

# Wellsville-Mendon Conservation District

## Design Standards and Standard Drawings

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WELLSVILLE-MENDON  
CONSERVATION DISTRICT



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DRAFTSMAN:	MATT GUNN	PRINT DATE:	JUNE 26, 2021
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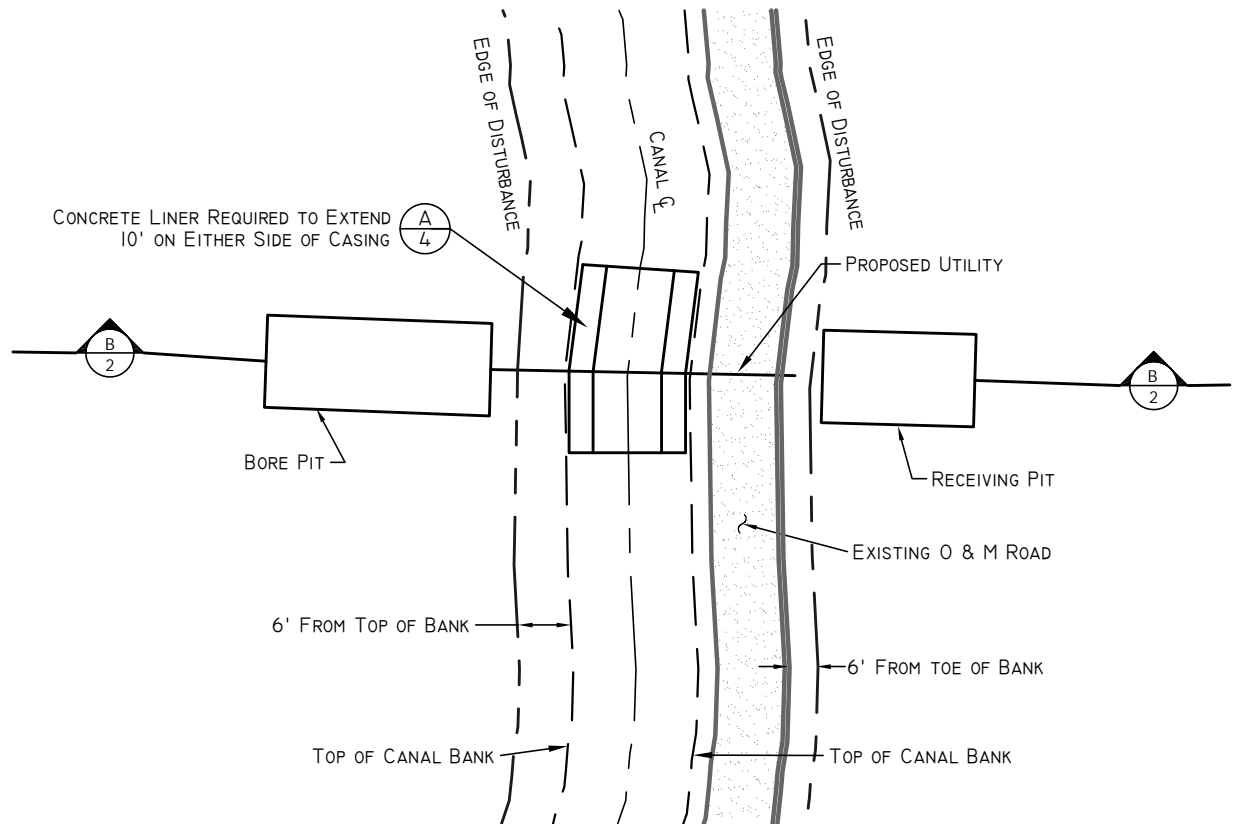
WELLSVILLE-MENDON CONSERVATION DISTRICT  
**STANDARD DRAWINGS**  
**COVER SHEET**

01-Cover Sheet.dwg  
0x31021 - Wellsville-Mendon Canal Reviews 2021 Standard Drawings

JOB NO.

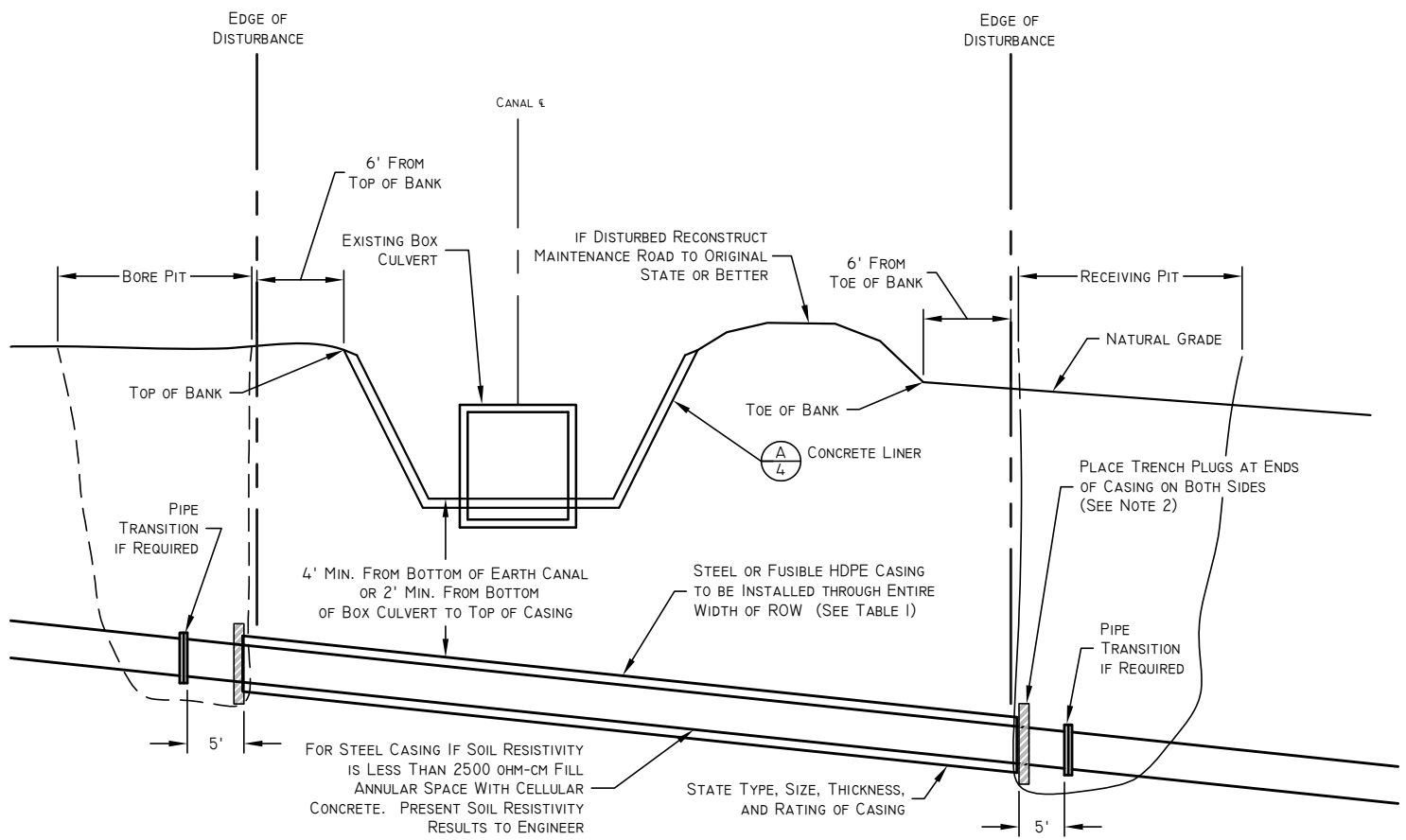
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WELLSVILLE-MENDON CONSERVATION DISTRICT  
**STANDARD DRAWINGS**  
**CANAL BORING DETAILS**  
02-Boring Details.dwg  
03/21/2021 - Wellsville-Mendon Canal Reviews 2021 Standard Drawings



**A** BORING UNDER CANAL PLAN VIEW  
NTS

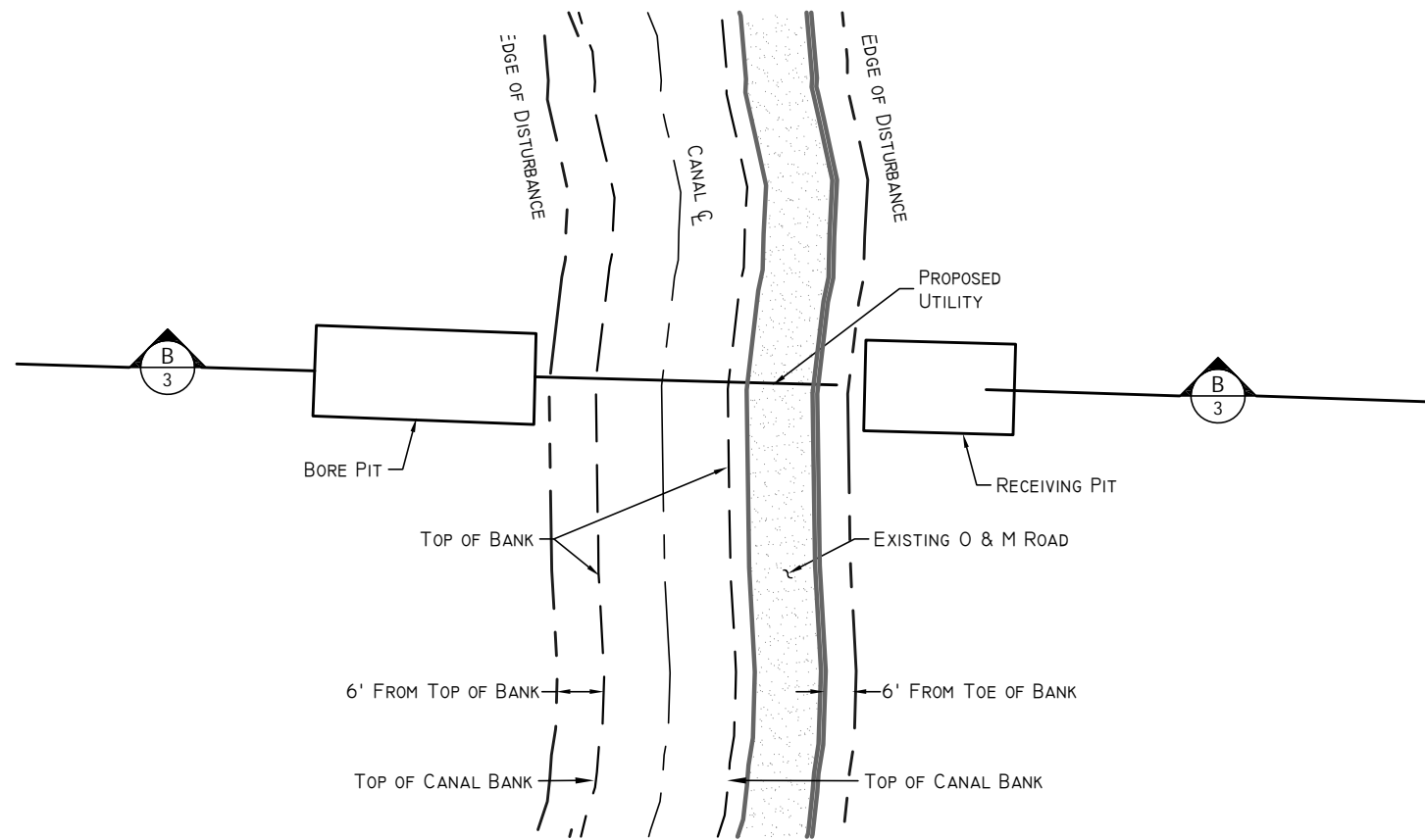
- NOTES:
1. BORE PIT COMPACTION TO BE 92% MODIFIED PROCTOR DENSITY.
  2. TRENCH PLUGS ARE TO BE PLACED IN LOCATIONS SHOWN ON BOTH SIDES FOR WIDTH OF TRENCH AND 12 INCHES ABOVE AND BELOW CASING PIPES AND A MINIMUM THICKNESS OF 24 INCHES. PLUGS SHALL BE A 10% BENTONITE AND 90% CLAY MIXTURE, OR SHALL BE A FLOWABLE FILL CONCRETE.
  3. STORMWATER RUNOFF ENTERS THE CANAL DURING STORM EVENTS OR AT OTHER UNEXPECTED TIMES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT THE WORK SITE.
  4. WATERLINE PIPE INSIDE OF CASING SHALL HAVE RESTRAINING JOINTS.
  5. THRUST BLOCKS OR MECHANICAL RESTRAINTS ARE REQUIRED ON ALL BENDS AND TEES FOR DIP, PVC, OR PIP WATERLINES.
  6. CASING MUST BE A MINIMUM OF 2 FEET BELOW THE BOTTOM OF THE EXISTING CANAL BOX CULVERT OR 4 FEET BELOW EARTHEN CANAL BOTTOM.
  7. BORE PITS MUST BE PLACED 6' FROM TOE OF CANAL BANK ON DOWNHILL SIDE AND 6' FROM THE TOP OF CANAL BANK ON UPHILL SIDE.
  8. CARRIER PIPE SHALL HAVE ADEQUATE CASING SPACERS PER MANUFACTURERS SPECIFICATIONS.
  9. CROSSING MUST BE PERPENDICULAR TO CANAL UNLESS APPROVED BY ENGINEER.



**B** BORE CASING CROSS SECTION  
NTS

TABLE I  
STEEL CASING THICKNESS

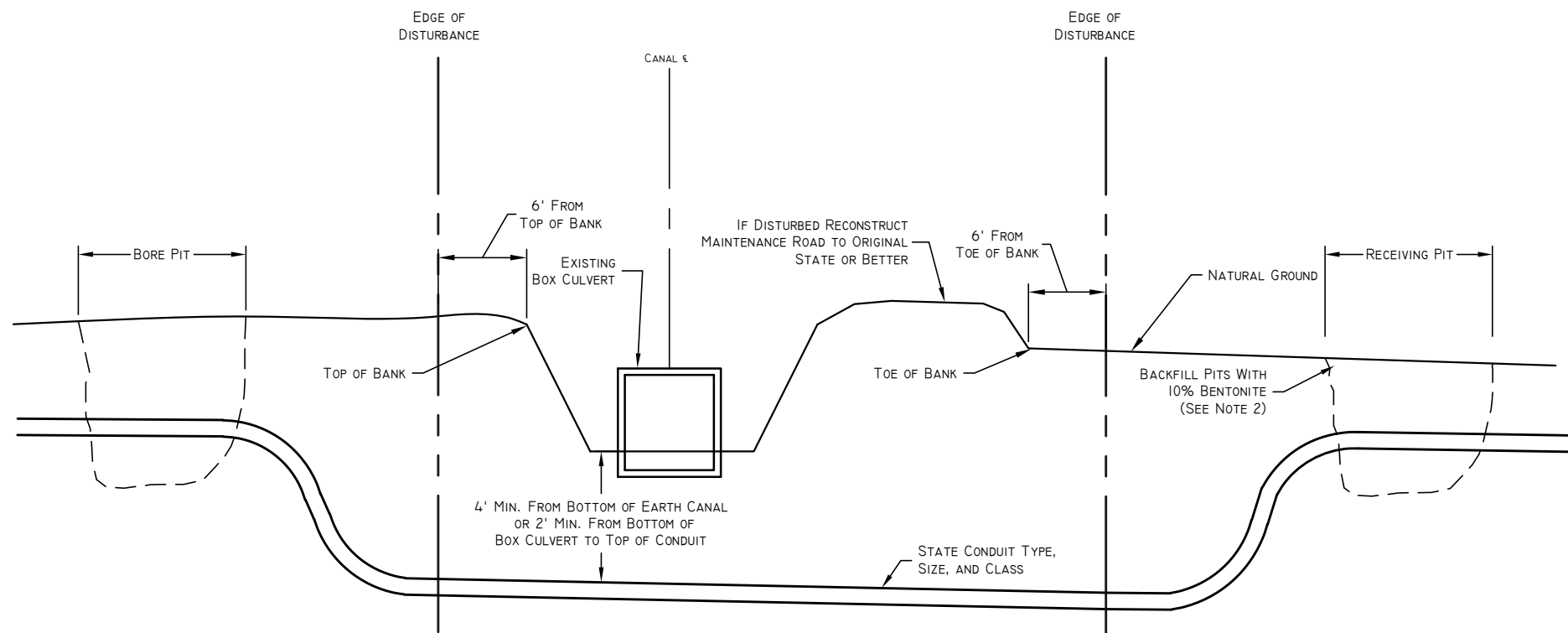
DIAMETER (INCHES)	MINIMUM WALL THICKNESS (INCHES)
12"	0.188"
14" - 16"	0.312"
18"	0.312"
20" - 22"	0.375"
24" - 26"	0.438"
28" - 32"	0.500"
34" - 36"	0.562"
38" - 42"	0.562"



**A** DIRECTIONAL DRILL UNDER CANAL  
NTS

**NOTES:**

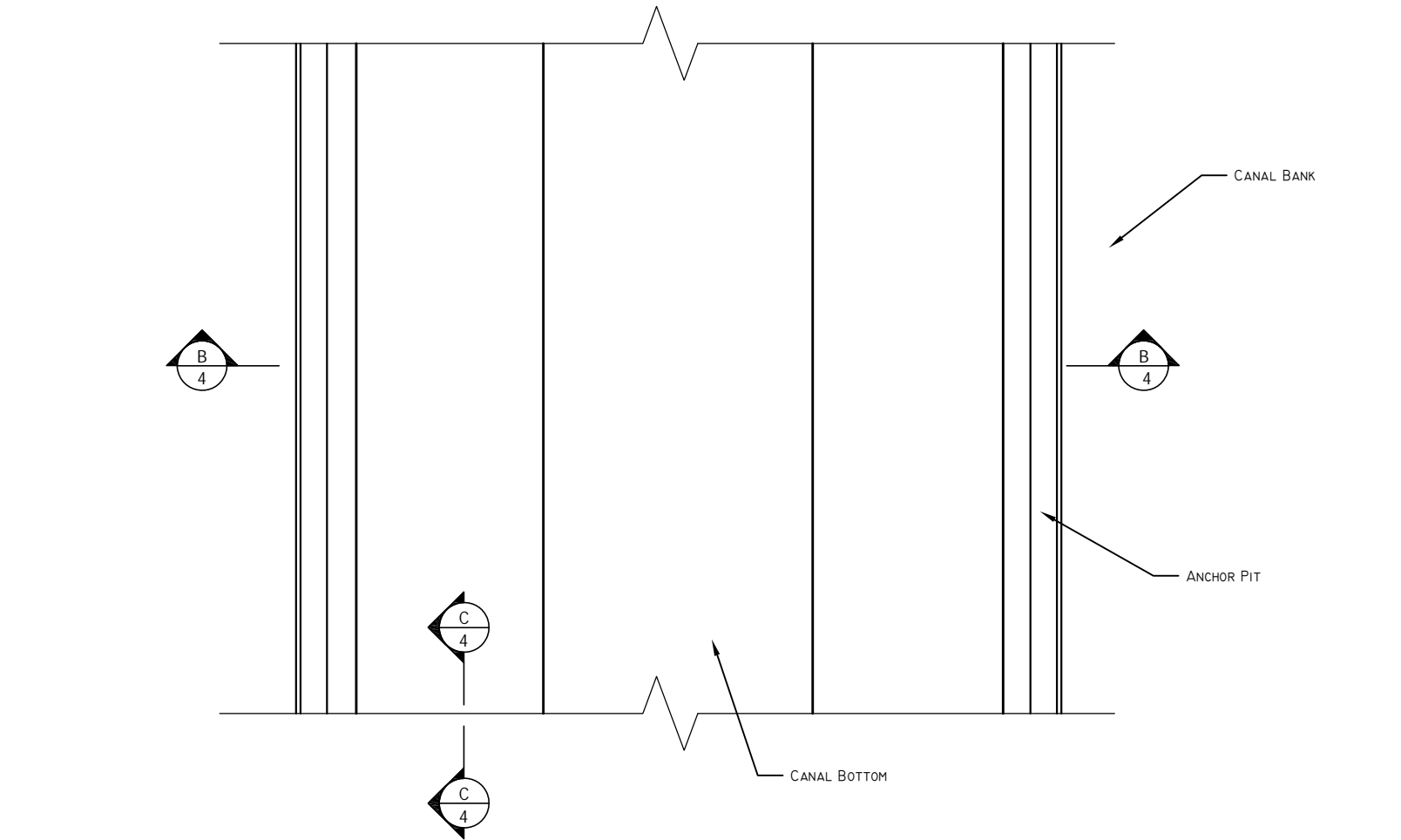
1. BORE PIT COMPACTION TO BE 92% MODIFIED PROCTOR DENSITY.
2. FILL BORE PITS WITH A MIXTURE OF NATIVE MATERIAL AND 10% BENTONITE POWDER TO CREATE A SEAL THAT WILL PREVENT WATER FROM FOLLOWING THE NEW CONDUIT.
3. STORMWATER RUNOFF ENTERS THE CANAL DURING STORM EVENTS OR AT OTHER UNEXPECTED TIMES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT THE WORK SITE.
4. CONDUIT MUST BE A MINIMUM OF 2 FEET BELOW THE BOTTOM OF THE EXISTING CANAL BOX CULVERT OR 4 FEET BELOW EARTHEN CANAL BOTTOM.
5. BORE PITS MUST BE PLACED 6' FROM TOE OF CANAL BANK ON THE DOWNHILL SIDE, AND 6' FROM THE TOP OF THE CANAL BANK ON THE UPHILL SIDE.



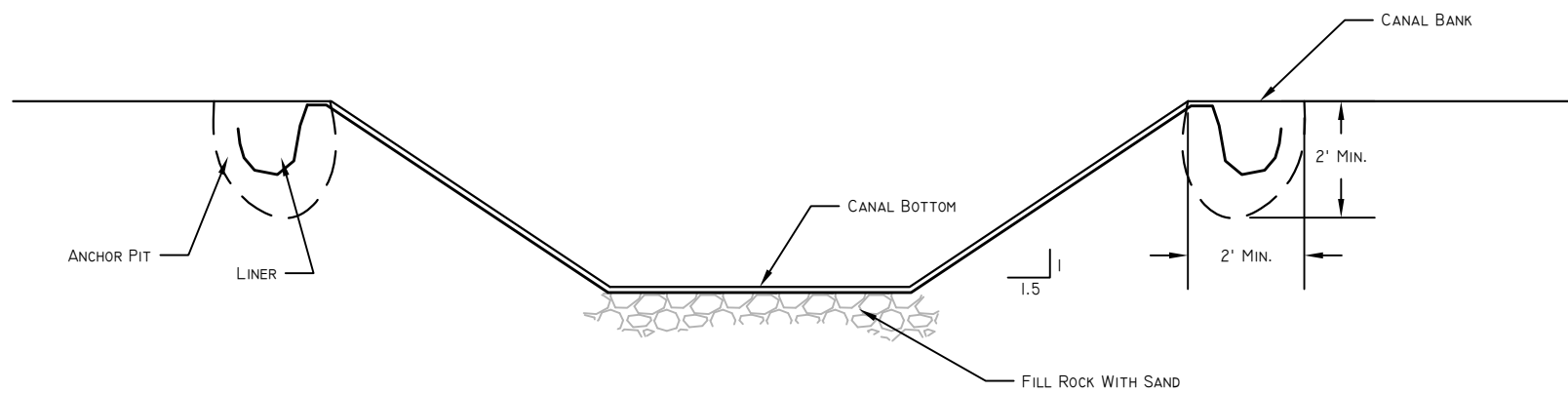
**B** DIRECTIONAL DRILL CROSS SECTION  
NTS

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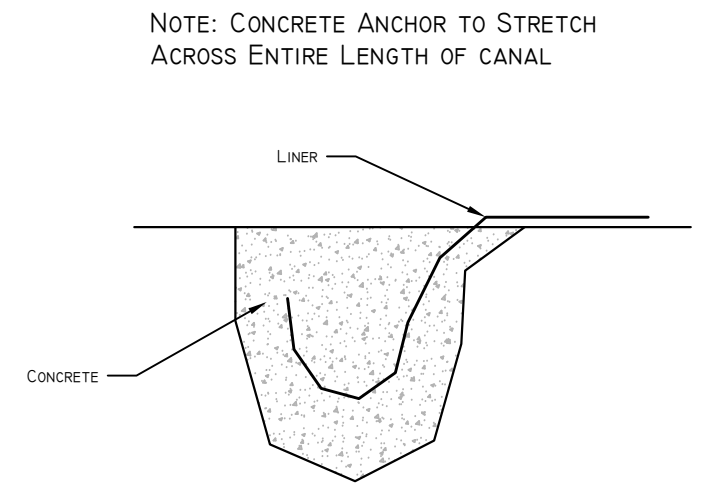
WELLSVILLE-MENDON CONSERVATION DISTRICT  
**STANDARD DRAWINGS**  
**DIRECTIONAL DRILLING DETAILS**  
03-Directional Drilling.dwg  
03/21021 - Wellsville-Mendon Canal Reviews 2021 Standard Drawings



**A** CANAL LINER PLAN  
NTS



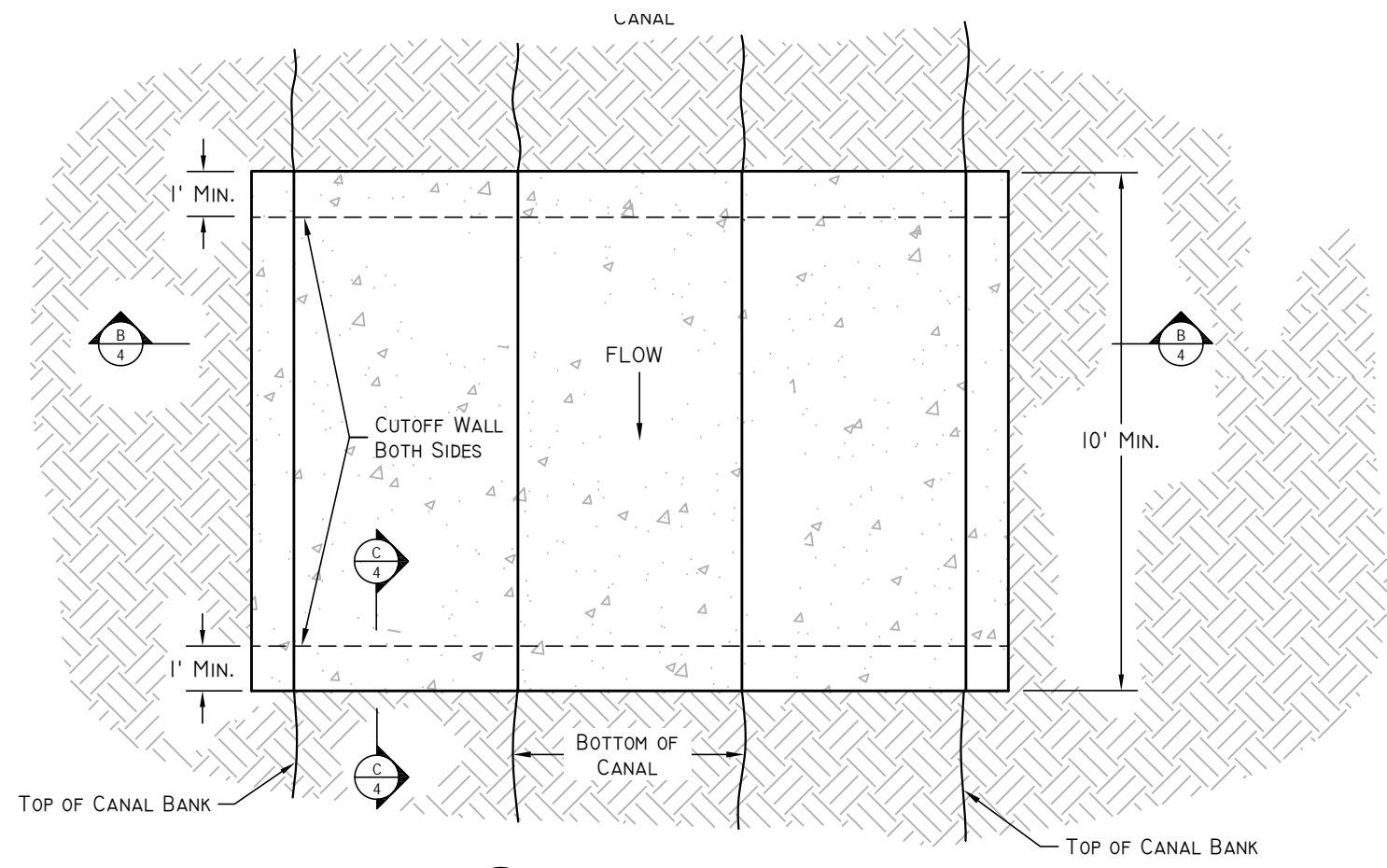
**B** MEMBRANE LINER CROSS SECTION  
NTS



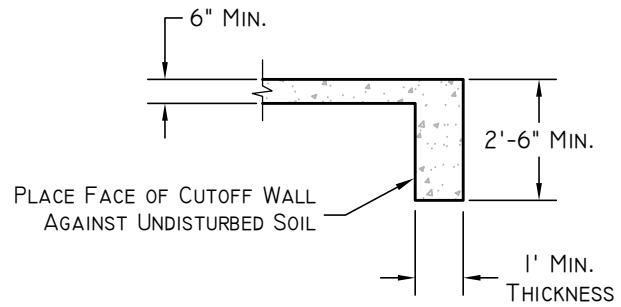
**C** CANAL LINING ANCHOR  
NTS

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WELLSVILLE-MENDON CONSERVATION DISTRICT  
STANDARD DRAWINGS  
MEMBRANE CANAL LINER  
04-Concrete Liner.dwg  
03/21021 - Wellsville-Mendon Canal Reviews 2021 Standard Drawings

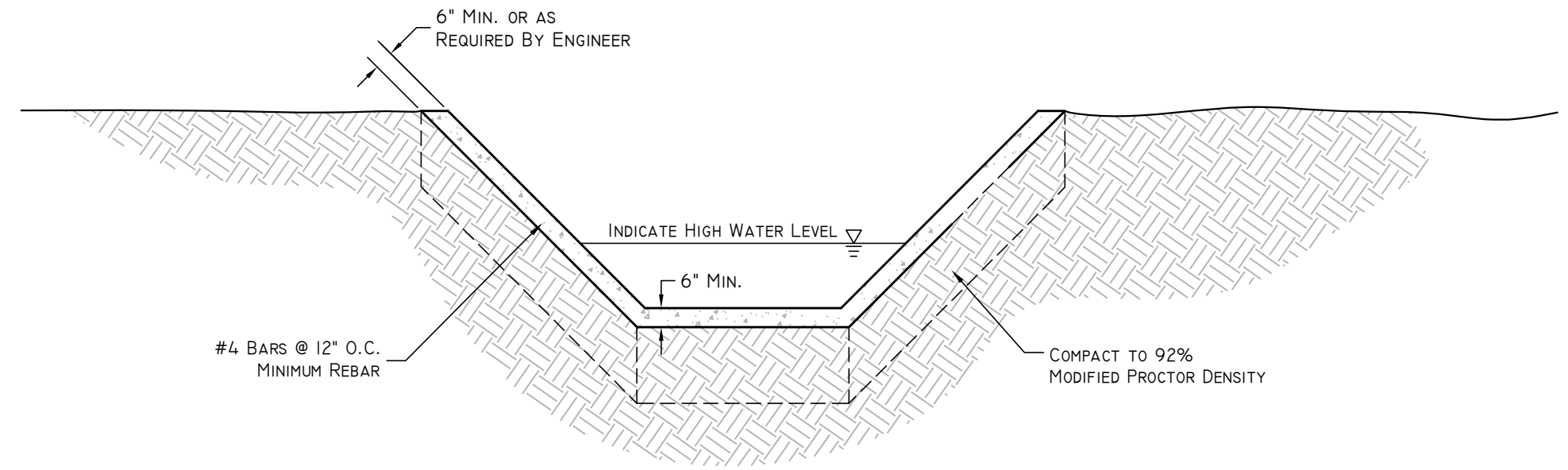


**(A) CONCRETE LINER PLAN**  
NTS



NOTE:  
ENGINEER TO DETERMINE REBAR SIZE  
AND SPACING IN CUTOFF WALL.

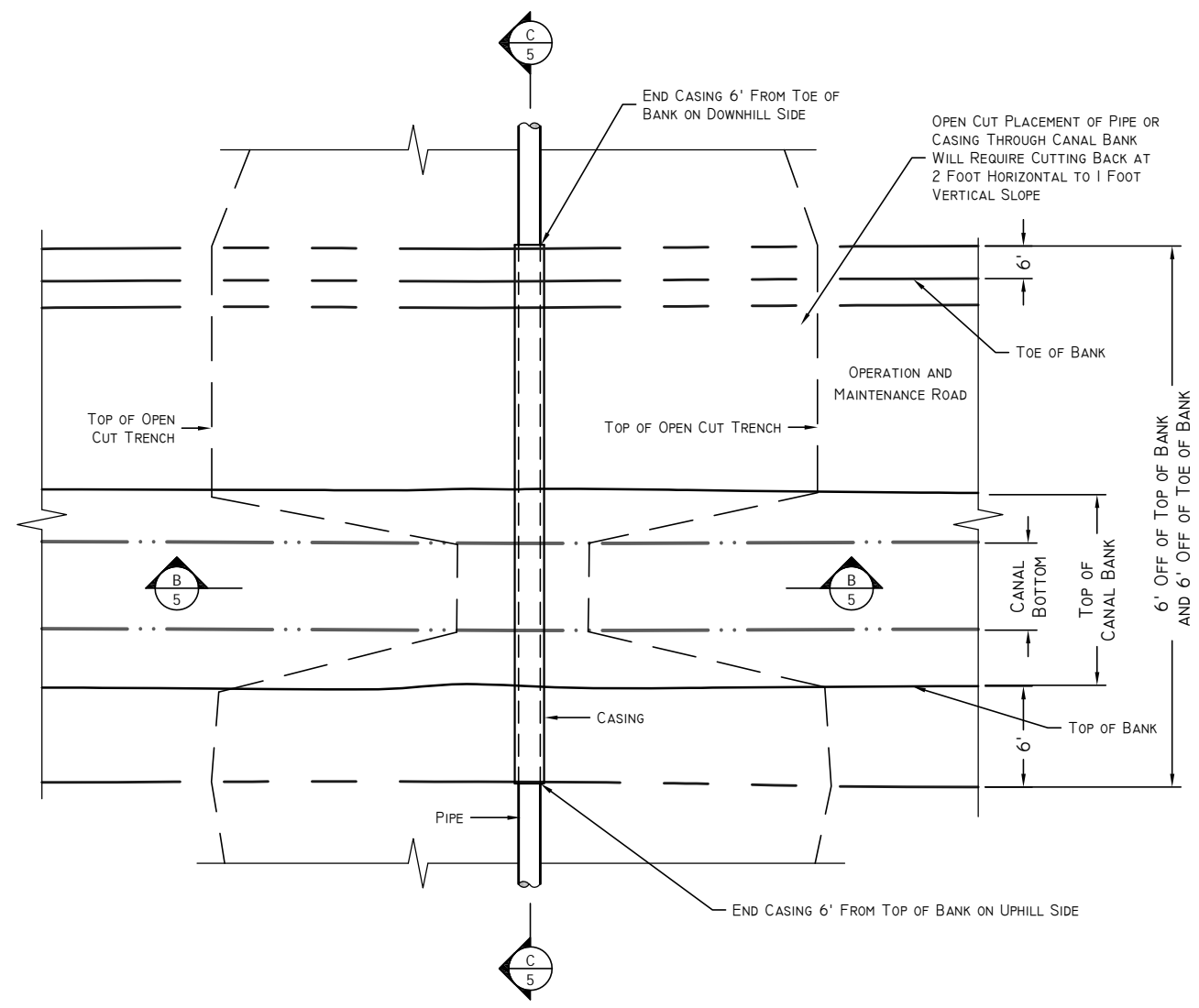
**(C) CUTOFF WALL CROSS SECTION**  
NTS



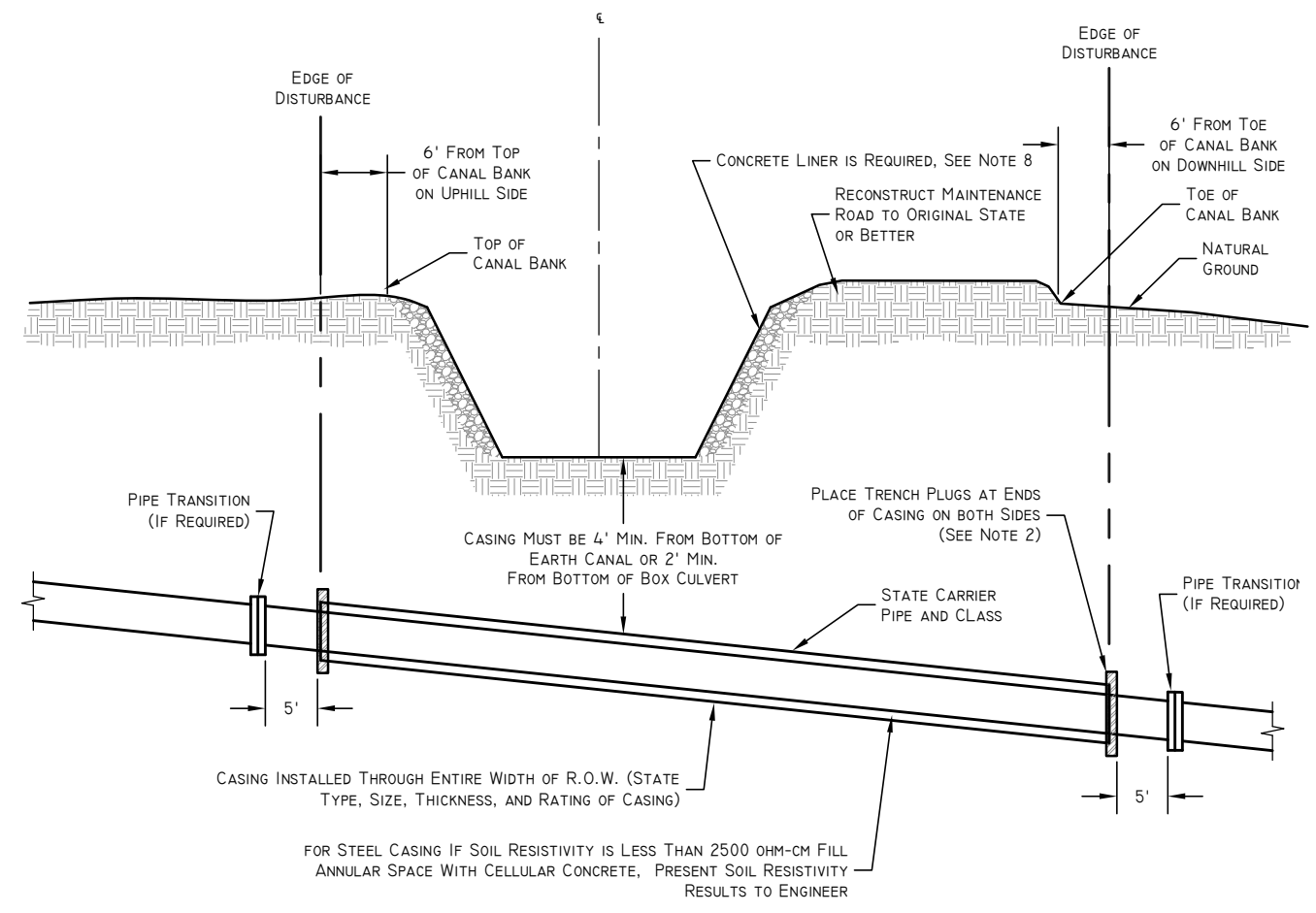
**(B) CONCRETE LINER CROSS SECTION**  
NTS

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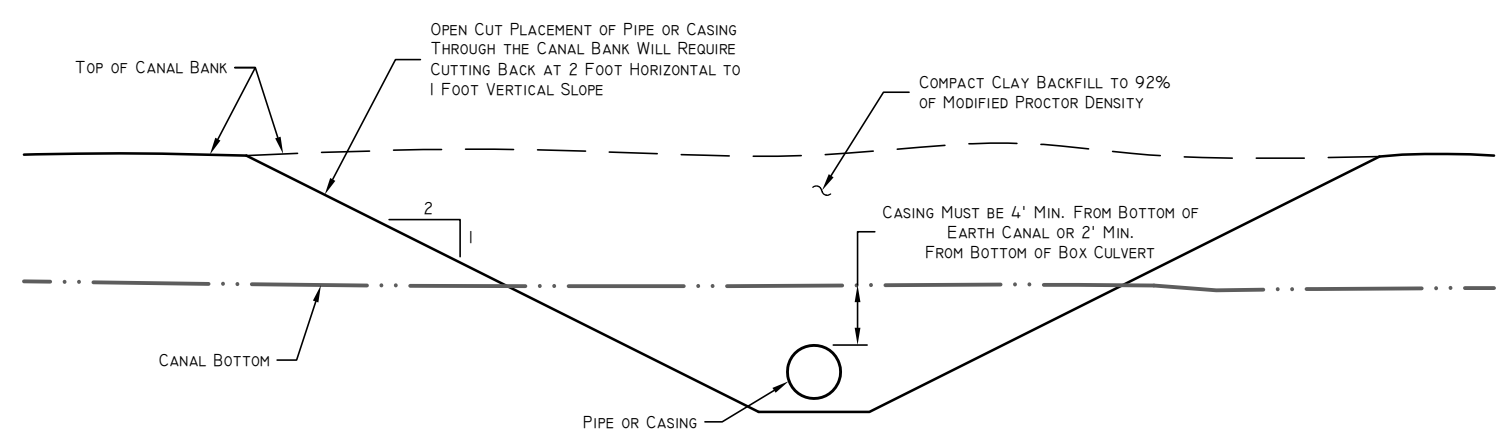
WELLSVILLE-MENDON CONSERVATION DISTRICT	STANDARD DRAWINGS
CONCRETE CANAL LINER	
04-Concrete Liner.dwg	
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**A** OPEN CUT PLAN VIEW  
NTS



**C** OPEN CUT CANAL CROSSING PROFILE  
NTS



**B** OPEN CUT CANAL CROSSING CROSS SECTION  
NTS

**TABLE I**  
STEEL CASING THICKNESS

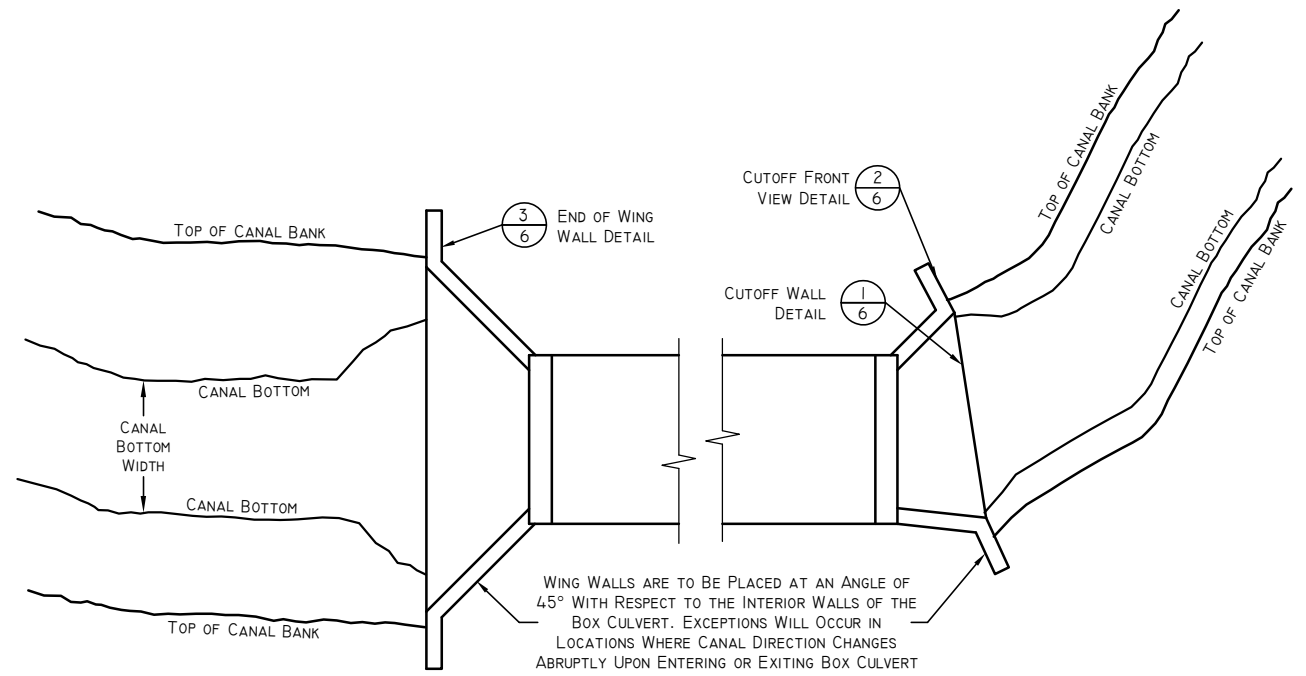
DIAMETER (INCHES)	MINIMUM WALL THICKNESS (INCHES)
12"	0.188"
14" - 16"	0.312"
18"	0.312"
20" - 22"	0.375"
24" - 26"	0.438"
28" - 32"	0.500"
34" - 36"	0.562"
38" - 42"	0.562"

**NOTES:**

- REMOVAL AND REPLACEMENT OF CANAL FLOOR AND BANKS WILL REQUIRE TESTING AND PROCTORS BY A LICENSED SOILS LAB. COMPACTION TO BE 92% MODIFIED PROCTOR DENSITY.
- TRENCH PLUGS ARE TO BE PLACED IN LOCATIONS SHOWN ON BOTH SIDES FOR WIDTH OF TRENCH AND 12 INCHES ABOVE AND BELOW CASING PIPES AND A MINIMUM THICKNESS OF 24 INCHES. PLUGS SHALL BE A 10% BENTONITE AND 90% CLAY MIXTURE, OR SHALL BE A FLOWABLE FILL CONCRETE.
- STORM WATER RUNOFF ENTERS THE CANAL DURING STORM EVENTS OR AT OTHER UNEXPECTED TIMES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT THE WORK SITE.
- WATERLINE PIPE INSIDE OF CASING SHALL HAVE RESTRAINING JOINTS.
- THRUST BLOCKS OR MECHANICAL RESTRAINTS ARE REQUIRED ON ALL BENDS AND TEES FOR DIP, PVC, OR PIP WATERLINES.
- CASING MUST BE 4' MIN. FROM BOTTOM OF EARTH CANAL OR 2' MIN. FROM BOTTOM OF BOX CULVERT.
- END PIPE CASING 6' FROM THE TOP OF THE CANAL BANK ON THE UPHILL SIDE AND 6' FROM THE TOE OF THE CANAL BANK ON THE DOWNHILL SIDE.
- CONCRETE LINER IS TO BE INSTALLED IN THE CANAL EXTENDING 5 FEET PAST THE EXTENTS OF CANAL DISTURBANCE SEE DETAIL. (A) (5)
- CARRIER PIPE SHALL HAVE ADEQUATE CASING SPACERS. PER MANUFACTURERS SPECIFICATIONS.

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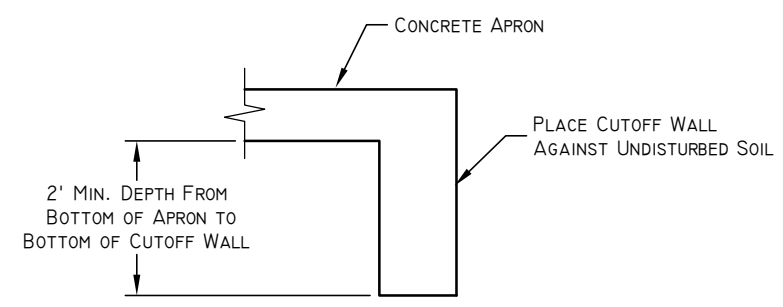
WELLSVILLE-MENDON CONSERVATION DISTRICT  
**STANDARD DRAWINGS**  
**OPEN CUT DETAILS**  
06-Open Cut Details.dwg  
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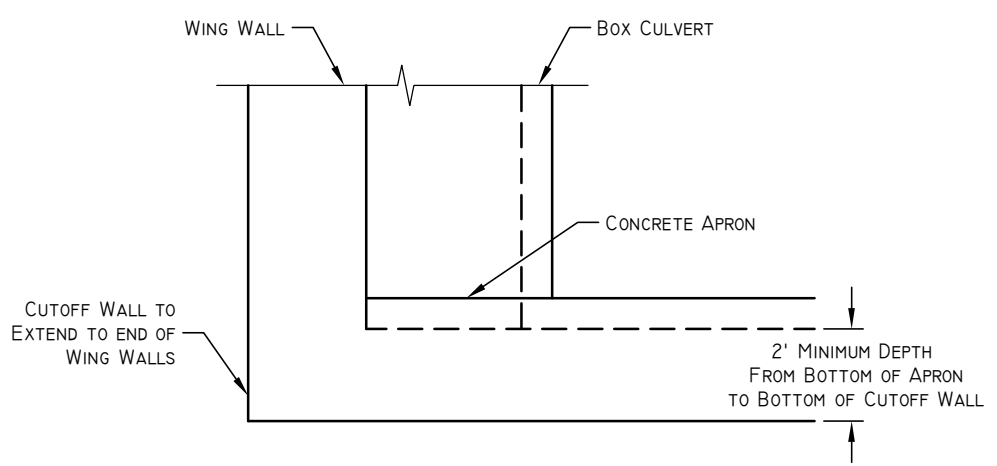
**A** PLAN VIEW OF BOX CULVERT  
NTS

NOTES:

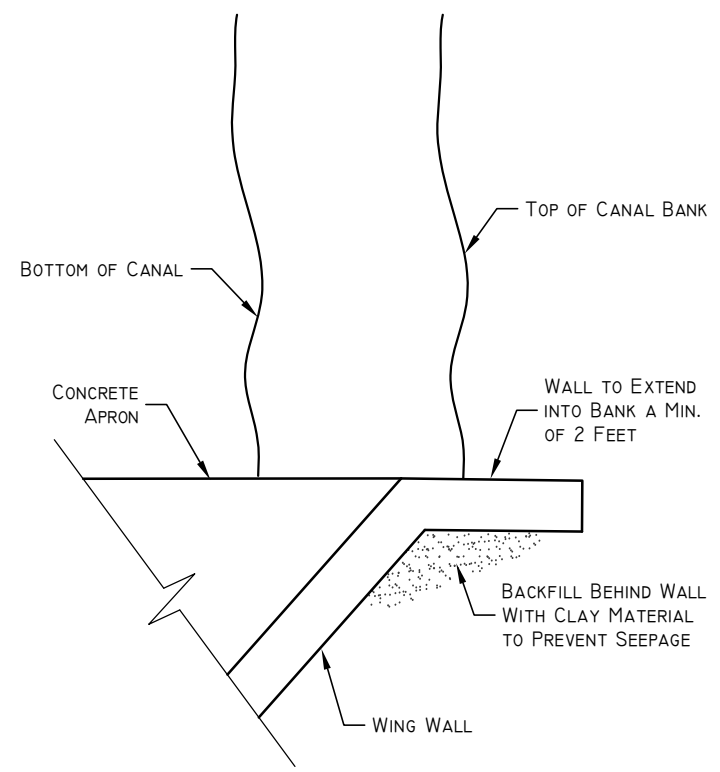
1. BOX CULVERTS TO HAVE A MINIMUM HEIGHT OF 6 FEET.
2. WIDTH OF BOX CULVERT IS TO MATCH EXISTING CHANNEL BOTTOM.
3. NO RIPRAP ALLOWED IN THE CANAL.
4. ACCESS TO CANAL OPERATION AND MAINTENANCE ROAD SHALL BE INSTALLED WITH CURB CUTS AT DRIVE APPROACHES AND THICKENED CONCRETE AT SIDEWALKS.
5. CUTOFF WALLS AND APRONS BETWEEN WING WALLS ARE REQUIRED.
6. END OF WING WALL SHALL NOT INTERFERE WITH OPERATION AND MAINTENANCE ROAD.
7. 6 FOOT CHAIN LINK FENCE OR 4 FOOT PARAPET WALL IS REQUIRED ON ALL BOX CULVERTS THAT CARRY PEDESTRIAN TRAFFIC. EXCEPTIONS MAY OCCUR WHERE LOCAL ORDINANCES NOTE OTHERWISE AND UPON APPROVAL BY CANAL COMPANY.
8. DRAWINGS SUBMITTED FOR REVIEW ARE TO SHOW PLAN AND PROFILE VIEWS, NOTE SLOPE, INCLUDE DETAIL INDICATING REBAR SIZE AND SPACING, AND STATE TRAFFIC LOADING.
9. CASINGS MUST HAVE A MINIMUM OF 2 FEET BETWEEN TOP OF CASING AND BOTTOM OF BOX CULVERT.
10. ALL CONCRETE USED IN CONSTRUCTION SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI. THE CONCRETE MIX SHALL INCLUDE BETWEEN 5% AND 7% AIR ENTRAINMENT.



**1** CUTOFF WALL DETAIL  
NTS



**2** CUTOFF FRONT VIEW DETAIL  
NTS



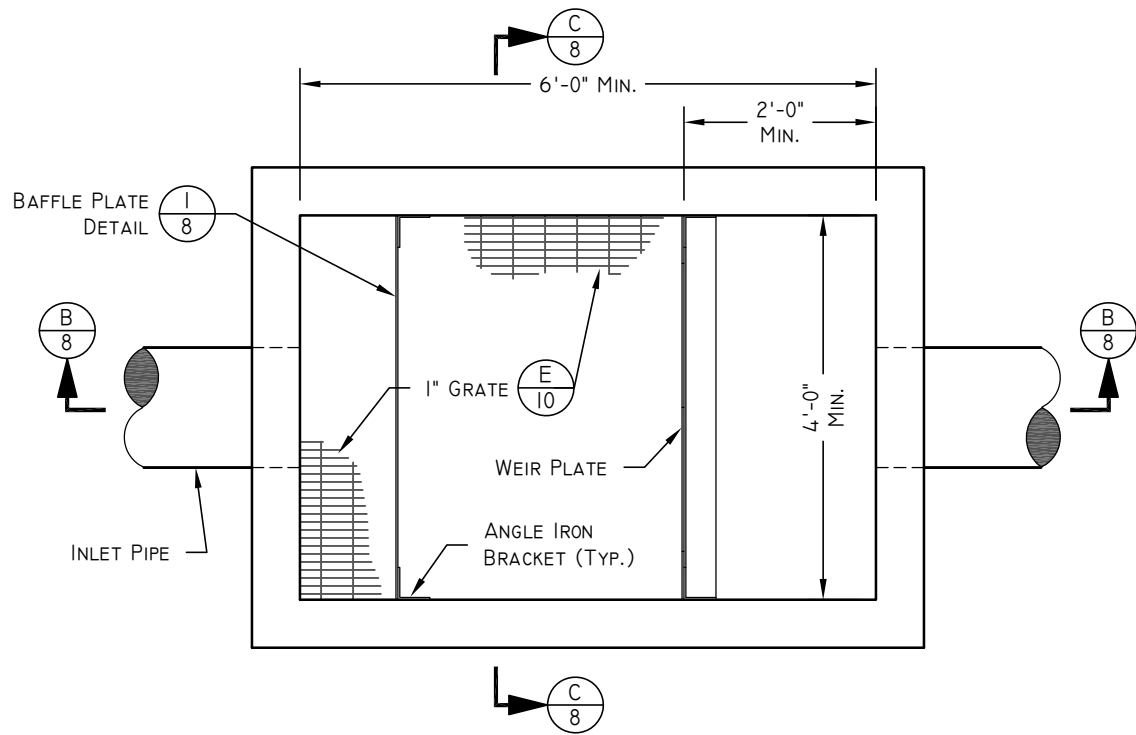
**3** END OF WING WALL DETAIL  
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	MATT GURR			
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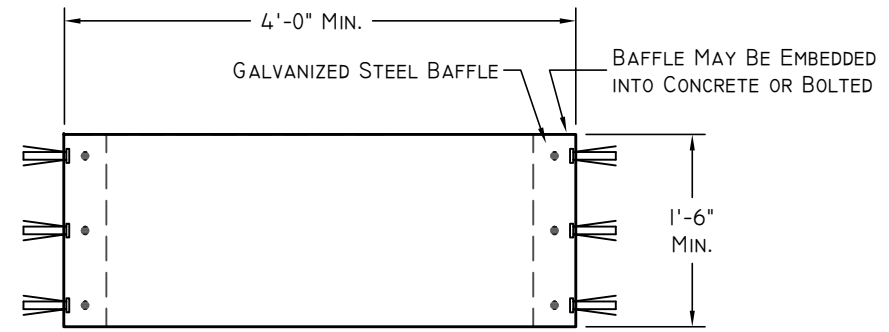
WELLSVILLE-MENDON CONSERVATION DISTRICT  
**STANDARD DRAWINGS**  
**BOX CULVERT DETAILS**  
07-Box Culvert Details.dwg  
03/21/2021 - Wellsville-Mendon Canal Reviews 2021 Standard Drawings







**A PLAN VIEW**  
NTS

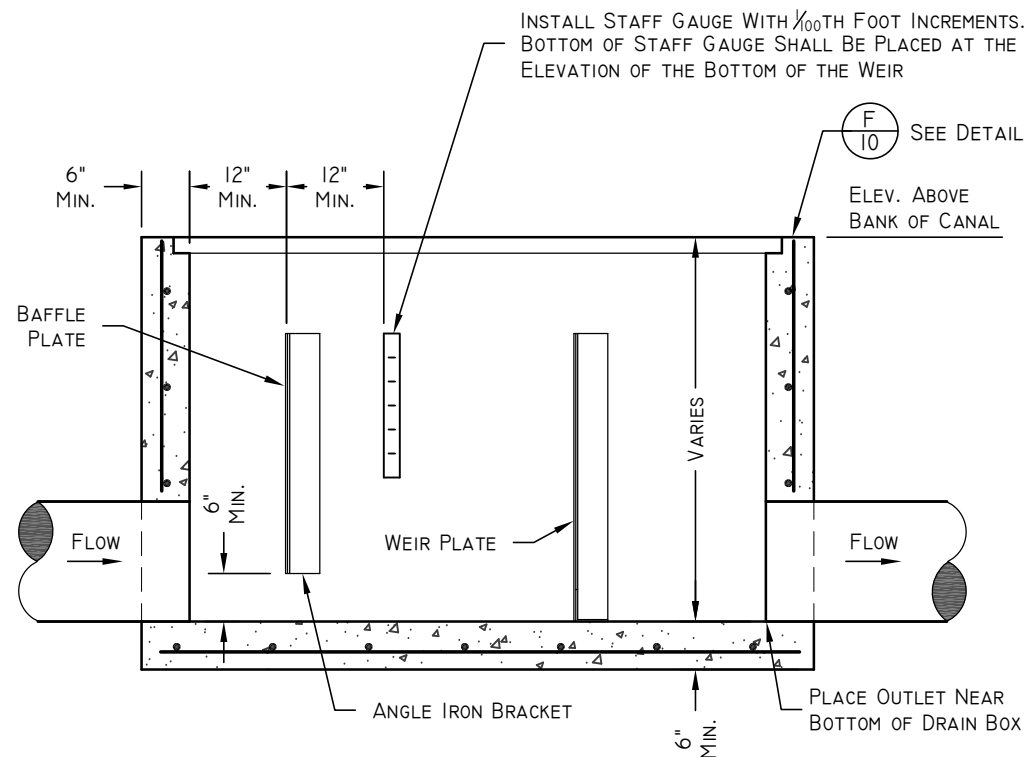


**I BAFFLE PLATE DETAIL**  
NTS

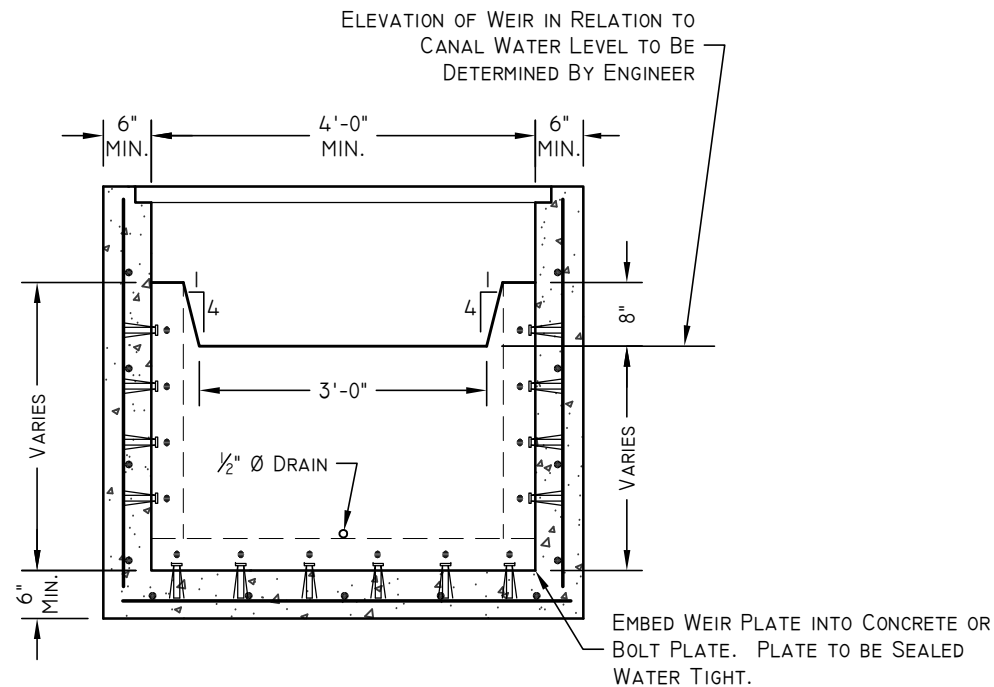
**TABLE I**  
 $Q = 3.367 LH^{3/2} @ L=3$

H (FT.)	Q (CFS)
0.2	0.90
0.3	1.66
0.4	2.56
0.5	3.57
0.6	4.69
0.66	5.42

NOTE: THIS WEIR IS SHOWN AS AN EXAMPLE. THE EXACT WEIR DIMENSIONS & FLOW TABLE TO BE DETERMINED BY APPLICANTS ENGINEER.



**B INLET AND OUTLET CROSS SECTION**  
NTS

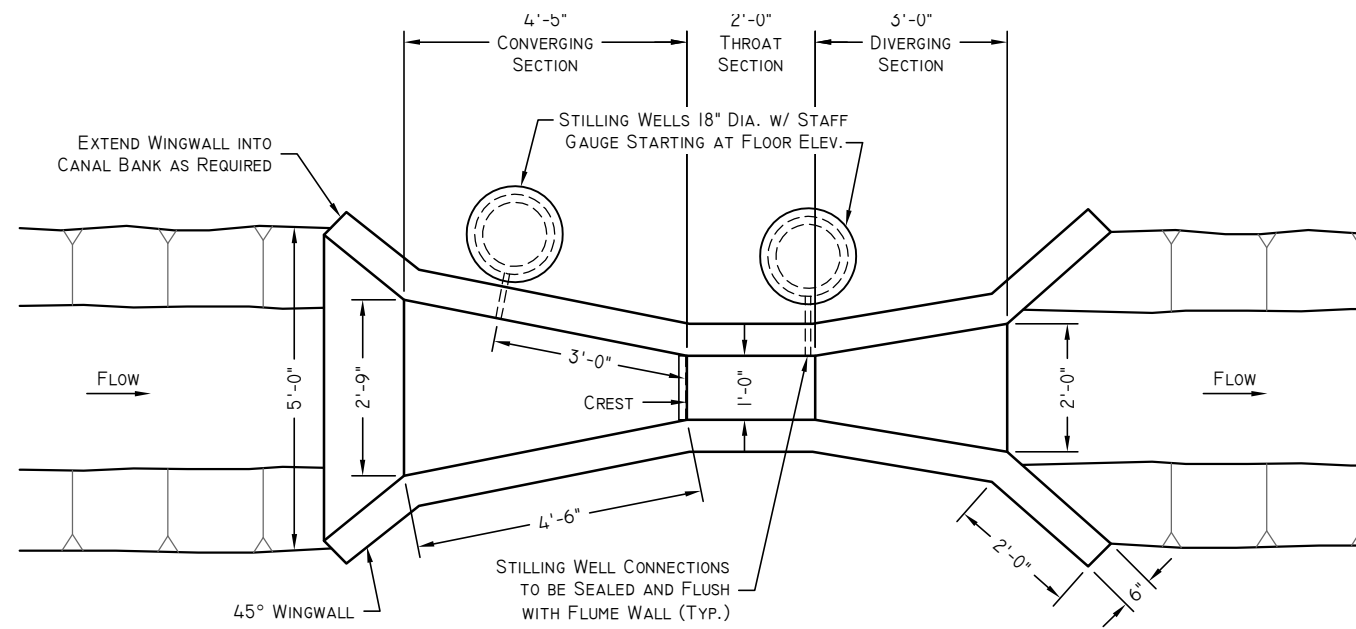


**C WEIR SECTION**  
NTS

**NOTES:**

- IF BOX IS CAST IN PLACE REBAR TO BE PLACED AT 12 INCHES O.C. E.W. MINIMUM.
- DETAILS FOR CAST IN PLACE BOX SEE **C/10**.
- ALL PIPES IN BOX SHALL BE GROUTED AND WATERTIGHT.
- SUBMIT TO CANAL COMPANY ENGINEER FOR REVIEW ON FINAL DIMENSIONS ON REBAR REINFORCEMENT AND CONCRETE COMPONENTS.
- GRATE TO BE GALVANIZED.

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NO.	DATE	DESCRIPTION		



**A** FLUME PLAN VIEW  
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**NOTES:**

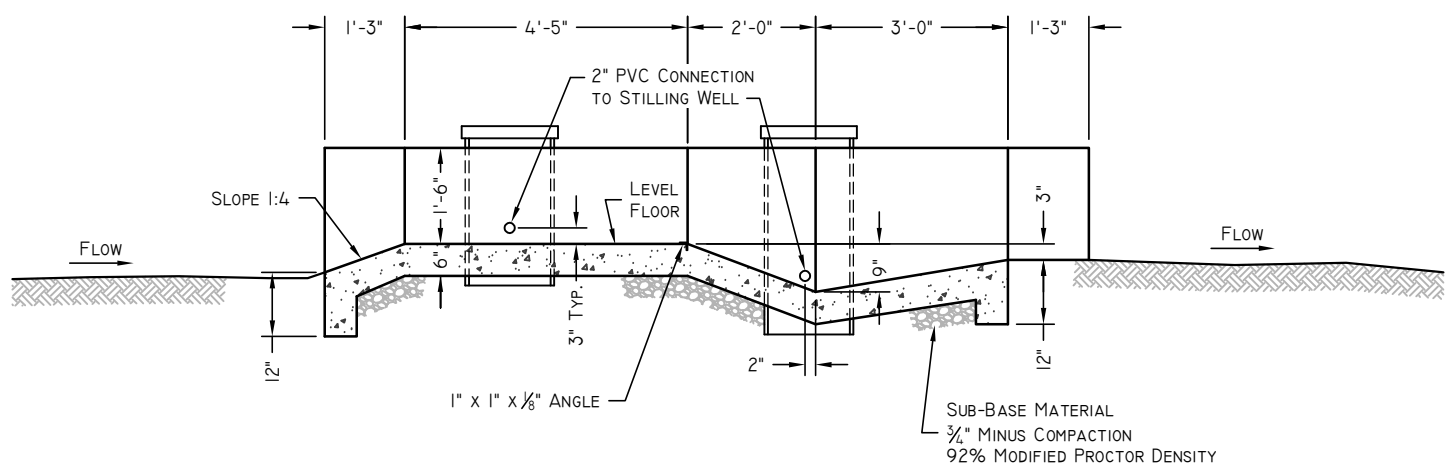
1. REINFORCING TO BE MINIMUM OF #4 REBAR @ 12 INCHES ON CENTER, EACH WAY WITH 20 INCH MINIMUM SPLICE LENGTH.
2. APPLICANT TO SUBMIT ACTUAL PLANS AND MATERIAL OF FLUME PRIOR TO CONSTRUCTION.

**TABLE I**

HEAD-FLOW RELATIONSHIP FOR CONCRETE FLUME

HEAD H <sub>a</sub> (FEET)	FLOW Q (CFS)	HEAD H <sub>a</sub> (FEET)	FLOW Q (CFS)	HEAD H <sub>a</sub> (FEET)	FLOW Q (CFS)	HEAD H <sub>a</sub> (FEET)	FLOW Q (CFS)	HEAD H <sub>a</sub> (FEET)	FLOW Q (CFS)	HEAD H <sub>a</sub> (FEET)	FLOW Q (CFS)
0.20	0.35	0.42	1.07	0.64	2.03	0.86	3.18	1.08	4.50	1.30	5.96
0.21	0.37	0.43	1.11	0.65	2.08	0.87	3.24	1.09	4.56	1.31	6.03
0.22	0.40	0.44	1.15	0.66	2.13	0.88	3.29	1.10	4.62	1.32	6.10
0.23	0.43	0.45	1.19	0.67	2.18	0.89	3.35	1.11	4.68	1.33	6.18
0.24	0.46	0.46	1.23	0.68	2.23	0.90	3.41	1.12	4.75	1.34	6.25
0.25	0.49	0.47	1.27	0.69	2.28	0.91	3.46	1.13	4.82	1.35	6.32
0.26	0.51	0.48	1.31	0.70	2.33	0.92	3.52	1.14	4.88	1.36	6.39
0.27	0.54	0.49	1.35	0.71	2.38	0.93	3.58	1.15	4.94	1.37	6.46
0.28	0.58	0.50	1.39	0.72	2.43	0.94	3.64	1.16	5.01	1.38	6.53
0.29	0.61	0.51	1.44	0.73	2.48	0.95	3.70	1.17	5.08	1.39	6.60
0.30	0.64	0.52	1.48	0.74	2.53	0.96	3.76	1.18	5.15	1.40	6.68
0.31	0.68	0.53	1.52	0.75	2.58	0.97	3.82	1.19	5.21	1.41	6.75
0.32	0.71	0.54	1.57	0.76	2.63	0.98	3.88	1.20	5.28	1.42	6.82
0.33	0.74	0.55	1.62	0.77	2.68	0.99	3.94	1.21	5.34	1.43	6.89
0.34	0.77	0.56	1.66	0.78	2.74	1.00	4.00	1.22	5.41	1.44	6.97
0.35	0.80	0.57	1.70	0.79	2.80	1.01	4.06	1.23	5.48	1.45	7.04
0.36	0.84	0.58	1.75	0.80	2.85	1.02	4.12	1.24	5.55	1.46	7.12
0.37	0.88	0.59	1.80	0.81	2.90	1.03	4.18	1.25	5.62	1.47	7.19
0.38	0.92	0.60	1.84	0.82	2.96	1.04	4.25	1.26	5.69	1.48	7.26
0.39	0.95	0.61	1.88	0.83	3.02	1.05	4.31	1.27	5.76	1.49	7.34
0.40	0.99	0.62	1.93	0.84	3.07	1.06	4.37	1.28	5.82	1.50	7.41
0.41	1.03	0.63	1.98	0.85	3.12	1.07	4.43	1.29	5.89		

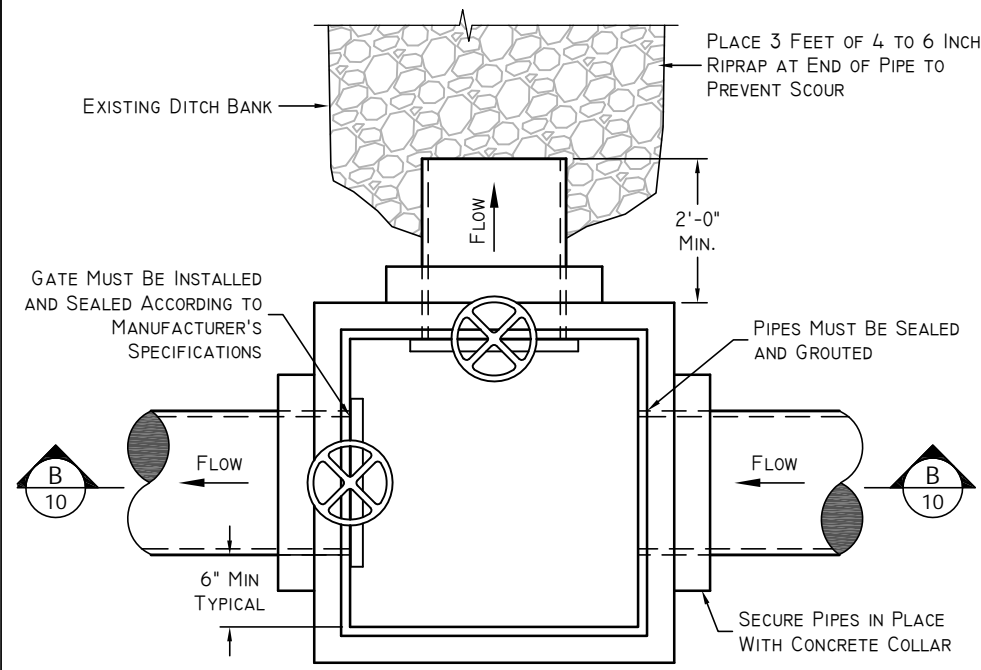
NOTE: THIS FLUME IS SHOWN AS AN EXAMPLE. THE EXACT FLUME DIMENSIONS & FLOW TABLE TO BE DETERMINED BY APPLICANTS ENGINEER.



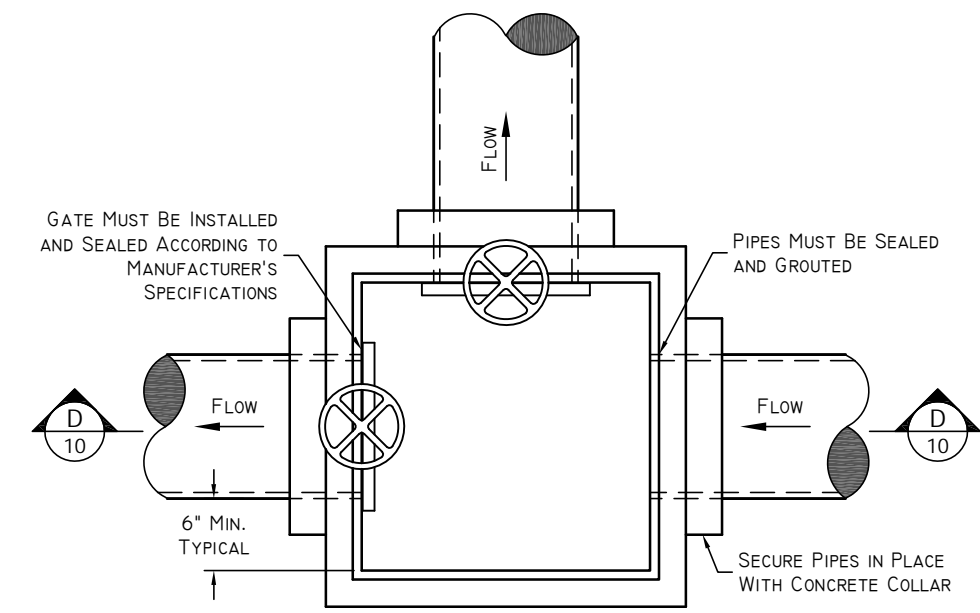
**B** FLUME PROFILE VIEW  
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DRAFTSMAN:	MATT GURR	PRINT DATE:	JUNE 26, 2021
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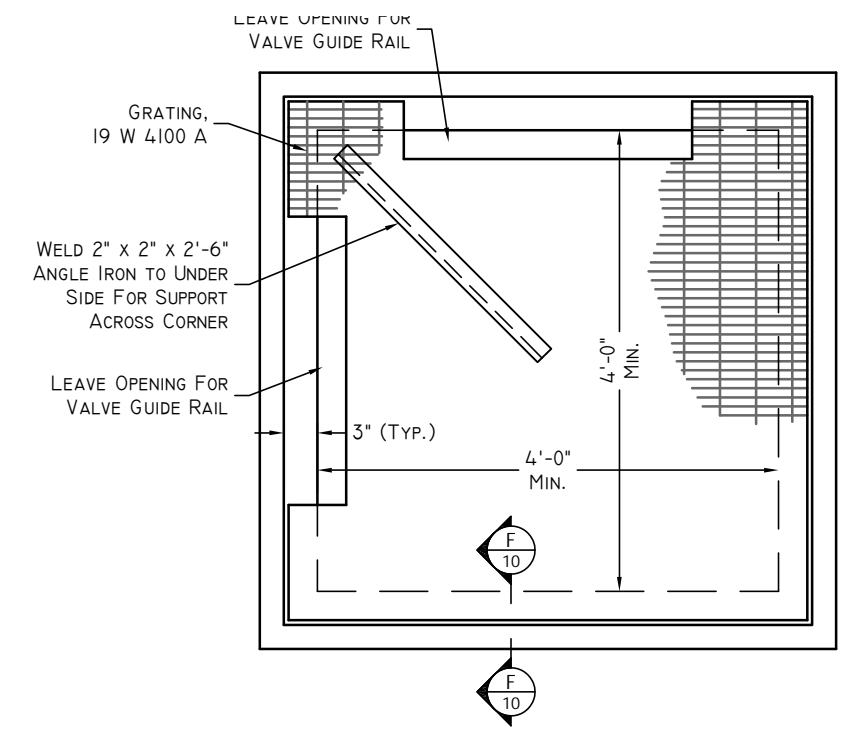
WELLSVILLE-MENDON CONSERVATION DISTRICT  
**STANDARD DRAWINGS**  
**I-FT PARSHALL FLUME**  
10-1-Ft. Parshall Flume.dwg  
03/21/2021 - Wellsville-Mendon Canal Reviews 2021 Standard Drawings



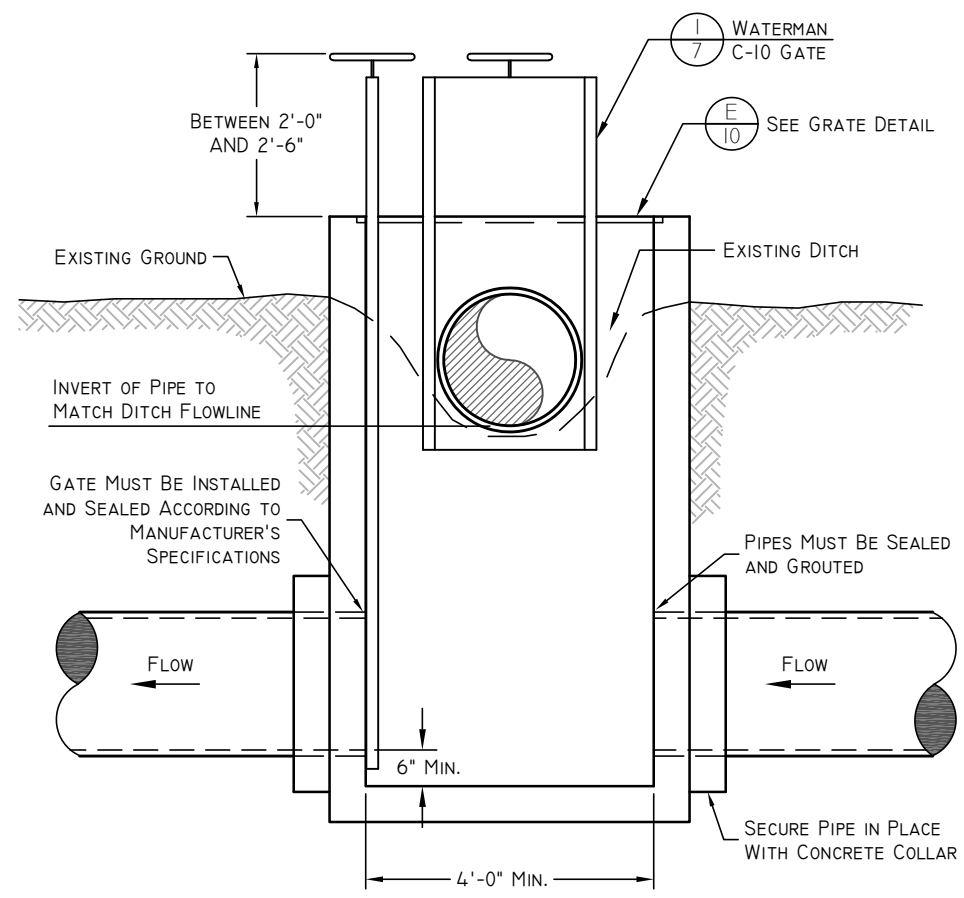
**A TURNOUT BOX PLAN**  
NTS



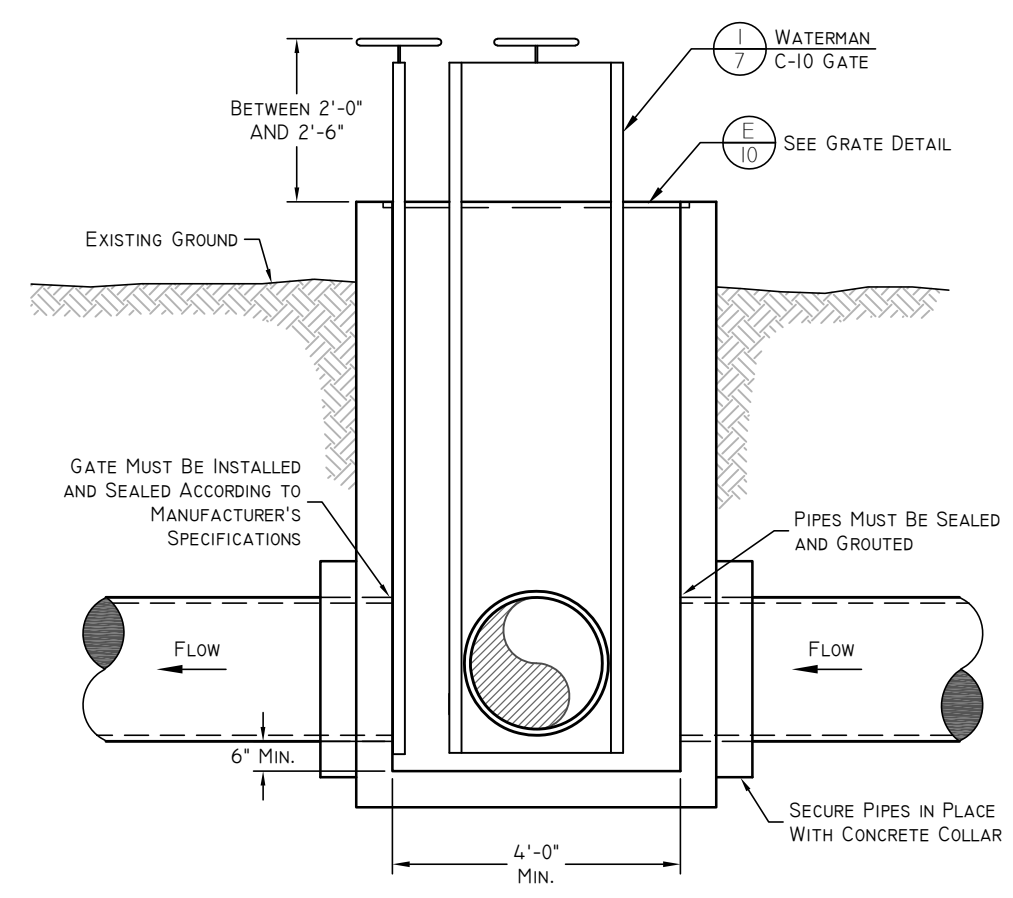
**C DIVERSION BOX**  
NTS



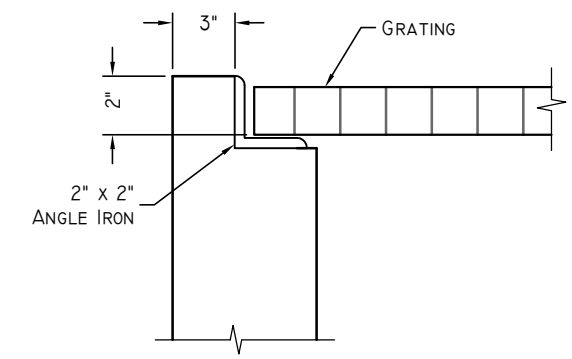
**E GRATE DETAIL - TOP VIEW**  
NTS



**B TURNOUT BOX SECTION**  
NTS



**D DIVERSION BOX SECTION**  
NTS

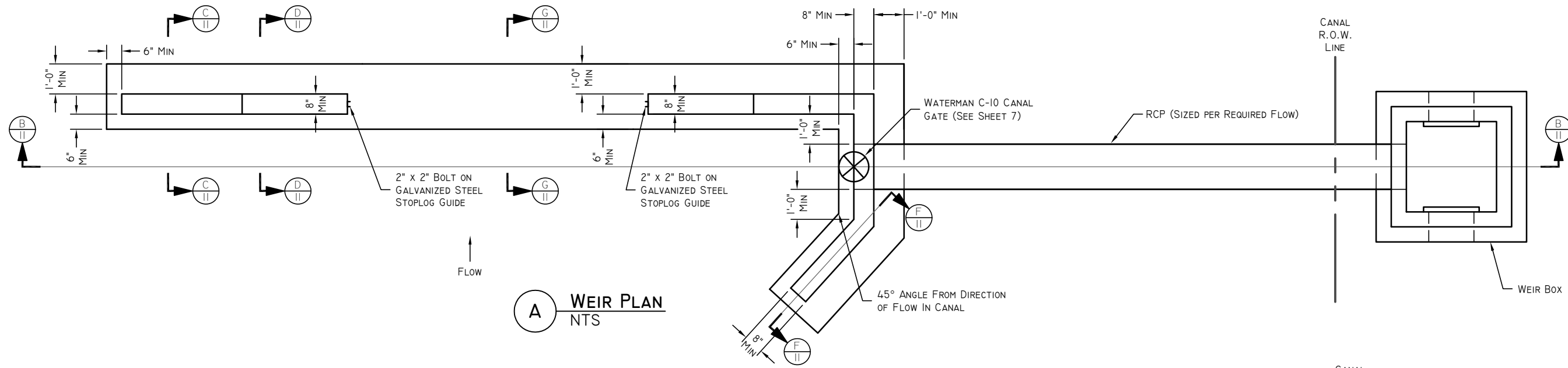


**F GRATING LIP SECTION**  
NTS

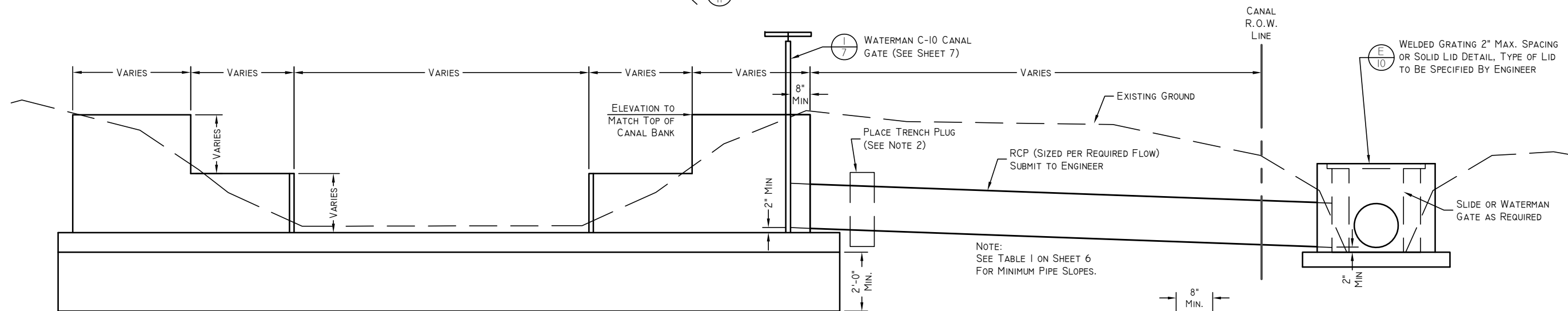
**NOTES:**

1. ALL PIPES INTO BOX SHALL BE GROUTED AND WATERTIGHT WITH CONCRETE COLLAR.
2. BOXES MAY BE PRECAST OR CAST IN PLACE. BOXES SHALL HAVE A MINIMUM INTERIOR WIDTH AND LENGTH OF 4' WITH MINIMUM OF #4 REBAR @ 12" O.C. BOXES MUST BE SUBMITTED FOR REVIEW.
3. TURNOUT AND DIVERSION BOXES SHALL NOT BE PLACED IN ROADWAY.
4. GRATE TO BE GALVANIZED.

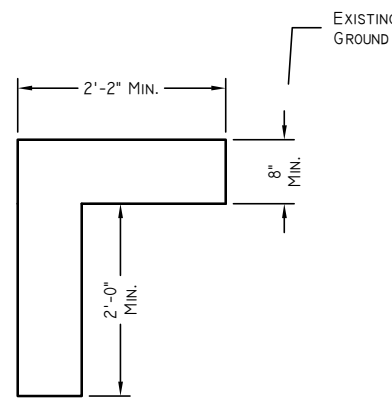
DESIGNER:	VINCE HOGE	PROJECT LEADER:	CHAD BROWN
DRAFTSMAN:	MATT GUR	PRINT DATE:	JUNE 26, 2021
NO.	DATE	REVISIONS	DESCRIPTION



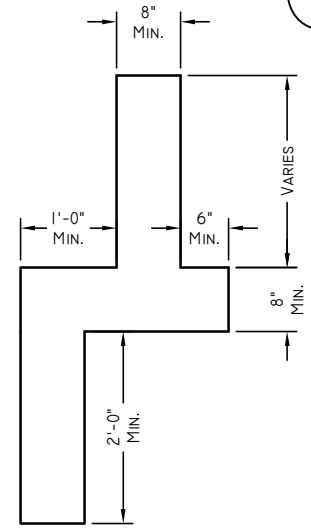
**A** WEIR PLAN  
NTS



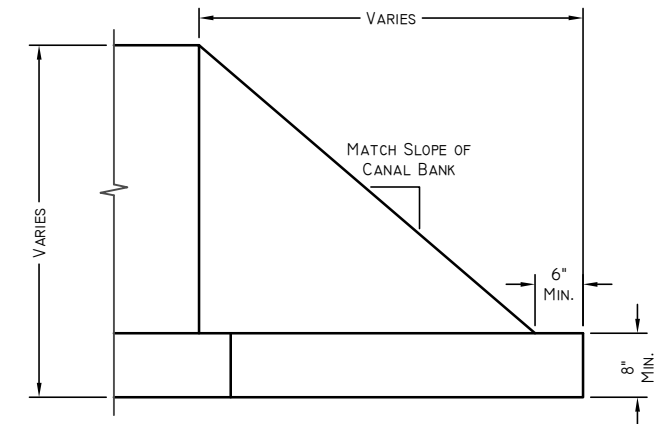
**B** WEIR PROFILE  
NTS



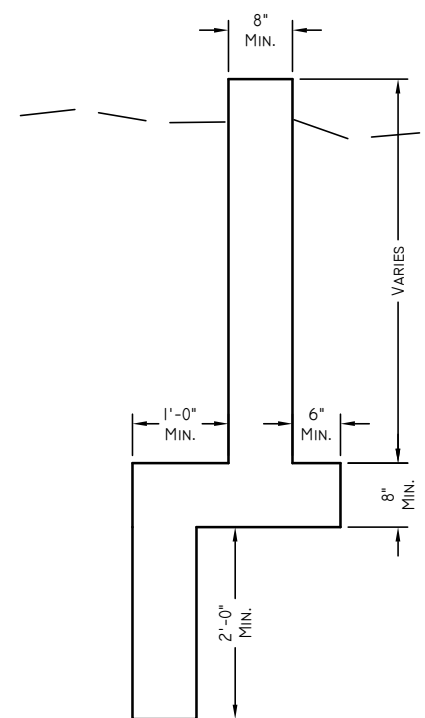
**G** FOOTING BETWEEN  
WEIR WALLS - DETAIL  
NTS



**D** SHORT WEIR  
WALL SECTION  
NTS



**F** WINGWALL DETAIL  
NTS



**C** TALL WEIR  
WALL SECTION  
NTS

NOTE:  
SEE TABLE 1 ON SHEET 6  
FOR MINIMUM PIPE SLOPES.

- NOTES:
1. MINIMUM OF #4 REBAR @ 12 INCHES O.C. E.W. IN BOX AND CHECK STRUCTURE. FINAL DIMENSIONS AND REINFORCEMENT MUST BE SUBMITTED AND REVIEWED BY COMPANY ENGINEER.
  2. TRENCH PLUG TO BE PLACED IN LOCATION SHOWN FOR WIDTH OF TRENCH AND 12 INCHES ABOVE AND BELOW PIPE AND A THICKNESS OF 24 INCHES. PLUGS SHALL BE A 10% BENTONITE AND 90% CLAY MIXTURE, OR A FLOWABLE FILL CONCRETE.
  3. ALL BACKFILL MATERIAL IN CANAL R.O.W. TO BE COMPACTED TO 92% MODIFIED PROCTOR DENSITY.

DESIGNER:	VINCE HOGE
DRAFTER:	MATT GURR
PROJECT LEADER:	CHAD BROWN
DATE:	JUNE 23, 2021
NO.	
INTS.	
REVISIONS	
DESCRIPTION	