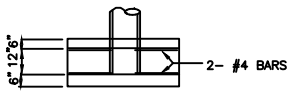
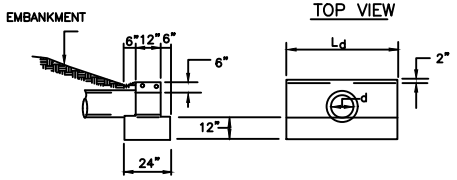
PIPE DIAMETER	L
18" & 21"	5'
24" & 27"	7'
30" & 33"	9'



TOP VIEW

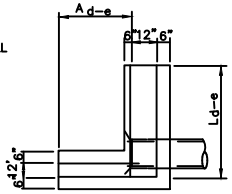


END VIEW SIDE VIEW

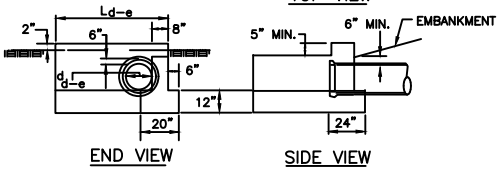
TYPE D ENDWALL

LOCAL CONDITIONS WILL GOVERN DIMENSION A.

$L_{d-e} = 2.5_{d-e} + 12"$



TOP VIEW

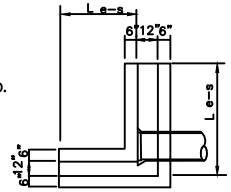


END VIEW SIDE VIEW

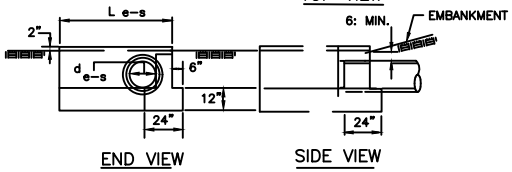
TYPE D-E ENDWALL

SIDE ROAD WALL TO BE PARALLEL TO SIDE ROAD.

$L_{e-s} = 2.5D_{e-s} = 12"$



TOP VIEW



END VIEW SIDE VIEW

TYPE E-S ENDWALL

TABLE A

2:1 EMBANKMENT SLOPES

PIPE DIAMETER	SKEW χ =90° TO 60° θ = 30°			SKEW Δ = 55° θ = 35°			SKEW Δ = 50° θ = 40°			SKEW Δ =45° θ = 45°			SKEW Δ = 40° θ = 50°			SKEW Δ = 30° θ = 60°			SKEW Δ = 20° θ = 60°			SKEW Δ = 10° θ = 80°				
d (in.)	L (FT.)	R (FT.)	W_1 (FT.)	L (FT.)	R (FT.)	W_1 (FT.)	L (FT.)	R (FT.)	W_1 (FT.)	L (FT.)	R (FT.)	W_1 (FT.)	L (FT.)	R (FT.)	W_1 (FT.)	L (FT.)	R (FT.)	W_1 (FT.)	L (FT.)	R (FT.)	W_1 (FT.)	L (FT.)	R (FT.)	W_1 (FT.)	W_2 (FT.)	A (in.)
36	5.8	0	4.6	6.0	.33	4.9	6.2	.5	5.2	6.5	.67	5.7	7.0	.75	6.2	8.3	1.33	8.0	11.1	1.75	11.7	19.6	5.0	23.0	4.6	12
42	6.3	0	5.8	6.6	.33	6.1	6.9	.5	6.5	7.3	.67	7.1	7.8	.75	7.8	9.3	1.33	10.0	12.5	1.75	14.6	22.5	5.0	28.8	5.8	12
48	6.9	0	6.9	7.2	.33	7.3	7.5	.5	7.8	8.0	.67	8.5	8.5	.75	9.4	10.3	1.33	12.0	14.0	1.75	17.5	25.3	5.0	34.6	6.9	12
54	7.5	0	8.0	7.8	.33	8.5	8.2	.5	9.1	8.7	.67	9.9	9.3	.75	10.9	11.3	1.33	14.0	15.5	1.75	20.5	28.2	5.0	40.3	8.0	12
60	8.1	0	9.2	8.4	.33	9.8	8.8	.5	10.4	9.4	.67	11.3	10.1	.75	12.5	12.3	1.33	16.0	16.9	1.75	23.4	31.1	5.0	46.0	9.2	15
72	9.2	0	11.5	9.6	.33	12.2	10.1	.5	13.0	10.8	.67	14.1	11.7	.75	15.6	14.3	1.33	20.0	19.8	1.75	29.2	36.9	5.0	57.6	11.5	15

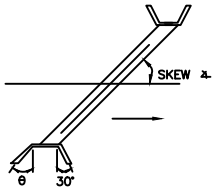
$SD = \frac{d_{D-W}}{\cos\theta} = \frac{d_{D-W}}{\sin \text{Skew}}$

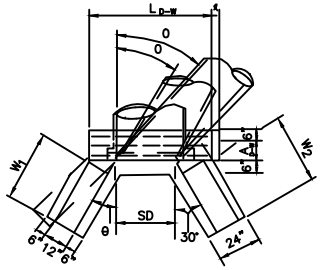
$L_{D-W} = SD + 2.3'$

$W_1 = 2d_{D-W} \frac{2'}{\cos\theta}$ (FOR 2:1 SLOPE)

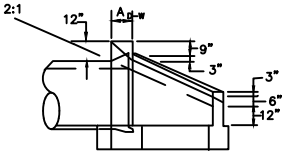
$W_1 = \frac{X}{\cos}(d_{D-W} 0.5 - \frac{1.0}{X})$ (FOR VARIABLE)

SLOPE WHEN X EQUALS HORIZONTAL DIMENSION OF THE SLOPE DESIGNATION

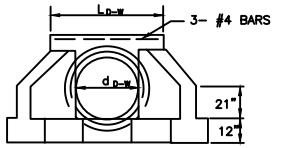




PLAN VIEW



SECTION A-A



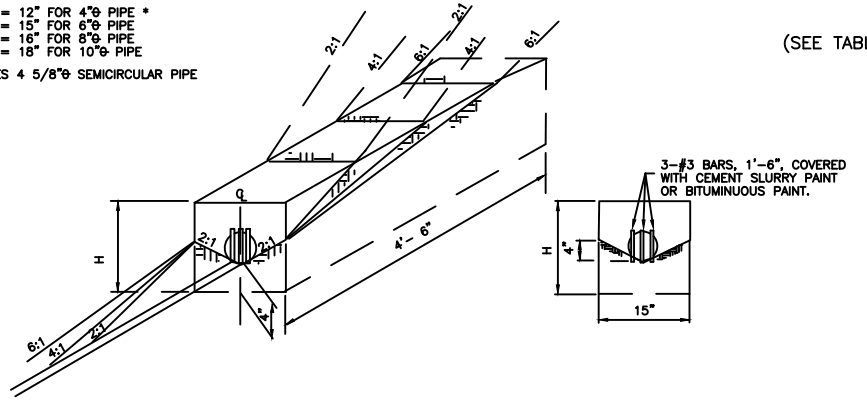
FRONT ELEVATION VIEW

TYPE D-W ENDWALL

(SEE TABLE A FOR DIMENSIONS NOT INDICATED)

H = 12" FOR 4"θ PIPE *
= 15" FOR 6"θ PIPE
= 16" FOR 8"θ PIPE
= 18" FOR 10"θ PIPE

* INCLUDES 4 5/8"θ SEMICIRCULAR PIPE



SUBSURFACE DRAIN OUTLET ENDWALL

NOTES

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATIONS AS OUTLINED IN PUBLICATION 408, SECTION 605.
2. USE CLASS A CEMENT CONCRETE OR BETTER.
3. CHAMFER EXPOSED EDGES ONE INCH.
4. PROVIDE REINFORCEMENT (.12 IN/LN FT.) IN ACCORDANCE WITH PUBLICATION 408, SECTION 709.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
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ENDWALLS (RC-31M)

SCALE:	NTS
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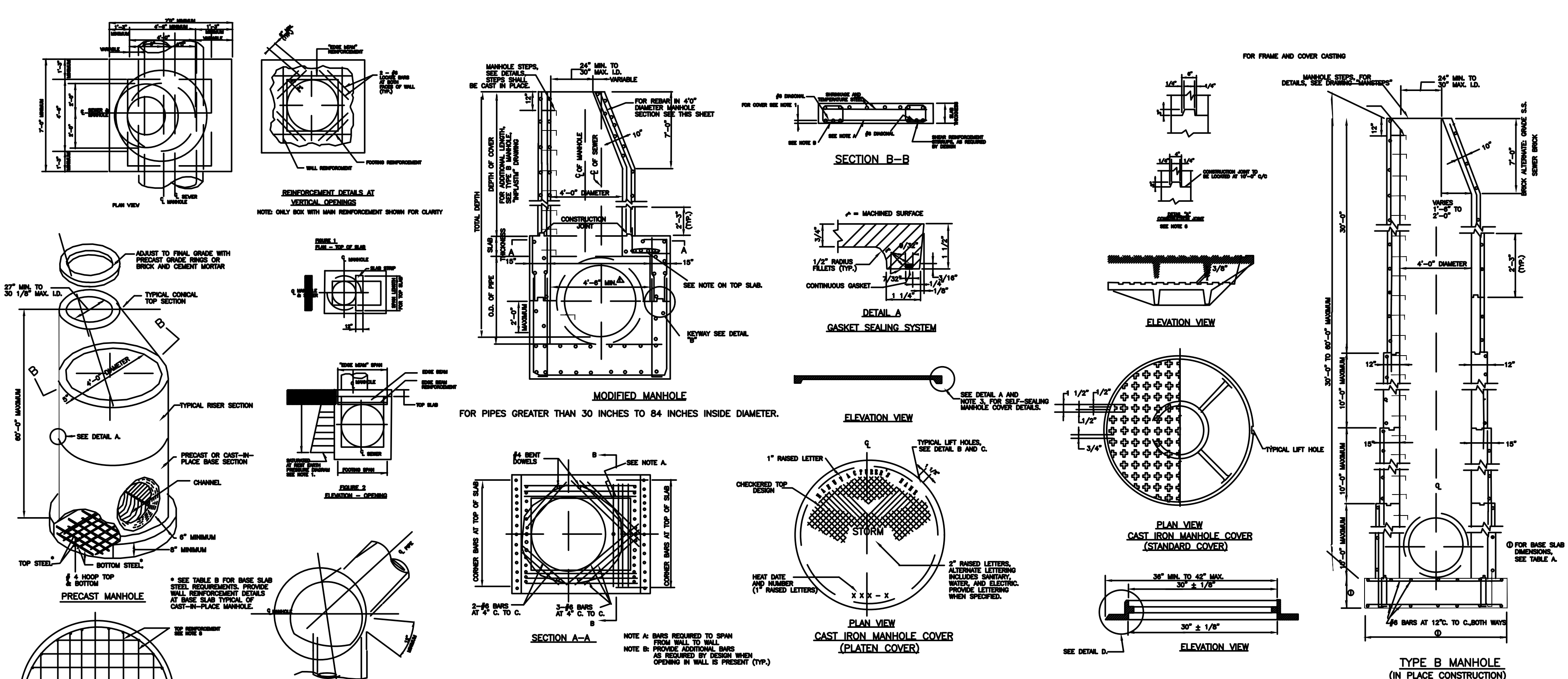
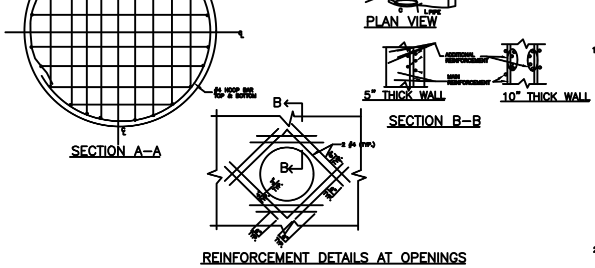
REV:	
REV BY:	TD
DWG #:	
JOB #:	
SHEET:	





1. CONSTRUCTION REQUIREMENTS.
   A. CONSTRUCT IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SPECIFICATIONS, SECTIONS 605, 606, 714: AND ASTM C–478–90, STANDARD SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS, AS MODIFIED HEREIN.
   B. MINIMUM CONCRETE CLASS:
      CAST–IN–PLACE CLASS A
      PRECAST CLASS AA
   C. PROVIDE STEEL REINFORCEMENT IN ACCORDANCE WITH ASTM A185, STEEL WELDED WIRE FABRIC ASTM A663 & A675, PLAIN BILLET STEEL BARS OR ASTM A615 DEFORMED BILLET STEEL BARS PROVIDE MINIMUM YIELD STRENGTH OF 60,000 PSI.
   D. CLEAR COVER FOR STEEL:
      WALLS: CAST–IN–PLACE 2"
      PRECAST 1/1/2"
      FOOTINGS: CAST–IN–PLACE 2 1/2" (TOP BARS)
      3" (BOTTOM BARS)
      2" (SIDE COVER)
      PRECAST 2" (TOP bARS)
      1 1/2" (BOTTOM BARS)
      1 1/2" (SIDE COVER)
      SLABS: CAST–IN–PLACE 2" (TOP & BOTTOM BARS)
2. FOR PIPE WITH INSIDE DIAMETERS GREATER THAN 30" SEE DRAWING "PRECASTM".
3. PROVIDE 12" MINIMUM HORIZONTAL CLEARANCE BETWEENOPENINGS
   PROVIDE 12" MINIMUM HORIZONTAL CLEARANCE BETWEEN OPENINGS LOCATED AT THE SAME DEPTH. PIPE NOT LOCATED AT THE SAME DEPTH MUST BE LOCATED VERTICALLY AT LEAST ONE TIMES MAXIMUM OPENING DIAMETER APART.
4. FORM A CONCRETE CHANNEL AT THE BOTTOM OF THE MANHOLE CONFORMING TO THE SHAPE OF THE LOWER HALF OF THE INCOMING AND/OR OUTGOING PIPES. A FULL DEPTH U–SHAPED CHANNEL SHOULD BE PROVIDED WHEN NECESSARY TO REDUCE ENERGY LOSSES.
5. USE 5" THICK WALLS WITH INE ROW OF REINFORCING, OR USE 10" THICK OR GREATER WALLS WITH TWO ROWS OF REINFORCING.
6. CONSTRUCTION JOINTS AND KEYS MAY BE CONSTRUCTED UPWARDS OR DOWNWARDS. JOINTS AND KEYS ARE TO BE THROUGHLY CLEANED BEFORE PLACING NEXT CONCRETE SECTION.
7. A SAFE BEARING CAPACITY OF 1.5 TONS PER SQUARE FOOT UNDER THE ENTIRE BASE SLAB IS ASSUMED TO DETERMINE THE BASE SIZE. WHEN THE SUBSOIL IS EXTREMELY POOR, PROCEED WITH CONSTRUCTION ONLY AFTER THE ENGINEER SPECIFIES AN ADEQUATE BASE DESIGN.
8. FOR FOOTING TOP REINFORCEMENT, BOTH DIRECTIONS, USE #6 BARS AT 12" FOR DEPTHS TO 60 FT. OR 0.30 IN.2/FT. WWF FOR DEPTHS TO 30" AND 0.32 IN2/FT. WWF FOR DEPTHS GREATER THAN 30 " (6" MAXIMUM SPACING).
9. FOR FOOTING BOTTOM REINFORCEMENT, BOTH DIRECTIONS, USE #4 BARS AT 12" FOR DEPTHS TO 60 FT. OR 0.15 IN/FT. WWF FOR DEPTHS TO 30 FT. AND 0.16 IN/FT WWF FOR DEPTHS GREATER THAN 30 FT. (6" MAXIMUM SPACING).

TABLE A
BASE SLAB DIMENSIONS

MAXIMUM DIAMETER OF PIPE	TYPE OF MANHOLE	DEPTH FROM TOP OF MANHOLE TO INVERT OF PIPE	AS DESIGNED** TONS PER SQUARE FOOT	AS DESIGNED** MINIMUM WIDTH OF BASE	AS DESIGNED** MINIMUM THICKNESS OF BASE BELOW BOTTOM OF THE PIPE
30"	A	MAX. 10'–0"	0.65	6'–6"	0'–8"
30"	A	MAX. 20'–0"	0.82	7'–0"	0'–8"
30"	A	MAX. 30'–0"	1.12	7'–0" DIA.	0'–8"
30"	B	MAX. 40'–0"	1.35	7'–6" DIA.	1'–0"
30"	B	MAX. 50'–0"	1.50	8'–6" DIA.	1'–6"
30"	B	MAX. 60'–0"	1.55	9'–6" DIA.	2'–0"
—	*MOD.	MAX. 40'–0"	1.05	7'–0"X7–0"	—

* FOR MODIFIED MANHOLE DETAILS, SEE DRAWING "PRECASTM"

** A SAFE BEARING CAPACITY OF 1.50 TONS PER SQUARE FOOT IS ASSUMED TO DETERMINE THE BASE SIZE. WHEN THE SUBSOIL IS EXTREMELY POOR, PROCEED WITH CONSTRUCTION ONLY AFTER THE ENGINEER SPECIFIES AN ADEQUATE BASE DESIGN.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
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IN PLACE STANDARD MANHOLE
RC–39M

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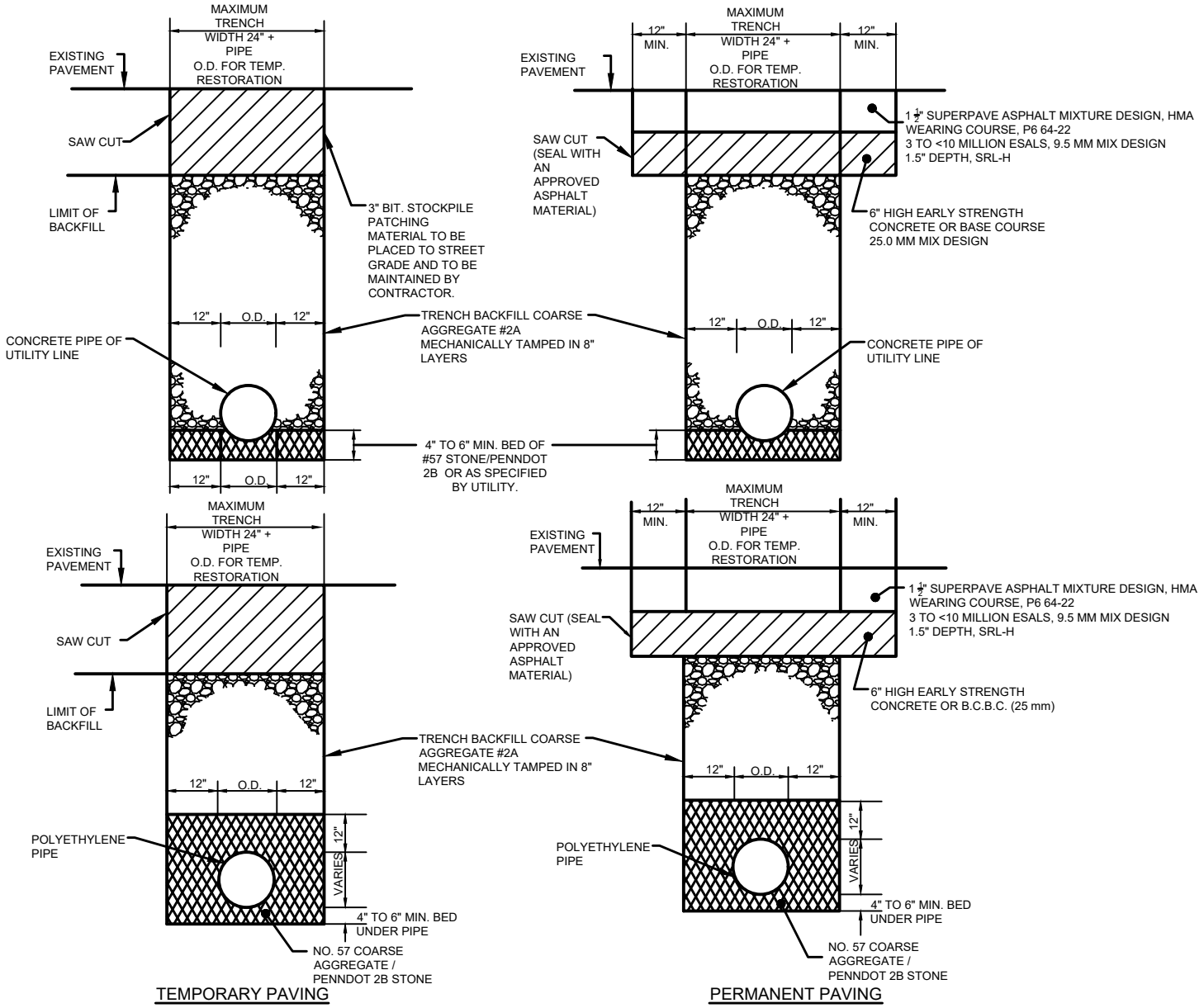
DWN BY:	
REV:	
REV BY:	TD
DWG #:	



TEMPORARY PAVING

PERMANENT PAVING

NOTE:

TEMPORARY TRENCH SHALL BE MAINTAINED A MINIMUM OF 90 DAYS OR AS SPECIFIED BY THE TOWNSHIP ENGINEER TO ACCOUNT FOR SETTLING.

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
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TRENCH RESTORATION FOR EXISTING STREETS

SCALE:	NTS
DATE:	08/09/2022
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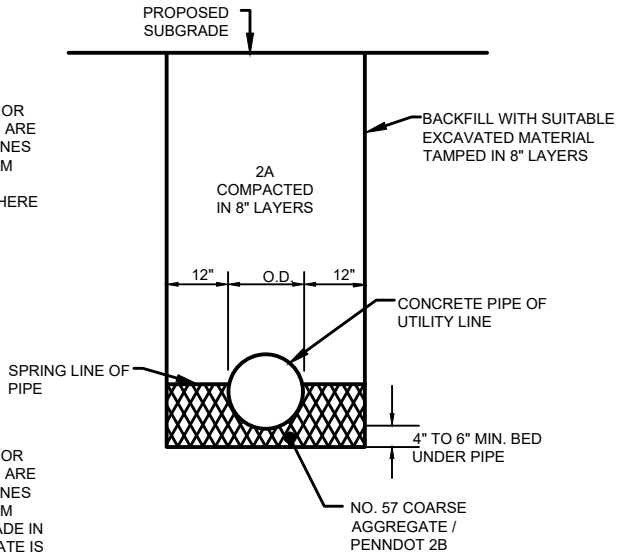
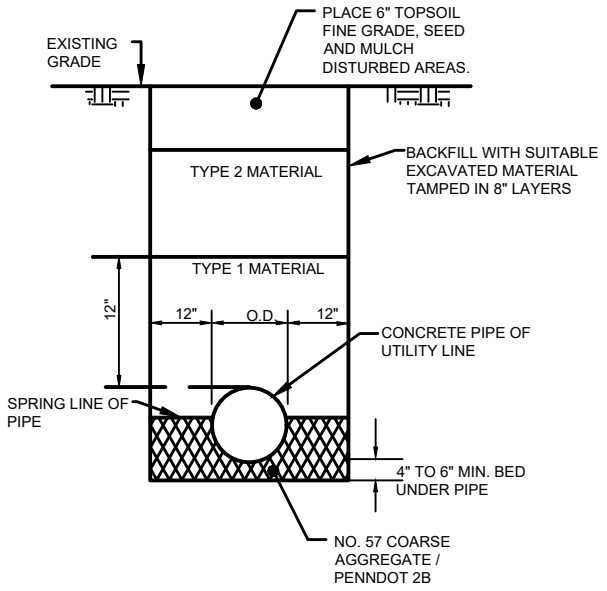
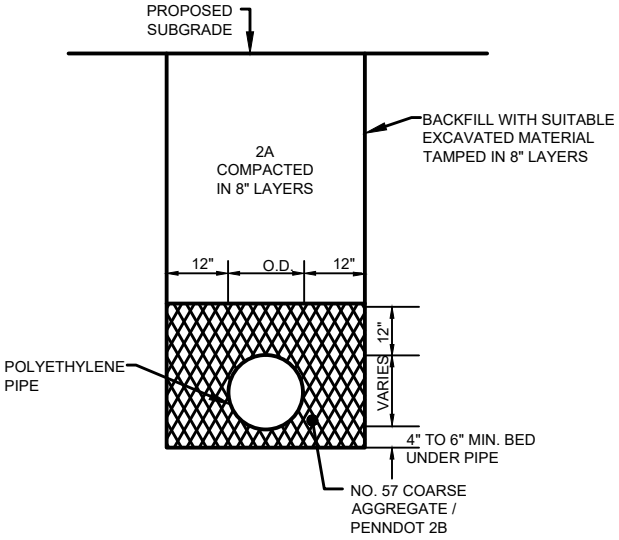
REV:	
REV BY:	TD
DWG #:	

TYPE 1 MATERIAL:
RXCAVATED MATERIAL FROM THE TRENCH OR MATERIALS FROM OTHER SOURCES WHICH ARE FREE FROM LARGE CLODS ROOTS, OR STONES LARGER THAN 2 INCHES MAY BE USED FROM TOP OF BEDDING MATERIAL TO ONE FOOT ABOVE CROWN OF PIPE IN LAWN AREAS WHERE POLYETHYLENE (PE) PIPE IS NOT USED.

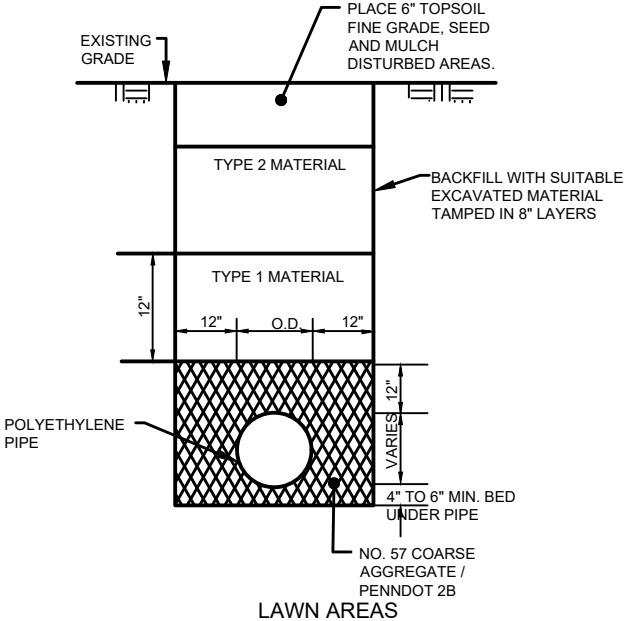
TYPE 2 MATERIAL:
EXCAVATED MATERIAL FROM THE TRENCH OR MATERIALS FROM OTHER SOURCES WHICH ARE FREE FROM LARGE CLODS ROOTS, OR STONES LARGER THAN 8 INCHES MAY BE USED FROM ONE FOOT ABOVE TOP OF PIPE TO SUBGRADE IN LAWN AREAS WHERE 2A COARSE AGGREGATE IS NOT REQUIRED.







PROPOSED STREETS



LAWN AREAS

LIMERICK TOWNSHIP

646 WEST RIDGE PIKE
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TRENCH RESTORATION FOR PROPOSED STREETS AND LAWN AREAS

SCALE:	NTS
DATE:	08/09/2022
DWN BY:	
REV:	
REV BY:	TD
DWG #:	