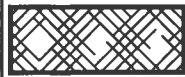


PREPARED FOR: <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	PREPARED BY:  5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>TRENCH PIPE ZONE DETAIL</b>
<b>Not to scale</b>	<b>September 2023</b>	<b>Standard Detail SD-001</b>

**NOTE:**

WHERE SPECIAL SELECT BACKFILL IS REQUIRED BETWEEN THE PIPE ZONE AND THE SURFACE MATERIAL, THE PIPE ZONE SHALL EXTEND 12" ABOVE THE PIPE REGARDLESS OF PIPE MATERIAL



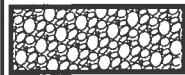
SELECTED EXCAVATED MATERIAL  
MECHANICALLY COMPACTED  
MAXIMUM SIZE ROCKS- 3"



2B CRUSHED STONE OR  
CRUSHED GRAVEL.  
1B CRUSHED STONE OR  
CRUSHED GRAVEL WITH  
APPROVAL BY THE OWNERS  
REPRESENTATIVE.



CLASS "C" CONCRETE

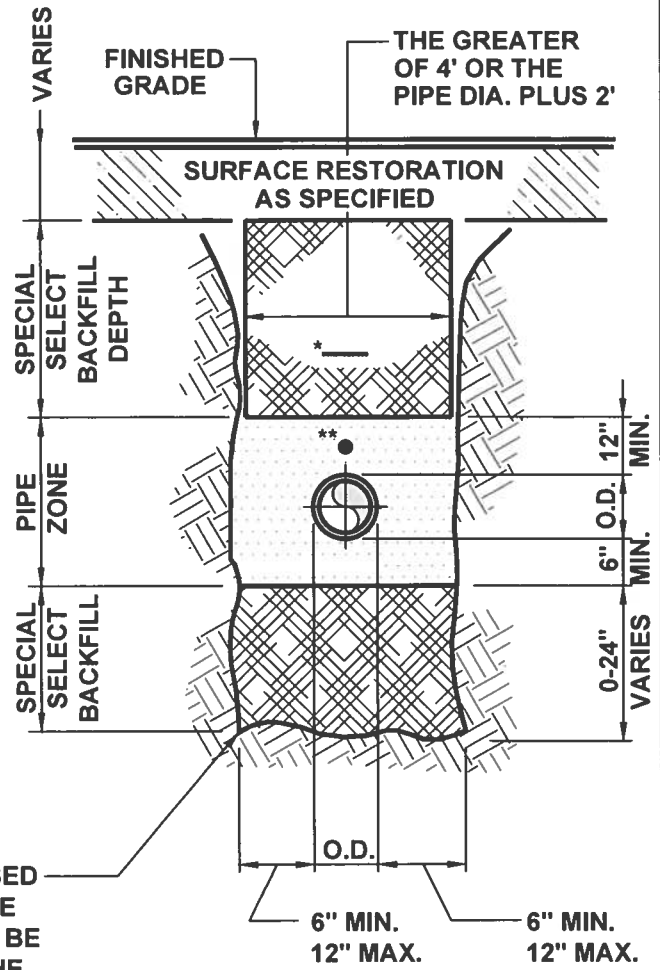


MECHANICALLY COMPACTED  
BACKFILL

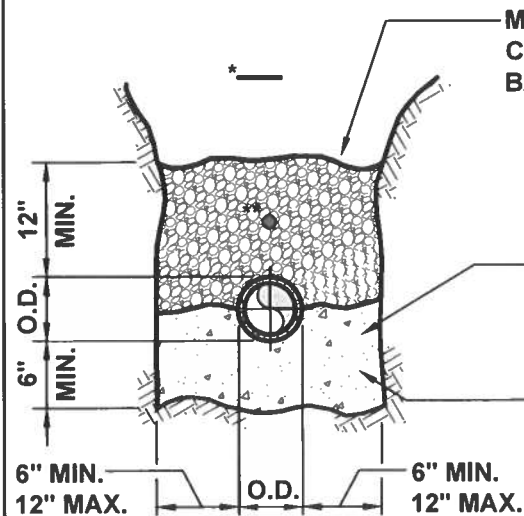
\* — 3" DETECTABLE BLUE MARKING TAPE  
LABELED "CAUTION WATERLINE BELOW"  
TO BE INSTALLED 24" ABOVE PIPE.

\*\* ● INSTALL TRACE WIRE 6" ABOVE PIPE.  
REFER TO SD-027 AND SD-027-A.

WHERE EXCAVATION EXPOSES THE BOTTOM OF PROPOSED TRENCHES WHERE VERY SOFT OR OTHER UNSTABLE PIPE FOUNDATION MATERIALS EXIST, THE CONTRACTOR WILL BE DIRECTED TO OVERCUT OR STABILIZE / OVERCUT AND THE CONTRACTOR SHALL BE COMPENSATED FOR THE ADDITIONAL EXCAVATION IN ACCORDANCE WITH THE PROVISIONS SPECIFIED IN THE GENERAL CONDITIONS.



**SPECIAL BACKFILL  
DETAIL 002 A**

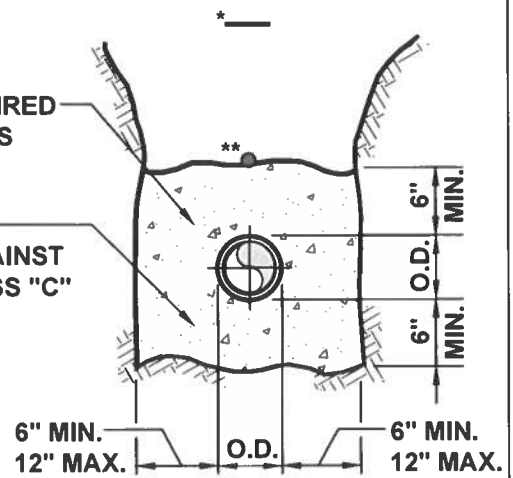


**TYPICAL CONCRETE CRADLE  
DETAIL 002 B**

CONC. ENCASEMENT REQUIRED  
AT ALL STREAM CROSSINGS  
OR AS DIRECTED BY HSWA

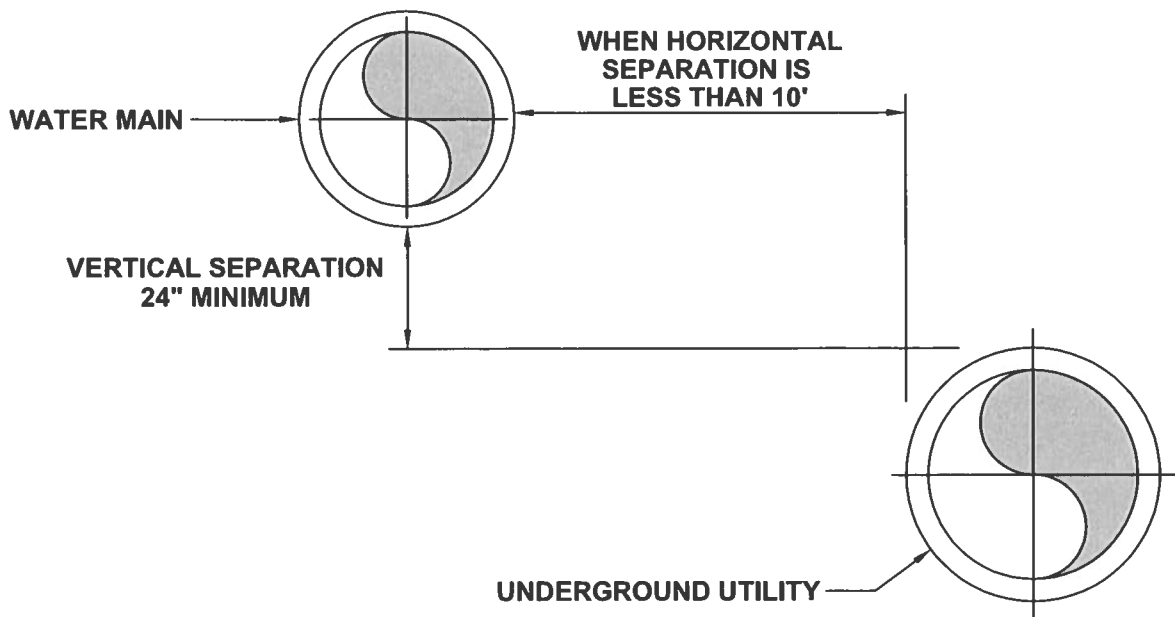
6" MIN. THICKNESS CONC.  
ENCASEMENT POURED AGAINST  
UNDISTURBED EARTH CLASS "C"  
CONCRETE

CONCRETE CRADLE  
REQUIRED WHEN SOIL  
CONDITIONS DICTATE OR  
AS DIRECTED BY HSWA



**TYPICAL CONCRETE ENCASEMENT  
DETAIL 002 C**

<p>PREPARED FOR: <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania</p>	<p>PREPARED BY: <b>KLH</b> ENGINEERS INC. 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com</p>	<p><b>TRENCH DETAILS</b></p>
<p>Not to scale</p>	<p>September 2023</p>	<p>Standard Detail SD-002</p>



#### NOTES:

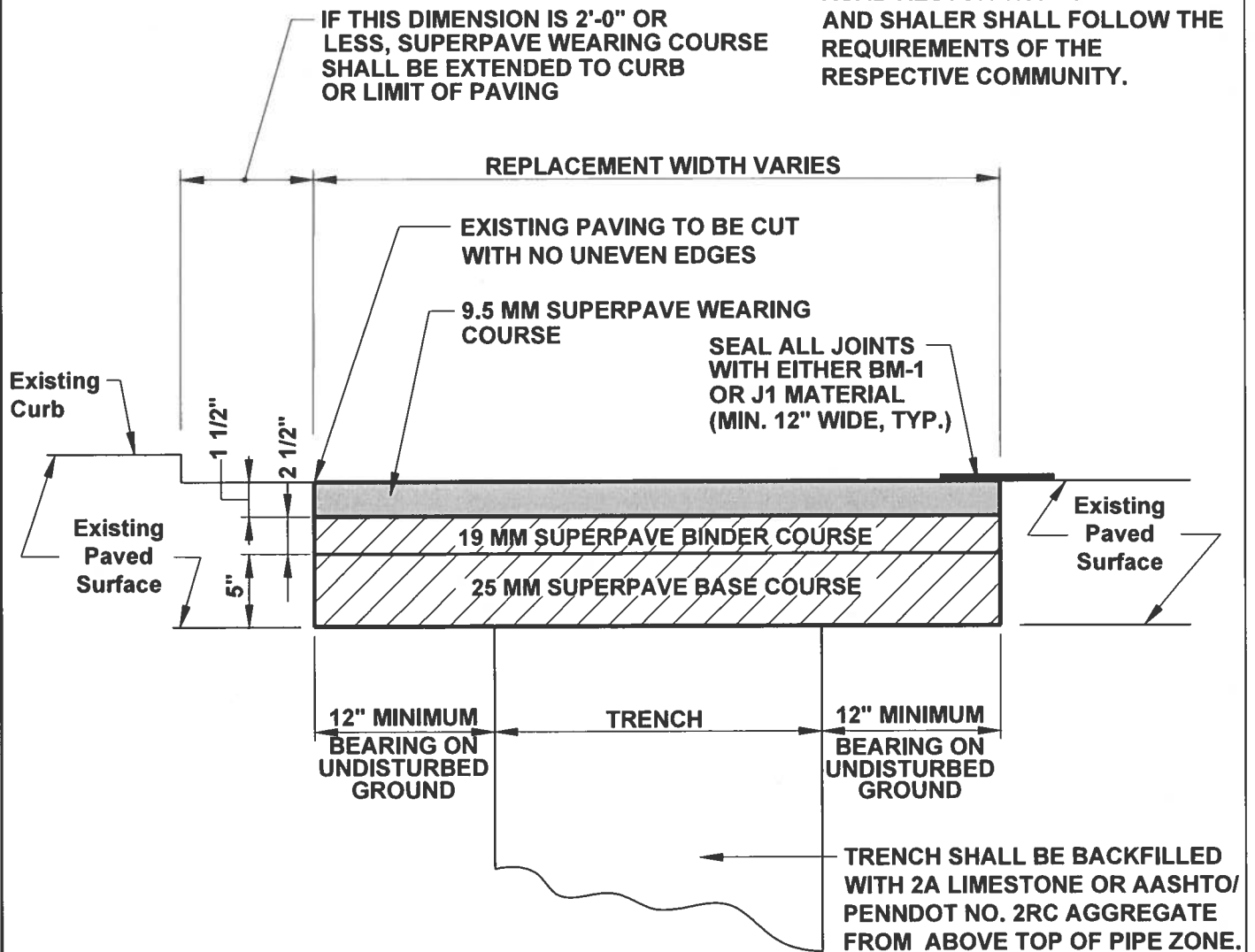
1. WHEN THE HORIZONTAL SEPARATION OF THE WATER MAIN AND ANY OTHER UTILITY LINE IS LESS THAN 10', THE VERTICAL SEPARATION BETWEEN THE TOP (CROWN) OF THE SEWER LINE AND THE BOTTOM (INVERT) OF THE WATER MAIN SHALL BE AT LEAST 24" WHETHER THE WATER MAIN IS ABOVE OR BELOW THE UTILITY LINE.
2. SEWER LINE SHALL BE ENCASED IN CONCRETE FOR 10' ON EITHER SIDE OF THE WATER MAIN WHERE SEWER / WATER LINE CROSSINGS OCCUR AND WHERE CONDITIONS PREVENT AN 24" VERTICAL SEPARATION.
3. THERE SHALL BE AT LEAST A 10' HORIZONTAL SEPARATION BETWEEN WATER MAINS AND SANITARY SEWER FORCE MAINS. FORCE MAINS CROSSING WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 24" BETWEEN THE OUTSIDE OF THE FORCE MAIN AND THE OUTSIDE OF THE WATER MAIN WHETHER THE WATER MAIN IS ABOVE OR BELOW THE SEWER LINE.
4. SEPARATION OF THE WATER MAIN AND ELECTRIC (BOTH PRIMARY & SECONDARY), COMMUNICATIONS, AND FIBER OPTIC WILL BE NO LESS THAN 6' UNLESS OTHERWISE APPROVED BY HAMPTON SHALER WATER AUTHORITY.

PREPARED FOR <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	PREPARED BY <b>KLH</b> ENGINEERS, INC. 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>REQUIRED DISTANCES BETWEEN WATER AND UNDERGROUND UTILITIES</b>
<b>Not to scale</b>	<b>March 2025</b>	<b>Standard Detail SD-003</b>

**NOTE:**

REFERENCE SUPERPAVE  
PER PA DOT SECTION 409,  
MIXTURE & DESIGN STANDARDS

THIS DETAIL APPLIES TO WORK  
PERFORMED IN MILLVALE, ETNA,  
INDIANA, WEST DEER, AND  
SHARPSBURG.  
ROAD RESTORATION IN HAMPTON  
AND SHALER SHALL FOLLOW THE  
REQUIREMENTS OF THE  
RESPECTIVE COMMUNITY.

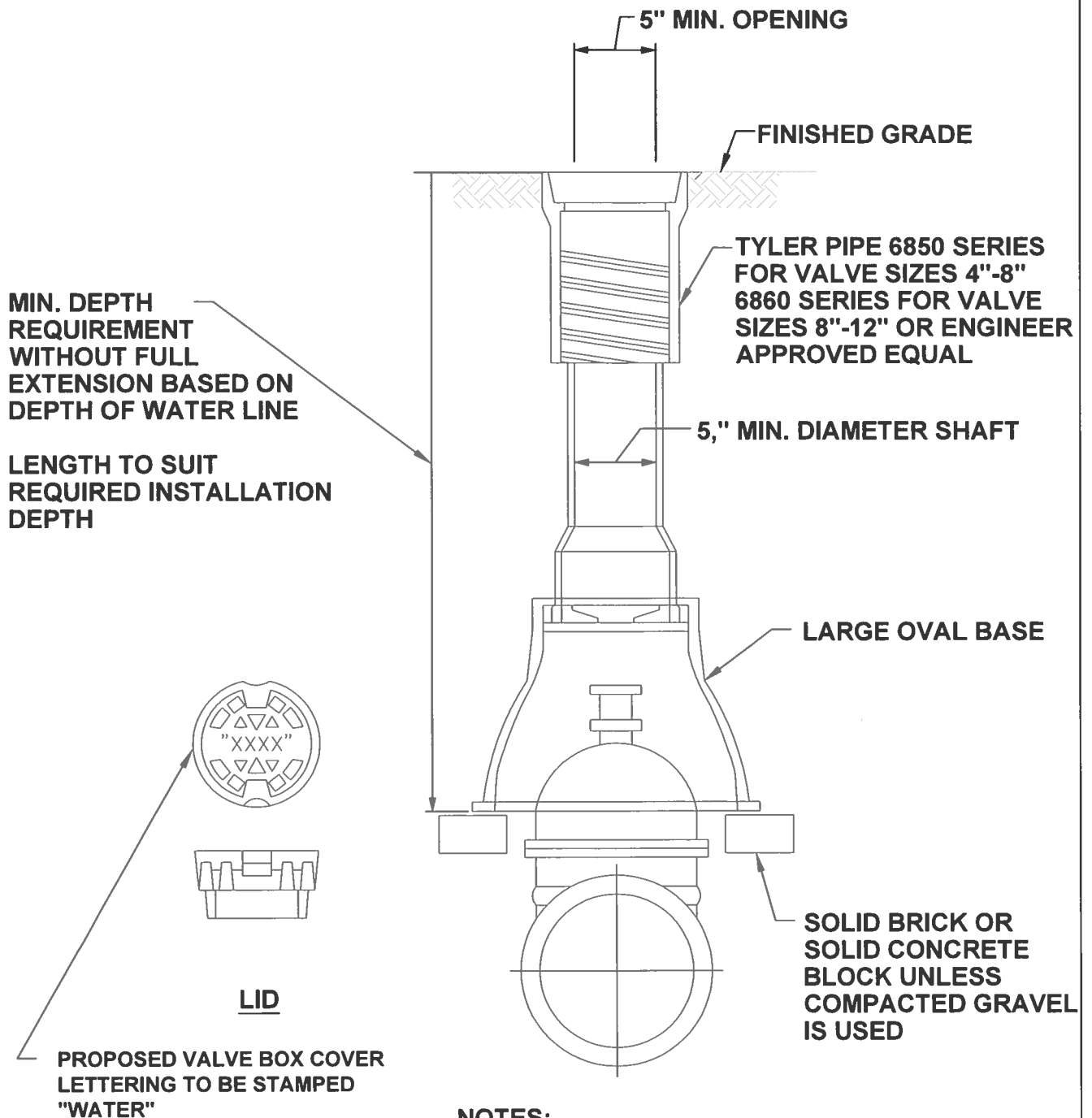


**NOTE:**

DURING COLD WEATHER WHEN SUPERPAVE MATERIAL IS NOT AVAILABLE FROM THE ASPHALT PLANTS, OR IF DIRECTED BY THE ENGINEER, THE TRENCH SHALL BE BACKFILLED WITH 2RC SELECT MATERIAL TO AN ELEVATION WITHIN 3" OF THE ROAD SURFACE. THE TRENCH SHALL THEN BE SURFACED WITH A TEMPORARY PATCH OF COLD PATCH MATERIAL. AS SOON AS THE ASPHALT PLANTS OPEN IN THE SPRING, THE CONTRACTOR SHALL REMOVE THE COLD PATCH AND 2RC MATERIALS AND SAW-CUT THE REQUIRED BENCHES AND THE SUPERPAVE MATERIAL SHALL THEN BE PLACED AND SEALED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE ON THE TEMPORARY PATCH AND SHALL KEEP A SMOOTH RIDING SURFACE ON THE STREET.

\* FOR CONCRETE SURFACED ROADWAYS, THE REQUIREMENTS OF  
PA DOT PUBLICATION 408 ARE REQUIRED.

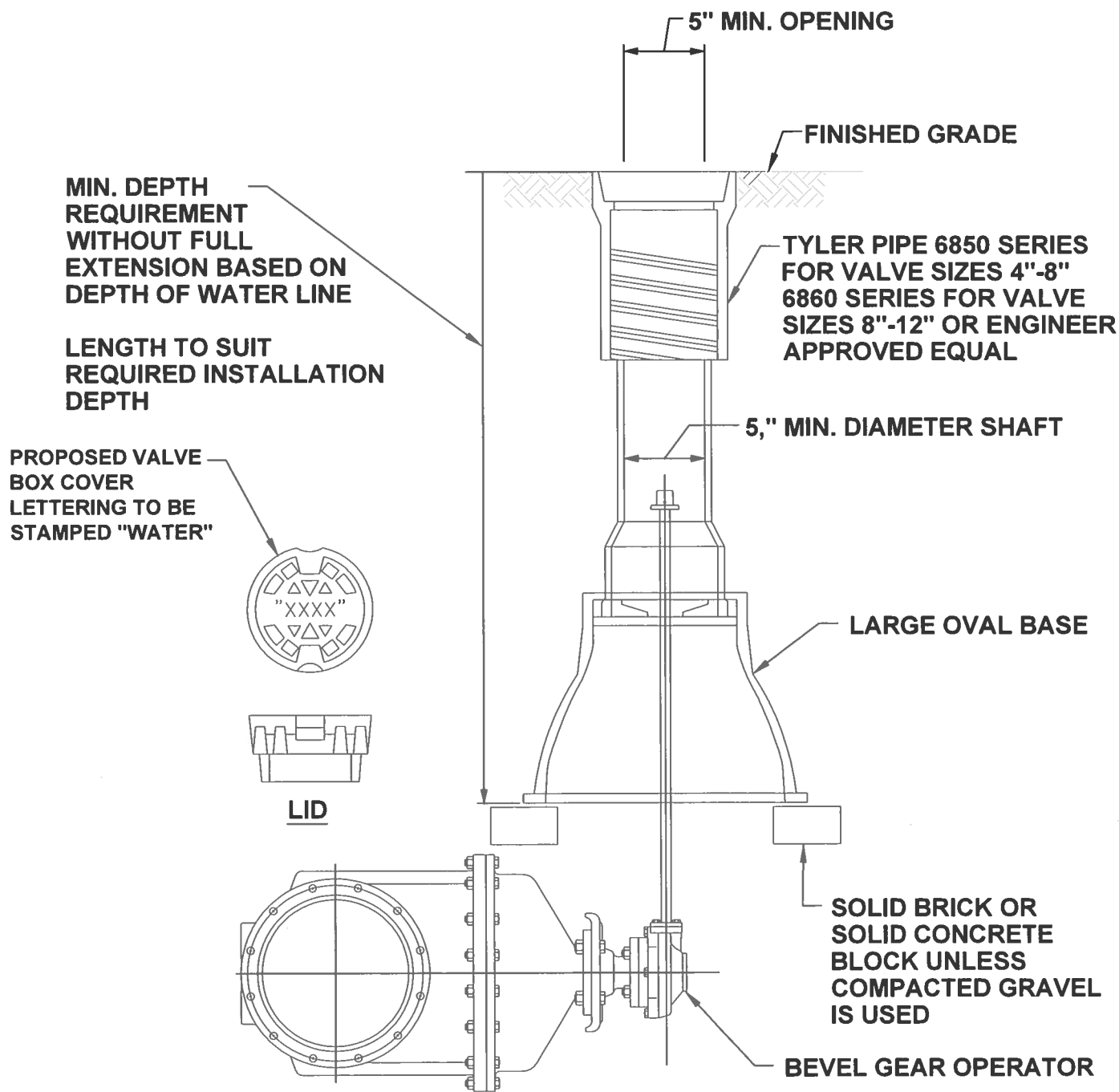
PREPARED FOR: <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	PREPARED BY: <b>KLH</b> ENGINEERS, INC. 5173 Campbell's Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>TRENCH BACKFILL AND PAVEMENT REPLACEMENT REQUIREMENTS FOR MUNICIPAL ROADS</b>
Not to scale	September 2023	Standard Detail SD-004



**NOTES:**

1. ALL BOXES SET PLUMB AND CENTERED OVER OPERATING NUT.
2. ALL CONTACT SURFACES MACHINED.
3. C.I. VALVE BOXES SHALL BE COATED WITH 2 COATS OF COAL TAR PITCH VARNISH OR OWNER APPROVED PROTECTIVE COATING.

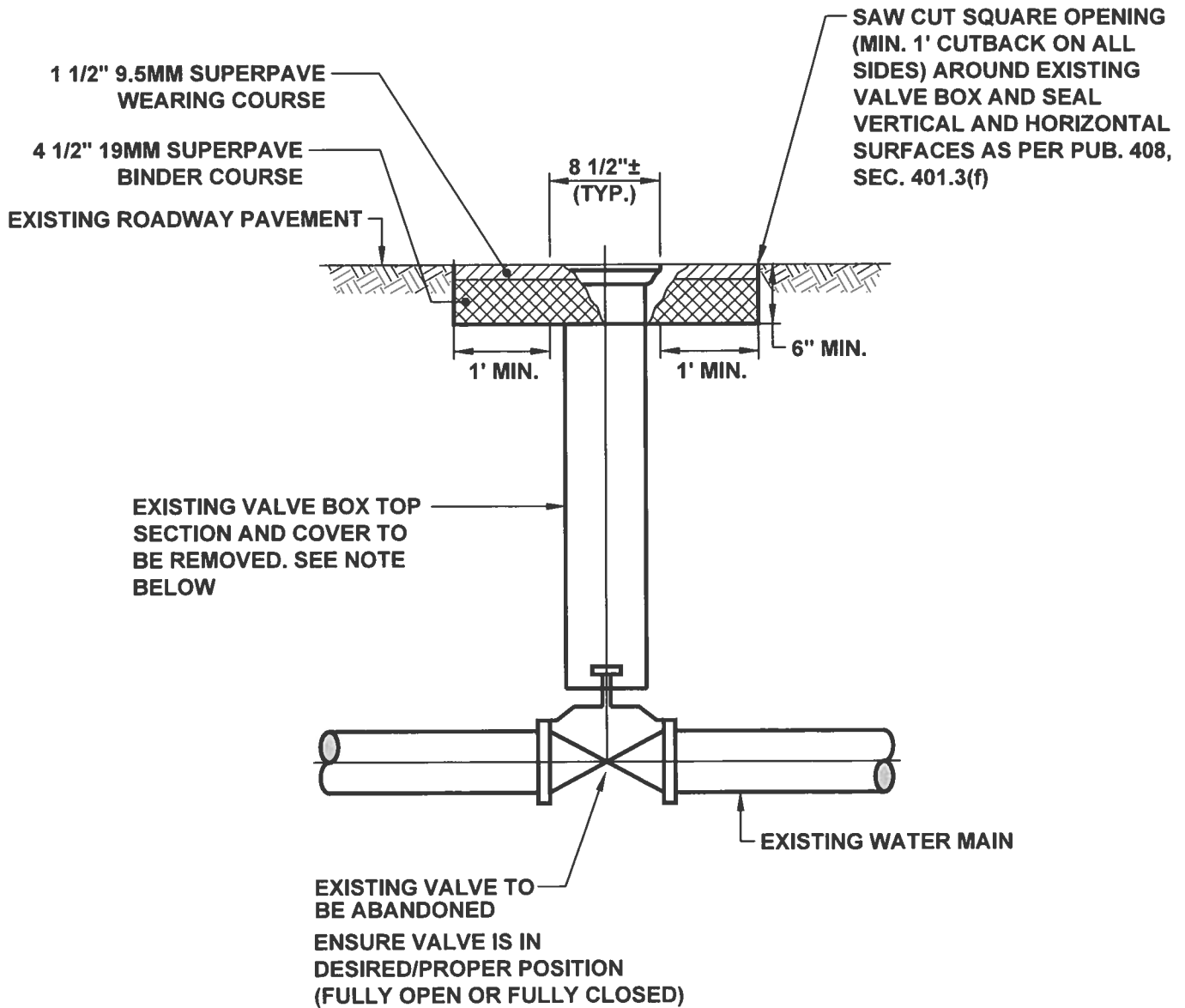
<small>PREPARED FOR:</small> <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	<small>PREPARED BY:</small> <b>KLH</b> ENGINEERS, INC. 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>STANDARD VALVE BOX AND COVER DETAIL</b>
<b>Not to scale</b>	<b>September 2023</b>	



**NOTES:**

1. ALL BOXES SET PLUMB AND CENTERED OVER OPERATING NUT.
2. ALL CONTACT SURFACES MACHINED.
3. C.I. VALVE BOXES SHALL BE COATED WITH 2 COATS OF COAL TAR PITCH VARNISH OR OWNER APPROVED PROTECTIVE COATING.

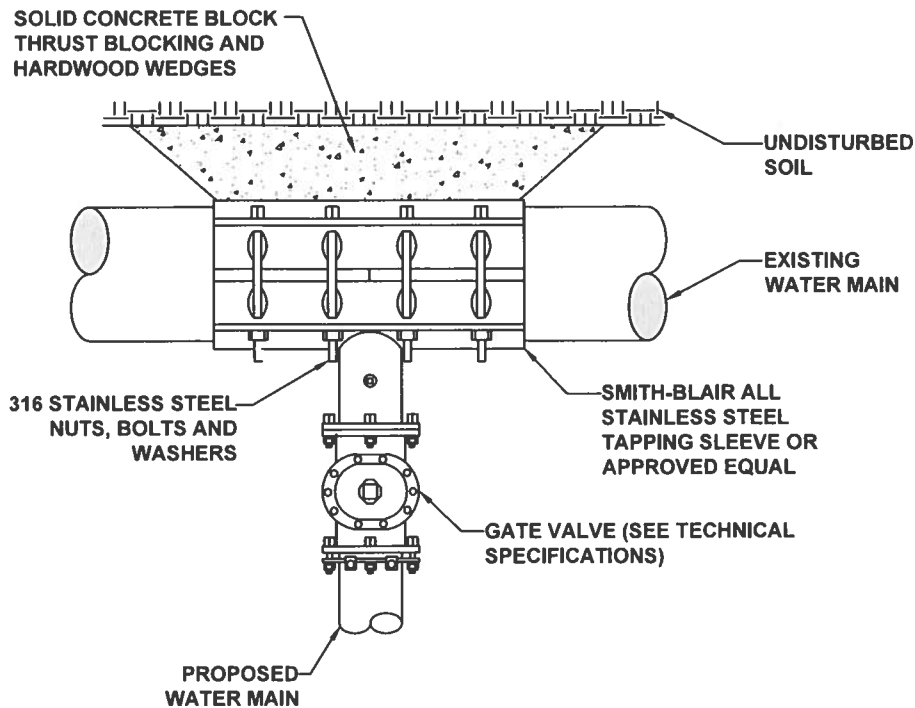
<p>PREPARED FOR:</p> <p><b>Hampton Shaler Water Authority</b></p> <p>3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania</p>	<p>PREPARED BY:</p> <p><b>KLH</b> ENGINEERS, INC.</p> <p>5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com</p>	<p><b>VALVE BOX AND COVER DETAIL FOR HORIZONTAL INSTALLATION OF 12" &amp; LARGER VALVES WITH MINIMUM COVER</b></p>
<p><b>Not to scale</b></p>	<p><b>September 2023</b></p>	<p><b>Standard Detail SD-006</b></p>



**NOTE:**

VOID LEFT BY PULLED VALVE BOX TOP SECTION TO BE FILLED WITH CONCRETE TO A LEVEL 6" BELOW EXISTING PAVED SURFACE

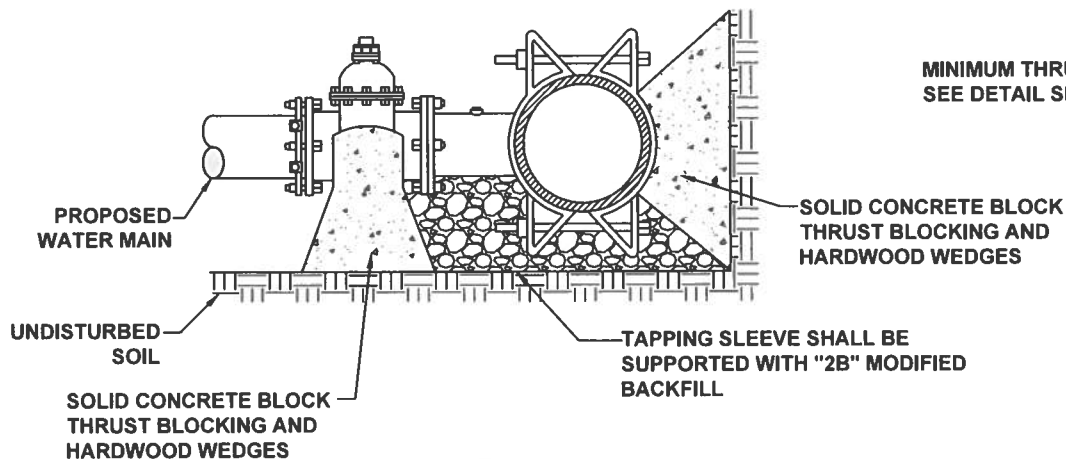
<p>PREPARED FOR:</p> <p><b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania</p>	<p>PREPARED BY:</p> <p><b>KLH</b> ENGINEERS, INC. 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com</p>	<p><b>VALVE BOX AND COVER REMOVAL AND RESTORATION</b></p>
<p><b>Not to scale</b></p>	<p><b>September 2023</b></p>	<p><b>Standard Detail SD-007</b></p>



**TAPPING SLEEVE - PLAN**

**NOTES:**

1. TAPPING SLEEVE IS APPROVED FOR USE WHERE WORKING PRESSURES ARE UNDER 150 PSI. CONSULT ENGINEER TO DETERMINE WORKING PRESSURES.
2. SOLID CONCRETE BLOCK MUST BEAR UPON UNDISTURBED SOIL.
3. ALL DUCTILE IRON PIPE AND FITTINGS TO BE WRAPPED IN POLYETHYLENE ENCASEMENT.
4. ALL FITTINGS ARE TO BE MECHANICALLY RESTRAINED.
5. ALL NUTS, BOLTS, AND WASHERS EXPOSED TO DIRECT BURIAL CONDITIONS, THAT ARE NOT ALREADY CALLED OUT, MUST BE 304 STAINLESS STEEL.



**TAPPING SLEEVE - ELEVATION**

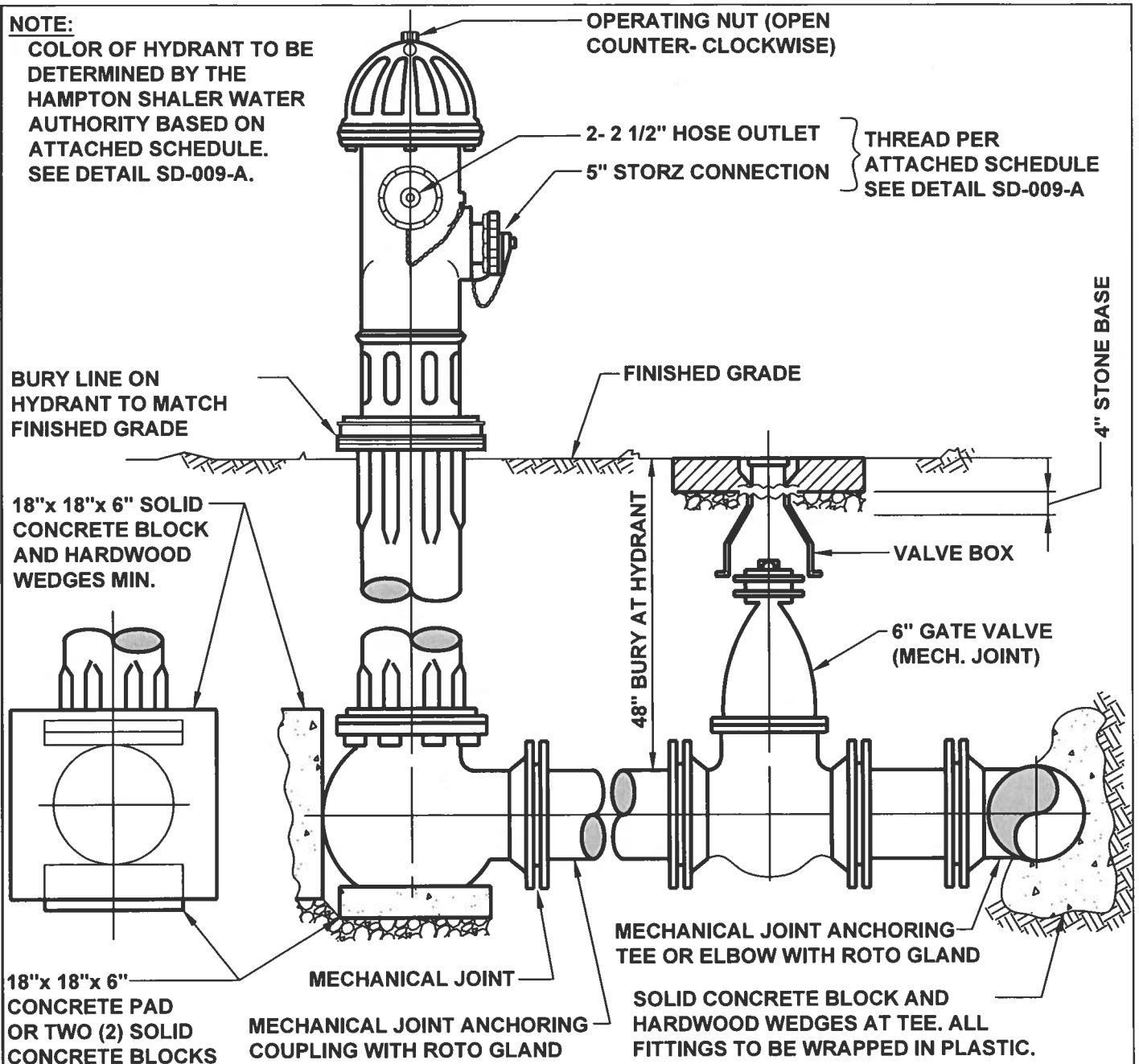
**MINIMUM THRUST BLOCK SIZES - SEE DETAIL SD-023.**

**NOTE: WET TAP MUST BE AT LEAST ONE LINE SIZE SMALLER**

<p>PREPARED FOR:</p> <p><b>Hampton Shaler Water Authority</b>  3101 McCully Rd  Allison Park, Pa 15101  Allegheny County, Pennsylvania</p>	<p>PREPARED BY:</p> <p><b>KLH ENGINEERS, INC.</b>  5173 Campbells Run Road  Pittsburgh, Pa 15205  Phone: 412-494-0510 - Fax: 412-494-0426  info@klhengineers.com</p>	<p><b>TAPPING SLEEVE (LIVE TAP) WITH THRUST BLOCK</b></p>
<p><b>Not to scale</b></p>	<p><b>September 2023</b></p>	<p><b>Standard Detail SD-008</b></p>

**NOTE:**

COLOR OF HYDRANT TO BE DETERMINED BY THE HAMPTON SHALER WATER AUTHORITY BASED ON ATTACHED SCHEDULE. SEE DETAIL SD-009-A.

**NOTES:**


1. IN THE INSTALLATION OF ALL FIRE HYDRANTS IN SLOPING AREAS, THE CONTRACTOR SHALL EXCAVATE AROUND ALL SIDES OF THE HYDRANT FOR A DISTANCE OF AT LEAST 18" AND CONSTRUCT A SELF-SUSTAINING DRY STONE WALL IN THE EXCAVATED AREA TO PREVENT EARTH FROM MOVING INTO THE AREA.
2. CONTRACTOR SHALL INSTALL 12 CUBIC FEET OF 3/4" BROKEN STONE OR GRAVEL AROUND THE BASE OF HYDRANT AND COVER THE AGGREGATE WITH 40 MIL. POLYTHYLENE.
3. ALL HYDRANTS PLACED IN EXCAVATED AREAS SHALL BE PROTECTED AND BE MADE COMPLETELY ACCESSIBLE.
4. FIRE HYDRANT SHALL FACE ROADWAY.

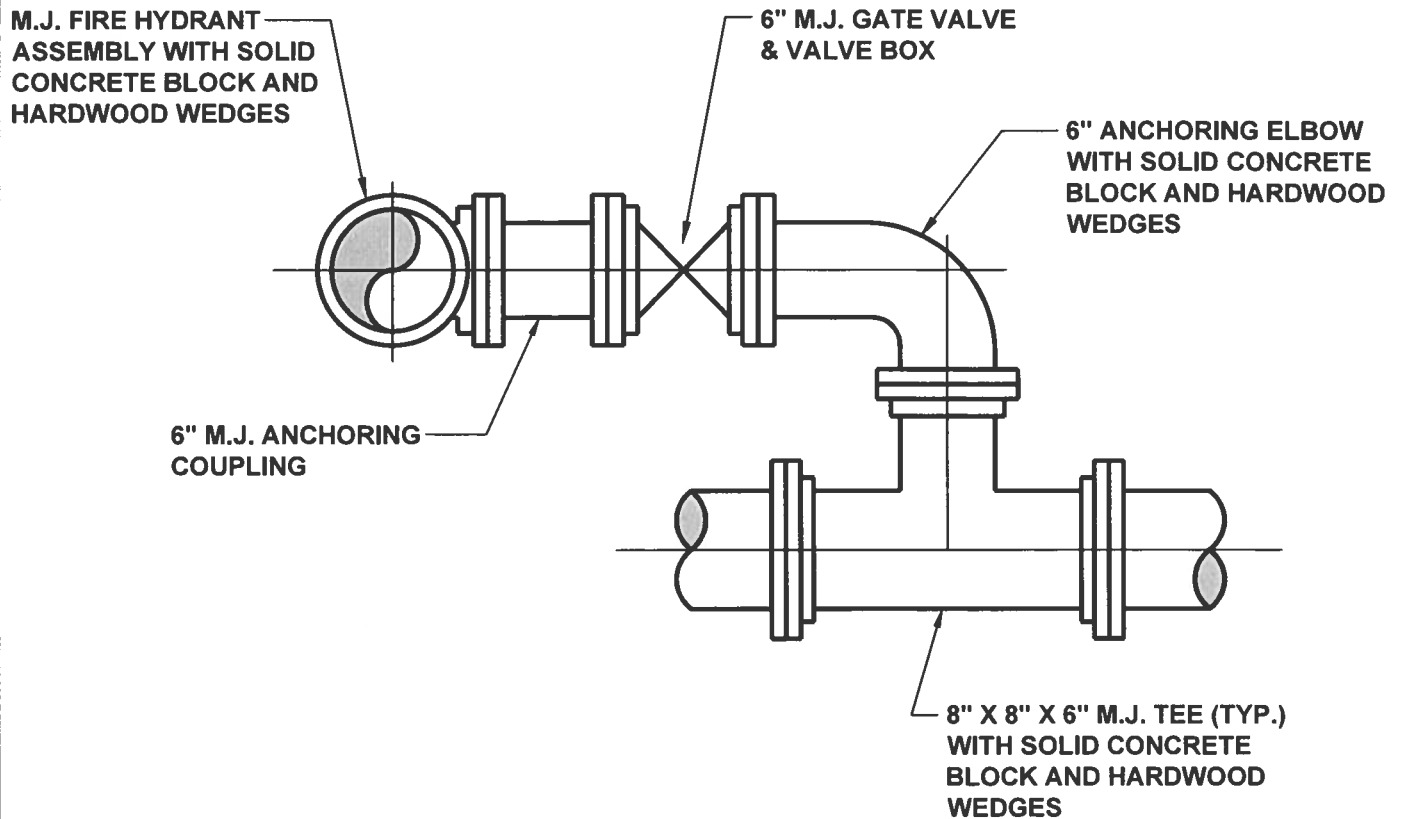
PREPARED FOR: <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	PREPARED BY: <b>KLH</b> ENGINEERS, INC. 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>FIRE HYDRANT ASSEMBLY</b>  <div>1 OF 2</div>
Not to scale	September 2023	Standard Detail SD-009

## HSWA HYDRANT SPEC SHEET

Municipality	Side Nozzle (YELLOW) 2 1/2" Pgh 6-297	Side Nozzle (RED) 2 1/2" Pgh 6-295	Side Nozzle (GREEN) 2 1/2" NST	Pumper Nozzle 5" Storz
Shaler		X		X
Hampton	X			X
West Deer			X	X
O'Hara	X			X
Etna	X			X
Sharpsburg	X			X


**ALL HYDRANTS SHALL BE MUELLER SUPER CENTURION OR KENNEDY K 81d**  
**SAFETY YELLOW UNLESS OTHERWISE NOTED**  
**MINIMUM BURIED DEPTH OF 42 INCHES**  
**OPERATING NUT 1 1/2" PENTAGON - OPEN LEFT**

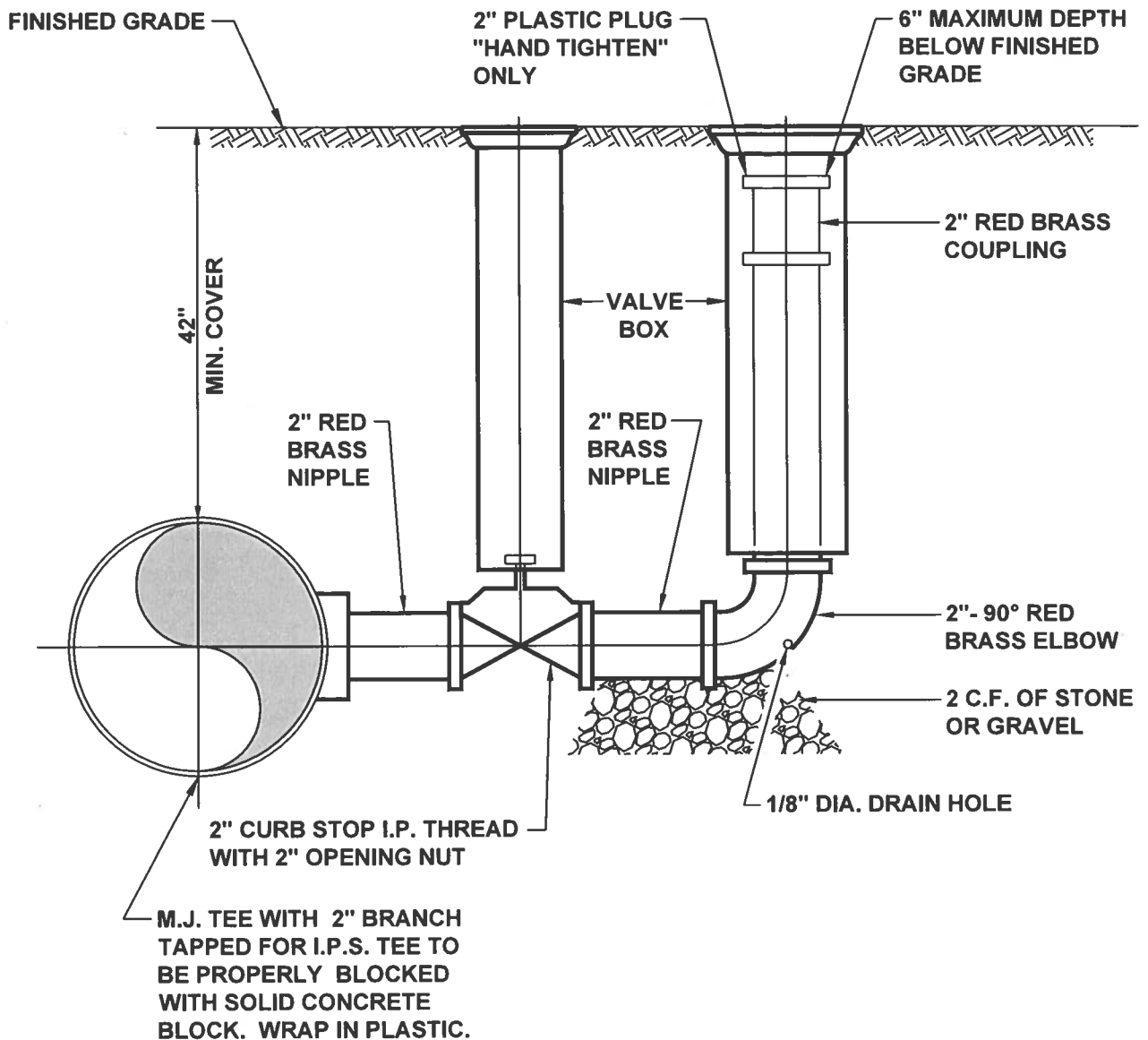
<small>PREPARED FOR:</small> <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	<small>PREPARED BY:</small>  5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>FIRE HYDRANT ASSEMBLY SPEC SHEET SCHEDULE</b> <div style="text-align: right;"><b>2 OF 2</b></div>
<b>Not to scale</b>	<b>September 2023</b>	<b>Standard Detail SD-009-A</b>



**NOTES:**

1. FOR TYPICAL FIRE HYDRANT & APPURTENANCES SEE FIRE HYDRANT ASSEMBLY DETAILS SD-009 AND SD-009-A. FOLLOW DETAILS SD-009 AND SD-009-A AND AVOID BENDS WHERE POSSIBLE.
2. ALL FITTINGS TO BE WRAPPED IN PLASTIC .
3. FIRE HYDRANT TO FACE ROADWAY.
4. THIS STANDARD APPLIES TO DEVELOPMENTS WITH SIDEWALKS.

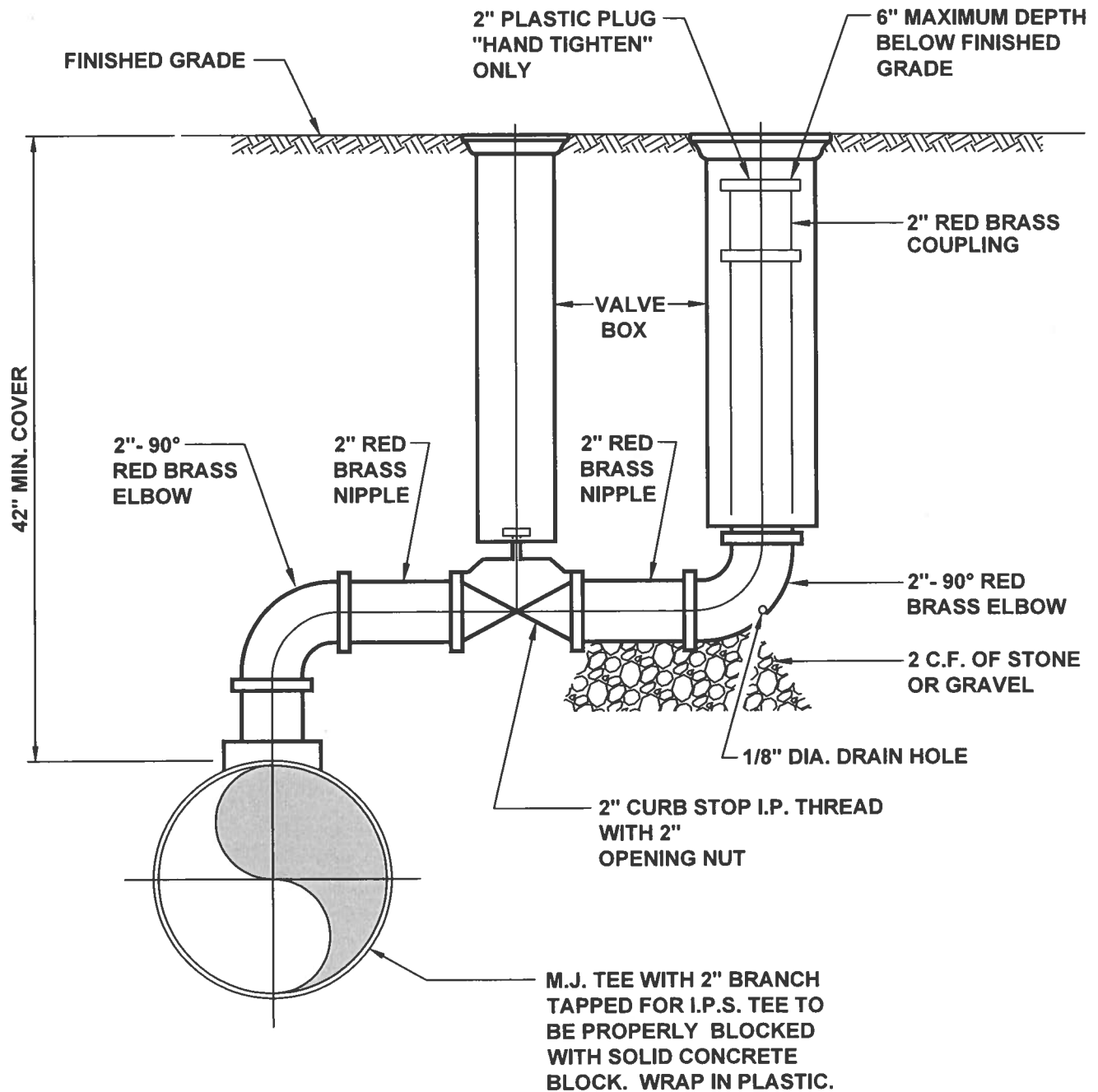
<small>PREPARED FOR:</small> <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	<small>PREPARED BY:</small>  5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>90° FIRE HYDRANT ASSEMBLY DETAIL (AS SHOWN OR OPPOSITE HAND)</b>
<b>Not to scale</b>	<b>September 2023</b>	<b>Standard Detail SD-010</b>



**NOTES:**


1. ALL PIPE AND FITTINGS TO BE RED BRASS.
2. PLACE 2 CUBIC FEET OF STONE UNDER DRAIN HOLE.

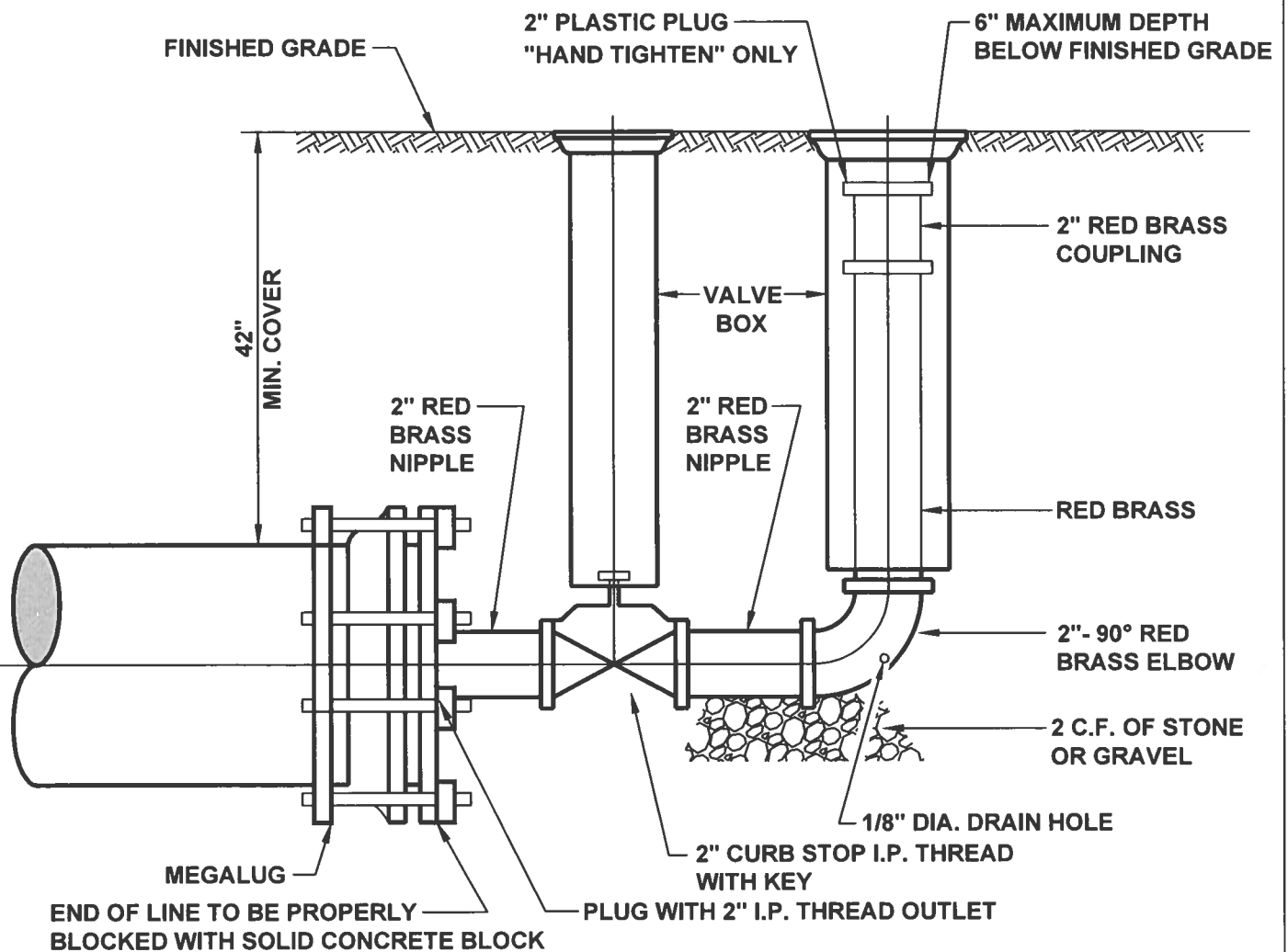
<p>PREPARED FOR:</p> <p><b>Hampton Shaler Water Authority</b>  3101 McCully Rd  Allison Park, Pa 15101  Allegheny County, Pennsylvania</p>	<p>PREPARED BY:</p> <p><b>KLH ENGINEERS, INC.</b>  5173 Campbells Run Road  Pittsburgh, Pa 15205  Phone: 412-494-0510 - Fax: 412-494-0426  info@klhengineers.com</p>	<p><b>TYPICAL SIDE BLOW-OFF</b></p>
<p><b>Not to scale</b></p>	<p><b>September 2023</b></p>	<p><b>Standard Detail SD-011</b></p>



**NOTES:**

1. ALL PIPE AND FITTINGS TO BE RED BRASS.
2. PLACE 2 CUBIC FEET OF STONE UNDER DRAIN HOLE.

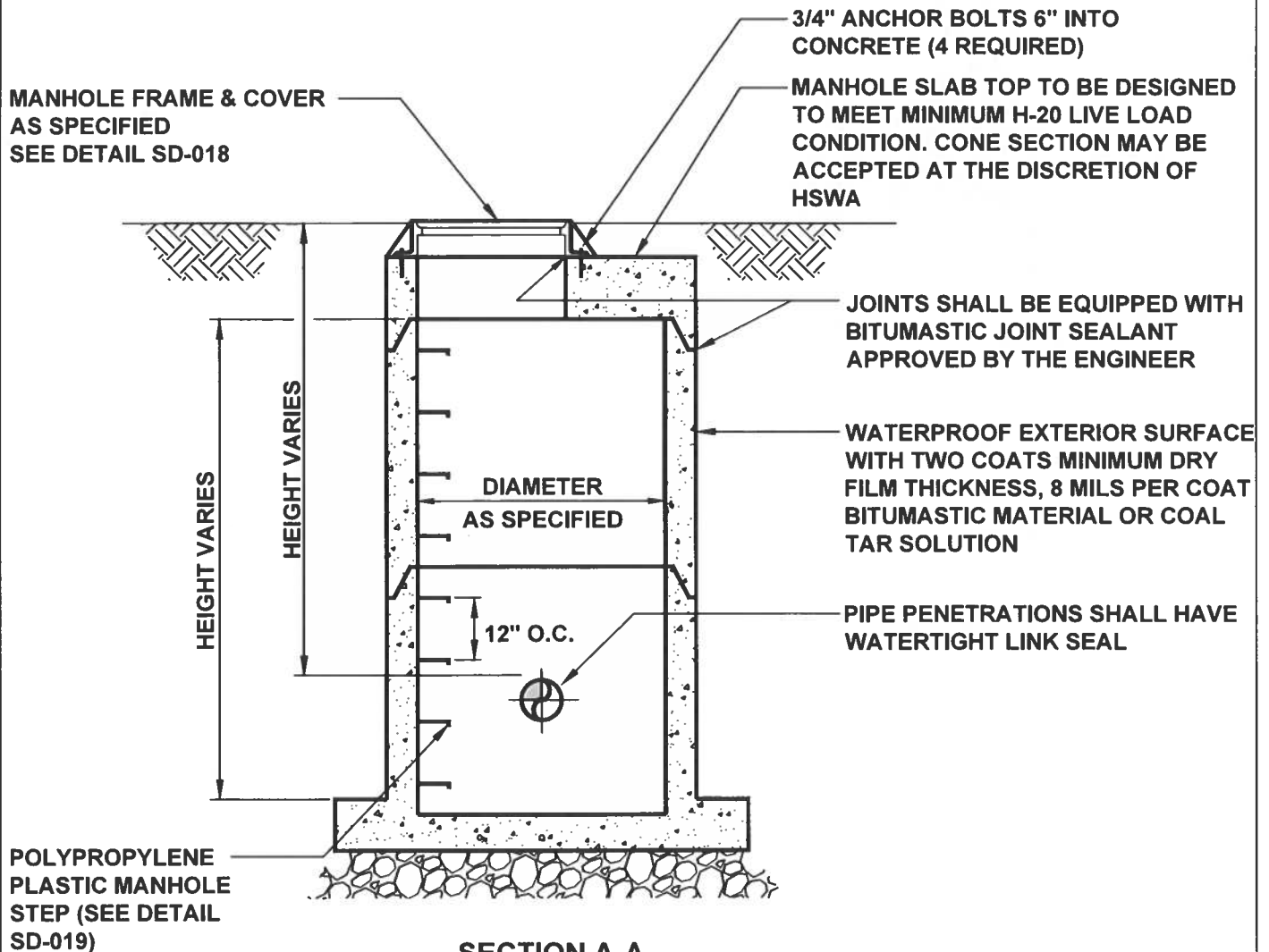
<small>PREPARED FOR:</small> <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	<small>PREPARED BY:</small>  5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>TYPICAL BLOW-OFF</b>
<b>Not to scale</b>	<b>September 2023</b>	<b>Standard Detail SD-012</b>



**NOTE:**

1. ALL PIPE AND FITTINGS TO BE RED BRASS.
2. PLACE 2 CUBIC FEET OF STONE UNDER DRAIN HOLE.
3. ALL FITTINGS TO BE WRAPPED IN PLASTIC.

<p>PREPARED FOR</p> <p><b>Hampton Shaler Water Authority</b></p> <p>3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania</p>	<p>PREPARED BY</p> <p><b>KLH</b> ENGINEERS INC.</p> <p>5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com</p>	<p><b>TYPICAL END BLOW-OFF</b></p>
<p><b>Not to scale</b></p>	<p><b>September 2023</b></p>	<p><b>Standard Detail SD-013</b></p>

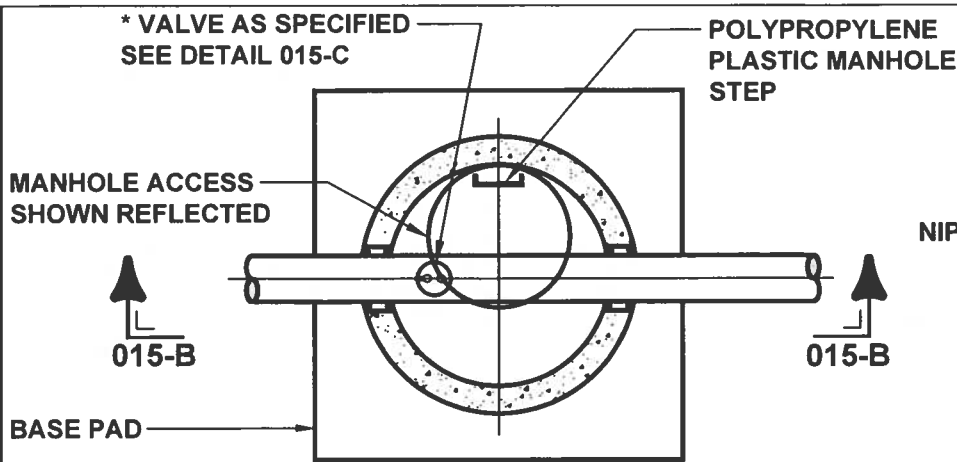


**SECTION A-A**

**NOTES:**

1. PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO ASTM-C478, LATEST REVISION.
2. PRECAST MANHOLE IS ALWAYS REINFORCED
3. SUPPORT MANHOLE STRUCTURE AND ALL PIPING CONNECTIONS ON A MINIMUM OF 6" THICKNESS "2B" BEDDING MATERIAL. ENCAPSULATE ALL PIPES WITHIN MANHOLE EXCAVATION IN THE SAME MATERIAL TO AN ELEVATION OF 12" ABOVE THE TOPS OF PIPES.

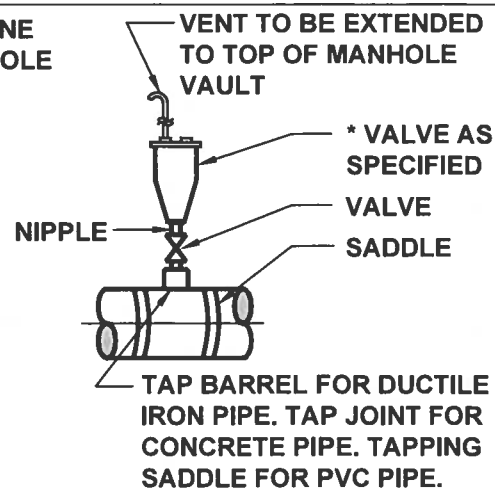
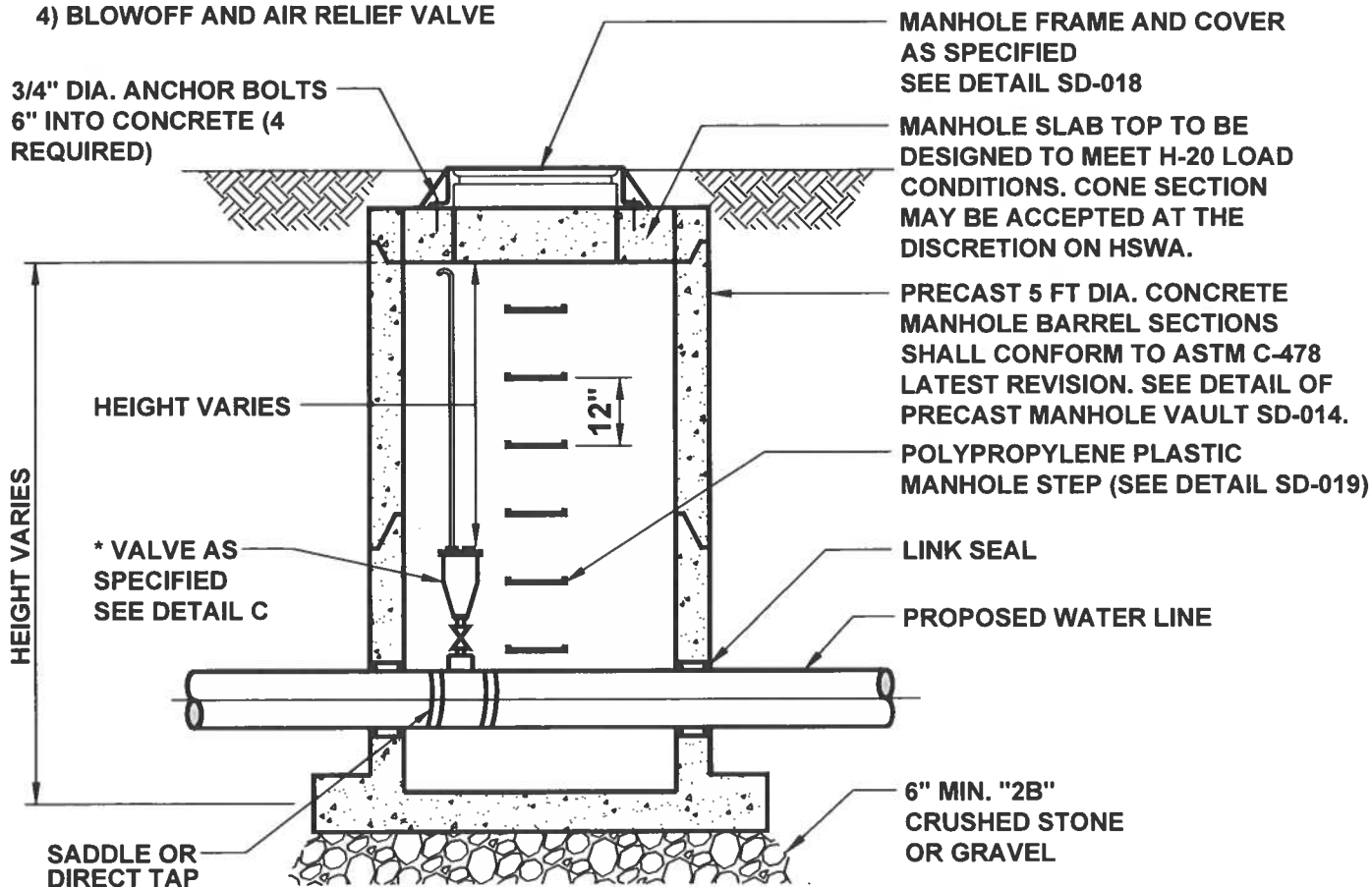
<p>PREPARED FOR:</p> <p><b>Hampton Shaler Water Authority</b></p> <p>3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania</p>	<p>PREPARED BY:</p> <p><b>KLH</b> ENGINEERS INC.</p> <p>5173 Campbell's Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com</p>	<p><b>PRECAST CONCRETE MANHOLE VAULT</b></p>
<p><b>Not to scale</b></p>	<p><b>September 2023</b></p>	<p><b>Standard Detail SD-014</b></p>



\* TYPE OF VALVE  
INSTALLED IN THE  
MANHOLE AS REQUIRED BY  
THE ENGINEER:

- 1) AIR RELEASE VALVE
- 2) AIR AND VACUUM RELIEF VALVE
- 3) COMBINATION AIR VALVE
- 4) BLOWOFF AND AIR RELIEF VALVE

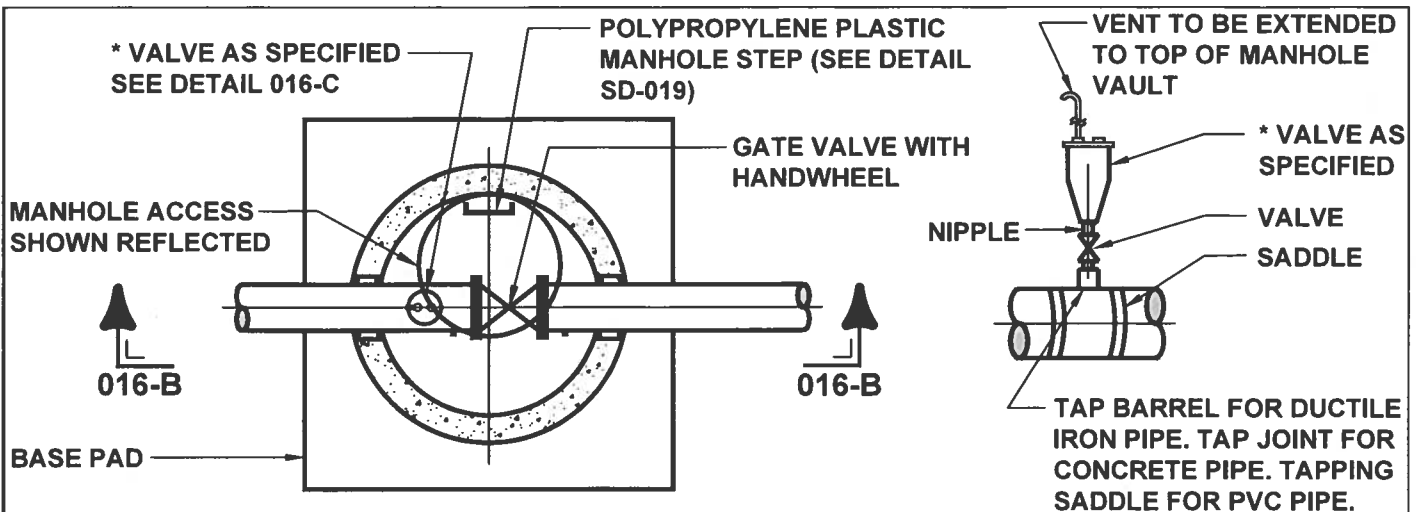
3/4" DIA. ANCHOR BOLTS  
6" INTO CONCRETE (4  
REQUIRED)



**DETAIL 015-C**

**SECTION 015-B**

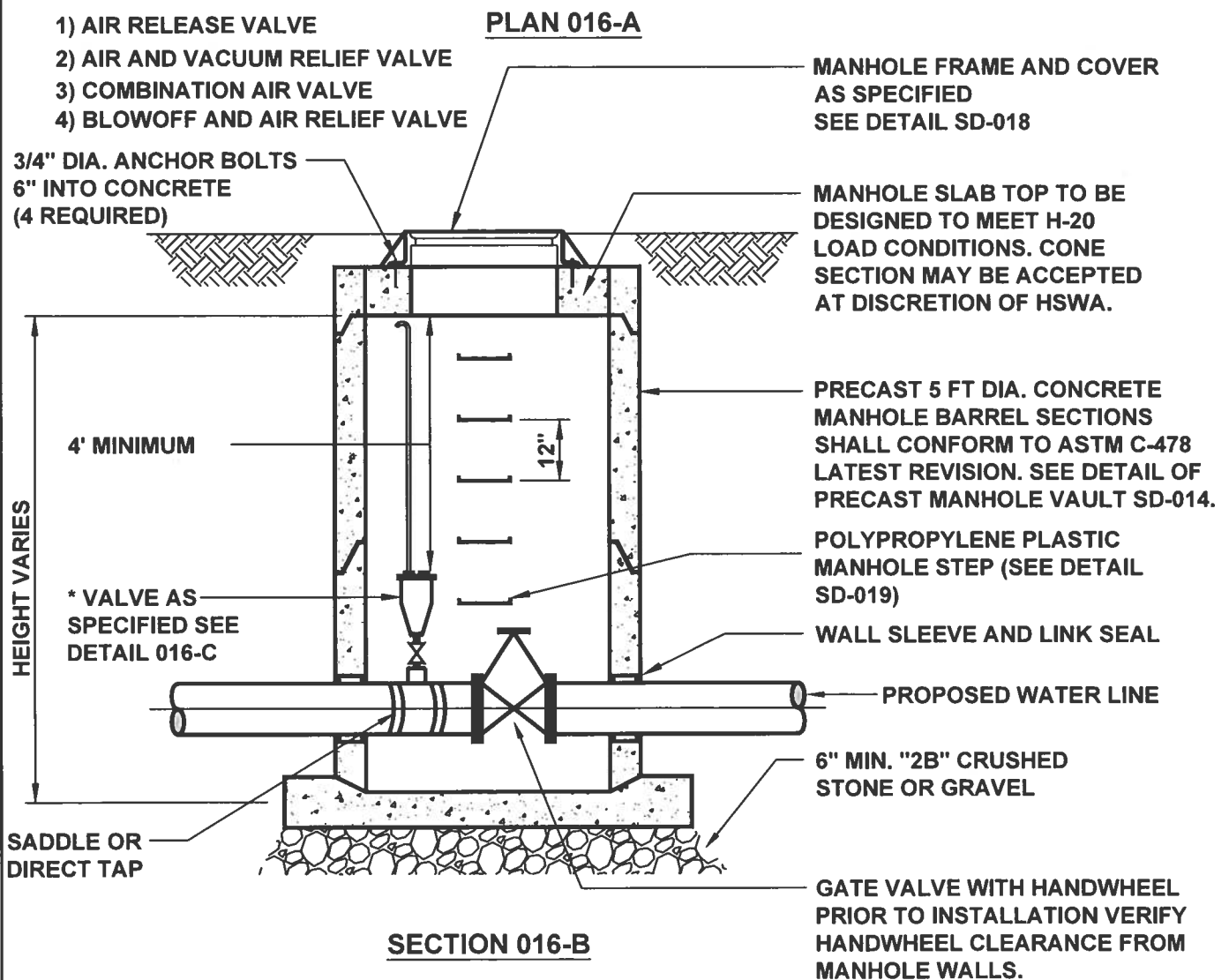
<p>PREPARED FOR:</p> <p><b>Hampton Shaler Water Authority</b></p> <p>3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania</p>	<p>PREPARED BY:</p> <p><b>KLH</b> ENGINEERS INC.</p> <p>5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com</p>	<p><b>WATER AIR RELEASE OR AIR AND VACUUM VALVE IN MANHOLE VAULT</b></p>
<p><b>Not to scale</b></p>	<p><b>September 2023</b></p>	<p><b>Standard Detail SD-015</b></p>



\* TYPE OF VALVE INSTALLED IN THE MANHOLE AS REQUIRED BY THE ENGINEER:

- 1) AIR RELEASE VALVE
- 2) AIR AND VACUUM RELIEF VALVE
- 3) COMBINATION AIR VALVE
- 4) BLOWOFF AND AIR RELIEF VALVE

3/4" DIA. ANCHOR BOLTS  
6" INTO CONCRETE  
(4 REQUIRED)



**SECTION 016-B**

<p>PREPARED FOR:</p> <p><b>Hampton Shaler Water Authority</b></p> <p>3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania</p>	<p>PREPARED BY:</p> <p><b>KLH</b> ENGINEERS, INC.</p> <p>5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com</p>	<p><b>WATER SYSTEM MAIN VALVE AND WATER AIR RELEASE OR AIR AND VACUUM VALVE IN MANHOLE VAULT</b></p>
<p><b>Not to scale</b></p>	<p><b>September 2023</b></p>	<p><b>Standard Detail SD-016</b></p>

POLYPROPYLENE PLASTIC  
MANHOLE STEP  
(SEE DETAIL SD-019)

MANHOLE ACCESS  
SHOWN REFLECTED

GATE VALVE WITH HANDWHEEL  
PRIOR TO INSTALLATION VERIFY  
HANDWHEEL CLEARANCE FROM  
MANHOLE WALLS.

BASE PAD

017-B

017-B

**PLAN 017-A**

MANHOLE FRAME AND  
COVER AS SPECIFIED  
SEE DETAIL SD-018

3/4" DIA. ANCHOR BOLTS  
6" INTO CONCRETE  
(4 REQUIRED)

MANHOLE SLAB TOP TO BE  
DESIGNED TO MEET H-20  
LOAD CONDITIONS.  
CONE SECTION MAY BE  
ACCEPTED AT DISCRETION  
OF HSWA.

POLYPROPYLENE PLASTIC  
MANHOLE STEP  
(SEE DETAIL SD-2-019)

PRECAST CONCRETE MANHOLE  
BARREL SECTIONS SHALL  
CONFORM TO ASTM C-478 LATEST  
REVISION. DIAMETER AS SPECIFIED.  
SEE DETAIL OF PRECAST MANHOLE  
VAULT SD-014.

HEIGHT VARIES

HEIGHT VARIES

12"

LINK SEAL

PROPOSED WATER LINE

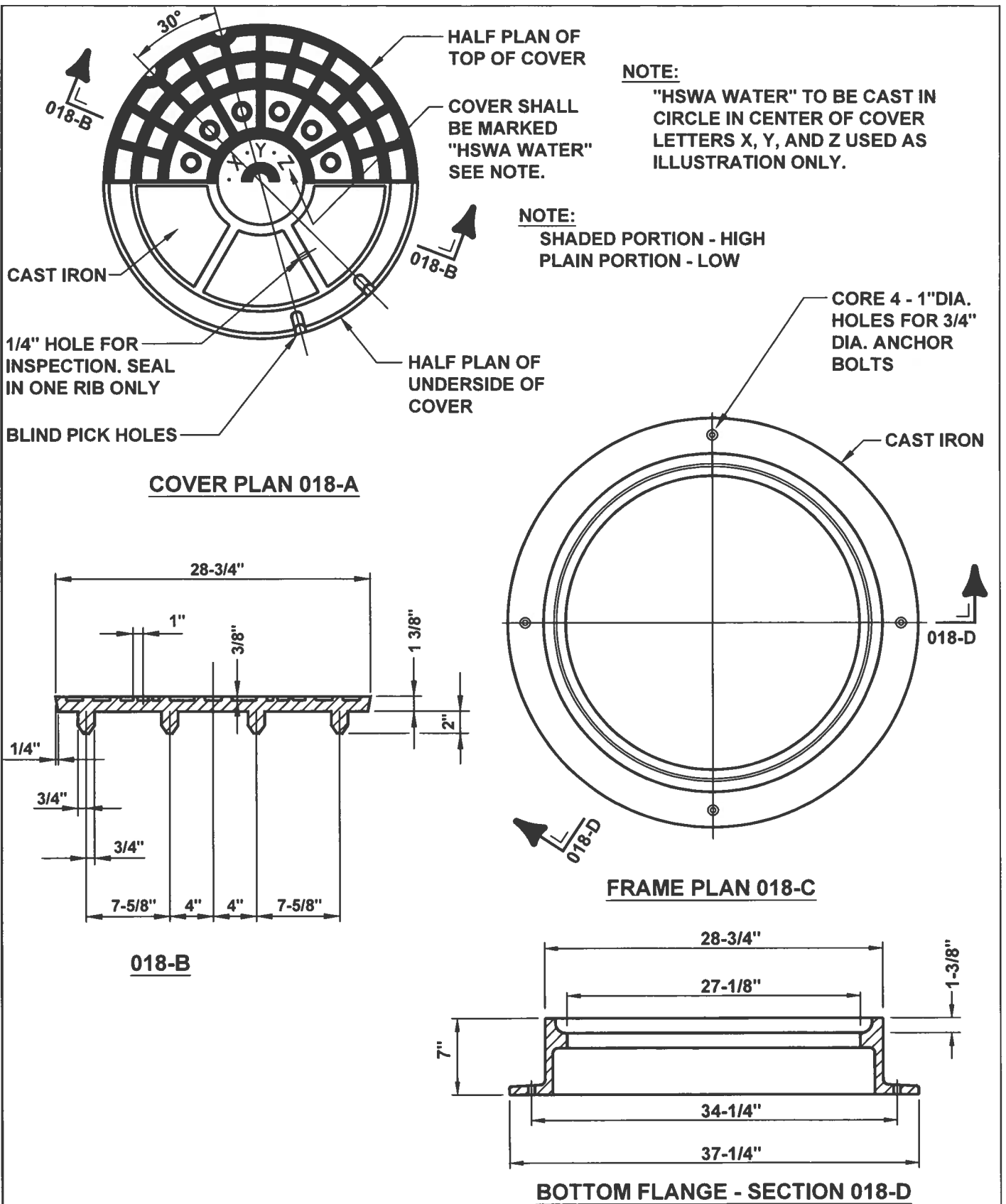
8"

6" MIN. "2B"  
CRUSHED STONE  
OR GRAVEL

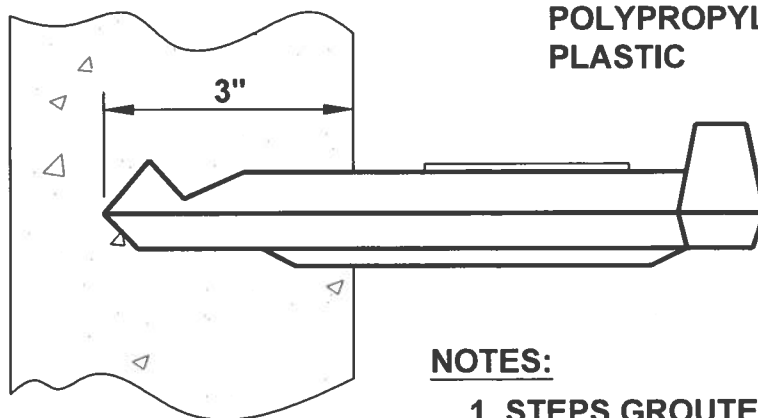
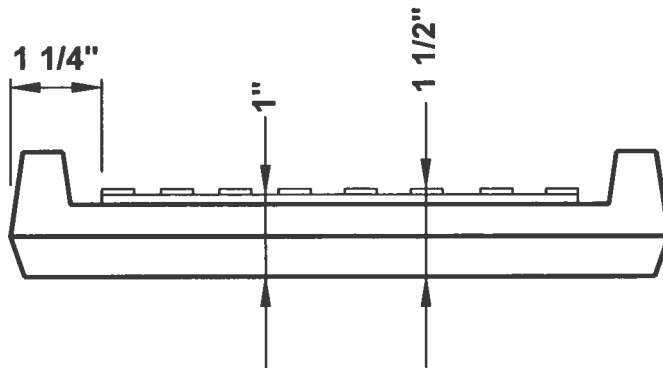
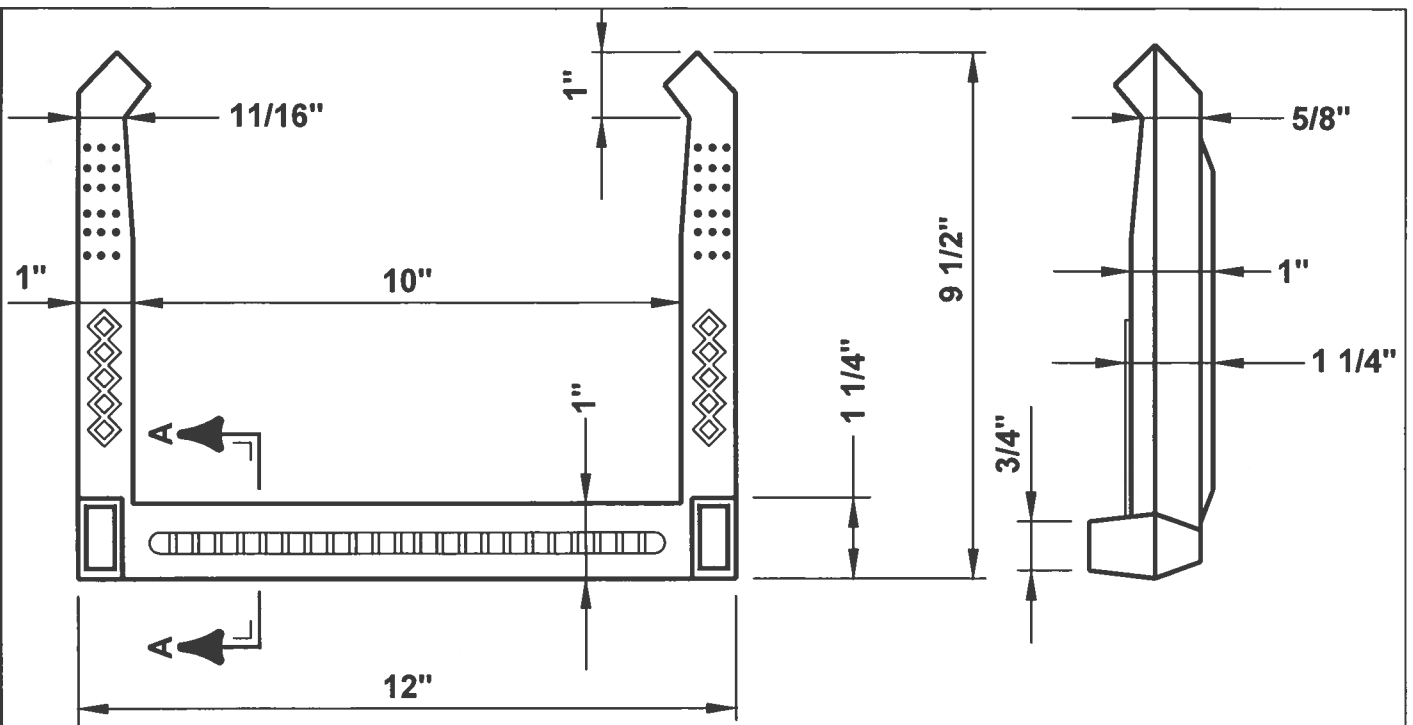
GATE VALVE WITH HANDWHEEL  
PRIOR TO INSTALLATION VERIFY  
HANDWHEEL CLEARANCE FROM  
MANHOLE WALLS.

**SECTION 017-B**

<p>PREPARED FOR:</p> <p><b>Hampton Shaler Water Authority</b></p> <p>3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania</p>	<p>PREPARED BY:</p> <p><b>KLH</b> ENGINEERS, INC.</p> <p>5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com</p>	<p><b>WATER SYSTEM MAIN VALVE IN MANHOLE VAULT</b></p>
<p><b>Not to scale</b></p>	<p><b>September 2023</b></p>	<p><b>Standard Detail SD-017</b></p>

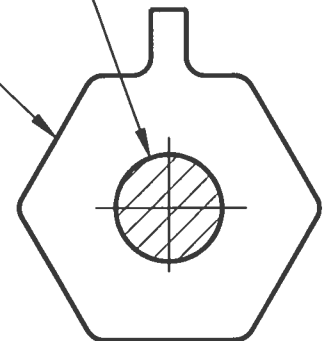


PREPARED FOR: <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	PREPARED BY: <b>KLH</b> ENGINEERS, INC. 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>STANDARD CAST IRON MANHOLE FRAME AND COVER</b>
<b>Not to scale</b>	<b>September 2023</b>	<b>Standard Detail SD-018</b>



NO. 3 DEFORMED BAR

POLYPROPYLENE PLASTIC



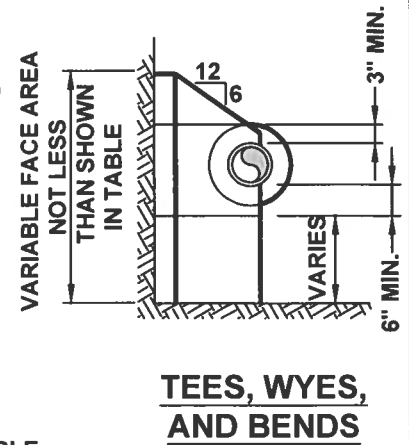
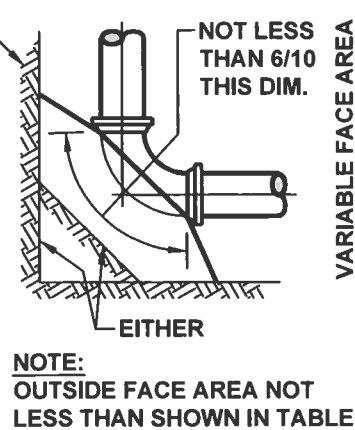
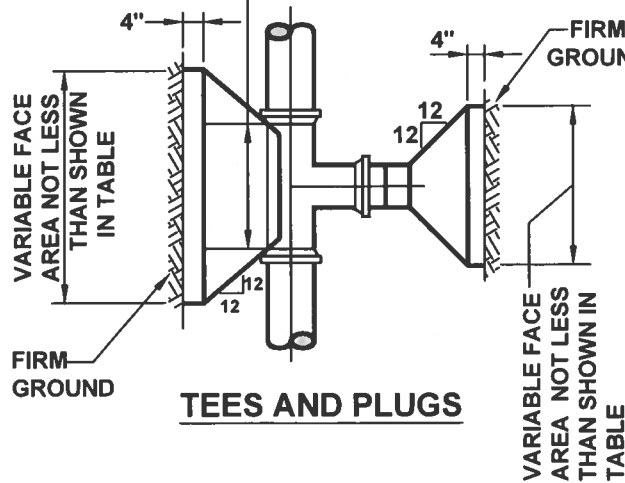
#### NOTES:

1. STEPS GROUTED IN PLACE
2. INSTALL STEPS ON 12" C:C

#### SECTION A

<p>PREPARED FOR:</p> <p><b>Hampton Shaler Water Authority</b></p> <p>3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania</p>	<p>PREPARED BY:</p> <p><b>KLH ENGINEERS, INC.</b></p> <p>5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com</p>	<p><b>POLYPROPYLENE PLASTIC MANHOLE STEP</b></p>
<p>Not to scale</p>	<p>September 2023</p>	<p>Standard Detail SD-019</p>

NOT LESS THAN  
6/10 THIS DIA.



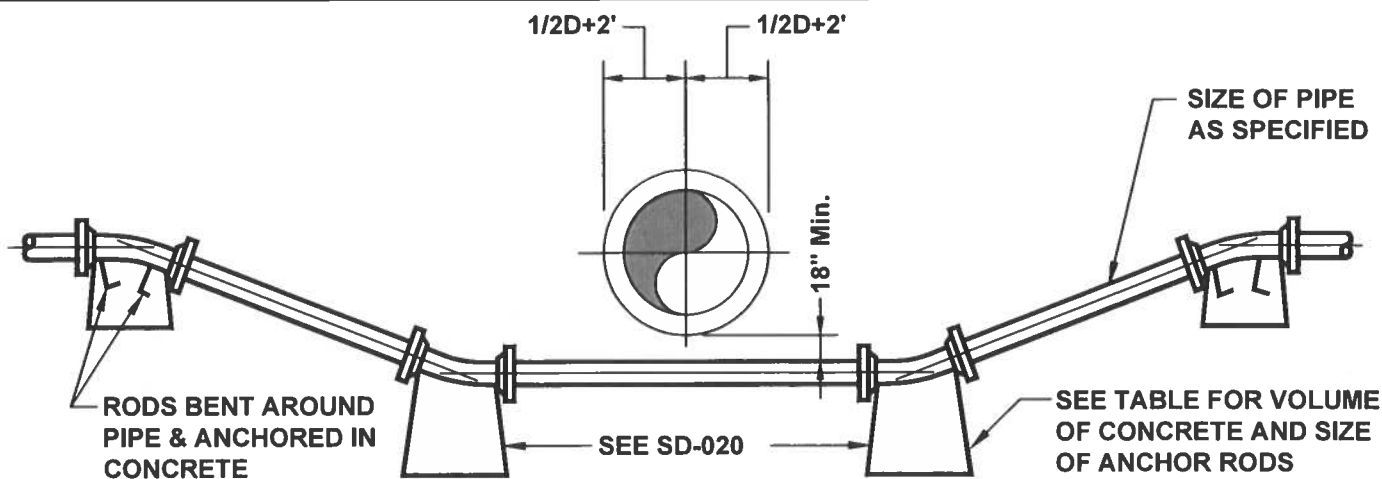
**NOTES:**

1. ALL TEES, WYES, CROSSES, PLUGS AND BENDS OF 10° OR MORE SHALL BE BLOCKED AGAINST FIRM EARTH WITH SOLID CONCRETE BLOCK AND HARDWOOD WEDGES.
2. EARTH PRESSURE FIGURED AT 4000 PSF. IF EARTH ENCOUNTERED WILL NOT WITHSTAND THIS PRESSURE, THE AREA OF THE BLOCK MUST BE INCREASED PROPORTIONATELY.
3. ALL FITTINGS SHALL BE WRAPPED IN PLASTIC PRIOR TO SETTING SOLID CONCRETE BLOCKS.

			AREA OF BLOCK IN SQUARE FEET				
PIPE SIZE (in)	AREA* (sq in)	TOTAL FORCE (lbs)	TEES & PLUGS	90 DEGREE BENDS	45 DEGREE BENDS	22 1/2 DEGREE BENDS	11 1/4 DEGREE BENDS
4	19	4,275	1.1	1.5	1.0	1.0	1.0
6	38	8,550	2.2	3.0	1.6	1.0	1.0
8	65	14,625	3.7	5.2	2.8	1.4	1.0
10	97	21,825	5.5	7.7	4.2	2.1	1.1
12	137	30,825	7.7	10.9	5.9	3.0	1.5
14	184	41,400	10.4	14.6	7.9	4.0	2.1
16	238	53,550	13.4	18.9	10.3	5.2	2.7
20	367	82,575	20.7	29.2	15.8	8.1	4.1
24	523	117,675	29.4	41.6	22.5	11.5	5.9

CALCULATIONS ARE BASED ON 225 PSI PRESSURE OR 150 PSI WORKING PRESSURE PLUS 50% INCREASE FOR WATER HAMMER FOR SIZES 4" TO 24" INCLUSIVE. FOR SIZES 30" & 36" THE TABLE IS BASED ON 120 PSI PRESSURE OR 75 PSI WORKING PRESSURE PLUS 50% WATER HAMMER.

<p>PREPARED FOR:</p> <p><b>Hampton Shaler Water Authority</b></p> <p>3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania</p>	<p>PREPARED BY:</p> <p><b>KLH ENGINEERS INC.</b></p> <p>5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com</p>	<p><b>SOLID CONCRETE BLOCK THRUST BLOCKING</b></p>
<p>Not to scale</p>	<p>September 2023</p>	<p>Standard Detail SD-020</p>



**NOTE:**

THE TABLE IS BASED ON 225 PSI TEST PRESSURE. ALL BLOCKS HAVING LENGTH OF 3'-0" OR MORE TO BE REINFORCED WITH #4 @ 6" PLACED 3" FROM TOP OF BLOCK.

**NOTE:**

ALL FITTINGS SHALL BE WRAPPED IN PLASTIC PRIOR TO POURING CONCRETE ANCHORS.

PIPE SIZE	TOTAL FORCE (lbs)	VOLUME IN CUBIC FEET			SIZE AND NO. OF ANCHOR RODS		
		45 DEGREE BENDS	22 1/2 DEGREE BENDS	11 1/4 DEGREE BENDS	45 DEGREE BENDS	22 1/2 DEGREE BENDS	11 1/4 DEGREE BENDS
4	4275	22.7	11.6	5.9	1-#4	1-#4	1-#4
6	8550	45.5	23.3	11.9	2-#4	1-#4	1-#4
8	14625	77.8	39.6	20.3	2-#4	2-#4	1-#4
10	21825	116.1	59.1	30.3	2-#4	2-#4	2-#4
12	30825	164.0	83.5	42.8	2-#5	2-#4	2-#4
14	41400	220.2	112.1	57.5	2-#6	2-#4	2-#4
16	53550	284.9	145.0	73.4	2-#7	2-#5	2-#4
20	82575	439.2	223.6	114.7	2-#8	2-#6	2-#4
24	117675	626.0	318.7	183.4	2-#9	2-#7	2-#5

PREPARED FOR:

**Hampton Shaler  
Water Authority**

3101 McCully Rd  
Allison Park, Pa 15101  
Allegheny County, Pennsylvania

PREPARED BY:

**KLH**  
ENGINEERS, INC.

5173 Campbells Run Road  
Pittsburgh, Pa 15205  
Phone: 412-494-0510 - Fax: 412-494-0426  
info@klhengineers.com

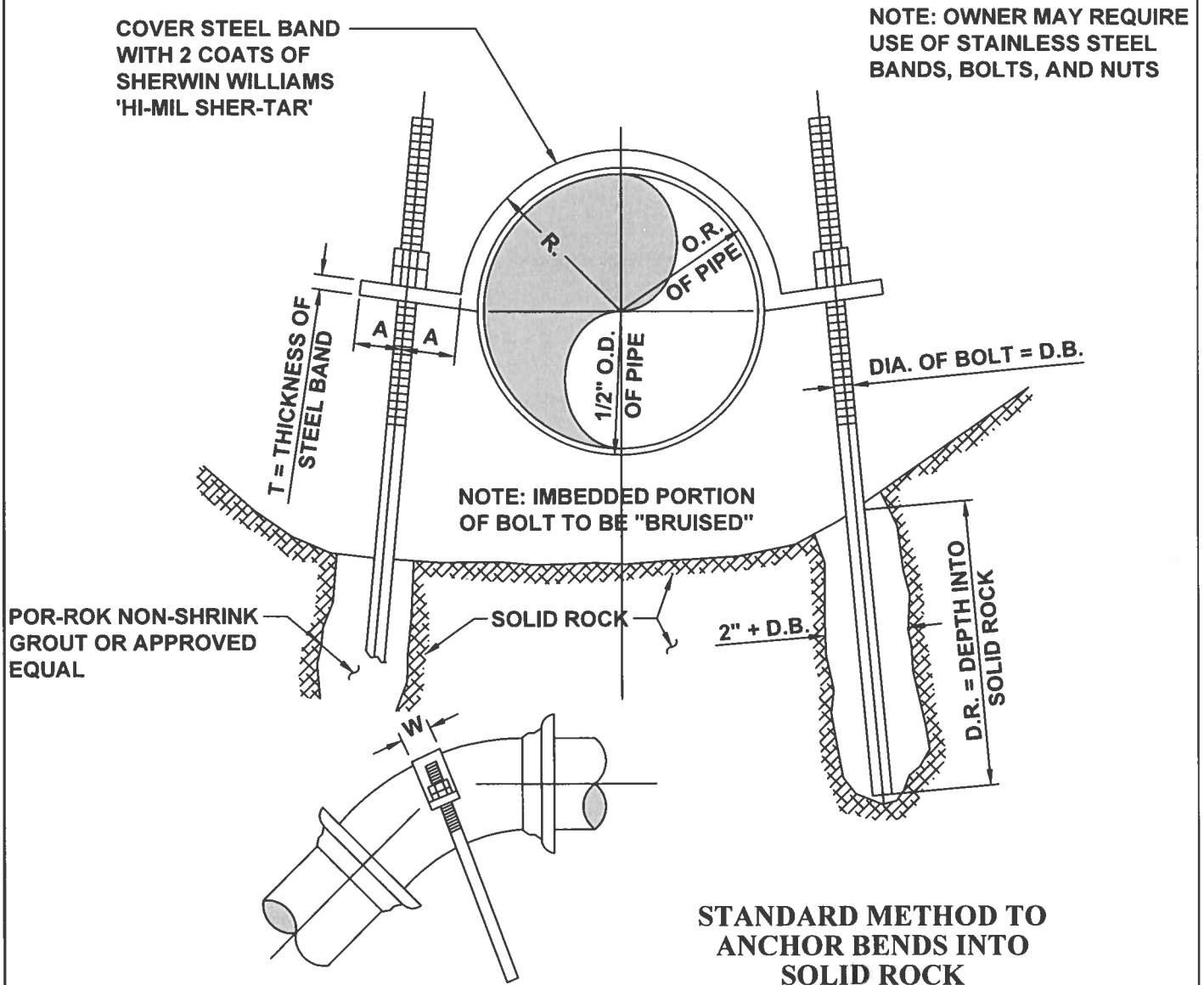
**CONCRETE ANCHORS AND  
METHOD OF LAYING MAINS  
UNDER OBSTRUCTIONS**

**Not to scale**

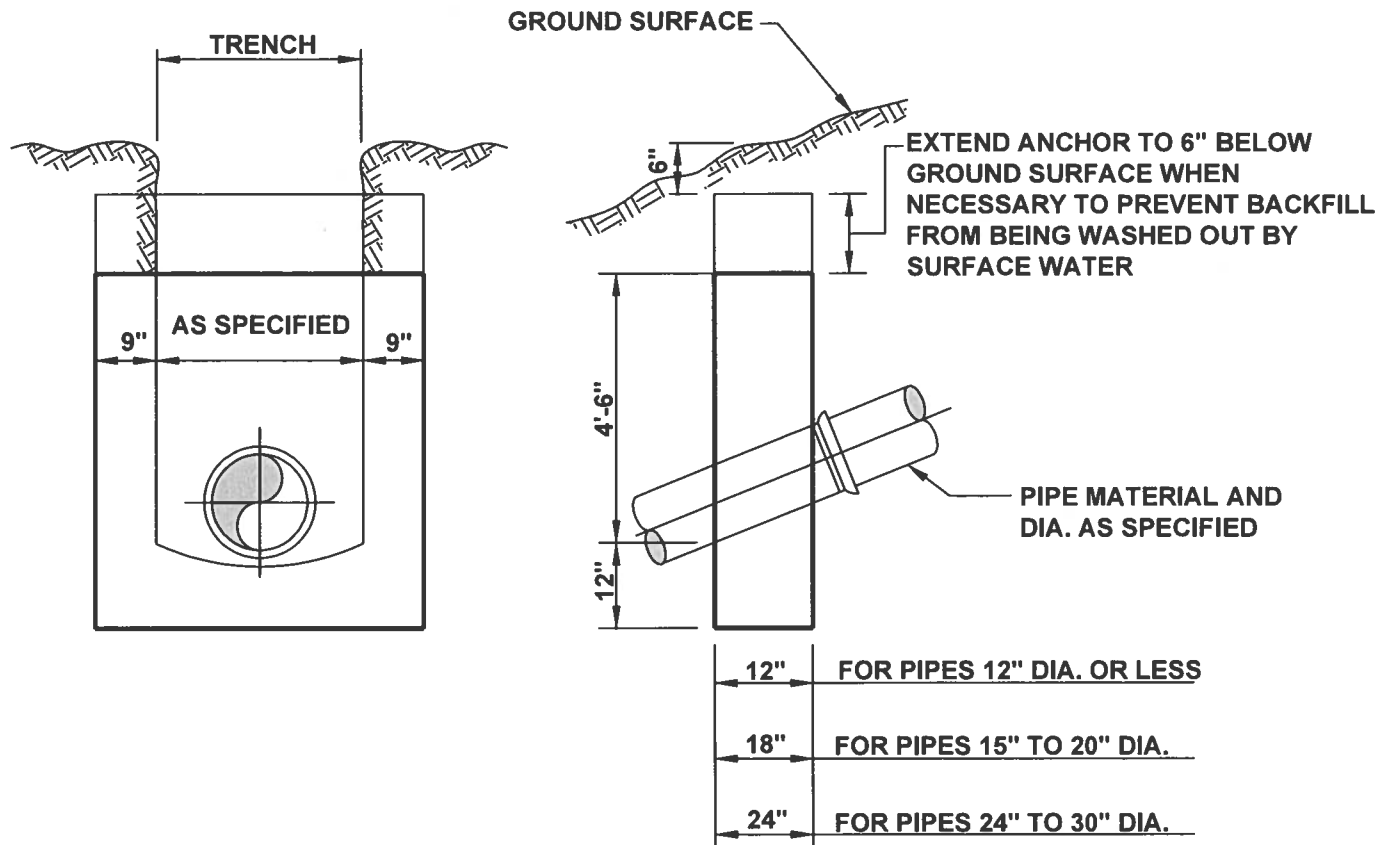
**September 2023**

**Standard Detail SD-021**

SIZE OF PIPE	4", 6", 8"			10" & 12"			14" & 16"			18" & 20"			24"		
DEGREE BEND	22 $\frac{1}{2}$ °	45°	90°	22 $\frac{1}{2}$ °	45°	90°	22 $\frac{1}{2}$ °	45°	90°	22 $\frac{1}{2}$ °	45°	90°	22 $\frac{1}{2}$ °	45°	90°
R = O.R.+	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"	1/2"	3/4"	3/4"	1/2"	3/4"	1"	1/2"	1"	1"
W	2"	2"	2"	2"	2 1/2"	3"	2"	3"	4"	3"	3 1/2"	4"	4"	4"	4"
T	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"	1/2"	3/4"	3/4"	1/2"	3/4"	1"	1/2"	1"	1"
A	2"	2"	2"	2"	2 1/2"	3"	2"	3"	3 1/2"	2 1/2"	3 1/2"	3 3/4"	3 1/2"	3 3/4"	4"
D.B.	3/4"	3/4"	3/4"	3/4"	1"	1 1/8"	3/4"	1 1/8"	1 1/2"	1"	1 3/8"	1 7/8"	1 1/4"	1 5/8"	2"
D.R.	6"	6"	6"	6"	8"	10"	6"	10"	10"	8"	10"	10"	10"	10"	10"



<small>PREPARED FOR:</small> <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	<small>PREPARED BY:</small> <b>KLH ENGINEERS INC</b> 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>STANDARD METHOD TO ANCHOR BENDS INTO SOLID ROCK</b>
Not to scale	September 2023	Standard Detail SD-022



### CONCRETE ANCHORS FOR PIPES ON STEEP GRADES

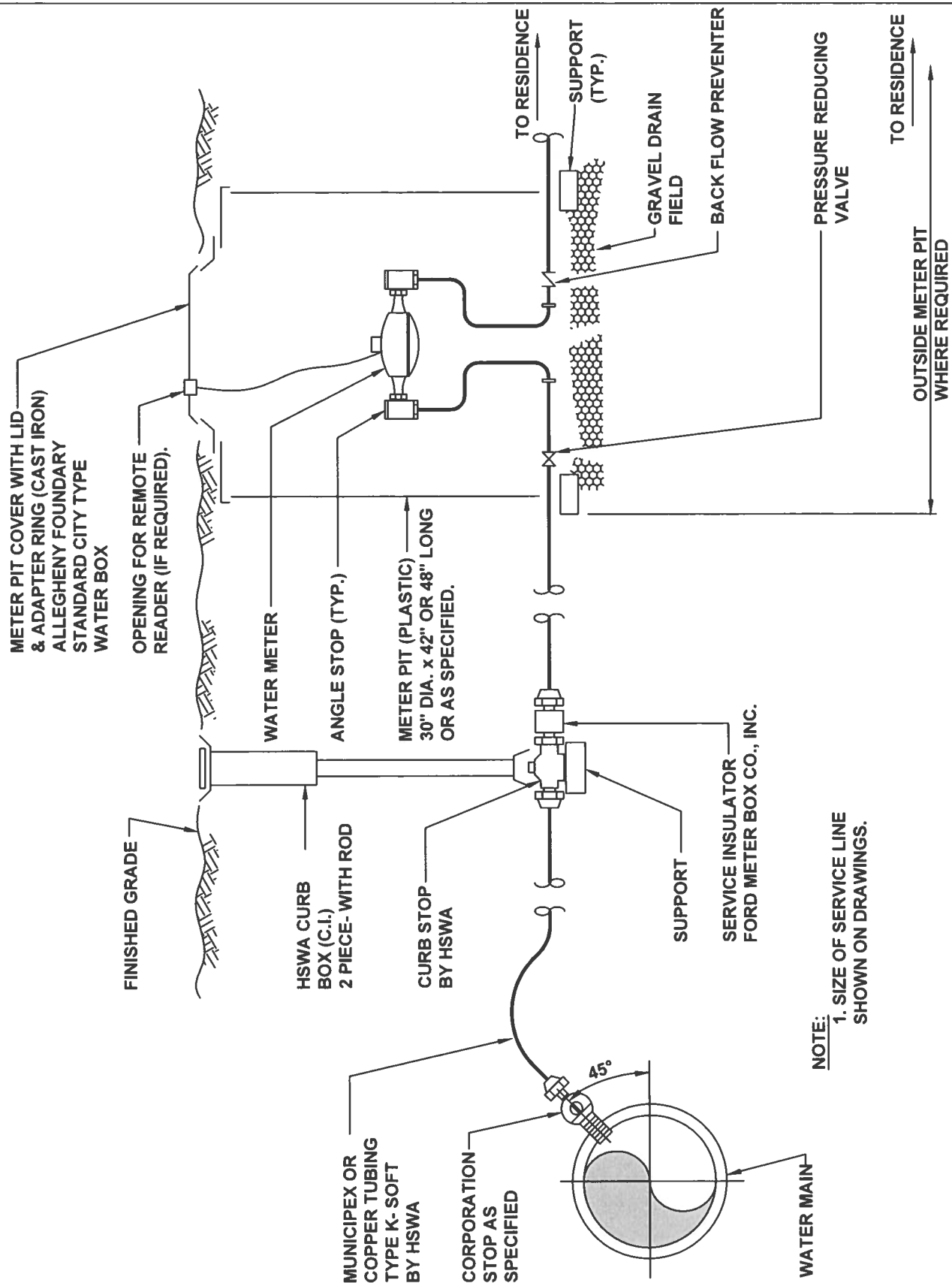
PROVIDE NO ANCHORS ON GRADES LESS THAN 20% UNLESS NOTED  
 PROVIDE ANCHORS 36' C-C ON GRADES BETWEEN 20% AND 34%  
 PROVIDE ANCHORS 24' C-C ON GRADES BETWEEN 34% AND 50%  
 PROVIDE ANCHORS 16' C-C ON GRADES BETWEEN 50% AND 70%

#### NOTE:

FOR CONDITIONS OTHER THAN SHOWN HEREON, ANCHORS SHALL BE PROVIDED AS REQUIRED BY THE CONTRACT PLANS OR ORDERED IN THE FIELD BY THE OWNER'S REPRESENTATIVE.

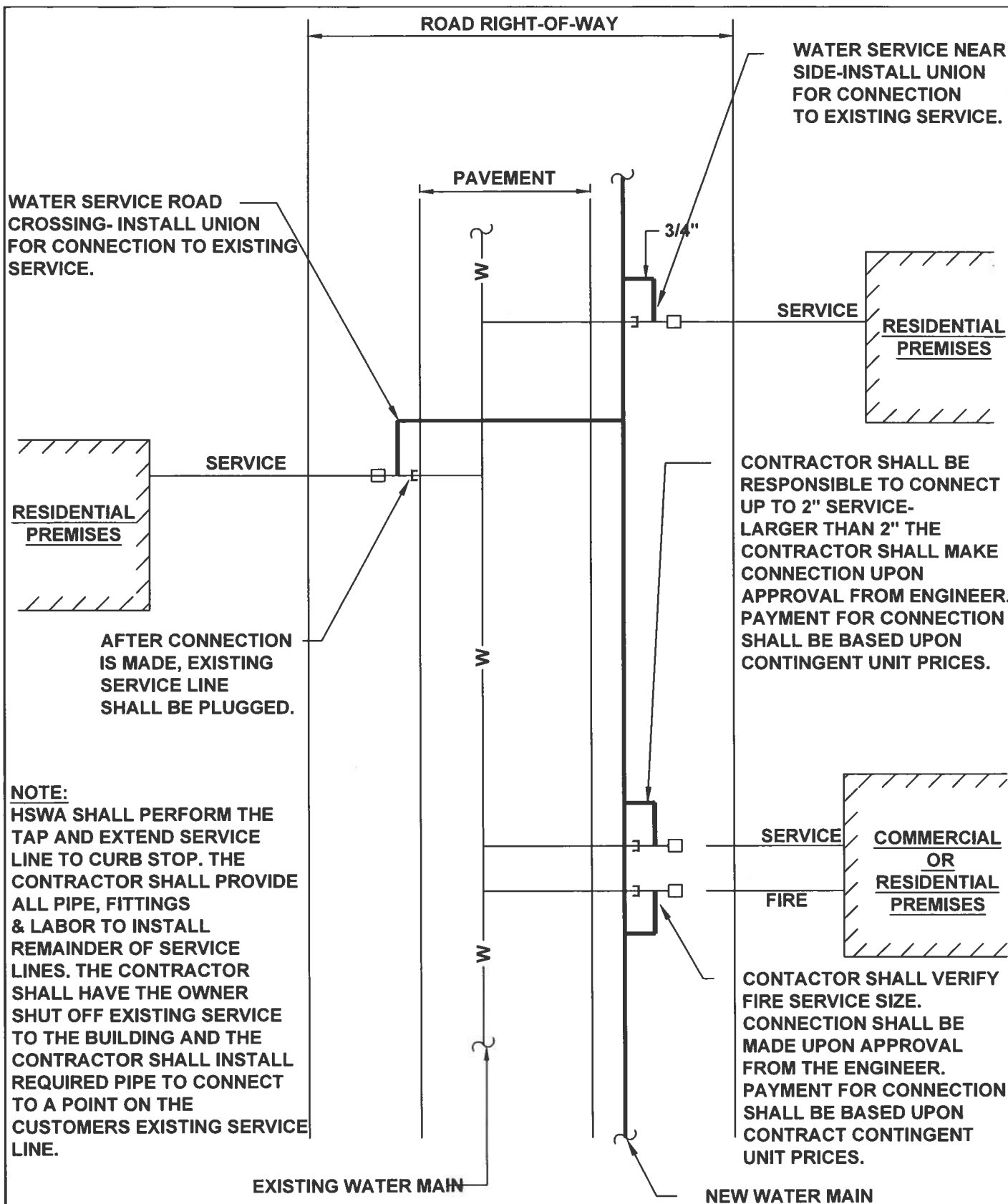
ANCHOR FACES TO USE WOOD FORMS THAT MAY BE LEFT IN PLACE UPON BACKFILL

PREPARED FOR: <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	PREPARED BY: <b>KLH</b> ENGINEERS, INC. 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>CONCRETE ANCHORS FOR PIPELINES</b>
<b>Not to scale</b>	<b>September 2023</b>	<b>Standard Detail SD-023</b>

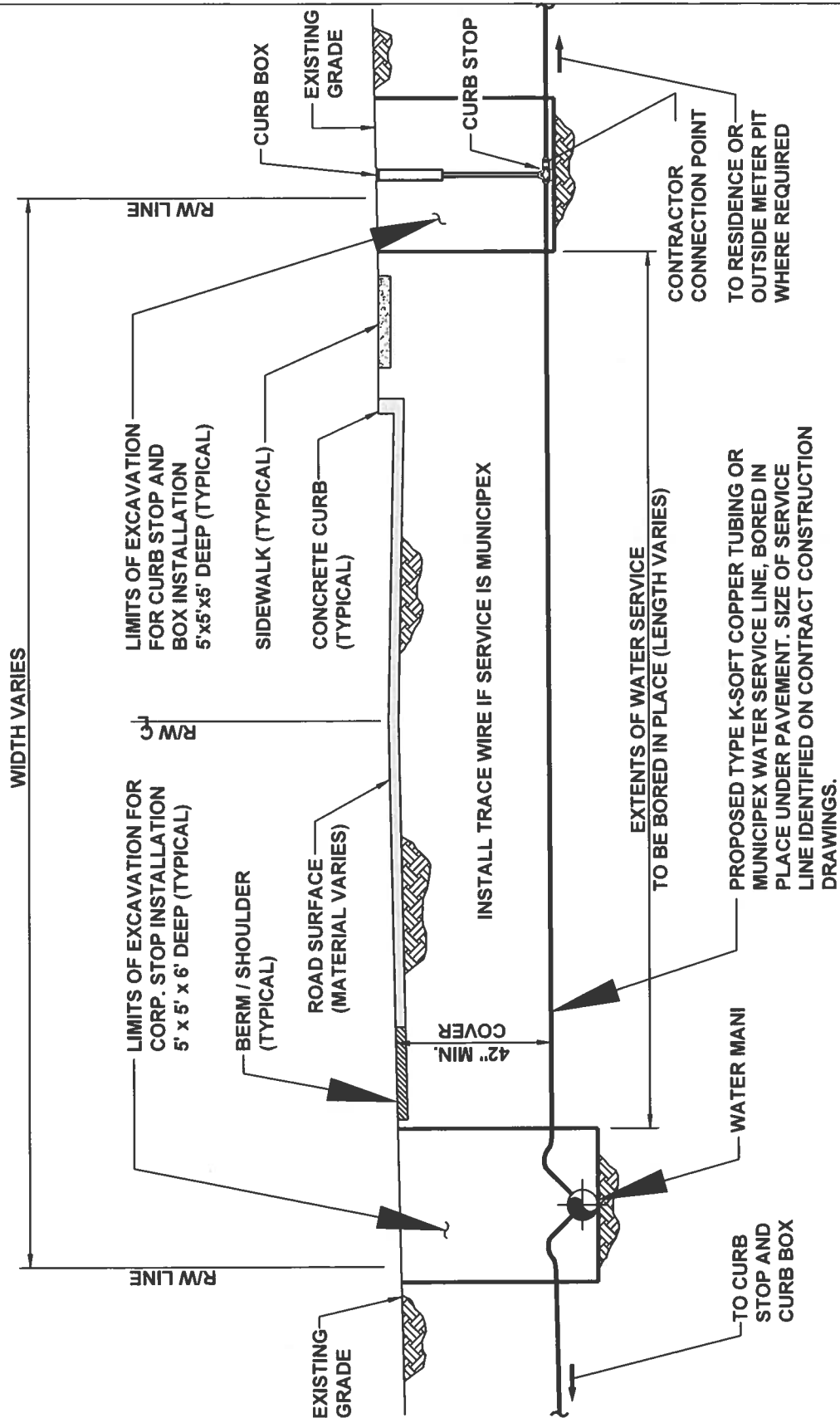


NOTE:  
1. SIZE OF SERVICE LINE  
SHOWN ON DRAWINGS.

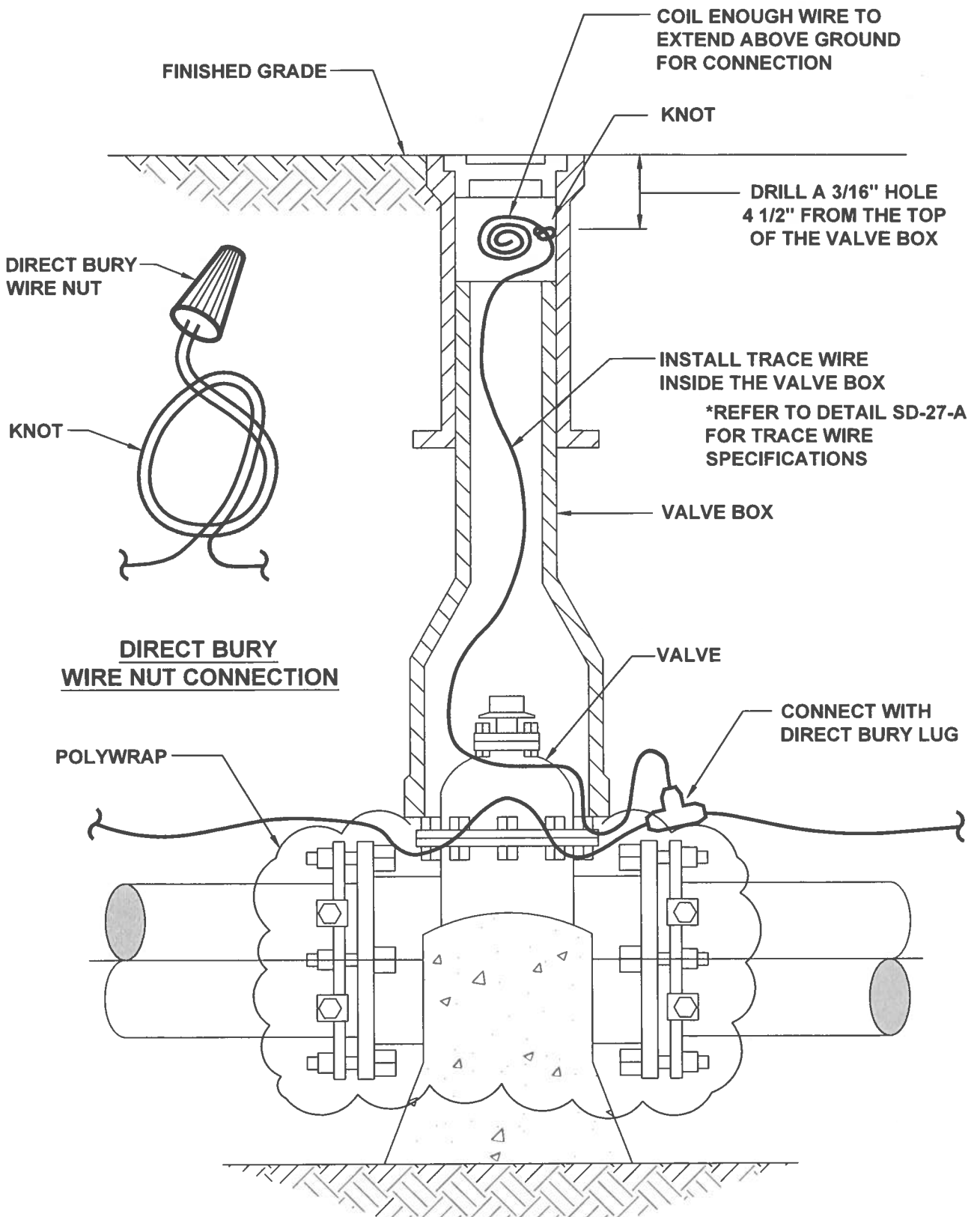
PREPARED FOR: <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	PREPARED BY: <b>KLH</b> ENGINEERS INC 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>TYPICAL CONNECTION FOR WATER SERVICE</b>
Not to scale	September 2023	Standard Detail SD-024



PREPARED FOR: <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	PREPARED BY: <b>KLH ENGINEERS, INC.</b> 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>TYPICAL WATER SERVICE LINE REPLACEMENT</b>
<b>Not to scale</b>	<b>September 2023</b>	<b>Standard Detail SD-025</b>



PREPARED FOR: <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	PREPARED BY: <b>KLH</b> ENGINEERS, INC. 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>TYPICAL CONNECTION FOR PROPOSED WATER SERVICE INSTALLATION BORED UNDER ROAD PAVEMENT</b>
<b>Not to scale</b>	<b>September 2023</b>	<b>Standard Detail SD-026</b>



PREPARED FOR: <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	PREPARED BY: <b>KLH ENGINEERS INC</b> 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>VALVE BOX TRACE WIRE DETAIL</b>  <div>1 OF 2</div>
Not to scale	September 2023	Standard Detail SD-027

**APPROVED TRACE WIRE MATERIAL:**

TRACE WIRE FOR DIRECT BURY INSTALLATIONS SHALL BE #12 AWG SOLID COPPER WIRE WITH A 30 MIL HIGH DENSITY POLYETHYLENE (HDPE) OR HIGH MOLECULAR WEIGHT POLYETHYLENE (HMWPE) COATING DESIGNED FOR DIRECT BURIAL. COLOR SHALL BE BLUE.

DIRECT BURY WIRE NUTS (DRYCONN DBSR AQUA MANUFACTURED BY KING INNOVATION OR APPROVED EQUAL).

DIRECT BURY LUG (DRYCONN DIRECT BURY LUG AQUA AS MANUFACTURED BY KING INNOVATION OR APPROVED EQUAL).

**INSTALLATION:**

TRACE WIRE SHALL BE INSTALLED IN A CONTINUOUS FASHION. INSTALL TRACE WIRE 6" ABOVE THE WATER MAIN. BRING TRACE WIRE TO SURFACE AT EVERY VALVE BOX. TRACE WIRE SHALL BE BROUGHT TO THE SURFACE AT LEAST EVERY FIVE HUNDRED (500) FEET. TAKE CARE NOT TO DAMAGE THE WIRE COATING. REPAIR DAMAGED COATING WITH ELECTRICAL TAPE.

**TRACE WIRE CONNECTIONS:**

**JOINING ENDS OF TRACE WIRE:**

CONNECTIONS INTO EXISTING TRACE WIRE, CONNECTIONS INTO TRACE WIRE USED DURING WATER MAIN BORES, CONNECTIONS BETWEEN ONE SPOOL OF TRACE WIRE TO ANOTHER, AND OTHER SIMILAR CONNECTIONS SHALL BE MADE USING A DIRECT BURY WIRE NUT. WHEN CONNECTING TRACE WIRE ENDS TOGETHER, STRIP 5/8" OF INSULATION FROM THE END OF EACH WIRE. INSERT THE TWO ENDS FIRMLY INTO THE DIRECT BURY WIRE NUT. TWIST THE WIRE NUT CLOCKWISE WHILE PUSHING THE WIRES FIRMLY INTO THE NUT. DO NOT OVER TORQUE. TIE THE WIRES IN A KNOT AS SHOWN IN THE DIRECT BURY WIRE NUT CONNECTION DETAIL ON SD-027.

**JOINING THE TRACE WIRE - BRANCH TO MAIN:**

CONNECTIONS OF TRACE WIRE AT TEES, CROSSES, AND AT LOCATIONS WHERE THE TRACE WIRE WILL BE BROUGHT TO THE SURFACE SHALL BE CONDUCTED USING A DIRECT BURY LUG.

**TRACE WIRE IN A VALVE BOX:**

TRACE WIRE SHALL BE BROUGHT UP IN ALL VALVE BOXES. THE TRACE WIRE SHALL BE BROUGHT TO THE SURFACE ACCORDING TO THE DETAIL ON DWG. SD-027.

**TRACE WIRE AT HYDRANTS:**

TRACE WIRE SHALL BE BROUGHT IN FIRE HYDRANTS BRANCH VALVES PER THE DETAIL ON SD-027.

**TRACE WIRE AT SERVICES:**

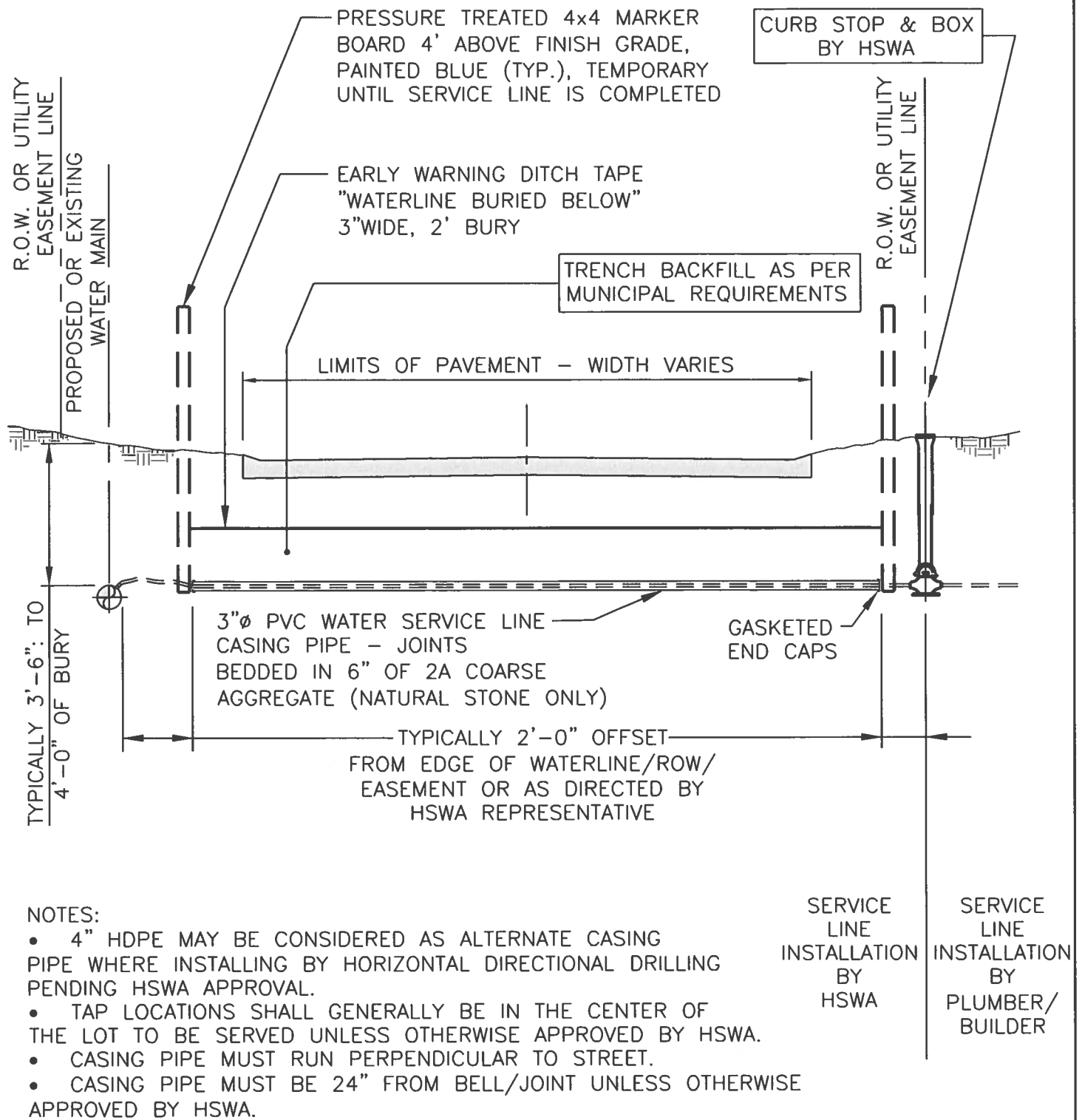
TRACE WIRE SHALL BE EXTENDED TO CURB STOP IF SERVICE IS MUNICIPEX.

**TRACE WIRE AT THE END OF THE PVC MAIN:**

AT ALL WATER MAIN END CAPS, A MINIMUM OF 6 FEET OF TRACER WIRE SHALL BE EXTENDED BEYOND THE END OF THE PIPE, COILED AND SECURED FOR FUTURE CONNECTIONS. THE END OF THE TRACER WIRE SHALL BE SPLICED TO THE WIRE OF A SIX POUND ZINC ANODE AND IS TO BE BURIED AT THE SAME ELEVATIONS AS THE WATER MAIN.

<small>PREPARED FOR:</small> <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	<small>PREPARED BY:</small> <b>KLH</b> ENGINEERS, INC. 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>TRACE WIRE SPECIFICATIONS</b>  <b>2 OF 2</b>
<b>Not to scale</b>	<b>September 2023</b>	<b>Standard Detail SD-027-A</b>

S:\KLH Template\Standard Details\Client Standard Details\42 Hampton Shaler Water Authority\DWG\SD-028 Service Line.dwg (SD-28) - Mar 07 2025 06:18:36 am PLOTTED BY: jantionas



### LONG SIDE WATER SERVICE LINE CASING PIPE DETAIL

<b>PREPARED FOR:</b> <b>Hampton Shaler Water Authority</b> 3101 McCully Rd Allison Park, Pa 15101 Allegheny County, Pennsylvania	<b>PREPARED BY:</b> <b>KLH ENGINEERS, INC.</b> 5173 Campbells Run Road Pittsburgh, Pa 15205 Phone: 412-494-0510 - Fax: 412-494-0426 info@klhengineers.com	<b>DETAIL OF LONG SIDE WATER SERVICE LINE CASING PIPE</b>
<b>Not to scale</b>	<b>March 2025</b>	<b>Standard Detail SD-28</b>