

**TOWNSHIP PAVEMENT RESTORATION NOTES:**

1. RESTORE WITH SUPERPAVE (25mm) TO SURFACE AND ALLOW TO SETTLE FOR 90 DAYS. SUPERPAVE DEPTH OF 6-1/2" OR TO MATCH EXISTING PAVING, WHICHEVER IS GREATER.
2. MILL RESTORED AREA PLUS 1 FOOT TO EACH SIDE OF TRENCH TO 1-1/2" DEPTH.
3. PAVE MILLED AREA WITH 1-1/2" OF SUPERPAVE (9.5mm).
4. SEAL EDGES WITH PG64-22.
5. PAVEMENT SAWCUTTING SHALL PROVIDE A CLEAN AND NEAT EDGE AT RIGHT ANGLES OF SURFACE OF PAVEMENT TO REMAIN.



**WARWICK TOWNSHIP MUNICIPAL AUTHORITY**

315 CLAY ROAD, LITITZ, PA 17543

**STANDARD DETAIL**

**TRENCH RESTORATION DETAIL FOR EXISTING PAVED AREAS**

DATE:  
MARCH 2020

SCALE:  
N.T.S.

DRAWING NO.

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CAD

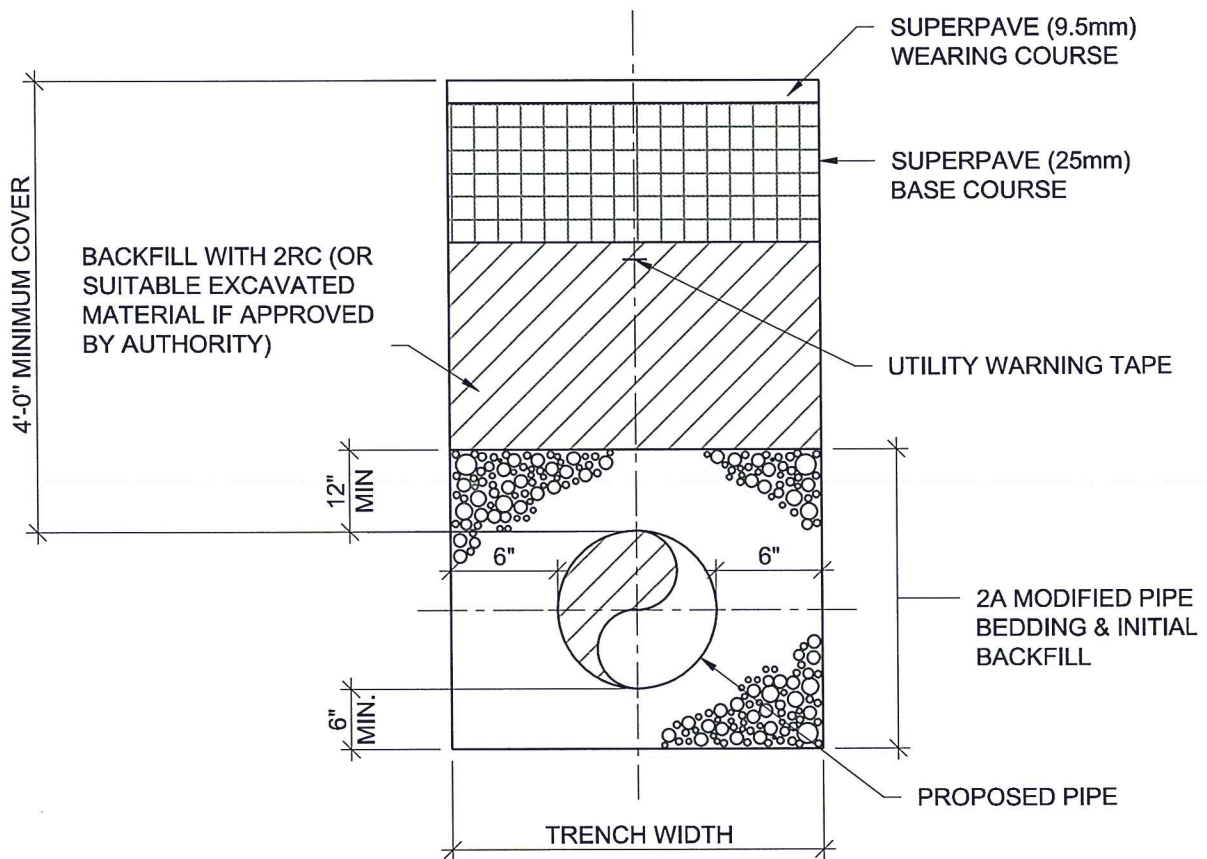
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PROJECT NO.  
4185.001

**W1**



**NEW DEVELOPMENT RESIDENTIAL STREET PAVMENT NOTES:**

1. RESTORE WITH SUPERPAVE (25mm) TO SURFACE AND ALLOW TO SETTLE FOR 90 DAYS.
2. FINAL PAVE WITH SUPERPAVE (9.5mm)
3. PAVEMENT CROSS SECTION AS REQUIRED BY TOWNSHIP.



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**WARWICK TOWNSHIP MUNICIPAL AUTHORITY**

315 CLAY ROAD, LITITZ, PA 17543

**STANDARD DETAIL**

**TRENCH RESTORATION FOR NEW DEVELOPMENT RESIDENTIAL STREETS**

DATE:  
MARCH 2020

SCALE:  
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**W1A**

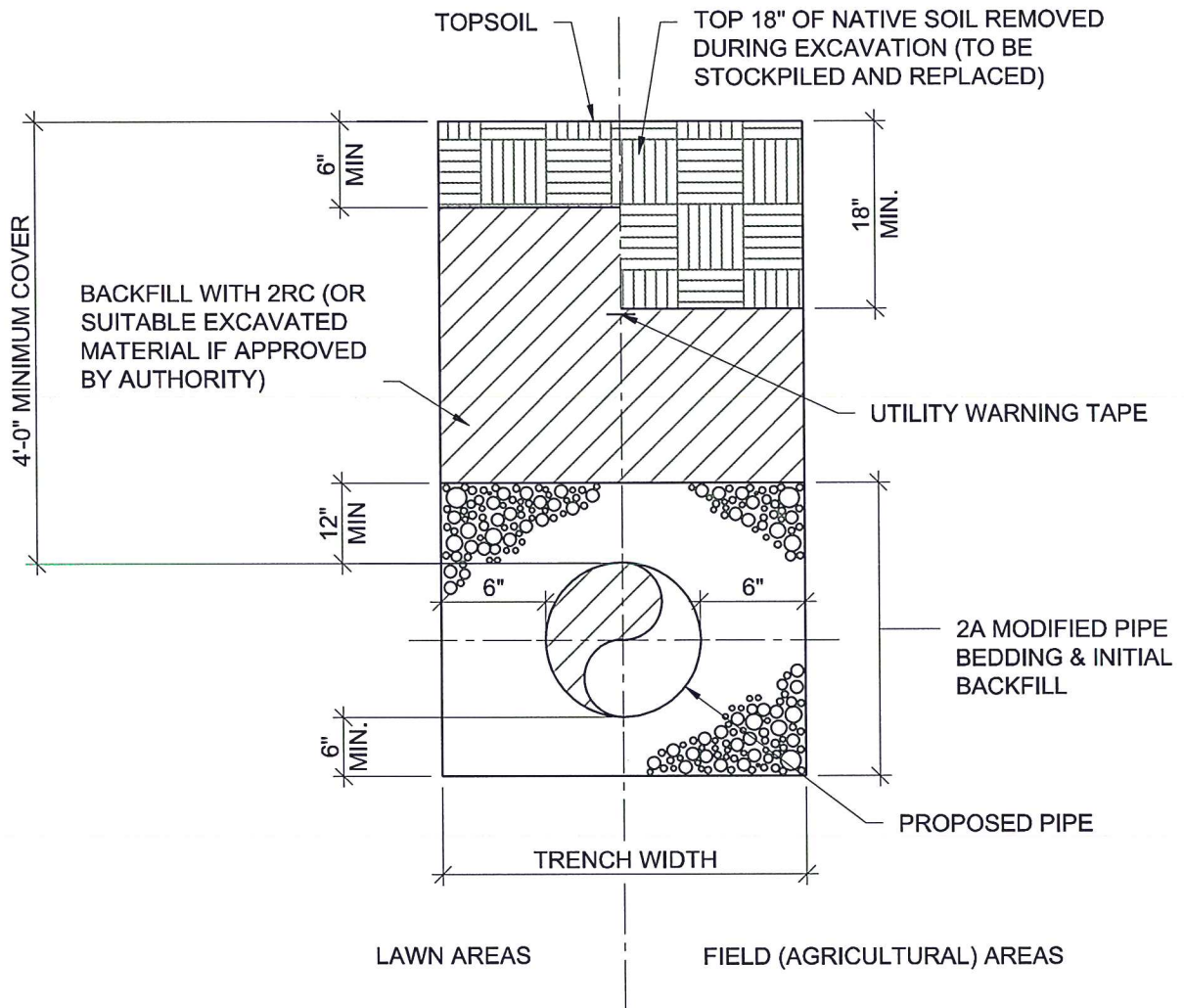
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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

### STANDARD DETAIL

#### TRENCH RESTORATION LAWN / FIELD AREAS

DATE:  
MARCH 2020

SCALE:  
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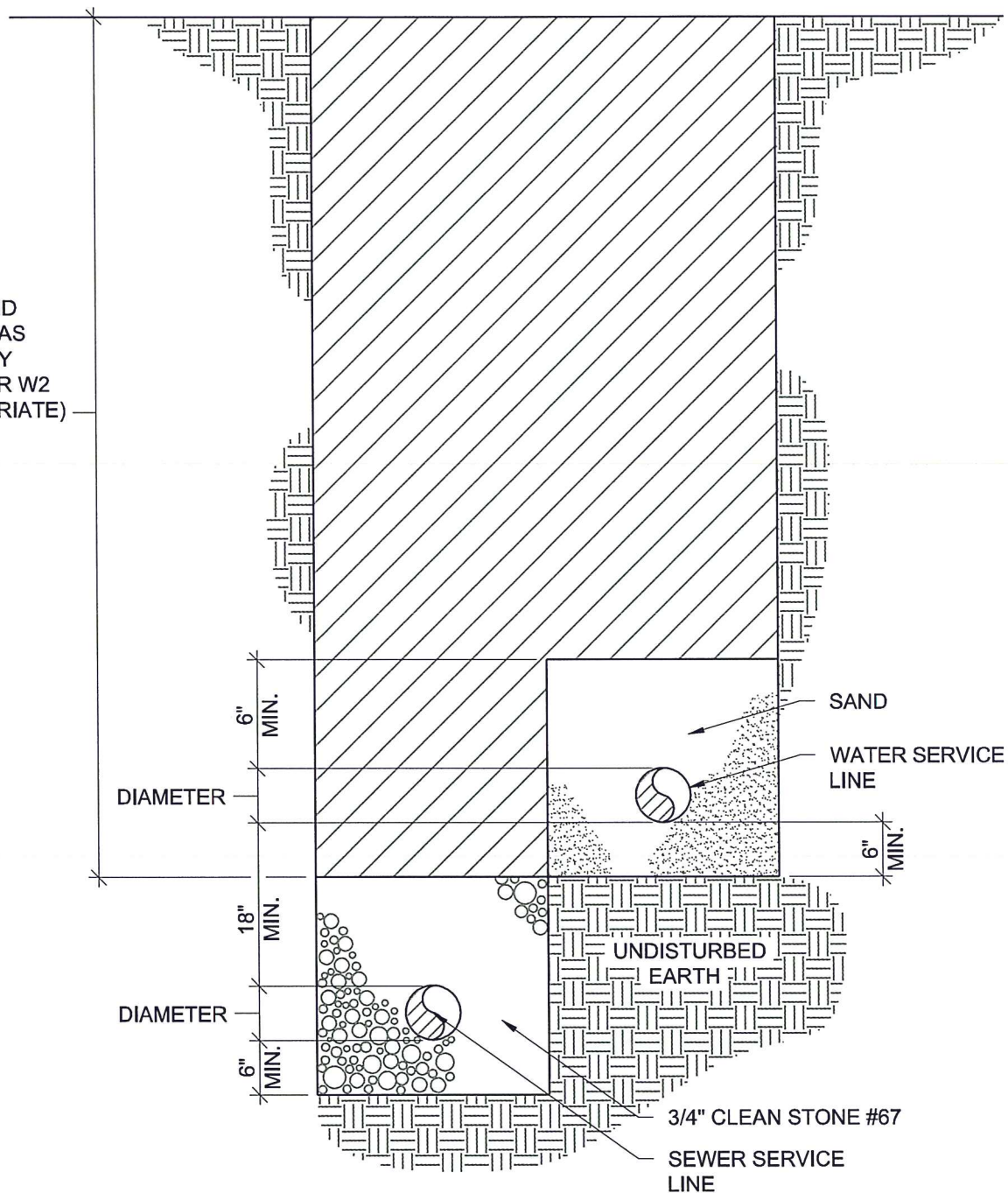
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BACKFILL AND  
SURFACING AS  
REQUIRED BY  
S1, W1, S2 OR W2  
(AS APPROPRIATE)



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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

### STANDARD DETAIL

COMBINED WATER / SEWER TRENCH (LATERALS ONLY)

DATE:  
MARCH 2020

SCALE:  
N.T.S.

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**W3**

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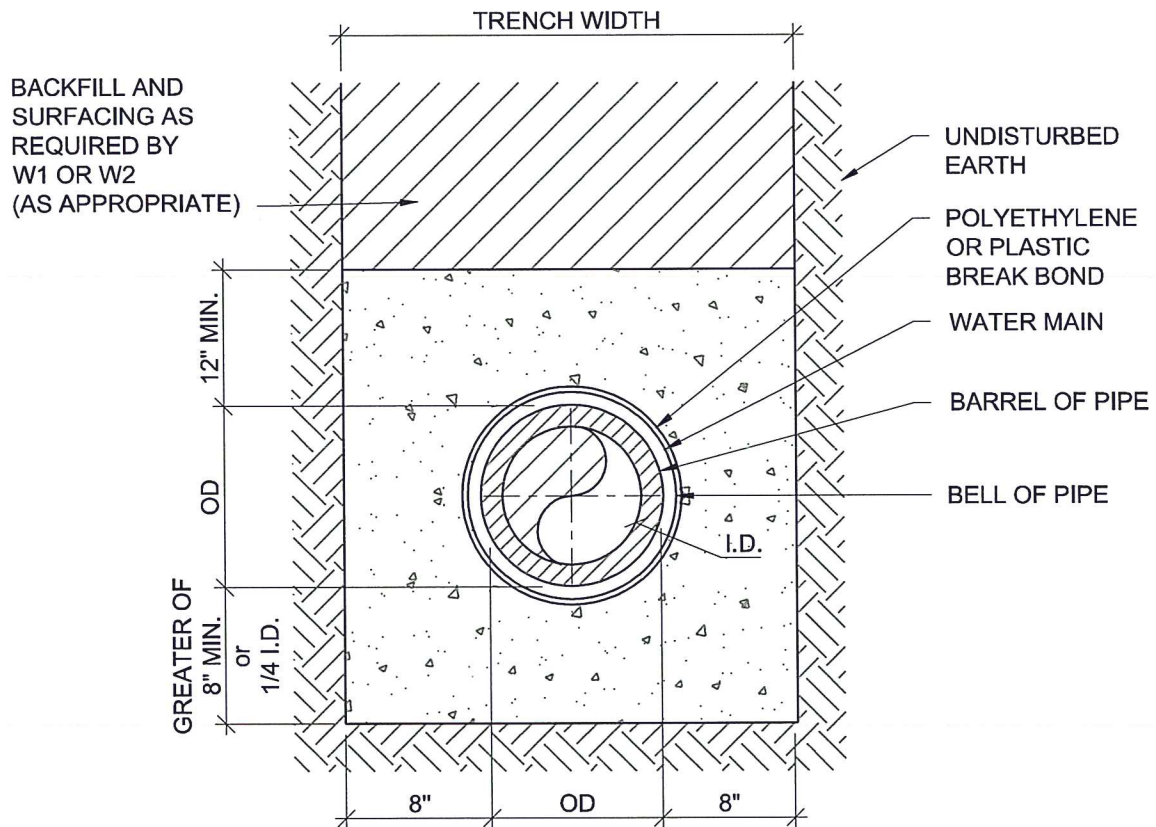
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NOTE: ALL CONCRETE SHALL HAVE MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT THE END OF 28 DAYS.



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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

STANDARD DETAIL

CONCRETE ENCASEMENT

DATE:  
MARCH 2020

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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

### STANDARD DETAIL

#### CONCRETE SLOPE COLLAR ANCHOR

DATE:  
MARCH 2020

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HORIZONTAL BENDS							
NOMINAL PIPE DIA.	LENGTH OF PIPE RESTRAINT REQUIRED PER FITTING IN FEET						
	11.25°	22.5°	45°	90°	TEE	CAP/VALVE	REDUCER
4	2	3	6	13	11	14	--
6	2	4	8	19	16	20	10
8	3	5	10	25	23	26	11
10	3	6	13	30	28	32	11
12	4	7	15	35	34	38	11
16	5	10	19	46	46	49	21

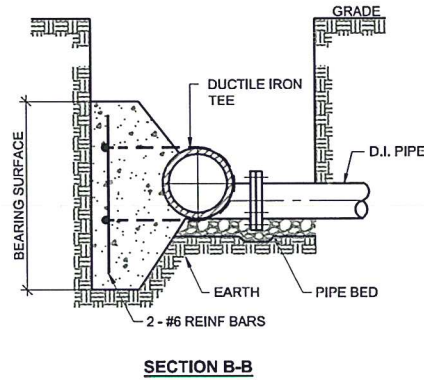
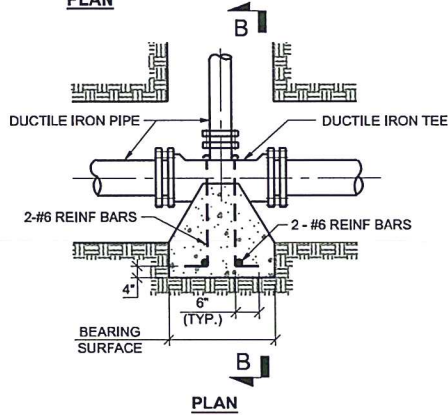
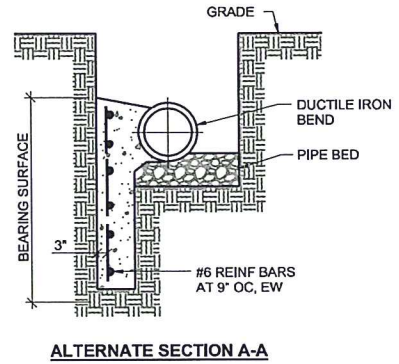
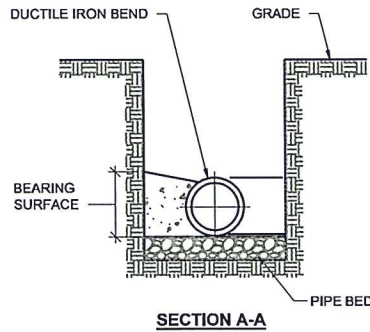
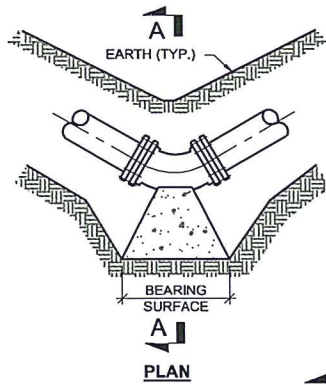
VERTICAL BENDS								
NOMINAL PIPE DIA.	LENGTH OF PIPE RESTRAINT REQUIRED PER FITTING IN FEET							
	VERTICAL UP BEND ANGLE				VERTICAL DOWN BEND ANGLE			
	11.25°	22.5°	45°	90°	11.25°	22.5°	45°	90°
4	2	3	6	13	3	6	12	28
6	2	4	8	19	4	8	16	39
8	3	5	10	25	6	11	22	52
10	3	6	13	30	7	13	26	63
12	4	7	15	35	8	15	31	75
16	5	10	19	46	10	20	41	98

**NOTES:**

1. LENGTHS ARE BASED ON THE DUCTILE IRON PIPE RESEARCH ASSOCIATION THRUST RESTRAINT DESIGN FOR DUCTILE IRON PIPE ONLINE CALCULATOR, ACCESSED 01/03/2020. ASSUMING THE FOLLOWING: TRENCH - TYPE 5, SOIL - CLAY 1, BURY DEPTH 4', PRESSURE 150 PSI, SAFETY FACTOR 1.5, AND TEE RUN LENGTH TO FIRST JOINT 6'.
2. LENGTHS ARE PROVIDED FOR DUCTILE IRON PIPE WITHOUT POLYETHYLENE WRAP. POLYETHYLENE WRAP WILL REQUIRE ADDITIONAL RESTRAINT LENGTH TO BE DETERMINED ON AN AS NEEDED BASIS BY WTMA ENGINEER.
3. REDUCER LENGTHS ARE GIVEN FROM THE INDICATED SIZE TO THE NEXT SMALLER SIZE. REDUCER RESTRAINT LENGTHS SHOULD BE ADDED IF GREATER REDUCTION IS REQUIRED (I.E. 16" TO 8" = 21+11+11 = 43 FEET)

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			DATE: MARCH 2020	SCALE: N.T.S.	DRAWING NO.
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THRUST BLOCKING SCHEDULE OF DIMENSIONS								
MINIMUM SQUARE FEET OF BEARING SURFACE REQUIRED FOR HORIZONTAL THRUST BLOCKING AND VERTICAL THRUSTS DOWNWARD * BASED UPON 150 PSI PRESSURE *								
PIPE SIZES →	4", 6" AND 8"				10" AND 12"			
	DEGREE BEND OR DEFLECTION				DEGREE BEND OR DEFLECTION			
TYPE OF BEARING MATERIAL AND ALLOWABLE LOADS	11 1/4"	22 1/2"	45°	90°	11 1/4"	22 1/2"	45°	90°
SAND 1 TON/SQ FT SOFT CLAY 1 TON/SQ FT	1.50	3.00	6.00	12.00	3.00	6.00	12.00	24.50
SAND & GRAVEL 2 TON/SQ FT	1.00	1.50	3.00	6.00	1.50	3.00	6.00	12.00
CLAY 3 TON/SQ FT	1.00	1.00	2.00	4.00	1.00	2.00	4.00	8.00
SOFT ROCK 5 TON/SQ FT	1.00	1.00	1.00	2.50	1.00	1.00	2.50	5.00
ROCK 20 TON/SQ FT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MINIMUM SQUARE FEET OF BEARING SURFACE REQUIRED FOR HORIZONTAL THRUST BLOCKING AND VERTICAL THRUSTS DOWNWARD * BASED UPON 150 PSI PRESSURE *								
PIPE SIZES →	16"							
	DEGREE BEND OR DEFLECTION							
TYPE OF BEARING MATERIAL AND ALLOWABLE LOADS	11 1/4"	22 1/2"	45°	90°				
SAND 1 TON/SQ FT SOFT CLAY 1 TON/SQ FT	5.50	11.00	21.50	43.00				
SAND & GRAVEL 2 TON/SQ FT	2.50	5.50	11.00	21.50				
CLAY 3 TON/SQ FT	2.00	3.50	7.00	14.00				
SOFT ROCK 5 TON/SQ FT	1.00	2.00	4.50	8.50				
ROCK 20 TON/SQ FT	1.00	1.00	1.00	2.00				

#### NOTES:

1. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT THE END OF 28 DAYS. POURED CONCRETE OR SAKCRETE ONLY.
2. ALL REINFORCING STEEL SHALL BE GRADE 60 DEFORMED BARS.
3. INSTALL CONCRETE THRUST BLOCKS AT EACH ELBOW, TEE AND CAPPED OR VALVED END FITTINGS LOCATED IN THE HORIZONTAL PLANE.
4. PAINT ALL EXPOSED STEEL WITH TWO COATS OF ASPHALT PAINT.
5. NO COUPLING OR JOINTS SHALL BE COVERED WITH CONCRETE.
6. STAINLESS STEEL ALL-THREADS WITH PIPE STRAPS MAY BE USED IN PLACE OF REINFORCING BARS.
7. ALL THRUST BLOCKS SHOWN ARE INTENDED AS A GUIDE AND SHALL WITHSTAND THE REQUIRED PRESSURE.
8. MEGALUGS REQUIRED ON ALL MECHANICAL JOINT FITTINGS.
9. CERTAIN SITUATIONS MAY WARRANT THE USE OF TIE RODS AS INDICATED ON THIS DETAIL OR AS REQUIRED BY THE AUTHORITY.
10. PIPING SHALL BE WRAPPED WITH POLYETHYLENE PRIOR TO PLACEMENT OF CONCRETE.
11. FOR SOIL BEARING VALUES LESS THAN 1 TON / SQ. FT., CONSULT WITH AUTHORITY ENGINEER FOR RECOMMENDATION.
12. CONCRETE QUANTITY TO BE IN ACCORDANCE WITH THIS DETAIL. MINIMUM AMOUNT OF CONCRETE MUST BE INSTALLED.



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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

### STANDARD DETAIL

### HORIZONTAL THRUST BLOCKING

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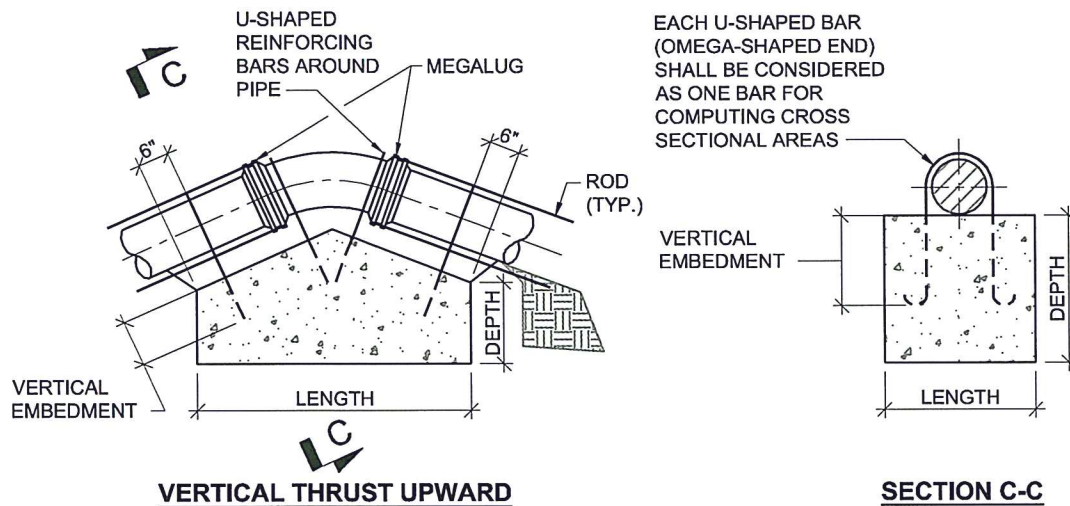
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### VERTICAL THRUST BLOCKING UPWARD THRUSTS SCHEDULE OF DIMENSIONS

\* BASED UPON 150 PSI PRESSURE \*

PIPE SIZE	4", 6" AND 8"			10" AND 12"			16"		
DEGREE BEND OR DEFLECTION	11 1/4°	22 1/2°	45°	11 1/4°	22 1/2°	45°	11 1/4°	22 1/2°	45°
LENGTH	3.00	4.00	6.00	4.50	6.00	8.00	6.00	8.00	11.00
WIDTH	3.00	3.00	3.00	3.00	3.00	4.00	3.50	3.50	5.00
DEPTH	2.00	3.00	4.00	3.00	4.50	5.00	3.50	5.00	5.00
SQ. IN. REINFORCING	0.17	0.33	0.65	0.37	0.74	1.46	0.66	1.32	2.60

BAR NO.	5	6	7	8	9	10	11
CROSS-SECTION IN <sup>2</sup> PER BAR	0.31	0.44	0.60	0.79	1.00	1.27	1.56
VERTICAL EMBEDMENT	15"	19"	26"	35"	44"	56"	68"

#### NOTES:

- ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT THE END OF 28 DAYS. POURED CONCRETE OR SAKCRETE ONLY.
- ALL REINFORCING STEEL SHALL BE GRADE 60 DEFORMED BARS.
- INSTALL CONCRETE THRUST BLOCKS AT EACH ELBOW, TEE AND CAPPED OR VALVED END FITTINGS LOCATED IN THE VERTICAL PLANE.
- PAINT ALL EXPOSED STEEL WITH TWO COATS OF ASPHALT PAINT.
- NO COUPLING OR JOINTS SHALL BE COVERED WITH CONCRETE.
- STAINLESS STEEL ALL-THREADS WITH PIPE STRAPS MAY BE USED IN PLACE OF REINFORCING BARS.
- ALL THRUST BLOCKS SHOWN ARE INTENDED AS A GUIDE AND SHALL WITHSTAND THE REQUIRED PRESSURE.
- MEGALUGS REQUIRED ON ALL MECHANICAL JOINT FITTINGS.
- CERTAIN SITUATIONS MAY WARRANT THE USE OF TIE RODS AS INDICATED ON THIS DETAIL OR AS REQUESTED BY THE AUTHORITY.
- PIPING SHALL BE WRAPPED WITH POLYETHYLENE PRIOR TO PLACEMENT OF CONCRETE.
- FOR SOIL BEARING VALUES LESS THAN 1 TON / SQ. FT., CONSULT WITH AUTHORITY ENGINEER FOR RECOMMENDATION.
- CONCRETE QUANTITY TO BE IN ACCORDANCE WITH THIS DETAIL. MINIMUM AMOUNT OF CONCRETE MUST BE INSTALLED.



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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

STANDARD DETAIL

VERTICAL THRUST BLOCKING

DATE:  
MARCH 2020

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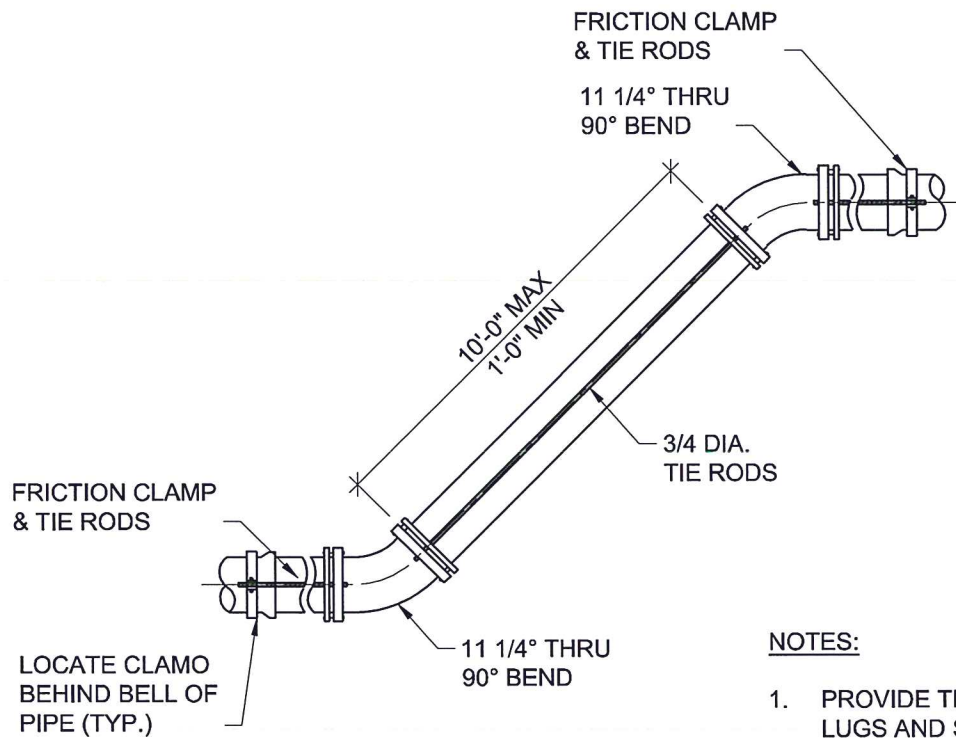
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4185.001

**W8**



**NOTES:**

1. PROVIDE THRUST CLAMPS WITH LUGS AND STAINLESS STEEL TIE RODS AT EACH ELBOW LOCATED IN THE VERTICAL PLAN.
2. PROVIDE STAINLESS STEEL TIE RODS.



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**WARWICK TOWNSHIP MUNICIPAL AUTHORITY**

315 CLAY ROAD, LITITZ, PA 17543

**STANDARD DETAIL**

**THRUST CLAMPING**

DATE:  
MARCH 2020

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**W9**

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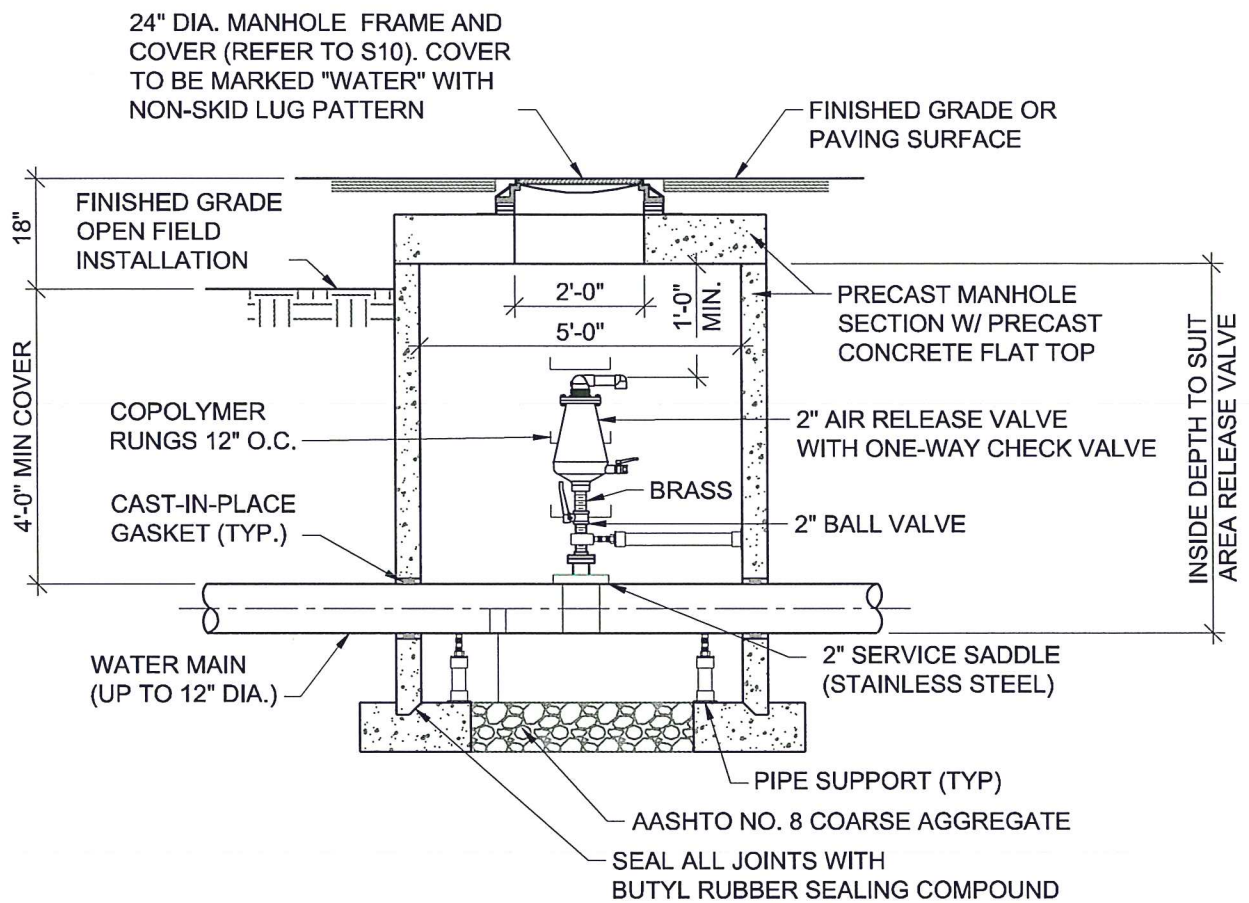
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**NOTES:**

1. NO PIPE JOINTS IN MANHOLE
2. MANHOLE COVER SHALL BE 24 INCH DIAMETER BY 1 1/2 INCH THICK AT SEATING SURFACE OF FRAME.



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**WARWICK TOWNSHIP MUNICIPAL AUTHORITY**

315 CLAY ROAD, LITITZ, PA 17543

**STANDARD DETAIL**

**AIR RELEASE VALVE AND MANHOLE**

DATE:  
MARCH 2020

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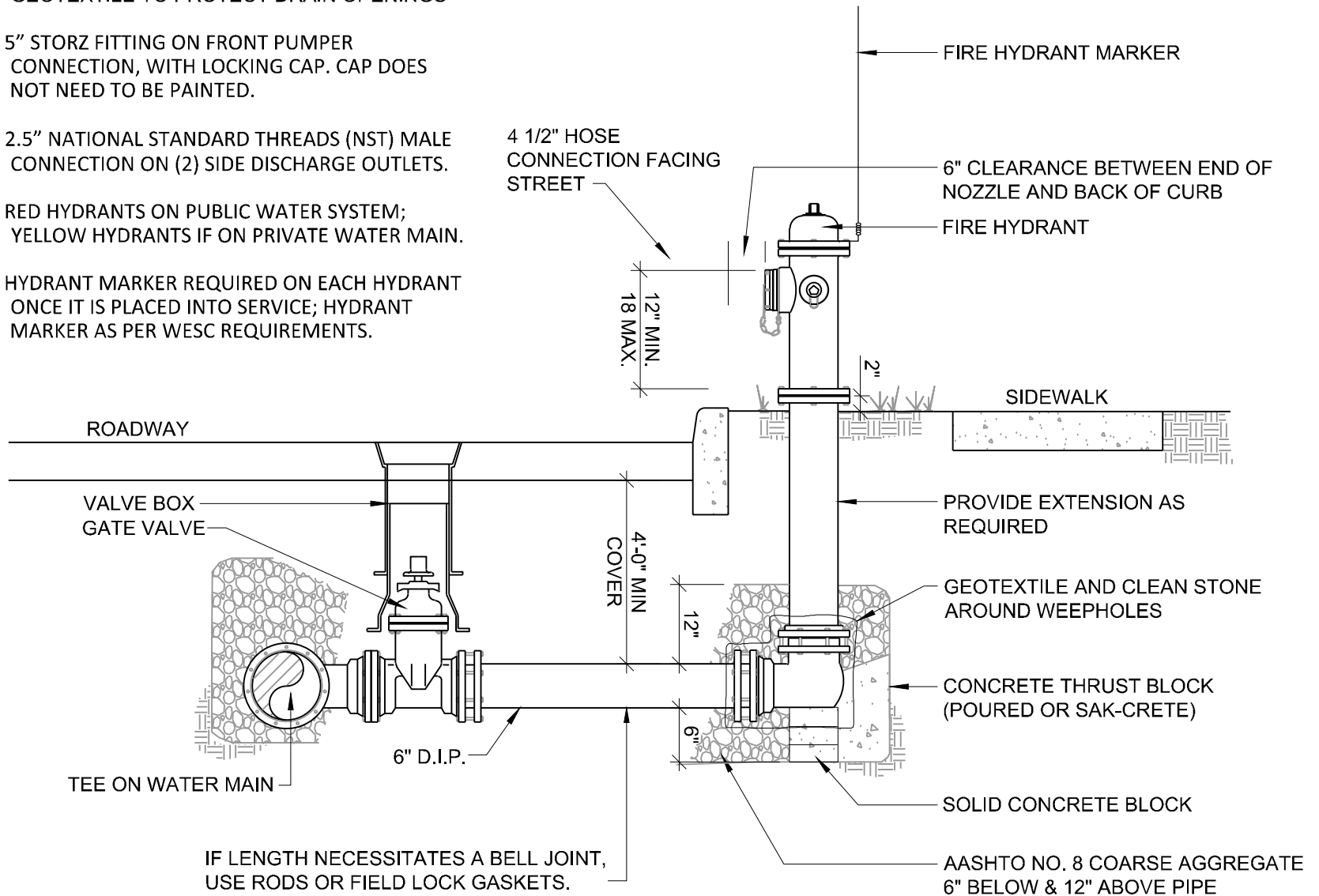
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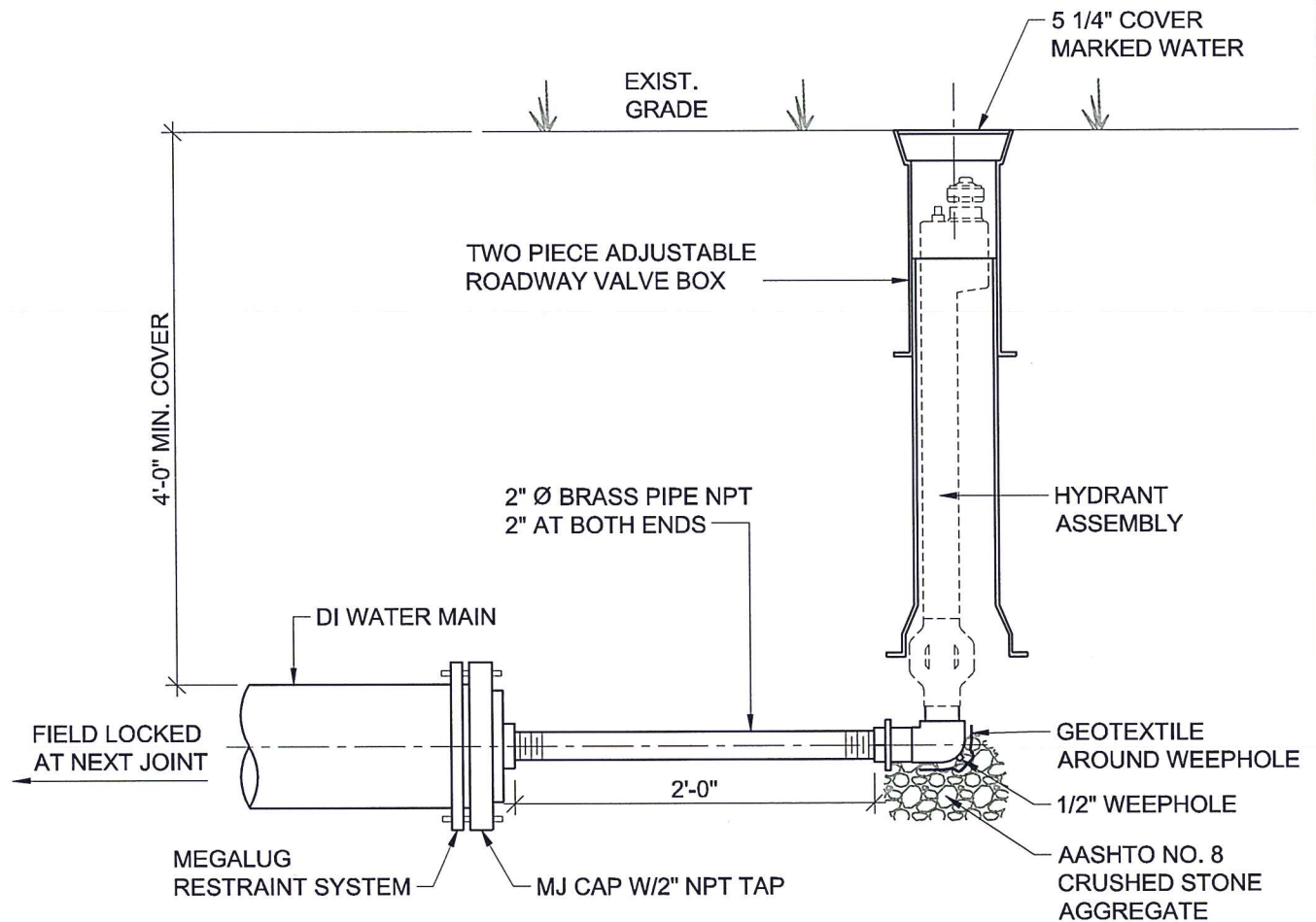
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<b>WARWICK TOWNSHIP MUNICIPAL AUTHORITY</b> 315 CLAY ROAD, LITITZ, PA 17543 <b>STANDARD DETAIL</b> FIRE HYDRANT ASSEMBLY		DATE: APRIL 2020	SCALE: N.T.S.	DRAWING NO. <b>W11</b>
		REV. / DATE A 4/7/2020	PROJECT NO. 4185.001	

**NOTES:**

1. PROVIDE THRUST RESTRAINT BETWEEN GATE VALVE AND TEE USING MEGA-LUGS OR TIE RODS AND CONCRETE THRUST BLOCKS.
2. WRAP BASE AND BASE FLANGE WITH GEOTEXTILE TO PROTECT DRAIN OPENINGS
3. 5" STORZ FITTING ON FRONT PUMPER CONNECTION, WITH LOCKING CAP. CAP DOES NOT NEED TO BE PAINTED.
4. 2.5" NATIONAL STANDARD THREADS (NST) MALE CONNECTION ON (2) SIDE DISCHARGE OUTLETS.
5. RED HYDRANTS ON PUBLIC WATER SYSTEM; YELLOW HYDRANTS IF ON PRIVATE WATER MAIN.
6. HYDRANT MARKER REQUIRED ON EACH HYDRANT ONCE IT IS PLACED INTO SERVICE; HYDRANT MARKER AS PER WESC REQUIREMENTS.





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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

STANDARD DETAIL

BLOW-OFF HYDRANT

DATE:  
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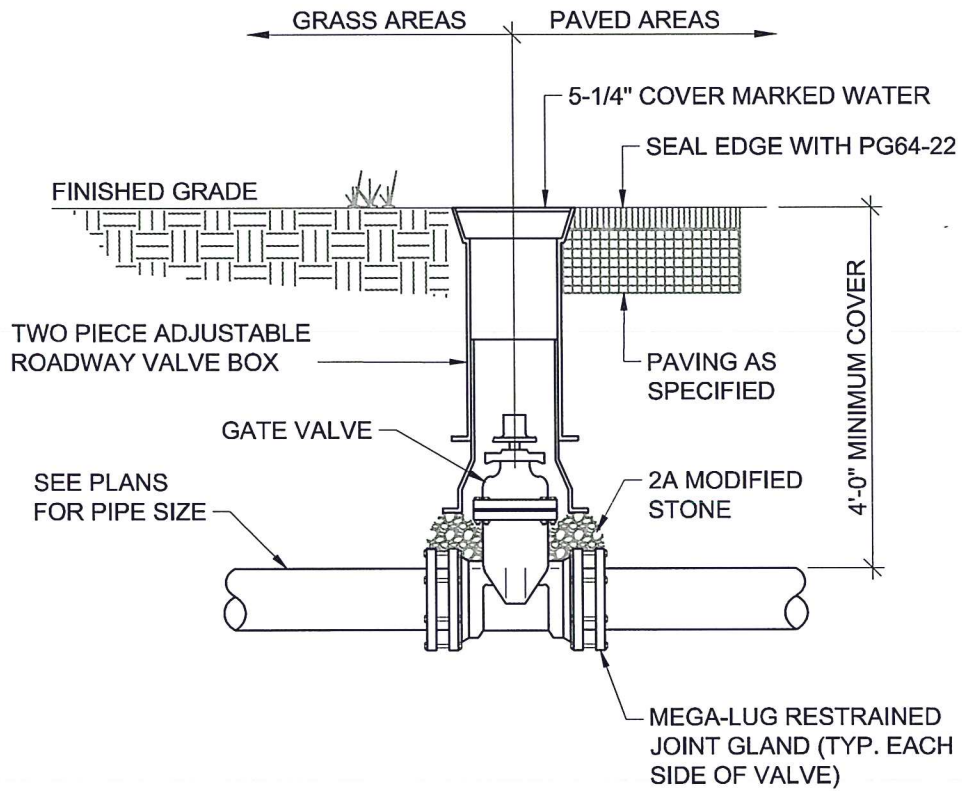
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**W12**





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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

STANDARD DETAIL

BURIED GATE VALVE & VALVE BOX

DATE:  
MARCH 2020

SCALE:  
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**W13**

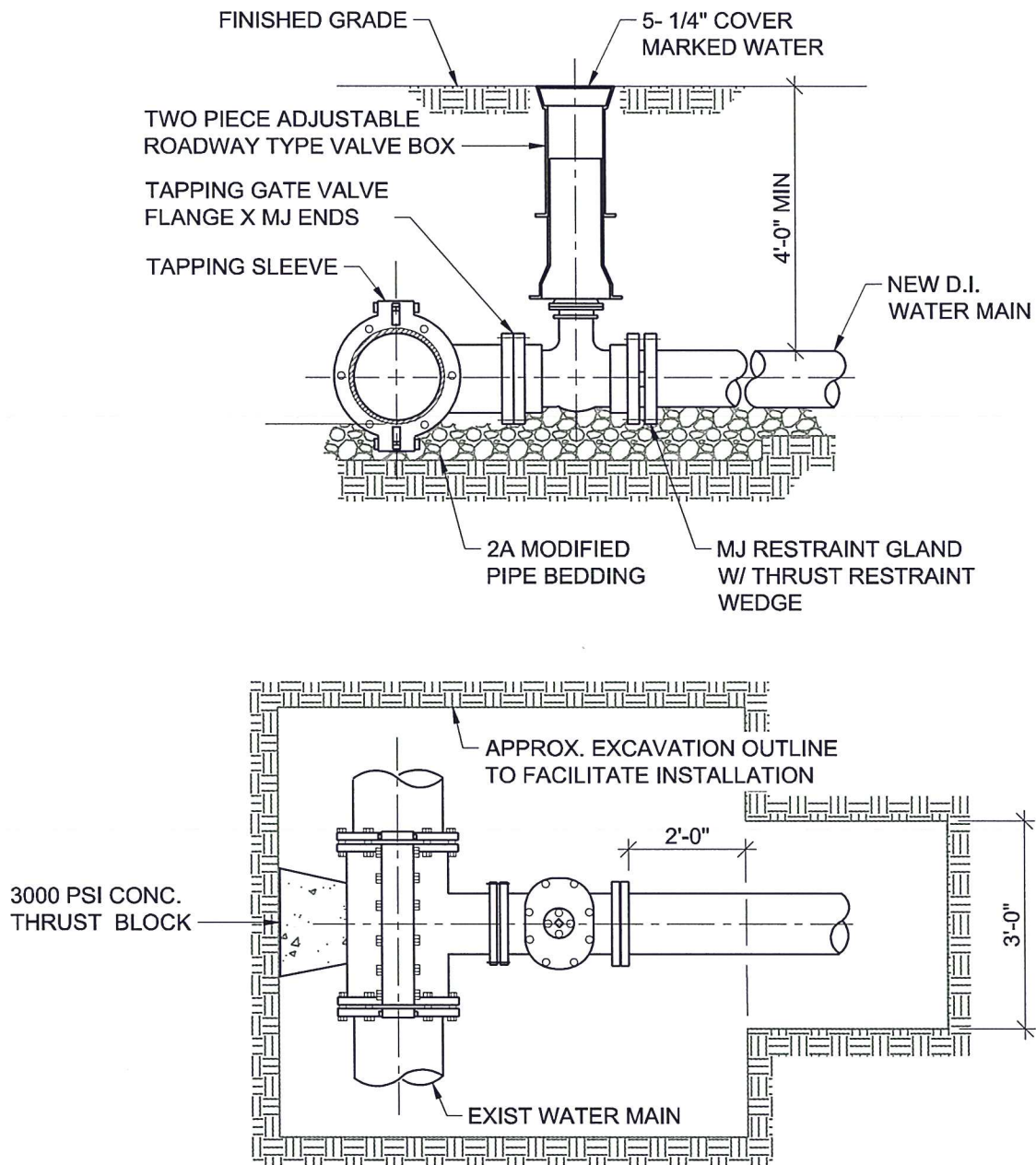
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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

### STANDARD DETAIL

#### TAPPING SLEEVE & GATE VALVE TRENCH

DATE:  
MARCH 2020

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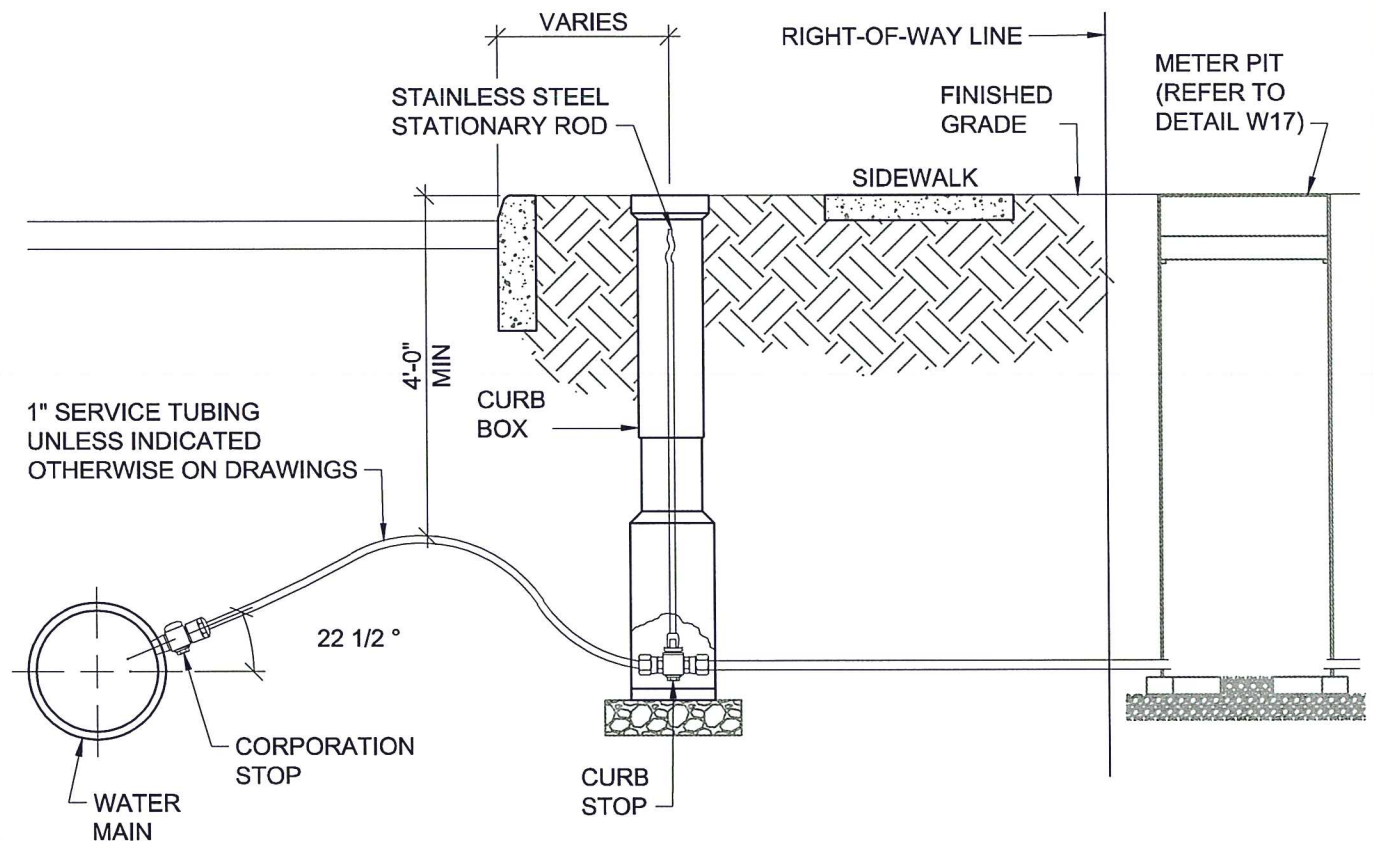
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**W14**

**SERVICE LINE NOTES:**

1. BED COPPER SERVICE TUBING 6" BELOW AND 12" ABOVE WITH PADOT TYPE "A" CONCRETE CEMENT SAND.
2. HIGH POINT OF SERVICE LINE SHALL BE 3 INCHES ABOVE TOP OF WATER MAIN
3. RESTORE EXISTING ROADS DISTURBED AS PART OF THIS WORK TO COMPLY WITH TOWNSHIP STANDARDS.
4. WTMA IS RESPONSIBLE FOR SERVICE LINE TO AND INCLUDING CURB STOP. HOMEOWNER IS RESPONSIBLE FOR SERVICE LINE FROM CURB STOP TO HOME, INCLUDING VALVE BOX AND METER PIT.
5. IF NO SIDEWALK, WHETHER THERE IS CURB OR NOT, THE CURB STOP AND 1 FOOT STUB SHALL BE PLACED WITHIN A MAXIMUM DISTANCE OF 5 FEET FROM EDGE OF PAVE.
6. WARNING TAPE TO BE INSTALLED ABOVE TUBING.
7. PLACEMENT OF CURB AND METER PIT WILL VARY AND IS SUBJECT TO WTMA APPROVAL.
8. STAMP CURB WITH "W" FOR WATER.



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**WARWICK TOWNSHIP MUNICIPAL AUTHORITY**

315 CLAY ROAD, LITITZ, PA 17543

**STANDARD DETAIL****WATER SERVICE INSTALLATION - COPPER LINE**

DATE:  
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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

### STANDARD DETAIL

WATER SERVICE INSTALLATION DETAIL - PE LINE (W/O CURB AND SIDEWALK)

DATE:  
MARCH 2020

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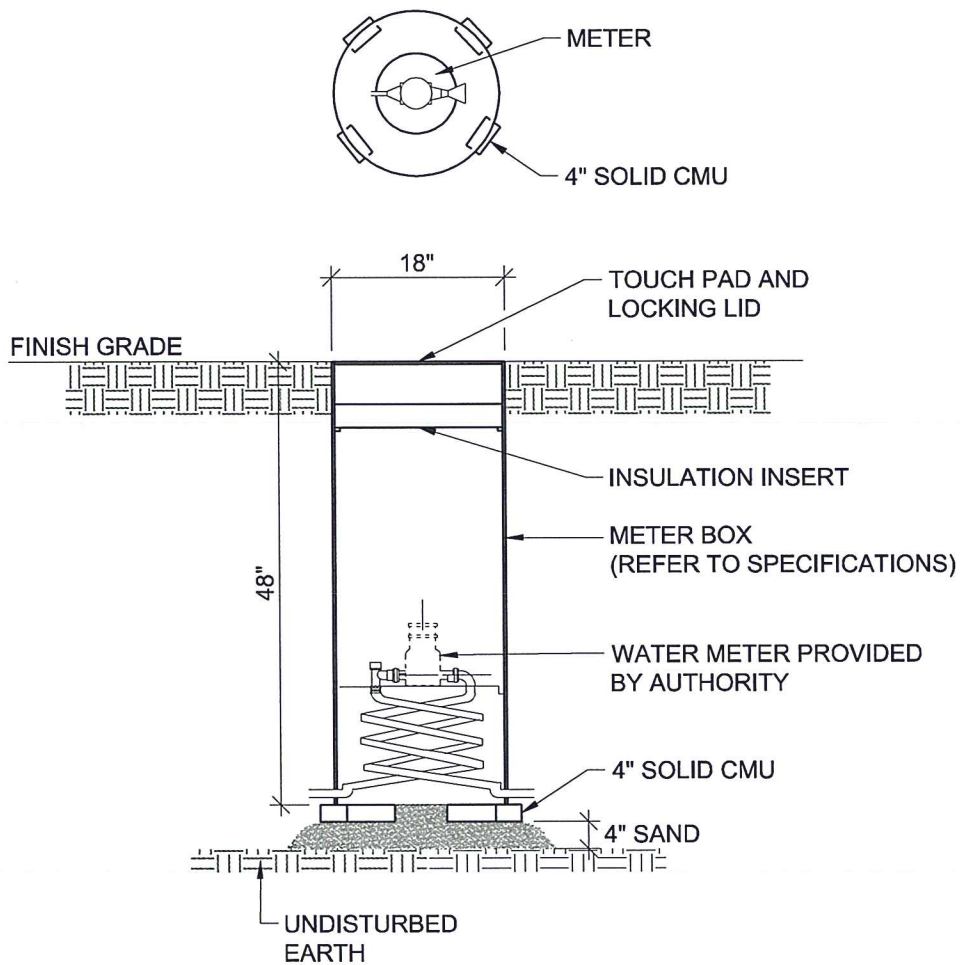
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**NOTES:**

1. METER PIT TO INCLUDE BACK FLOW PREVENTION AND SHUT-OFF VALVES.



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**WARWICK TOWNSHIP MUNICIPAL AUTHORITY**

315 CLAY ROAD, LITITZ, PA 17543

**STANDARD DETAIL**

**RESIDENTIAL WATER METER PIT - (1" SERVICE)**

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MARCH 2020

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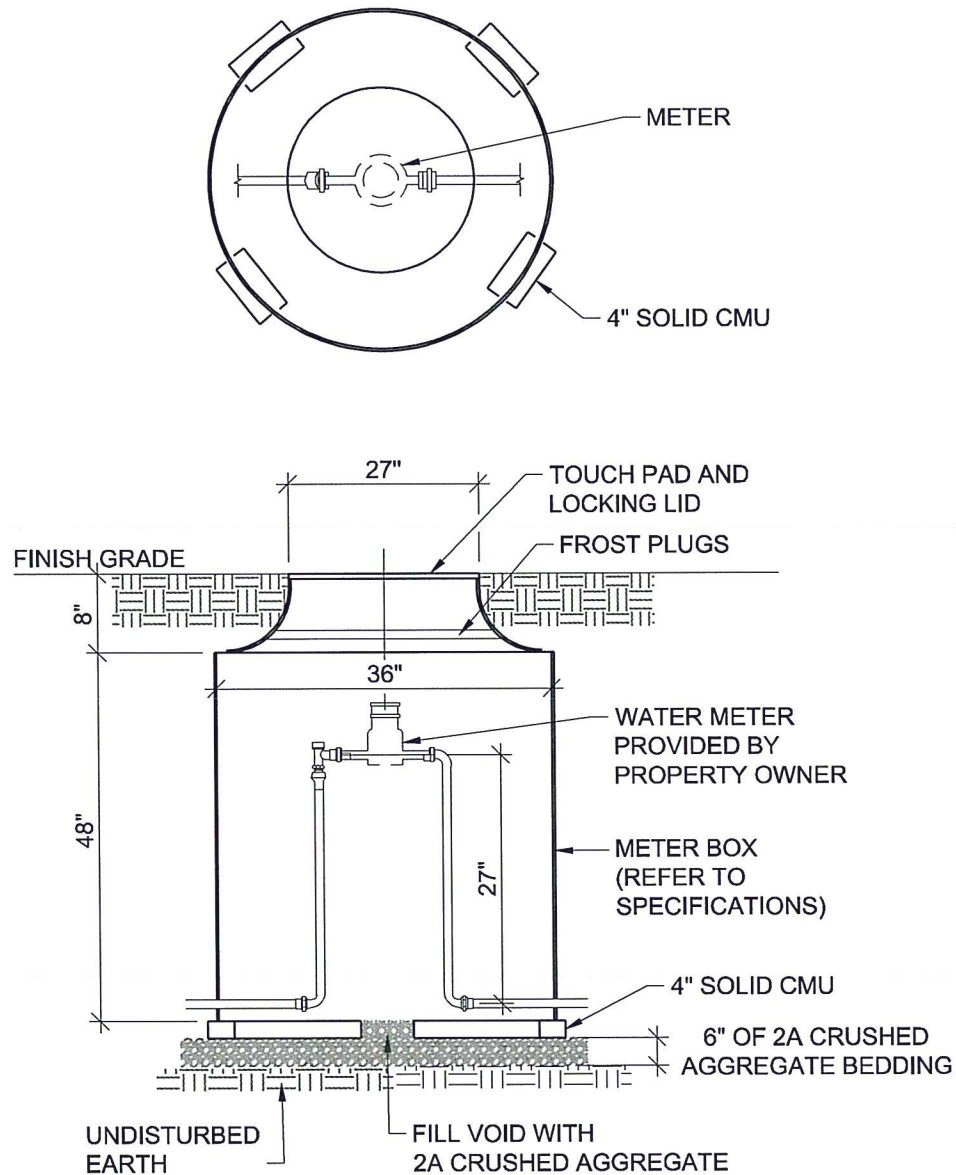
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**W17**



**NOTE:**

1. METER PIT TO INCLUDE BACKFLOW PREVENTION AND SHUT-OFF VALVE.



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**WARWICK TOWNSHIP MUNICIPAL AUTHORITY**

315 CLAY ROAD, LITITZ, PA 17543

**STANDARD DETAIL**

**MULTI-RESIDENTIAL OR NON-DOMESTIC WATER METER PIT - (1 1/2" AND 2" SERVICE)**

DATE:  
MARCH 2020

SCALE:  
N.T.S.

DRAWING NO.

REV. / DATE  
- -

PROJECT NO.  
4185.001

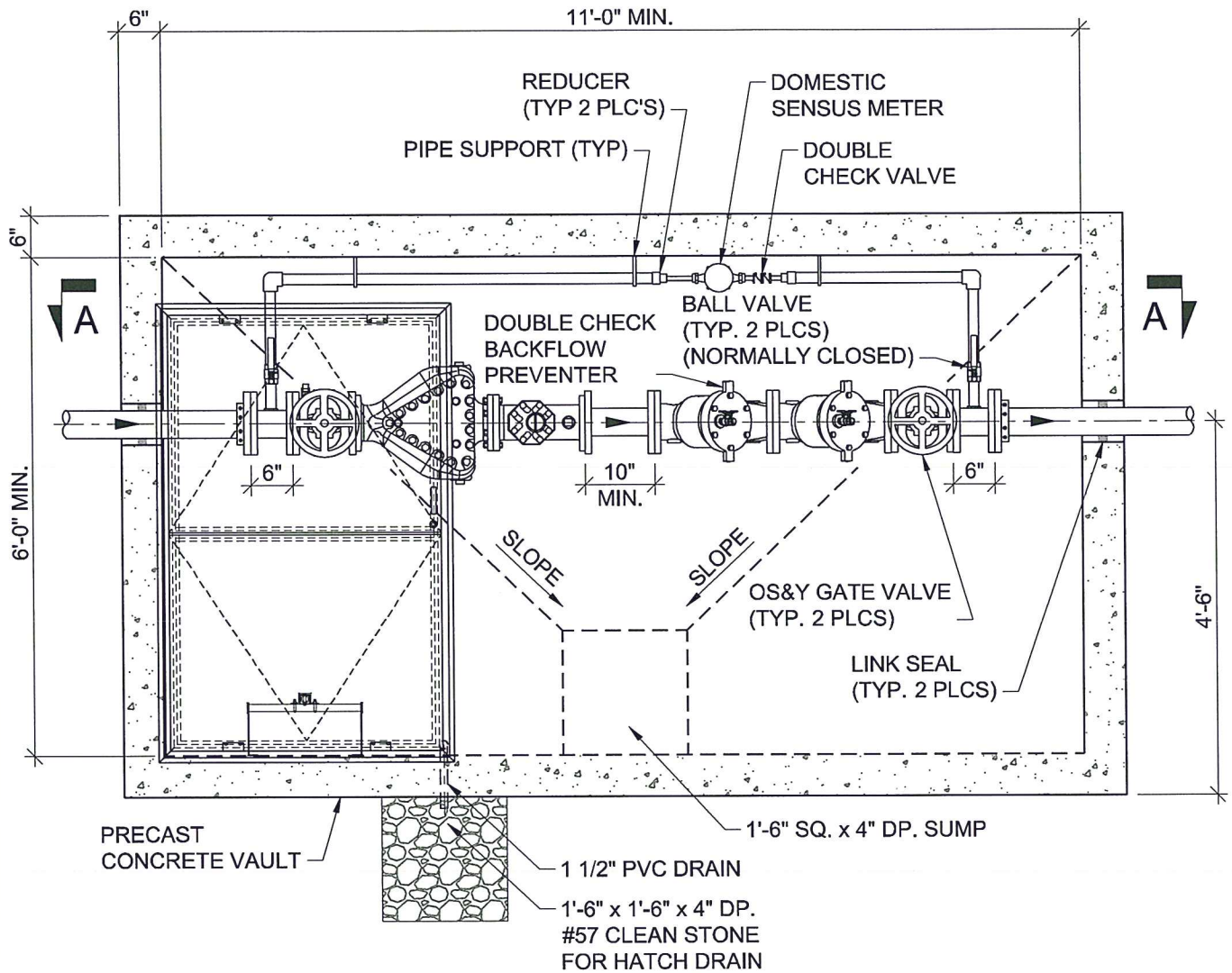
**W18**

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SER





### PLAN

#### NOTES:

1. BYPASS LINE SHALL BE SIZED TO SUPPLY DOMESTIC FLOW WHEN PRIMARY FLOW METER OR ASSOCIATED COMPONENTS REQUIRE SERVICE.
2. FLOW METERS SHALL BE INSTALLED WITH THE MANUFACTURER'S RECOMMENDED STRAIGHT RUNS OF PIPE UP STREAM AND DOWN STREAM OF THE METER ASSEMBLY.



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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

### STANDARD DETAIL

#### COMBINATION DOMESTIC AND FIRE METER PIT

DATE:  
MARCH 2020

SCALE:  
N.T.S.

DRAWING NO.

PREPARED BY  
CAD

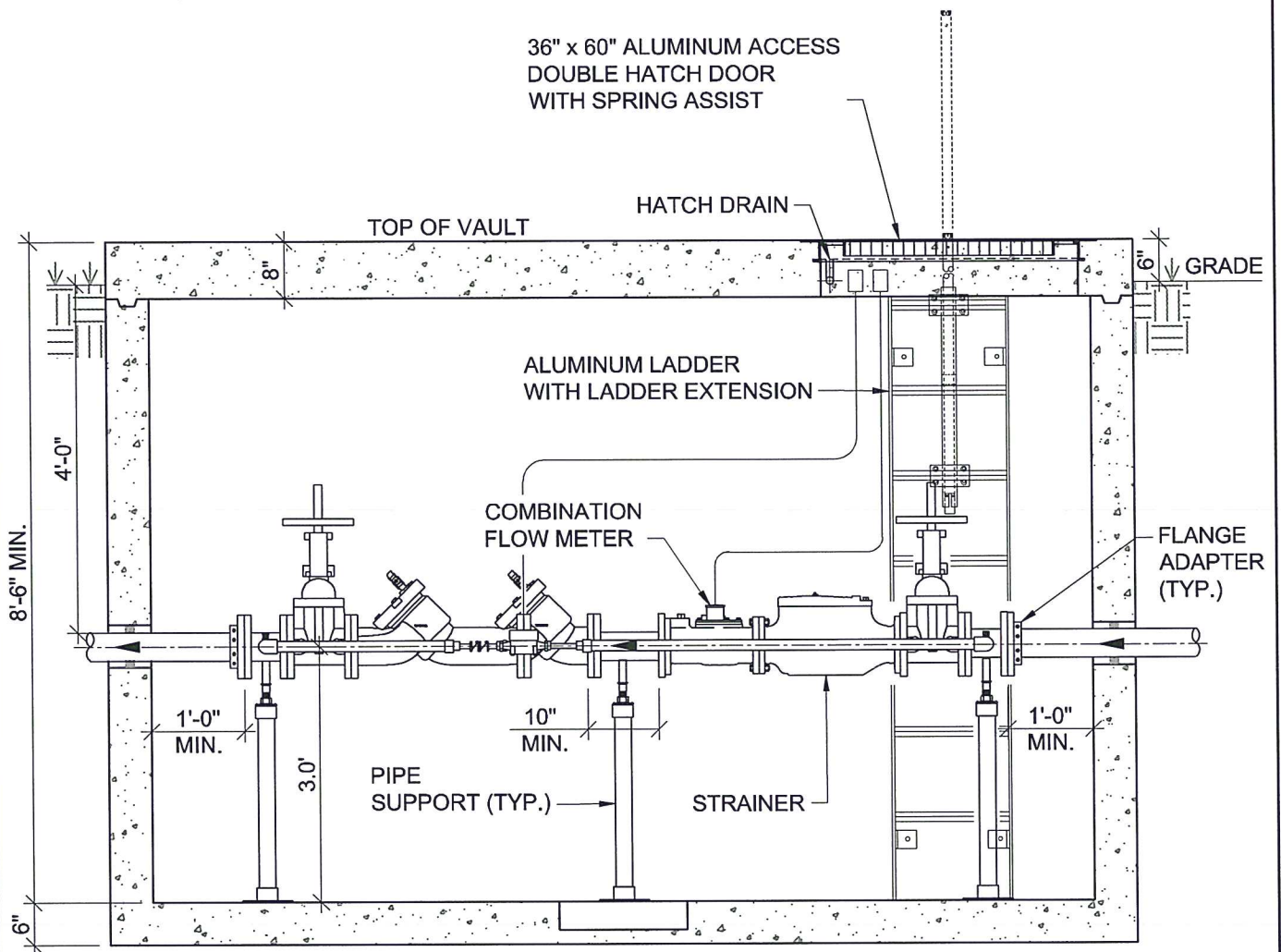
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- -

PROJECT NO.  
4185.001

**W19 (1 of 2)**



**SECTION A-A**

**NOTES:**

1. PRECAST CONCRETE ASSEMBLY SHALL CONTAIN XYPEX CONCRETE WATERPROOF ADMIXTURE.
2. RACEWAY LOCATED WITHIN VAULT SHALL BE RIGID CONDUIT.



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**WARWICK TOWNSHIP MUNICIPAL AUTHORITY**

315 CLAY ROAD, LITITZ, PA 17543

**STANDARD DETAIL**

**COMBINATION DOMESTIC AND FIRE METER PIT**

DATE:  
MARCH 2020

SCALE:  
N.T.S.

DRAWING NO.

REV. / DATE  
- -

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4185.001

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**W19 (2 of 2)**

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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

### STANDARD DETAIL

FIRE METER PIT - HIGH DOMESTIC USE

DATE:  
MARCH 2020

SCALE:  
N.T.S.

DRAWING NO.

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REV. / DATE

PROJECT NO.

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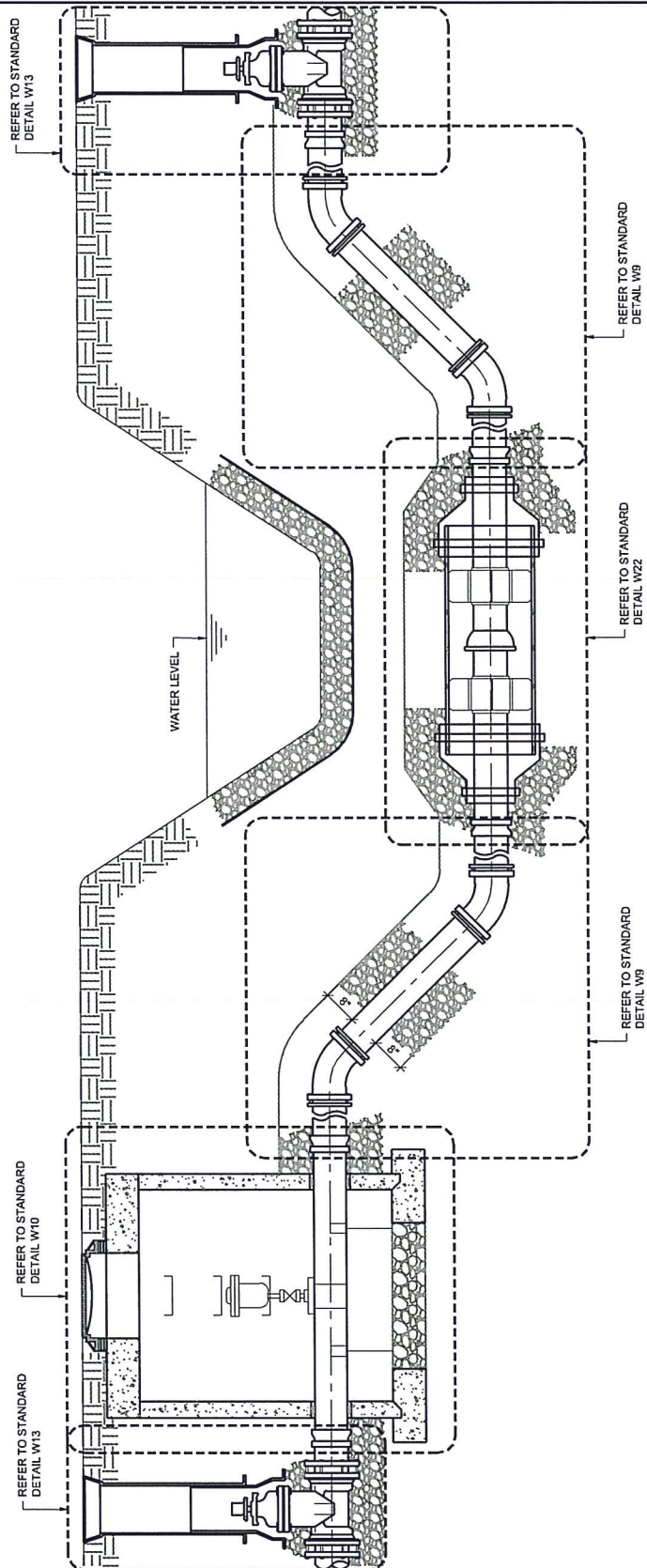
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# W20





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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

STANDARD DETAIL

WATER MAIN STREAM CROSSING

DATE:  
MARCH 2020

SCALE:  
N.T.S.

DRAWING NO.

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CAD

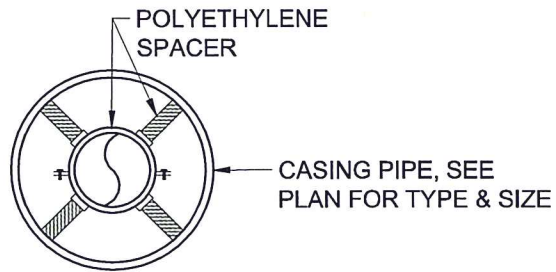
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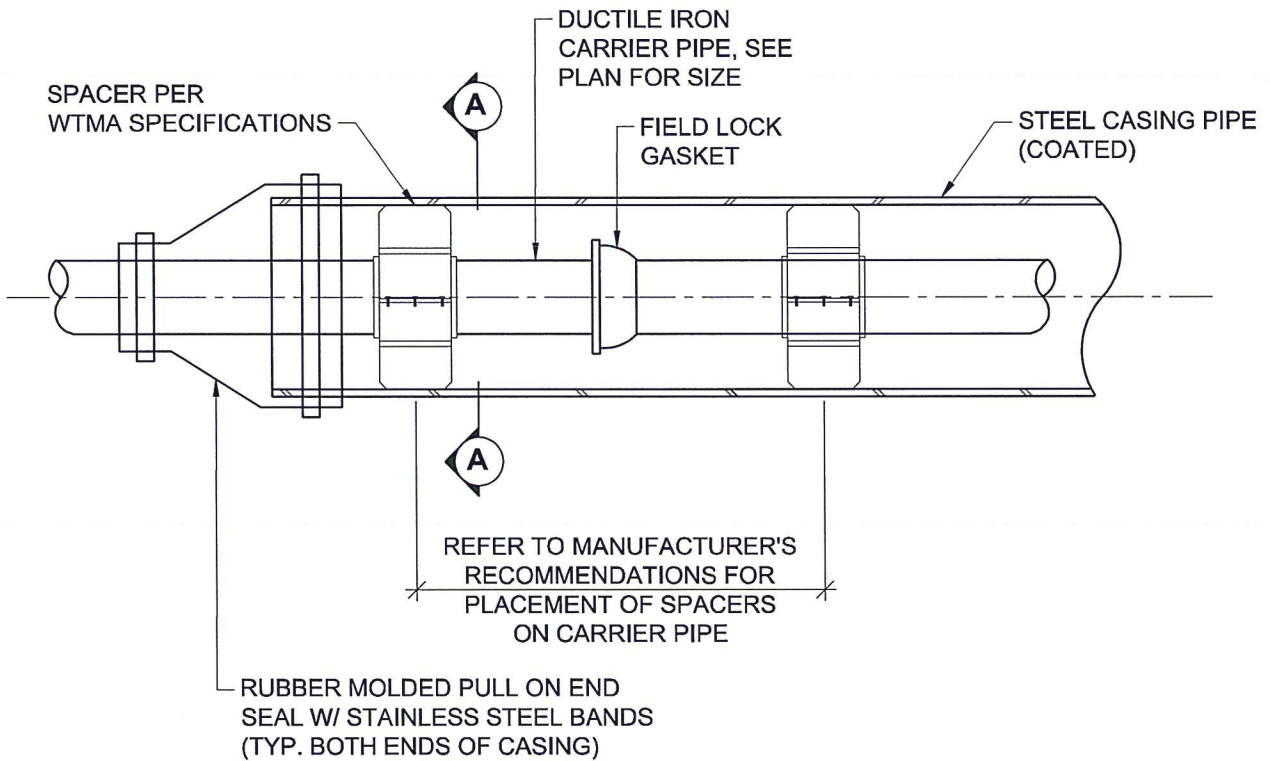
REV. / DATE  
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PROJECT NO.  
4185.001

**W21**



**SECTION A-A**



REFER TO MANUFACTURER'S  
RECOMMENDATIONS FOR  
PLACEMENT OF SPACERS  
ON CARRIER PIPE

**CASING NOTES:**

1. CASING PIPE TO BE 2 TIMES DIAMETER OF CARRIER PIPE.



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**WARWICK TOWNSHIP MUNICIPAL AUTHORITY**

315 CLAY ROAD, LITITZ, PA 17543

**STANDARD DETAIL**

**WATER MAIN PIPE CASING**

DATE:  
MARCH 2020

SCALE:  
N.T.S.

DRAWING NO.

**W22**

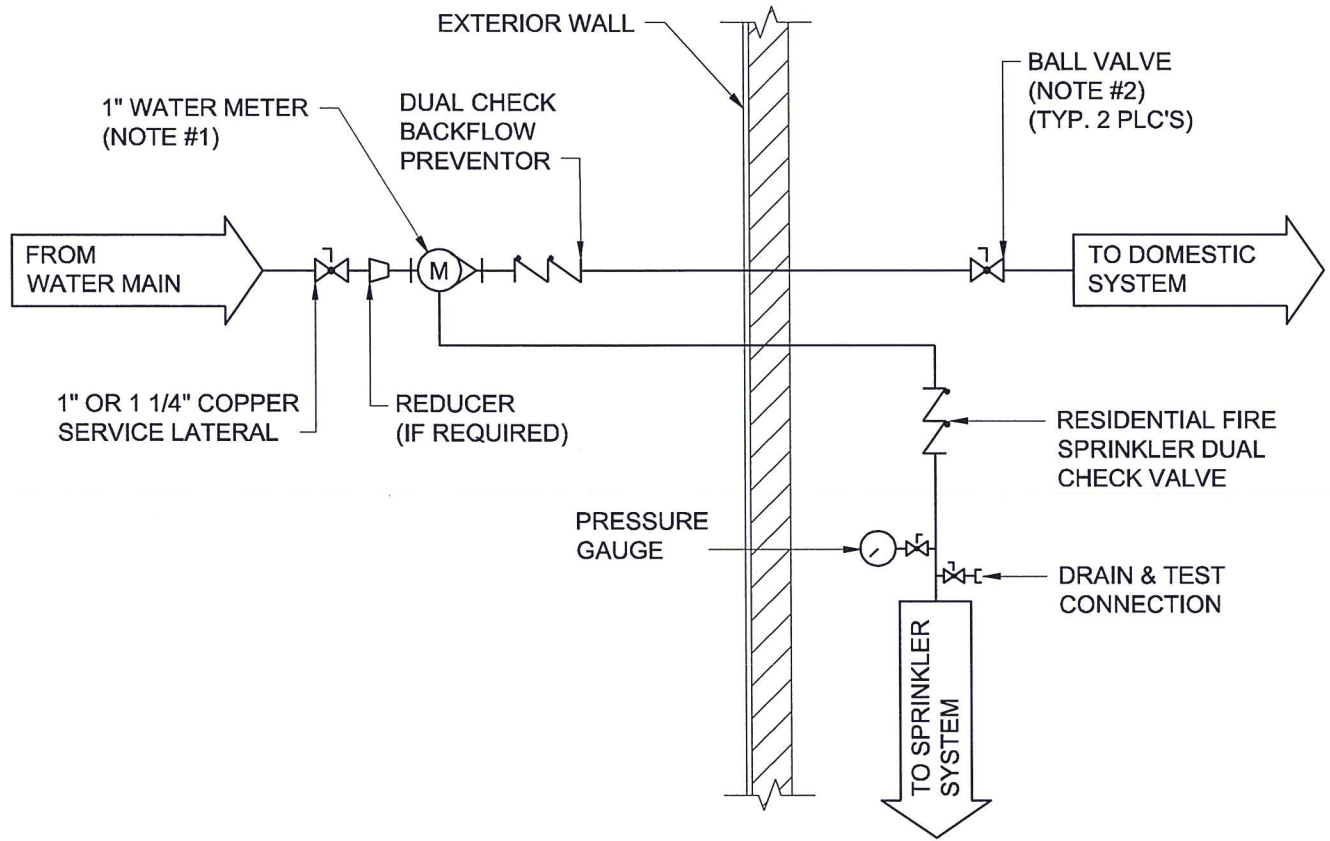
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- -

PROJECT NO.  
4185.001



#### GENERAL METER INSTALLATION NOTES

1. ISOLATION VALVES SHALL BE BRONZE FULL PORT BALL VALVES WITH THREADED ENDS.
2. PROVIDE PRESSURE REDUCER WHERE SYSTEM PRESSURE EXCEEDS 80 PSI.



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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

### STANDARD DETAIL

#### COMBINED RESIDENTIAL DOMESTIC / SPRINKLER SERVICE

DATE:  
MARCH 2020

SCALE:  
N.T.S.

DRAWING NO.

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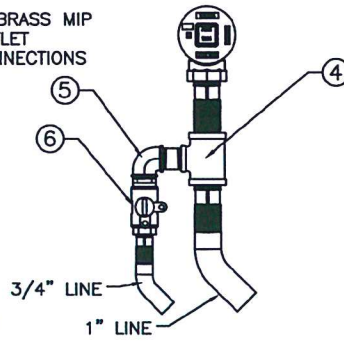
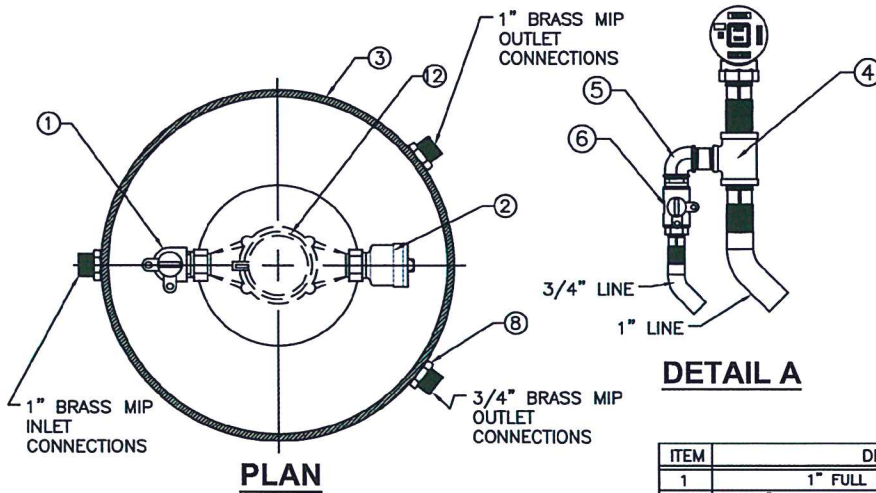
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REV. / DATE  
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PROJECT NO.  
4185.001

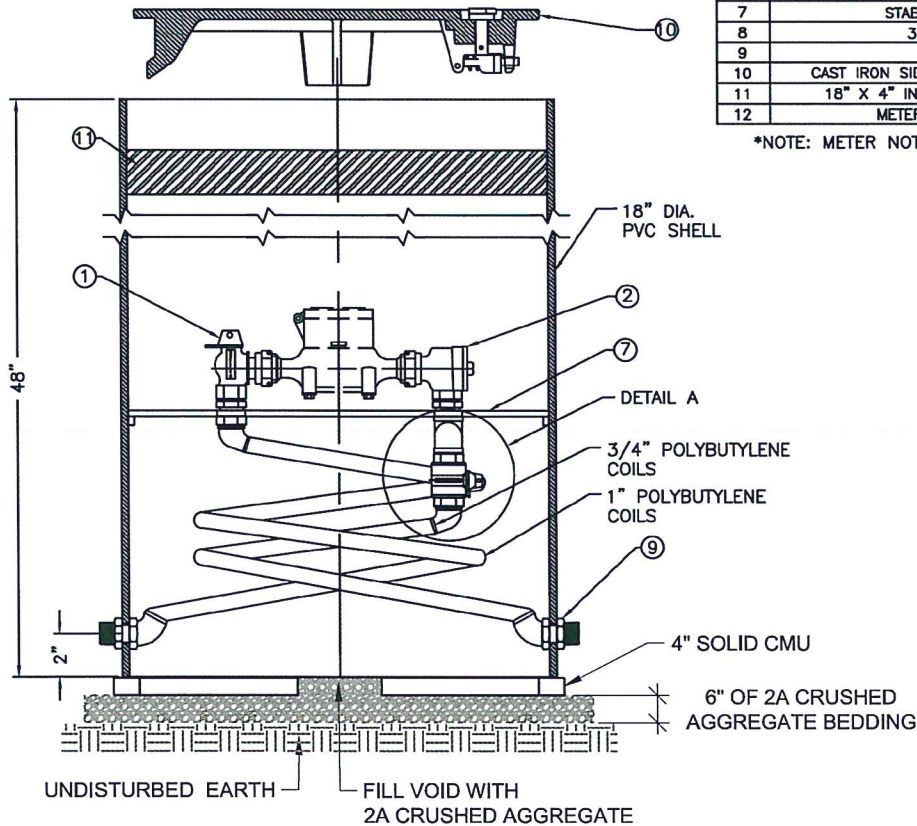
**W23 (1 OF 2)**





ITEM	DESCRIPTION	PART NO.	REQ'D
1	1" FULL PORT BALL VALVE	B24265N	1
2	1" ASSE APPROVED DUAL CHECK VALVE	H14244AN	1
3	18" SHELL SUB-ASSEMBLY		1
4	1" X 1" X 3/4" TEE		1
5	3/4" ELBOW		1
6	3/4" INLINE BALL VALVE		1
7	STABILIZING PLATFORM		1
8	3/4" HEX NUT		2
9	1" HEX NUT		8
10	CAST IRON SIDE LOCKING LID (OPTIONAL)	282927	----
11	18" X 4" INSULATING PAD (OPTIONAL)	790153	----
12	METER (NOT INCLUDED)		----

\*NOTE: METER NOT INCLUDED



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## WARWICK TOWNSHIP MUNICIPAL AUTHORITY

315 CLAY ROAD, LITITZ, PA 17543

### STANDARD DETAIL

COMBINED RESIDENTIAL/SPRINKLER WATER METER PIT - (1" SERVICE)

DATE:  
MARCH 2020

SCALE:  
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**W23 (2 OF 2)**