	Tubeling/ Plug @ 12" O.C.
13%	Juncus effusus	Soft Rush	Tubeling/ Plug @ 12" O.C.
13%	Panicum virgatum	Switchgrass	Tubeling/ Plug @ 12" O.C.
13%	Eupatorium coelestinum	Mist Flower	Tubeling/ Plug @ 12" O.C.
13%	Scirpus validus	Soft Stem Bulrush	Tubeling/ Plug @ 12" O.C.
11%	Sagittaria latifolia	Duck Potato	Tubeling/ Plug @ 12" O.C.
13%	Eupatorium fistulosum	Joe Pye Weed	Tubeling/ Plug @ 12" O.C.
11%	Carex baltica	Baltic Sedge	Tubeling/ Plug @ 12" O.C.
100%	TOTAL		



SPACING "D"	ROW "A"	PLANTS PER 10 SQ. FT.
8" O.C.	6.93'	26
12" O.C.	10.4'	11.5
16" O.C.	15.6'	5.12
20" O.C.	17.3'	2.42
24" O.C.	20.8'	2.9
36" O.C.	30.9'	1.28

NOTE: QUANTITY OF PERENNIALS AND SPACING AS NOTED IN PLANT SCHEDULE



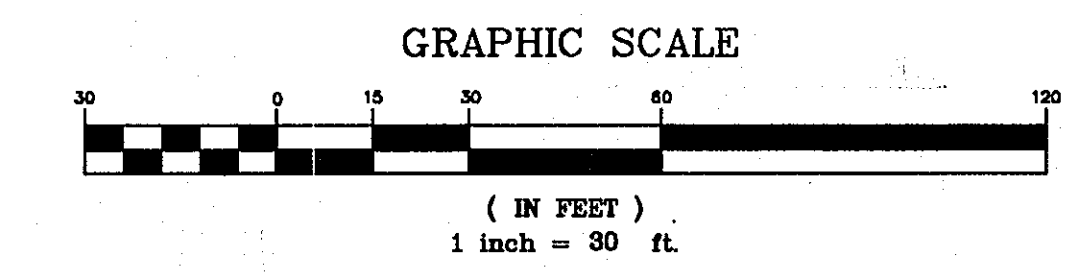
**1 HERBACEOUS TUBELING/ PLUG PLANTING DETAIL**  
 NOT TO SCALE  
 DETAIL-FILE

**PLANTING GENERAL NOTES**

- THIS PLAN IS FOR LANDSCAPING PURPOSES ONLY, AND ANY OTHER INFORMATION SHOWN IS FOR REFERENCE ONLY. SEE SITE PLAN FOR INFORMATION ABOUT ALL LAYOUT, GRADING AND OTHER SITE IMPROVEMENTS.
- CALL MISS UTILITY AT 811 OR 1-800-257-7777 TO MARK UTILITIES AT LEAST 48 HOURS BEFORE DIGGING.
- ALL MATERIALS AND PLANTING PROCEDURES EXCEPT AS OTHERWISE NOTED SHALL CONFORM TO THE LATEST EDITION OF "LANDSCAPE SPECIFICATION GUIDELINES" BY THE LANDSCAPE CONTRACTORS ASSOCIATION MD-DC-VA.
- PLANTS SHALL CONFORM TO THE CURRENT EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1)
- PLANT NAMES SHALL BE THOSE GIVEN IN THE LATEST EDITION OF STANDARD PLANT NAMES, AMERICAN COMMITTEE ON HORTICULTURAL NOMENCLATURE.
- TOPSOIL FOR UPLAND AREAS SHALL MEET SPECIFICATIONS AS PER THE 1994 MD STANDARDS AND SPECIFICATIONS FOR SOIL AND EROSION AND SEDIMENT CONTROL.
- THE CONTRACTOR SHALL SUBMIT REPRESENTATIVE SOIL SAMPLES FROM BOTH IN-SITU SOILS AND SOILS BROUGHT IN FROM OFF-SITE TO A STATE LICENSED TESTING LABORATORY. THE CONTRACTOR SHALL INCORPORATE OR APPLY SOIL AMENDMENTS AND FERTILIZATION BASED UPON RESULTS OF THE SOIL TESTS AND RECOMMENDATIONS BY THE TEST LAB. THE CONTRACTOR SHALL OBTAIN RECOMMENDATIONS FOR BOTH UPLAND AND WETLAND SOILS.
- THE CONTRACTOR SHALL APPLY GRASS ACCORDING TO THE 1994 MD STANDARD AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. DO NOT USE KENTUCKY 31 TALL FESCUE.
- THE CONTRACTOR SHALL STAKE OUT ALL PLANTING BEDS AND TREE LOCATIONS AND THESE MUST BE APPROVED BY THE LANDSCAPE ARCHITECT BEFORE DIGGING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND COORDINATE PLANTINGS WITH ALL EXISTING UTILITIES. IF DISCREPANCIES OCCUR BECAUSE OF UTILITY LOCATIONS OR OTHER EXISTING CONDITIONS THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT IMMEDIATELY TO COORDINATE ANY NECESSARY ADJUSTMENTS.
- ALL PLANT MATERIAL SHALL BE LABELED BY THE NURSERY AND DELIVERED WITH LABELS IN PLACE FOR INSPECTION. SUBSTITUTIONS IN PLANT SPECIES OR SIZE WILL NOT BE PERMITTED EXCEPT WITH THE APPROVAL OF THE LANDSCAPE ARCHITECT. PRUNING IS NOT TO OCCUR UNTIL MATERIAL HAS BEEN PLANTED. CONTRACTOR SHALL PRUNE PLANT MATERIAL AS SOON THEREAFTER AS IS ADVISABLE UNDER STANDARD HORTICULTURAL PRACTICES.
- IT IS OF UTMOST IMPORTANCE THAT ALL PLANT MATERIAL BE SET SLIGHTLY HIGHER IN RELATION TO GRADE THAN IT WAS GROWN IN THE NURSERY AND WITH GOOD EARTH TO ROOT CONTACT. ANY MATERIALS OR WORK MAY BE REJECTED BY THE LANDSCAPE ARCHITECT IF IT DOES NOT MEET THIS OR ANY OTHER REQUIREMENT OF THE SPECIFICATIONS, AND REJECTED MATERIALS SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AT CONTRACTOR'S EXPENSE.
- THE CONTRACTOR SHALL MULCH AND WATER ALL PLANTS WELL ON THE DAY THEY ARE PLANTED. THE SURFACE MULCH LAYER SHALL CONSIST OF WELL-AGED COMPOST. THE CONTRACTOR SHALL APPLY THE MULCH UNIFORMLY TO A 2 TO 3 INCH DEPTH. MULCH SHALL BE KEPT 3 TO 4 INCHES AWAY FROM ALL TRUNKS AND WOODY STEMS.
- IN CASE OF DISCREPANCIES BETWEEN QUANTITIES ON THE PLANT LIST AND THE PLAN, THE PLAN SHALL GOVERN.
- SEED OR SOD BARE AREAS AS DIRECTED BY OWNER FOR ALL DISTURBED AREAS TO BE STABILIZED THAT ARE NOT LANDSCAPED OR COVERED.
- WETLAND PLANTS MUST BE WET CULTURED FOR A MINIMUM OF 3 MONTHS AND SUPPLIED BY A RECOGNIZED WETLAND NURSERY WHICH WILL PROVIDE CERTIFICATION OF THE CULTURE PROCESS. UPLAND PLANTS CAN BE SUPPLIED FROM STANDARD UPLAND GROWN NURSERY OPERATIONS. SEE LIST FOR WETLAND PLANTING SOURCES.

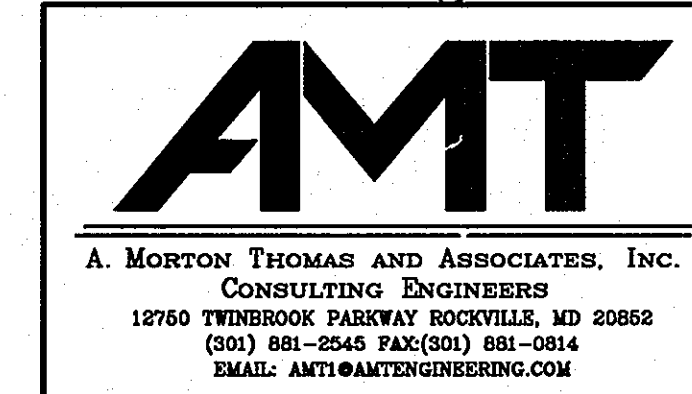
ENVIRONMENTAL CONCERN, INC. P.O. BOX P 210 WEST CHEW AVENUE ST. MICHAELS, MARYLAND 21663 TEL: (301) 745-9820 FAX: (301) 745-3517	OCTORARO WETLAND NURSERIES P.O. BOX 24 OXFORD, PA 19363 TEL: (215) 932-3762 OR ELKTON, MD (410) 392-8176	SIGNATURE HORTICULTURAL SERVICES 19960 GORE MILL ROAD FREELAND, MD 21053 TEL: (410) 329-6466 FAX: (410) 329-2156
WICKLEIN'S WATER GARDENS 1820 CROMWELL BRIDGE ROAD BALTIMORE, MARYLAND 21234 TEL: (301) 823-1335	ENVIRONMENTAL CONSULTANTS, INC. P.O. BOX 3198 SUFFOLK, VIRGINIA 23434 TEL: (804) 539-4833	

- JOB CONDITIONS:**
  - EXAMINE AND EVALUATE GRADES, SOILS AND WATER LEVELS, OBSERVE THE CONDITIONS UNDER WHICH WORK IS TO BE PERFORMED, AND NOTIFY THE LANDSCAPE ARCHITECT OF UNSATISFACTORY CONDITIONS. DO NOT PROCEED WITH THE WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED IN AN ACCEPTABLE MANNER.
  - UTILITIES: REVIEW UNDERGROUND UTILITIES LOCATION MAPS AND PLANS PROVIDED BY OWNER; DEMONSTRATE AN AWARENESS OF UTILITY LOCATIONS, AND CERTIFY ACCEPTANCE OF LIABILITY FOR THE PROTECTION OF UTILITIES DURING COURSE OF WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO UTILITIES OR PROPERTY.
  - EXCAVATION: WHEN CONDITIONS DETRIMENTAL TO PLANT GROWTH ARE ENCOUNTERED, SUCH AS RUBBLE FILL, ADVERSE DRAINAGE CONDITIONS, OR OBSTRUCTIONS, NOTIFY LANDSCAPE ARCHITECT BEFORE PLANTING.



**RECORD DRAWINGS**  
 TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
 BY: [Signature]



DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
 [Signatures and Dates]  
 DIRECTOR OF PUBLIC WORKS  
 CHIEF, BUREAU OF UTILITIES

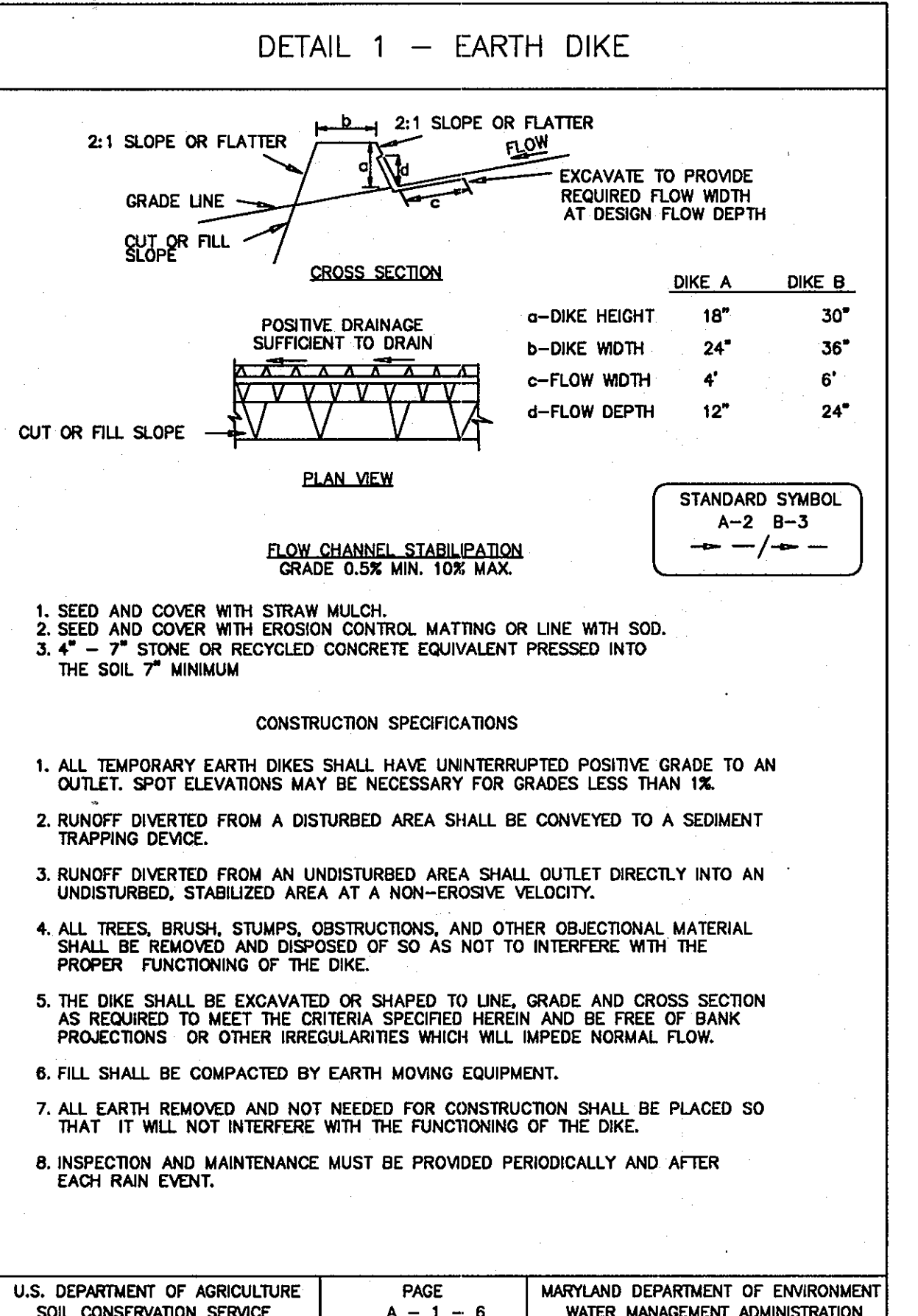
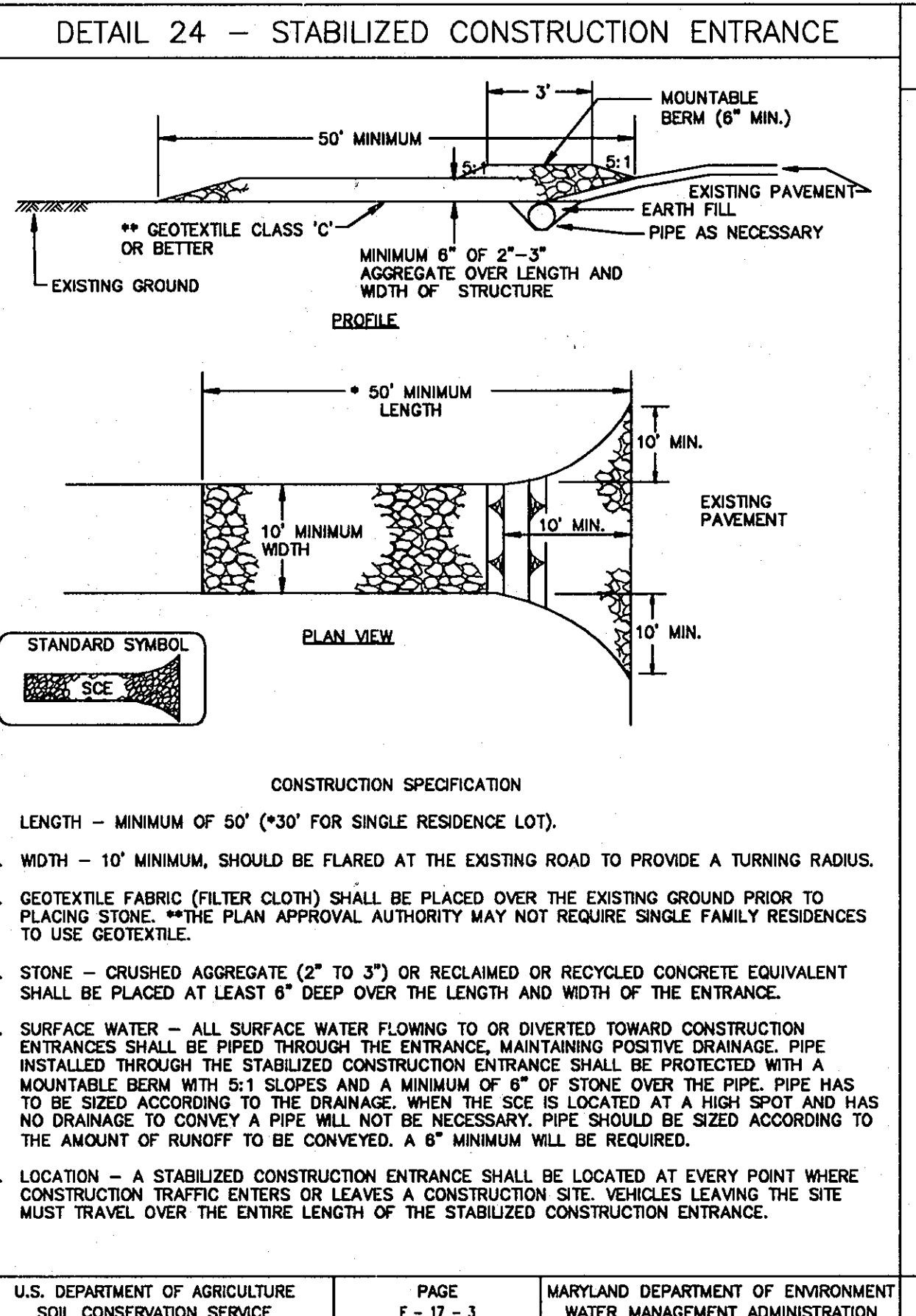
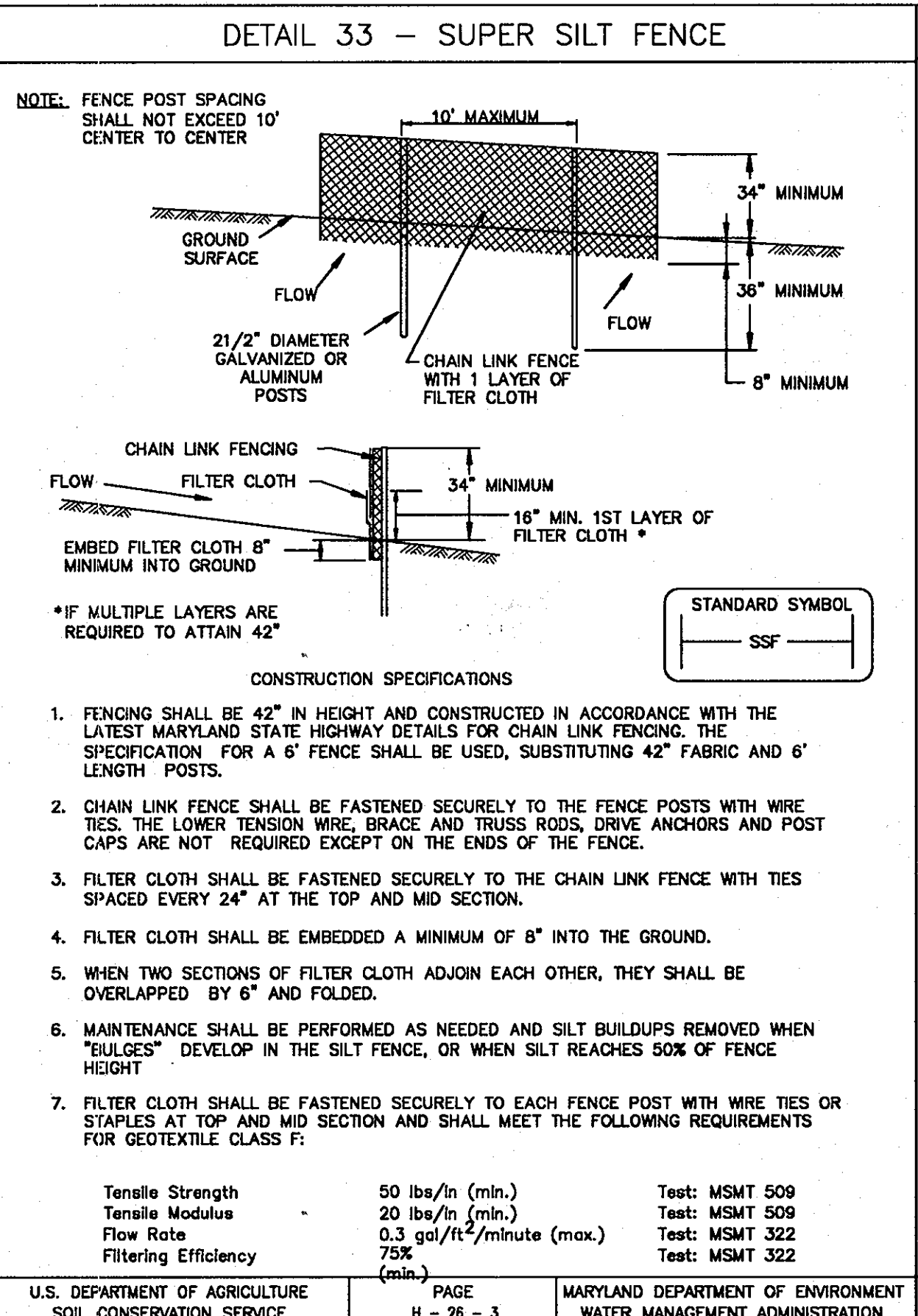
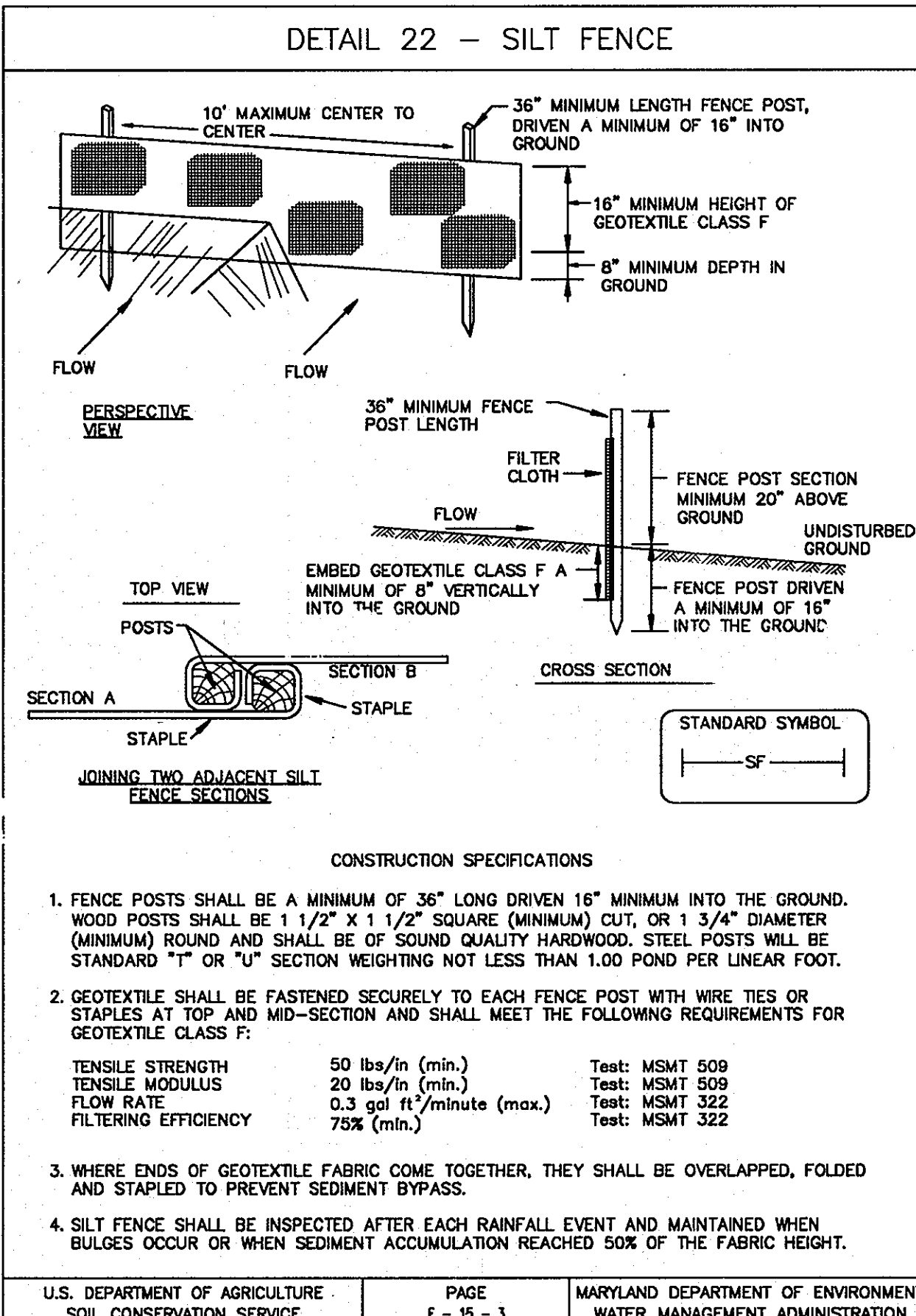
**O'BRIEN & GERE ENGINEERS, INC.**  
 8401 Corporate Drive  
 Suite 400  
 Landover, Maryland 20785  
 (301) 731-5622  
 FAX: (301) 577-4737

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16872, EXPIRATION DATE 3/26/10

DSN. BY: AES  
 DRN. BY: AES  
 CHK. BY: GJD  
 DATE: JAN. 2010  
 RJD BY NO. RECORD DRAWING 10/11  
 REVISION

WETLAND RESTORATION PLAN  
 600' SCALE MAP NO. 24 BLOCK NO. 17

US 29 WATER MAIN REPLACEMENT  
 TUNNEL CROSSING AT MONTGOMERY ROAD  
 CAPITAL PROJECT: W-8243  
 CONTRACT NO.: 44-4630  
 ELECTION DISTRICT: 2  
 HOWARD COUNTY, MARYLAND  
 SCALE AS SHOWN  
 SHEET 13 OF 26



### SILT FENCE

**SILT FENCE DESIGN CRITERIA**

SLOPE STEEPNESS	(MAXIMUM) SLOPE LENGTH	(MAXIMUM) SILT FENCE LENGTH
FLATTER THAN 50:1	UNLIMITED	UNLIMITED
50:1 TO 10:1	125 FEET	1,000 FEET
10:1 TO 5:1	100 FEET	750 FEET
5:1 TO 3:1	60 FEET	500 FEET
3:1 TO 2:1	40 FEET	250 FEET
2:1 AND STEEPER	20 FEET	125 FEET

**NOTE:** IN AREAS OF LESS THAN 2% SLOPE AND SANDY SOILS (USDA GENERAL CLASSIFICATION SYSTEM, SOIL CLASS A) MAXIMUM SLOPE LENGTH AND SILT FENCE LENGTH WILL BE UNLIMITED. IN THESE AREAS A SILT FENCE MAY BE THE ONLY PERIMETER CONTROL REQUIRED.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE E-15-3 MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

### SUPER SILT FENCE

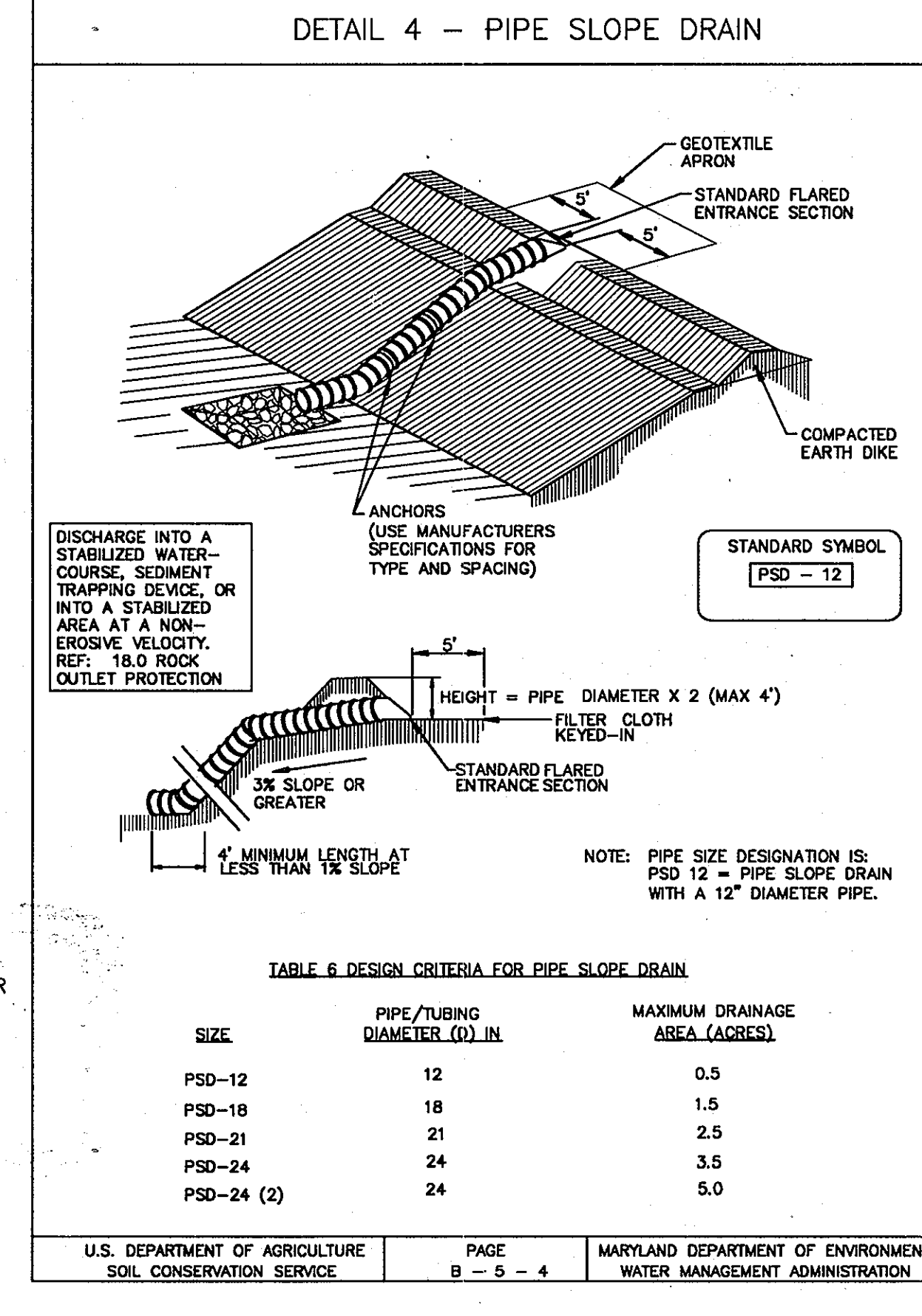
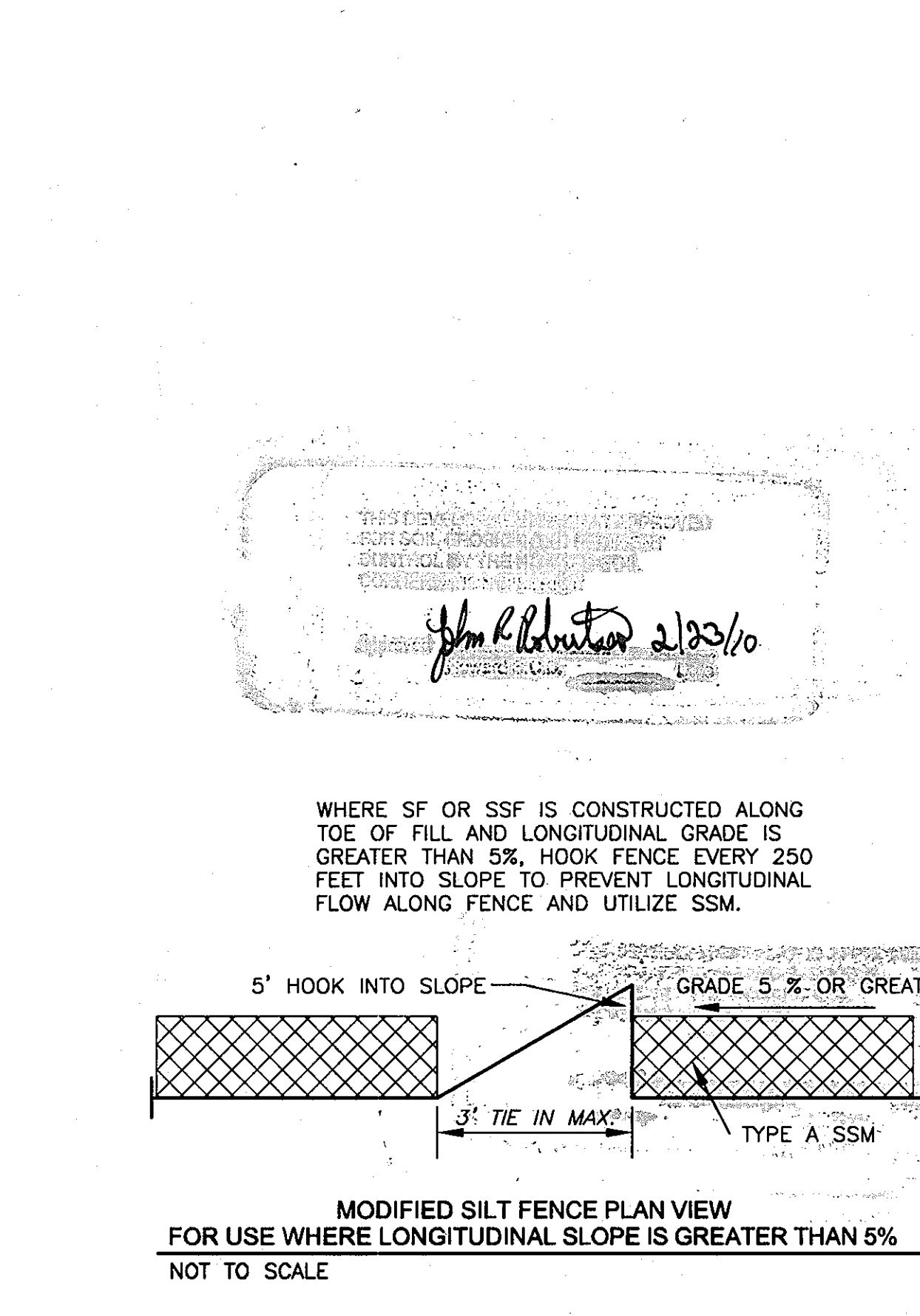
**DESIGN CRITERIA**

SLOPE	SLOPE STEEPNESS	SLOPE LENGTH (MAXIMUM)	SILT FENCE LENGTH (MAXIMUM)
0 - 10%	0 - 10:1	UNLIMITED	UNLIMITED
10 - 20%	10:1 - 5:1	200 FEET	1,500 FEET
20 - 33%	5:1 - 3:1	100 FEET	1,000 FEET
33 - 50%	3:1 - 2:1	100 FEET	500 FEET
50% +	2:1 +	FEET	250 FEET

**NOTE:** WHERE SF OR SSF IS CONSTRUCTED ALONG TOE OF FILL AND LONGITUDINAL GRADE IS GREATER THAN 5%, HOOK FENCE EVERY 250 FEET INTO SLOPE TO PREVENT LONGITUDINAL FLOW ALONG FENCE AND UTILIZE SSM.

**MODIFIED SILT FENCE PLAN VIEW FOR USE WHERE LONGITUDINAL SLOPE IS GREATER THAN 5% NOT TO SCALE**

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE H-26-3 MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION



**RECORD DRAWINGS**  
TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

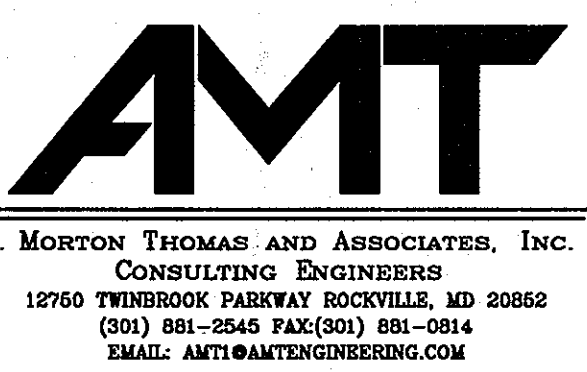
**O'BRIEN & GERE ENGINEERS, INC.**  
BY: *[Signature]*

THIS PLAN IS FOR EROSION AND SEDIMENT CONTROL PURPOSES ONLY

NOTE TO THE CONTRACTOR: "EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED"

"MISS UTILITY" NOTE

CALL "MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDERGROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION.



DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*[Signature]* DIRECTOR OF PUBLIC WORKS  
*[Signature]* CHIEF, BUREAU OF UTILITIES

*[Signature]* CHIEF - BUREAU OF ENGINEERING  
*[Signature]* CHIEF, UTILITY DESIGN

DATE: 1/29/10  
DATE: 1/28/10

**O'BRIEN & GERE ENGINEERS, INC.**

8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16872, EXPIRATION DATE 3/26/10

DSN BY: AES  
DRN BY: AES  
CHK BY: GJO  
DATE: JAN. 2010

BY	NO.	REVISION	DATE
RJD	1	RECORD DRAWING	10/11

SEDIMENT CONTROL DETAILS

600' SCALE MAP NO. 24 BLOCK NO. 17

US 29 WATER MAIN REPLACEMENT  
TUNNEL CROSSING AT MONTGOMERY ROAD

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 14 OF 26

J:\G001\03-238-003 TOLLHOUSE ROAD WATER TUNNEL\CAD\103238 EN2-OPTION 2.DWG

**HOWARD SOIL CONSERVATION DISTRICT STANDARD SEDIMENT CONTROL NOTES**

1. A minimum of 48 hours notice must be given to the Howard County Department of Inspections, Licenses and Permits, Sediment Control Division prior to the start of any construction (313-1855).
2. All vegetative and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the most current MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL and revisions thereto.
3. Following initial soil disturbance or re-disturbance, permanent or temporary stabilization shall be completed within: a) 7 calendar days for all perimeter sediment control structures, dikes, perimeter slopes and all slopes greater than 3:1, b) 14 days as to all other disturbed or graded areas on the project site.
4. All sediment traps/basins shown must be fenced and warning signs posted around their perimeter in accordance with Vol 1, Chapter 12 of the HOWARD COUNTY DESIGN MANUAL, Storm Drainage.
5. All disturbed areas must be stabilized within the time period specified above in accordance with the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for permanent seeding (Sec. 51), sod (Sec. 54), temporary seeding (Sec. 50) and mulching (Sec. 52). Temporary stabilization with mulch alone can only be done when recommended seed rates do not allow for proper germination and establishment of grasses.
6. All sediment control structures are to remain in place and are to be maintained in operative condition until permission for their removal has been obtained from the Howard County Sediment Control Inspector.
7. Site Analysis:
 

Total Area of Site	0.6 Acres
Area Disturbed	0.68 Acres
Area to be roofed or paved	0.0 Acres
Area to be vegetatively stabilized	0.68 Acres
Total Cut	5900 Cu. Yds.
Total Fill	5900 Cu. Yds.
Offsite waste/borrow area location:	LOCATION TO BE DETERMINED
8. Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.
9. Additional sediment control must be provided, if deemed necessary by the Howard County Sediment Control Inspector.
10. On all sites with disturbed areas in excess of 2 acres, approval of the inspection agency shall be requested upon completion of installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading. Other building or grading inspection approvals may not be authorized until this initial approval by the inspection agency is made.
11. Trenches for the construction of utilities is limited to three pipe lengths or that which shall be back-filled and stabilized by the end of each work day, whichever is shorter.

**HOWARD SOIL CONSERVATION DISTRICT PERMANENT SEEDING NOTES**

Apply to graded or cleared areas not subject to immediate further disturbance where a permanent long-lived vegetative cover is needed.  
 Seedbed Preparation: Loosen upper three inches of soil by raking, disking or other acceptable means before seeding, if not previously loosened.

**Soil Amendments:** In lieu of soil test recommendations, use one of the following schedules:

1. Preferred -- Apply 2 tons/acre dolomitic limestone (92 lbs/1000 sq. ft.) and 600 lbs/acre 10-10-10 fertilizer (14 lbs/1000 sq. ft.) before seeding. Harrow or disk into upper three inches of soil. At time of seeding, apply 400 lbs/acre 30-0-0 ureaform fertilizer (9 lbs/1000 sq. ft.)
2. Acceptable -- Apply 2 tons/acre dolomitic limestone (92 lbs/1000 sq. ft.) and 1000 lbs/acre 10-10-10 fertilizer (23 lbs/1000 sq. ft.) before seeding. Harrow or disk into upper three inches of soil.

**Seeding** -- For the periods March 1 -- April 30, and August 1 -- October 15, seed with 60 lbs/acre (1.4 lbs/1000 sq. ft.) of Tall Fescue (no K-31 Fescue allowed). For the period May 1 -- July 31, seed with 60 lbs Tall Fescue (no K-31 Fescue allowed) per acre and 2 lbs/acre (.05 lbs/1000 sq. ft.) of weeping love grass. During the period of October 16 -- February 28, protect site by:  
 Option 1 -- Two tons per acre of well anchored straw mulch and seed as soon as possible in the spring.  
 Option 2 -- Use sod.  
 Option 3 -- Seed with 60 lbs/acre Tall Fescue (no K-31 Fescue allowed) and mulch with 2 tons/acre well anchored straw.

**Mulching** -- Apply 1-1/2 to 2 tons per acre (70 to 90 lbs/1000 sq. ft.) of unrotted small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gallons per acre (5 gal/1000 sq. ft.) of emulsified asphalt on flat areas. On slope 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq. ft.) for anchoring.

**Maintenance** -- Inspect all seeding areas and make needed repairs, replacements and reseeding.

**TEMPORARY SEEDING NOTES.**  
 Apply to graded or cleared areas likely to be re-disturbed where a short-term vegetative cover is needed.  
**Seedbed preparation:** -- Loosen upper three inches of soil by raking, disking or other acceptable means before seeding, if not previously loosened.  
**Soil Amendments:** -- Apply 600 lbs/acre 10-10-10 fertilizer (14 lbs/1000 sq. ft.).  
**Seeding:** -- For periods March 1 -- April 30 and from August 15 -- October 15, seed with 2-1/2 bushel per acre of annual rye (3.2 lbs/1000 sq. ft.). For the period May 1 -- August 14, seed with 3 lbs/acre of weeping lovegrass (.07 lbs/1000 sq. ft.). For the period November 16 -- February 28, protect site by applying 2 tons/acre of well anchored straw mulch and seed as soon as possible in the spring, or use sod.  
**Mulching:** -- Apply 1-1/2 to 2 tons/acre (70 to 90 lbs/1000 sq. ft.) of unrotted weed-free, small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gal. per acre (5 gal/1000 sq. ft.) of emulsified asphalt on flat areas. On slope 8 ft. or higher, use 348 gal. per acre (8 gal/1000 sq. ft.) for anchoring.  
 Refer to the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for additional rates and methods not covered.

**NOTES:**

1. EARTHWORK QUANTITIES SHOWN HERE ON ARE APPROXIMATE AND ARE FOR THE REVIEWING AGENCY USE ONLY. THE CONTRACTOR MUST MAKE HIS OWN DETERMINATION OF EARTHWORK QUANTITIES.
2. VOLUMETRIC DISTRIBUTIONS SHOWN HEREON ARE SUBJECT TO GEOTECHNICAL OBSERVATION, TESTING AND CONFIRMATION TO BE PERFORMED BY THE CONTRACTOR'S TESTING AGENCY DURING CONSTRUCTION.
3. STOCKPILING IN THE FLOODPLAIN IS NOT PERMITTED. CONTRACTOR TO HAUL ANY EXCESS MATERIAL FROM THE FLOODPLAIN.
4. DIRECT DISCHARGE OF UNTREATED (FOR SEDIMENT CONTROL) WATER IS NOT ALLOWED INTO STREAM.

**SEQUENCE OF CONSTRUCTION**

1. THE CONTRACTOR SHALL NOTIFY THE HOWARD COUNTY DEPARTMENT OF INSPECTIONS, LICENSES AND PERMITS SEDIMENT CONTROL DIVISION AT (301-313-1855) WITHIN SEVEN (7) DAYS TO HOLD A PRE-CONSTRUCTION MEETING BETWEEN HOWARD COUNTY AND PROJECT REPRESENTATIVES.
2. WITH THE APPROVAL OF THE HOWARD COUNTY INSPECTOR, INSTALL SCE AT TOLLHOUSE ROAD AND MD 103 RAMP FROM US 29. CLEAR AND GRUB AREA TO INSTALL SEDIMENT CONTROL MEASURES/DEVICES AT LOCATIONS WHERE WORK WILL BE EACH DAY AND AS SHOWN ON PLANS.
3. INSTALL SEDIMENT CONTROL MEASURES INCLUDING CLEAR WATER DIVERSION, SUPER SILT FENCE, AND TEMPORARY DIVERSION PIPE.
4. START CLEARING AND GRUBBING FOR AND INSTALL THE WATER MAIN. INSTALL WATER MAIN LINE (SEE PLANS) THAT CAN BE BACKFILLED, COMPACTED AND STABILIZED AT THE END OF EACH DAY, AND/OR PER HOWARD SOIL CONSERVATION DISTRICT STANDARD SEDIMENT CONTROL NOTE #11. IN WETLANDS, STOCKPILE THE TOP 12 INCHES OF TOPSOIL REMOVED FROM THE TRENCH. USE THIS STOCKPILED WETLAND TOPSOIL AS THE TOP 12 INCHES OF TRENCH BACKFILL. EXCAVATED MATERIAL MUST NOT BE STOCKPILED FOR LONGER THAN FOURTEEN (14) DAY. EXCAVATED MATERIAL MUST BE STABILIZED WITH SILT FENCE OR OTHER EROSION AND SEDIMENT CONTROL MEASURES TO PREVENT REENTRY OF SOIL INTO STREAMS AND WETLANDS. FOLLOW MAINTENANCE OF TRAFFIC PLANS.
5. COMPLETE WATER MAIN INSTALLATION.
6. RESTORE ALL DISTURBED WETLAND AREAS PER WETLAND RESTORATION PLAN AND MDE INSPECTOR REQUIREMENTS.
7. STABILIZE REMAINING DISTURBED AREAS. WITH APPROVAL OF THE HOWARD COUNTY SCD INSPECTOR, REMOVE THE SEDIMENT CONTROL MEASURES AND STABILIZE THE AREAS ASSOCIATED WITH EROSION AND SEDIMENT CONTROL REMOVAL ACTIVITIES.

**"MISS UTILITY" NOTE**

CALL "MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDERGROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION.

**THIS PLAN IS FOR EROSION AND SEDIMENT CONTROL PURPOSES ONLY**

**NOTE TO THE CONTRACTOR: "EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED"**

APPROVED FOR THE HOWARD COUNTY DEPARTMENT OF INSPECTIONS, LICENSES AND PERMITS SEDIMENT CONTROL DIVISION  
 JOHN R. BALDWIN 2/23/10

**RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.**

**O'BRIEN & GERE ENGINEERS, INC.**  
 BY: [Signature]

**AMT**  
 A. MORTON THOMAS AND ASSOCIATES, INC.  
 CONSULTING ENGINEERS  
 12750 TWINGBROOK PARKWAY ROCKVILLE, MD 20852  
 (301) 881-2545 FAX: (301) 881-0814  
 EMAIL: AMT@AMTENGINEERING.COM

**DEPARTMENT OF PUBLIC WORKS**  
 HOWARD COUNTY, MARYLAND

Director of Public Works: [Signature] 2/26/10  
 Chief, Bureau of Engineering: [Signature] 1/29/10  
 Chief, Bureau of Utilities: [Signature] 2/15/10  
 Chief, Utility Design: [Signature] 1/28/10

**O'BRIEN & GERE ENGINEERS, INC.**  
 8401 Corporate Drive  
 Suite 400  
 Landover, Maryland 20785  
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[Professional Engineer Seal]

DESIGNED BY: AES			
DRAWN BY: AES			
CHECKED BY: GJO			
DATE: JAN. 2010	RJD	1	RECORD DRAWING
	BY	NO.	REVISION

SEDIMENT CONTROL NOTES	
600' SCALE MAP NO. 24	BLOCK NO. 17

**US 29 WATER MAIN REPLACEMENT TUNNEL CROSSING AT MONTGOMERY ROAD**

CAPITAL PROJECT: W-8243  
 CONTRACT NO.: 44-4630  
 ELECTION DISTRICT: 2  
 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
 SHEET 15 OF 26

FILE NO. 43844-001F

**HOWARD SOIL CONSERVATION DISTRICT STANDARD SEDIMENT CONTROL NOTES**

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9. Additional sediment control must be provided, if deemed necessary by the Howard County Sediment Control Inspector.
10. On all sites with disturbed areas in excess of 2 acres, approval of the inspection agency shall be requested upon completion of installation of perimeter erosion and sediment controls, but before proceeding with any other earth disturbance or grading. Other building or grading inspection approvals may not be authorized until this initial approval by the inspection agency is made.
11. Trenches for the construction of utilities is limited to three pipe lengths or that which shall be back-filled and stabilized by the end of each work day, whichever is shorter.

**HOWARD SOIL CONSERVATION DISTRICT PERMANENT SEEDING NOTES**

Apply to graded or cleared areas not subject to immediate further disturbance where a permanent long-lived vegetative cover is needed.  
**Seedbed Preparation:** Loosen upper three inches of soil by raking, disking or other acceptable means before seeding, if not previously loosened.

**Soil Amendments:** In lieu of soil test recommendations, use one of the following schedules:

1. Preferred --- Apply 2 tons/acre dolomitic limestone (92 lbs/1000 sq. ft.) and 600 lbs/acre 10-10-10 fertilizer (14 lbs/1000 sq. ft.) before seeding. Harrow or disk into upper three inches of soil. At time of seeding, apply 400 lbs/acre 30-0-0 ureaform fertilizer (9 lbs/1000 sq. ft.)
2. Acceptable --- Apply 2 tons/acre dolomitic limestone (92 lbs/1000 sq. ft.) and 1000 lbs/acre 10-10-10 fertilizer (23 lbs/1000 sq. ft.) before seeding. Harrow or disk into upper three inches of soil.

**Seeding:** For the periods March 1 --- April 30, and August 1 --- October 15, seed with 60 lbs/acre (1.4 lbs/1000 sq. ft.) of Tall Fescue (no K-31 Fescue allowed). For the period May 1 --- July 31, seed with 60 lbs Tall Fescue (no K-31 Fescue allowed) per acre and 2 lbs/acre (.05 lbs/1000 sq. ft.) of weeping love grass. During the period of October 16 --- February 28, protect site by:

- Option 1 --- Two tons per acre of well anchored straw mulch and seed as soon as possible in the spring.
- Option 2 --- Use sod.
- Option 3 --- Seed with 60 lbs/acre Tall Fescue (no K-31 Fescue allowed) and mulch with 2 tons/acre well anchored straw.

**Mulching:** Apply 1-1/2 to 2 tons per acre (70 to 90 lbs/1000 sq. ft.) of unrotted small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gallons per acre (5 gal/1000 sq. ft.) of emulsified asphalt on flat areas. On slope 8 feet or higher, use 348 gallons per acre (8 gal/1000 sq. ft.) for anchoring.

**Maintenance:** --- Inspect all seeding areas and make needed repairs, replacements and reseeds.

**TEMPORARY SEEDING NOTES:**

Apply to graded or cleared areas likely to be re-disturbed where a short-term vegetative cover is needed.

**Seedbed preparation:** --- Loosen upper three inches of soil by raking, disking or other acceptable means before seeding, if not previously loosened.

**Soil Amendments:** --- Apply 600 lbs/acre 10-10-10 fertilizer (14 lbs/1000 sq. ft.).

**Seeding:** --- For periods March 1 --- April 30 and from August 15 --- October 15, seed with 2-1/2 bushel per acre of annual rye (3.2 lbs/1000 sq. ft.). For the period May 1 --- August 14, seed with 3 lbs/acre of weeping lovegrass (.07 lbs/1000 sq. ft.). For the period November 16 --- February 28, protect site by applying 2 tons/acre of well anchored straw mulch and seed as soon as possible in the spring, or use sod.

**Mulching:** --- Apply 1-1/2 to 2 tons/acre (70 to 90 lbs/1000 sq. ft.) of unrotted weed-free, small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gal. per acre (5 gal/1000 sq. ft.) of emulsified asphalt on flat areas. On slope 8 ft. or higher, use 348 gal. per acre (8 gal/1000 sq. ft.) for anchoring.

Refer to the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for additional rates and methods not covered.

**NOTES:**

1. EARTHWORK QUANTITIES SHOWN HERE ON ARE APPROXIMATE AND ARE FOR THE REVIEWING AGENCY USE ONLY. THE CONTRACTOR MUST MAKE HIS OWN DETERMINATION OF EARTHWORK QUANTITIES.
2. VOLUMETRIC DISTRIBUTIONS SHOWN HEREON ARE SUBJECT TO GEOTECHNICAL OBSERVATION, TESTING AND CONFIRMATION TO BE PERFORMED BY THE CONTRACTOR'S TESTING AGENCY DURING CONSTRUCTION.
3. STOCKPILING IN THE FLOODPLAIN IS NOT PERMITTED. CONTRACTOR TO HAUL ANY EXCESS MATERIAL FROM THE FLOODPLAIN.
4. DIRECT DISCHARGE OF UNTREATED (FOR SEDIMENT CONTROL) WATER IS NOT ALLOWED INTO STREAM.

**SEQUENCE OF CONSTRUCTION**

1. THE CONTRACTOR SHALL NOTIFY THE HOWARD COUNTY DEPARTMENT OF INSPECTIONS, LICENSES AND PERMITS SEDIMENT CONTROL DIVISION AT (301-313-1855) WITHIN SEVEN (7) DAYS TO HOLD A PRE-CONSTRUCTION MEETING BETWEEN HOWARD COUNTY AND PROJECT REPRESENTATIVES.
2. WITH THE APPROVAL OF THE HOWARD COUNTY INSPECTOR, INSTALL SCE AT TOLLHOUSE ROAD AND MD 103 RAMP FROM US 29. CLEAR AND GRUB AREA TO INSTALL SEDIMENT CONTROL MEASURES/DEVICES AT LOCATIONS WHERE WORK WILL BE EACH DAY AND AS SHOWN ON PLANS.
3. INSTALL SEDIMENT CONTROL MEASURES INCLUDING CLEAR WATER DIVERSION, SUPER SILT FENCE, AND TEMPORARY DIVERSION PIPE.
4. START CLEARING AND GRUBBING FOR AND INSTALL THE WATER MAIN. INSTALL WATER MAIN LINE (SEE PLANS) THAT CAN BE BACKFILLED, COMPACTED AND STABILIZED AT THE END OF EACH DAY, AND/OR PER HOWARD SOIL CONSERVATION DISTRICT STANDARD SEDIMENT CONTROL NOTE #11. IN WETLANDS, STOCKPILE THE TOP 12 INCHES OF TOPSOIL REMOVED FROM THE TRENCH. USE THIS STOCKPILED WETLAND TOPSOIL AS THE TOP 12 INCHES OF TRENCH BACKFILL. EXCAVATED MATERIAL MUST NOT BE STOCKPILED FOR LONGER THAN FOURTEEN (14) DAY. EXCAVATED MATERIAL MUST BE STABILIZED WITH SILT FENCE OR OTHER EROSION AND SEDIMENT CONTROL MEASURES TO PREVENT REENTRY OF SOIL INTO STREAMS AND WETLANDS. FOLLOW MAINTENANCE OF TRAFFIC PLANS.
5. COMPLETE WATER MAIN INSTALLATION.
6. RESTORE ALL DISTURBED WETLAND AREAS PER WETLAND RESTORATION PLAN AND MDE INSPECTOR REQUIREMENTS.
7. STABILIZE REMAINING DISTURBED AREAS. WITH APPROVAL OF THE HOWARD COUNTY SCD INSPECTOR, REMOVE THE SEDIMENT CONTROL MEASURES AND STABILIZE THE AREAS ASSOCIATED WITH EROSION AND SEDIMENT CONTROL REMOVAL ACTIVITIES.

**"MISS UTILITY" NOTE**

CALL "MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDERGROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION.

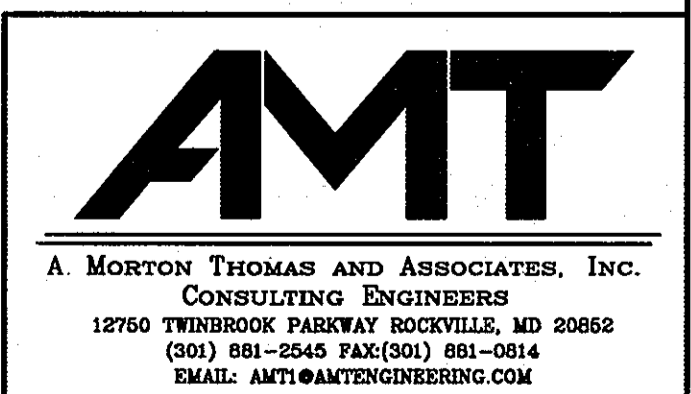
**THIS PLAN IS FOR EROSION AND SEDIMENT CONTROL PURPOSES ONLY**

**NOTE TO THE CONTRACTOR: "EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED"**

APPROVED FOR RECORD DRAWING  
 JOHN R. BELMONT 2/23/10

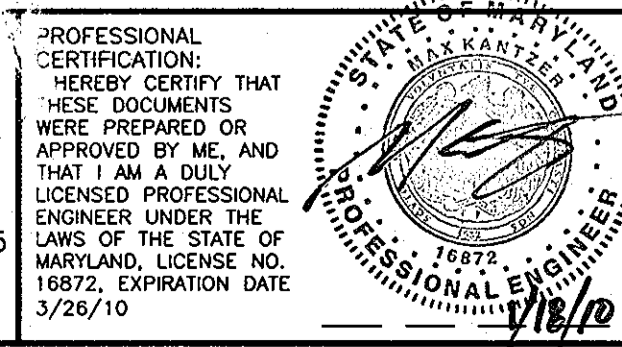
RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
 BY: [Signature]



DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND	
[Signature] 2/23/10 DIRECTOR OF PUBLIC WORKS	[Signature] 1/29/10 CHIEF - BUREAU OF ENGINEERING
[Signature] 2/15/10 CHIEF, BUREAU OF UTILITIES	[Signature] 1/28/10 CHIEF UTILITY DESIGN

**O'BRIEN & GERE ENGINEERS, INC.**  
 8401 Corporate Drive  
 Suite 400  
 Landover, Maryland 20785  
 (301) 731-5622  
 FAX: (301) 577-4737



DESIGNED BY: AES	
DRAWN BY: AES	
CHECKED BY: GJO	
DATE: JAN. 2010	
BY: RJD	RECORD DRAWING
NO. 1	REVISION
DATE: 10/11	

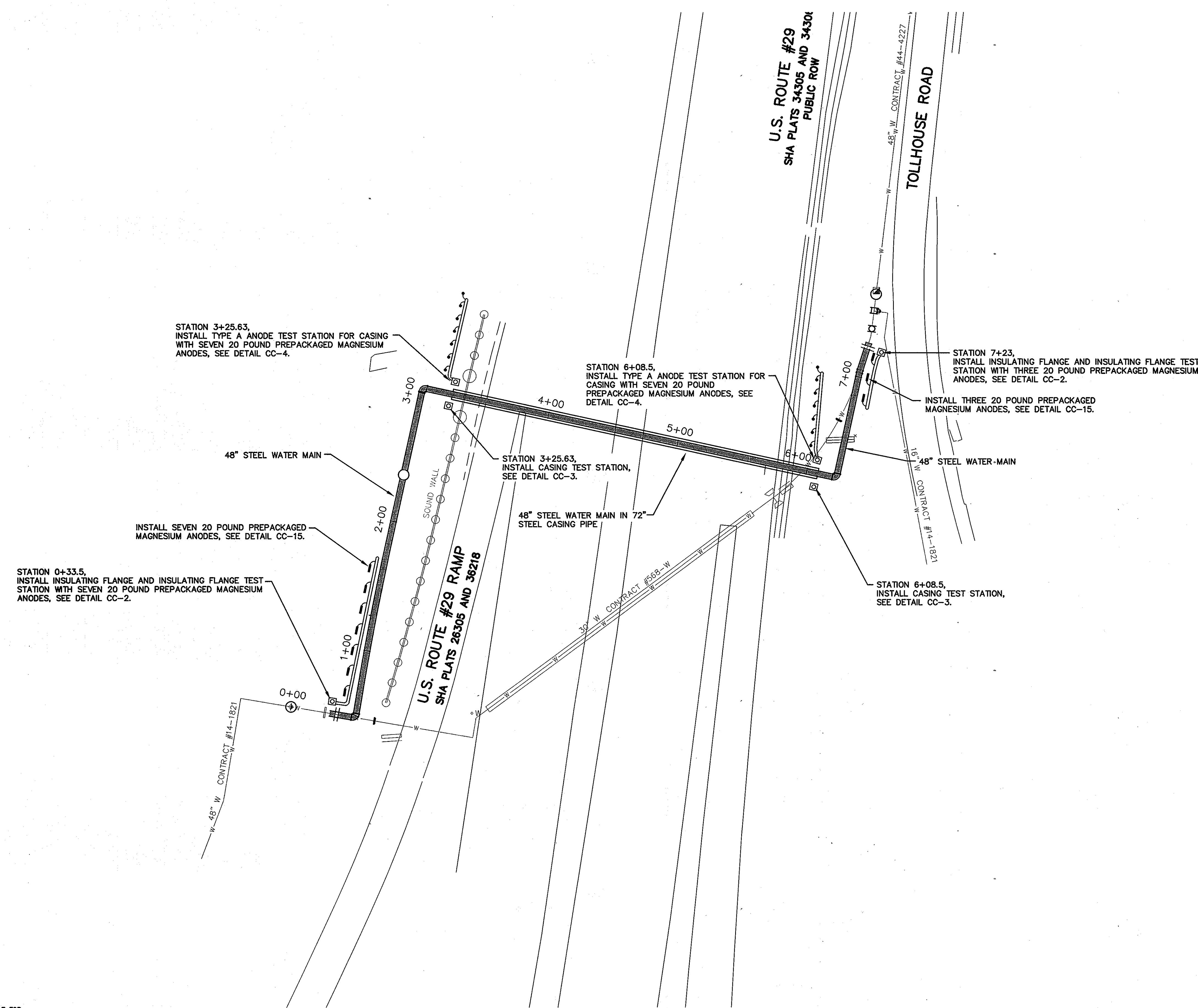
SEDIMENT CONTROL NOTES	
600' SCALE MAP NO. 24	BLOCK NO. 17

US 29 WATER MAIN REPLACEMENT  
 TUNNEL CROSSING AT MONTGOMERY ROAD  
 CAPITAL PROJECT: W-8243  
 CONTRACT NO.: 44-4630  
 ELECTION DISTRICT: 2  
 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
 SHEET 15 OF 26

**NOTES:**

1. ELECTRICAL ISOLATION IS REQUIRED FOR ALL CONNECTIONS TO NEW STEEL WATER MAIN, SEE DETAIL CC-9.
2. INSTALL SEPARATOR MESH ON WATER MAIN AT EXISTING UTILITY CROSSINGS IF THERE IS LESS THAN 12 INCHES OF SPACING BETWEEN THEM, SEE DETAIL CC-10.
3. ALL STEEL PIPING TO BE EXTERNALLY COATED IN ACCORDANCE WITH THE SPECIFICATIONS.
4. COAT ALL STEEL PIPE JOINTS AND FITTINGS IN ACCORDANCE WITH THE SPECIFICATIONS.
5. BOND ALL NEW NON-WELDED PIPE JOINTS EXCEPT THOSE THAT ARE SPECIFIED TO BE ELECTRICALLY ISOLATED, SEE DETAIL CC-7.
6. ALL STEEL CASING PIPING TO BE EXTERNALLY COATED IN ACCORDANCE WITH THE SPECIFICATIONS.



THIS DRAWING IS NOT APPLICABLE FOR USE AS STANDARD CORROSION CONTROL PROCEDURES FOR OTHER PROJECTS DUE TO VARIABLE CONDITIONS AT OTHER SITES. NEITHER THIS DESIGN NOR ANY PART THEREOF MAY BE DUPLICATED IN ANY WAY FOR OTHER PROJECTS OR MODIFIED IN ANY WAY FOR THIS OR OTHER PROJECTS, EXCEPT BY WRITTEN AGREEMENT WITH RUSSELL CORROSION CONSULTANTS, INC.

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
BY: *[Signature]*

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

*[Signature]* 1/29/10  
DIRECTOR OF PUBLIC WORKS DATE

*[Signature]* 1/28/10  
CHIEF, BUREAU OF UTILITIES DATE

*[Signature]* 1/28/10  
CHIEF, UTILITY DESIGN DIVISION DATE

**RUSSELL CORROSION CONSULTANTS, INC.**  
5405 TWIN KNOLLS RD., SUITE 3  
COLUMBIA, MD 21045

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 17083, EXPIRATION DATE 9/27/2010.

*[Professional Seal]*

DSN. BY: MJS				
DRN. BY: DJD				
CHK. BY: MJS				
DATE: JAN. 2010	RJD	RECORD DRAWING	10/11	
	BY	NO.	REVISION	DATE

**CORROSION CONTROL LAYOUT**  
**STEEL PIPE OPTION**

600' SCALE MAP NO. \_\_\_\_\_ BLOCK NO. \_\_\_\_\_

**US 29 WATER MAIN REPLACEMENT**  
**TUNNEL CROSSING AT MONTGOMERY ROAD**

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

CP-1

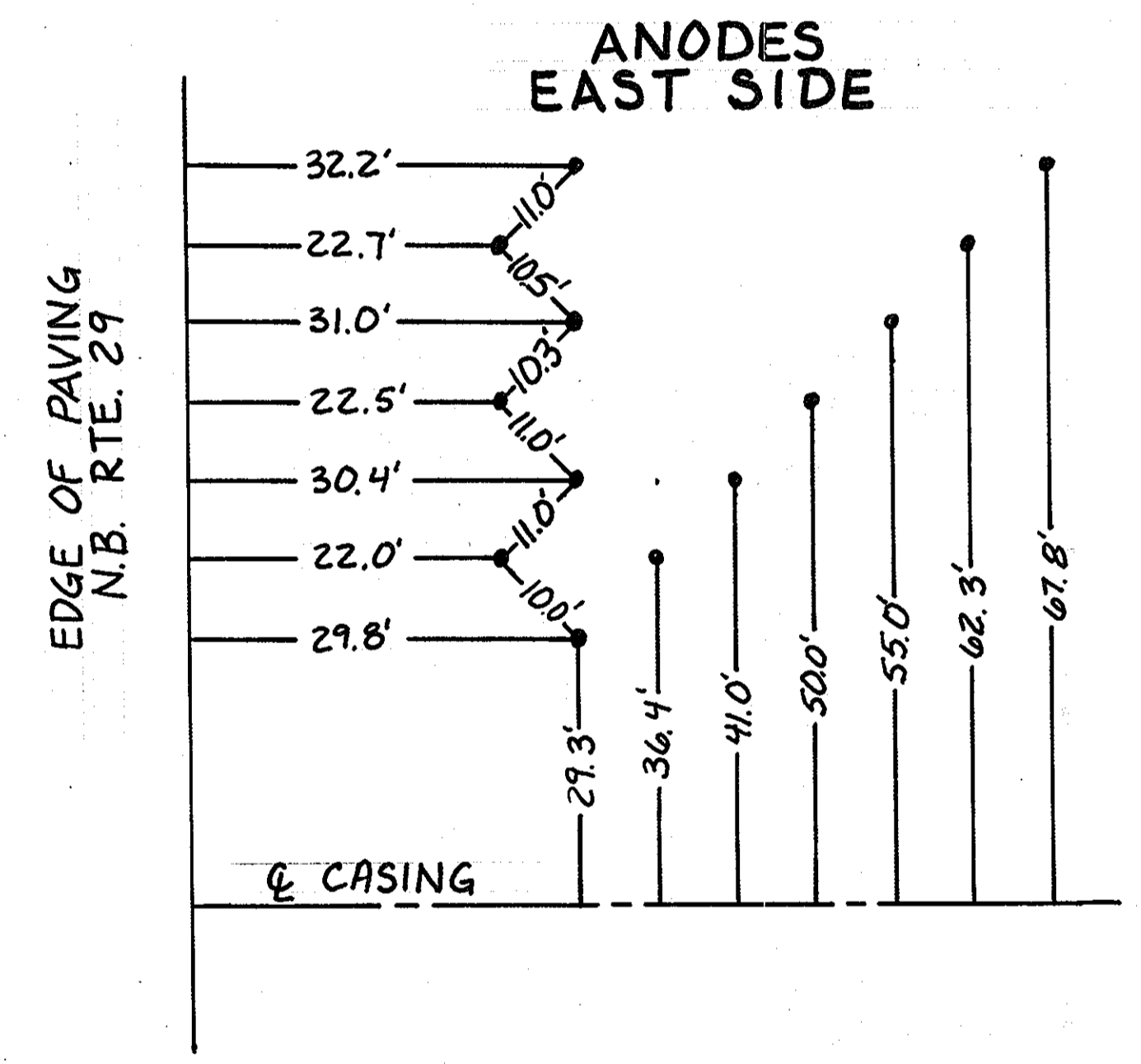
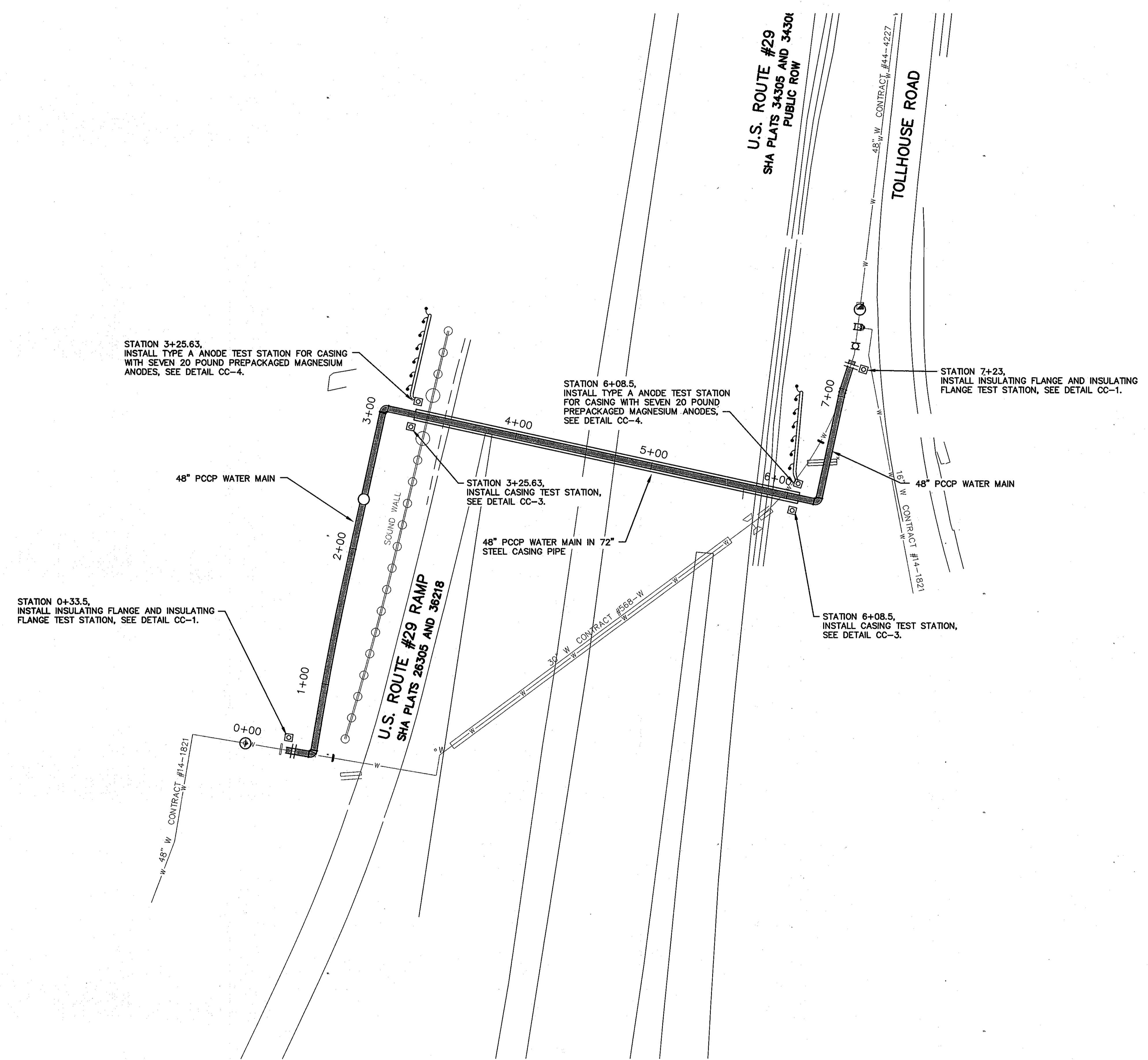
SCALE AS SHOWN

SHEET 16 OF 26

FILE NO. 43844-



- NOTES:**
1. ELECTRICAL ISOLATION IS REQUIRED FOR ALL CONNECTIONS TO NEW PCCP WATER MAIN, SEE DETAIL CC-9.
  2. INSTALL SEPARATOR MESH ON WATER MAIN AT EXISTING UTILITY CROSSINGS IF THERE IS LESS THAN 12 INCHES OF SPACING BETWEEN THEM. SEE DETAIL CC-10.
  3. BOND ALL NEW PIPE JOINTS EXCEPT THOSE THAT ARE SPECIFIED TO BE ELECTRICALLY ISOLATED, SEE DETAIL CC-8.
  4. ALL STEEL CASING PIPING TO BE EXTERNALLY COATED IN ACCORDANCE WITH THE SPECIFICATIONS.
  5. 71" O.D. STEEL CASING PIPE W/ PERMALOCK JOINTS. 6" INTERNAL WELDS AT 3, 9 AND 12 O'CLOCK FOR CASING CONTINUITY.



THIS DRAWING IS NOT APPLICABLE FOR USE AS STANDARD CORROSION CONTROL PROCEDURES FOR OTHER PROJECTS DUE TO VARIABLE CONDITIONS AT OTHER SITES. NEITHER THIS DESIGN NOR ANY PART THEREOF MAY BE DUPLICATED IN ANY WAY FOR OTHER PROJECTS OR MODIFIED IN ANY WAY FOR THIS OR OTHER PROJECTS EXCEPT BY WRITTEN AGREEMENT WITH RUSSELL CORROSION CONSULTANTS, INC.

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS. THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
BY: *[Signature]*

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

*[Signature]* 1/29/10  
DIRECTOR OF PUBLIC WORKS DATE

*[Signature]* 1/28/10  
CHIEF, BUREAU OF UTILITIES DATE

*[Signature]* 1/29/10  
CHIEF - BUREAU OF ENGINEERING DATE

*[Signature]* 1/28/10  
CHIEF, UTILITY DESIGN DIVISION DATE

**RUSSELL CORROSION CONSULTANTS, INC.**  
5405 TWIN KNOLLS RD., SUITE 3  
COLUMBIA, MD 21045

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 17083, EXPIRATION DATE 9/27/2010.

*[Signature]*  
PROFESSIONAL ENGINEER

DSN. BY: MJS					
DRN. BY: DJD					
CHK. BY: MJS					
DATE: JAN. 2010					
BY: RJD	NO. 1	REVISION	RECORD DRAWING	DATE: 10/11	

**CORROSION CONTROL LAYOUT**  
PCCP OPTION

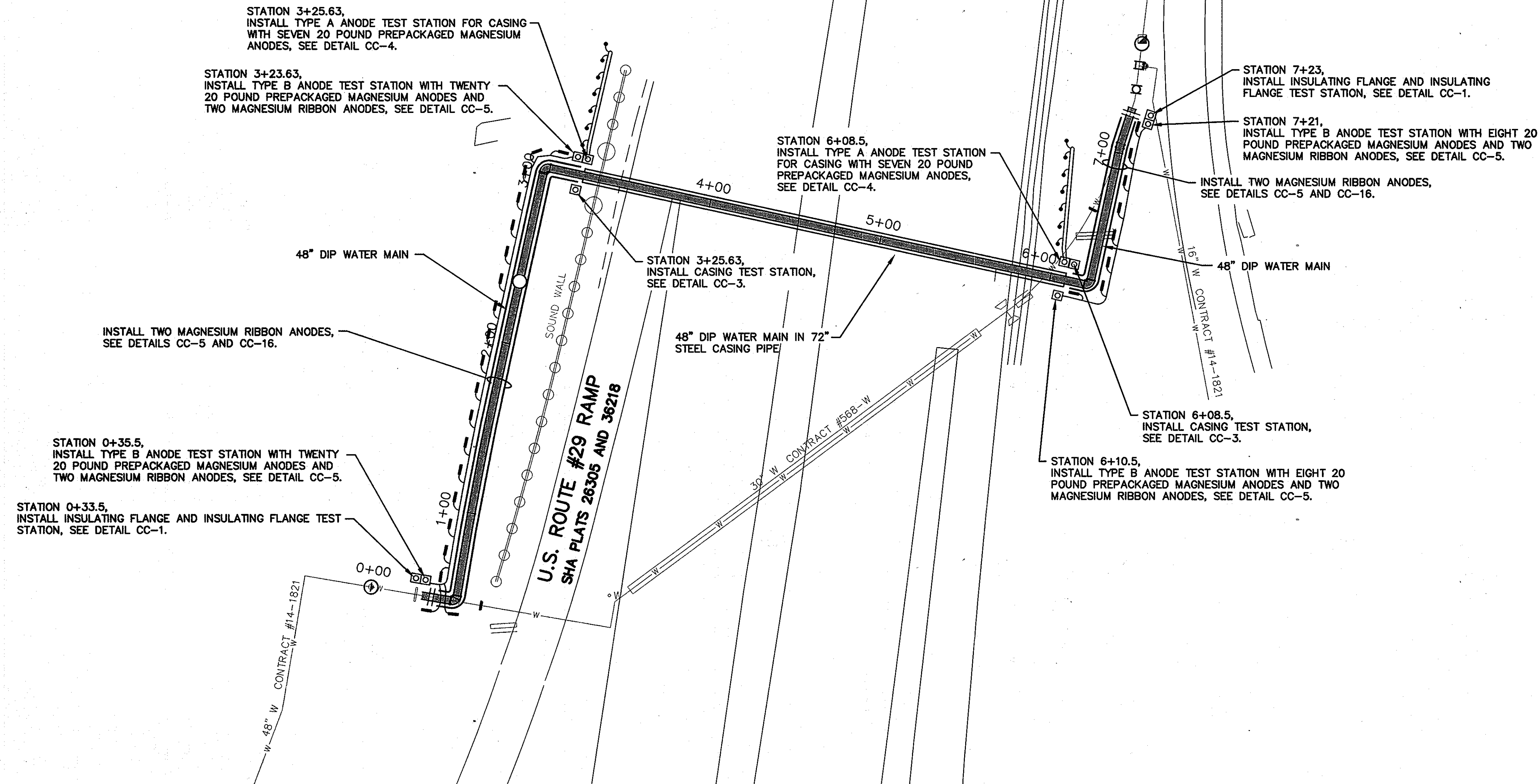
600' SCALE MAP NO. \_\_\_\_\_ BLOCK NO. \_\_\_\_\_

**US 29 WATER MAIN REPLACEMENT**  
TUNNEL CROSSING AT MONTGOMERY ROAD

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

CP-2  
SCALE AS SHOWN  
SHEET 17 OF 26  
FILE NO. 43844-

- NOTES:**
1. ELECTRICAL ISOLATION IS REQUIRED FOR ALL CONNECTIONS TO NEW DIP WATER MAIN, SEE DETAIL CC-9.
  2. INSTALL SEPARATOR MESH ON WATER MAIN AT EXISTING UTILITY CROSSINGS IF THERE IS LESS THAN 12 INCHES OF SPACING BETWEEN THEM, SEE DETAIL CC-10.
  3. BOND ALL NEW PIPE JOINTS EXCEPT THOSE THAT ARE SPECIFIED TO BE ELECTRICALLY ISOLATED, SEE DETAIL CC-7.
  4. INLINE SPLICES OF RIBBON ANODES, IF NECESSARY, SHALL BE MADE AS SHOWN IN DETAIL CC-20.
  5. ALL STEEL CASING PIPING TO BE EXTERNALLY COATED IN ACCORDANCE WITH THE SPECIFICATIONS.



THIS DRAWING IS NOT APPLICABLE FOR USE AS STANDARD CORROSION CONTROL PROCEDURES FOR OTHER PROJECTS DUE TO VARIABLE CONDITIONS AT OTHER SITES. NEITHER THIS DESIGN NOR ANY PART THEREOF MAY BE DUPLICATED IN ANY WAY FOR OTHER PROJECTS OR MODIFIED IN ANY WAY FOR THIS OR OTHER PROJECTS EXCEPT BY WRITTEN AGREEMENT WITH RUSSELL CORROSION CONSULTANTS, INC.

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
BY: *[Signature]*

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*[Signature]* 1/29/10  
DIRECTOR OF PUBLIC WORKS DATE

*[Signature]* 1/29/10  
CHIEF - BUREAU OF ENGINEERING DATE

*[Signature]* 1/29/10  
CHIEF, BUREAU OF UTILITIES DATE

*[Signature]* 1/29/10  
CHIEF, UTILITY DESIGN DIVISION DATE

RUSSELL CORROSION CONSULTANTS, INC.  
5405 TWIN KNOLLS RD., SUITE 3  
COLUMBIA, MD 21045

PROFESSIONAL CERTIFICATION:  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 17083, EXPIRATION DATE 9/27/2010.

*[Seal]*

DSN. BY: MJS			
DRN. BY: DJD			
CHK. BY: MJS			
DATE: JAN. 2010			
RJD	1	RECORD DRAWING	10/11
BY	NO.	REVISION	DATE

CORROSION CONTROL LAYOUT  
DUCTILE IRON PIPE OPTION

60' SCALE MAP NO. \_\_\_\_\_ BLOCK NO. \_\_\_\_\_

US 29 WATER MAIN REPLACEMENT  
TUNNEL CROSSING AT MONTGOMERY ROAD

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

CP-3

SCALE AS SHOWN

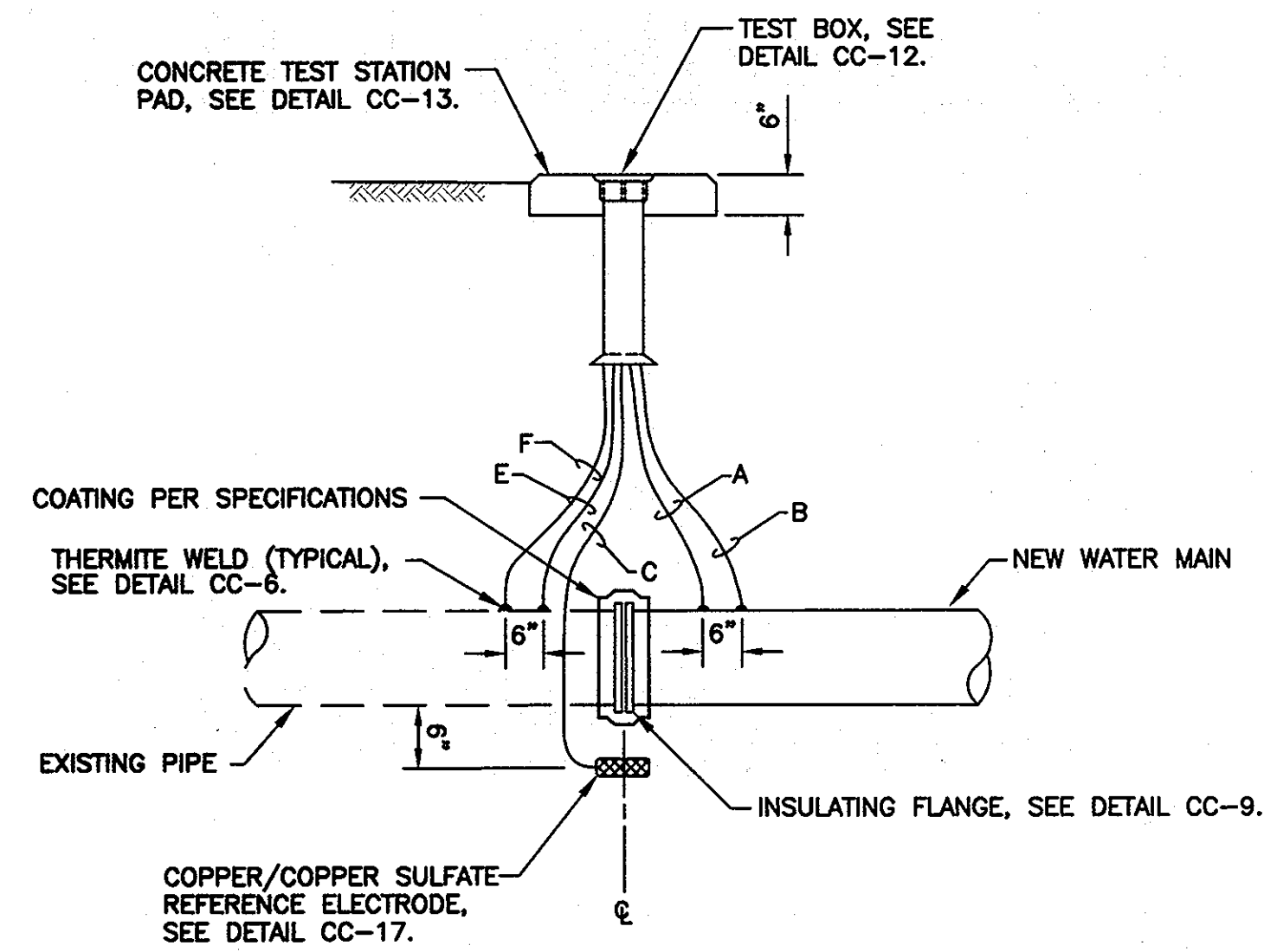
SHEET 18 OF 26

FILE NO. 43844-

WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW WATER MAIN	A B	1 3	#8 #10	THWN THWN	BLUE BLUE
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
EXISTING PIPE OR NEW PIPE TEE	E F	2 5	#8 #10	THWN THWN	WHITE WHITE

**NOTES:**

- DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES THROUGH PVC CONDUIT TO FINAL TEST BOX LOCATION.
- ALL THERMITE WELDS TO PCPP TO BE PERFORMED AT STEEL BONDING PLATES.
- MAINTAIN SUFFICIENT SLACK IN THE TEST WIRES SO THAT THE WIRES CAN EXTEND A MINIMUM OF 18 INCHES FROM THE TEST BOX.



PROFILE

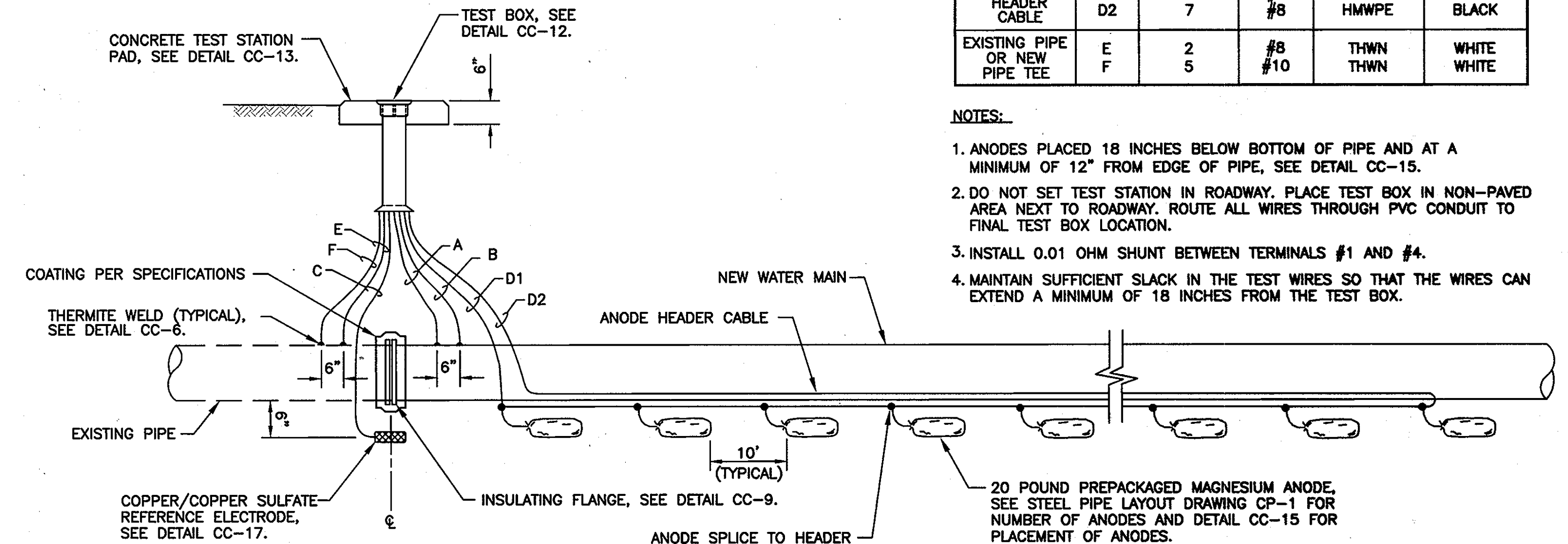
**CC-1: INSULATING FLANGE TEST STATION**

NOT TO SCALE

WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW WATER MAIN	A B	1 3	#8 #10	THWN THWN	BLUE BLUE
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
ANODE HEADER CABLE	D1 D2	4 7	#8 #8	HMWPE HMWPE	BLACK BLACK
EXISTING PIPE OR NEW PIPE TEE	E F	2 5	#8 #10	THWN THWN	WHITE WHITE

**NOTES:**

- ANODES PLACED 18 INCHES BELOW BOTTOM OF PIPE AND AT A MINIMUM OF 12" FROM EDGE OF PIPE. SEE DETAIL CC-15.
- DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES THROUGH PVC CONDUIT TO FINAL TEST BOX LOCATION.
- INSTALL 0.01 OHM SHUNT BETWEEN TERMINALS #1 AND #4.
- MAINTAIN SUFFICIENT SLACK IN THE TEST WIRES SO THAT THE WIRES CAN EXTEND A MINIMUM OF 18 INCHES FROM THE TEST BOX.



PROFILE

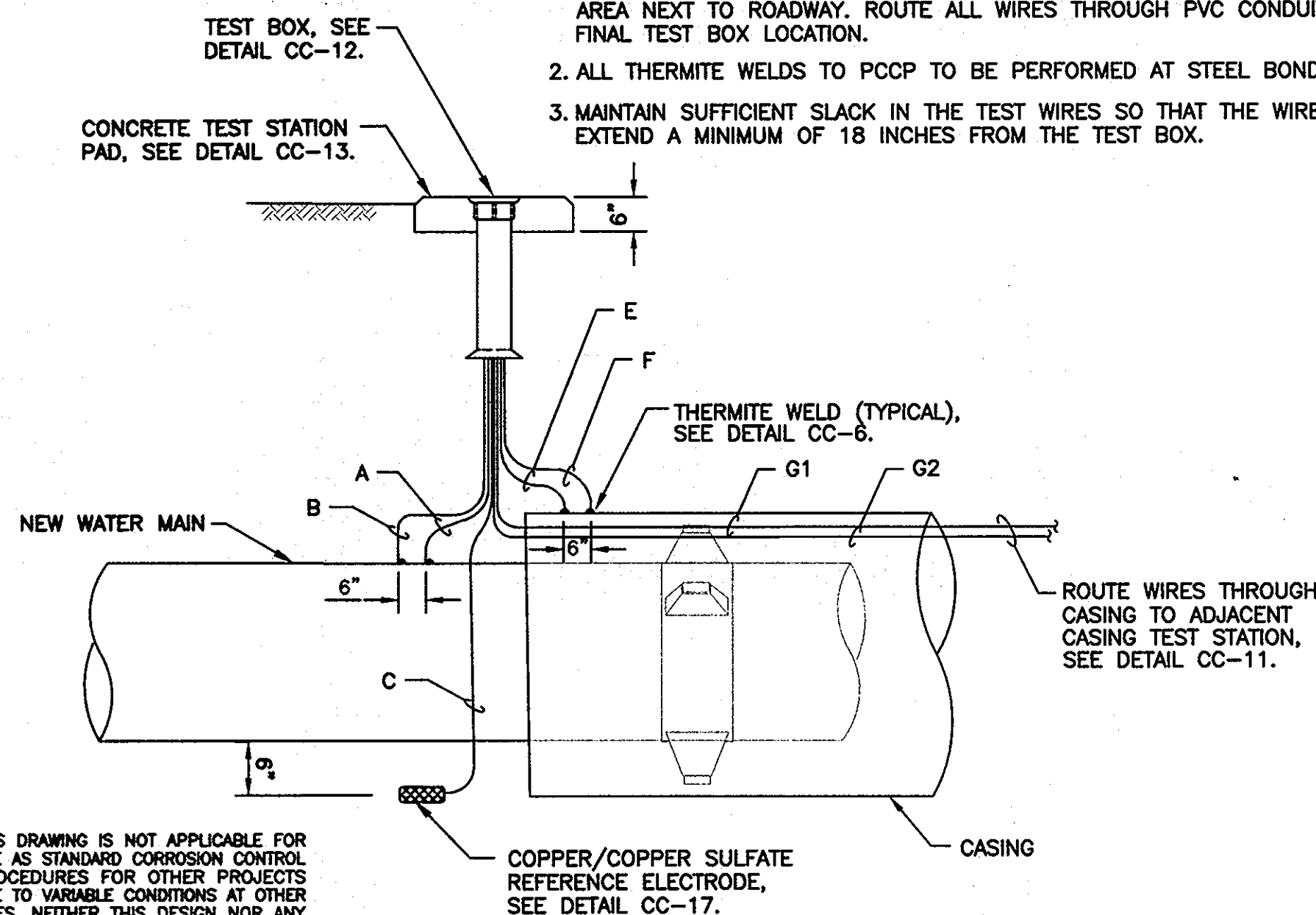
**CC-2: INSULATING FLANGE TEST STATION WITH PREPACKAGED ANODES**

NOT TO SCALE

WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW WATER MAIN	A B	1 3	#8 #10	THWN THWN	BLUE BLUE
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
CASING PIPE	E F	2 5	#8 #10	THWN THWN	WHITE WHITE
ADJACENT CASING TEST STATION	G1 G2	7 7	#10 #10	THWN THWN	RED RED

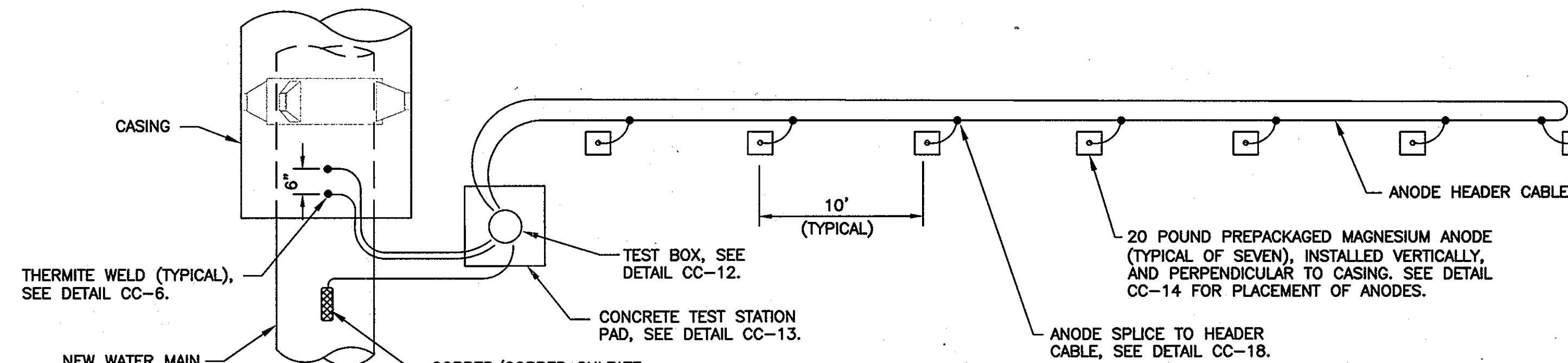
**NOTES:**

- DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES THROUGH PVC CONDUIT TO FINAL TEST BOX LOCATION.
- ALL THERMITE WELDS TO PCPP TO BE PERFORMED AT STEEL BONDING PLATES.
- MAINTAIN SUFFICIENT SLACK IN THE TEST WIRES SO THAT THE WIRES CAN EXTEND A MINIMUM OF 18 INCHES FROM THE TEST BOX.

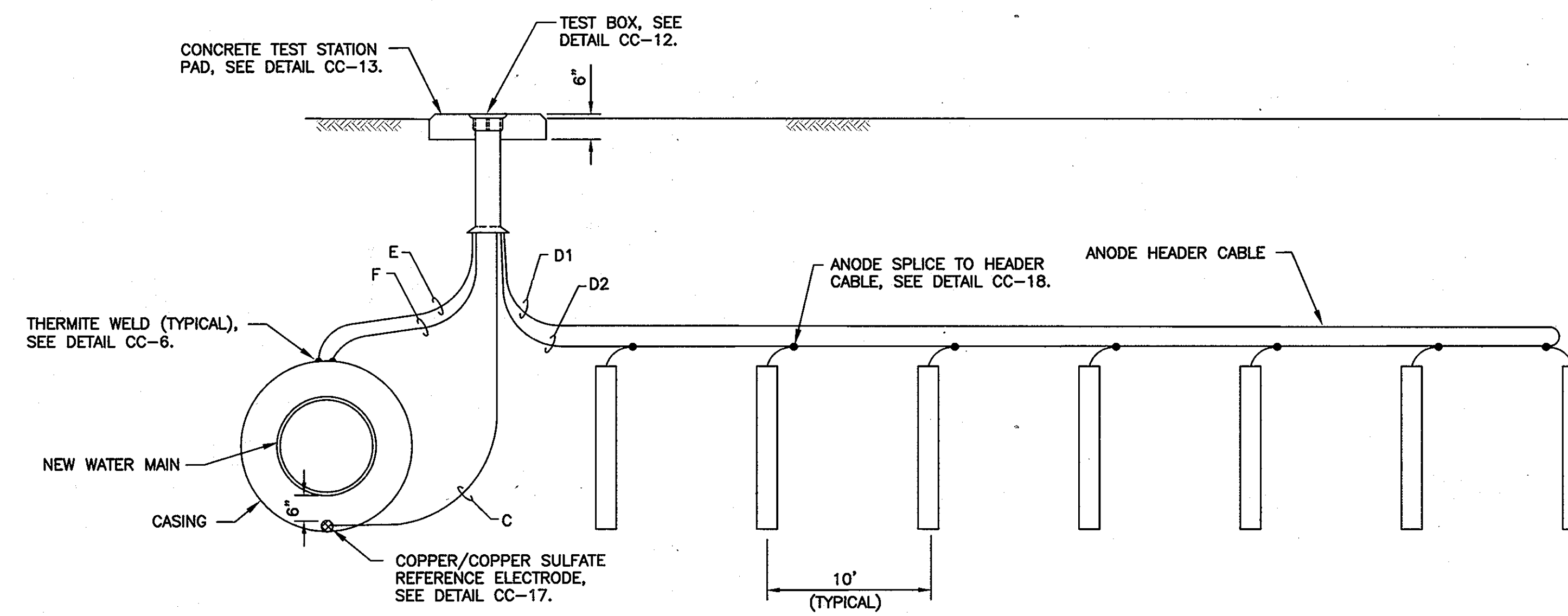


**CC-3: CASING TEST STATION**

NOT TO SCALE



PLAN



PROFILE

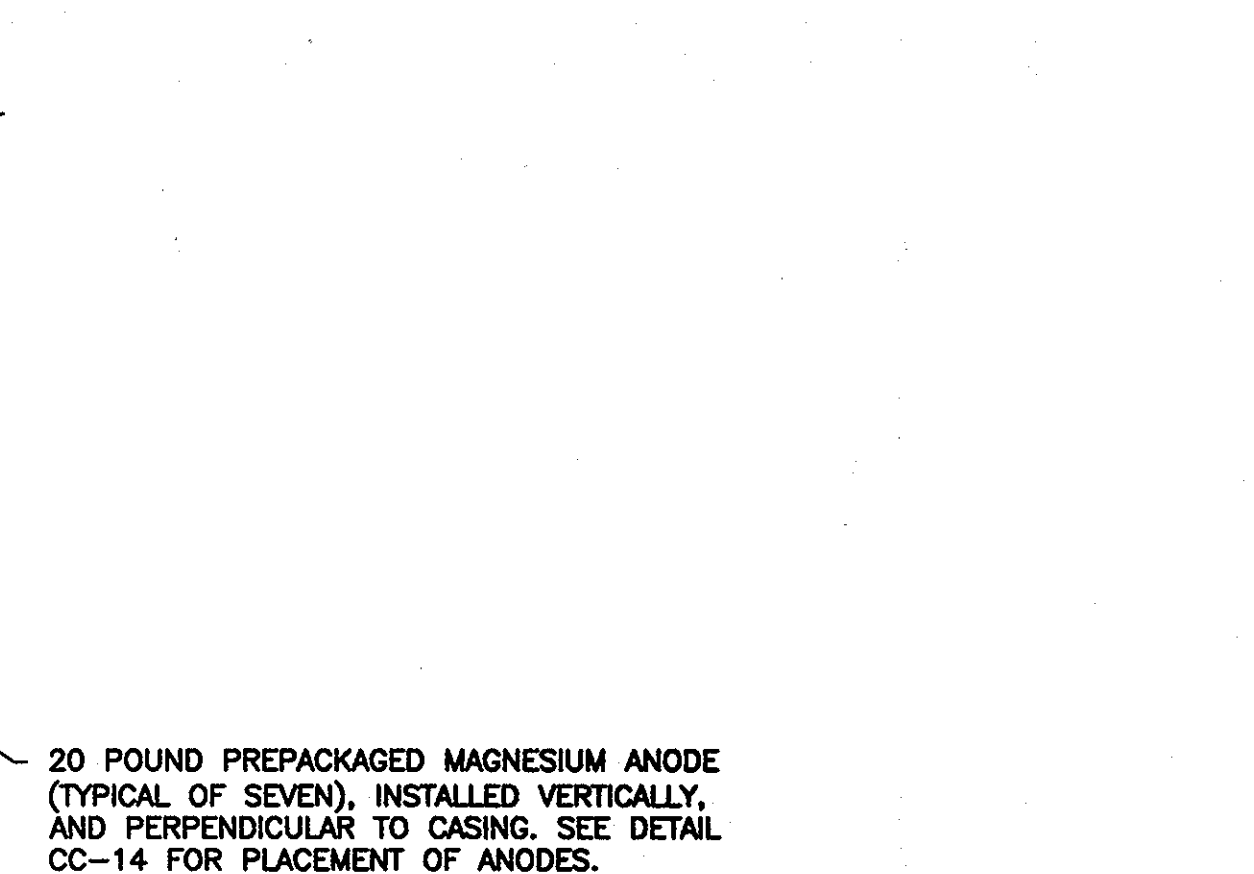
**CC-4: TYPE A ANODE TEST STATION**

NOT TO SCALE

WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
ANODE HEADER CABLE	D1 D2	4 4	#8 #8	HMWPE HMWPE	BLACK BLACK
CASING	E F	2 5	#8 #10	THWN THWN	WHITE WHITE

**NOTES:**

- ANODES PLACED VERTICALLY WITH BOTTOM OF ANODE AT SAME DEPTH AS THE BOTTOM OF CASING. SEE DETAIL CC-14.
- DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES THROUGH PVC CONDUIT TO FINAL TEST BOX LOCATION.
- INSTALL 0.01 OHM SHUNT BETWEEN TERMINALS #1 AND #4.
- MAINTAIN SUFFICIENT SLACK IN THE TEST WIRES SO THAT THE WIRES CAN EXTEND A MINIMUM OF 18 INCHES FROM THE TEST BOX.



RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS. THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
BY: [Signature]

CP-4

**DEPARTMENT OF PUBLIC WORKS**

HOWARD COUNTY, MARYLAND

Director of Public Works: [Signature] DATE: 1/29/10  
 Chief - Bureau of Engineering: [Signature] DATE: 1/29/10  
 Chief, Bureau of Utilities: [Signature] DATE: 1/28/10  
 Chief, Utility Design Division: [Signature] DATE: 1/28/10

RUSSELL CORROSION CONSULTANTS, INC.  
5405 TWIN KNOLLS RD., SUITE 3  
COLUMBIA, MD 21045

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 17083, EXPIRATION DATE 9/27/2010.



DSN. BY: MJS

DRN. BY: DJD

CHK. BY: MJS

DATE: JAN. 2010

RJD | RECORD DRAWING

**CORROSION CONTROL DETAILS - 1**

600' SCALE MAP NO. BLOCK NO.

**US 29 WATER MAIN REPLACEMENT TUNNEL CROSSING AT MONTGOMERY ROAD**

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN

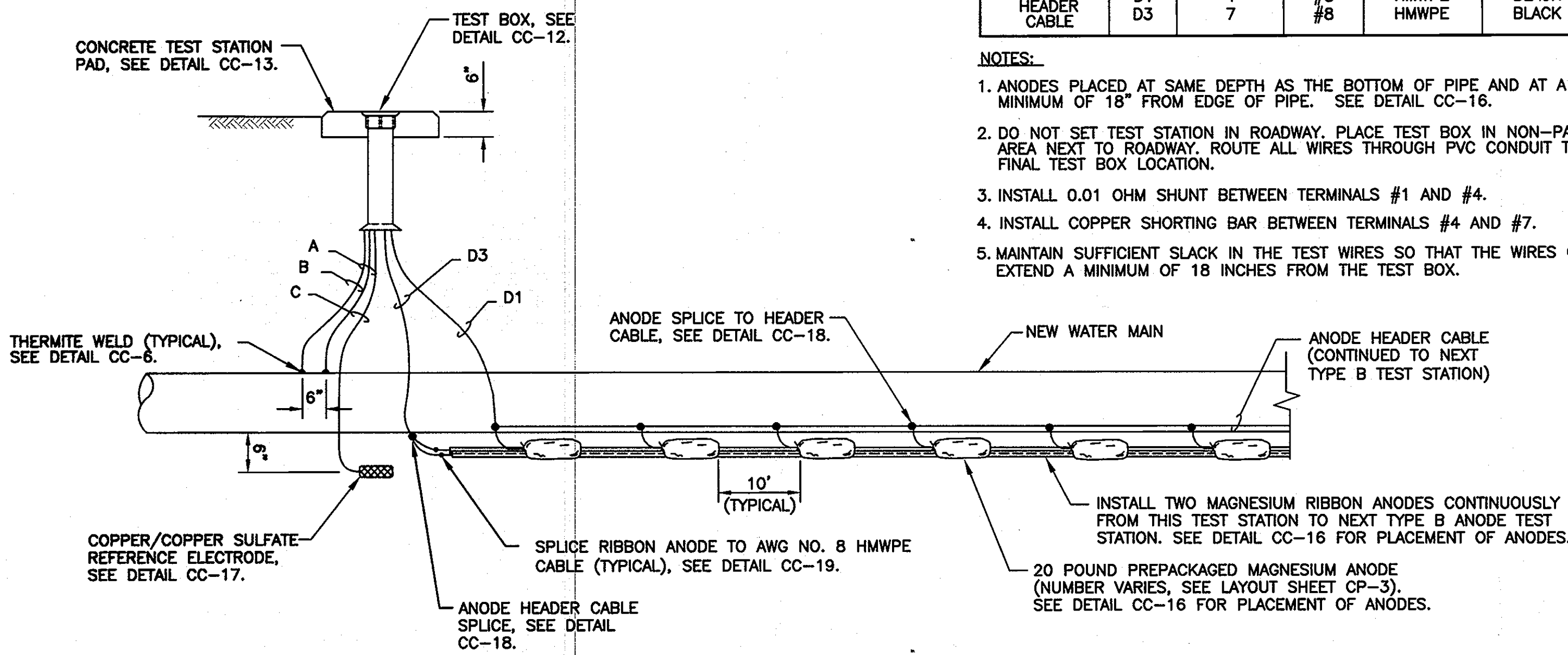
SHEET 19 OF 26

FILE NO. 43844-

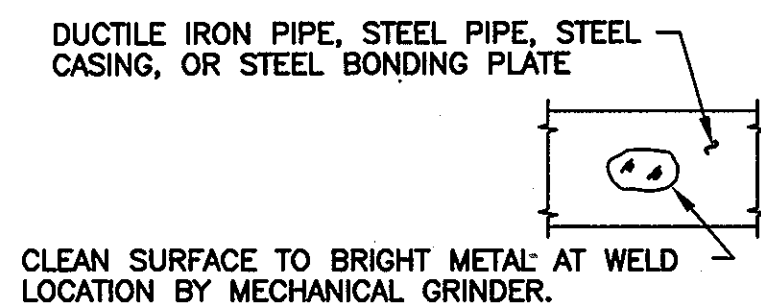
WIRING SCHEDULE					
DESCRIPTION	WIRE	TEST STATION TERMINAL	AWG WIRE SIZE	TYPE OF INSULATION	COLOR OF INSULATION
NEW WATER MAIN	A B	1 3	#8 #10	THWN THWN	BLUE BLUE
PERMANENT REFERENCE ELECTRODE	C	6	#14	HMWPE	BLACK
ANODE HEADER CABLE	D1 D3	4 7	#8 #8	HMWPE HMWPE	BLACK BLACK

**NOTES:**

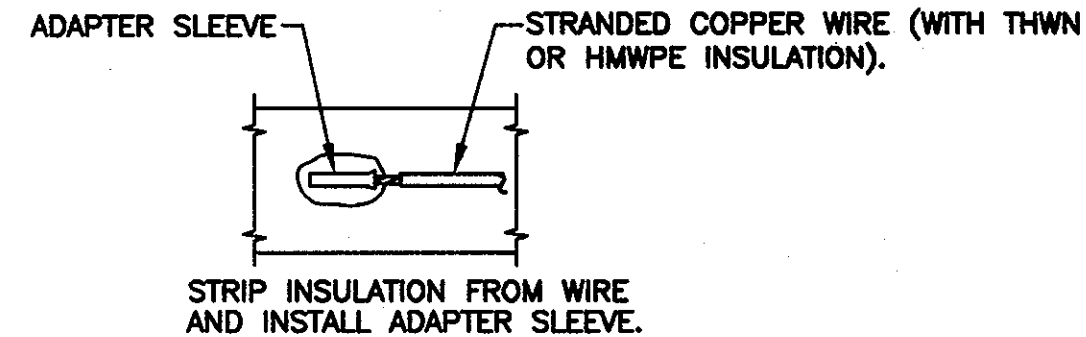
- ANODES PLACED AT SAME DEPTH AS THE BOTTOM OF PIPE AND AT A MINIMUM OF 18" FROM EDGE OF PIPE. SEE DETAIL CC-16.
- DO NOT SET TEST STATION IN ROADWAY. PLACE TEST BOX IN NON-PAVED AREA NEXT TO ROADWAY. ROUTE ALL WIRES THROUGH PVC CONDUIT TO FINAL TEST BOX LOCATION.
- INSTALL 0.01 OHM SHUNT BETWEEN TERMINALS #1 AND #4.
- INSTALL COPPER SHORTING BAR BETWEEN TERMINALS #4 AND #7.
- MAINTAIN SUFFICIENT SLACK IN THE TEST WIRES SO THAT THE WIRES CAN EXTEND A MINIMUM OF 18 INCHES FROM THE TEST BOX.



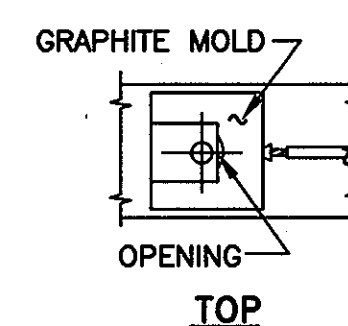
**CC-5: TYPE B ANODE TEST STATION**  
NOT TO SCALE



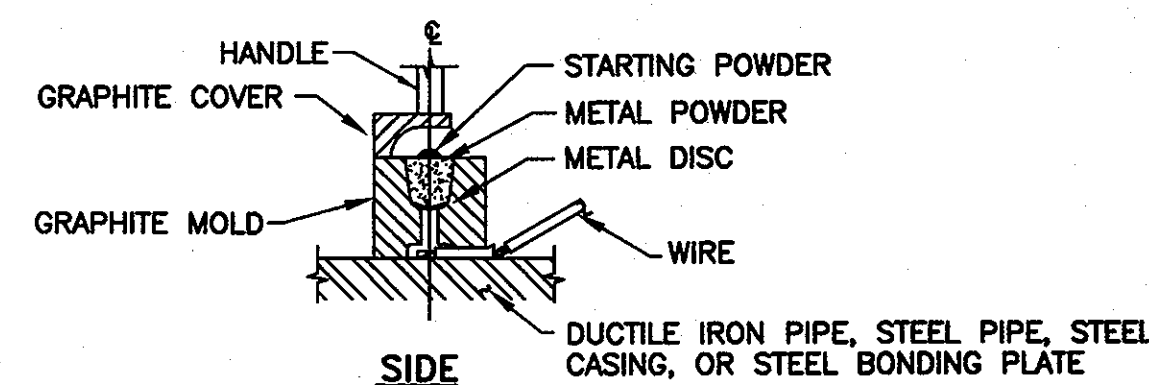
**STEP 1**



**STEP 2**



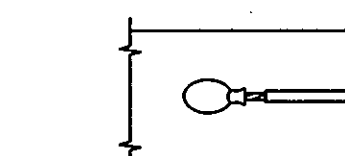
**TOP**



**SIDE**

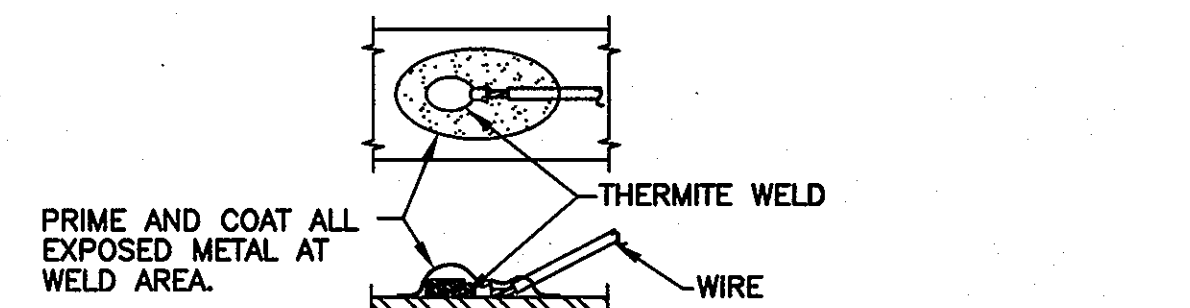
HOLD GRAPHITE MOLD FIRMLY OVER ADAPTER SLEEVE WITH OPENING AWAY FROM OPERATOR - IGNITE STARTING POWDER.

**STEP 3**



REMOVE SLAG FROM CONNECTION. THOROUGHLY CLEAN WELD AREA.

**STEP 4**



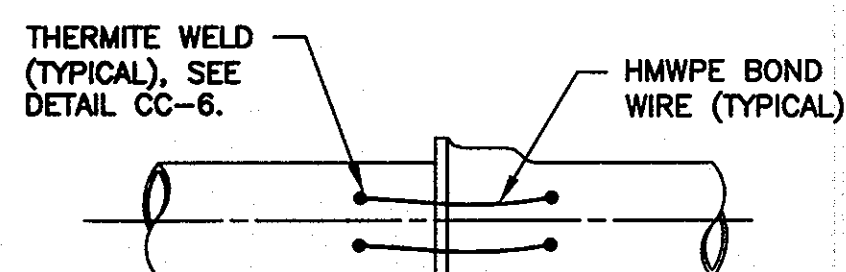
**STEP 5**

**NOTES:**

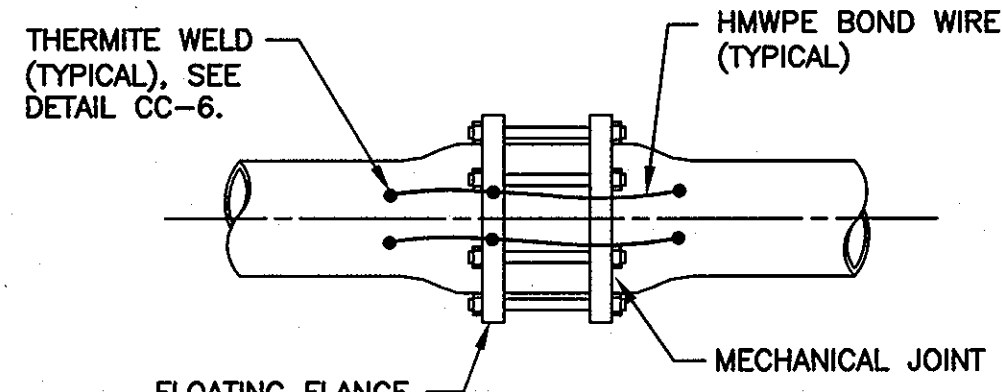
- THERMITE WELDS MADE TO DUCTILE IRON PIPE, STEEL PIPE, OR THE STEEL CASING SHALL BE COATED WITH A PREFABRICATED ONE-PIECE PLASTIC CAP FILLED WITH ELASTOMERIC MATERIAL, ROYSTON HANDY-CAP OR APPROVED EQUAL.
- THERMITE WELDS MADE TO THE STEEL BONDING PLATES OF PCCP PIPING SHALL BE COATED WITH BRUSH APPLIED R28 MASTIC (10 MILS MINIMUM THICKNESS) OR APPROVED EQUAL. MASTIC SHALL BE DRY BEFORE THERMITE WELDS ARE COVERED OVER WITH GROUT.

**CC-6: THERMITE WELD**

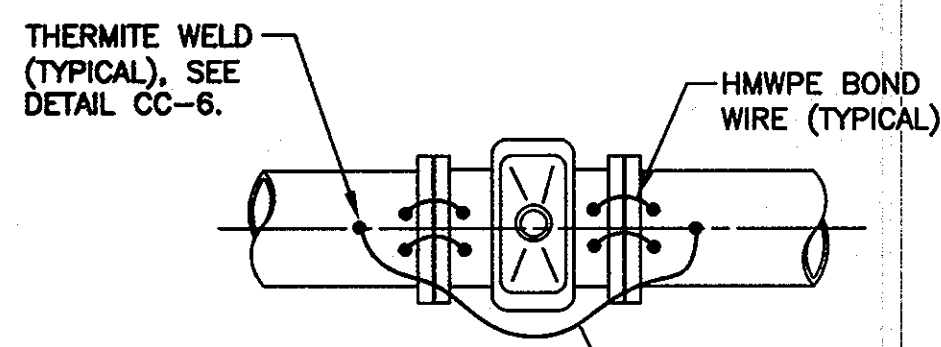
NOT TO SCALE



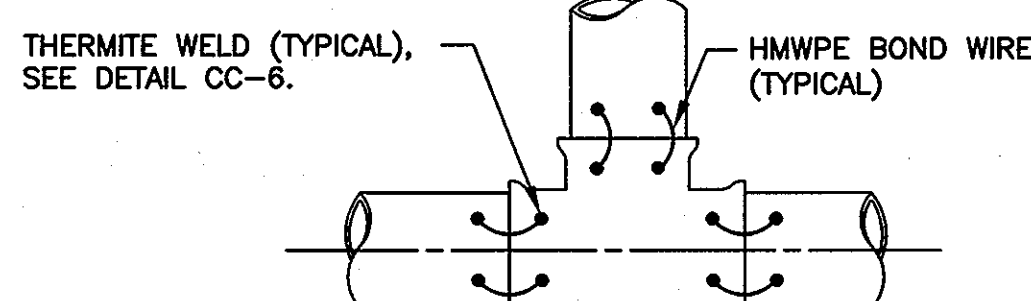
**TYPICAL PIPE JOINT BOND**



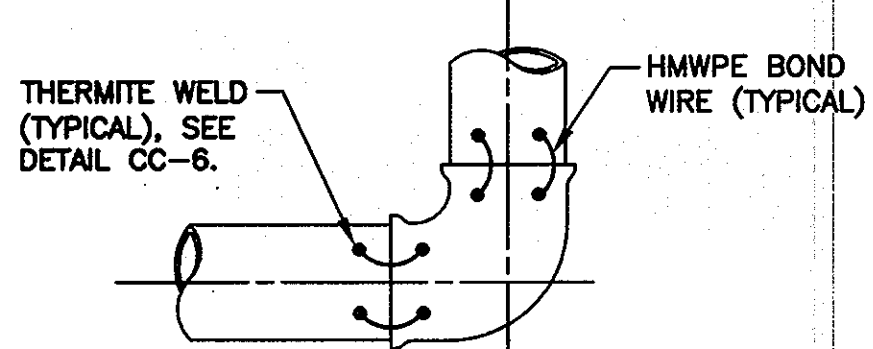
**TYPICAL MECHANICAL COUPLING BOND**



**TYPICAL BONDING OF VALVE**



**TYPICAL BONDING OF TEE**



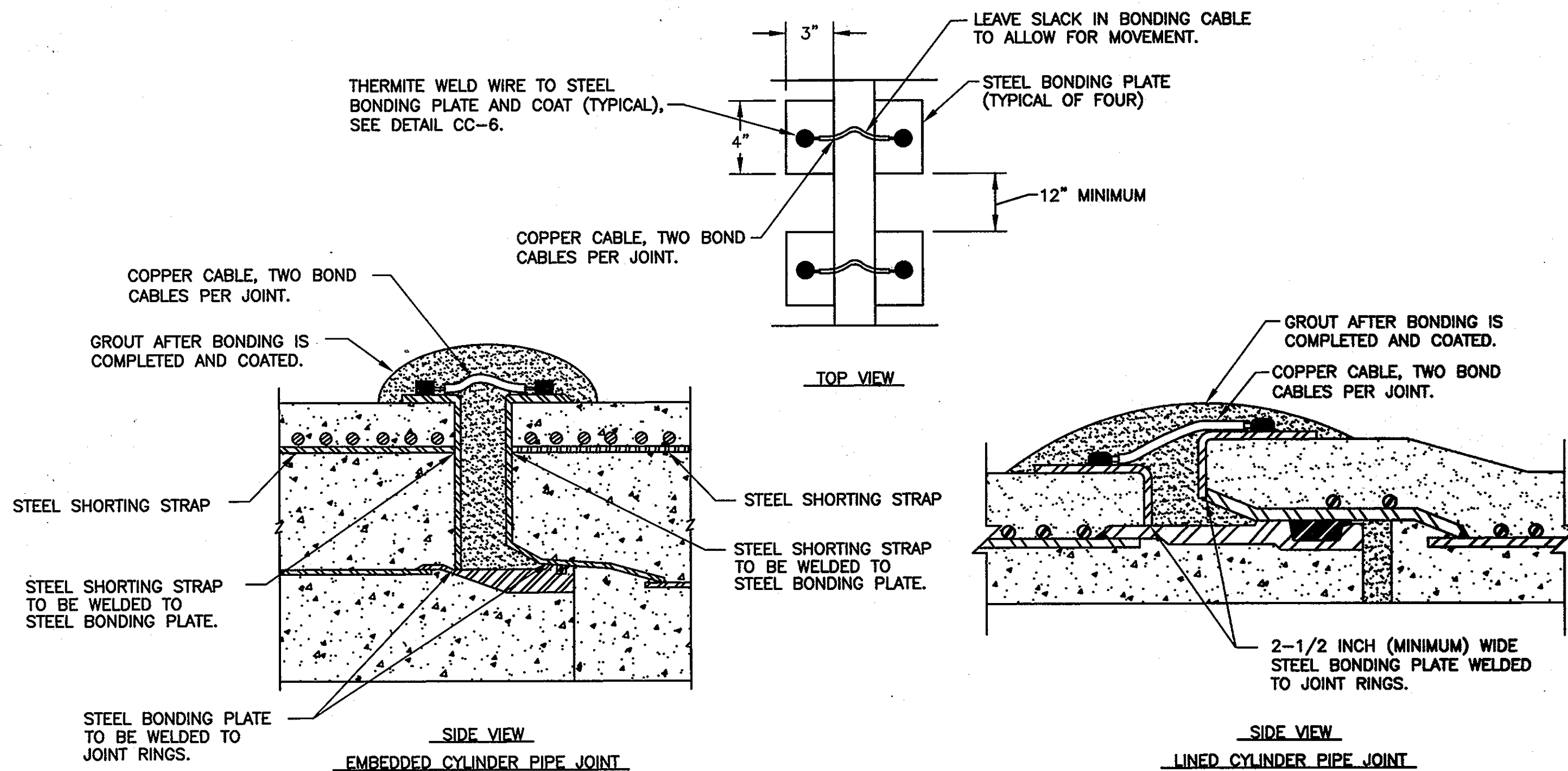
**TYPICAL BONDING OF BEND, REDUCER OR SOLID SLEEVE**

**NOTES:**

- BOND ALL PIPE JOINTS, INCLUDING THOSE ON PIPE, FITTINGS, VALVES, ETC., EXCEPT THOSE SPECIFIED TO BE INSULATED.
- THERMITE WELD BONDING WIRES TO TOP OF PIPE OR FITTINGS, SEE DETAIL CC-6.
- WIRE SIZE FOR BONDING JOINTS SHALL BE AWG NO. 2.
- ALL THERMITE WELDS TO PCCP TO BE PERFORMED AT THE STEEL BONDING PLATES, SEE DETAIL CC-8.

**CC-7: JOINT BONDING**

NOT TO SCALE



**NOTES:**

- TWO STEEL SHORTING STRAPS REQUIRED PER PIPE SECTION FOR EMBEDDED CYLINDER PIPE. NO SHORTING STRAPS REQUIRED FOR LINED CYLINDER PIPE.
- STEEL BONDING PLATES AND STEEL SHORTING STRAPS (IF REQUIRED) TO BE INSTALLED BY PIPE MANUFACTURER DURING PIPE FABRICATION.
- BOND ALL PIPE JOINTS, INCLUDING THOSE ON PIPE, FITTINGS, VALVES, ETC., EXCEPT THOSE SPECIFIED TO BE INSULATED.
- WIRE SIZE FOR BONDING JOINTS SHALL BE AWG NO. 2.

**CC-8: PCCP JOINT BONDING**

NOT TO SCALE

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

**O'BRIEN & GERE ENGINEERS, INC.**  
BY: *[Signature]*

THIS DRAWING IS NOT APPLICABLE FOR USE AS STANDARD CORROSION CONTROL PROCEDURES FOR OTHER PROJECTS DUE TO VARIABLE CONDITIONS AT OTHER SITES. NEITHER THIS DESIGN NOR ANY PART THEREOF MAY BE DUPLICATED IN ANY WAY FOR OTHER PROJECTS OR MODIFIED IN ANY WAY FOR THIS OR OTHER PROJECTS, EXCEPT BY WRITTEN AGREEMENT WITH RUSSELL CORROSION CONSULTANTS, INC.

**DEPARTMENT OF PUBLIC WORKS**

HOWARD COUNTY, MARYLAND

*[Signatures]*  
DIRECTOR OF PUBLIC WORKS DATE: 1/29/10  
CHIEF - BUREAU OF ENGINEERING DATE: 1/29/10  
CHIEF, BUREAU OF UTILITIES DATE: 1/29/10  
CHIEF, UTILITY DESIGN DIVISION DATE: 1/29/10

**RUSSELL CORROSION CONSULTANTS, INC.**  
5405 THIN KNOLLS RD., SUITE 3  
COLUMBIA, MD 21045

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 17083, EXPIRATION DATE 9/27/2010.



DSN. BY: MJS  
DRN. BY: DJD  
CHK. BY: MJS  
DATE: JAN. 2010  
BY: RJD  
NO. 1  
RECORD DRAWING  
REVISION  
DATE: 10/11

**CORROSION CONTROL DETAILS - 2**

600' SCALE MAP NO. BLOCK NO.

**US 29 WATER MAIN REPLACEMENT TUNNEL CROSSING AT MONTGOMERY ROAD**

CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

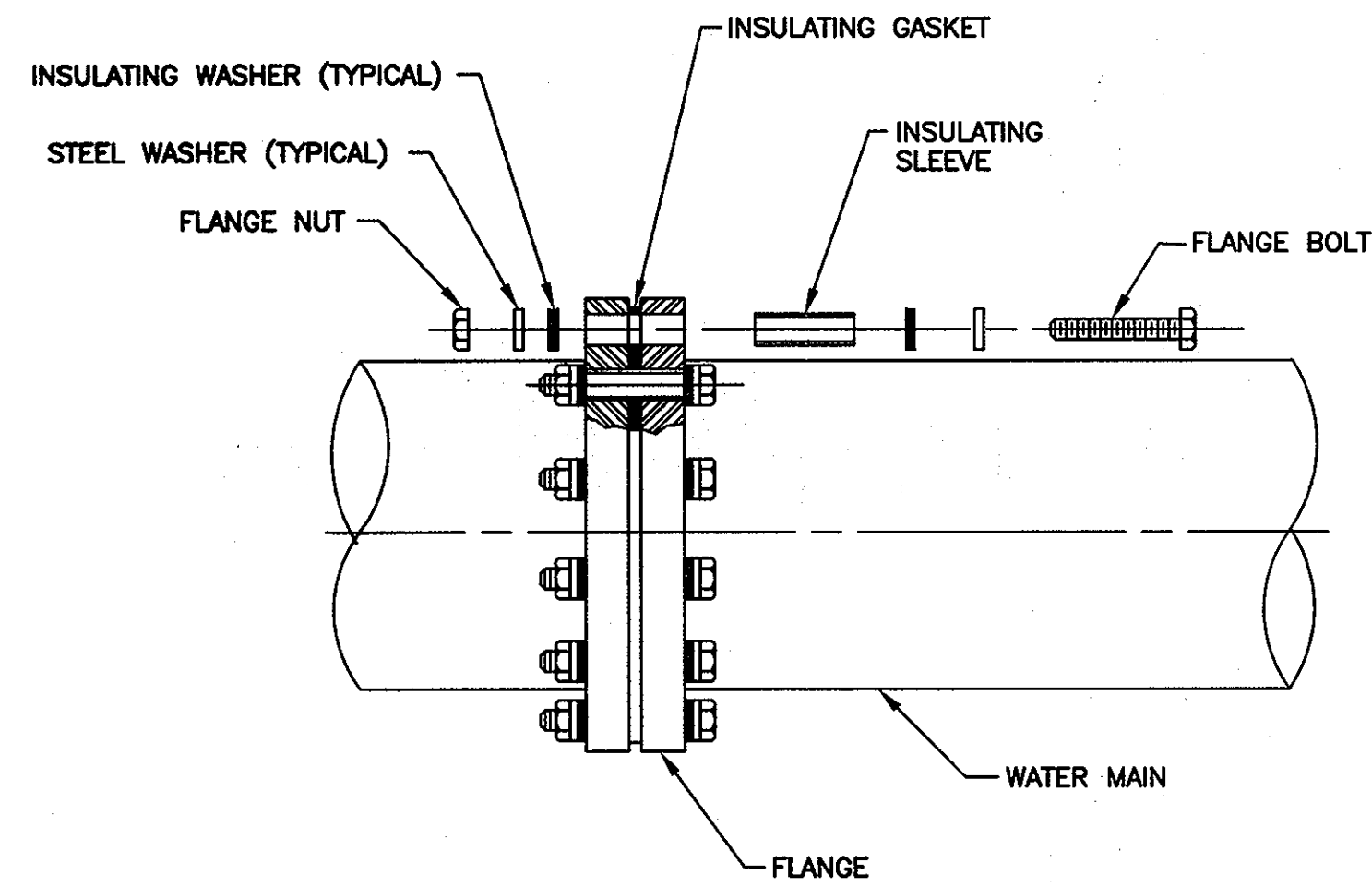
CP-5

SCALE AS SHOWN

SHEET

20 OF 26

FILE NO. 43844-

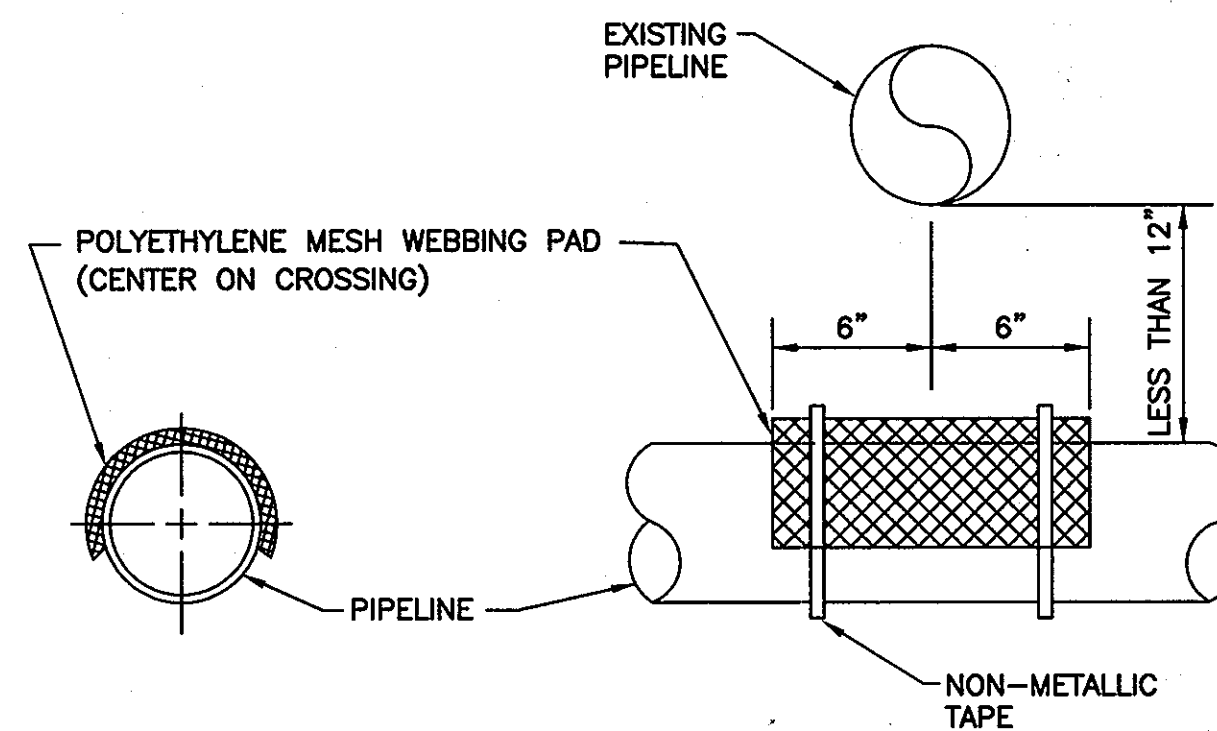


**NOTES:**

1. AFTER ASSEMBLY, TEST TO VERIFY THAT ISOLATION IS EFFECTIVE. IF ISOLATION IS NOT EFFECTIVE, REPAIR AS NECESSARY AND RETEST. THIS PROCESS SHALL CONTINUE UNTIL ISOLATION IS VERIFIED AS EFFECTIVE.
2. AFTER VERIFYING EFFECTIVE ISOLATION, COAT THE ENTIRE FLANGE AND ALL EXPOSED METAL INCLUDING BOLTS, NUTS, AND WASHERS WITH FOUR COMPONENTS OF DENSO OR TRENTON WAX TAPE COATING SYSTEM. COATING SYSTEM SHALL EXTEND A MINIMUM OF 12 INCHES ON EITHER SIDE OF FLANGE.
3. ALL INSULATING FLANGES TO BE PROVIDED WITH TEST STATION, SEE DETAILS CC-1 AND CC-2.

**CC-9: INSULATING FLANGE**

NOT TO SCALE

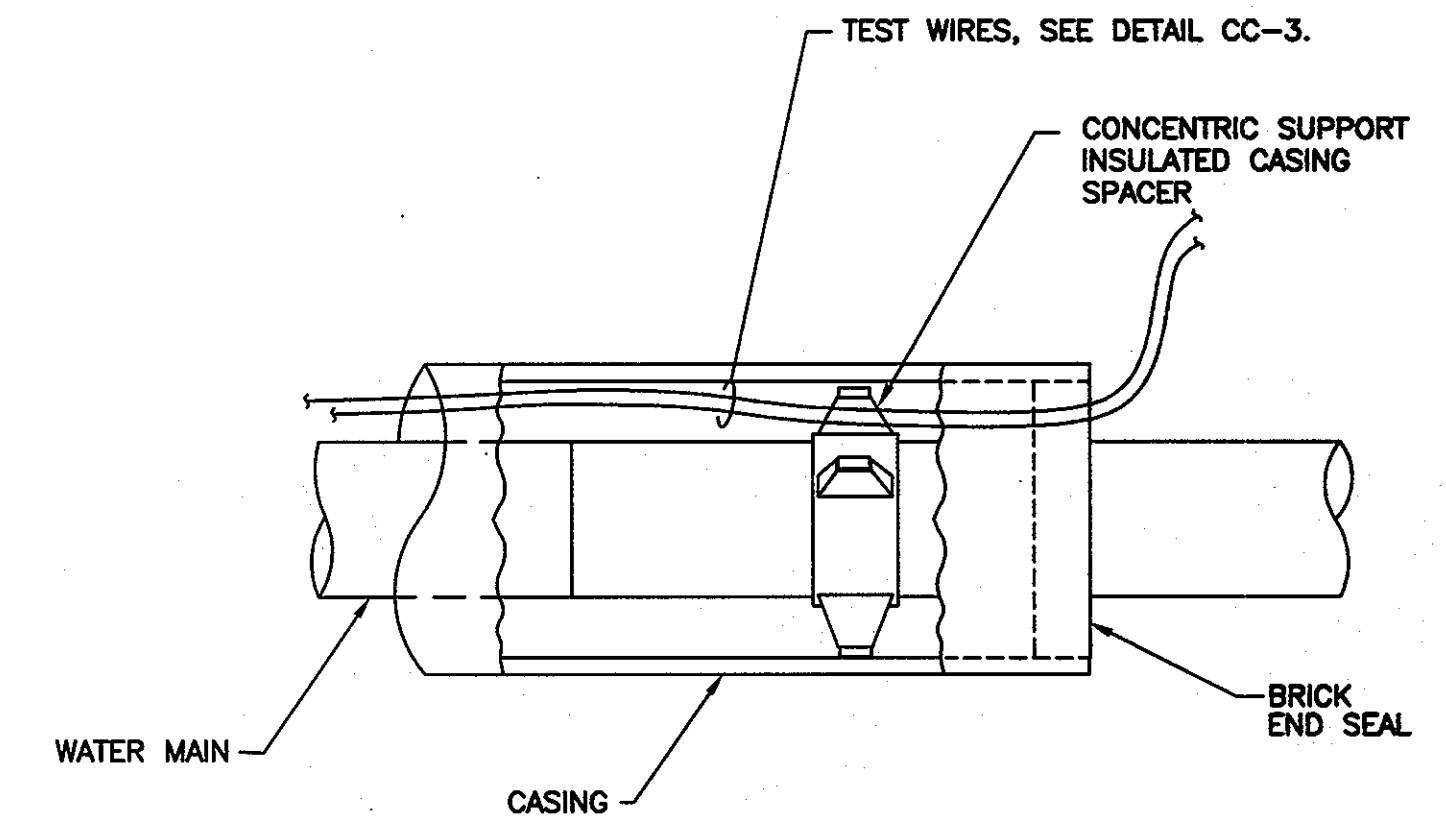


**NOTES:**

1. USE ONLY WHEN PIPES ARE LESS THAN 12" APART.
2. SEPARATOR MESH NOT REQUIRED IF EXISTING PIPELINE IS PVC OR HDPE.

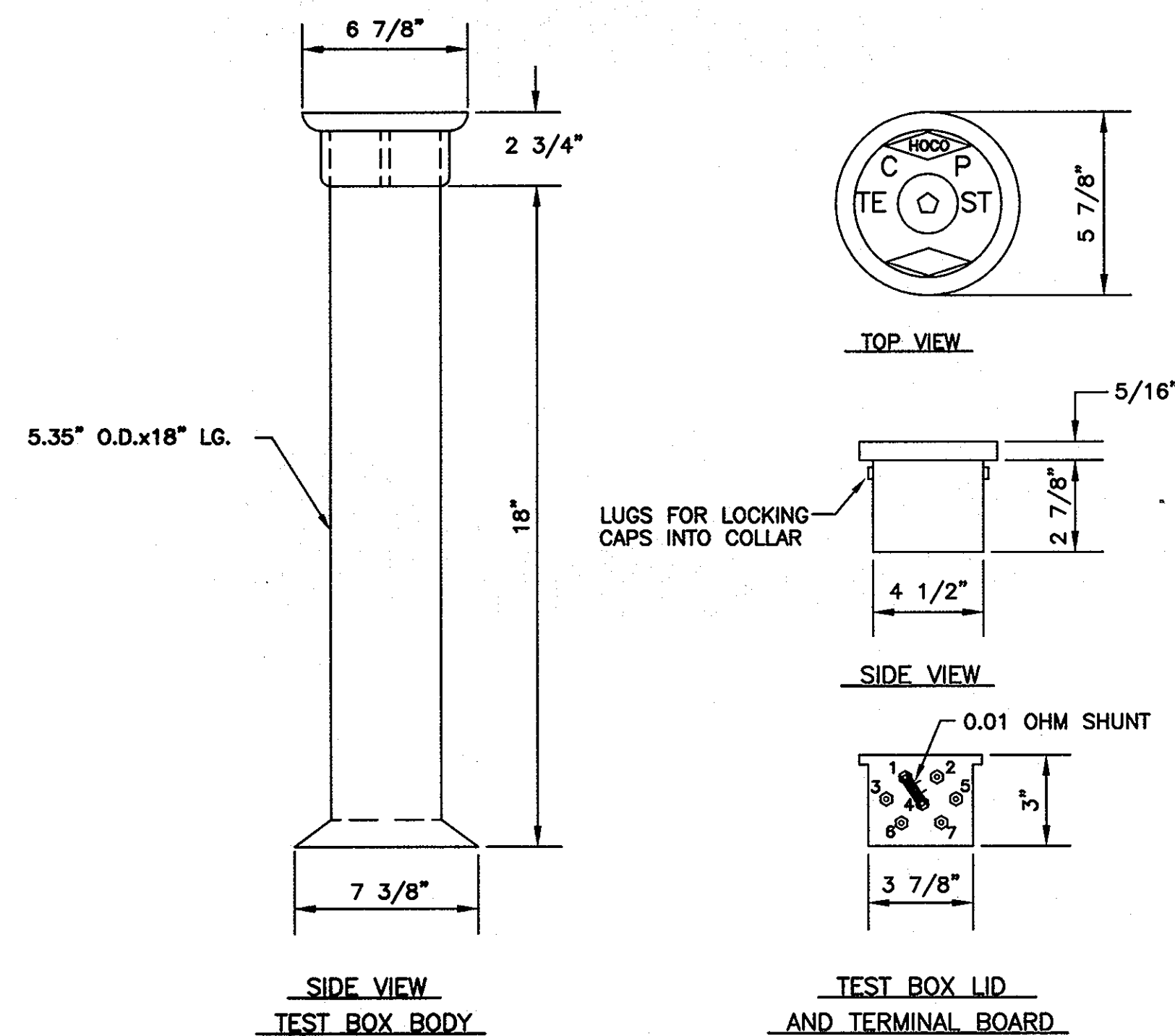
**CC-10: SEPARATOR TO AVOID ELECTRICAL CONTACT**

NOT TO SCALE



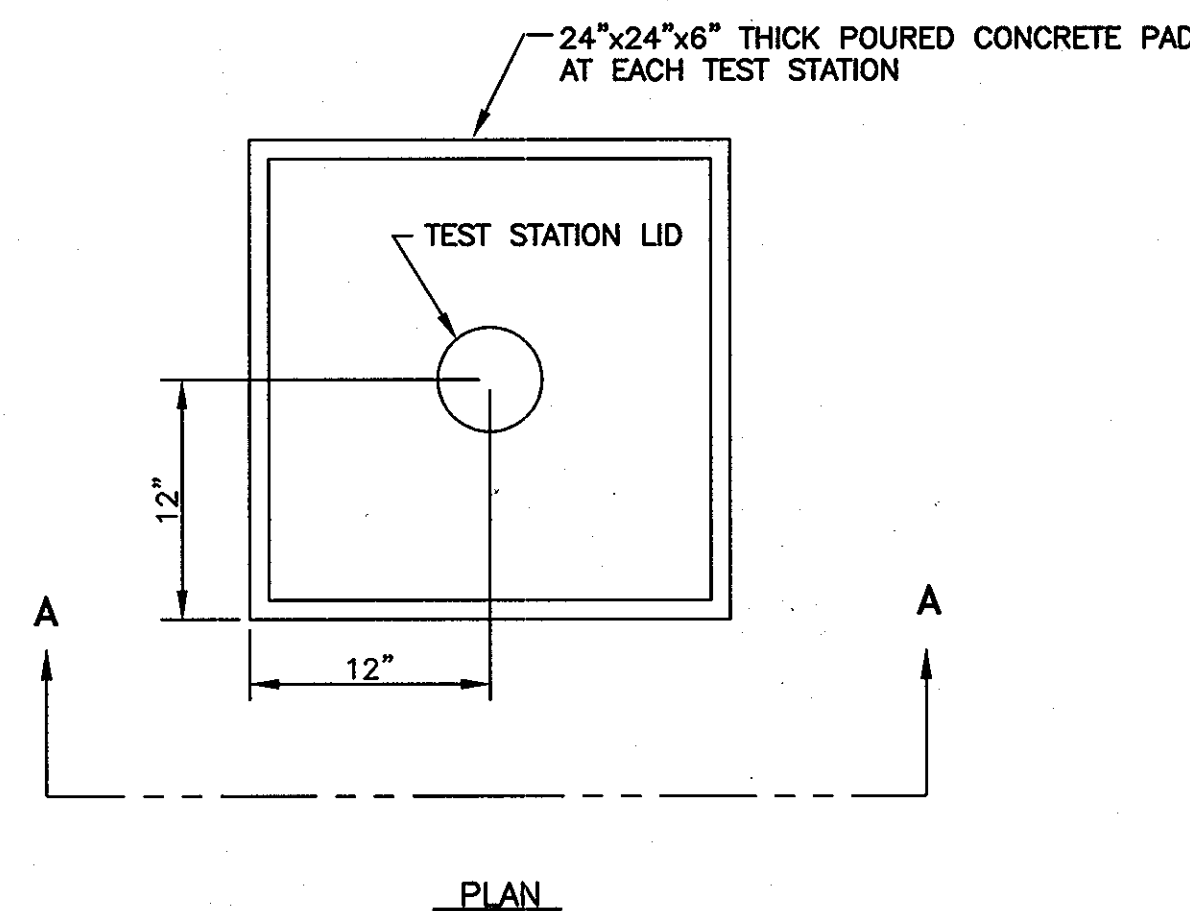
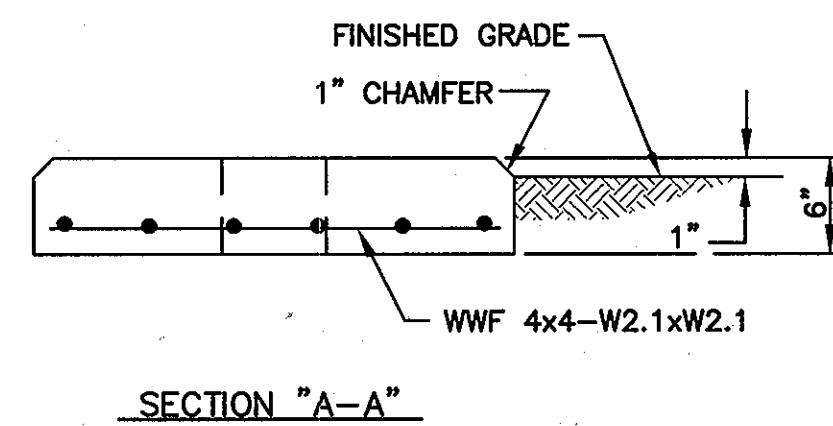
**CC-11: CASING TEST WIRES**

NOT TO SCALE



**CC-12: TEST BOX**

NOT TO SCALE

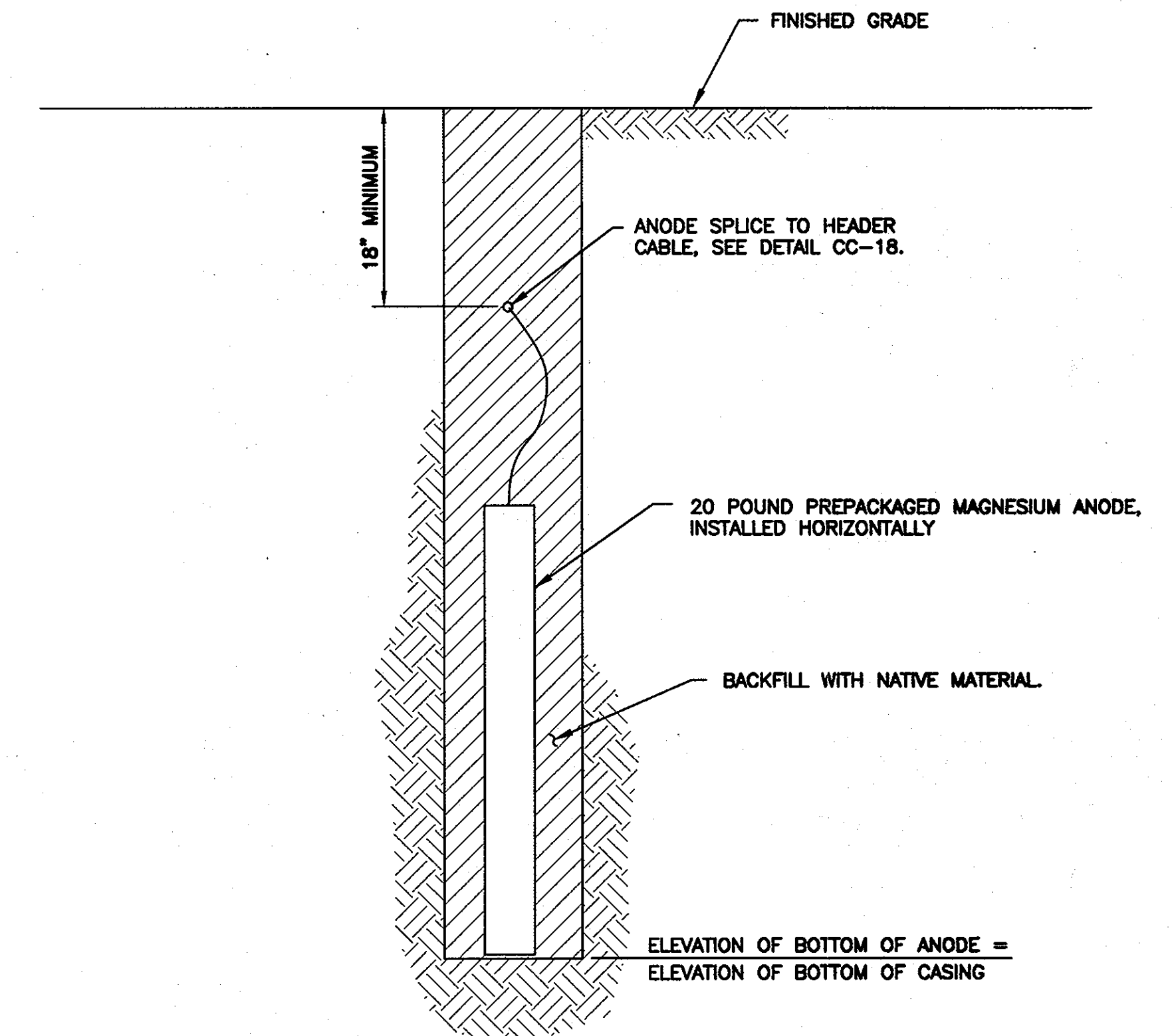


**CC-13: TEST STATION PAD**

NOT TO SCALE

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
BY: [Signature]



**CC-14: VERTICAL INSTALLATION OF PREPACKAGED MAGNESIUM ANODE**

NOT TO SCALE

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**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

Director of Public Works: [Signature] DATE: 1/29/10  
 Chief - Bureau of Engineering: [Signature] DATE: 1/29/10  
 Chief, Bureau of Utilities: [Signature] DATE: 1/28/10  
 Chief, Utility Design Division: [Signature] DATE: 1/28/10

**RUSSELL CORROSION CONSULTANTS, INC.**  
5405 TWIN KNOTS RD., SUITE 3  
COLUMBIA, MD 21045

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 17083, EXPIRATION DATE 9/27/2010.

Professional Engineer: [Signature]

DSN. BY: MJS				
DRN. BY: DJD				
CHK. BY: MJS				
DATE: JAN. 2010				
RJD	I	RECORD DRAWING	10/11	
BY NO.		REVISION	DATE	

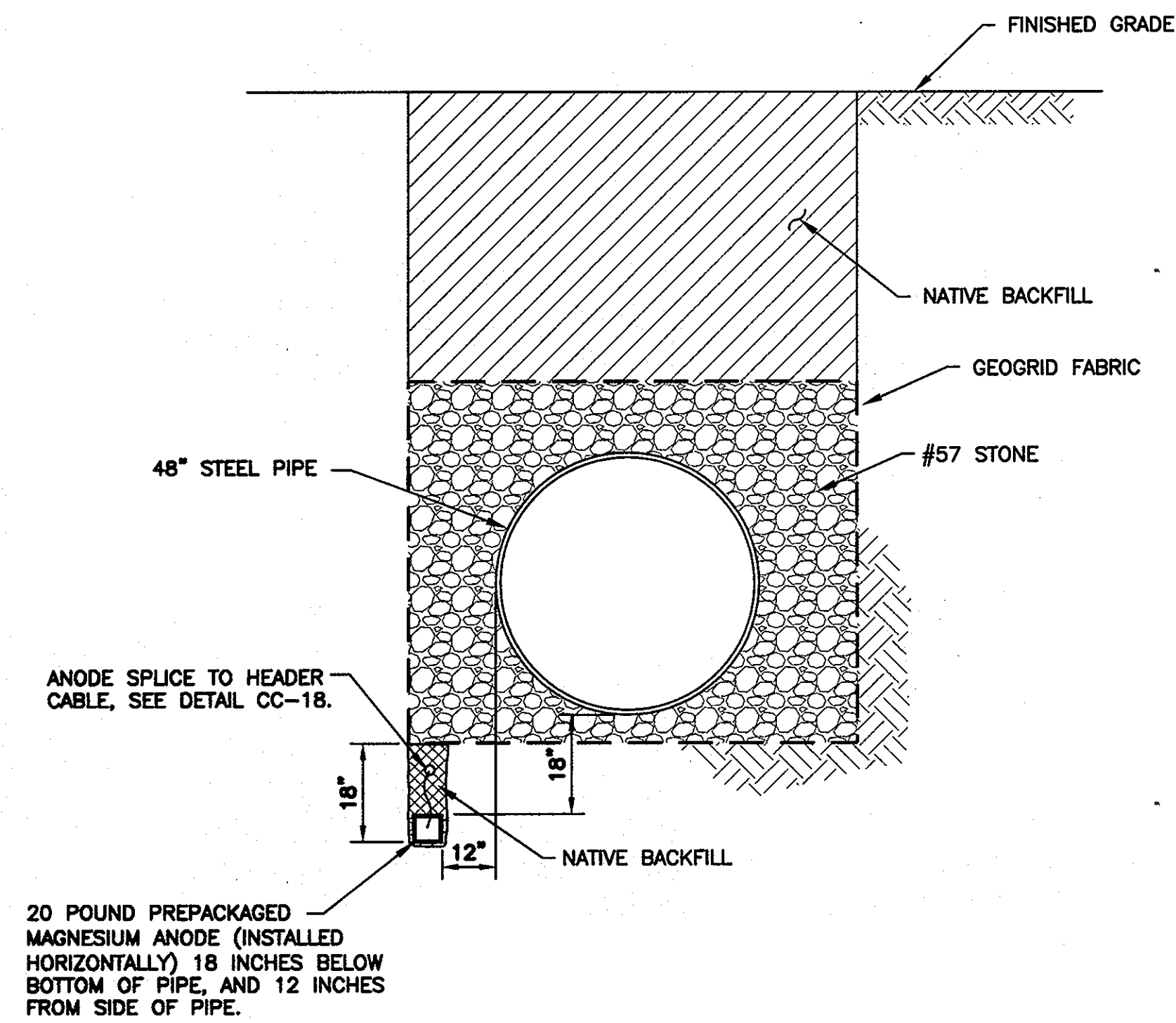
**CORROSION CONTROL DETAILS - 3**

600' SCALE MAP NO. \_\_\_\_\_ BLOCK NO. \_\_\_\_\_

**US 29 WATER MAIN REPLACEMENT TUNNEL CROSSING AT MONTGOMERY ROAD**

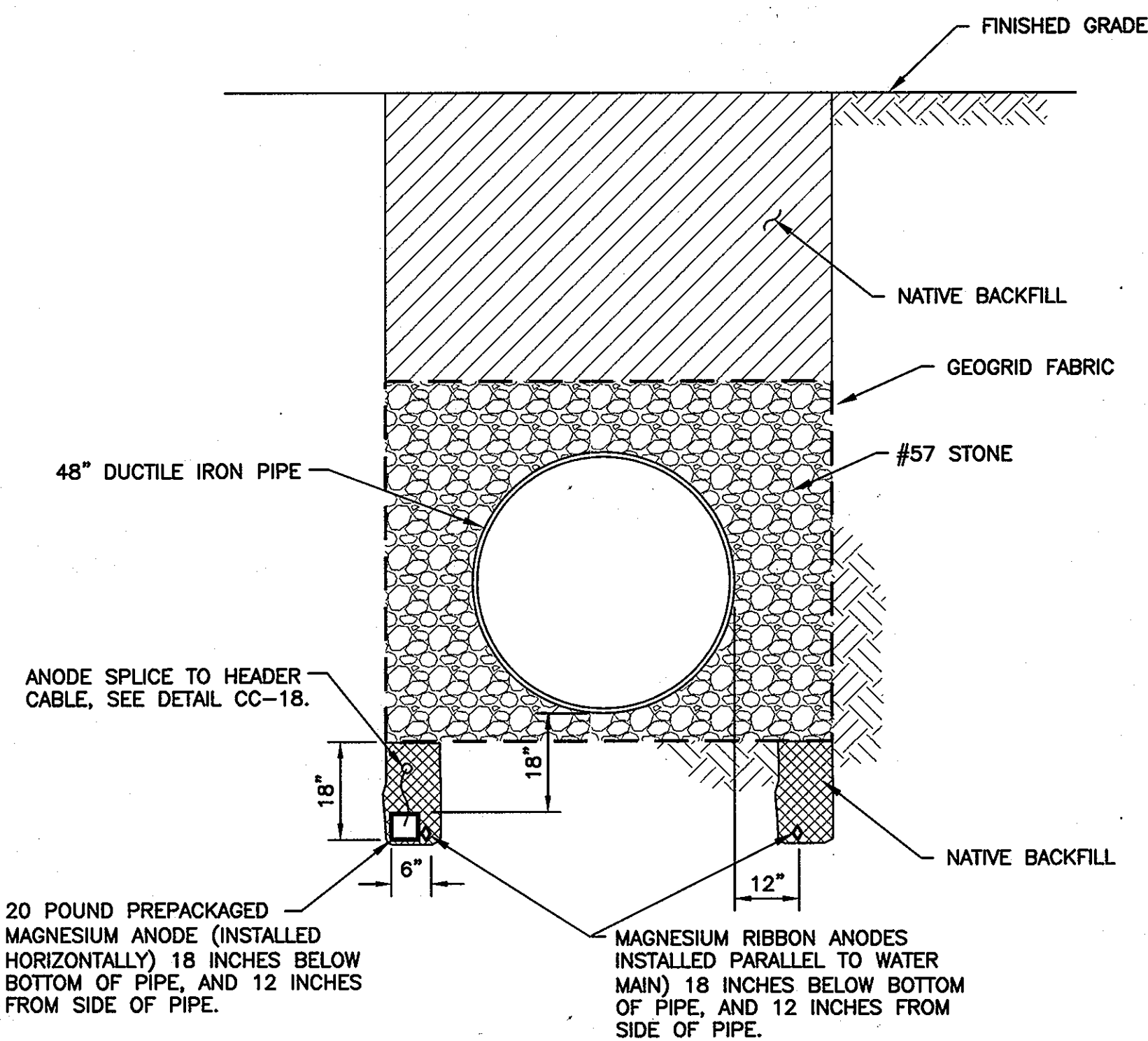
CAPITAL PROJECT: W-8243  
 CONTRACT NO.: 44-4630  
 ELECTION DISTRICT: 2  
 HOWARD COUNTY, MARYLAND

CP-6  
 SCALE AS SHOWN  
 SHEET 21 OF 26  
 FILE NO. 43844-



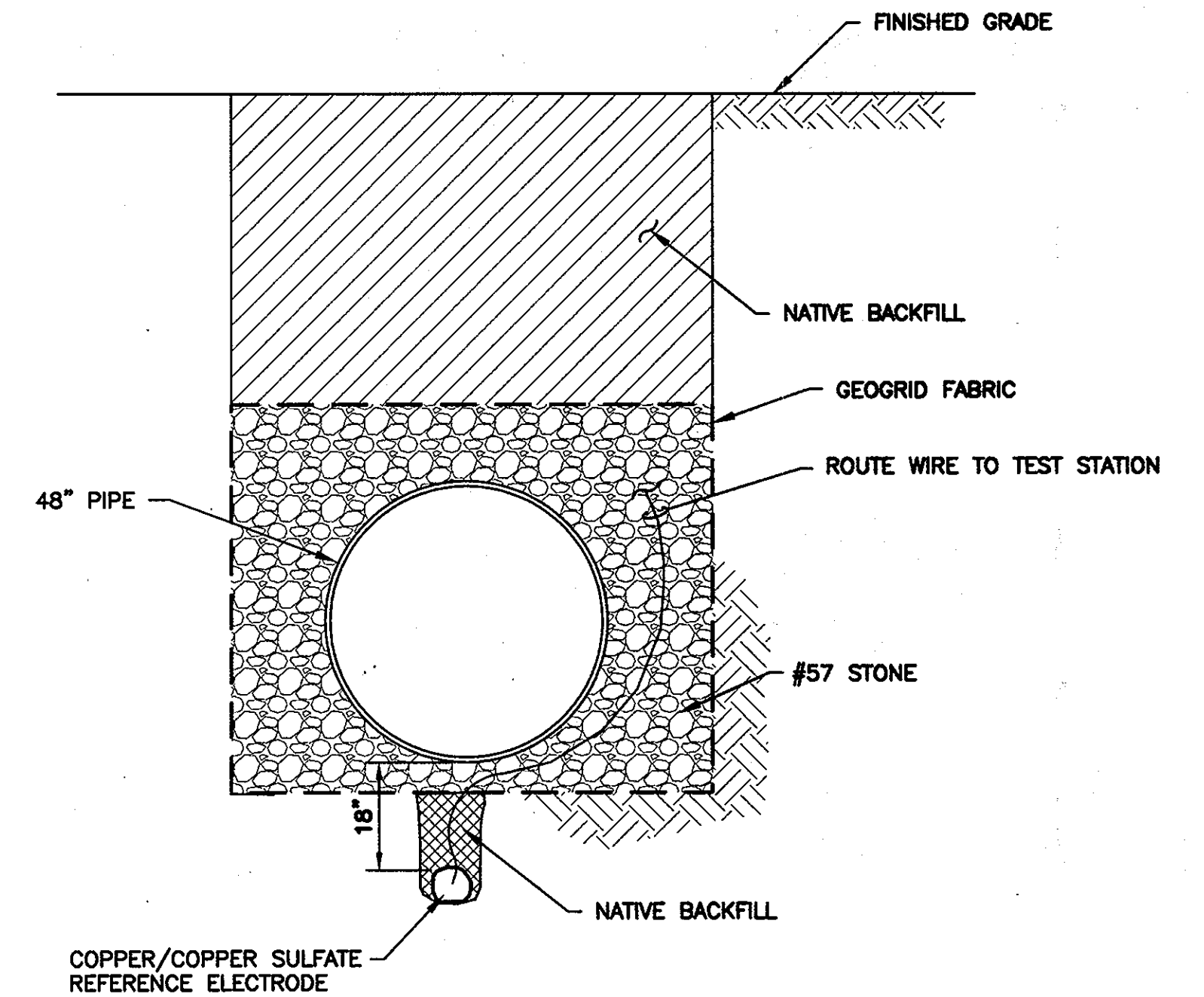
**CC-15: HORIZONTAL INSTALLATION OF PREPACKAGED MAGNESIUM ANODE**

NOT TO SCALE



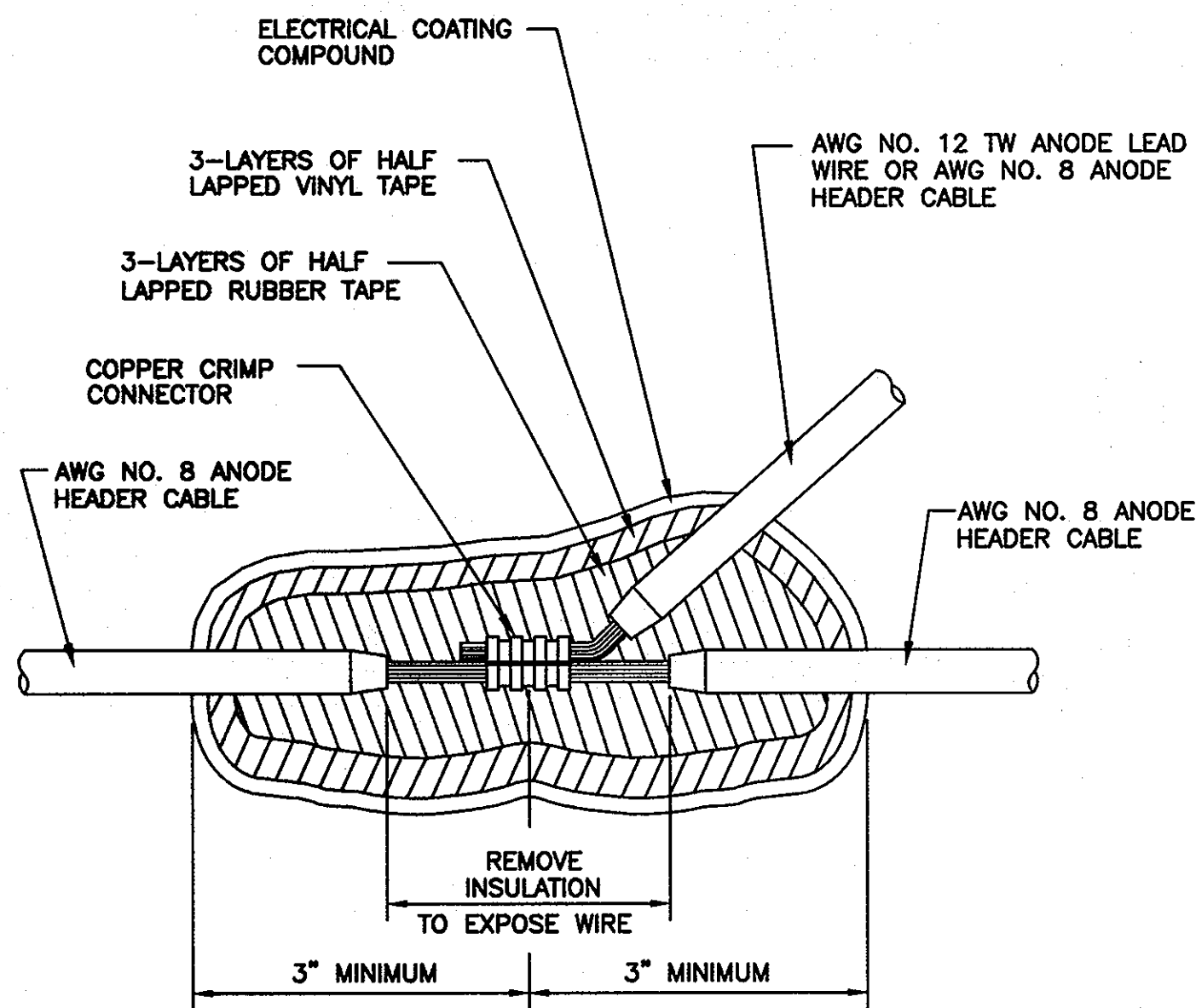
**CC-16: HORIZONTAL INSTALLATION OF PREPACKAGED MAGNESIUM ANODE WITH MAGNESIUM RIBBON ANODES**

NOT TO SCALE



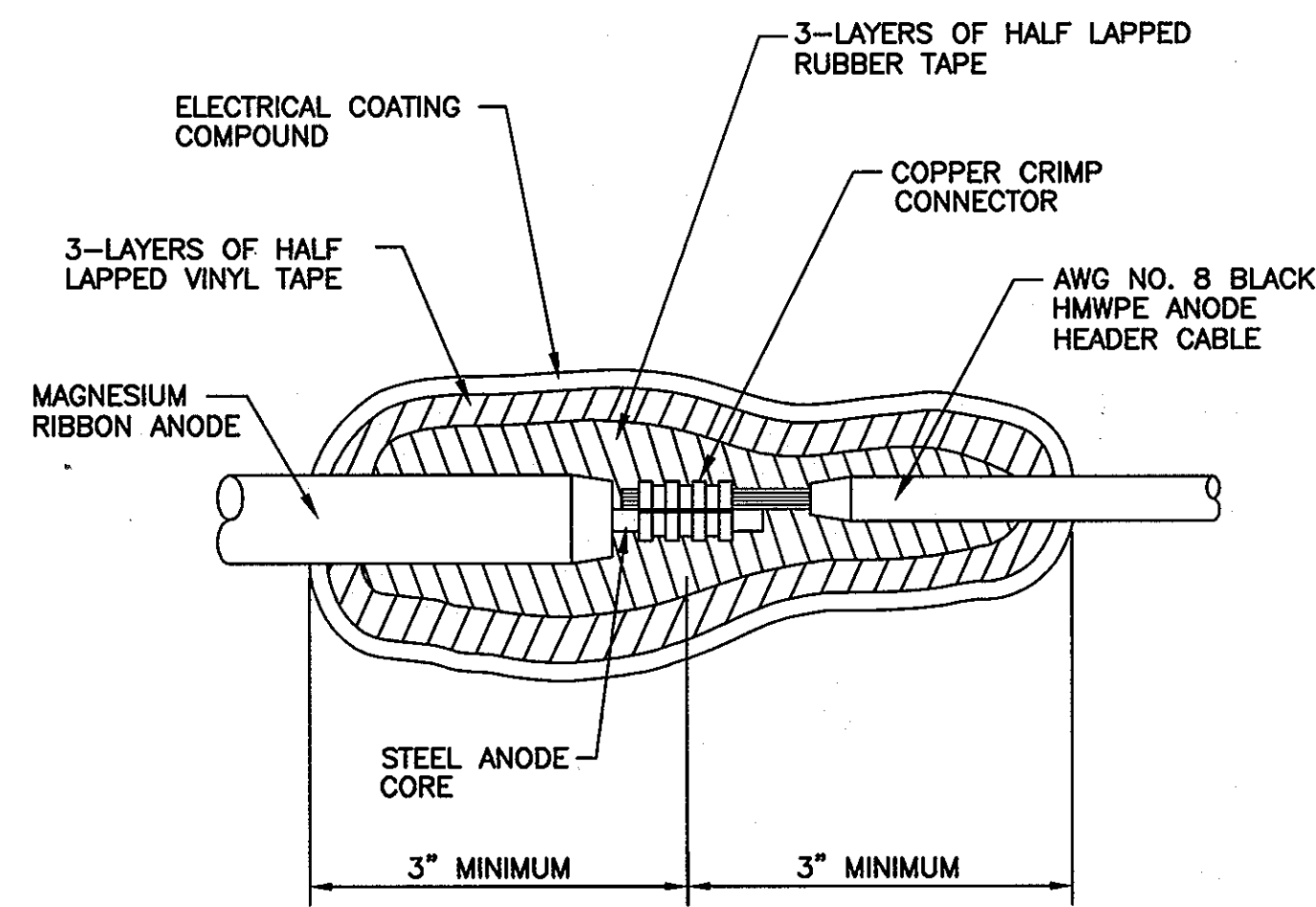
**CC-17: INSTALLATION OF REFERENCE ELECTRODE**

NOT TO SCALE



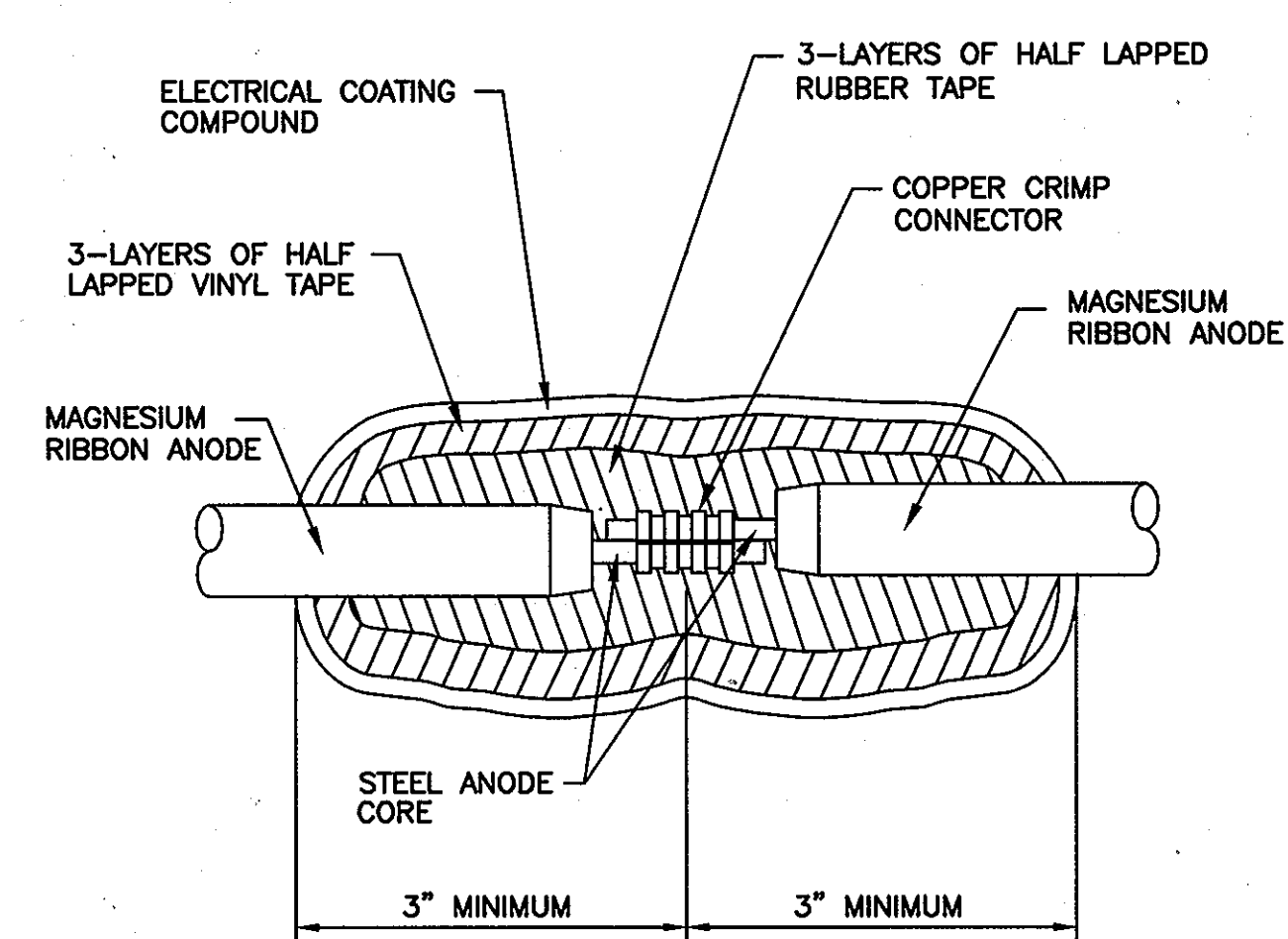
**CC-18: ANODE HEADER CABLE SPLICE**

NOT TO SCALE



**CC-19: RIBBON ANODE END TO LEAD WIRE SPLICE**

NOT TO SCALE



**CC-20: INLINE RIBBON ANODE SPLICE**

NOT TO SCALE

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS. THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC. BY: [Signature]

HOWARD COUNTY 48" STEEL WATER MAIN OPTION				
STATION NUMBER	TEST STATION TYPE	DETAIL NUMBER	NUMBER OF ANODES	REFERENCE ELECTRODE
0+33.50	INSULATING FLANGE WITH ANODES	CC-2	7	YES
3+25.63	TYPE A ANODE FOR CASING	CC-4	7	YES
3+25.63	CASING	CC-3	0	YES
6+08.5	CASING	CC-3	0	YES
6+08.5	TYPE A ANODE FOR CASING	CC-4	7	YES
7+23	INSULATING FLANGE WITH ANODES	CC-2	3	YES

HOWARD COUNTY 48" PCCP WATER MAIN OPTION				
STATION NUMBER	TEST STATION TYPE	DETAIL NUMBER	NUMBER OF ANODES	REFERENCE ELECTRODE
0+33.50	INSULATING FLANGE	CC-1	0	YES
3+25.63	TYPE A ANODE FOR CASING	CC-4	7	YES
3+25.63	CASING	CC-3	0	YES
6+08.5	CASING	CC-3	0	YES
6+08.5	TYPE A ANODE FOR CASING	CC-4	7	YES
7+23	INSULATING FLANGE	CC-1	0	YES

HOWARD COUNTY 48" DIP WATER MAIN OPTION				
STATION NUMBER	TEST STATION TYPE	DETAIL NUMBER	NUMBER OF ANODES	REFERENCE ELECTRODE
0+33.50	INSULATING FLANGE	CC-1	0	YES
0+35.50	ANODE	CC-4	20 PREPACKAGED AND 2 RIBBON	YES
3+23.63	ANODE	CC-4	7	YES
3+25.63	TYPE A ANODE FOR CASING	CC-4	7	YES
3+25.63	CASING	CC-3	0	YES
6+08.5	CASING	CC-3	0	YES
6+08.5	TYPE A ANODE FOR CASING	CC-4	7	YES
6+10.5	ANODE	CC-4	8 PREPACKAGED AND 2 RIBBON	YES
7+21	ANODE	CC-4	8 PREPACKAGED AND 2 RIBBON	YES
7+23	INSULATING FLANGE	CC-1	0	YES

**CC-21: TEST STATION SCHEDULES**

NOT TO SCALE

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DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

Director of Public Works: [Signature] DATE: 1/22/10  
Chief - Bureau of Engineering: [Signature] DATE: 1/22/10

Chief, Bureau of Utilities: [Signature] DATE: 1/22/10  
Chief, Utility Design Division: [Signature] DATE: 1/22/10

RUSSELL CORROSION CONSULTANTS, INC.  
5405 TWIN KNOTS RD., SUITE 3  
COLUMBIA, MD 21045

PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 17083, EXPIRATION DATE 9/27/2010.

STATE OF MARYLAND PROFESSIONAL ENGINEER

DSN. BY: MJS  
DRN. BY: DJD  
CHK. BY: MJS  
DATE: JAN. 2010

RJD I RECORD DRAWING 10/11  
BY NO. REVISION DATE

CORROSION CONTROL DETAILS - 4

600' SCALE MAP NO. BLOCK NO.

US 29 WATER MAIN REPLACEMENT TUNNEL CROSSING AT MONTGOMERY ROAD  
CAPITAL PROJECT: W-8243  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT: 2  
HOWARD COUNTY, MARYLAND

CP-7  
SCALE AS SHOWN  
SHEET 22 OF 26  
FILE NO. 43844-

S. US 29 off Ramp

PHASE 1a,1b

PHASE 1a  
Left Lane Closure  
per STD 104.04-03  
along US 29 may  
be used during periods  
of installation of  
Settlement Markers

Work Zone:  
Tunnel under  
US 29

PHASE 1a  
Mobile Operation per  
STD 104.04-17 during  
periods of installation  
of Settlement Markers.

S. US 29

S. US 29

N. US 29

N. US 29

N. US 29 on Ramp

PHASE 1a  
Mobile Operation per  
STD 104.04-17 during  
periods of installation  
of Settlement Markers.

Work Zone:  
Staging Area

LOD

Tollhouse Road

Place Drums  
in front of  
inlet headwall

11ft. Min.  
Lanes

SEQUENCE OF OPERATION - PHASE 1a,1b

- PHASE 1a**  
1. INSTALL SETTLEMENT MARKERS.
- PHASE 1b**  
1. INSTALL ADVANCE WARNING SIGNS AND SET TEMPORARY TRAFFIC CONTROL DEVICES AS SHOWN.  
2. THE TRUCKS ENTERING/EXITING THE WORK AREA SHALL DISPLAY FLASHING YELLOW WARNING LIGHTS.  
3. EXCAVATE TUNNEL WATER MAIN UNDER US 29 ROADWAY.  
4. TEMPORARY TRAFFIC CONTROL SHALL REMAIN IN OPERATION DURING DURATION OF CONSTRUCTION.

KEY

- Area of Tunnel construction
- Area of Construction Staging
- Direction of Traffic
- Channelizing Device (Cones)
- Channelizing Device (Drum)
- Flagger
- Temp. Traffic Sign

RECORD DRAWINGS  
TO THE BEST OF OUR KNOWLEDGE,  
INFORMATION AND BELIEF, BASED ON  
INFORMATION PROVIDED BY OTHERS, THESE  
RECORD DRAWINGS SUBSTANTIALLY REPRESENT  
THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE  
ENGINEERS, INC.  
BY: *[Signature]*

Drop-Off Policy  
Contractor to maintain less than 2.5 in. of  
drop-off during periods of non-construction. Use  
appropriate standard. See General Note No. 13.



**The Traffic Group, Inc.**  
Suite H  
9900 Franklin Square Drive  
Baltimore, Maryland 21236  
410-931-8600  
1-800-583-8411  
Fax 410-931-8601  
Job No.: 2000-1211  
File Name: TUNNEL-MOT.DGN

**O'BRIEN & GERE**  
ENGINEERS, INC.  
8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

PROFESSIONAL CERTIFICATION:  
I HEREBY CERTIFY THAT  
THESE DOCUMENTS  
WERE PREPARED OR  
APPROVED BY ME, AND  
THAT I AM DULY  
LICENSED PROFESSIONAL  
ENGINEER UNDER THE  
LAWS OF THE STATE OF  
MARYLAND.  
LICENSE NO.: 25947 EXPIRATION DATE: 1/25/10

DSN. BY:	FJH			
DRN. BY:	FJH			
CHK. BY:	JDD			
DATE:	JAN. 2010	RJD	1	RECORD DRAWING
BY:	NO.	REVISION	DATE	

Maintenance of Traffic Plan-Phase 1a,1b  
US 29 Water Main - Tunnel Crossing

600' SCALE MAP NO. 24 BLOCK NO. 17

US ROUTE 29 WATER MAIN REPLACEMENT  
TUNNEL CROSSING AT MONTGOMERY ROAD

CAPITAL PROJECT: W-8234  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 23 OF 26

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*[Signature]* 1/23/10  
DIRECTOR OF PUBLIC WORKS DATE

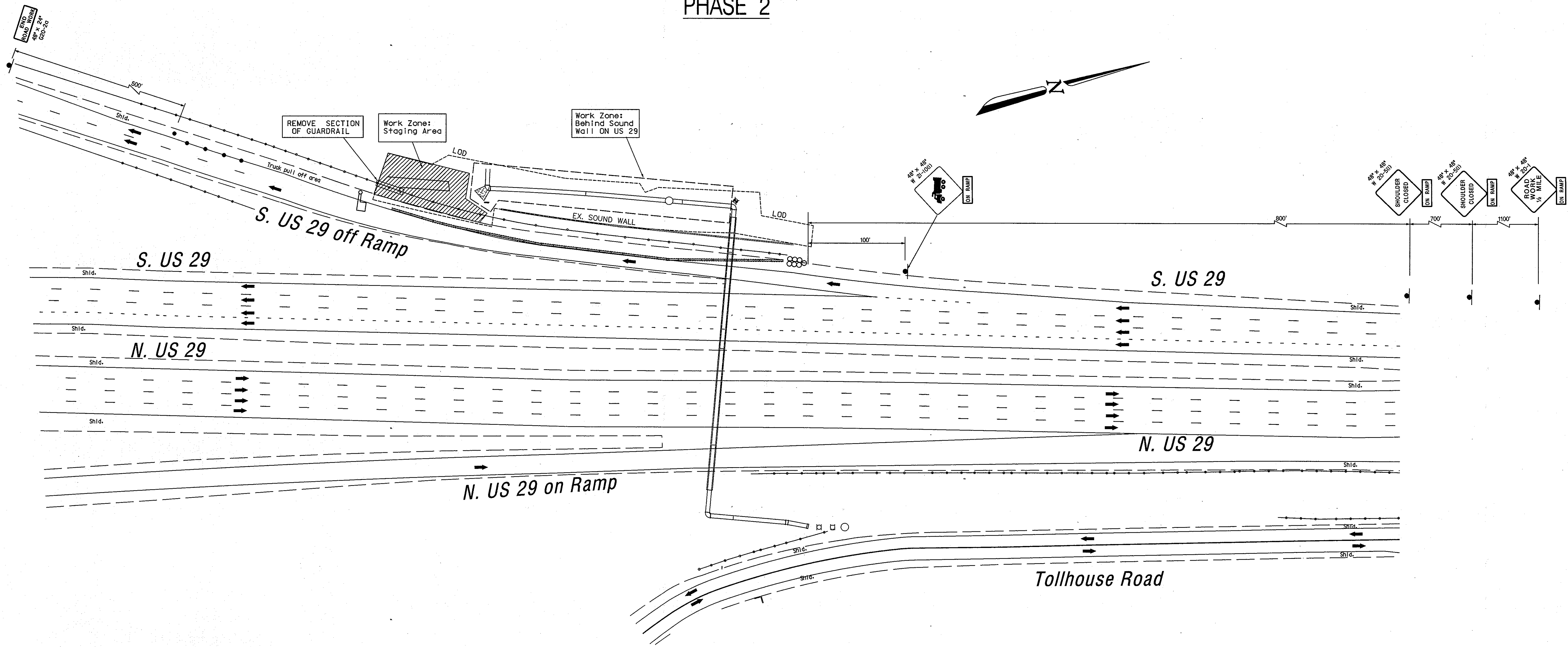
*[Signature]* 1/23/10  
CHIEF - BUREAU OF ENGINEERING DATE

*[Signature]* 1/23/10  
CHIEF - BUREAU OF UTILITIES DATE

*[Signature]* 1/23/10  
CHIEF - UTILITY DESIGN DIVISION DATE

E:\2000\2000-1211\Basin\US 29 Tunnel-MOT-Tunnel-MOT.dgn Tuesday, January 19, 2010 11:29 AM

PHASE 2



SEQUENCE OF OPERATION - PHASE 2

1. INSTALL ADVANCE WARNING SIGNS AND SET TEMPORARY TRAFFIC CONTROL DEVICES AS SHOWN.
2. THE TRUCKS ENTERING/EXITING THE WORK AREA SHALL DISPLAY FLASHING YELLOW WARNING LIGHTS..
3. EXCAVATE TUNNEL WATER MAIN BEHIND SOUND WALL ON US 29 ROADWAY.

**Drop Off Policy**  
 Contractor to maintain less than 2.5 in. of drop-off during periods of non-construction. Use appropriate standard. See General Note No: 13.



KEY

- Area of Construction
- Area of Construction Staging
- Direction of Traffic
- Channelizing Device (Drum)
- Channelizing Device (Barrier Wall)
- Flagger
- Temp. Traffic Sign
- Crash Cushion

RECORD DRAWINGS TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

O'BRIEN & GERE ENGINEERS, INC.  
 BY: *[Signature]*

**The Traffic Group, Inc.**  
 Suite H  
 9900 Franklin Square Drive  
 Baltimore, Maryland 21238  
 410-931-6600  
 1-800-583-8411  
 Fax 410-931-6601  
 Job No.: 2000-1211  
 File Name: TUNNEL-MOT.DGN

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
 Director of Public Works: *[Signature]* DATE: 2/26/10  
 Chief - Bureau of Engineering: *[Signature]* DATE: 1/29/10  
 Chief - Bureau of Utilities: *[Signature]* DATE: 2/15/10  
 Chief, Utility Design Division: *[Signature]* DATE: 1/29/10

**O'BRIEN & GERE ENGINEERS, INC.**  
 8401 Corporate Drive  
 Suite 400  
 Landover, Maryland 20785  
 (301) 731-5622  
 FAX: (301) 577-4737

PROFESSIONAL CERTIFICATION:  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.  
 LICENSE NO.: 14547  
 EXPIRATION DATE: 9/24/10

DSN. BY: FJH			
DRN. BY: FJH			
CHK. BY: JDD			
DATE: JAN. 2010	RJD	1	RECORD DRAWING
	BY	NO.	REVISION
			10/11
			DATE

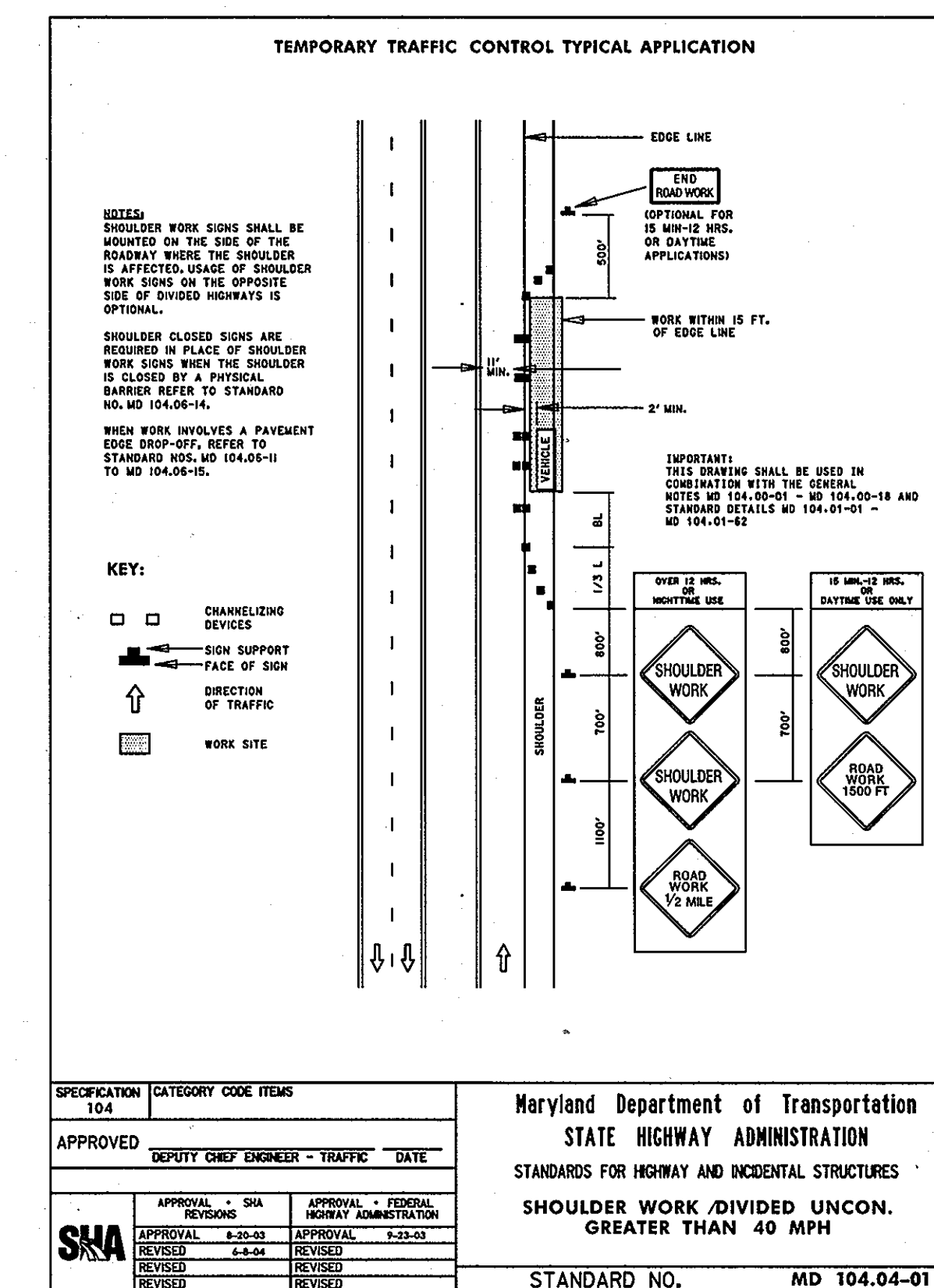
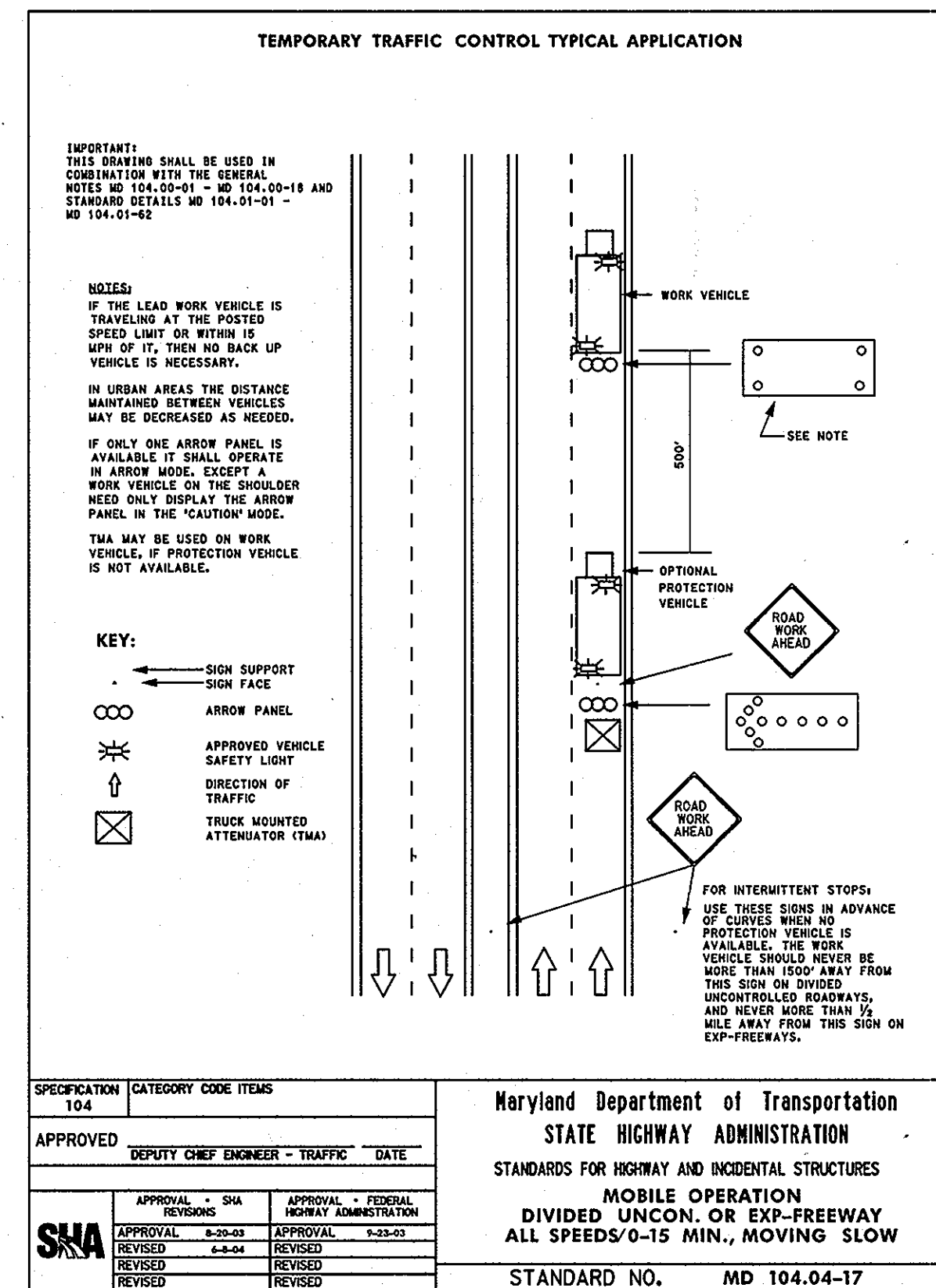
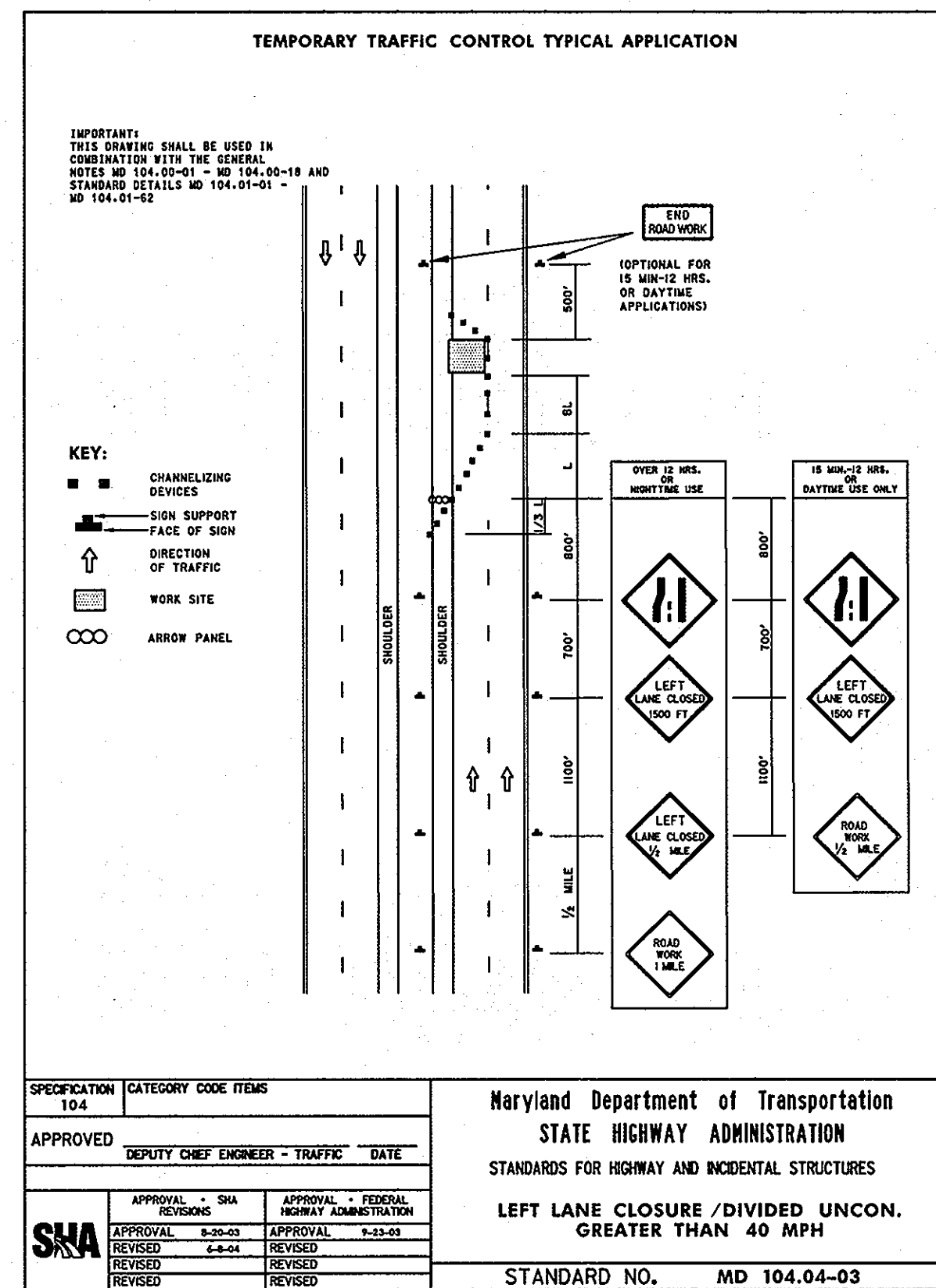
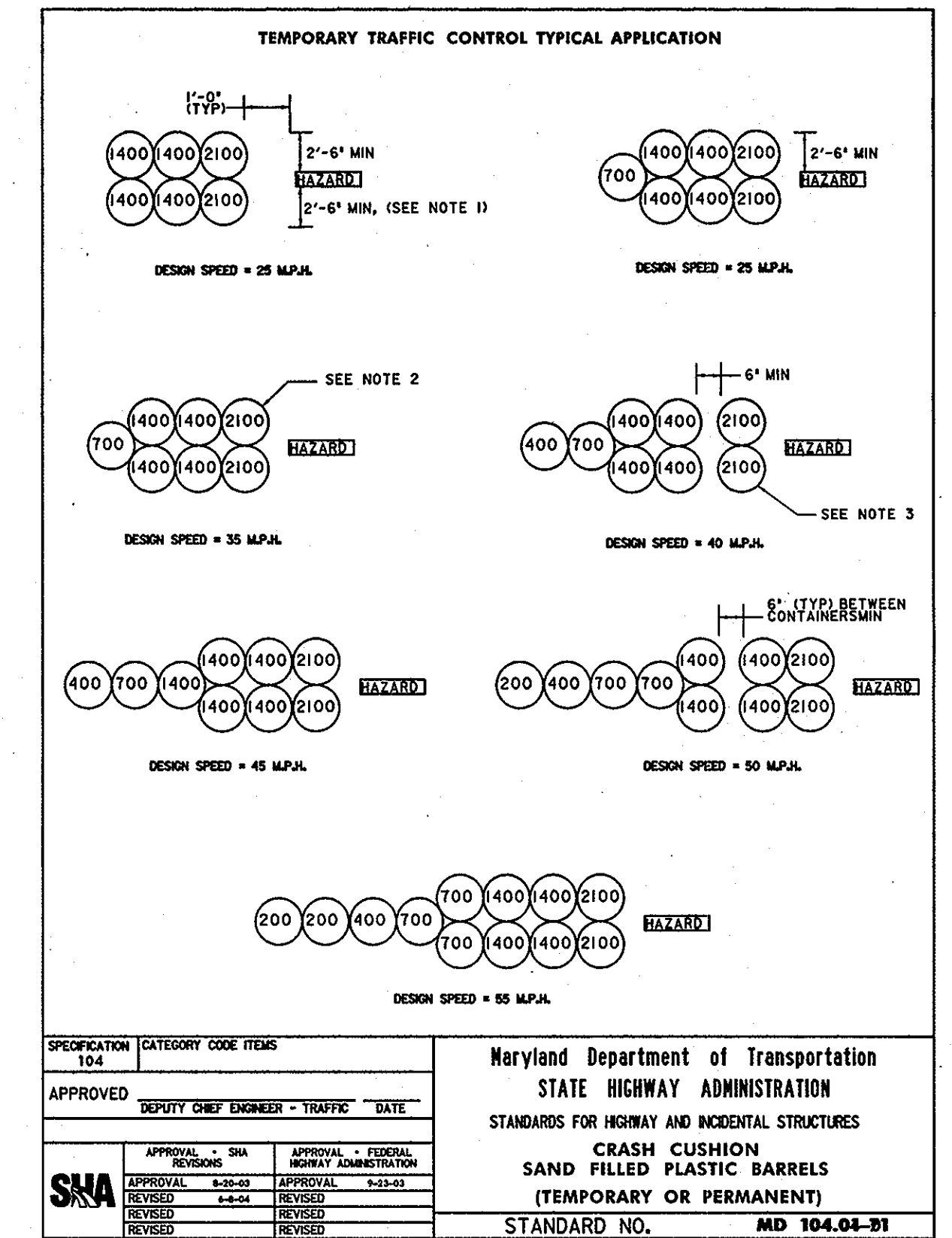
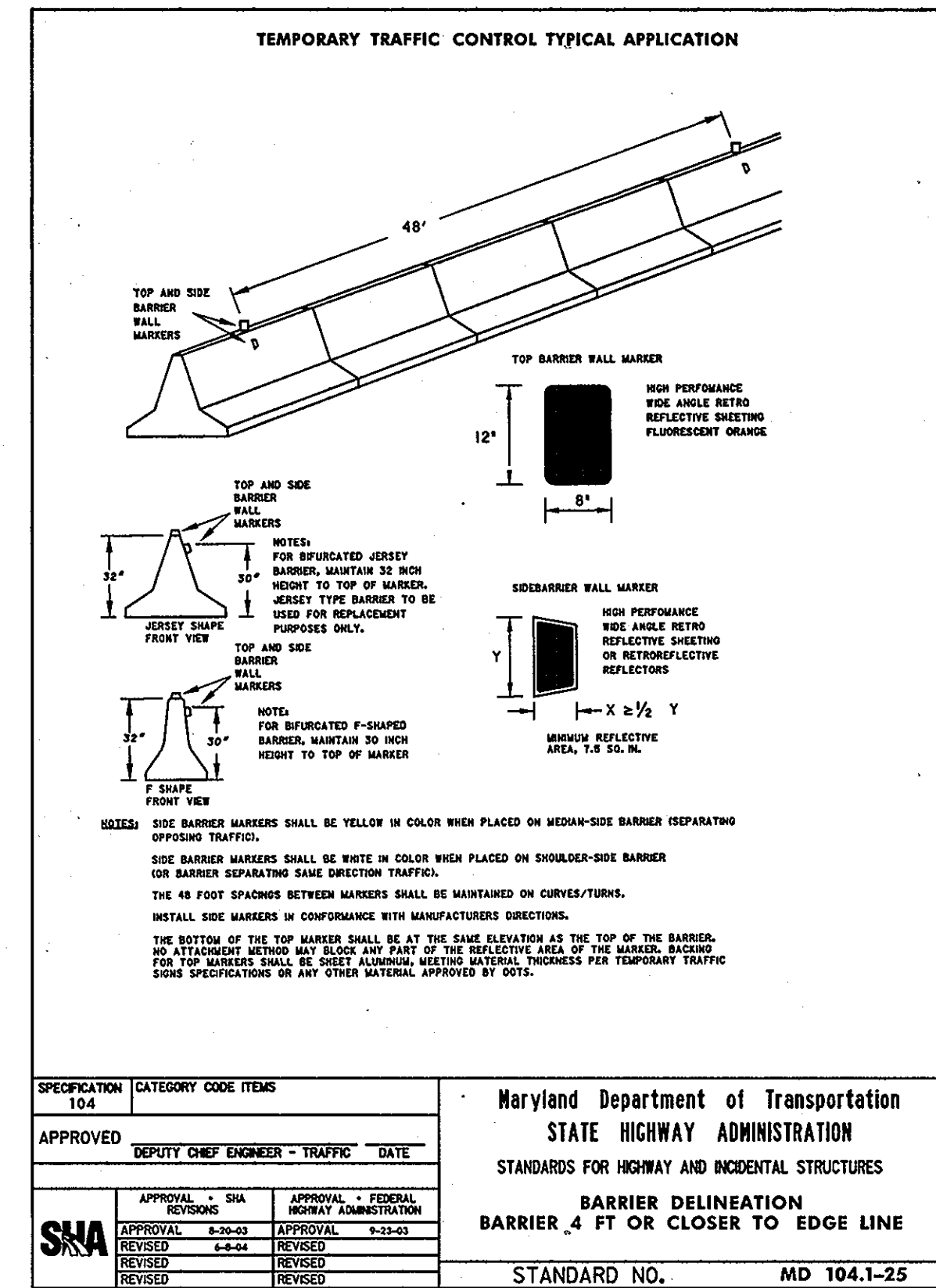
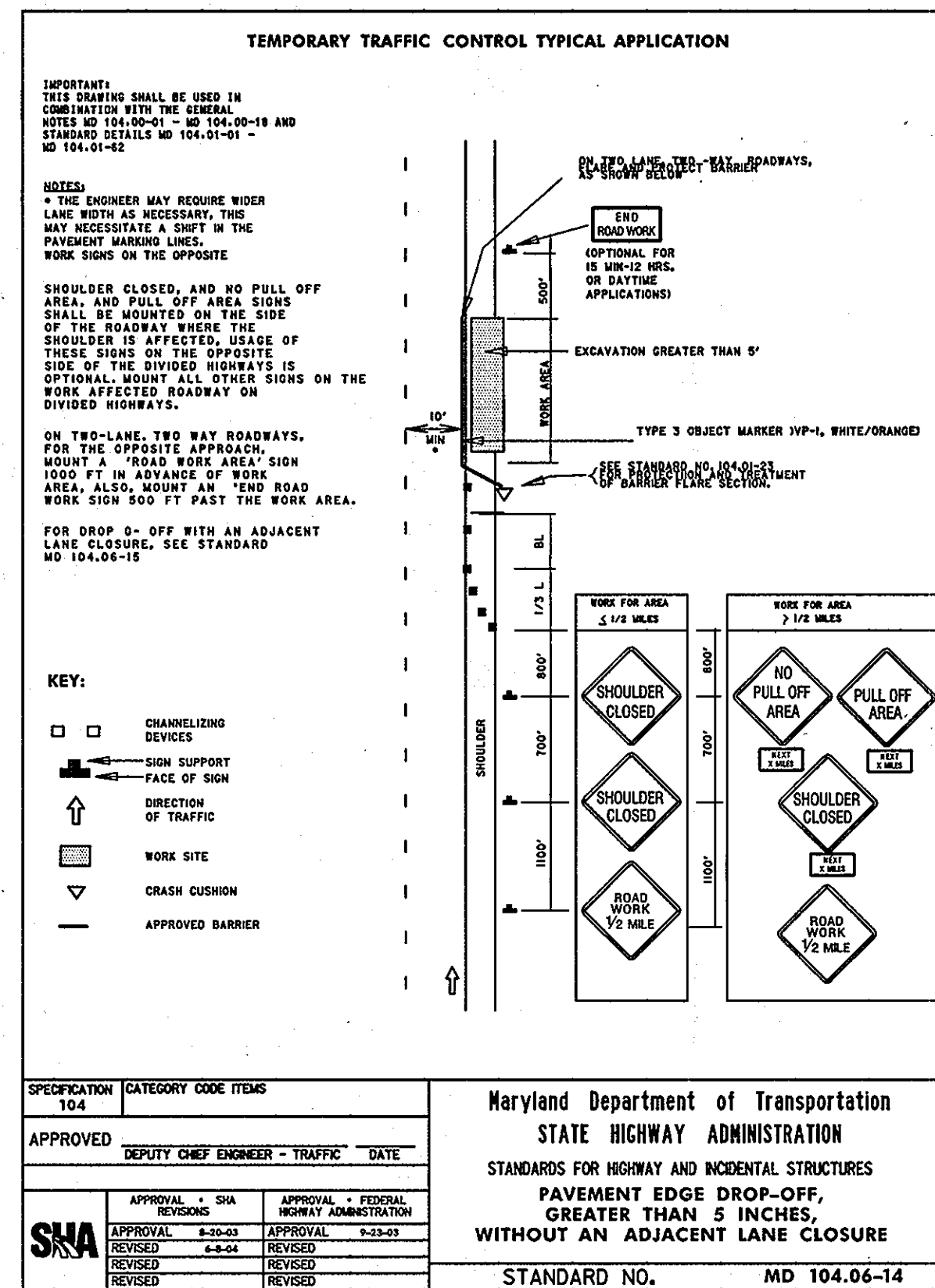
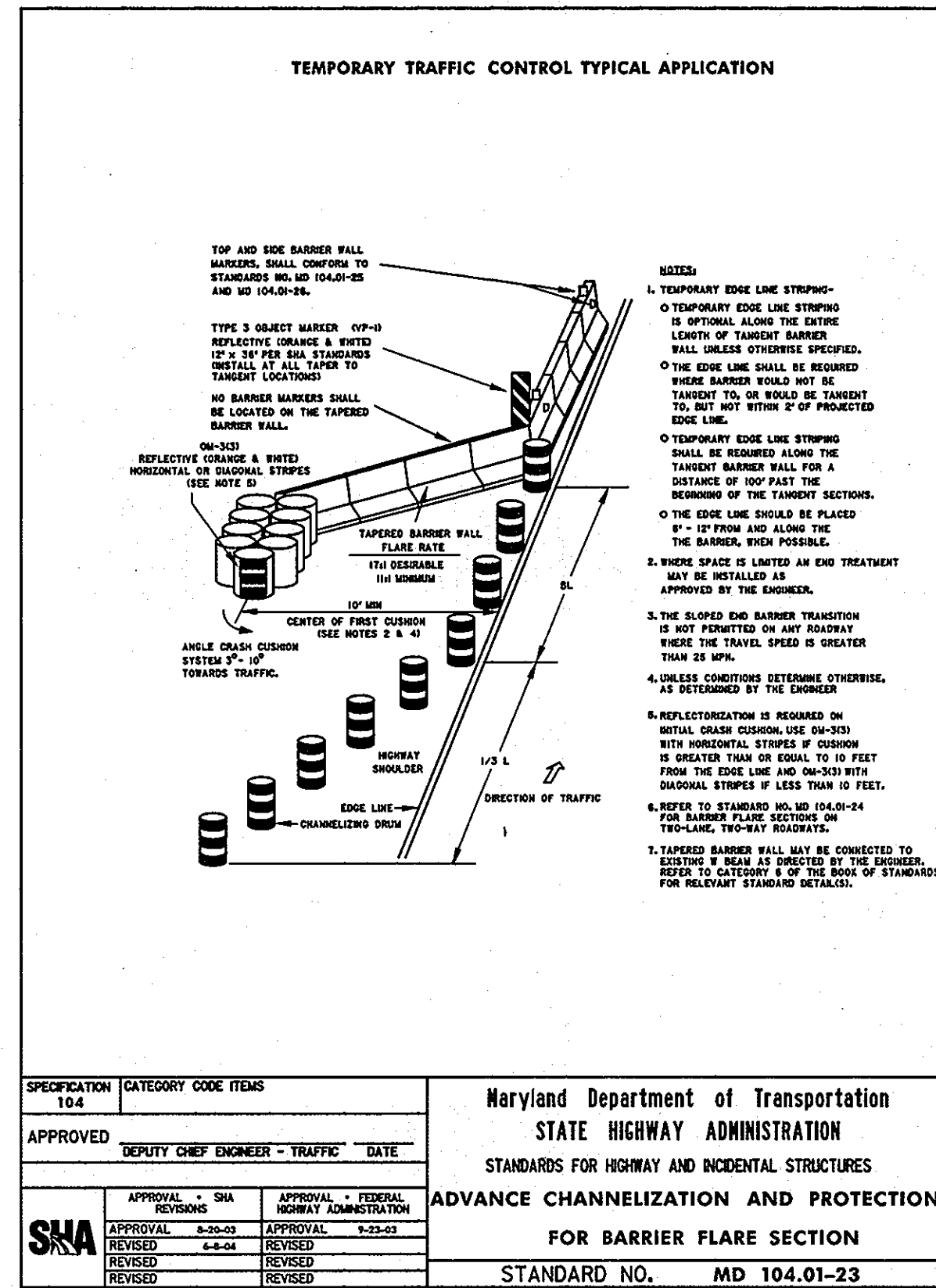
Maintenance of Traffic Plan-Phase 2  
 US 29 Water Main - Tunnel Crossing  
 600' SCALE MAP NO. 24 BLOCK NO. 17

US ROUTE 29 WATER MAIN REPLACEMENT  
 TUNNEL CROSSING AT MONTGOMERY ROAD  
 CAPITAL PROJECT: W-8234  
 CONTRACT NO.: 44-4630  
 ELECTION DISTRICT NO. 2  
 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
 SHEET 24 OF 26







**RECORD DRAWINGS**  
TO THE BEST OF OUR KNOWLEDGE, INFORMATION AND BELIEF, BASED ON INFORMATION PROVIDED BY OTHERS, THESE RECORD DRAWINGS SUBSTANTIALLY REPRESENT THE PROJECT AS CONSTRUCTED.

**O'BRIEN & GERE ENGINEERS, INC.**  
BY: *[Signature]*

**The Traffic Group, Inc.**  
Suite H  
9900 Franklin Square Drive  
Baltimore, Maryland 21236  
410-931-6600  
1-800-583-8411  
Fax 410-931-6601  
Job No.: 2000-1211  
File Name: TUNNEL-MOT.DGN

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

*[Signature]* 2/29/10  
DIRECTOR OF PUBLIC WORKS DATE

*[Signature]* 2/29/10  
CHIEF - BUREAU OF ENGINEERING DATE

*[Signature]* 2/29/10  
CHIEF, BUREAU OF UTILITIES DATE

*[Signature]* 2/29/10  
CHIEF, UTILITY DESIGN DIVISION DATE

**O'BRIEN & GERE ENGINEERS, INC.**  
8401 Corporate Drive  
Suite 400  
Landover, Maryland 20785  
(301) 731-5622  
FAX: (301) 577-4737

**PROFESSIONAL CERTIFICATION:**  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.  
LICENSE NO.: 15547  
EXPIRATION DATE: 7/25/10

DSN. BY: FJH  
DRN. BY: FJH  
CHK. BY: JDD  
DATE: JAN. 2010  
BY NO. RJD 1

**RECORD DRAWING**  
REVISION 10/11  
DATE

**Maintenance of Traffic Plan-Typicals**  
**US 29 Water Main - Tunnel Crossing**  
600' SCALE MAP NO. 24 BLOCK NO. 17

**US ROUTE 29 WATER MAIN REPLACEMENT TUNNEL CROSSING AT MONTGOMERY ROAD**  
CAPITAL PROJECT: W-8234  
CONTRACT NO.: 44-4630  
ELECTION DISTRICT NO. 2  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 26 OF 26

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