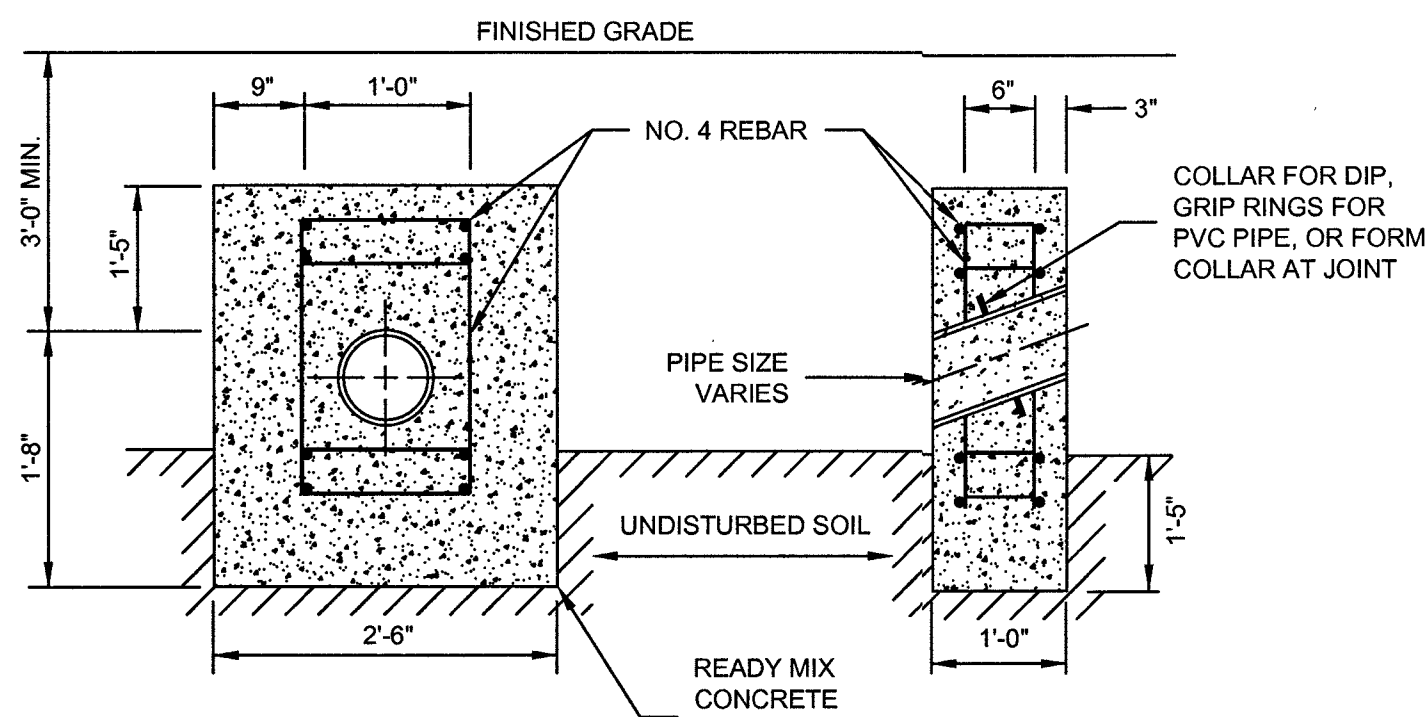
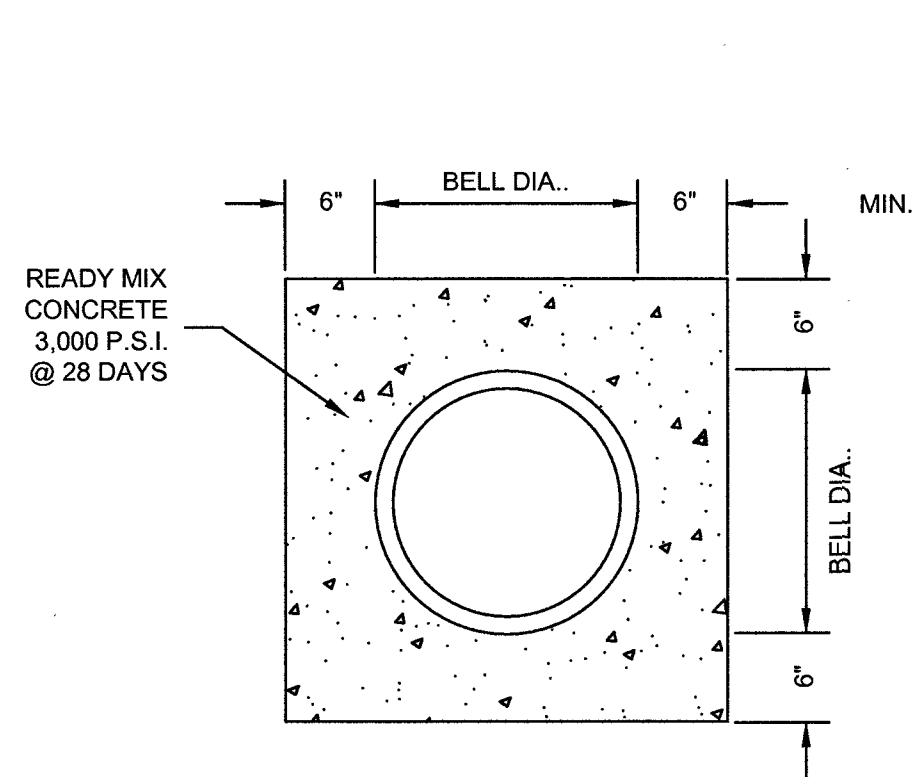
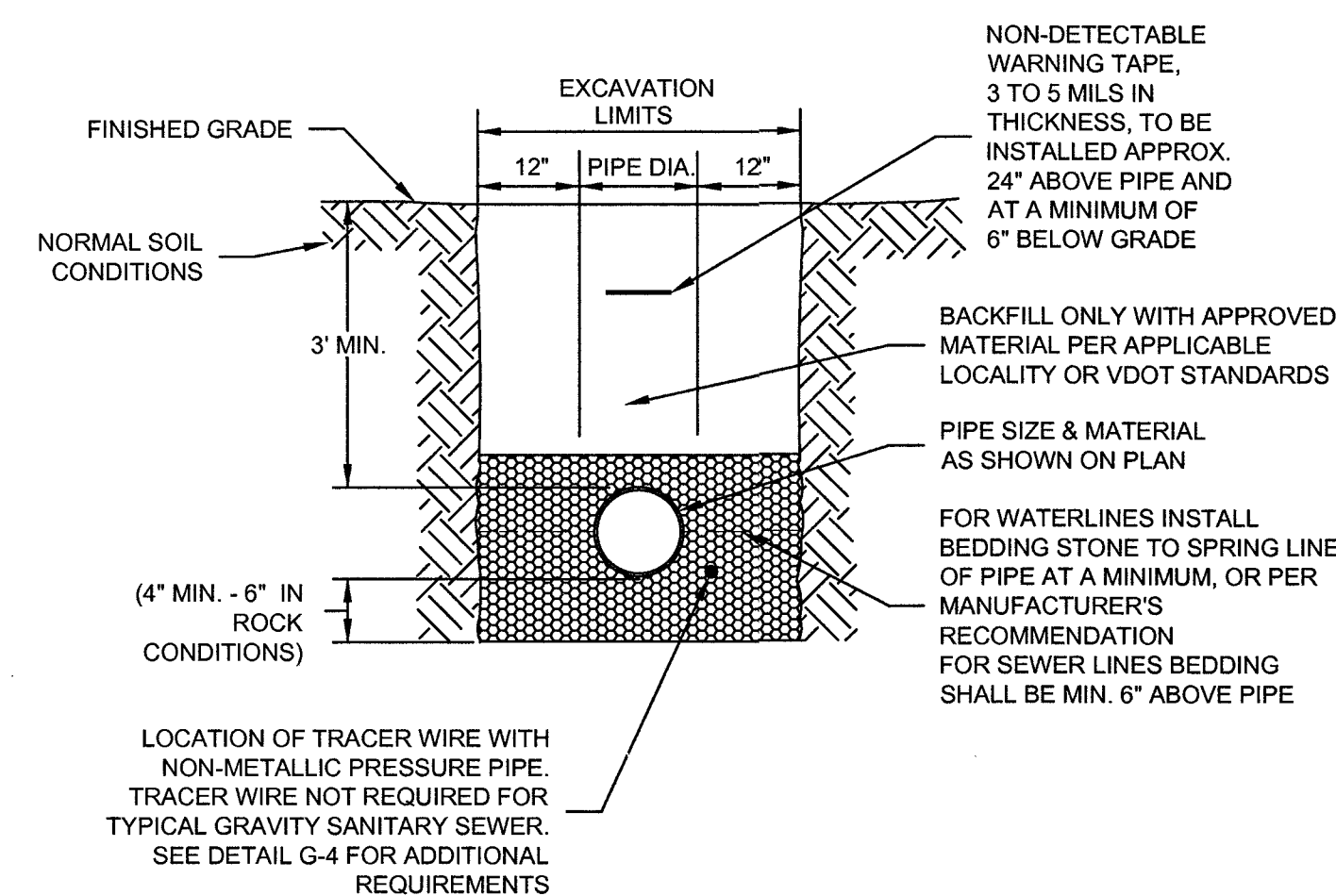


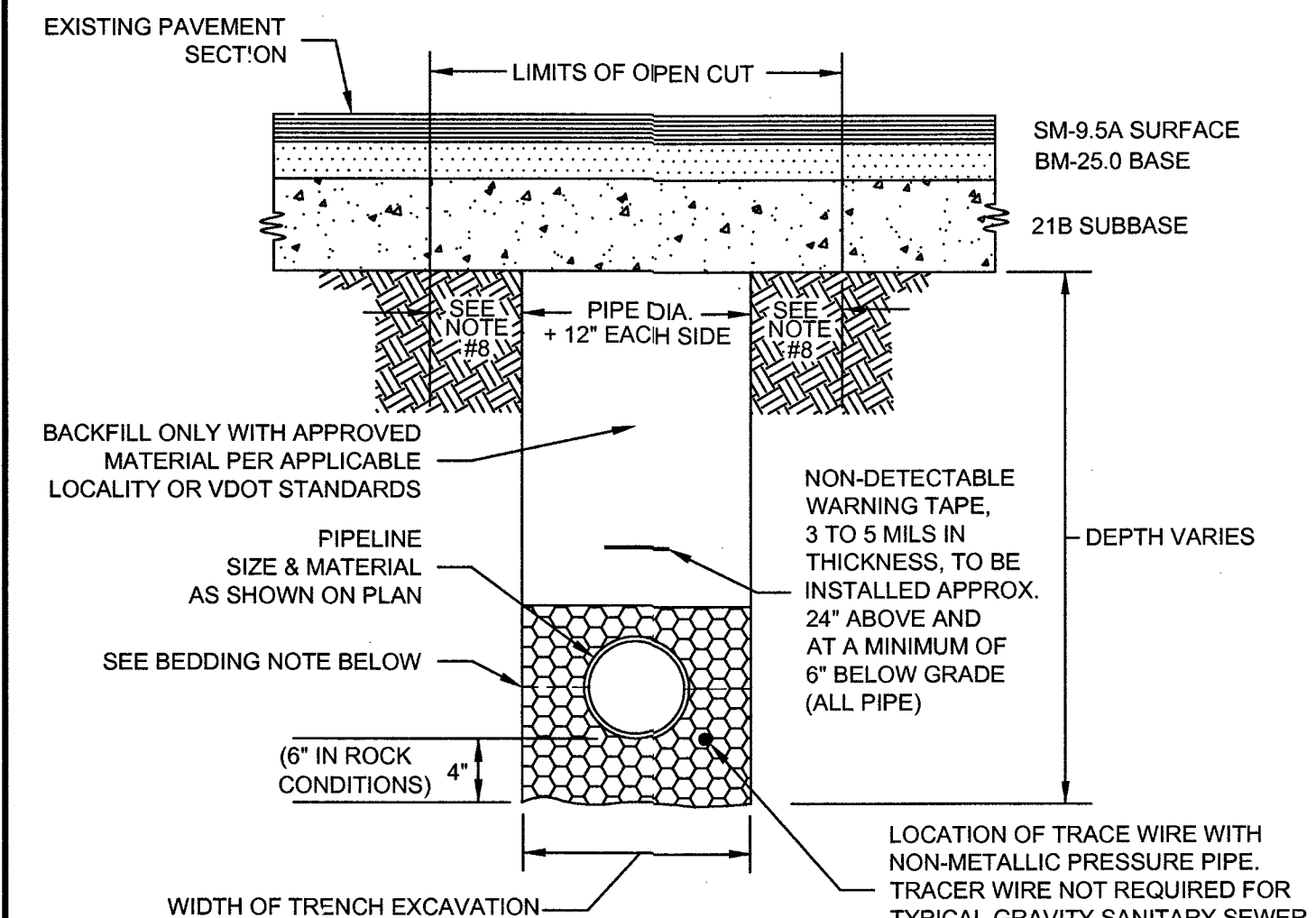
1. IN ADDITION TO ANCHOR BLOCKS, RESTRAINED JOINT PIPE WILL BE REQUIRED FOR ALL SLOPES EXCEEDING 20%
2. MINIMUM SPACING REQUIREMENTS SHALL BE AS FOLLOW:
  - \* SLOPES 20% TO 35% ~ 36 FT ON CENTER
  - \* SLOPES 35% TO 50% ~ 24FT ON CENTER
  - \* SLOPES 50% TO 60% ~ 18FT ON CENTER
  - \* ONLY ALLOWED WITH WRITTEN APPROVAL OF PARTICIPATING UTILITY



1. BEDDING, HAUNCHING AND INITIAL BACKFILL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THIS DETAIL AND MANUFACTURER'S RECOMMENDATION.
2. ALL PVC PIPE SHALL BE BEDDED IN COMPACTED VDOT #57 OR #88 STONE, OR CRUSHER RUN.
3. IN AREAS SUBJECTED TO VEHICULAR TRAFFIC, BEDDING STONE AND FILL SHALL BE PLACED IN 6" LAYERS, WITH EACH LAYER COMPACTED TO AT LEAST 90% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D 698.
4. BEDDING REQUIREMENTS FOR DUCTILE IRON WATER LINE ARE DEPENDENT ON MANUFACTURER'S BEDDING CRITERIA.
5. ALL EXCAVATIONS SHALL COMPLY WITH OSHA TECHNICAL MANUAL, CHAPTER 2, TITLED "EXCAVATIONS, SHIELDING AND TRENCHING AND SHIELDING".
6. THE TRACER WIRE SHALL BE PLACED ALONG THE LOWER QUADRANT OF THE PIPE. THE WIRE SHALL NOT TOUCH THE PIPE, BUT SHALL BE A MAXIMUM OF 6" FROM THE PIPE. NON-METALLIC SPACERS MAY BE USED TO MAINTAIN A SET DISTANCE FROM THE UTILITY.



1. BEDDING, HAUNCHING AND INITIAL BACKFILL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THIS DETAIL AND MANUFACTURER'S RECOMMENDATION.
2. ALL PVC PIPE SHALL BE BEDDED IN COMPACTED VDOT #57 OR #58 STONE.
3. IN VDOT ROW, THE CONTRACTOR SHALL REPLACE THE OPEN CUT WITH A MINIMUM TOP COURSE OF 15" MINIMUM VDOT SM-9.5A, BASE COURSE OF VDOT BM-25.0, AND SUBBASE OF 10" VDOT 21B, OR AS REQUIRED BY VDOT. IN CROWN, THE CONTRACTOR SHALL REPLACE PAVEMENT AS REQUIRED BY CITY. OF ROANOKE RIGHT OF WAY EXCAVATION AND RESTORATION STANDARDS, LATEST EDITION.
4. ALL CONSTRUCTION WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE AS SPECIFIED BY VDOT OR APPLICABLE LOCALITY.
5. PRIOR TO CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR SECURING ALL REQUIRED PERMITS FROM VDOT AND/OR APPLICABLE LOCALITY.
6. IN VDOT SUBJECT TO CITY TRAFFIC, BEDDING STONE AND FILL SHALL BE PLACED IN 6" LIFTS AND SHALL BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AS DETERMINED BY ASTM D 698.
7. ALL SEWER LINE PIPE SHALL BE BEDDED IN COMPACTED GRANULAR MATERIAL. BEDDING REQUIREMENTS FOR DUCTILE SEWER LINE ARE DEPENDENT ON MANUFACTURER'S BEDDING CRITERIA.
8. BENCHCUT ON EACH SIDE OF PAVEMENT: CITY OF ROANOKE = 12"; VDOT RIGHT-OF-WAY = 6".
9. ALL EXCAVATIONS SHALL COMPLY WITH OSHA TECHNICAL MANUAL, CHAPTER 2, TITLED "EXCAVATIONS: SAFETY REQUIREMENTS IN TRENCHING AND SHORING".
10. THE TRACER WIRE SHALL BE PLACED ALONG THE LOWER QUADRANT OF THE PIPE. THE WIRE SHALL NOT TOUCH THE PIPE, BUT SHALL BE A MAXIMUM OF 6" FROM THE PIPE. NON-METALLIC SPOCKERS MAY BE USED TO MAINTAIN A SET DISTANCE FROM THE UTILITY.



**BEDDING:** FOR WATERLINES, INSTALL BEDDING STONE TO SPRING LINE OF PIPE AT A MINIMUM, OR PER MANUFACTURER'S RECOMMENDATION, FOR SEWER LINES, BEDDING SHALL BE MINIMUM 6" ABOVE PIPE

**WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL**

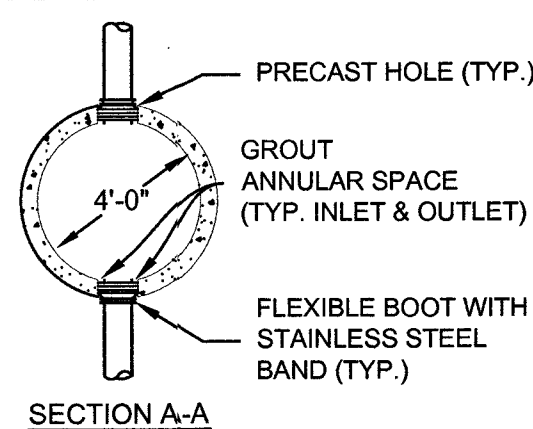
### BEDDING AND BACKFILL UNDER PAVEMENT AND IN RIGHT-OF-WAY

G-12

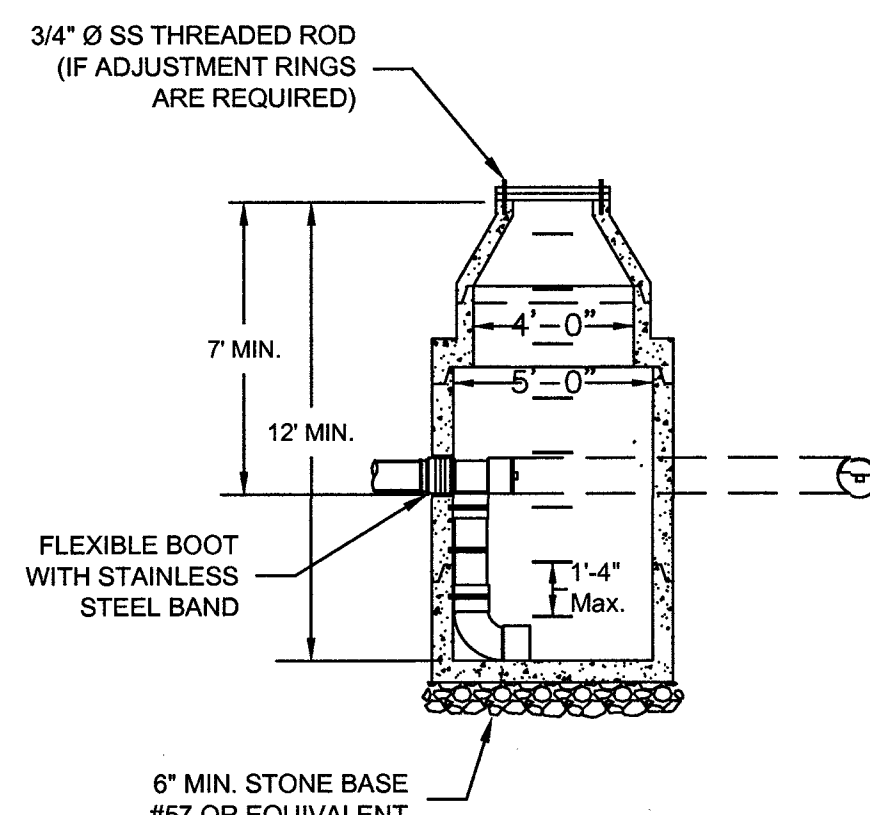
1. MATERIALS AND FABRICATION IN ACCORDANCE WITH ASTM C478-09.
  2. WHEN USED AS SAMPLING MANHOLE FLOW SHALL PASS STRAIGHT THROUGH, i.e., 180°.
  3. STEPS SHALL BE VERTICALLY ALIGNED. FIRST STEP SHALL BE WITHIN 12" OF COVER, BOTTOM STEP SHALL BE WITHIN 24" OF BOTTOM OF MANHOLE.
  4. FRAME AND COVER SHALL BE PROPERLY ALIGNED WITH THE 2 FOOT OPENING OF THE MANHOLE STRUCTURE AND BOLTED IN PLACE.
  5. FLAT TOP MANHOLES MAY ONLY BE SUBSTITUTED WITH THE PERMISSION OF THE PARTICIPATING UTILITY.
  6. FLEXIBLE JOINT MANHOLE CONNECTION SHALL BE AS MANUFACTURED BY PRES-SEAL GASKET CORPORATION OR EQUIVALENT.
  7. GROUT ANNUAL SPACE BETWEEN PIPE AND PRECAST MANHOLE ON INSIDE OF MANHOLE.
  8. WHEN REPLACING AN EXISTING MANHOLE OR INSTALLING A NEW PRECAST MANHOLE ON AN EXISTING SEWER, A MINIMUM OF SIX FEET (6') OF EXISTING PIPE SHALL BE REMOVED AND REPLACED WITH NEW MATERIAL ON INLET AND OUTLET OF MANHOLE.
  9. MANHOLES WHERE THE INVERT IS LOWER THAN THE NORMAL GROUNDWATER ELEVATION (I.E., ALONG CREEKS, RIVERS, LOW-LYING AREAS, ETC.) SHALL HAVE A FULL EXTERIOR COATING AND JOINT WRAP APPLIED IN ADDITION TO JOINT SEALANT. SEE NOTES 10 & 11.
  10. EXTERIOR COATING AND JOINT WRAP SHALL BE FACTORY COATED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATION. COATING SHALL BE HIGH BUILD COAL TAR EPOXY MEETING ASTM D1227. COATING SHALL BE APPLIED IN TWO COATS TO A MINIMUM TOTAL THICKNESS OF 16 MILS. IF REQUIRED ALL MANHOLES SHALL UTILIZE AN EXTERNAL FRAME AND JOINT SEAL AT ALL JOINTS AND AT THE FRAME/CHIMNEY INTERFACE. SEAL SHALL BE MADE OF EPDM RUBBER IN ACCORDANCE WITH ASTM D412 OR POLYOLEFIN BACKED EXTERIOR JOINT WRAP IN ACCORDANCE WITH ASTM E-1745, C-927, AND C-990. EPM SEALANT SHALL HAVE A MINIMUM THICKNESS OF 80 MILS. POLYOLEFIN BACKED EXTERIOR JOINT WRAP SHALL HAVE A BACKING BAND ELEMENT WITH MINIMUM THICKNESS OF 4 MILS. AND BUTYL ROLLER ADHESIVE WITH MINIMUM THICKNESS OF 60 MILS. SEAL SHALL AGGRESSIVELY BOND TO CONCRETE AND METAL STRUCTURES.
  11. FOR PIPE LARGER THAN 15 INCHES IN DIAMETER THE MINIMUM INSIDE DIAMETER OF THE MANHOLE SHALL BE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS BASED ON PIPE SIZE AND ANGLE BETWEEN INLET AND OUTLET PIPING.
- The diagram, labeled SECTION A-A, shows a cross-section of a manhole. A central vertical pipe is connected to a larger circular precast hole. The connection is made with a flexible joint, indicated by a dashed line. The space between the pipe and the precast hole is filled with grout, labeled 'GROUT ANNUAL SPACE (TYP. INLET & OUTLET)'. A dimension line indicates a 4'-0" diameter for the precast hole. A flexible boot with a stainless steel band is shown at the bottom of the precast hole, labeled 'FLEXIBLE BOOT WITH STAINLESS STEEL BAND (TYP.)'. The entire assembly is shown within a larger circular structure, labeled 'PRECAST HOLE (TYP.)'.

**SECTION A-A**

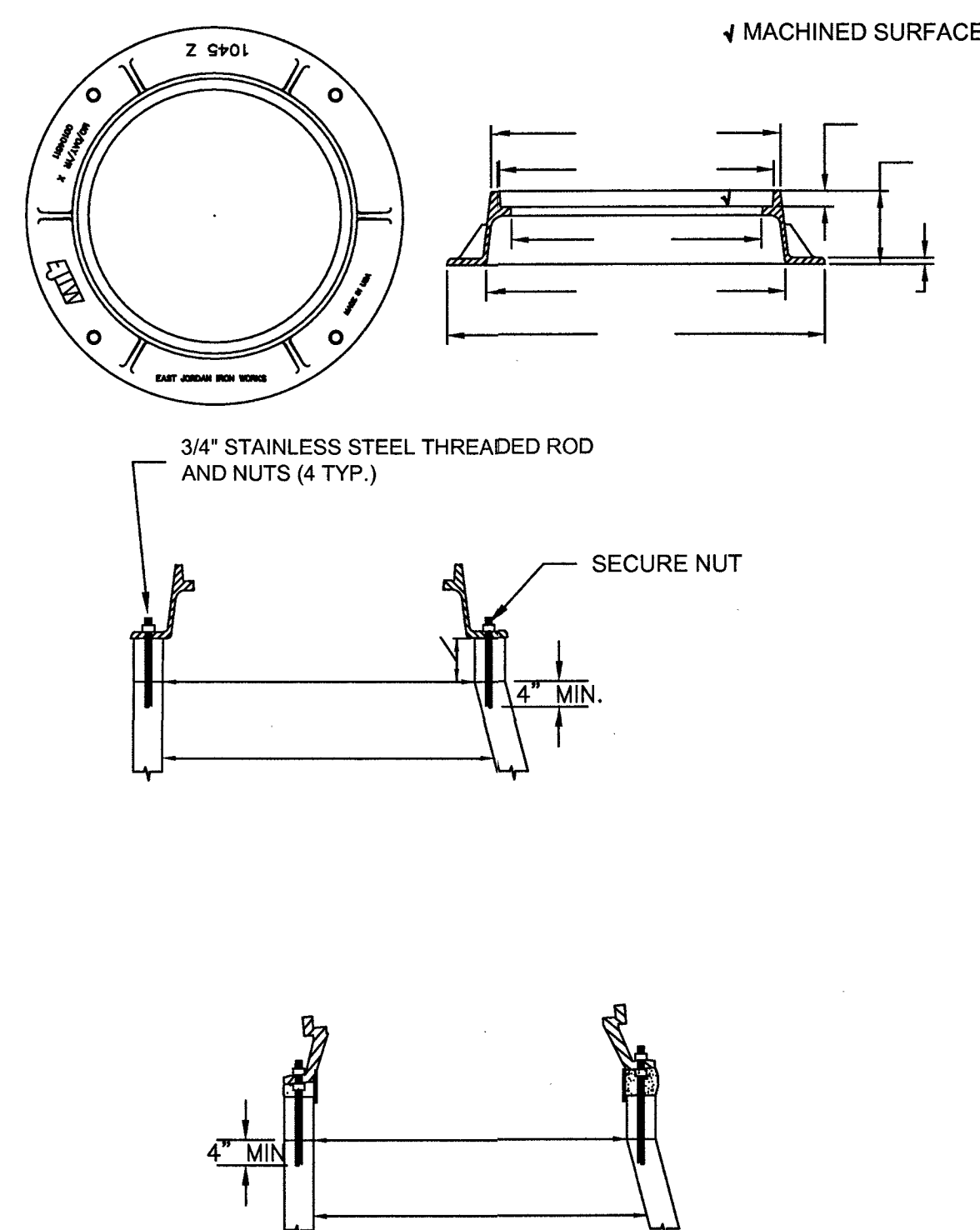
3/4" Ø SS THREADED ROD  
1/4" Ø NUTS & WASHERS



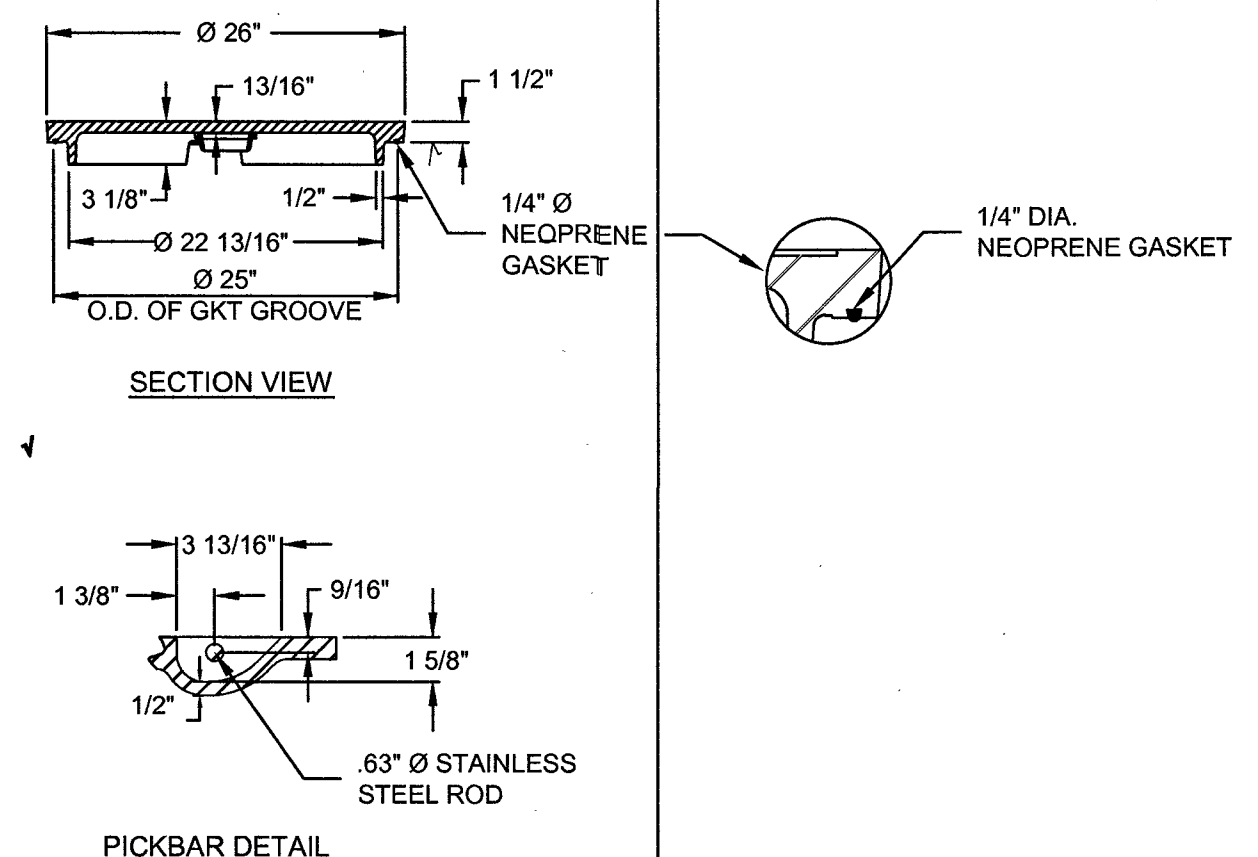
1. MATERIALS AND FABRICATION IN ACCORDANCE WITH ASTM C478-09.
2. STEPS SHALL BE VERTICALLY ALIGNED. FIRST STEP SHALL BE WITHIN 12" OF COVER, BOTTOM STEP SHALL BE WITHIN 24" OF BOTTOM OF MANHOLE.
3. THE FRAME AND COVER SHALL BE PROPERLY ALIGNED WITH THE 2 FOOT OPENING OF THE MANHOLE STRUCTURE AND BOLTED IN PLACE.
4. RELINER BY DURAN INSIDE DROP BOWLS AND PIPE BRACKETS WILL BE ALLOWED.
5. GROUT ANNULAR SPACE BETWEEN PIPE AND PRECAST MANHOLE ON INSIDE OF MANHOLE.
6. STEPS SHALL BE A MINIMUM OF 90 DEGREES FROM DROP & ALIGNED VERTICALLY.
7. STEPS SHALL BE ONLY USED IF THEY EXCEEDS 12" AND APPROVED BY PARTICIPATING UTILITY.
8. 6" MINIMUM DIAMETER MANHOLE REQUIRED FOR TWO OR MORE INSIDE DROP CONNECTIONS (MAIN LINE OR LATERAL) OR DEPTHS EXCEEDING 15'.
9. SEE FRAME AND COVER DETAIL.
10. SEE DETAIL S-01 FOR EXTERIOR COATING AND JOINT SEAL REQUIREMENTS.



1. WATERTIGHT MANHOLE FRAME MODEL #1045Z BY EAST JORDAN IRON WORKS, INC. OR EQUIVALENT.
2. HDPE ADJUSTMENT RINGS SHALL MEET H-20 LOAD RATING, AND SHALL BE INTERLOCKING OR UTILIZE BUTYL MASTIC JOINT SEALANT BETWEEN EACH RING TO FORM A WATERTIGHT JOINT.
3. CONCRETE ADJUSTMENT RINGS SHALL MEET H-20 LOAD RATING AND UTILIZE BUTYL MASTIC JOINT SEALANT BETWEEN EACH RING AND FRAME AN COVER TO FORM A WATERTIGHT JOINT.
4. FRAME HEIGHT SHALL BE 7" FOR BURIED LOCATIONS AND 4" FOR EXPOSED LOCATIONS.



- 
- 2" LETTERS (RECESSED FLUSH)
- NON-SLIP TEXTURE
- (2) CLOSED PICKHOLES
- (2) PICKBARS SEE DETAIL BELOW
- 2" LETTERS (RECESSED FLUSH)
- STOP LUGS FOR CAM
- 1040ACLGs
- 1/2" GAP
- BOTTOM VIEW OF COVER**



### BOLT-DOWN MANHOLE COVER

**WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL**

## WATERTIGHT MANHOLE COVER

**S-5**

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DETAILS

WESTERN VIRGINIA WATER AUTHORITY FY2011  
VCWRWF COLLECTION SYSTEM PROJECTS

ROANOKE, VIRGINIA

## DETAILS

DESIGNED BY:	LMR
DRAWN BY:	BMC
CHECKED BY:	LMR
SCALE:	NO SCALE
DATE:	04/14/13
PROJECT NUMBER:	B11132B-04
D-003	