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2016

CITY OF TOLEDO
CONSTRUCTION
STANDARDS



DIVISION OF
ENGINEERING SERVICES

Douglas R. Stephens

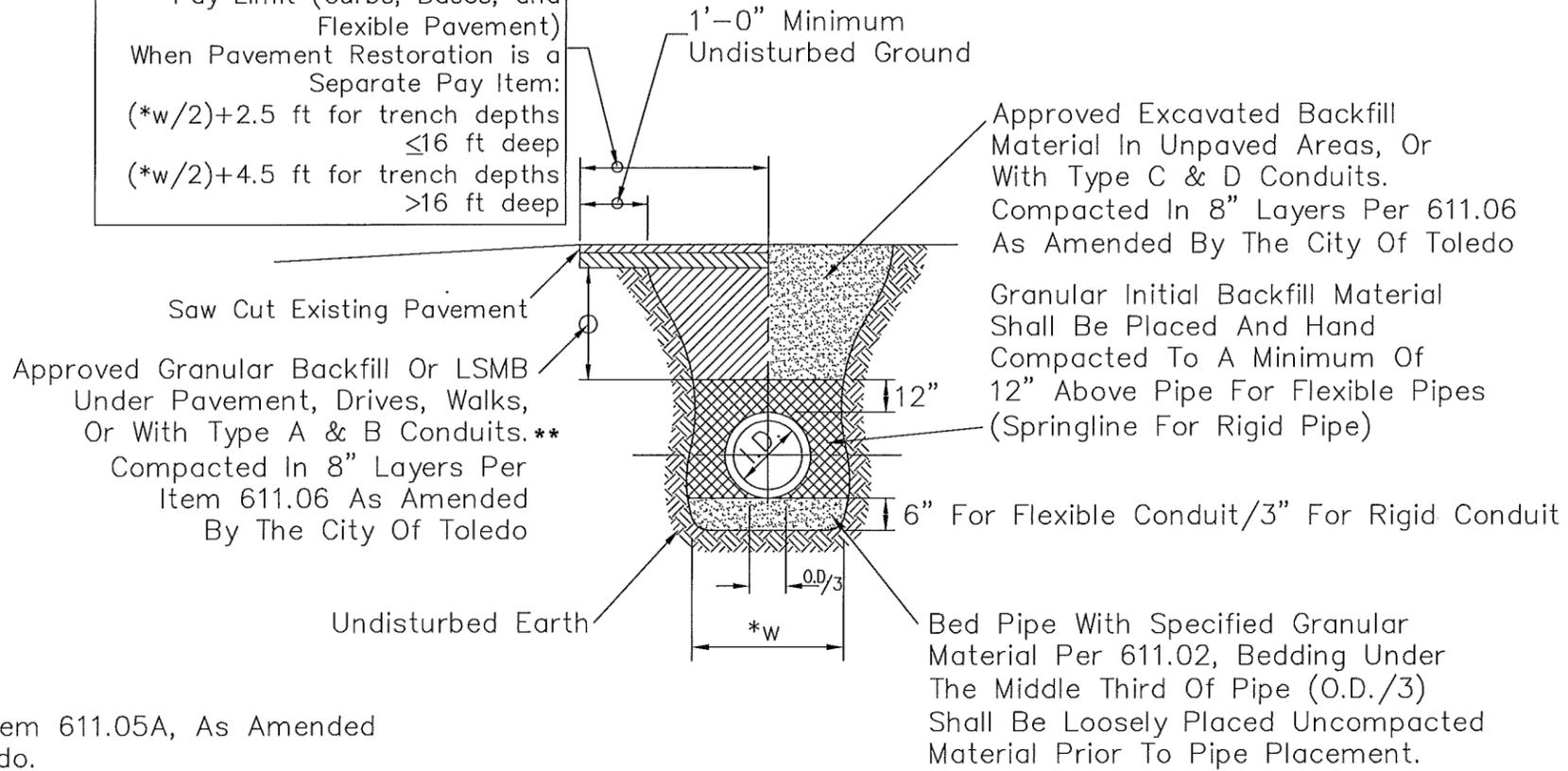
 Douglas R. Stephens P.E., Commissioner
Edward A. Moore

 Edward A. Moore, Director Public Utilities

1/29/16
 Date
 2/3/16
 Date

PAY LIMITS FOR UTILITY PROJECTS	
Maximum Pavement Restoration Pay Limit (Curbs, Bases, and Flexible Pavement)	
When Pavement Restoration is a Separate Pay Item:	
(*w/2)+2.5 ft for trench depths ≤16 ft deep	
(*w/2)+4.5 ft for trench depths >16 ft deep	

TRENCH DETAIL

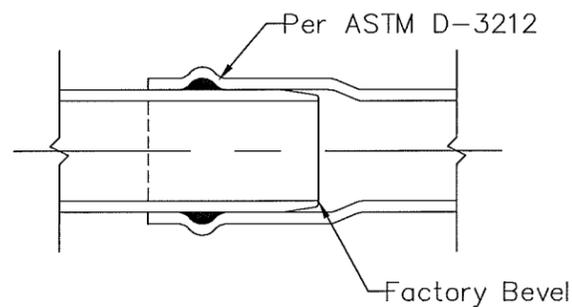


* "w" As Defined In Item 611.05A, As Amended By The City Of Toledo.

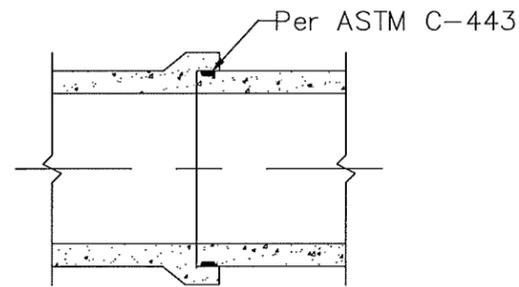
For Rigid Conduit: $w = \text{Pipe (O.D.)} \times 1.33$
 For Flexible Conduit: $w = \text{Pipe (O.D.)} \times 1.25 + 12"$
Conduit Defined Under Item 611.03

**If Any Portion Of The Trench Is Under Or Within 3 Feet Of The Pavement When The Trench Depth ≤ 7 Feet.
 Or
 If Any Portion Of The Trench Is Under Or Within 5 Feet Of The Pavement When The Trench Depth > 7 Feet.

PIPE JOINTS



PVC PIPE PREMIUM JOINT



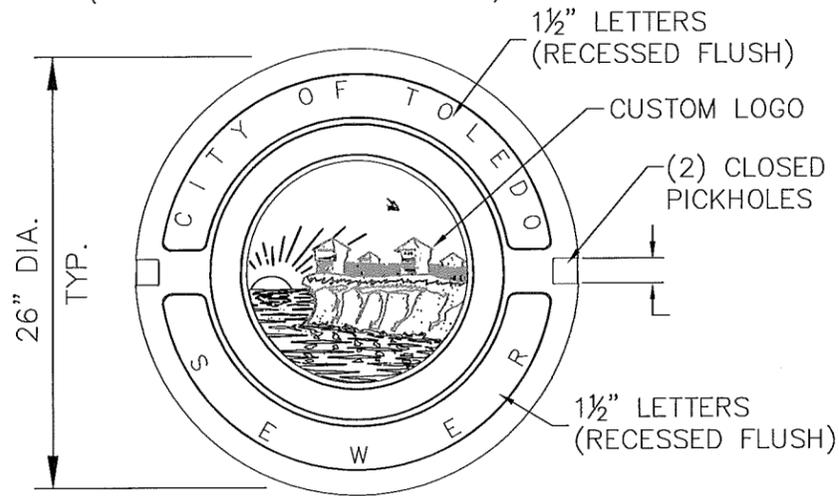
CIRCULAR RCP BELL & SPIGOT WITH PREMIUM JOINT

CITY OF TOLEDO
 CONSTRUCTION STANDARDS

SEWER TRENCH AND PIPE
 JOINT DETAILS

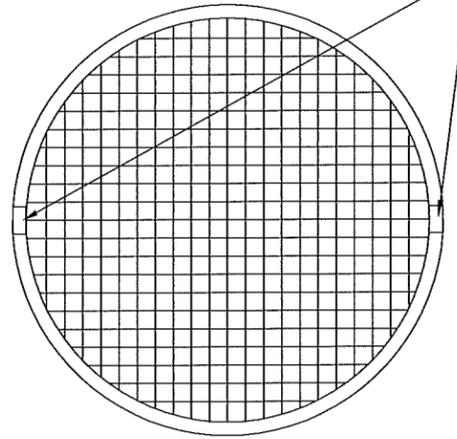
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DATE: 12-15	DRAWING FILE: STANDARD-1.DWG		

HEAVY DUTY MANHOLE FRAME AND COVER
 FOR USE ON ODOT MANHOLE NO. 3, NO. 4 AND NO. 5
 EAST JORDAN 1048, NEENAH R-1642B OR EQUAL
 (ALL DIMENSIONS ARE NOMINAL)



PUBLIC SANITARY SEWER

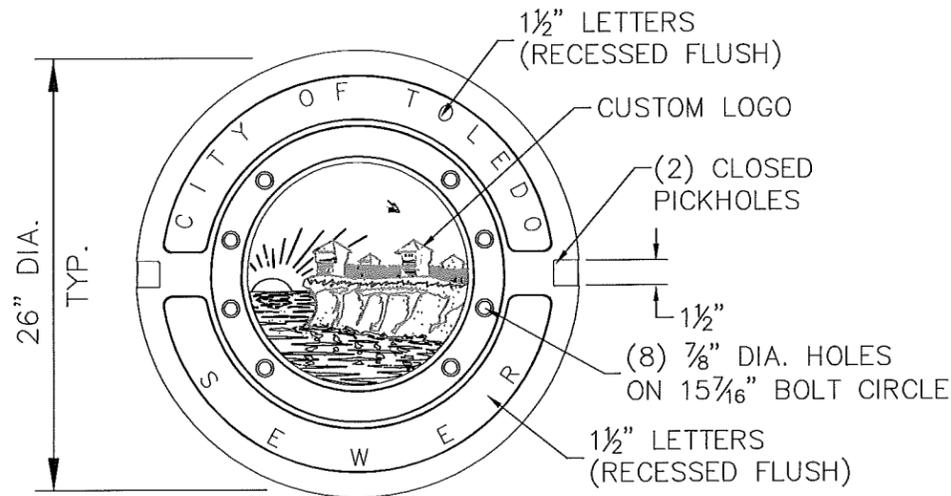
CONCEALED PICK HOLES



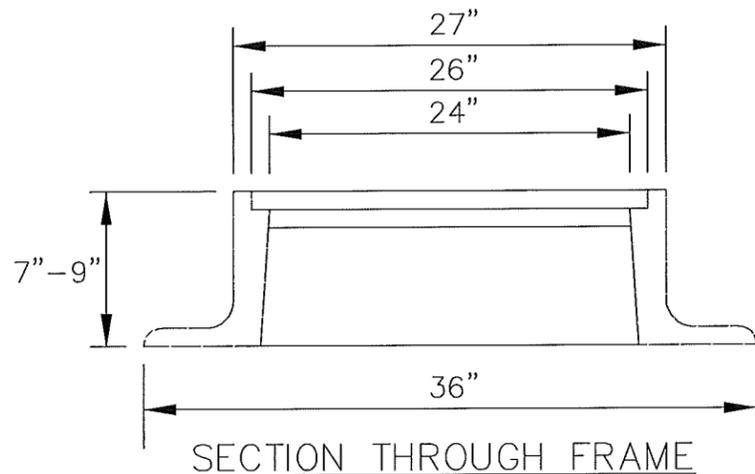
SANITARY SEWER
 (SOLID COVER)

*ALL PRIVATE SANITARY SEWER MANHOLES
 SHALL HAVE SOLID COVERS.

PLAN OF COVERS



PUBLIC STORM SEWER

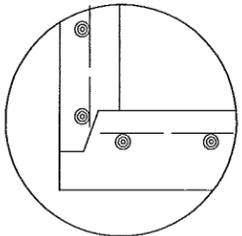


SECTION THROUGH FRAME

CASTING SPECIFICATIONS

1. CASTING SHALL MEET A.S.T.M. SPECIFICATIONS, BE POURED IN A CLOSED MOLD AND SHALL BE TRUE TO PATTERN. BEARING AREAS OF FRAME AND COVER SHALL BE MACHINED SO FITTED AND FINISHED AS TO PROVIDE A FIRM AND EVEN SEAT FOR ALL PORTIONS OF THE COVER IN THE FRAME. NO PROJECTIONS SHALL EXIST ON THE BEARING AREAS OF THE CASTING, AND THE FRAME WITHOUT ROCKING. FRAME AND COVER SHALL BE FITTED, MATCHED AND MARKED BEFORE DELIVERY TO THE PROJECT.
2. CASTING SHALL BE OF A GOOD GRADE OF MACHINABLE GREY IRON USED IN COMMERCIAL CASTINGS. DESIGNED FOR AN HS-20 LOADING PER AASHTO M 306 SPECIFICATIONS.
3. WHERE SPECIFIED, BOLT DOWN MANHOLE COVERS, SHALL HAVE 4 RECESSED BRONZE OR STAINLESS STEEL CAP SCREWS OR HEX HEAD MACHINE SCREWS OR FOUR RECESSED LOCKING DEVICES WITH STAINLESS STEEL HEX HEAD BOLTS.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
SEWER CASTING SPECIFICATIONS			
DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	2
DATE: 1-16	DRAWING FILE: STANDARD-2.DWG		



ALTERNATE CORNER
DETAIL

MANHOLE GENERAL NOTES

(FOR MANHOLES NO. 3, NO. 4, NO. 5)

ALL MANHOLES ARE TO BE PRECAST PER ASTM C478 UNLESS OTHERWISE APPROVED BY THE ENGINEER.

JOINTS BETWEEN SECTIONS SHALL CONFORM TO ASTM C-443 (RUBBER GASKETS) AND SHALL ALSO CONTAIN A 7/8" MASTIC BEAD PER ASTM C990.

ALL MANHOLE BASE SECTIONS SHALL BE SIZED TO MEET MANUFACTURER'S RECOMMENDATIONS FOR PIPE DIAMETERS AND CONFIGURATIONS.

1 1/4" HOLES FOR HANDLING MAY BE CAST IN CONCRETE RISER SECTIONS AND DOMES. AFTER INSTALLATION, HOLES SHALL BE FILLED WITH NON-SHRINKING MORTAR.

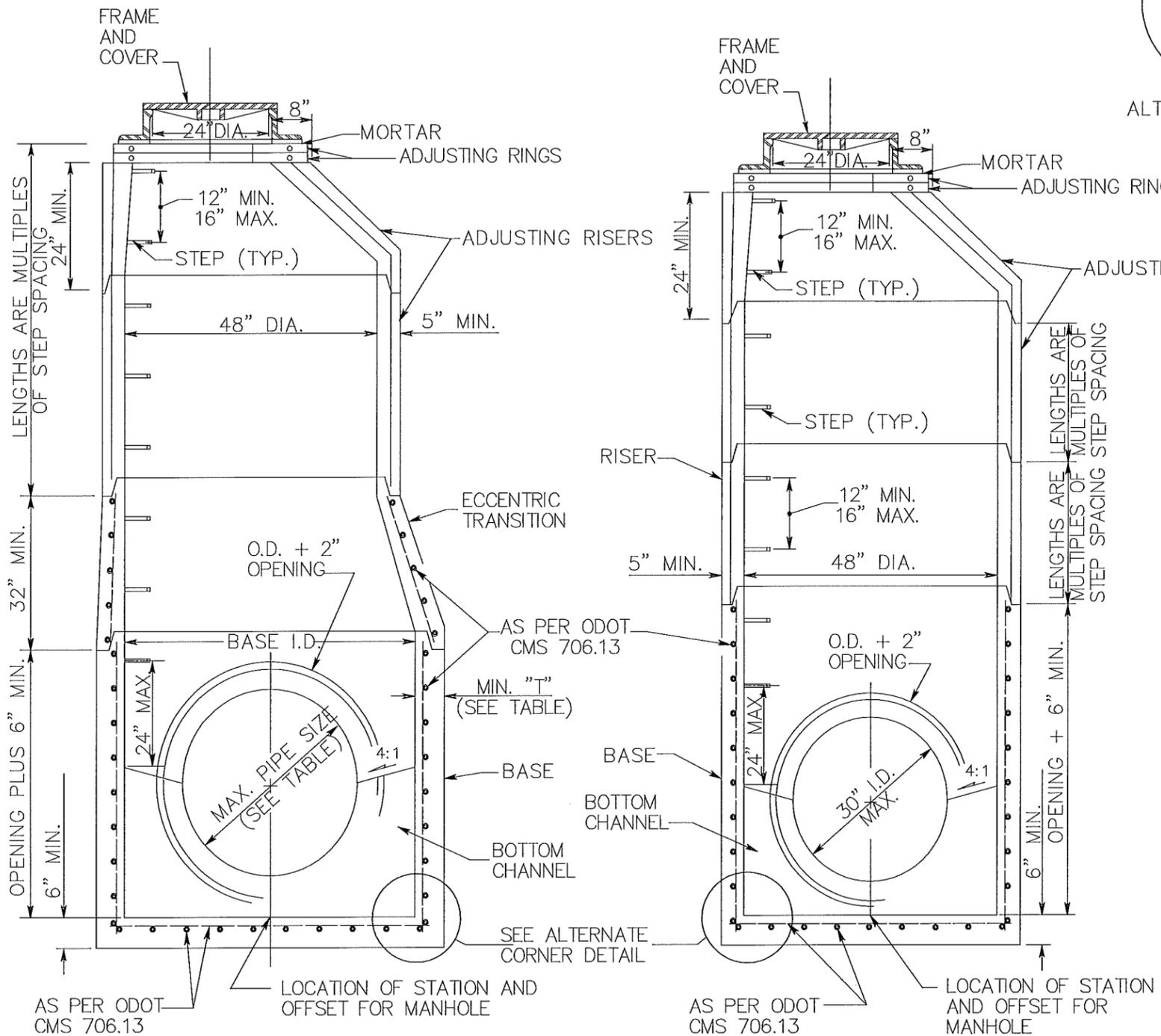
CASTINGS SHALL BE AS SPECIFIED ON STANDARD DRAWING FOR HEAVY DUTY MANHOLE FRAME AND COVER. (REFER TO SHEET 2.)

ADJUSTING RINGS (5" MIN. - 12" MAX.) ARE REQUIRED ON ALL MANHOLES. (REFER TO SHEET 6.)

CONCRETE COLLARS ARE REQUIRED ON ALL MANHOLES IN THE PAVEMENT. (REFER TO SHEET 17).

MATERIALS: MATERIALS FOR BASES AND OTHER PRECAST SECTIONS, INCLUDING REINFORCEMENT NOT SPECIFIED HEREIN, SHALL COMPLY WITH THE REQUIREMENTS OF ODOT CMS 706.13.

STEPS SHALL MEET THE REQUIREMENTS OF ODOT CMS 611.02.



60" TO 108" PRECAST BASE

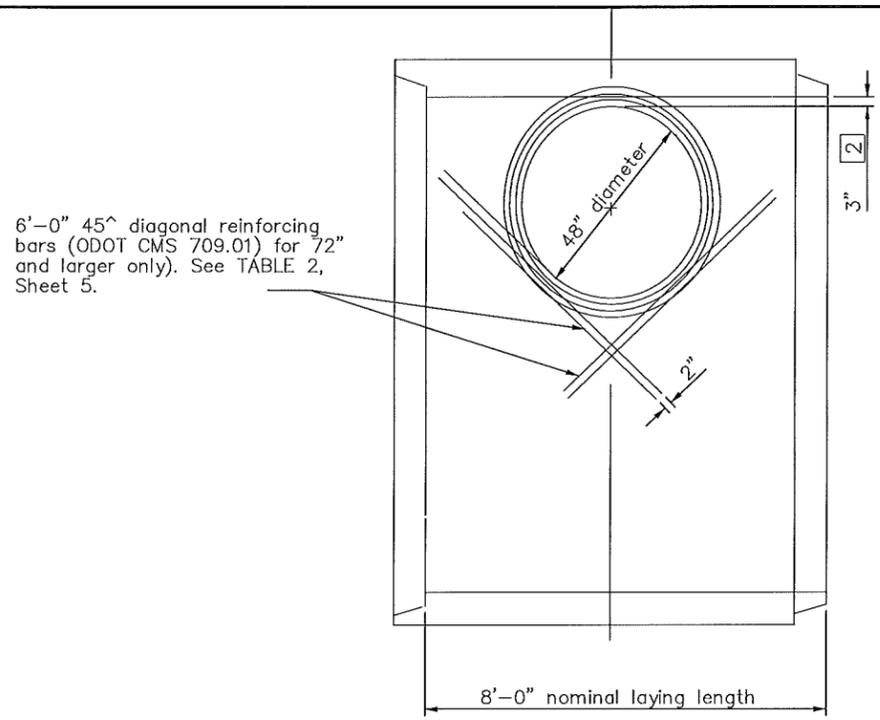
48" PRECAST BASE

SECTION VIEWS OF REINFORCED PRECAST MANHOLES
MANHOLE NO. 3

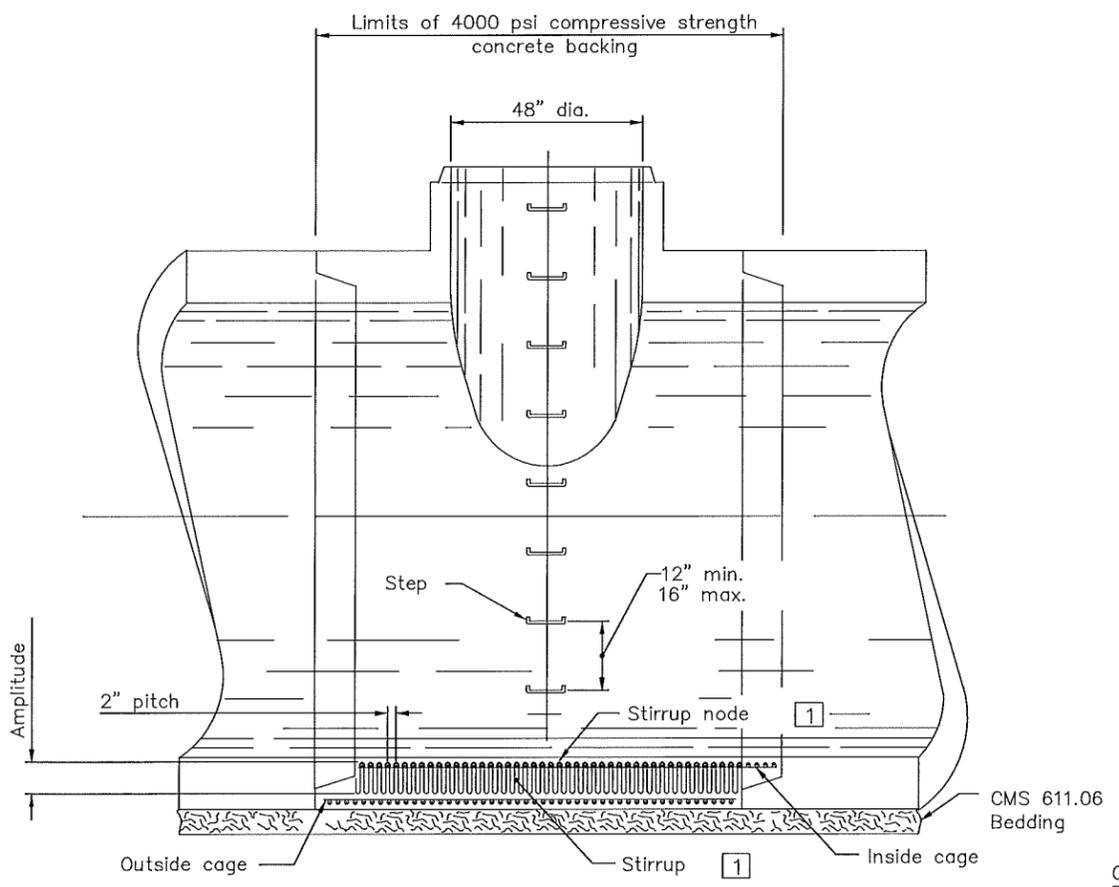
MAXIMUM PIPE SIZES		
BASE I.D.	MIN. "T"	MAX PIPE SIZE
60"	5"	36"
72"	6"	48"
84"	7"	54"
90"	7 1/2"	60"
96"	8"	66"
108"	9"	72"

CITY OF TOLEDO CONSTRUCTION STANDARDS			
MANHOLE No. 3 AND MANHOLE GENERAL NOTES			
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DATE: 1-16	DRAWING FILE: STANDARD-3	NO SCALE	

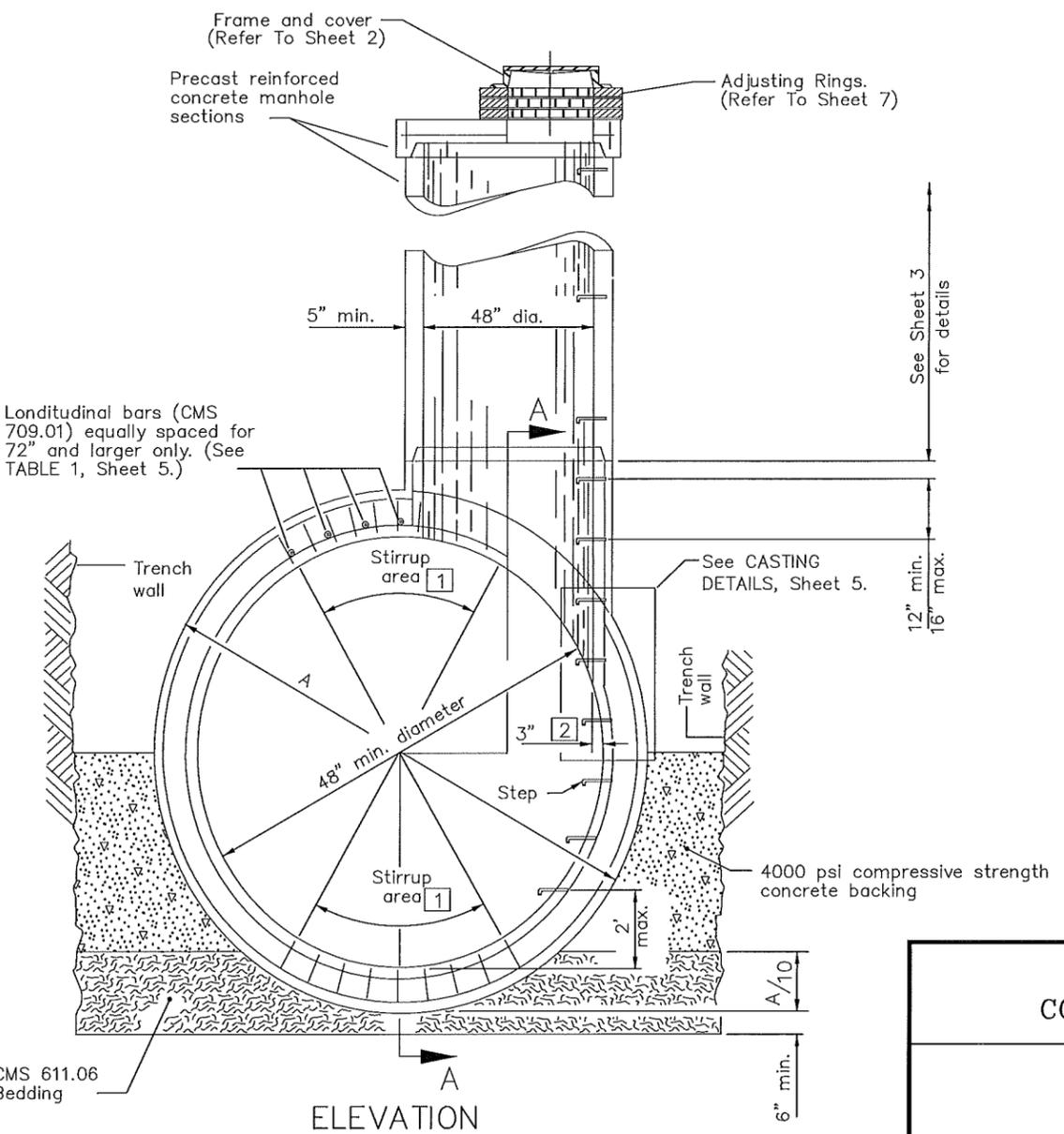
F:\CITYSTND\2016 CONSTRUCTION STANDARDS\Standard-4.dwg, Model, 1/20/2016 8:52:28 AM, kralib



PLAN VIEW



SECTION A-A
(Showing stirrup detail)



ELEVATION

MANHOLE NO. 4

NOTES

GENERAL: Base pipe, 48" dia. through 144" dia., consists of the design shown and as required for the stronger of the two adjoining sections of conduit. Provide other manhole components above the base as detailed or specified on sheets 3 and 7.

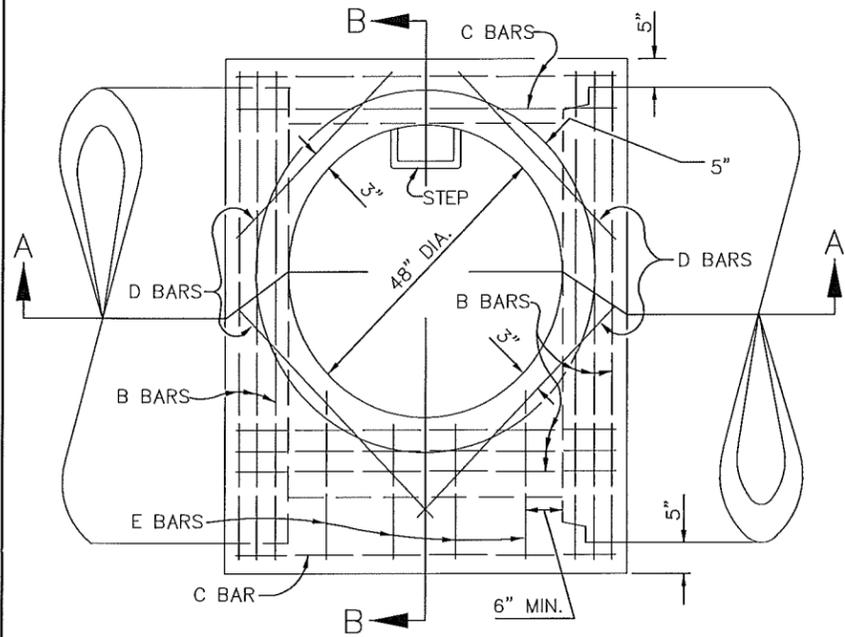
APPLICATION: The Manhole No. 4 shown here may be used where no change in pipe size, direction or slope occurs, and no lateral sewers enter the manhole below the riser section.

BEDDING: Provide the same bedding as used under the adjoining conduits that meets the requirements of CMS 611.06.

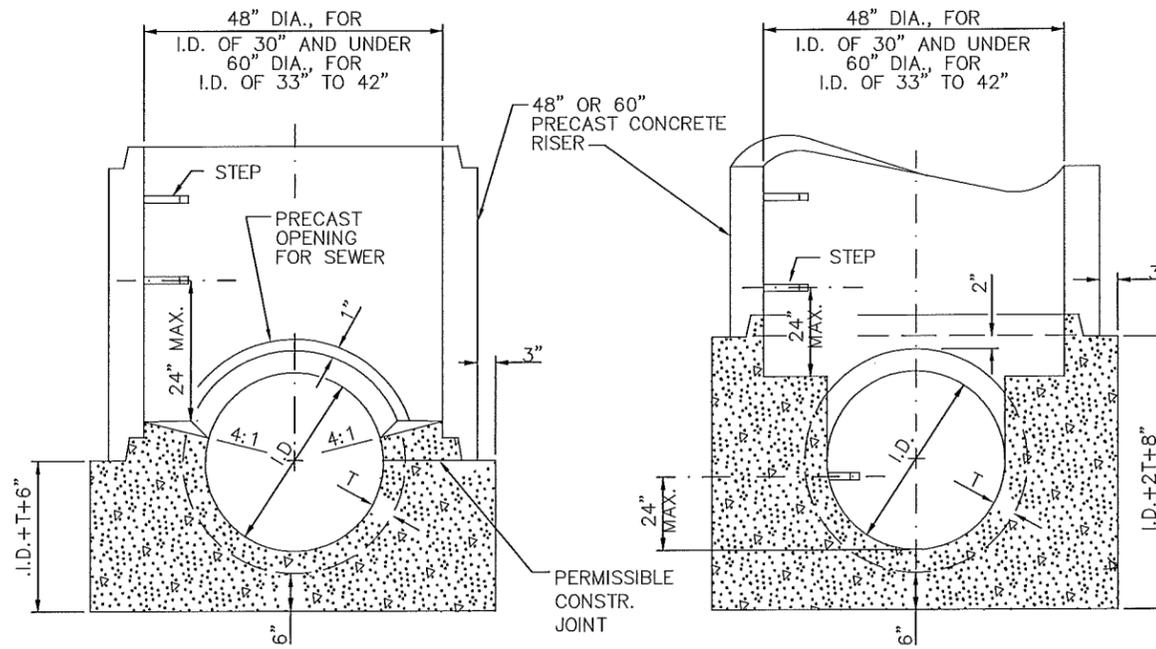
LEGEND

- 1 If required by conduit specification.
- 2 On all sizes except 48".
- 3 One-half of the required number to each side of hole. (See Sht. 5.)

CITY OF TOLEDO CONSTRUCTION STANDARDS			
MANHOLE No. 4			
DRAWN BY:	DESIGNED BY:	SCALE:	4
DATE: 1-16	DRAWING FILE: STANDARD-4	NO SCALE	



PLAN VIEW



MANHOLE NO. 5 BASE ON SEWER 42" AND UNDER

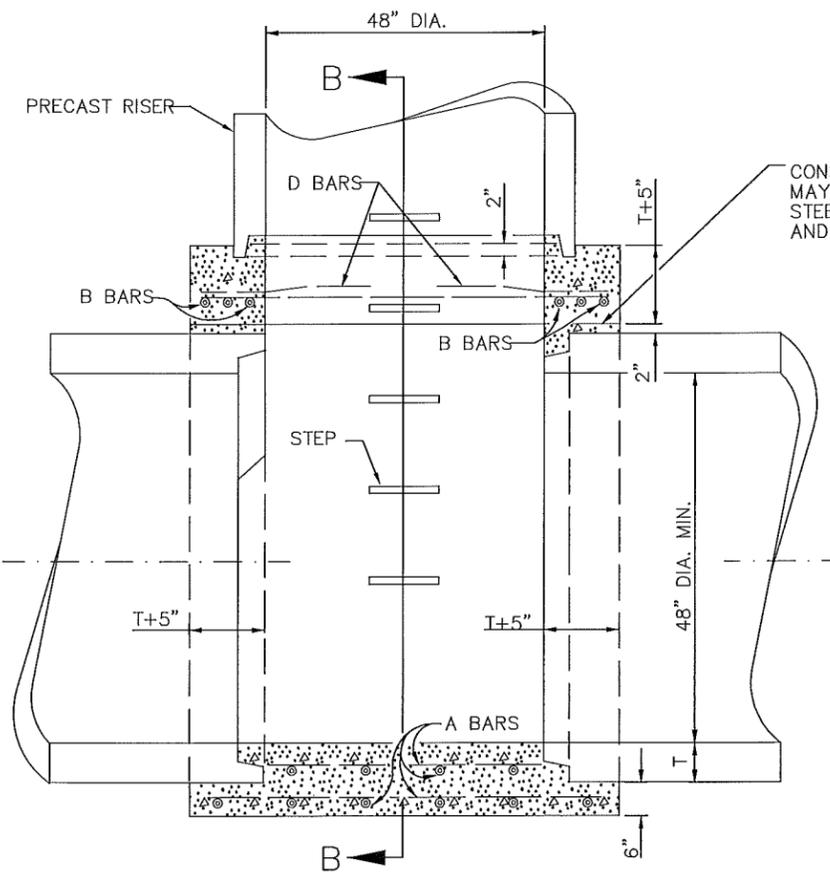
NOTES

MANHOLE: MANHOLE NO. 5 CONSISTS OF A BASE OR BOTTOM AS DETAILED HERE AND OTHER MANHOLE COMPONENTS AS DETAILED OR SPECIFIED ON ODOT SCD MH-1.2. INSTEAD OF THE TONGUE AND GROOVE JUNCTION BETWEEN THE RISER AND THE BASE, THE BASE MAY HAVE A FLAT SURFACE AND THE RISER MAY HAVE A SQUARE END SET IN A BED OF MORTAR ON THE BASE.

OPENINGS: PROVIDE PREFABRICATED OPENINGS FOR 42" AND UNDER INLET AND OUTLET SEWER PIPES IN THE RISER SECTION UNLESS THE BASE IS BUILT TO AN ELEVATION 2" ABOVE THE MANHOLE TOP OF THE INLET AND OUTLET PIPES.

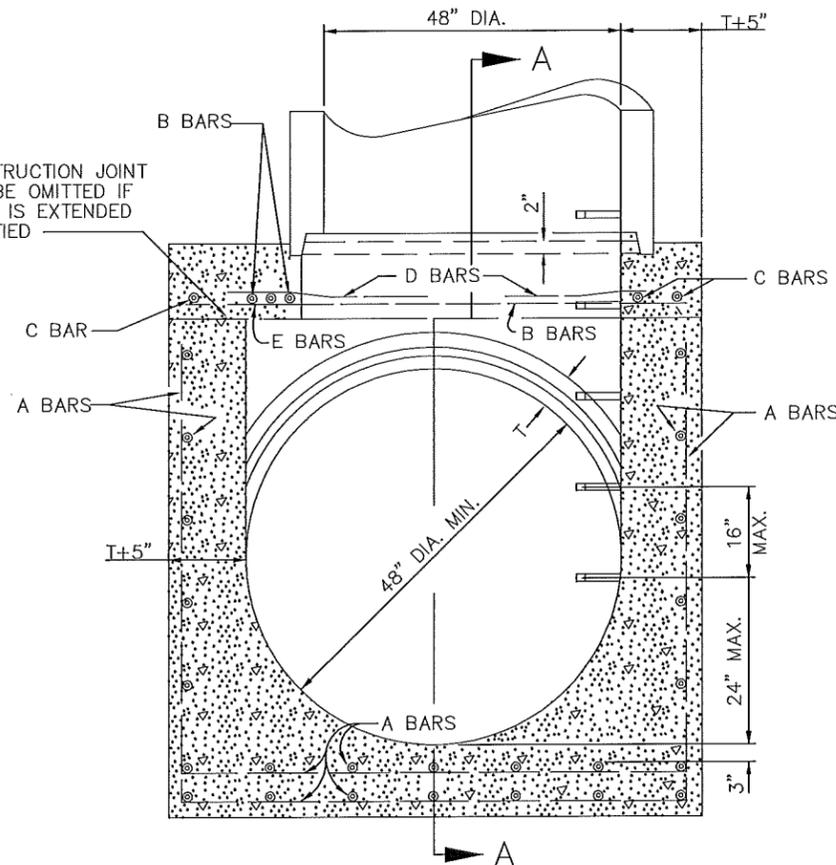
CONCRETE: USE 4000 PSI COMPRESSIVE STRENGTH CONCRETE FOR THE BASES OR MEET THE REQUIREMENTS OF CMS 706.13. THE BASES MAY BE PRECAST OR CAST-IN-PLACE. IF PRECAST, PROVIDE A BASE ON SEWERS 42" AND UNDER WITH SUFFICIENT STEEL REINFORCEMENT TO PERMIT SHIPPING AND PLACEMENT WITHOUT DAMAGE TO THE BASE. REINFORCE THE BASE ON SEWERS 48" AND OVER AS SHOWN.

T = WALL THICKNESS OF INTERCEPTING SEWER PIPE



SECTION A-A

MANHOLE NO. 5 BASE ON SEWER 48" AND OVER



SECTION B-B

REINFORCING STEEL LIST

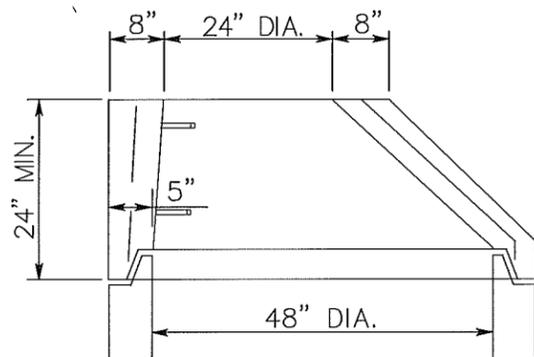
BAR	SPACING	BAR SIZES FOR SEWERS		
		48" TO 60"	66" TO 78"	84" TO 96"
A	12" C/C BOTH WAYS	#5	#6	#7
B	3" C/C BOTH WAYS	#5	#6	#7
C	AS SHOWN	#5	#6	#7
D	AS SHOWN	#5	#5	#5
E	12" C/C	#5	#5	#5

INCLUDED FOR ESTIMATING PURPOSES ONLY. THE COST OFF FURNISHING AND PLACING ALL REINFORCING STEEL IS INCLUDED IN ITEM 611 FOR PAYMENT.

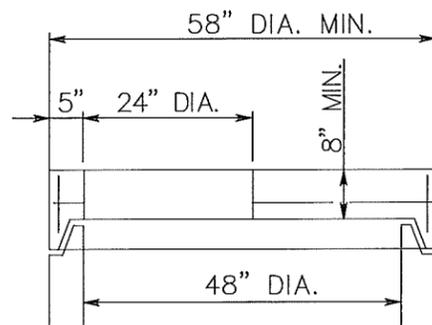
CITY OF TOLEDO
CONSTRUCTION STANDARDS

MANHOLE No. 5

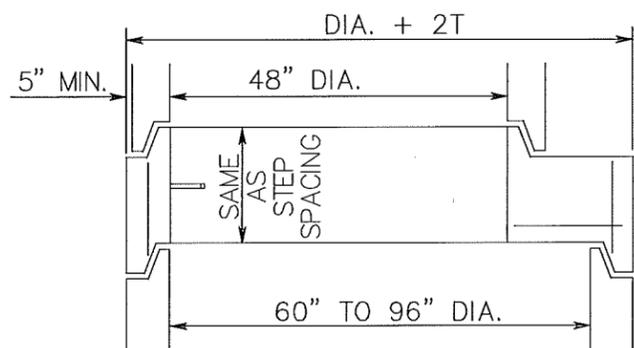
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1-16	STANDARD-5		



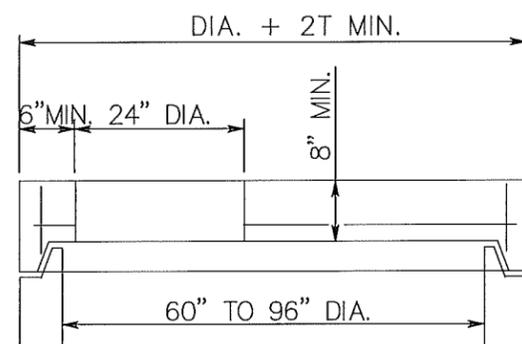
ECCENTRIC CONE TOP SECTION



FLAT TOP SECTION

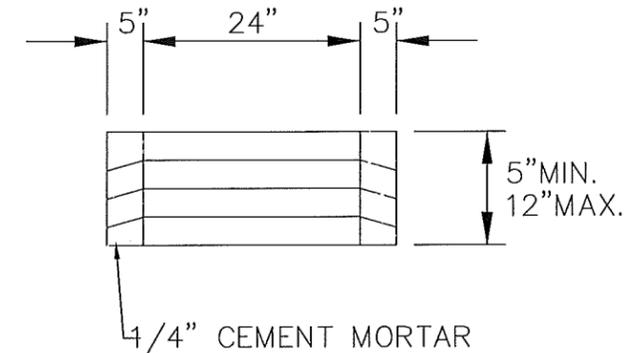
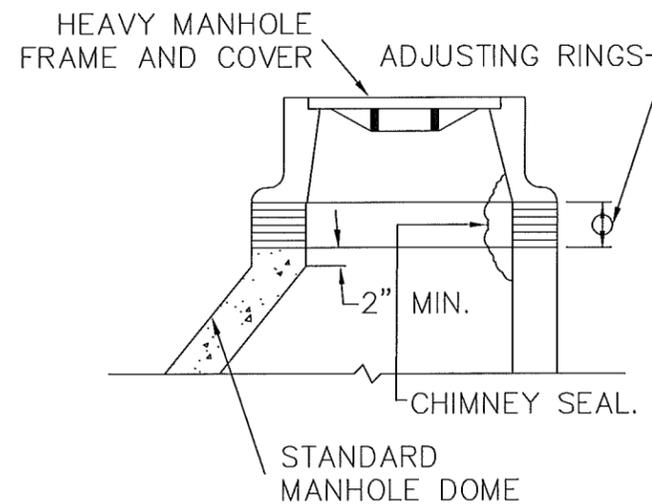


FLAT SLAB TRANSITION SECTION



FLAT TOP SECTION

FOR CONCRETE COLLARS ON FLAT TOP STRUCTURES, COLLARS AND CASTING SHALL BE PINNED TO THE TOP WITH TWO #4 BARS (ONE ON EACH SIDE) IN THE DIRECTION OF TRAFFIC.



ADJUSTING RINGS DETAILS

ADJUSTING RINGS, PRECAST 2", 3", 4" AND 6" HEIGHT SHALL BE REINFORCED WITH ONE NO. 3 GAGE WIRE OR EQUIVALENT. BRICK CAN BE USED FOR ADJUSTMENTS IF SO AUTHORIZED BY THE ENGINEER.

RINGS SHALL BE PLACED ON A 1/4" BED OF CEMENT MORTAR PER ODOT CMS 602.03.F

THE FOLLOWING SHALL BE CLEARLY STENCILED OR IMPRESSED ON EACH RISER RING:

- A. THE DATE OF MANUFACTURE
- B. THE NAME OR TRADE-MARK OF THE MANUFACTURER AND LOCATION OF THE PLANT

H.D.P.E. ADJUSTING RINGS MAY BE USED IN LIEU OF CONCRETE RINGS. H.D.P.E. RINGS SHALL BE INSTALLED USING CONSEAL CS-202 BUTYL SEALANT (ALL WEATHER SEALANT), OR EQUAL. 3/8"-THICK SEALANT SHALL BE USED BETWEEN RINGS. 1"-THICK SEALANT SHALL BE USED FOR STARTER RING AND BELOW CASTING. CHIMNEY SEALS ARE NOT REQUIRED WITH H.D.P.E. RINGS.

CITY OF TOLEDO
CONSTRUCTION STANDARDS

MANHOLE TOP SECTIONS
AND ADJUSTMENT RING DETAILS

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DATE: 1-16	DRAWING FILE: STANDARD-6	NO SCALE	

DROP CONNECTION NOTES

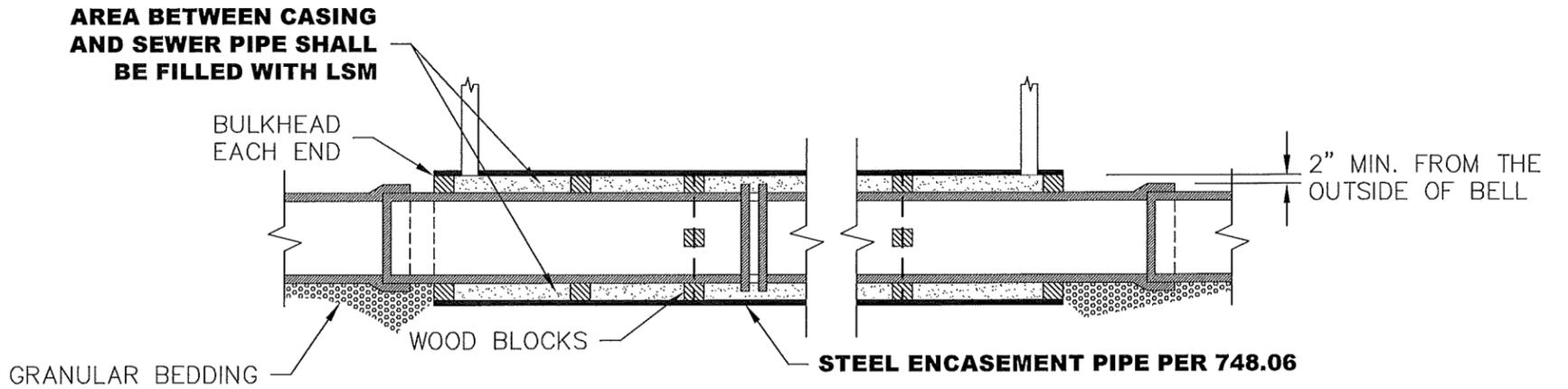
AN OUTSIDE DROP CONNECTION SHALL BE REQUIRED WHENEVER THE DIFFERENCE IN ELEVATION OF INVERTS OF (2) INTERSECTING CONDUITS IS GREATER THAN 24 INCHES. DROP CONNECTION TO BE SAME DIAMETER AS INCOMING SEWER, BUT NO LARGER THAN 18".

* FOR DROP CONNECTION BEING CONSTRUCTED WITH FLEXIBLE PIPE, THE HEIGHT OF CONCRETE ENCASEMENT SHALL BE 6" ABOVE THE JOINT AT THE ELBOW.

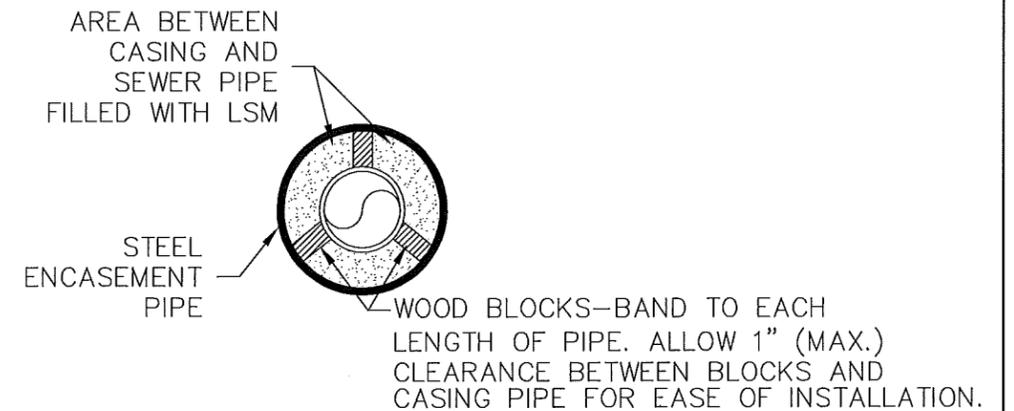
DROP CONNECTIONS INTO NEW MANHOLES SHALL BE CONSTRUCTED WITH THE DROPS LOWER INVERT AT THE SAME ELEVATION AS THAT OF THE MAIN LINE CHANNEL. IF MAIN LINE IS LARGER THAN DROP, MATCH CROWNS OR ON VERY LARGE MAIN LINE SEWERS MATCH C AT SANITARY ENGINEERS OPTION.

** ON NEW PRECAST DROP MANHOLES, CONCRETE SHALL EXTEND TO 5" ABOVE INCOMING LINE.

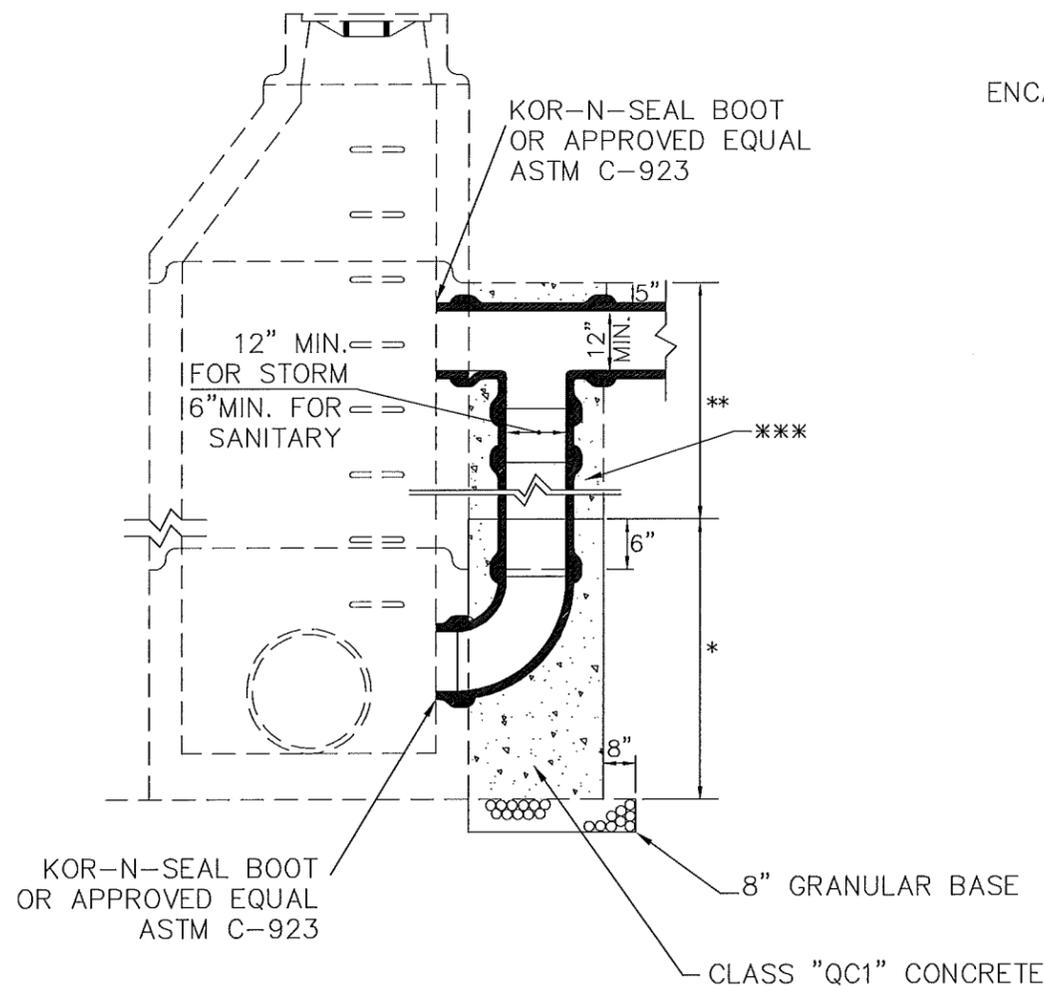
***REMAINING BACKFILL SHALL BE GRANULAR MATERIAL PER 611.02 AS AMENDED BY THE CITY OF TOLEDO.



NOTE:
WELD ALL ENCASEMENT PIPE JOINTS.



***SEWER BORING DETAIL**
NOT TO SCALE



DROP CONNECTION
FOR USE ON MANHOLE NO. 3

CITY OF TOLEDO CONSTRUCTION STANDARDS			
MANHOLE WITH DROP CONNECTION & SEWER BORING DETAIL			
DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	7
DATE: 1-16	DRAWING FILE: STANDARD-7.DWG		

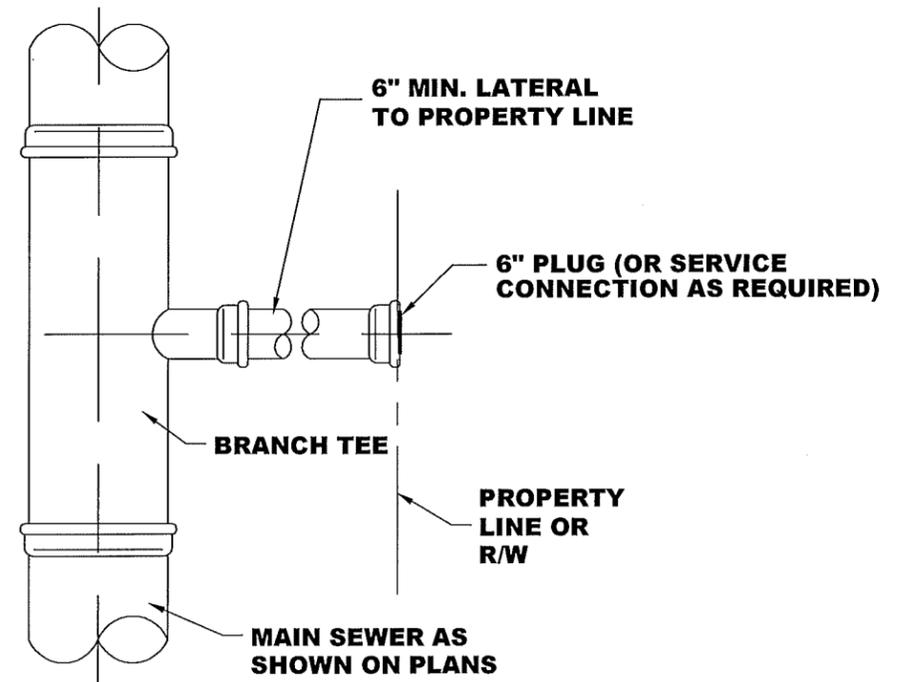
SANITARY SEWER NOTES:

- 1.) ONE HOUSE/BUILDING CONNECTION PER TAP WILL BE PERMITTED FOR NEW SEWER SERVICE LATERALS.
- 2.) RISERS ARE REQUIRED WHEN SEWER DEPTHS EXCEED 12' (TYPE 1)
- 3.) ALL SANITARY SEWER LATERALS CONSTRUCTED FOR EXISTING BUILDINGS WITH BASEMENTS SHALL BE A MINIMUM OF 3' BELOW THE BASEMENT FLOOR ELEVATION AT THE PROPERTY LINE OR RIGHT-OF-WAY LINE. IF THE PROPERTY IS A VACANT LOT, THE LATERAL SHALL BE A MINIMUM OF 8' BELOW THE FINISH GROUND SURFACE AT THE RIGHT-OF-WAY LINE OR PROPERTY LINE. ANY DEVIATION FROM THE ABOVE MINIMUM STANDARDS, SHALL BE SHOWN ON THE PLANS.

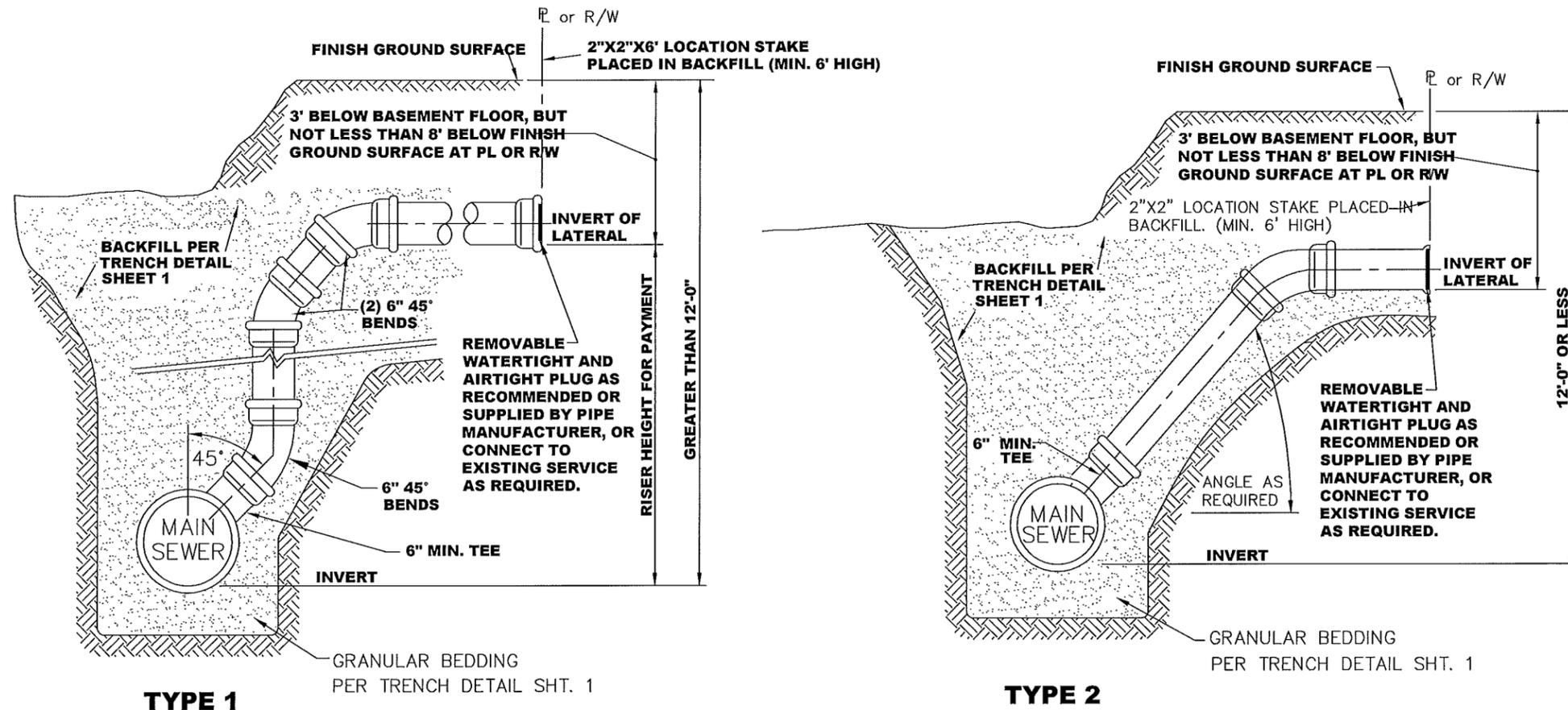
TAP CONNECTIONS TO SEWERS:

WHENEVER IT BECOMES NECESSARY TO PUT A NEW TAP CONNECTION IN TO AN EXISTING SEWER AND SAID CONNECTION IS NOT SHOWN ON THE PLANS, ONE OF THE FOLLOWING METHODS SHALL BE USED TO ACCOMPLISH THE CONNECTION:

- 1.) WHENEVER POSSIBLE A "TEE FITTING" SHALL BE INSTALLED.
- 2.) WHERE METHOD 1 CANNOT BE UTILIZED, TAPPING DIRECTLY INTO THE SEWER WITH AN INSERTA-TEE OR APPROVED EQUAL MAY BE PERMITTED.
- 3.) WHERE METHOD 1 OR 2 CANNOT BE UTILIZED, TAPPING DIRECTLY INTO THE SEWER BY CUTTING THE EXISTING PIPE IN SUCH A MANNER AS TO PREVENT PROJECTIONS OR OBSTRUCTIONS WITHIN THE INTERIOR OF EITHER PIPE IN THE JOINT AT THE INTERSECTION OF THE TWO PIPES SHALL BE TIGHTLY SEALED WITH A WATERSTOP GASKET, HYDRAULIC CEMENT MORTAR, AND A CONCRETE COLLAR.
- 4.) WHEN RECONNECTING EXISTING SERVICE LATERALS TO A NEW SEWER MAIN, THE DIAMETER OF THE NEW SERVICE CONNECTION IS TO MATCH THE DIAMETER OF EXISTING LATERAL.



PLAN



TYPE 1

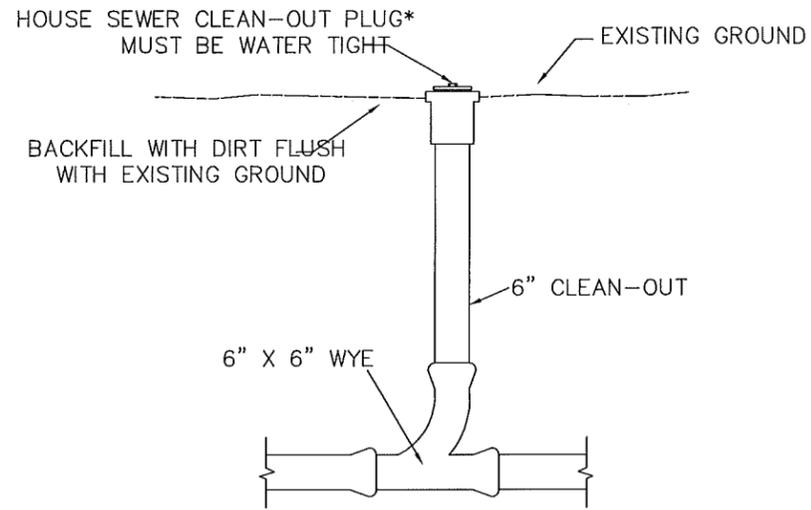
TYPE 2

RISER CONSTRUCTION

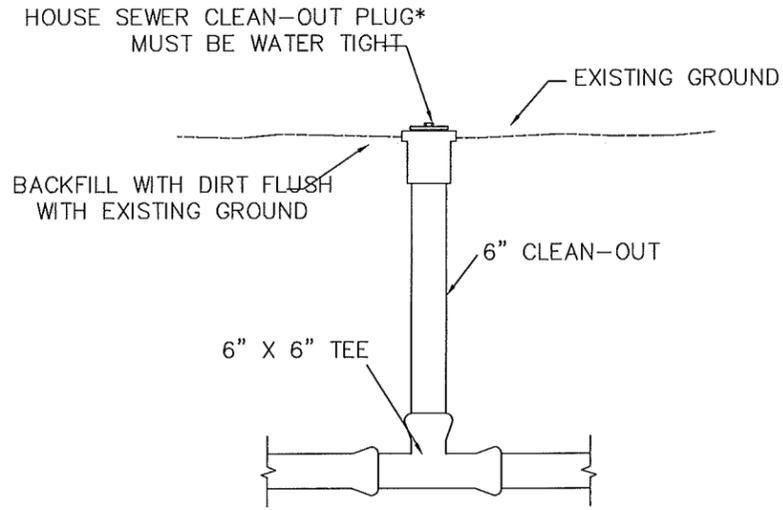
CITY OF TOLEDO
CONSTRUCTION STANDARDS

SANITARY SEWER
RISER DETAILS

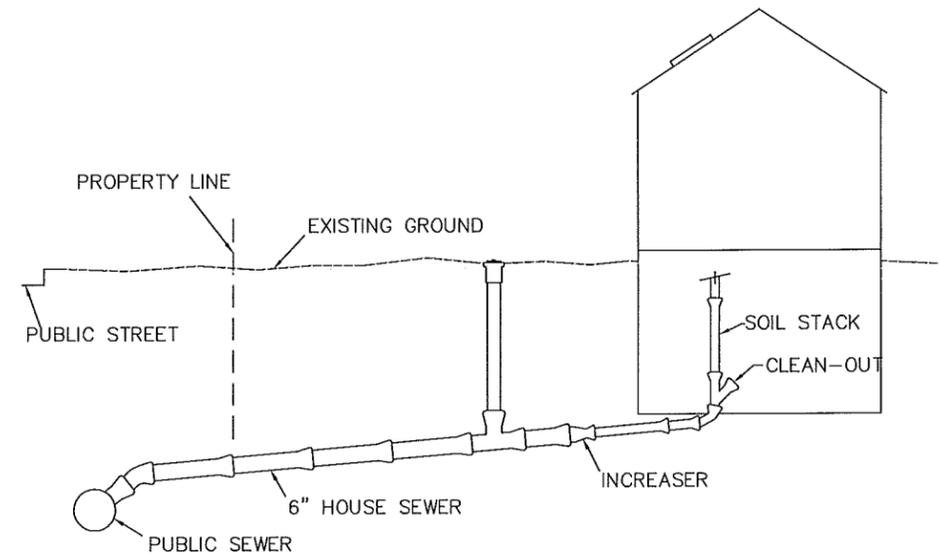
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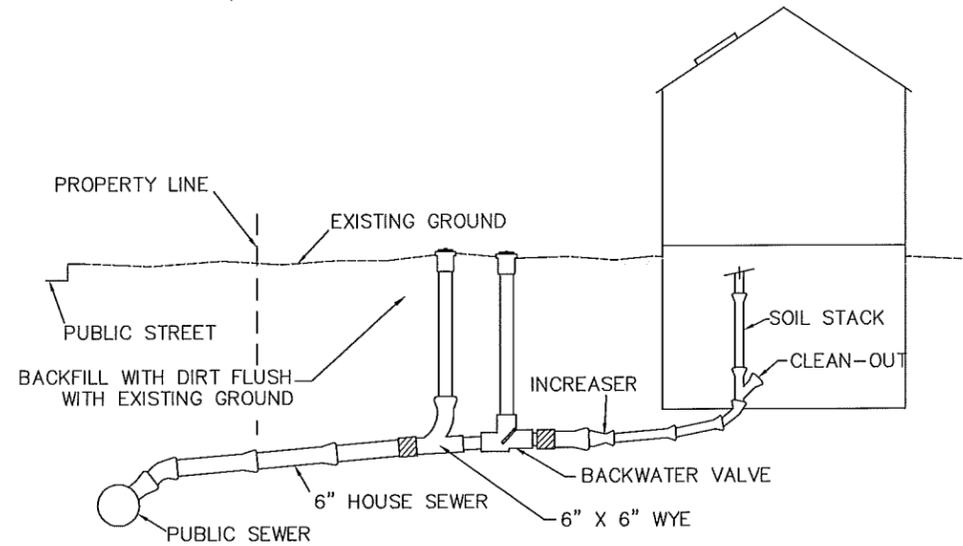
WYE CONSTRUCTION
CLEAN-OUT INSTALLATION DETAIL



TEE CONSTRUCTION
CLEAN-OUT INSTALLATION DETAIL



HOUSE SEWER CLEAN-OUT INSTALLATION
SEE DETAILS TO LEFT
(TEE CONSTRUCTION SHOWN)



EXTERNAL BACKWATER VALVE INSTALLATION
WITH REQUIRED WYE CLEAN-OUT
SEE DETAIL AT LEFT
(EXISTING CLAY SERVICE LINE SHOWN)

***CLEAN-OUT NOTE:**

ALL CONSTRUCTION MATERIALS SHALL BE APPROVED BY THE ENGINEER PRIOR TO BEGINNING OF THE CONSTRUCTION.

****EXTERNAL BACKWATER VALVE NOTES:**

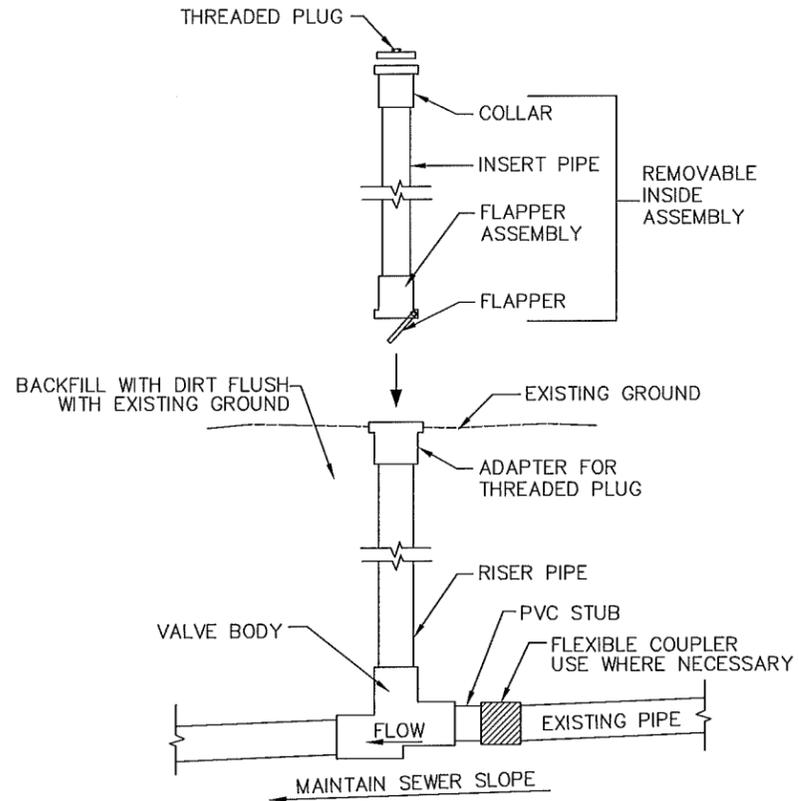
ALL CONSTRUCTION MATERIALS SHALL BE APPROVED BY THE ENGINEER PRIOR TO BEGINNING OF THE CONSTRUCTION.

BACKWATER VALVES MUST BE INSTALLED WITH A CLEAN-OUT, WHICH MUST BE WYE CONSTRUCTION AND MUST BE INSTALLED DOWNSTREAM OF THE BACKWATER VALVE, WITH THE WYE ORIENTED DOWNSTREAM.

BACKWATER VALVE INSTALLED OUTSIDE THE HOME MUST BE AN EXTENDABLE BACKWATER TYPE SUCH AS CLEAN CHECK, INC.'S 6" PVC EXTENDABLE BACKWATER VALVE OR APPROVED EQUAL.

6" BACKWATER VALVES MAY BE INSTALLED UTILIZING REDUCERS IF THE EXISTING SEWER LINE IS 8" OR 9".

RIM OF BACKWATER VALVE AND CLEANOUT RISERS SHOULD NORMALLY BE FLUSH WITH EXISTING GROUND, BUT MAY RISE ABOVE GROUND LEVEL IF OWNER PREFERS.

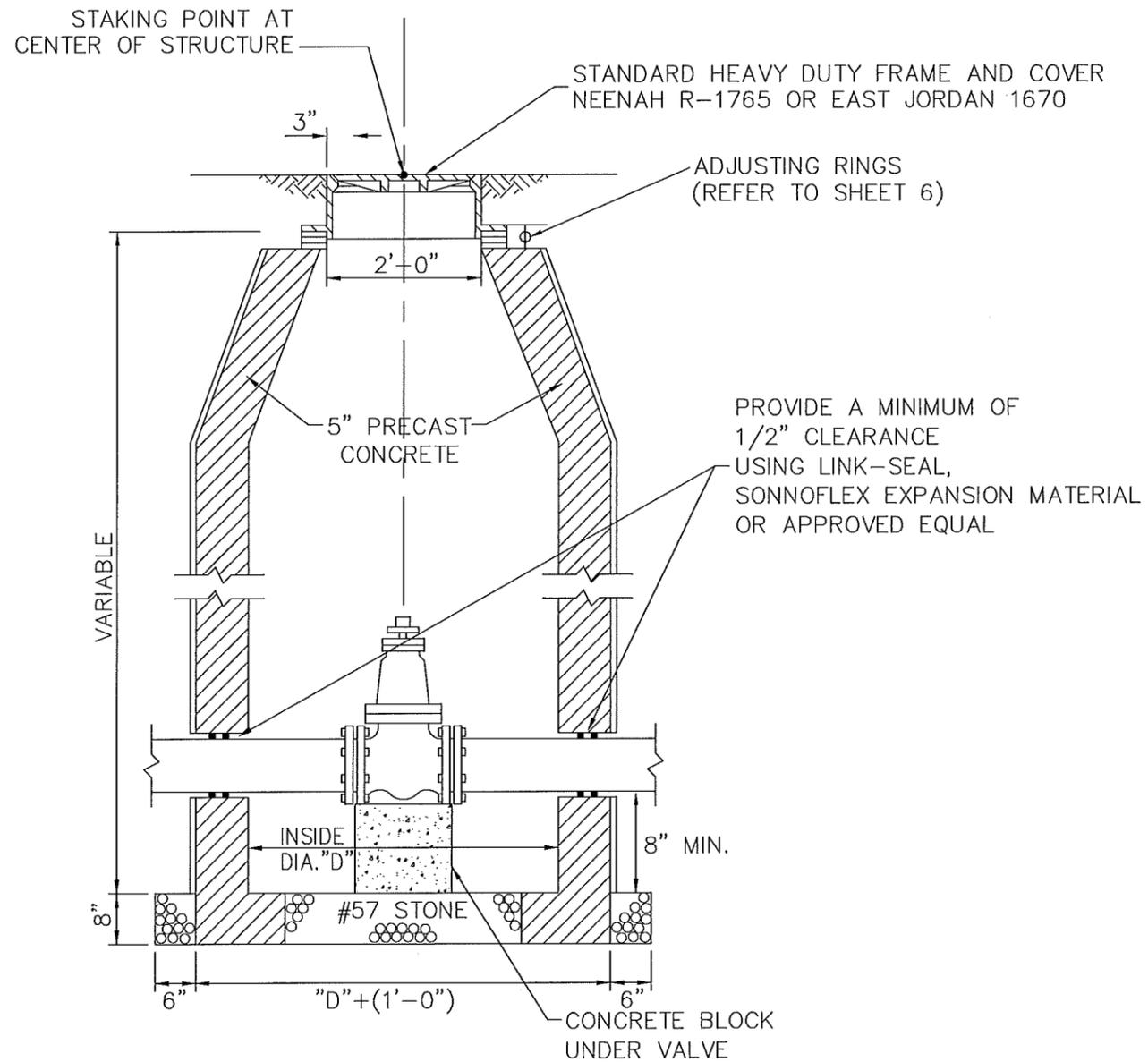


EXTERNAL BACKWATER VALVE DETAIL**

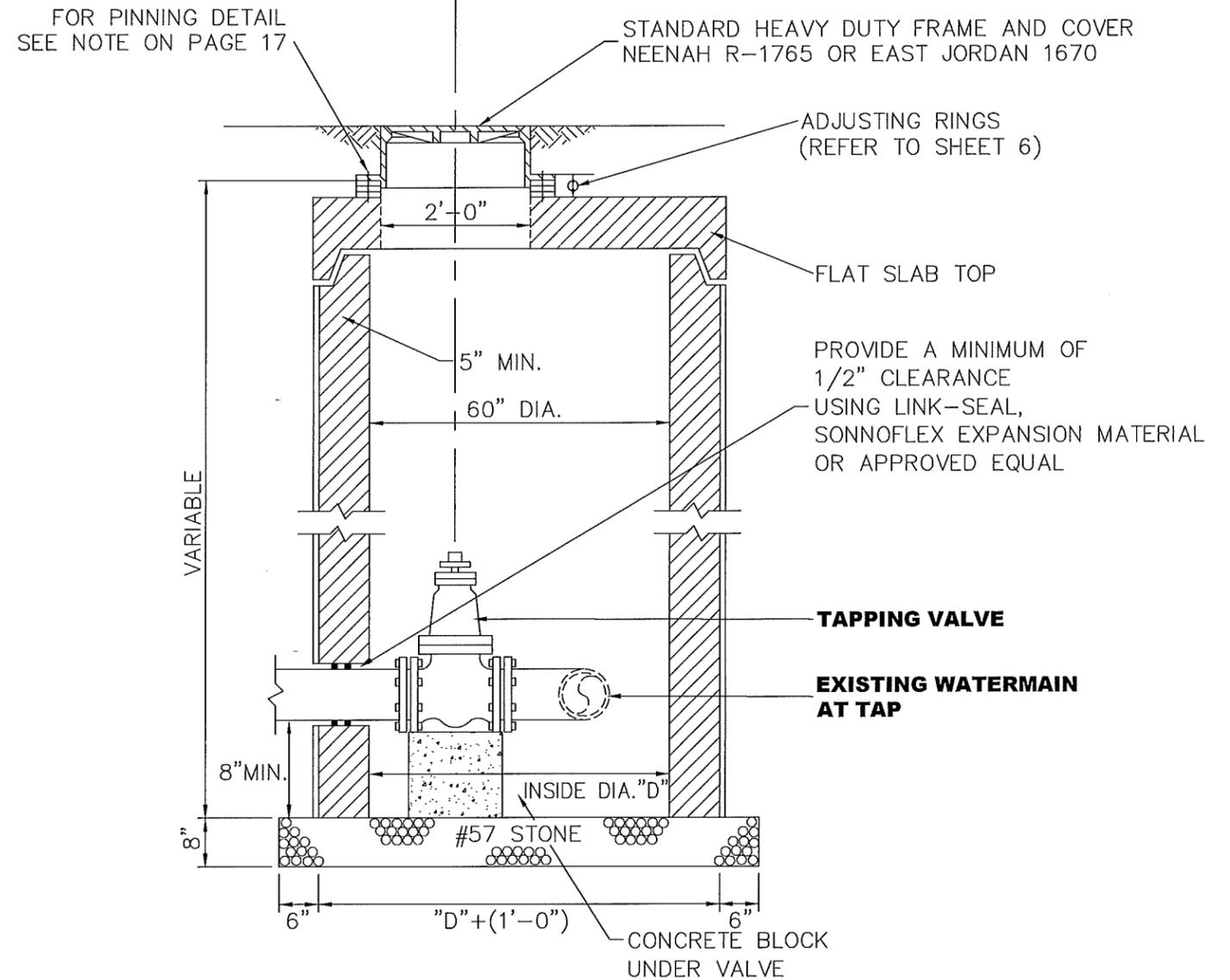
**CITY OF TOLEDO
CONSTRUCTION STANDARDS**

**CLEAN-OUT
AND EXTERNAL BACKWATER VALVE
INSTALLATION DETAIL**

DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	9
DATE: 1-16	DRAWING FILE: STANDARD-9.DWG		



48" DIAMETER WATER MANHOLE
(FOR USE ON MAINLINE WATER VALVES ≤ 10 " DIAMETER)
NOT TO SCALE



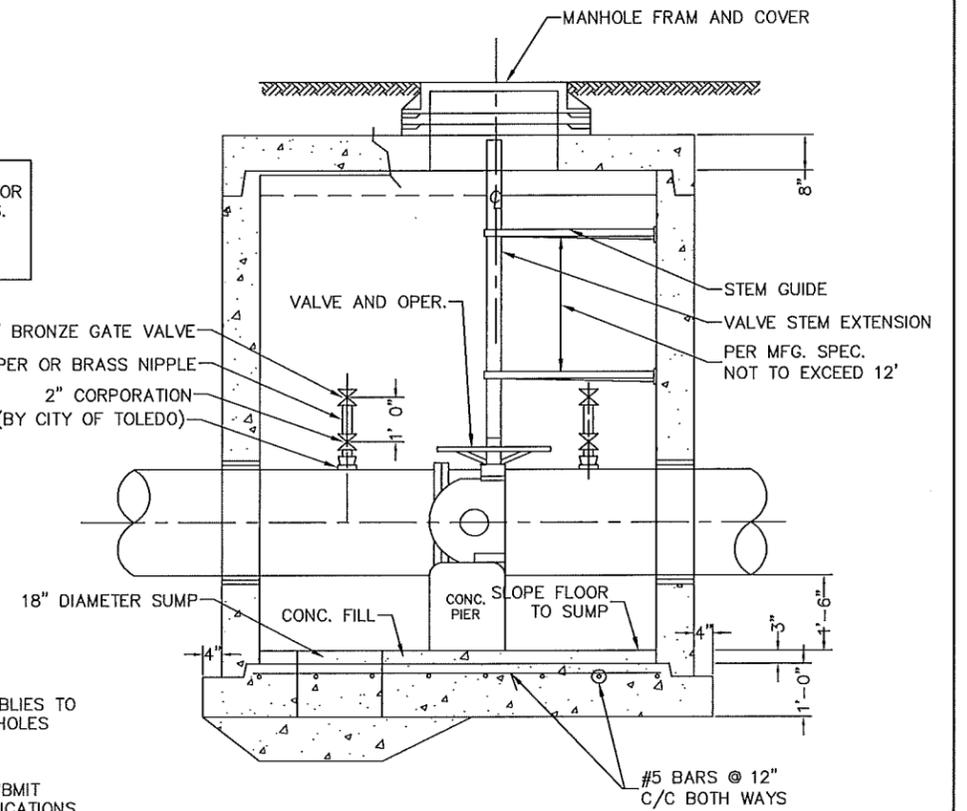
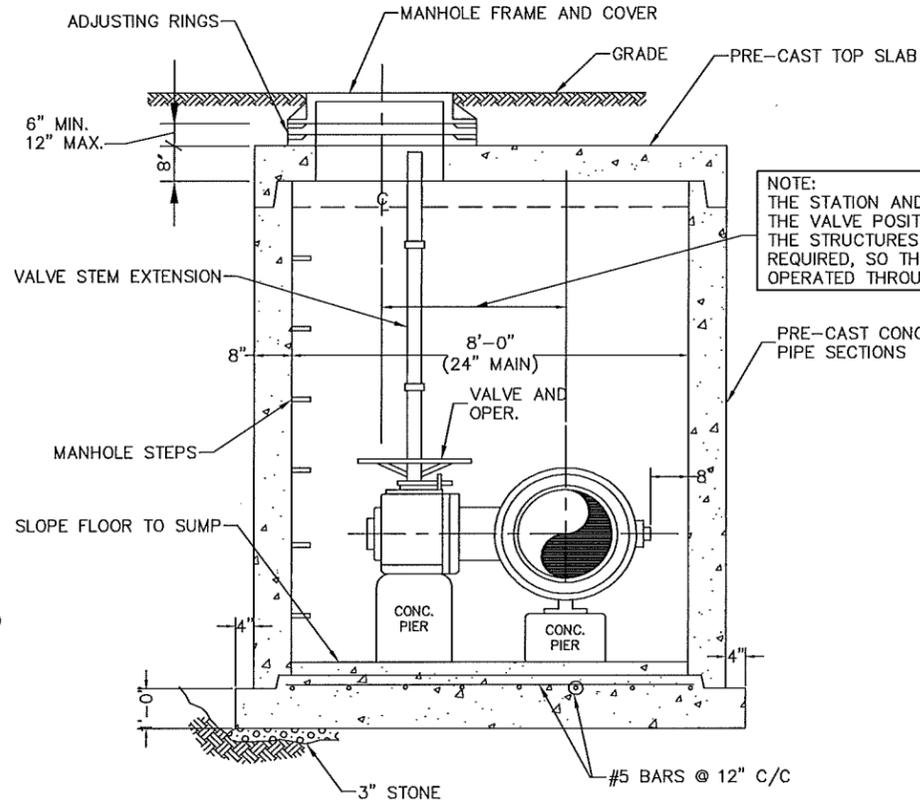
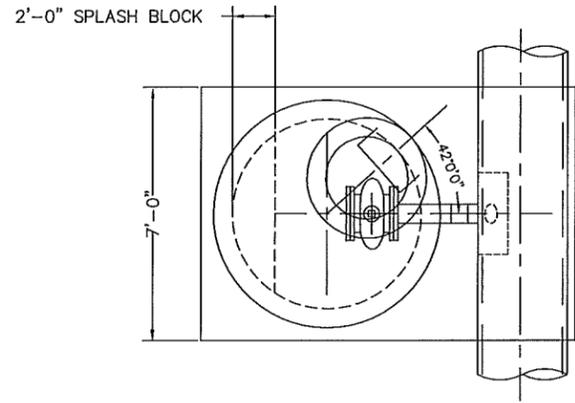
60" DIAMETER WATER MANHOLE
(FOR USE ON ALL SIZE TAPPING VALVES AND MAINLINE WATER VALVES ≥ 12 " DIAMETER)
NOT TO SCALE

NOTES:

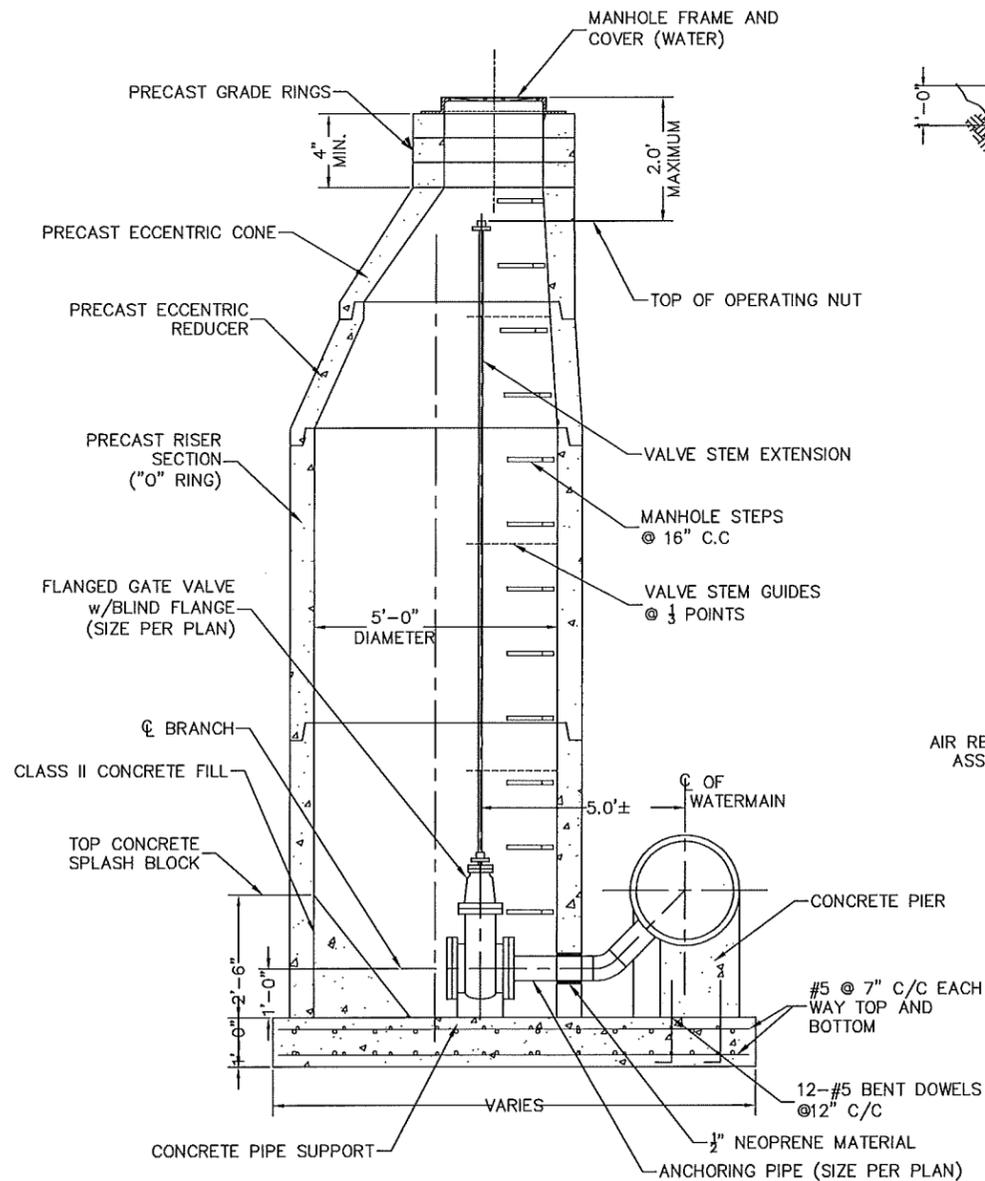
1. CONCRETE COLLARS ARE REQUIRED ON ALL MANHOLES IN PAVEMENT OR BERM AREAS. (REFER TO SHEET 17). ALL MANHOLE LIDS SHALL BE LABELED WATER. IF AN ALTERNATE CASTING OF SHORTER HEIGHT IS APPROVED FOR USE ON FLAT TOP STRUCTURES, THE MANHOLE CASTING SHALL BE SET TO GRADE AND PINNED PRIOR TO INSTALLING ASPHALT PAVEMENT. NO CONCRETE COLLAR WILL BE REQUIRED.
2. PRECAST MANHOLE PER ASTM C-478. JOINTS BETWEEN SECTIONS PER ASTM C-443 (RUBBER GASKETS) AND SHALL CONTAIN 7/8" MASTIC BEAD PER ASTM C-990.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
WATER VALVE MANHOLES			
DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	10
DATE: 1-16	DRAWING FILE: STANDARD-11.DWG		

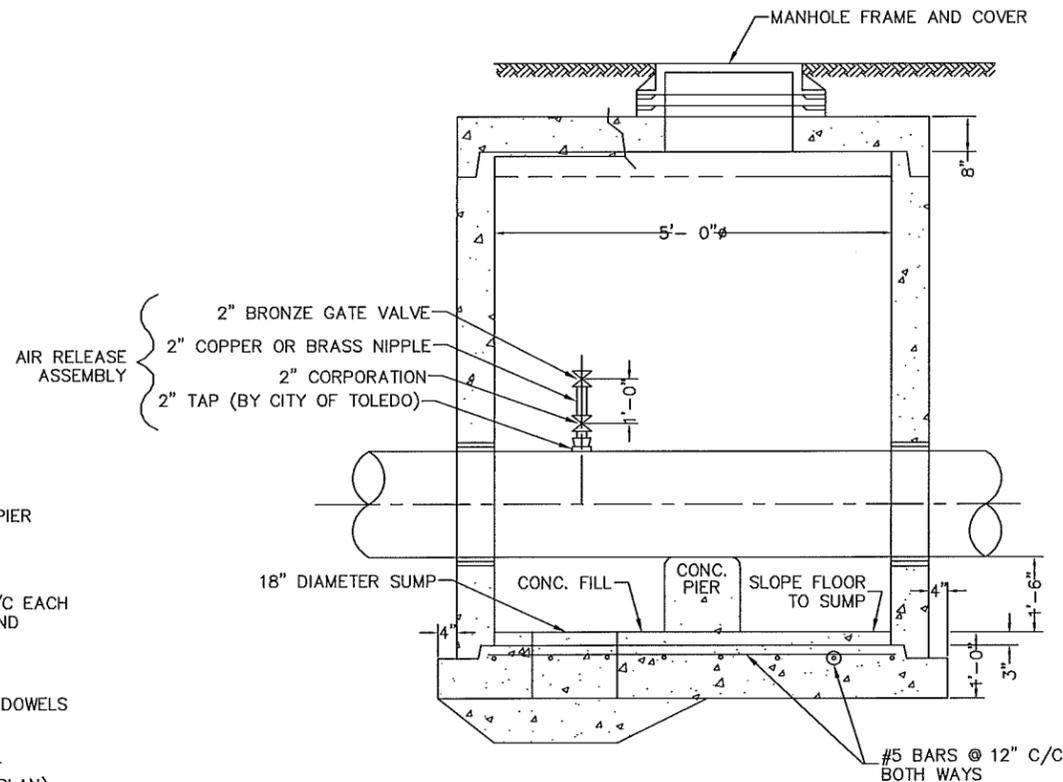
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BUTTERFLY VALVE MANHOLE
(NOT TO SCALE)



BLOW-OFF MANHOLE
(NOT TO SCALE)

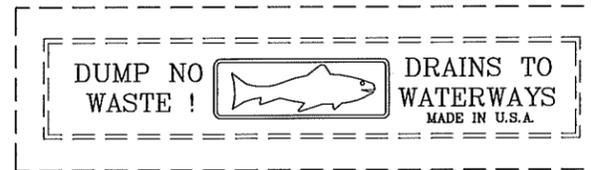
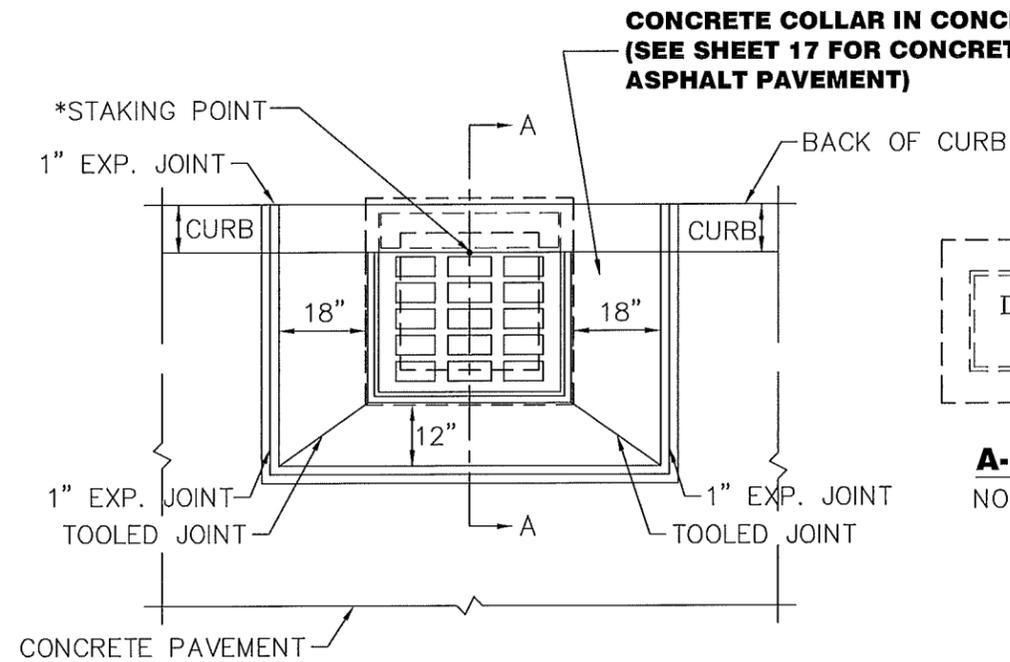


AIR RELEASE ASSEMBLY & MANHOLE
(NOT TO SCALE)

CITY OF TOLEDO
CONSTRUCTION STANDARDS

AIR RELEASE, BLOWOFF AND
BUTTERFLY VALVE MANHOLES

DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE
DATE: 1-16	DRAWING FILE: STANDARD-11.DWG	



A-1 CASTING CURB BACK DETAIL
NOT TO SCALE

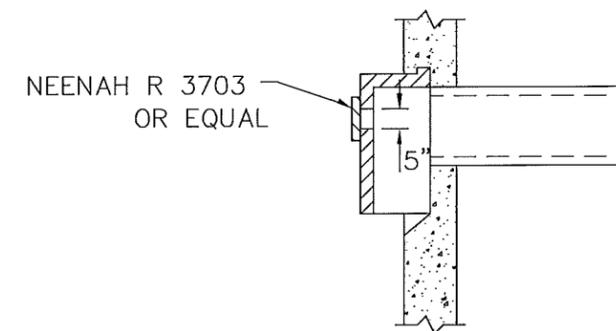
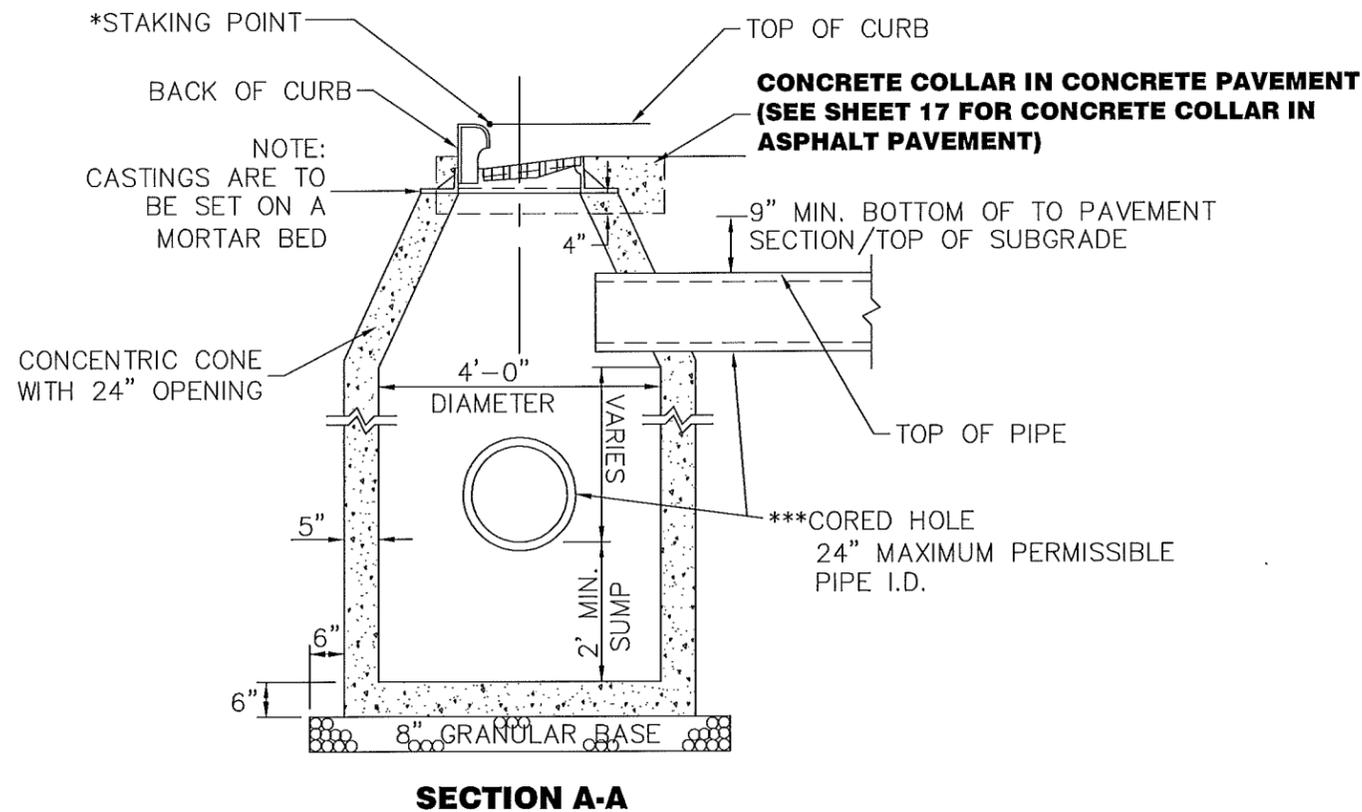
FOR ALL CATCH BASINS
IN RIGID CONCRETE PAVEMENT
EXPANSION JOINT WILL BE REQUIRED AS SHOWN

NOTES:

* **LOCATION FOR SURVEY STAKING. CASTING ELEVATION WILL BE TOP OF CURB GRADE AT STAKING POINT.**

GUTTER ELEVATION IS 8" BELOW CURB GRADE AT STAKING POINT.

REFER TO SHEET 15 FOR CATCH BASIN NOTES.



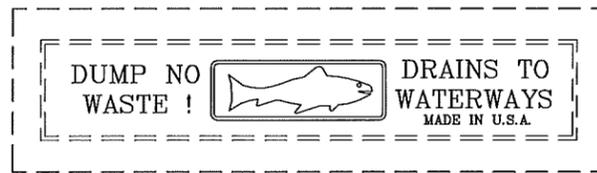
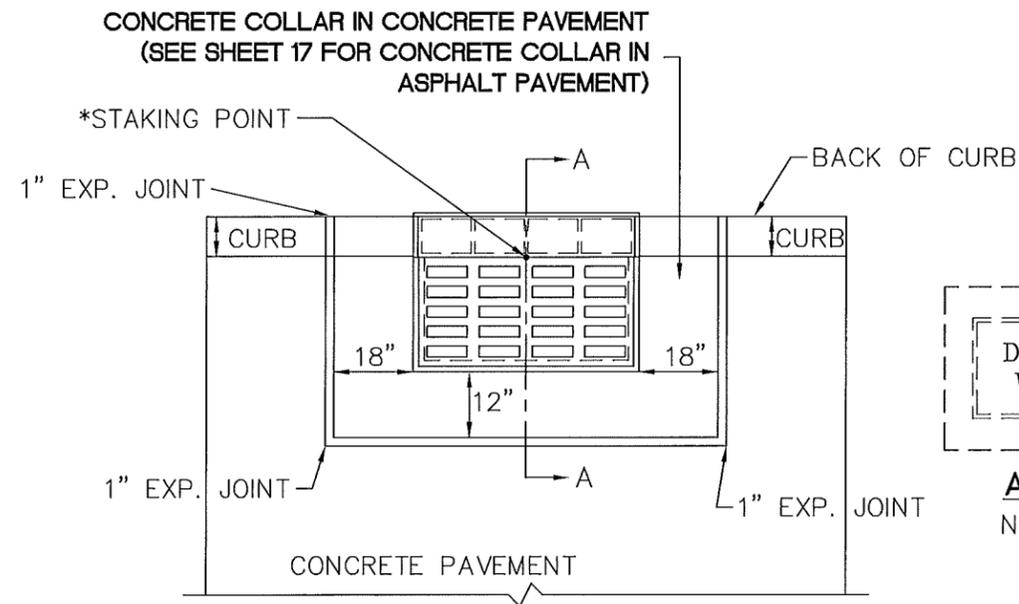
TRAP DETAIL
(FOR USE IN COMBINED SEWER AREA ONLY)

CITY OF TOLEDO
CONSTRUCTION STANDARDS

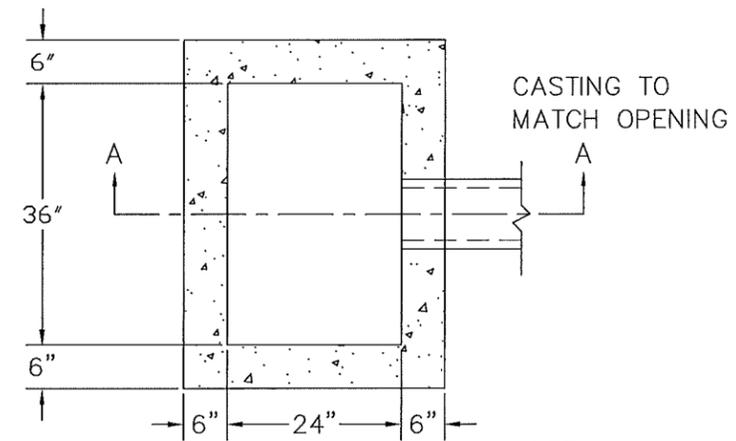
CATCH BASIN, TYPE A-1

DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE
DATE: 1-16	DRAWING FILE: STANDARD-12.DWG	

F:\CITYSTND\2016 CONSTRUCTION STANDARDS\STANDARD-13.dwg, Model, 2/2/2016 4:31:14 PM, krallb



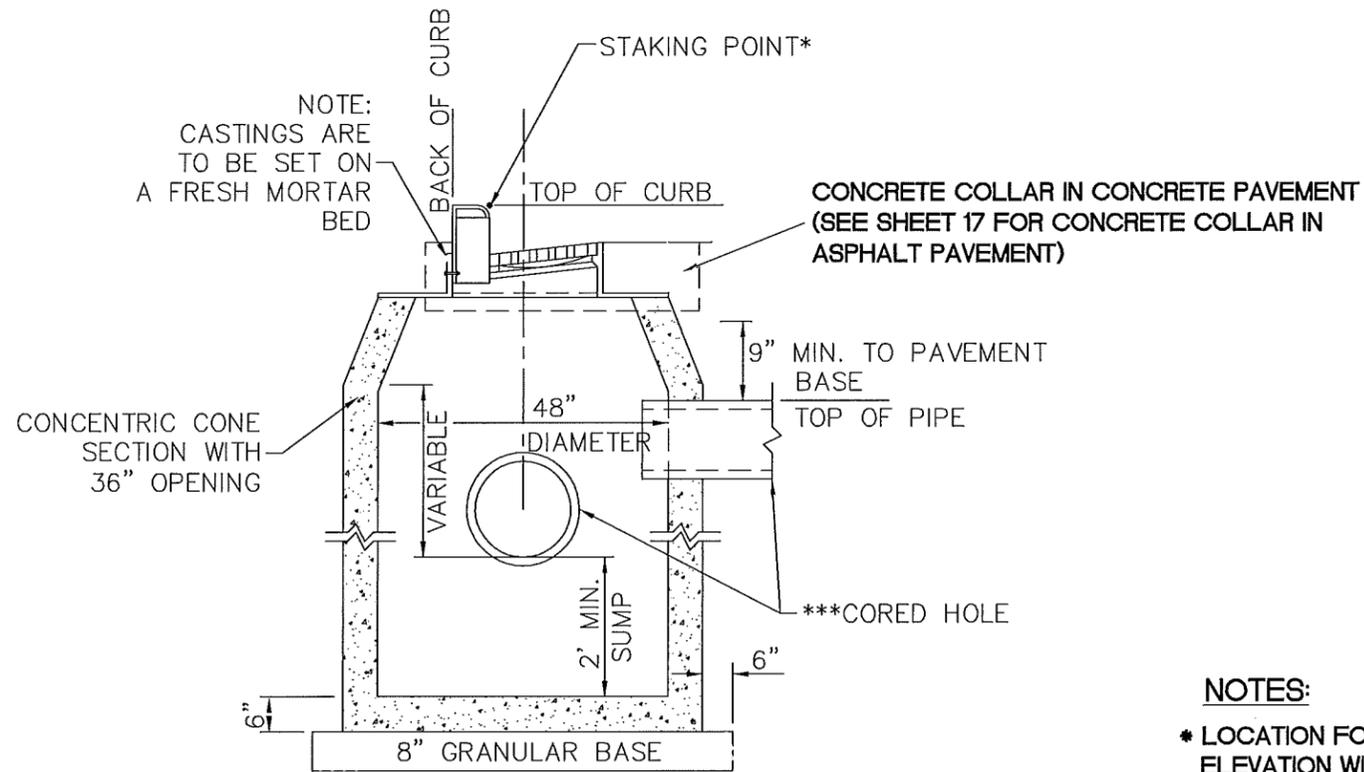
A-2 CASTING CURB BACK DETAIL
NOT TO SCALE



PLAN VIEW

NOTE
PRECAST RECTANGULAR 2'-0" BY 3'-0" STRUCTURES MAY BE USED FOR CATCH BASINS WHERE INLET PIPE DIAMETER IS $\leq 12"$ AND CONNECTIONS ARE PERPENDICULAR TO THE WALL OF THE STRUCTURE.

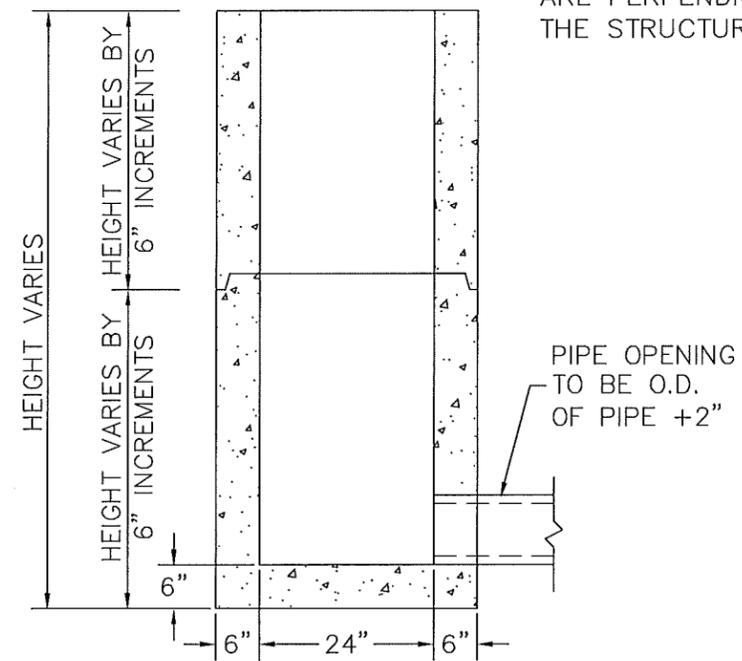
FOR ALL CATCH BASINS IN NEW CONCRETE PAVEMENT OR BASE EXPANSION JOINTS WILL BE REQUIRED AS SHOWN



48" ROUND STRUCTURE

SECTION A-A

STRUCTURE TO BE USED WITH A MAXIMUM 24" PIPE SIZE



24" X 36" RECTANGULAR STRUCTURE

SECTION A-A

NOTES:

* LOCATION FOR SURVEY STAKING. CASTING ELEVATION WILL BE TOP OF CURB GRADE AT STAKING POINT.

GUTTER ELEVATION IS 8' BELOW CURB GRADE AT STAKING POINT.

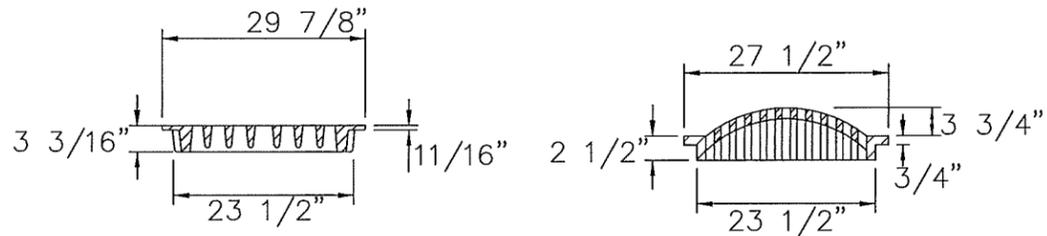
REFER TO SHEET 15 FOR CATCH BASIN NOTES.

CITY OF TOLEDO
CONSTRUCTION STANDARDS

CATCH BASIN, TYPE A-2

DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE
DATE: 1-16	DRAWING FILE: STANDARD-13.DWG	

GRATES FOR TYPE D CATCH BASIN & YARD BASIN



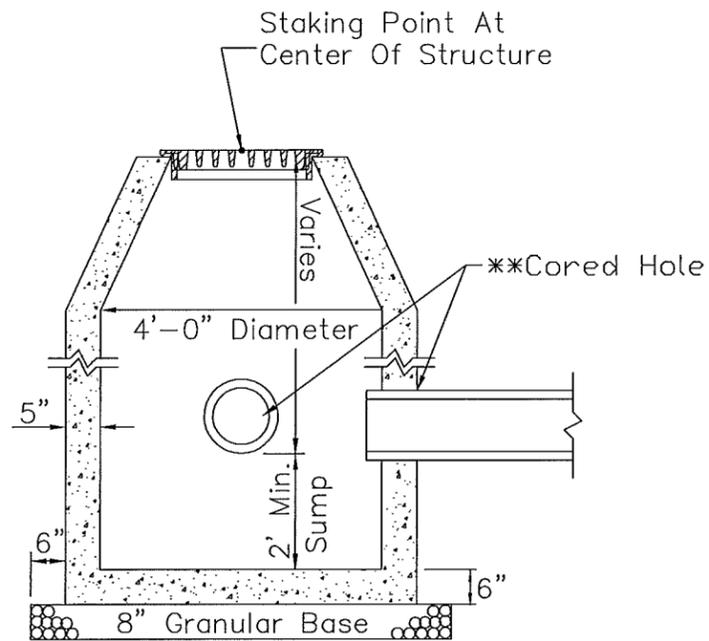
Flat Grate
East Jordan 6221 DNW
Or Equal

Beehive Grate
East Jordan 6121 N,
Or Equal

SECTION A-A
Grates

NOTE:

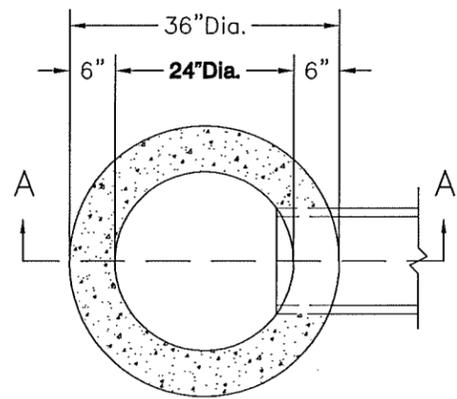
Not To Be Used If Catch Basin Is Located Within 10' Of Pavement On Unimproved Streets.



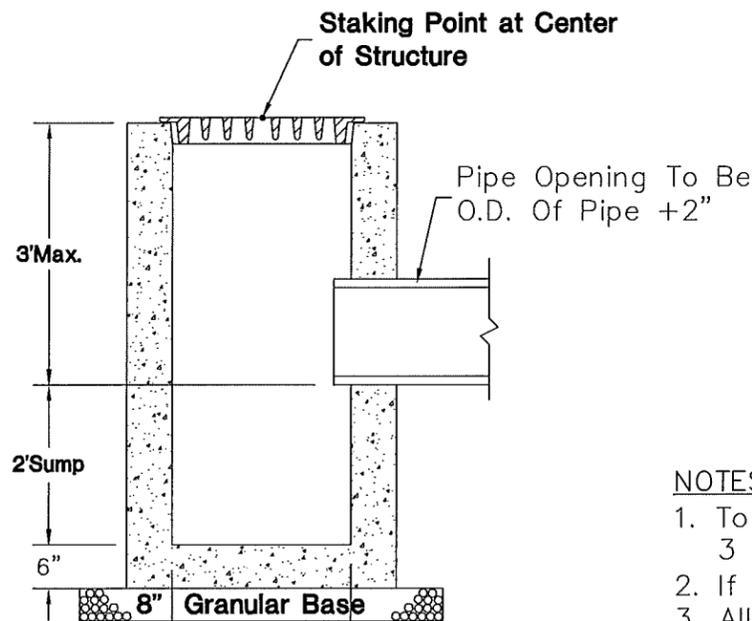
TYPE D CATCH BASIN

SECTIONAL ELEVATION

Maximum Permissible Pipe Size Shall Be 24" I.D.



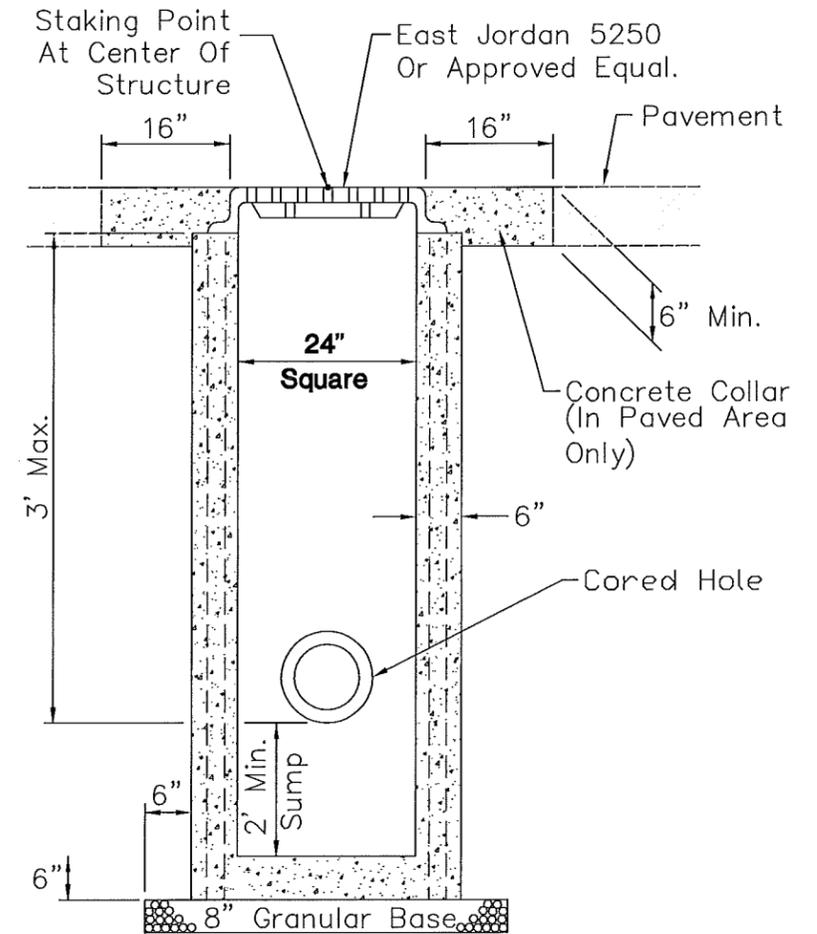
TOP VIEW



SECTION A - A'

YARD BASIN

Maximum Permissible Pipe Size Shall Be 12" I.D.



TYPE PL-1

SQUARE PRECAST REINFORCED CONCRETE CATCH BASIN (FOR USE IN PARKING LOTS)

Maximum Permissible Pipe Size Shall Be 12" I.D.

NOTES:

1. To Facilitate Cleaning / Maintenance, Basins Greater Than 3 Feet Deep Shall Be 48" Minimum Diameter.
2. If Outlet Of Basin Is To Storm Sewer, Trap Is Not Required.
3. All Pipe Openings Shall Be Cored At The Factory: Knock-Out Walls Are Prohibited.
4. See Catch Basin Notes On Page 15.

CITY OF TOLEDO CONSTRUCTION STANDARDS

CATCH BASIN, TYPE D, TYPE PL-1 (PARKING LOTS) AND YARD BASIN

DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	14
DATE: 1-16	DRAWING FILE: STANDARD-14.DWG		

CATCH BASIN CASTINGS

TYPE A-1

CURB TYPE	ROUND FLANGE
STRAIGHT CURB	EJ7022 W/M1 GRATE, T1 BACK NEENAH R-3274A
MOUNTABLE CURB	EJ7395 W/ M3 "S" GRATE
NO CURB/DROP CURB	EJ5130 W/M2 FLAT GRATE NEENAH R-3339-1

TYPE A-2

CURB TYPE	ROUND FLANGE	RECTANGULAR FLANGE
STRAIGHT CURB	EJ7360 W/M2 GRATE, T1 BACK NEENAH R-3246-F	EJ7035 W/M2 GRATE, T1 BACK NEENAH R-3246-CL
MOUNTABLE CURB	EJ V4510 NEENEH R-3514-F	EJ V4510
NO CURB/DROP CURB	EJ5130 W/M2 FLAT GRATE NEENAH R-3339-1	EJ5245 NEENAH R-3357-A

ODOT CATCH BASIN CASTINGS

TYPE 3	EAST JORDAN 7358 W/TYPE M2 GRATE, NEENAH R-3288 E2 OR APPROVED EQUAL
TYPE 3A	EAST JORDAN 7350 W/TYPE T1 AND M2 GRATE, NEENAH 3289-C OR APPROVED EQUAL
TYPE 6	EAST JORDAN 5245 NEENAH R-3409 OR APPROVED EQUAL

CURB PLATES

TOP OF CURB PLATE FOR ALL CASTINGS SHALL BE CAST WITH THE IMAGE OF FISH AND THE WORDS "DUMP NO WASTE! DRAINS TO RIVER". LETTERING SHALL HAVE 0.5" MINIMUM HEIGHT. ONCE CURB PLATE IS SET PLUG SLOTS WITH MORTAR.

CATCH BASIN NOTES

FLANGE OF CASTING MUST CONFORM TO THE GEOMETRIC SHAPE OF THE STRUCTURE.

CONCRETE BLOCK OR BRICK CATCH BASINS WILL ONLY BE USED UPON APPROVAL BY THE ENGINEER. WHEN CONCRETE BLOCKS OR BRICKS ARE USED, THE ENTIRE STRUCTURE SHALL BE PLASTERED INSIDE AND OUT WITH A MINIMUM THICKNESS OF 1/4" OF CEMENT MORTAR. ALL JOINTS SHALL BE FILLED WITH PORTLAND CEMENT MORTAR PER 602.03.

ALL CASTINGS PROVIDED SHALL HAVE BICYCLE SAFE GRATES.

BEARING AREAS OF FRAME AND GRATE SHALL BE SO FITTED AND FINISHED AS TO PROVIDE A FIRM AND EVEN SEAT FOR ALL PORTIONS OF THE GRATE IN THE FRAME. NO PROJECTIONS SHALL EXIST ON THE BEARING AREAS OF THE CASTING, AND THE GRATE SHALL SEAT IN THE FRAME WITHOUT ROCKING. FRAME AND GRATE SHALL BE FITTED, MATCHED AND MARKED BEFORE DELIVERY TO THE PROJECT.

CAUTION SHALL BE EXERCISED IN SETTING THE BASIN CASTING ON A FRESH MORTAR BED TO ENSURE UNIFORM SUPPORT.

STEPS REQUIRED IF BASIN IS DEEPER THAN 4'-0". STEPS SHALL BE MA INDUSTRIES PS-1 OR APPROVED EQUAL. SHALL BE 12" MINIMUM AND 16" MAXIMUM VERTICAL SPACING. STEPS SHALL PROTRUDE FROM INNER WALL OF STRUCTURE 4 1/2".

IF SUMPS ARE OMITTED, AS APPROVED BY THE ENGINEER, THE BOTTOM OF THE STRUCTURE SHALL BE CHanneled SIMILAR TO A MANHOLE BOTTOM.

ALL CATCH BASINS ARE TO BE PRECAST PER ASTM C478 UNLESS OTHERWISE APPROVED BY THE ENGINEER.

JOINTS BETWEEN SECTIONS IN ROUND STRUCTURES SHALL CONFORM TO ASTM C-443 (RUBBER GASKETS). JOINTS ON ALL STRUCTURES (ROUND AND RECTANGULAR) SHALL ALSO CONTAIN A 7/8" MASTIC BEAD PER ASTM C990.

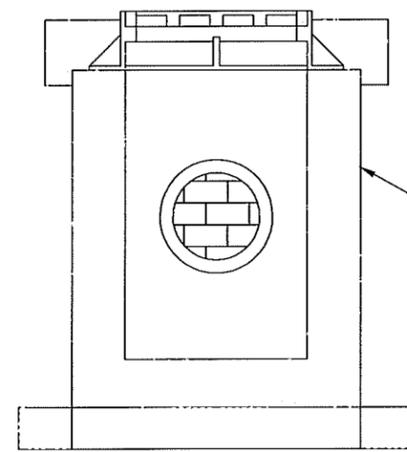
SET THE GUTTER FOR CASTINGS DESIGNED FOR STRAIGHT CURB/CURB AND GUTTER 8" BELOW THE TOP OF CURB GRADE. (2" BELOW NORMAL GUTTER GRADE). FOR BASINS WITHOUT CURB INLETS, SET THE CASTING ELEVATION 1" BELOW THE NORMAL PAVEMENT SLOPE MEASURED AT THE CENTER OF THE GRATE.

GROUT, (ON BOTH THE INSIDE AND THE OUTSIDE), THE ENTIRE PERIMETER OF THE INLET FRAME DOWN TO THE PRECAST STRUCTURE TO PREVENT ANY INFLOW INTO THE STRUCTURE. ALL ROUND CATCH BASINS SHALL BE MANUFACTURED PER ASTM C-478.

CITY OF TOLEDO
CONSTRUCTION STANDARDS

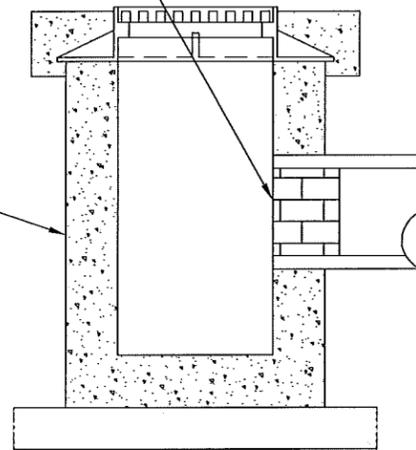
CATCH BASIN CASTINGS
AND NOTES

DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	15
DATE: 1-16	DRAWING FILE: STANDARD-15.DWG		



END VIEW

Brick To Be Flush With The Wall



SIDE VIEW

CATCH BASIN OR MANHOLE

Bricks Shall Be Mortared In Place With No Voids.

Bricks Shall Be Solid Concrete Or Clay. Size To Be 4"x 3-1/2"x 8" Or Larger.

Less Than 12" Diameter Opening ~ 1 Set Of Bricks

12" - 21" Diameter Opening ~ 2 Sets Of Bricks

21" - 27" Diameter Opening ~ 3 Sets Of Bricks

CITY OF TOLEDO
CONSTRUCTION STANDARDS

SEWER PLUG DETAIL AT STRUCTURE

DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	16
DATE: 12-14	DRAWING FILE: STANDARD-16.DWG		

NOTES

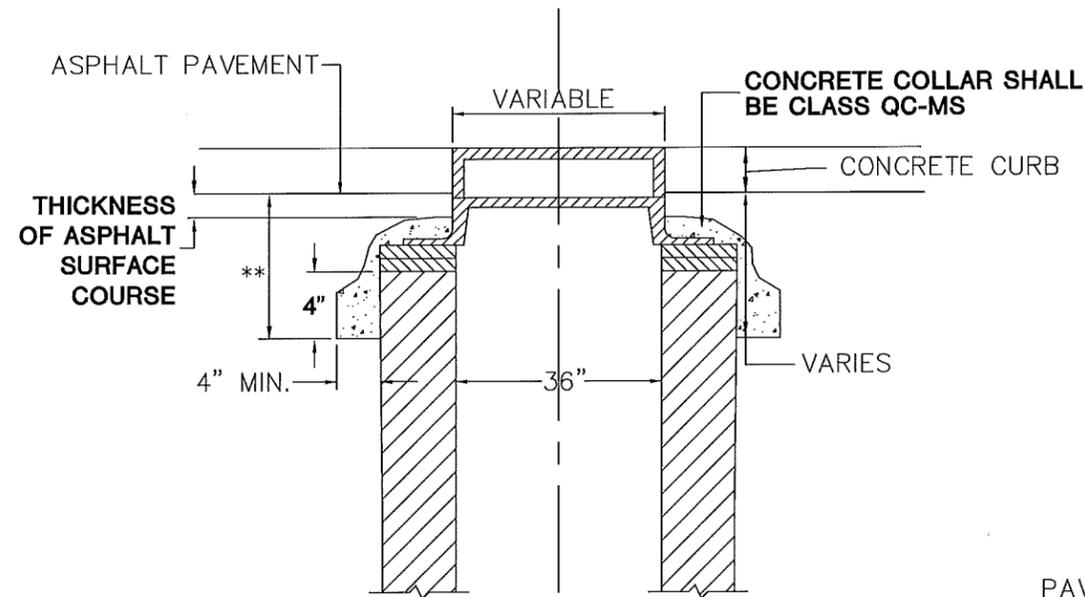
FOR CONCRETE COLLARS ON FLAT TOP STRUCTURES, COLLARS AND CASTING SHALL BE PINNED TO THE TOP WITH TWO #4 BARS (ONE ON EACH SIDE) IN THE DIRECTION OF TRAFFIC.

CONCRETE COLLAR SHALL BE REQUIRED FOR ALL MANHOLES LOCATED IN PAVEMENT OR BERM AREA.

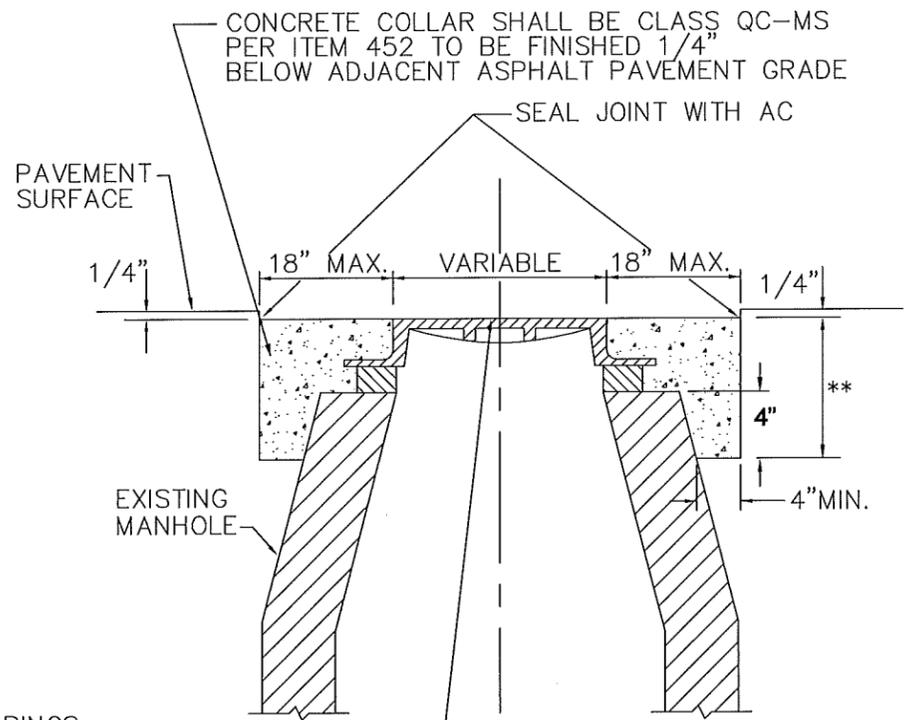
CONCRETE CURB SECTIONS ADJACENT TO CATCH BASINS SHALL BE POURED INTEGRALLY WITH CONCRETE COLLAR.

FOR CATCH BASINS ADJUSTED TO CURB AND GUTTER, THE COLLAR SHALL NOT EXTEND BEYOND THE FACE OF THE GUTTER PAN.

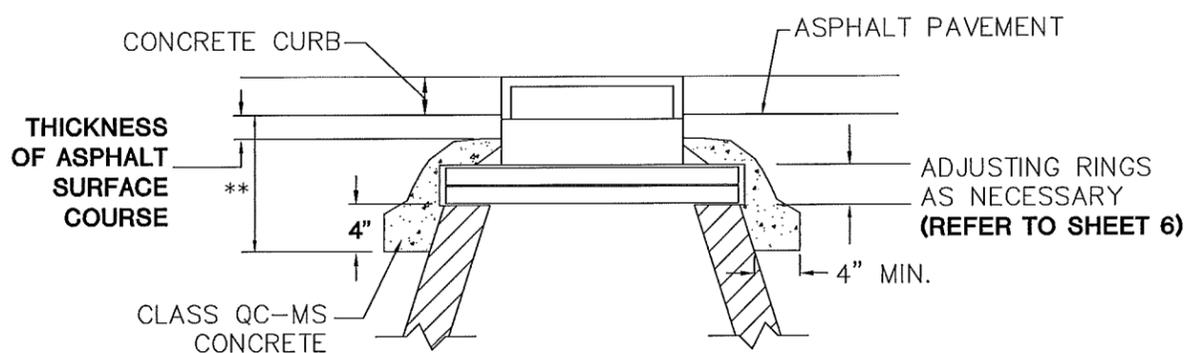
**** COLLAR SHALL LOCK IN CASTING, ADJUSTMENT RINGS, AND TOP 4" OF STRUCTURE AROUND ENTIRE PERIMETER OF STRUCTURE.**



CATCH BASIN COLLAR FOR RECTANGULAR STRUCTURES

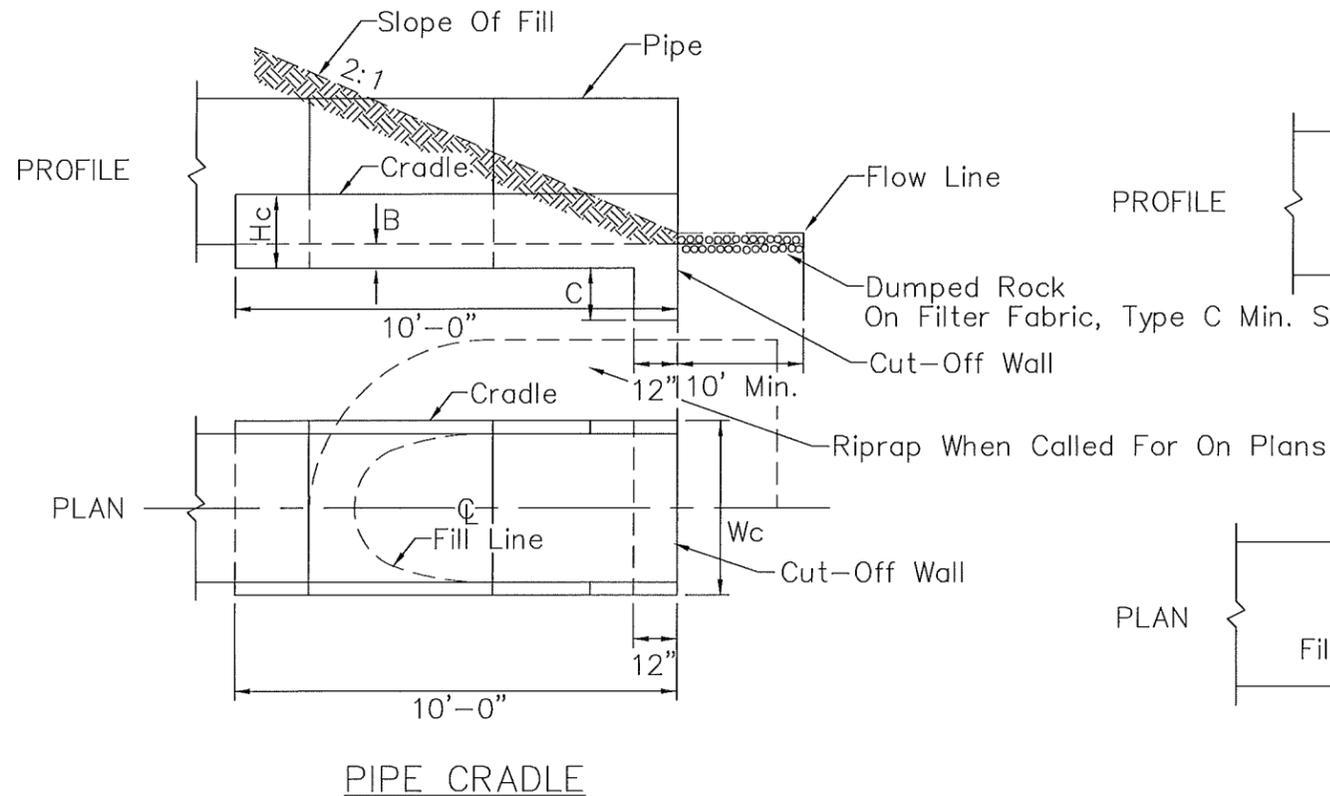


MANHOLE COLLAR DETAIL

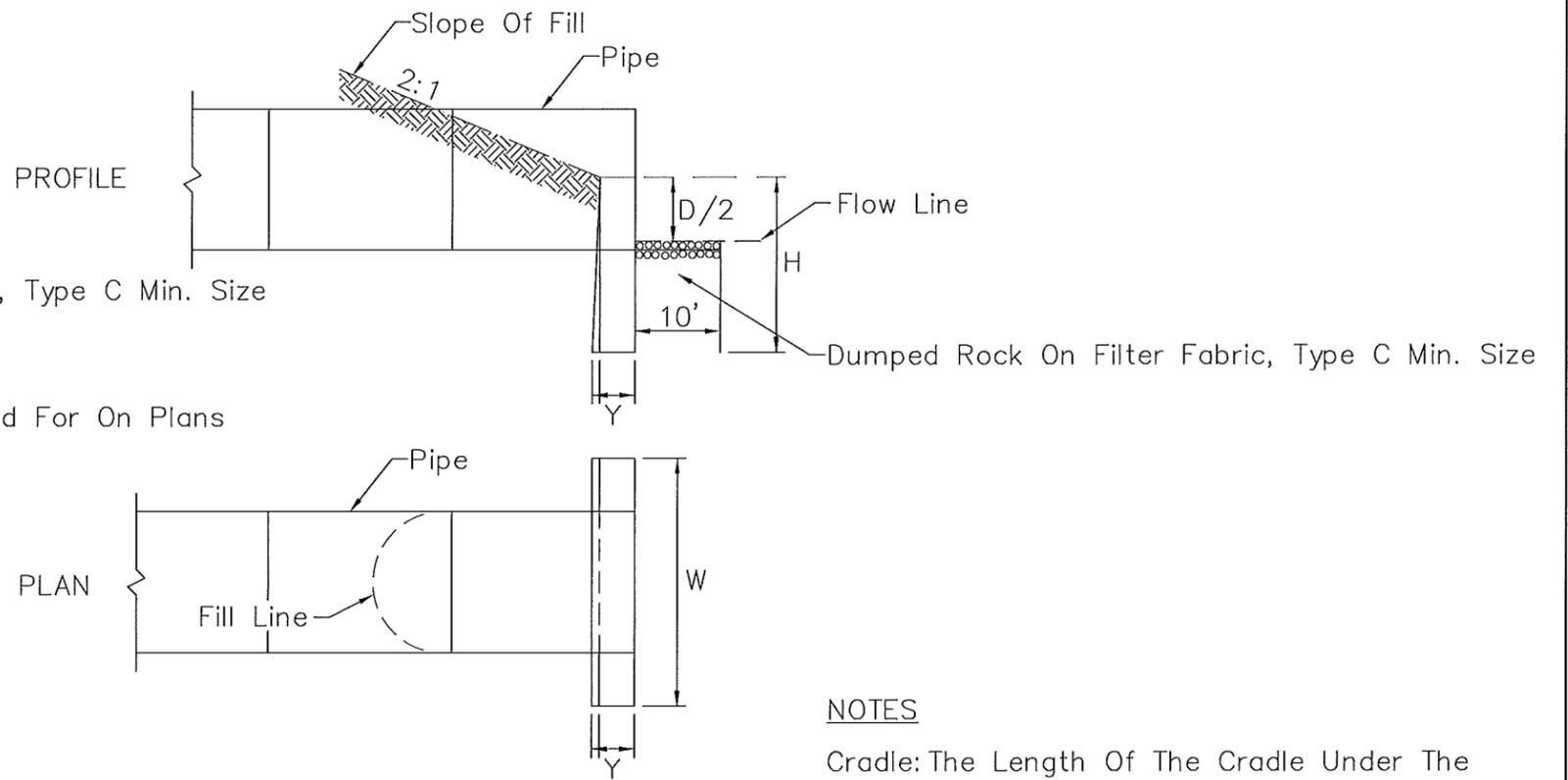


CATCH BASIN COLLAR DETAIL FOR ROUND STRUCTURES

CITY OF TOLEDO CONSTRUCTION STANDARDS			
CONCRETE COLLAR DETAILS AND NOTES			
DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	17
DATE: 1-16	DRAWING FILE: STANDARD-17.DWG		



PIPE CRADLE



ENDWALL

NOTES

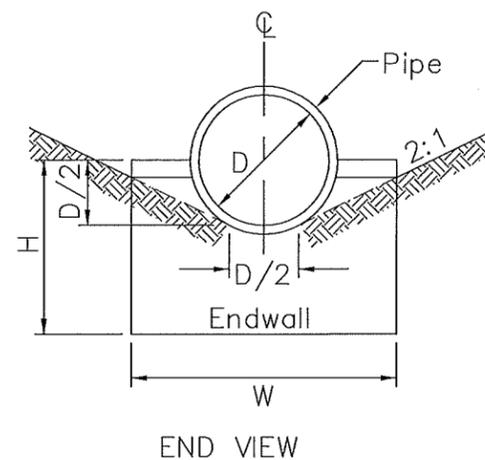
Cradle: The Length Of The Cradle Under The Pipe And The Dimensions Of The Cut-Off Wall May Be Varied If Deemed Advisable By The Designing Engineer And Shall Be Detailed On The Project Plans As A Special Design.

For Level Terrain Where Scour Will Not Occur The Cradle May Be Omitted From The Plans.

All Concrete Shall Be 4000 PSI Compressive Strength.

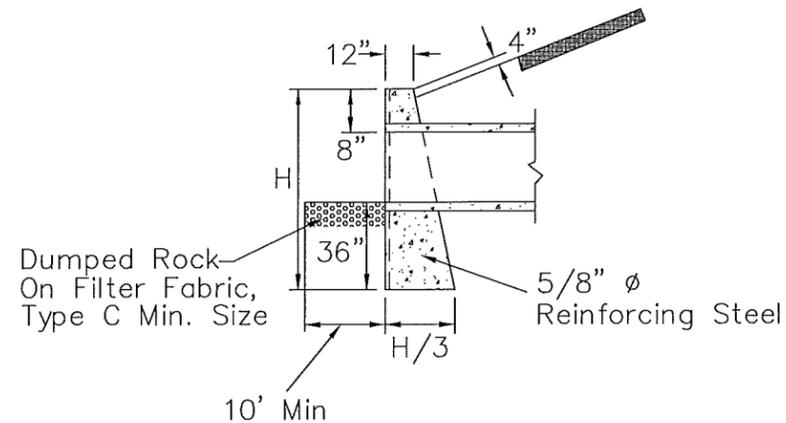
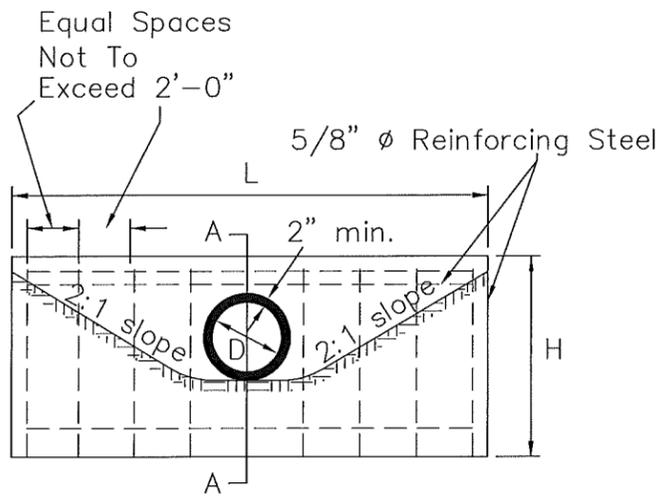
Riprap May Be Placed On Both Inlet And Outlet Ends As Deemed Necessary. The Engineer Will Determine The Necessity For And Amount Of Riprap For Each Structure.

Estimated Quantities: The Detail Of Each Structure Shall Show Dimensions Of The Cut-Off Walls And Cradle And The Amount Of Riprap To Be Used.



Dia. D	Width W	Conc. Cu. Yd. One End Wall	H	Y	B	C	Hc	Wc	CU. YD. CON.	
									Two Cut-Off Walls	Per Lin. Ft. Of Cradle
12"	2'-0"	0.20	3'-0"	12"	6"	1'-4"	0'-11"	1'-10"	.2	.0476
15"	2'-6"	0.25	3'-2"	12"	6"	1'-4"	1'-0"	2'-1"	.2	.0580
18"	3'-0"	0.31	3'-3"	12"	6"	1'-4"	1'-2"	2'-5"	.2	.0801
21"	3'-6"	0.37	3'-4"	12"	6"	1'-3"	1'-4"	2'-11"	.3	.0924
24"	4'-0"	0.43	3'-6"	12"	6"	1'-3"	1'-5"	3'-3"	.3	.1044
27"	4'-6"	0.49	3'-8"	12"	6"	1'-3"	1'-6"	3'-6"	.3	.1181
30"	5'-0"	0.56	3'-9"	12"	6"	1'-3"	1'-7"	3'-10"	.3	.1323
33"	5'-9"	0.62	3'-10"	12"	6"	1'-3"	1'-8"	4'-1"	.4	.1462
36"	6'-0"	0.69	4'-0"	12"	6"	1'-3"	1'-9"	4'-4"	.4	.1606
39"	6'-6"	0.77	4'-2"	12"	6"	2'-2"	1'-11"	4'-8"	.7	.1768
42"	7'-0"	0.84	4'-3"	12"	6"	2'-2"	2'-1"	5'-3"	.8	.2110
48"	8'-0"	1.09	4'-6"	14"	8"	1'-11"	2'-4"	5'-11"	.9	.2972
54"	9'-3"	1.32	4'-9"	14"	8"	1'-11"	2'-9"	6'-6"	.9	.3398
60"	10'-6"	1.93	5'-6"	16"	10"	1'-9"	3'-0"	7'-3"	.9	.4486
66"	11'-9"	2.42	5'-9"	18"	10"	1'-8"	3'-2"	7'-10"	1.0	.4989
72"	13'-0"	2.77	6'-0"	18"	10"	1'-7"	3'-6"	8'-11"	1.1	.6126
84"	15'-6"	4.05	6'-6"	22"						
96"	18'-0"	5.31	7'-0"	24"						

CITY OF TOLEDO CONSTRUCTION STANDARDS			
STANDARD ENDWALL AND PIPE CRADLE			
DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	18
DATE: 3-14	DRAWING FILE: STANDARD-18.DWG		



SECTION A - A

DIMENSIONS			QUANTITIES ONE HEADWALL	
Diameter	H	L	Concrete Cu. Yds.	Reinforcing Steel Lbs.
15"	5'-2"	7'-0"	1.7	41
18"	5'-5"	8'-4"	2.2	57
21"	5'-8"	9'-8"	2.8	62
24"	5'-11"	11'-0"	3.3	69
27"	6'-2"	12'-4"	3.9	80
30"	6'-5"	13'-8"	4.7	92
33"	6'-9"	15'-0"	5.6	98
36"	7'-0"	16'-4"	6.5	105

- L Circular Sections = 5D + 4T
- L Elliptical (Or Pipe Arch) = 4R + 4T + S
- H Circular Sections = D + T + 44"
- H Elliptical = R + T + 44"

- D= Diameter of Pipe
- R= Rise of Pipe
- S= Span of Pipe
- T= Thickness of Barrel
- L= Length of Headwall
- H= Height of Headwall

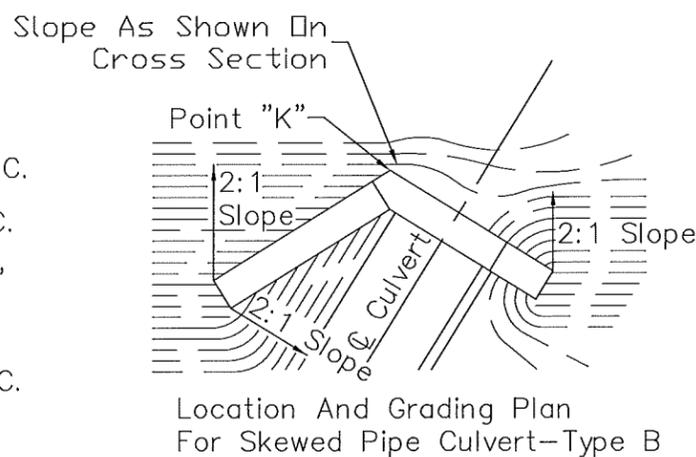
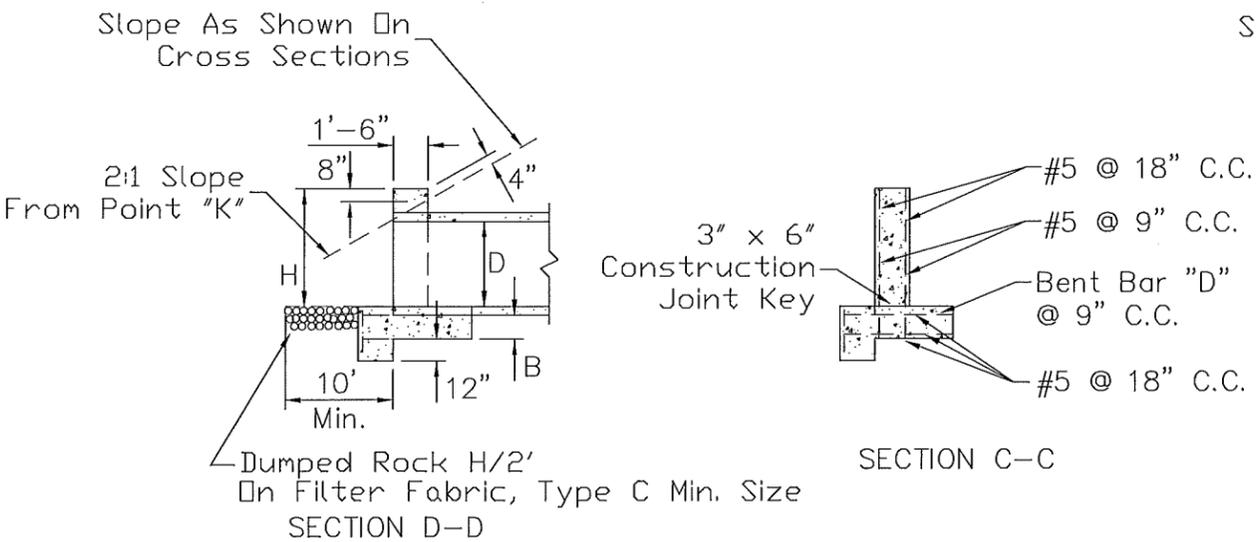
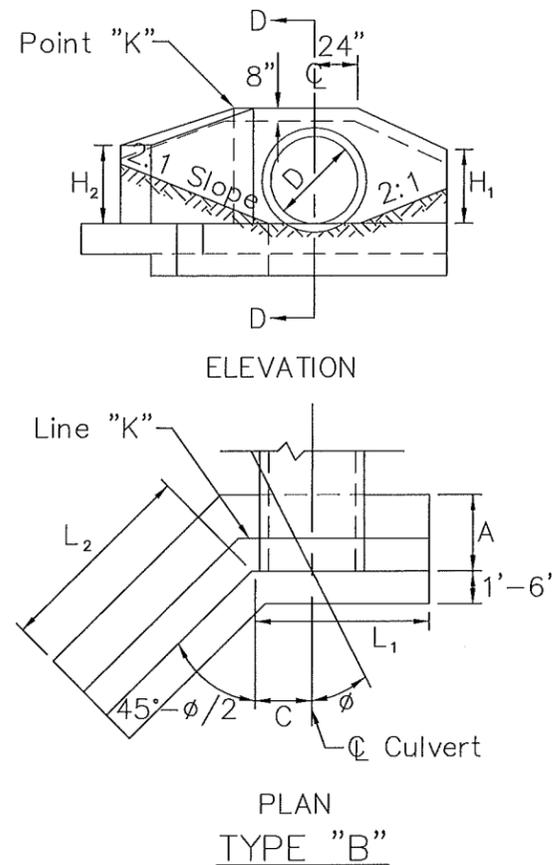
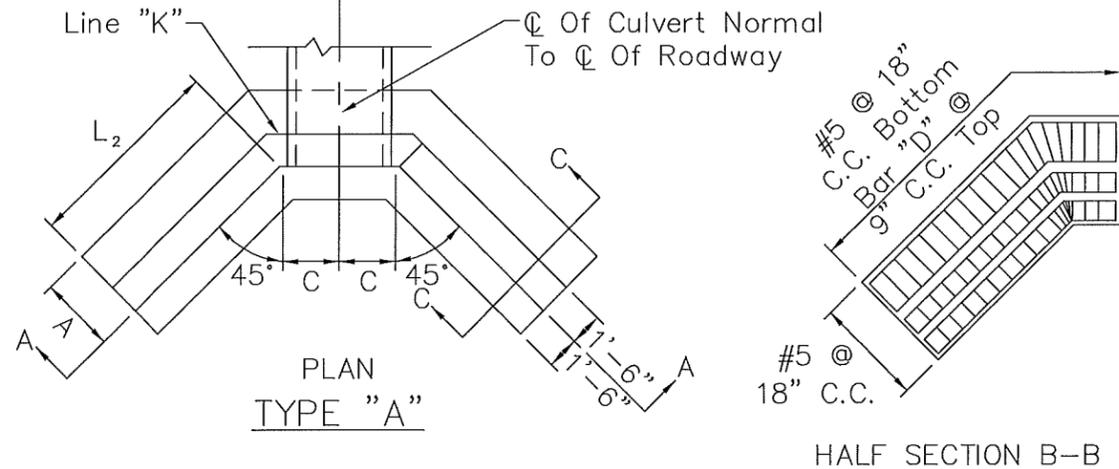
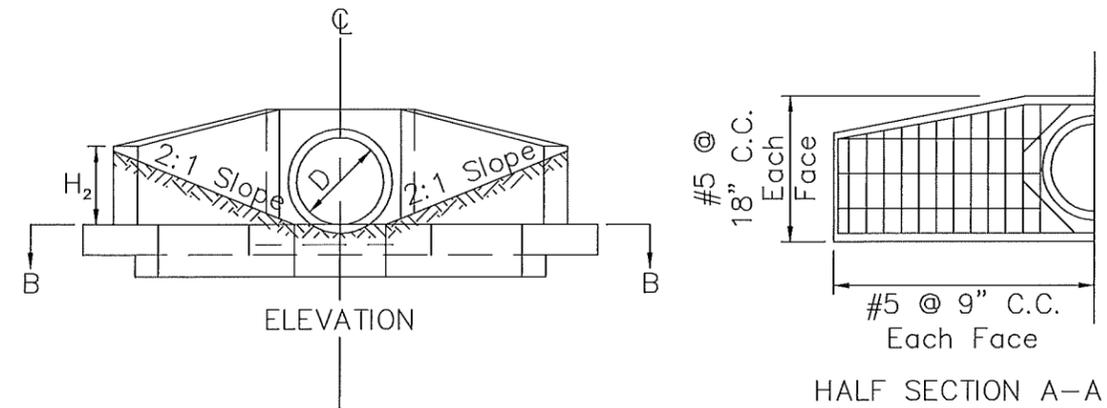
NOTES

Concrete Shall Be 4000 PSI Compressive Strength.

Chamfer All Exposed Corners 3/4"

All Reinforcement Steel To Be Epoxy Coated.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
STANDARD HEADWALL TYPE HW-1			
DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	19
DATE: 3-14	DRAWING FILE: STANDARD-19.DWG		



NOTES:

HW-3 Headwall Where Required Will Be Provided For Skewed And Nonskewed Culverts Having A Diameter Or Rise 42" To 84" Inches Inclusive.

Type "a" Is Used When The Skew Angle (ϕ) Is 10 Degrees Or Less And Type "B" When The Skew Angle Is 11 Degrees Or More.

Concrete Shall Be 4000 Psi Compressive Strength.

Reinforcing Steel Bars Shall Be 5/8" Round. Minimum Cover For All Bars Shall Be 3" Unless Otherwise Shown On Plans.

Details And Quantities Are Shown For Circular Sections Only. When Used W/ Reinforced Elliptical Concrete Pipe Adjust Dimensions And Quantities To Conform To Those Listed For The Nearest Size Circular Pipe. Apply The Dimensions Established By Vertical Diameter To Span. Round All Calculated Dimensions Established By Horizontal Diameter To Nearest 1". Chamfer All Exposed Corners 3/4".

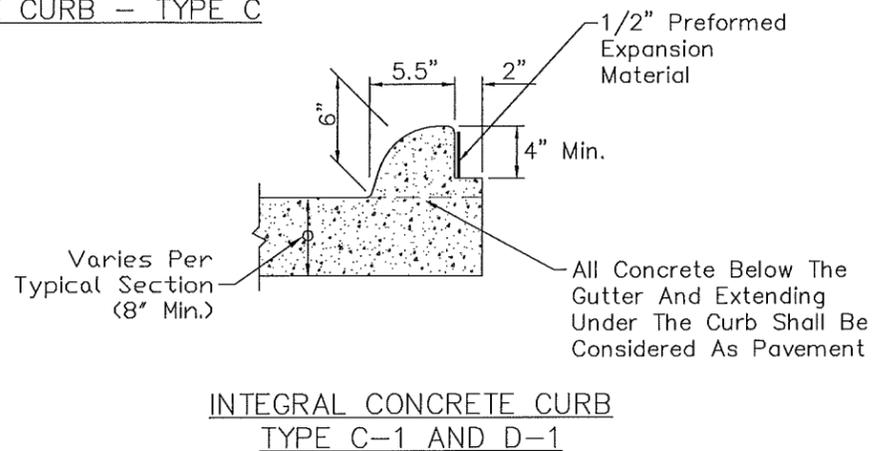
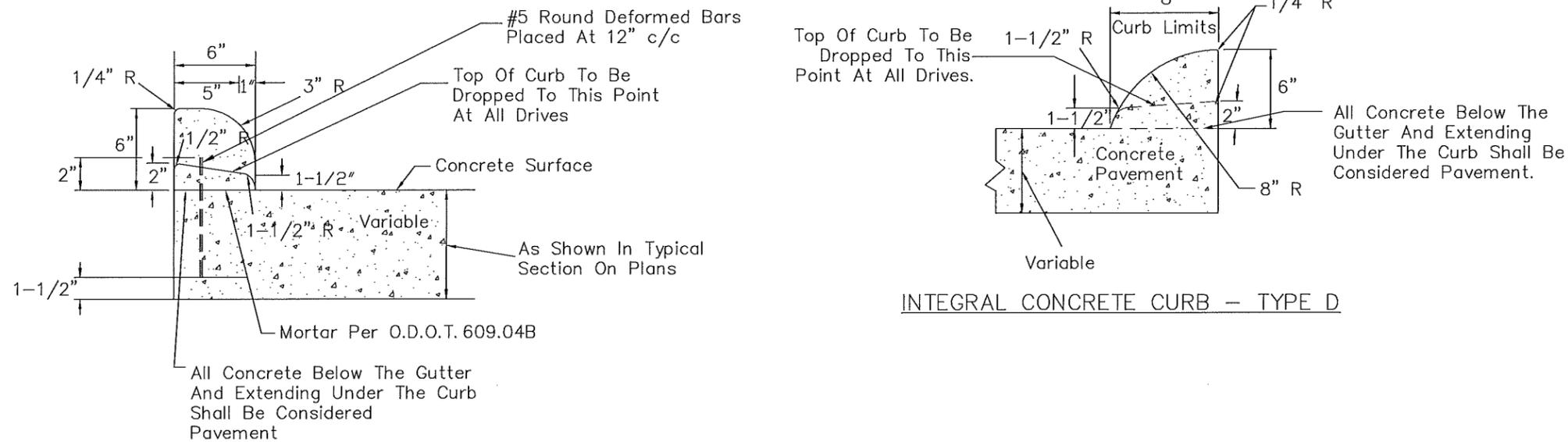
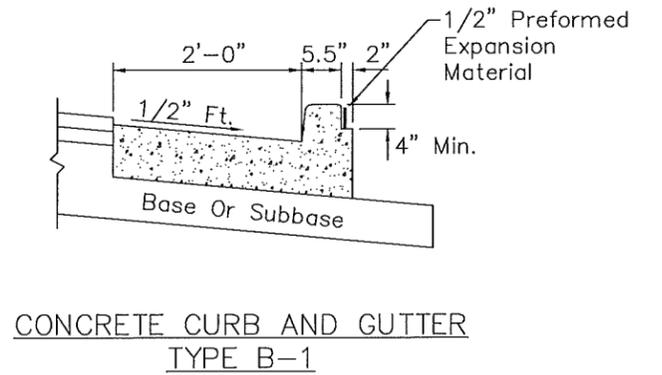
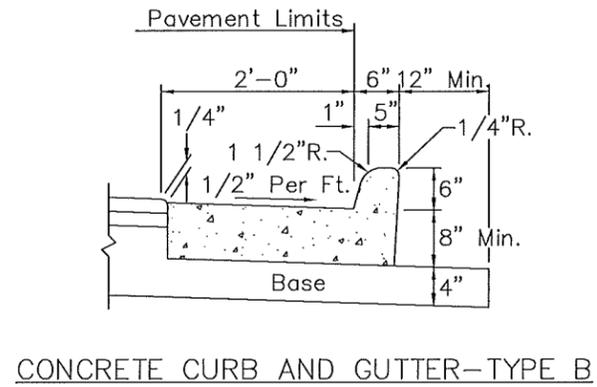
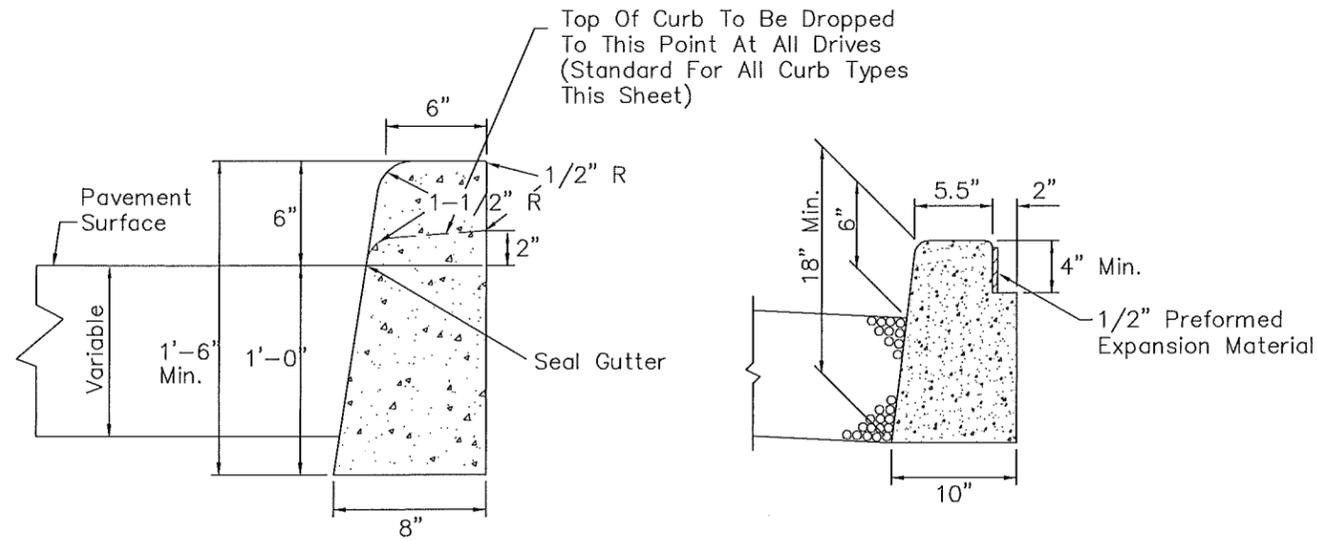
Where Soil Borings Indicate A Bearing Capacity Of Less Than 2,600 Pounds Per Square Foot, Increase The Width Of Footing.

All Reinforcement Steel To Be Epoxy Coated.

Headwall Location To Be Determined By The Intersection Of The Embankment Slope At The Back Of The Headwall At Point "K". The Slopes Adjacent To The Headwall Shall Be 2:1.

PIPE DIAM. D	$\phi=0^\circ$										$\phi=15^\circ$				$\phi=30^\circ$				$\phi=45^\circ$								
	H	A	B	C	BAR D	L ₂	H ₂	C.Y. CONC. R.C.P.	STEEL LBS.	L ₁	L ₂	H ₁	H ₂	C.Y. CONC. R.C.P.	STEEL LBS.	L ₁	L ₂	H ₁	H ₂	C.Y. CONC. R.C.P.	STEEL LBS.	L ₁	L ₂	H ₁	H ₂	C.Y. CONC. R.C.P.	STEEL LBS.
42"	4'-11"	3'-3"	1'-6"	2'-6"	#5	3'-7"	3'-1"	6.7	598	8'-9"	4'-6"	3'-8"	3'-2"	7.1	619	7'-10"	5'-9"	3'-2"	3'-3"	7.3	633	7'-10"	7'-9"	3'-2"	3'-3"	8.5	718
48"	5'-5"	3'-6"	1'-6"	2'-9"	#5	4'-4"	3'-4"	8.2	793	10'-0"	5'-4"	4'-1"	3'-5"	8.7	776	8'-9"	6'-10"	3'-5"	3'-6"	8.8	801	8'-9"	9'-2"	3'-5"	3'-7"	10.3	925
54"	5'-11"	3'-9"	1'-6"	3'-0"	#5	5'-2"	3'-8"	10.2	1069	11'-4"	6'-3"	4'-6"	3'-8"	10.5	1026	9'-8"	7'-11"	3'-8"	3'-9"	10.5	1024	9'-8"	10'-7"	3'-8"	3'-10"	12.2	1188
60"	6'-6"	4'-0"	1'-6"	3'-3"	#5	5'-11"	3'-11"	11.8	1149	12'-7"	7'-2"	4'-10"	4'-0"	12.4	1174	10'-7"	9'-0"	3'-10"	4'-1"	12.3	1157	10'-7"	12'-0"	3'-10"	4'-1"	14.3	1354
72"	7'-7"	4'-6"	1'-7"	3'-9"	#7	7'-5"	4'-5"	16.2	1783	15'-1"	8'-11"	5'-7"	4'-6"	17.1	1811	12'-5"	11'-2"	4'-3"	4'-7"	16.6	1788	12'-5"	14'-10"	4'-3"	4'-8"	19.6	2076
84"	8'-8"	5'-0"	1'-10"	4'-3"	#8	9'-0"	5'-0"	22.8	2595	17'-7"	10'-9"	6'-4"	5'-1"	23.9	2596	14'-7"	13'-4"	4'-10"	5'-2"	23.3	2511	14'-3"	17'-8"	4'-8"	5'-2"	27.0	2990

CITY OF TOLEDO CONSTRUCTION STANDARDS			
STANDARD HEADWALL TYPE HW-3			
DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	20
DATE: 11-14	DRAWING FILE: STANDARD-20.DWG		



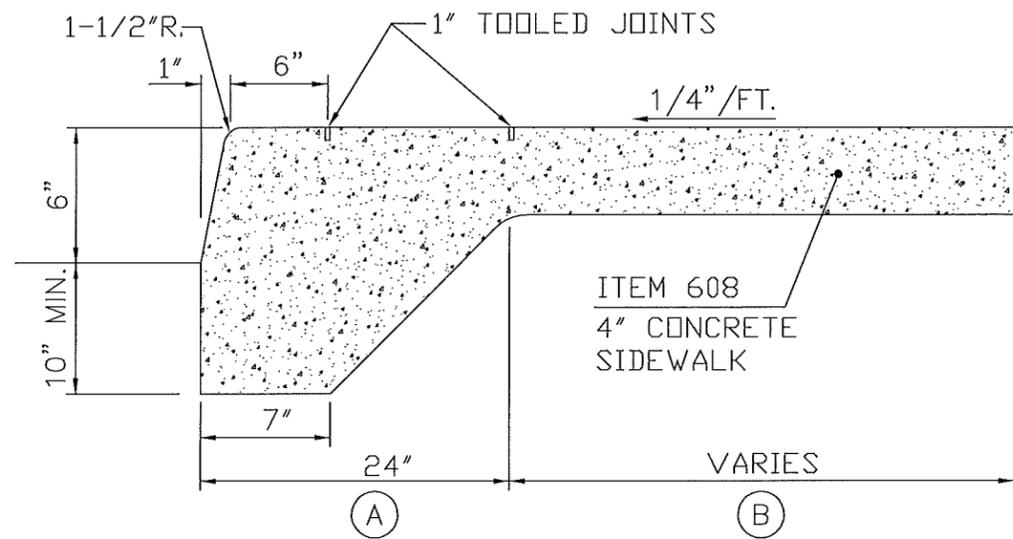
NOTES

- 1/2" Preformed Expansion Joint Will Be Placed At The End Of Radius For All Concrete Curb Or Curb And Gutter.
- Provide A Final Light Broom Finish.
- Curb Placement Shall Not Vary By More Than 1/2" / ft. For Line And Grade In 10 ft.
- Integral Curbs - Type C & D When Constructing Integral Curb And Concrete Pavement, The Curb Shall Be Placed At The Same Time As The Pavement, If This Is Not Possible, Tie Bars Shall Be Installed As Per ODOT 609.04B As Shown In The Detail Shown Under Type C.
- Type A-1, B-1, C-1 and D-1 Curb Standards Shall be Used When Curb Abuts New Sidewalk. All Curb Radii Are The Same As Those Shown For The Respective Curb Type.

CITY OF TOLEDO
CONSTRUCTION STANDARDS

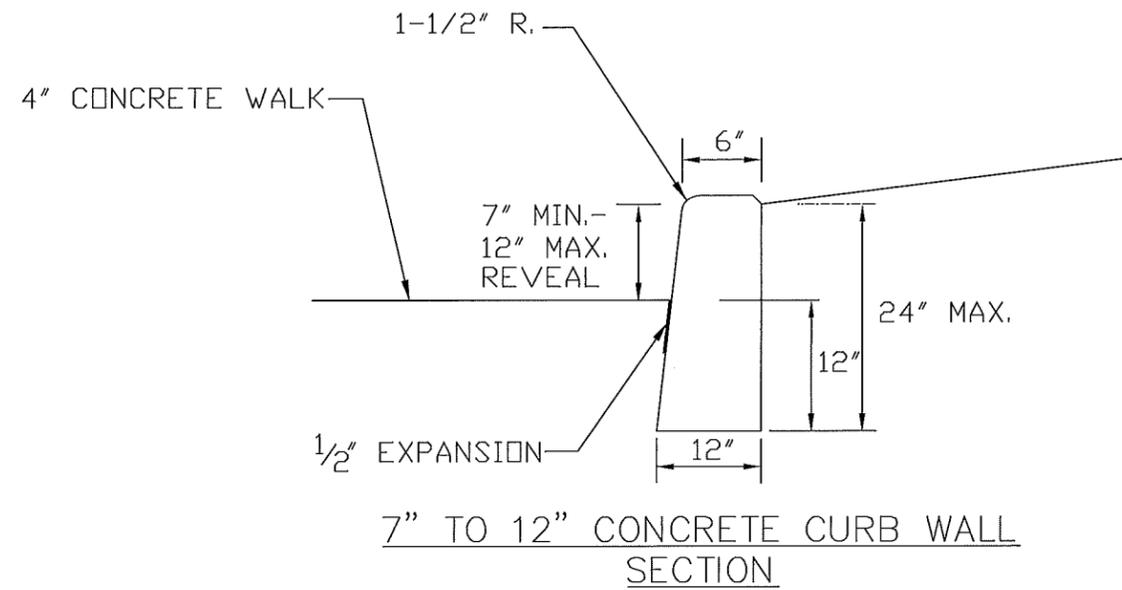
CONCRETE CURBS
TYPES A, B, C, AND D

DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	21
DATE: 3-14	DRAWING FILE: STANDARD-21.DWG		

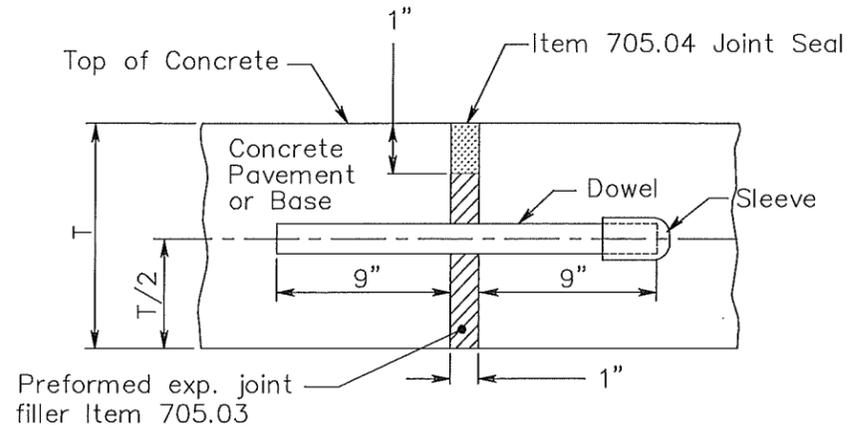


MONOLITHIC WALK/CURB

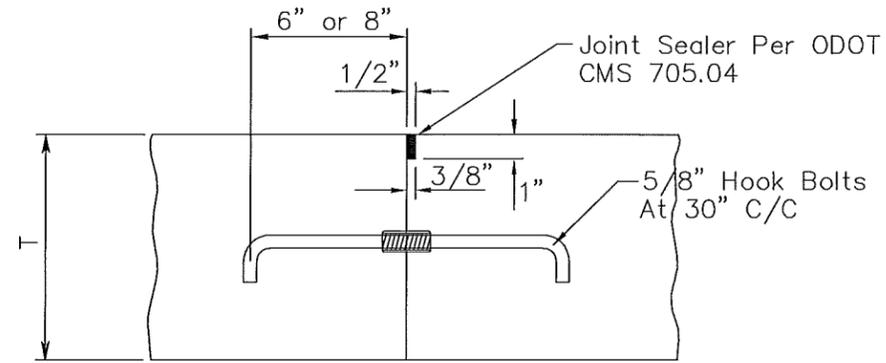
- (A) FACE OF CURB TO 24" WIDE PAID PER LF UNDER ITEM 609 – MONOLITHIC CURB
- (B) PAID AS CONCRETE WALK PER SF



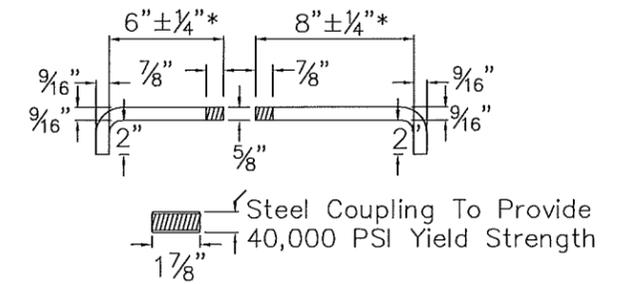
CITY OF TOLEDO CONSTRUCTION STANDARDS			
MONOLITHIC CURB & CONCRETE CURB WALL SECTION DETAILS			
DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	23
DATE: 3-14	DRAWING FILE: STANDARD-23.DWG		



EXPANSION JOINT - E

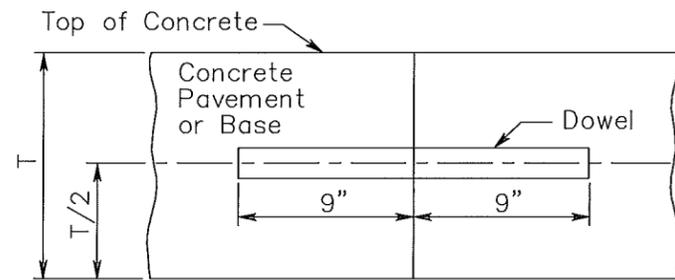


LONGITUDINAL JOINT - L

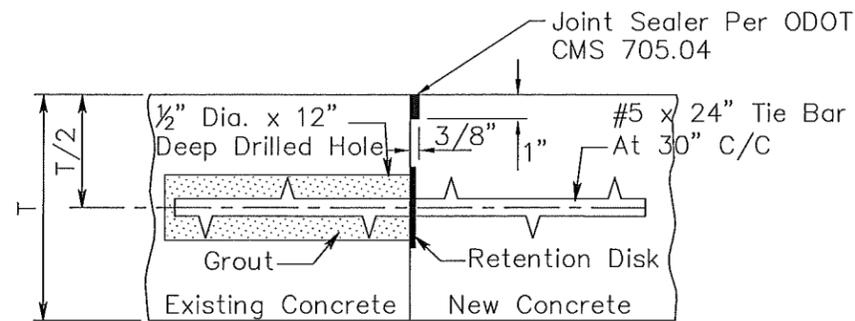


HOOK BOLT DETAIL

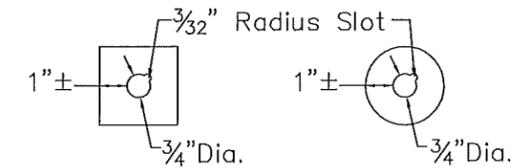
*Length As Specified



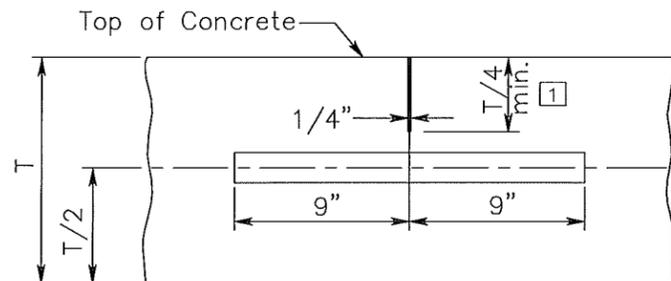
SECTION THROUGH CONSTRUCTION JOINT
CONSTRUCTION JOINT



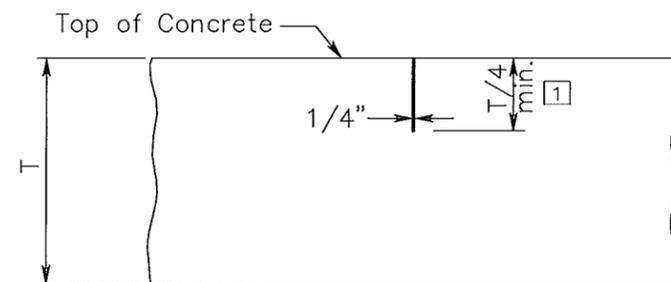
LONGITUDINAL JOINT - L
(DRILLED TIED)



NYLON OR PLASTIC
GROUT RETENTION DISCS
FOR DOWEL/TIE BARS



CONTRACTION JOINT W/ DOWELS - C



ITEM 452 and 305
CONTRACTION JOINT - C

LEGEND

1 Where T > 10", the sawcut depth shall be T/3.
If using early entry saws, cut joints 2 1/4" to 2 1/2" deep and 1/8" wide.

NOTES

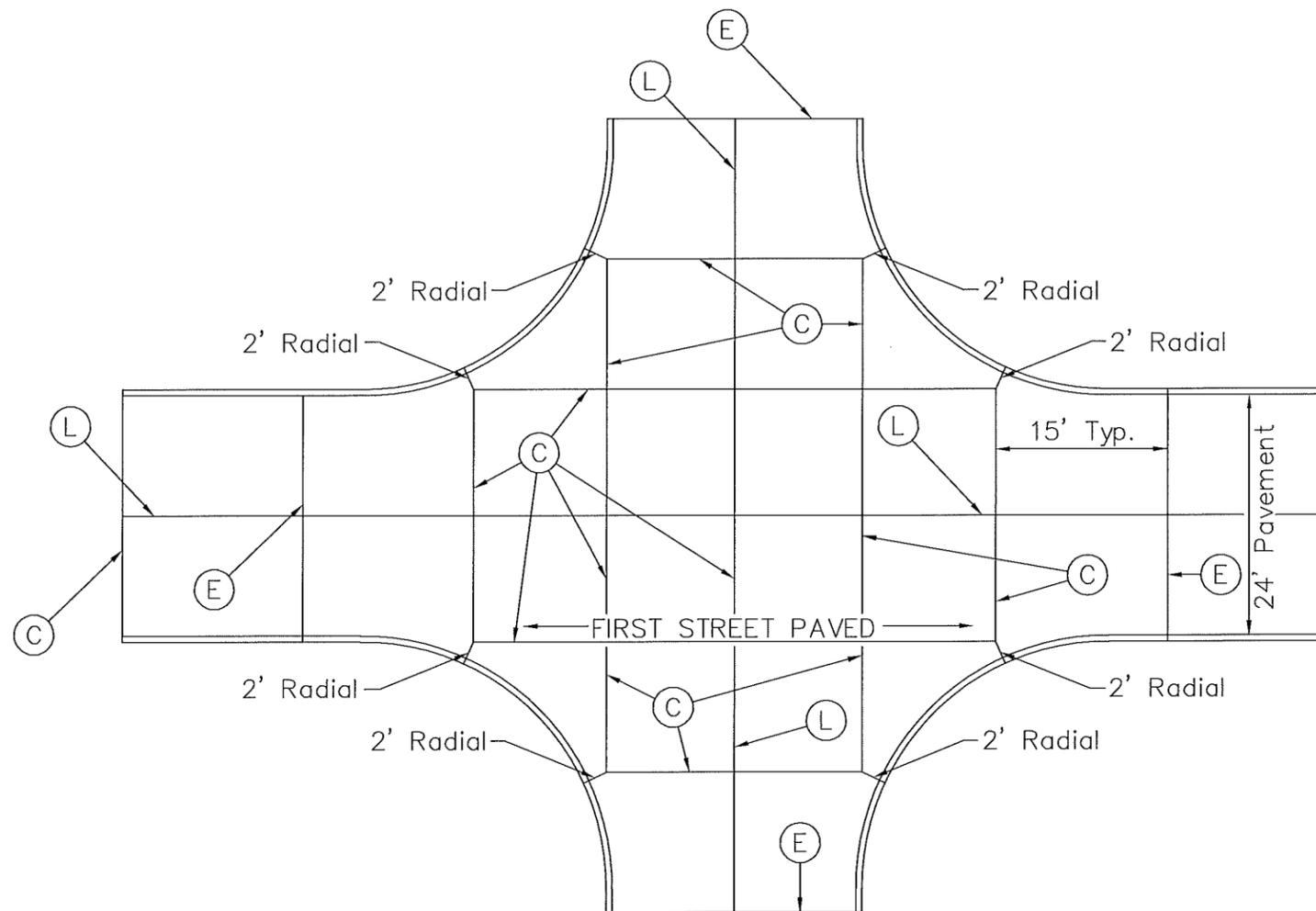
CONTRACTION JOINTS: Contraction joints in alleys, private drives, or commercial drives shall not be doweled.

EXPANSION JOINTS: Install Sleeves At Opposite Ends Of Adjacent Dowels. Dowels Shall Be Installed Per 451.09C.

Refer To ODOT CMS Item 451 For Dowel Sizing And Spacing.

(DRILLED TIED LONGITUDAL) JOINT: Type L Joints Shall Be Constructed In Accordance With CMS 255.05. The Nylon or Plastic Retention Disc Shall Be Clear or Opaque White In Color. Grout Shall Meet The Requirements of CMS 255.02. 5/8" Expansion Anchors, FF-S-325, Group VIII, Type I of Group II Type 4, Class 1 May Be Used In Lieu Of The #5 x 24" Deformed Bar And Shall Be Installed According To The Manufacturer's Recommendations.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
CONCRETE PAVEMENT JOINT DETAILS			
DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	24
DATE: 11-14	DRAWING FILE: STANDARD-24.DWG		



- (L) - Longitudinal Center Joint
- (E) - Expansion Joint
- (C) - Contraction Joint

NOTES:

Transverse Contraction Joints Shall Be Placed At 15' Maximum Spacing Or As Directed By The Engineer.

On Multilane Facilities Longitudinal Joints Shall Be Placed On Lane Lines As Well As The Typical Centerline As Shown.

When Concrete Pavement Is Placed Abutting Existing Concrete Pavement, Hook Bolts With Self Drilling Anchors Shall Be Inserted In The Existing Pavement At 30" Intervals Along The Joint.

Self Drilling Anchors May Be Of The Flush-End Type Or Of The Snap-off Chuck End Type Conforming To Federal Specifications No. FF-S-325 Group III, Type 1 (a) Or (c) Except For The Outside Diameter Of The Anchor. The Hook Bolt Shall Be Used To Complete The Assembly. Unless Otherwise Required, Expansion Anchors And Bolts Shall Be Placed At 30 Inches c/c.

1/2" Preformed Expansion Joint Will Be Placed At The End Of Radius For All Concrete Curb Or Curb And Gutter.

Cost To Be Included In The Appropriate 305 Or 450 Bid Item.

If Angle Of Intersecting Streets Is Less Than 85° The Layout Must Be Detailed On The Plan.

Expansion Joints To Be Located As Shown On Plan.

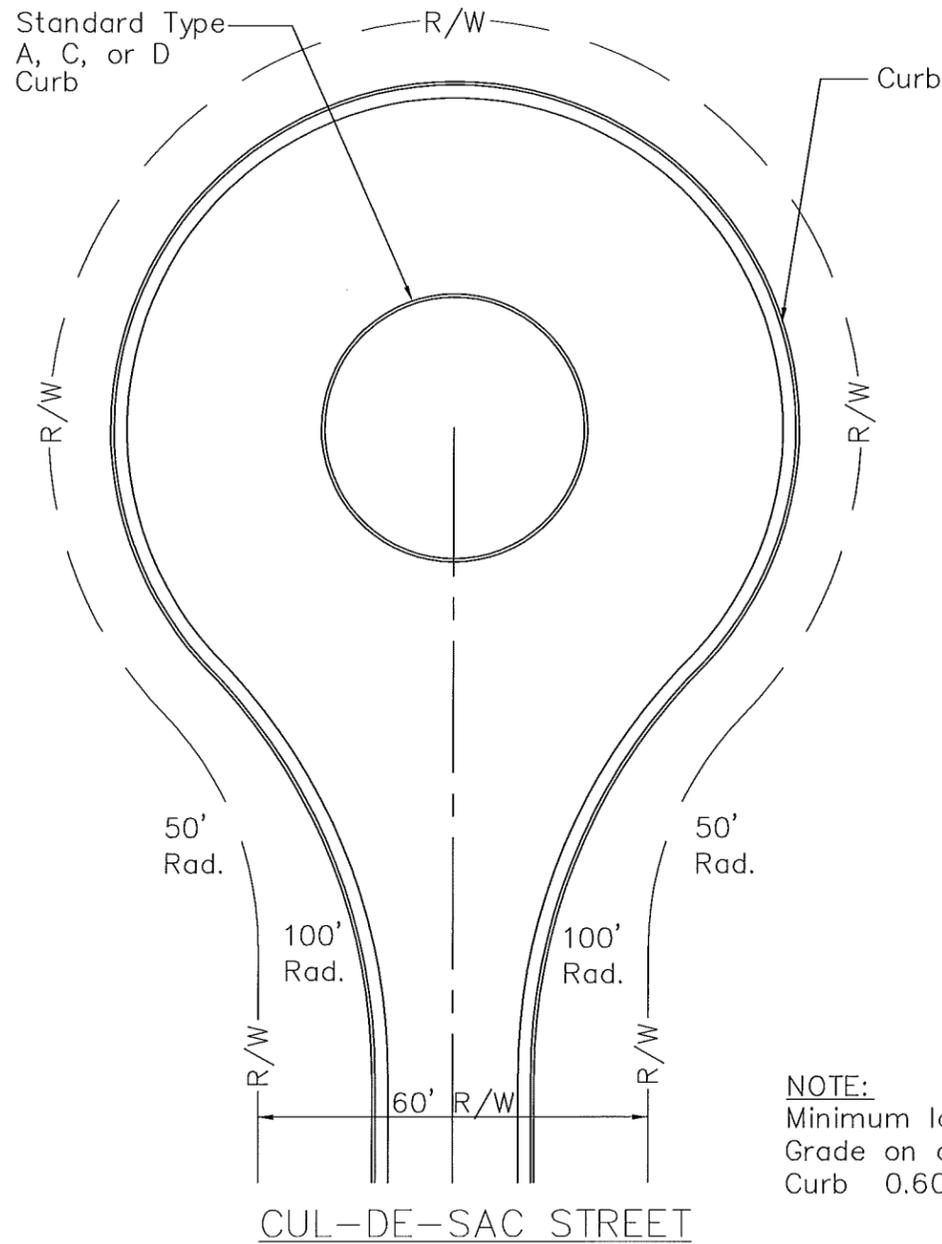
Joints Shall Be Cut As Soon As Possible After Placement Of Concrete. The Area Of Concrete Disturbed By The Cutting Operation Shall Be Resprayed With Curing Compound Immediately After Removing Cutting Equipment From Pavement.

CITY OF TOLEDO
CONSTRUCTION STANDARDS

PLAIN CONCRETE PAVEMENT JOINT LAYOUT

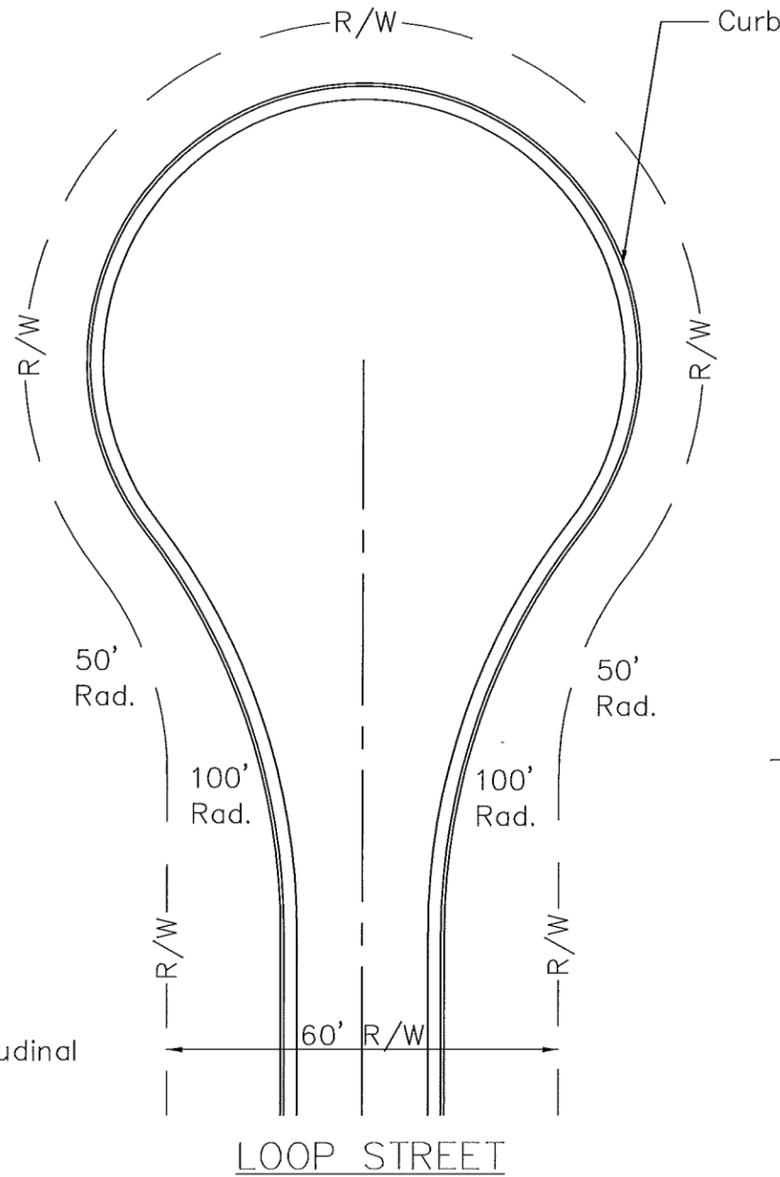
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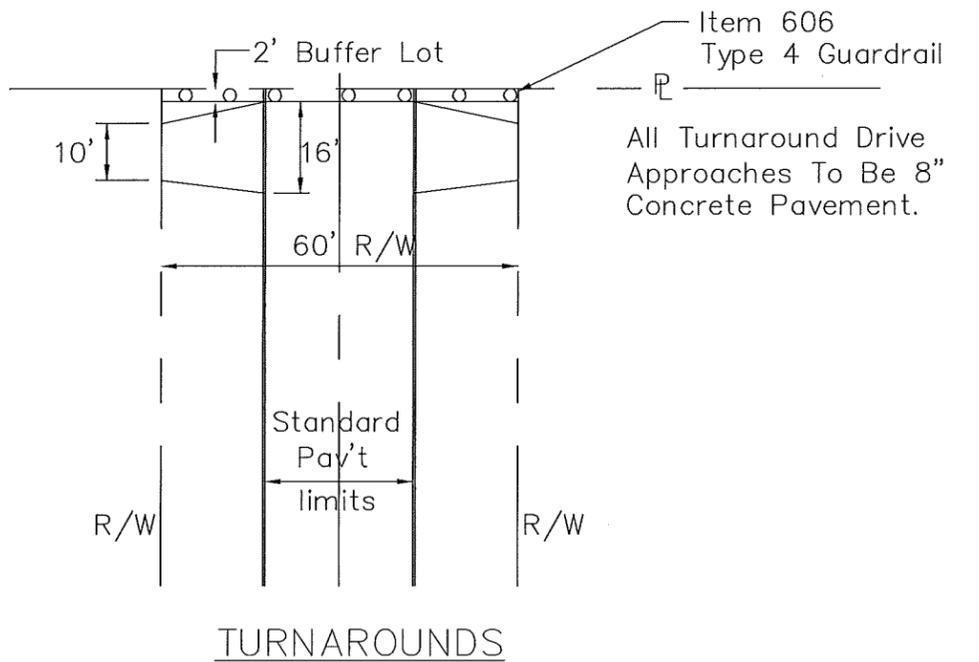
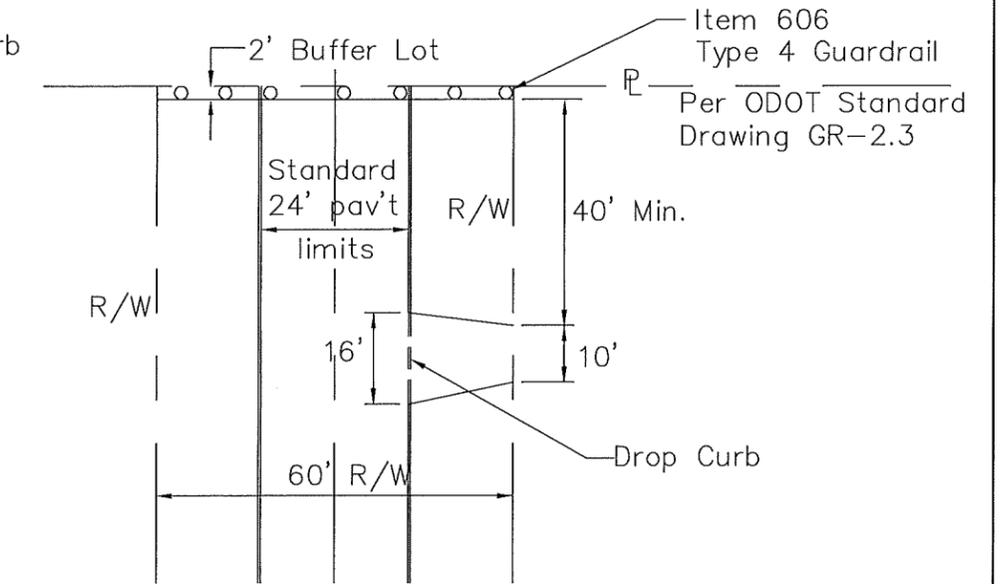


CUL-DE-SAC STREET

NOTE:
Minimum longitudinal
Grade on outer
Curb 0.60%



LOOP STREET

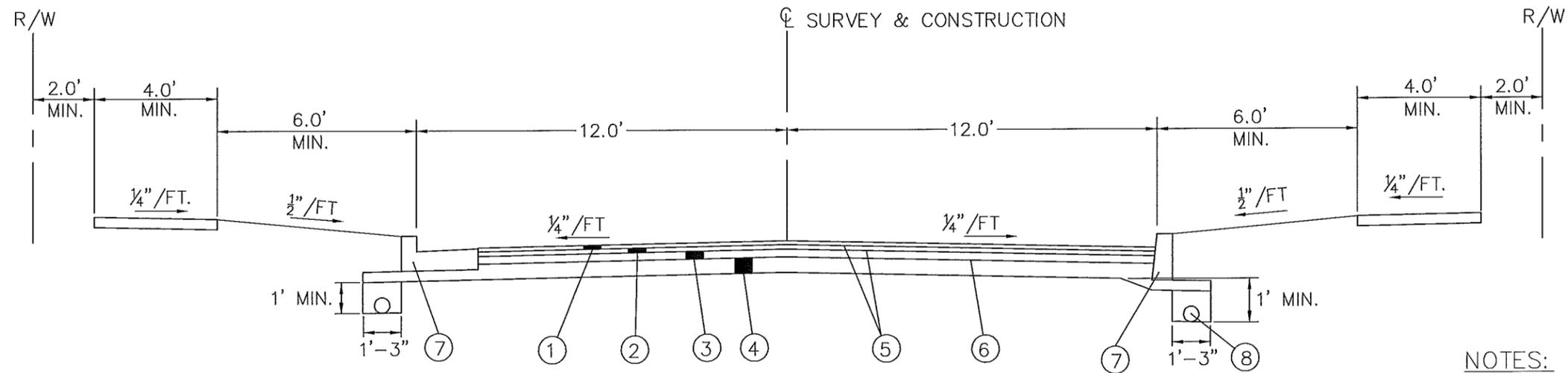


TURNAROUNDS

STREET DESIGN STANDARDS FOR CUL-DE-SAC AND LOOP STREETS	
RIGHT-OF-WAY (FEET)	60'
PAVEMENT WIDTH (FEET)	27' (LOOP STREETS)* 33' (CUL-DE-SAC)*
MINIMUM STOPPING SIGHT DISTANCE (FEET)	250'
MAXIMUM GRADE	5%
MAXIMUM CUL-DE-SAC LENGTH (FEET)	600'
MAXIMUM CUL-DE-SAC CENTER ISLAND RADIUS (FEET)	20'
MINIMUM CUL-DE-SAC RADIUS (PAVEMENT IN ISLAND)	53' TO BACK OF CURB
MINIMUM CUL-DE-SAC RADIUS (PAVEMENT WITHOUT ISLAND)	42.5' TO BACK OF CURB
MINIMUM CENTER LINE RADIUS OF STREETS WITH AN ANGLE TURN OF:	
(1) BETWEEN 80 AND 100	105'
(2) LESS THAN 80 OR MORE THAN 100	105'

*BACK OF MOUNTABLE CURB TO MOUNTABLE CURB, 2½ FEET – PAVEMENT 22 FEET FOR LOOP STREETS, PAVEMENT 30 FEET FOR CUL-DE-SACS.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
RESIDENTIAL CUL-DE-SAC & TURNAROUNDS			
DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	26
DATE: 2-12	DRAWING FILE: STANARD-26.DWG		

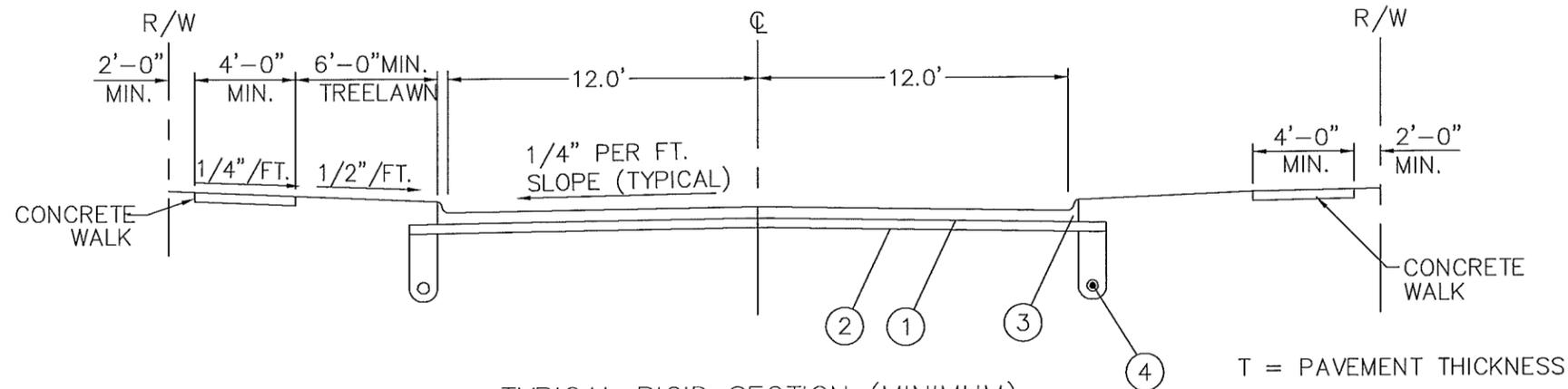


MINIMUM FLEXIBLE PAVEMENT TYPICAL SECTION

- ① ITEM 441 ~ 1-1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE 1 (446)
OR
ITEM 424 ~ 3/4" FINE GRADED POLYMER ASPHALT CONCRETE
- ② ITEM 441 ~ 1 3/4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 1 (446)
- ③ ITEM 301 ~ ASPHALT BASE, 3"
- ④ ITEM 304 ~ AGGREGATE BASE, 6"
- ⑤ ITEM 407 ~ TACK COAT
- ⑥ ITEM 408 ~ PRIME COAT
- ⑦ ITEM 609 ~ CONCRETE CURB & GUTTER, TYPE B
OR
ITEM 609 ~ CONCRETE CURB, TYPE A
- ⑧ ITEM 605 ~ 6" SHALLOW PIPE UNDERDRAIN PER 707.31 W/ SOCK

NOTES:

1. PAVEMENT SECTION DESIGNS SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT ODOT PAVEMENT DESIGN & REHABILITATION MANUAL.
2. ALL RESIDENTIAL STREETS SHALL BE CONSTRUCTED USING TYPE B CURB & GUTTER OR TYPE F MOUNTABLE CURB & GUTTER WITH FLEXIBLE PAVEMENT.
3. ALL RESIDENTIAL STREETS SHALL BE CONSTRUCTED USING INTEGRAL CURB TYPE C OR MOUNTABLE INTEGRAL CURB TYPE E WITH CONCRETE PAVEMENT.
4. THE MINIMUM AND TYPICAL RESIDENTIAL STREET WIDTH SHALL BE 24' WIDE AS MEASURED FROM FACE OF CURB TO FACE OF CURB. DESIGN WITH WIDTHS GREATER THAN 24' SHALL BE APPROVED ON A CASE BY CASE BASIS.



TYPICAL RIGID SECTION (MINIMUM)

- ① 452 PLAIN CONCRETE PAVEMENT (8"MIN.)
- ② 304 AGGREGATE BASE (4"MIN.)
- ③ 609 CONCRETE INTEGRAL CURB
- ④ 605 6" SHALLOW PIPE UNDERDRAIN W/SOCK OR TRENCH WRAP (AS REQUIRED)

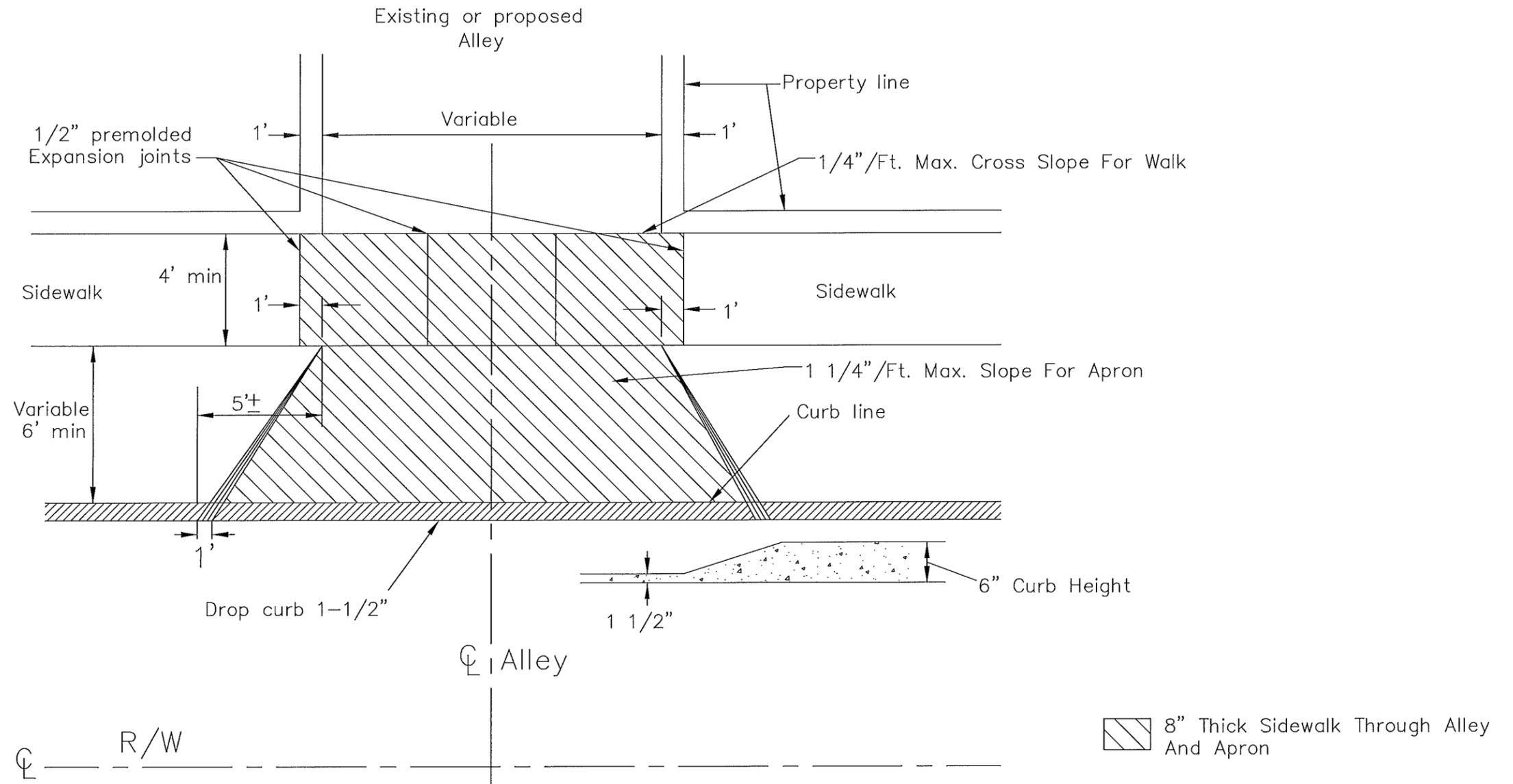
T = PAVEMENT THICKNESS

CITY OF TOLEDO
CONSTRUCTION STANDARDS

TYPICAL RESIDENTIAL PAVEMENT SECTIONS

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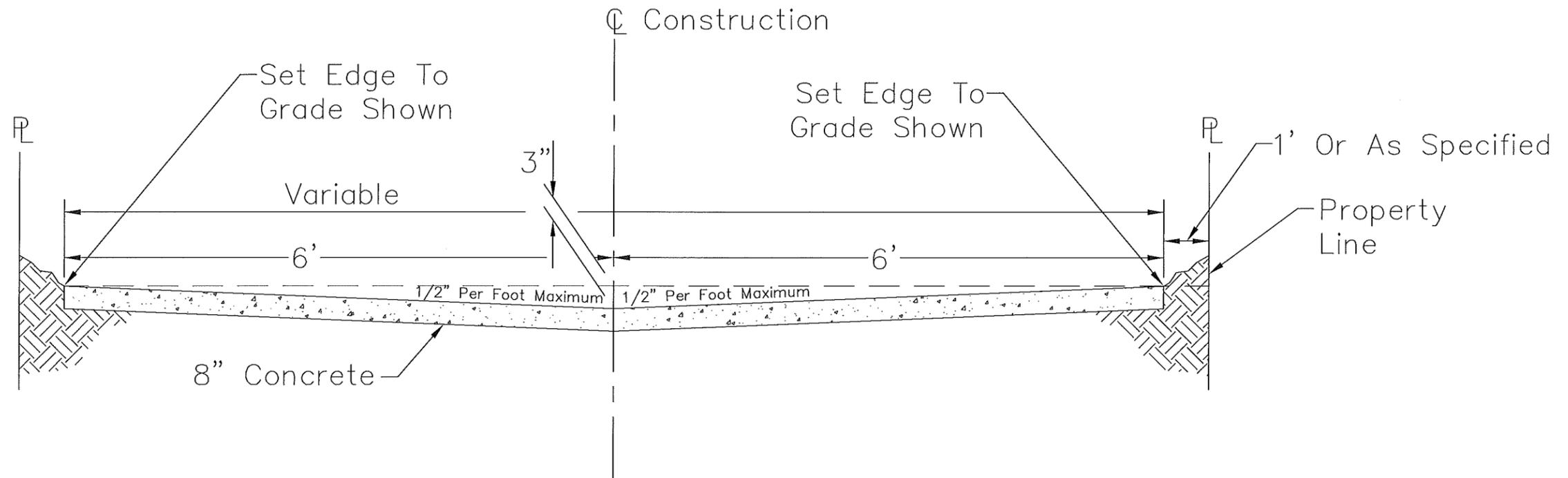
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ALLEY RETURN DETAIL
8" ITEM 452 PLAIN CONCRETE PAVEMENT

CITY OF TOLEDO CONSTRUCTION STANDARDS			
ALLEY RETURN DETAIL			
DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	28
DATE: 3-14	DRAWING FILE: STANDARD-28.DWG		

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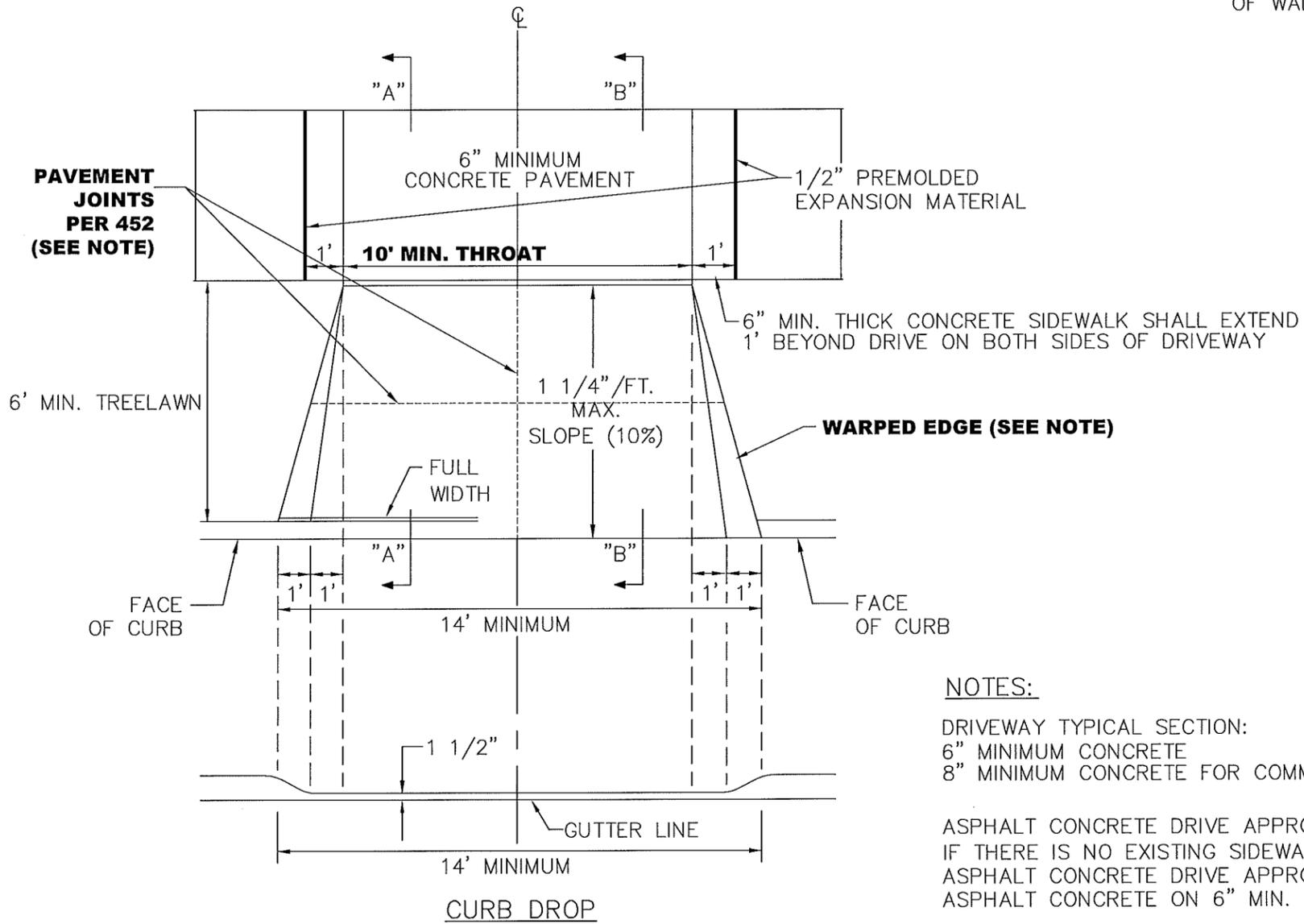


NOTE:

Expansion Joints Shall Be Placed At The Ends Of Alley Pavements Where They Butt Up To Alley Approach. Contraction Joints Shall Be Placed Every 15' And/Or As Directed By The Engineer.

TYPICAL ALLEY SECTION
8" ITEM 452- PLAIN CONCRETE PAVEMENT

CITY OF TOLEDO CONSTRUCTION STANDARDS			
TYPICAL ALLEY SECTION			
DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	29
DATE: 2-14	DRAWING FILE: STANDARD-29.DWG		



6' MIN. TREELAWN

FULL WIDTH

FACE OF CURB

FACE OF CURB

CURB DROP

1 1/4" / FT. MAX. SLOPE (10%)

WARPED EDGE (SEE NOTE)

14' MINIMUM

14' MINIMUM

10' MIN. THROAT

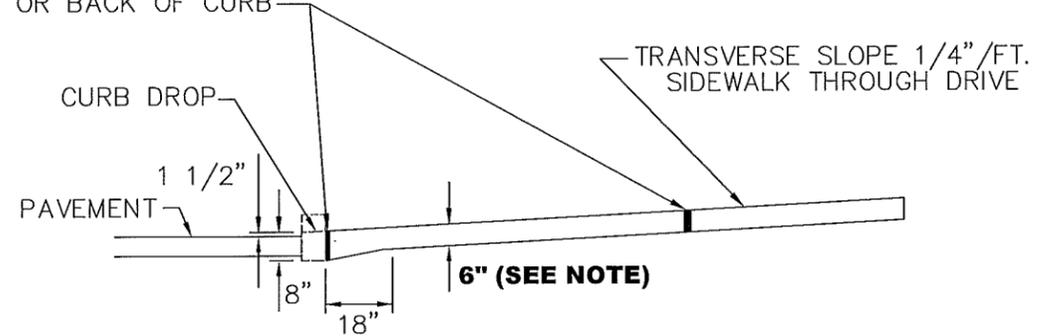
6" MINIMUM CONCRETE PAVEMENT

1/2" PREMOLDED EXPANSION MATERIAL

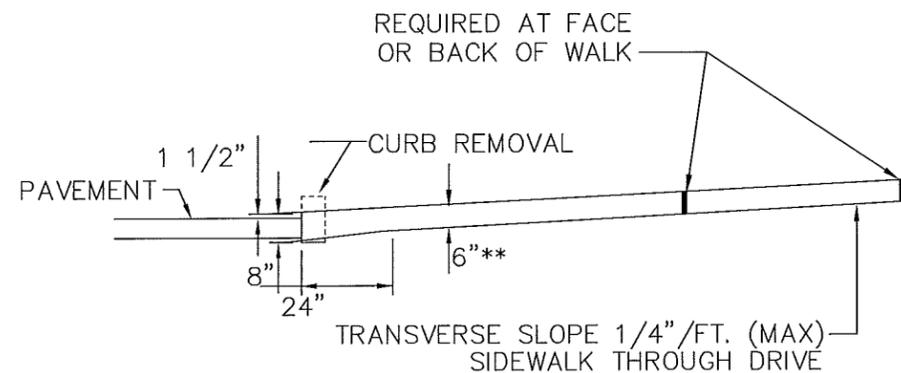
6" MIN. THICK CONCRETE SIDEWALK SHALL EXTEND 1' BEYOND DRIVE ON BOTH SIDES OF DRIVEWAY

PAVEMENT JOINTS PER 452 (SEE NOTE)

1/2" PREMOLDED EXPANSION MATERIAL REQUIRED AT EITHER FACE OF WALK OR BACK OF CURB



CURB AND DRIVE POURED SEPARATELY SECTION "A-A"



INTEGRAL CURB AND DRIVE SECTION "B-B"

NOTES:

DRIVEWAY TYPICAL SECTION:
6" MINIMUM CONCRETE
8" MINIMUM CONCRETE FOR COMMERCIAL DRIVES

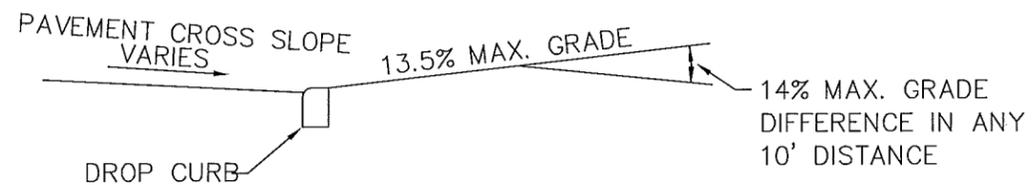
ASPHALT CONCRETE DRIVE APPROACH MAY BE ALLOWED, IF THERE IS NO EXISTING SIDEWALK AND/OR CURB
ASPHALT CONCRETE DRIVE APPROACH SHALL BE 2" MIN.
ASPHALT CONCRETE ON 6" MIN. AGGREGATE BASE.

THE WARPED EDGE IN THE DRIVE APPROACH SHALL BE SIMILAR TO TYPE "E" MOUNTABLE CURB AND SHALL TAPER TO 0" AT THE FACE OF THE SIDEWALK.

NO HORIZONTAL SAW CUTTING OF CURB WILL BE ALLOWED.
PROVIDE A FINAL LIGHT BROOM FINISH.

IF DRIVEWAY THROAT OR TREELAWN LENGTH IS >10 FT. PROVIDE EVENLY SPACED PAVEMENT JOINTS AS SHOWN OR AS DIRECTED BY THE ENGINEER.

WALKS SHALL BE POURED SEPARATE FROM DRIVES AND SHALL INCLUDE 1/2" EXPANSION JOINT.

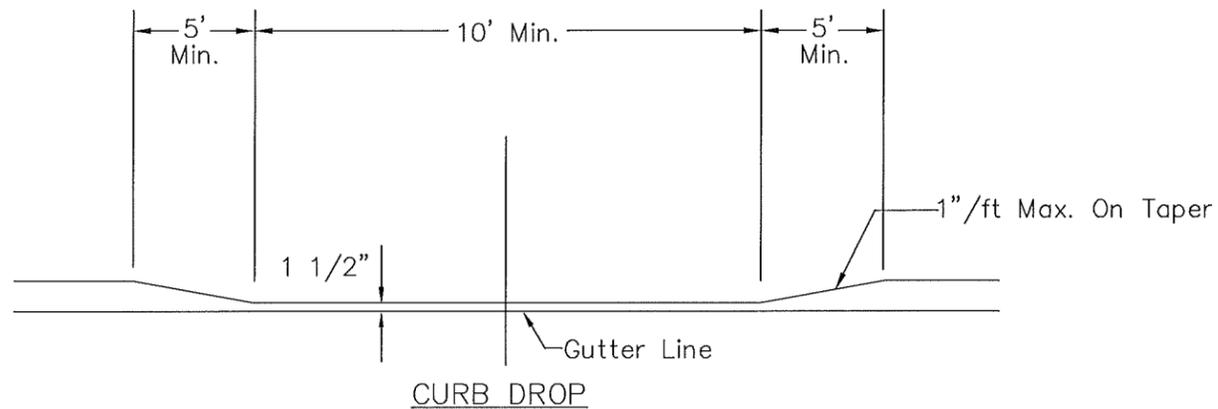


WITHOUT SIDEWALK

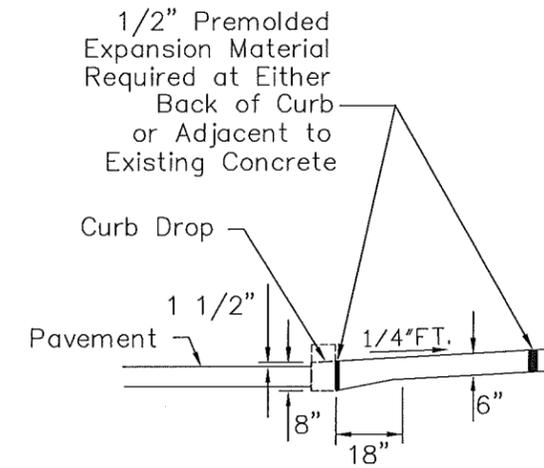
CITY OF TOLEDO
CONSTRUCTION STANDARDS

RESIDENTIAL DRIVEWAY DETAILS

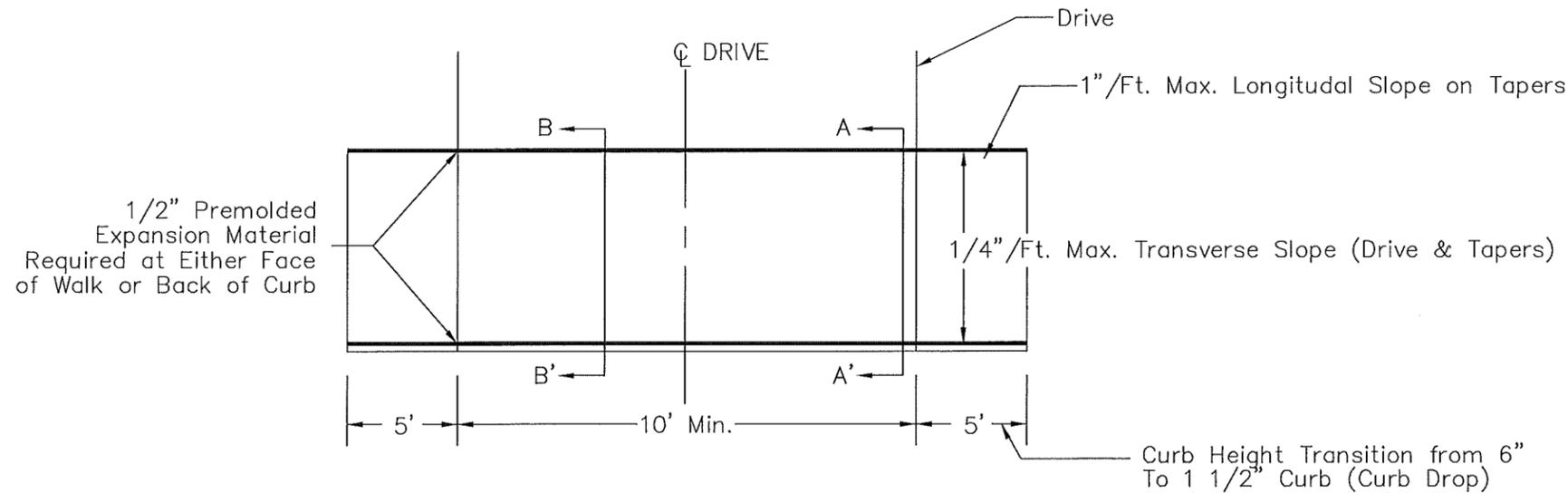
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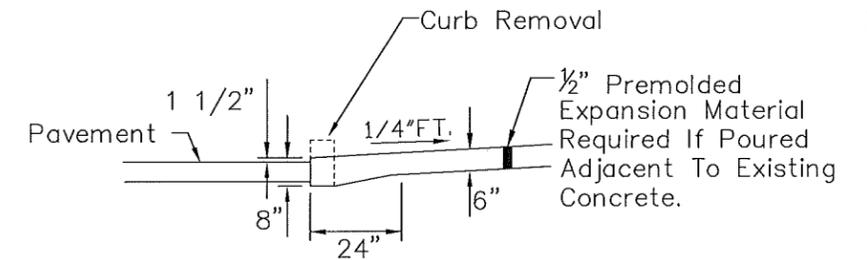
TYPICAL DRIVE REPLACEMENT, WALK AT BACK OF CURB



CURB AND DRIVE POURED SEPARATELY
SECTION "A-A"



TYPICAL DRIVE REPLACEMENT, WALK AT BACK OF CURB



INTEGRAL CURB AND DRIVE
SECTION "B-B"

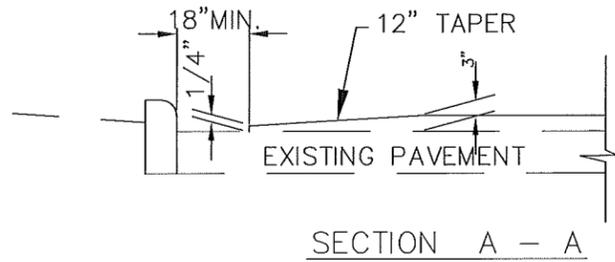
Note: Provide A Final Light Broom Finish

CITY OF TOLEDO
CONSTRUCTION STANDARDS

COMBINED SIDEWALK/DRIVEWAY DETAILS

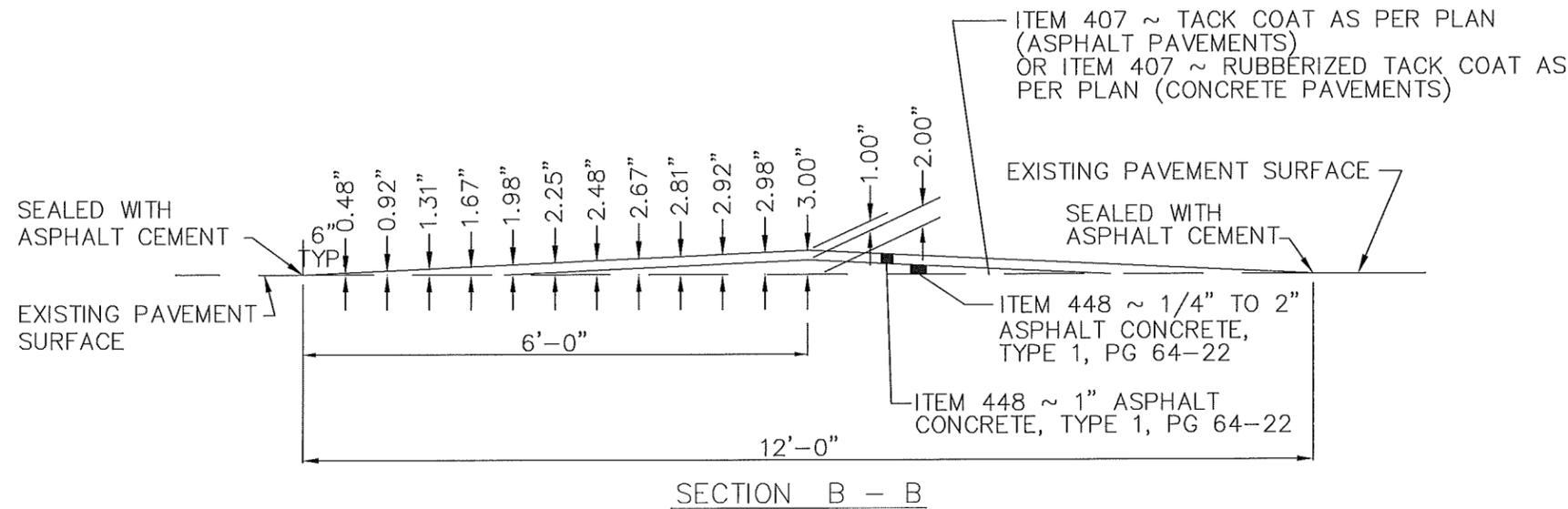
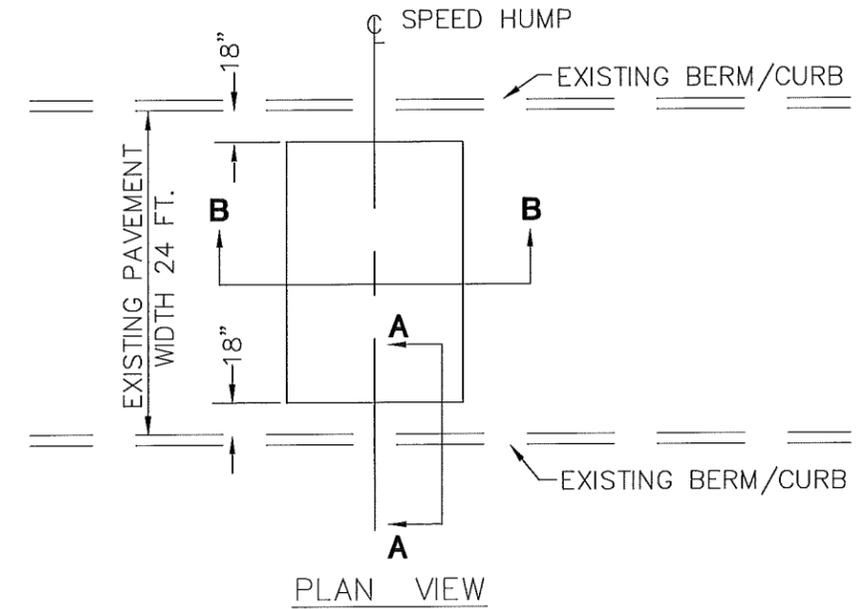
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DATE: 12-11	DRAWING FILE: STANADRD-31.DWG	

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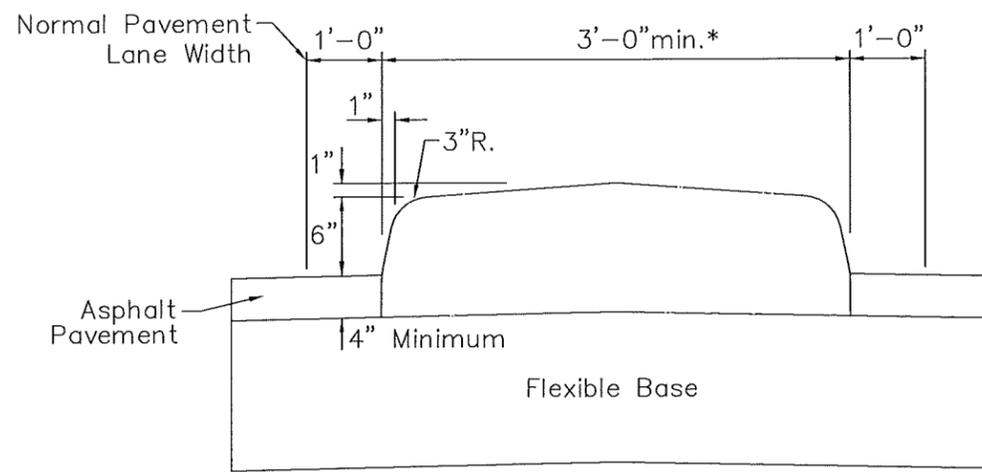
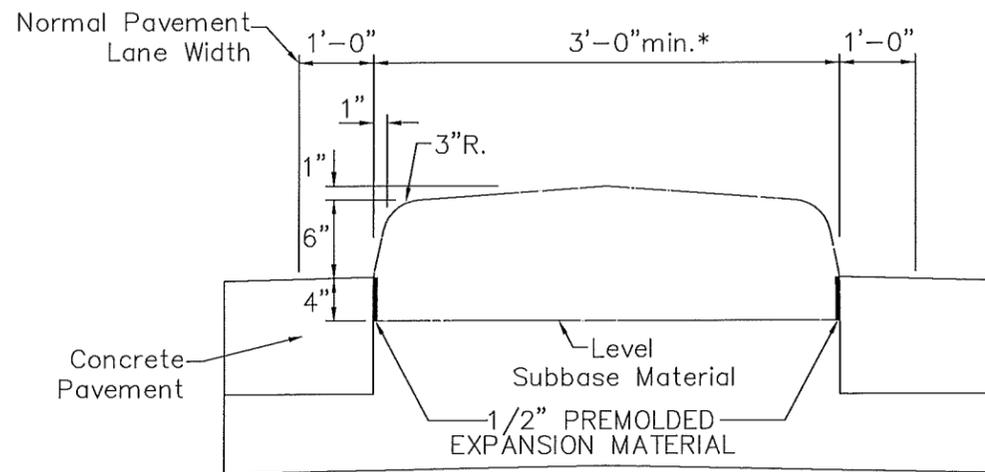


COSTS FOR ALL MATERIALS NECESSARY FOR FURNISHING AND PLACING SPEED HUMPS AS SPECIFIED HEREIN SHALL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM SPECIAL~SPEED HUMPS, AS PER PLAN (EACH).

BASIS OF PAYMENT



SPEED HUMP DETAIL



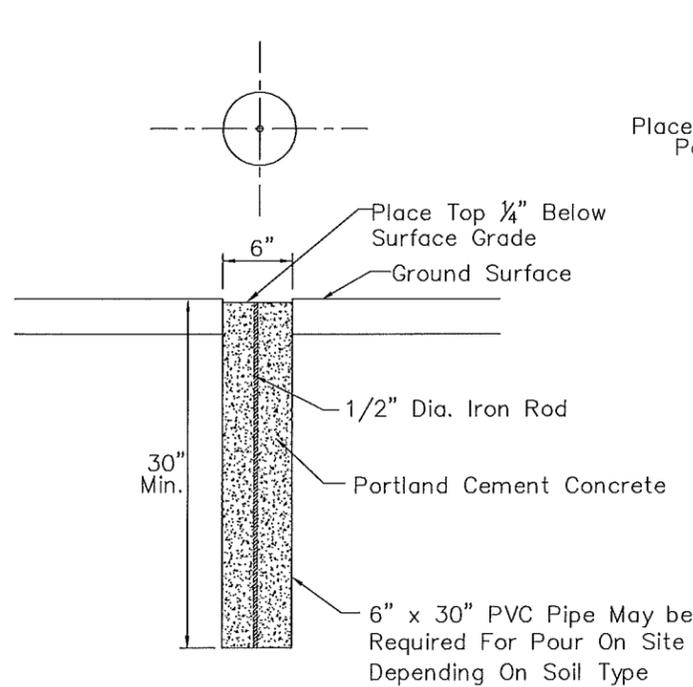
CONCRETE MEDIANS AND TRAFFIC ISLANDS

* For Medians Unless Otherwise Shown In The Plans

NOTES:

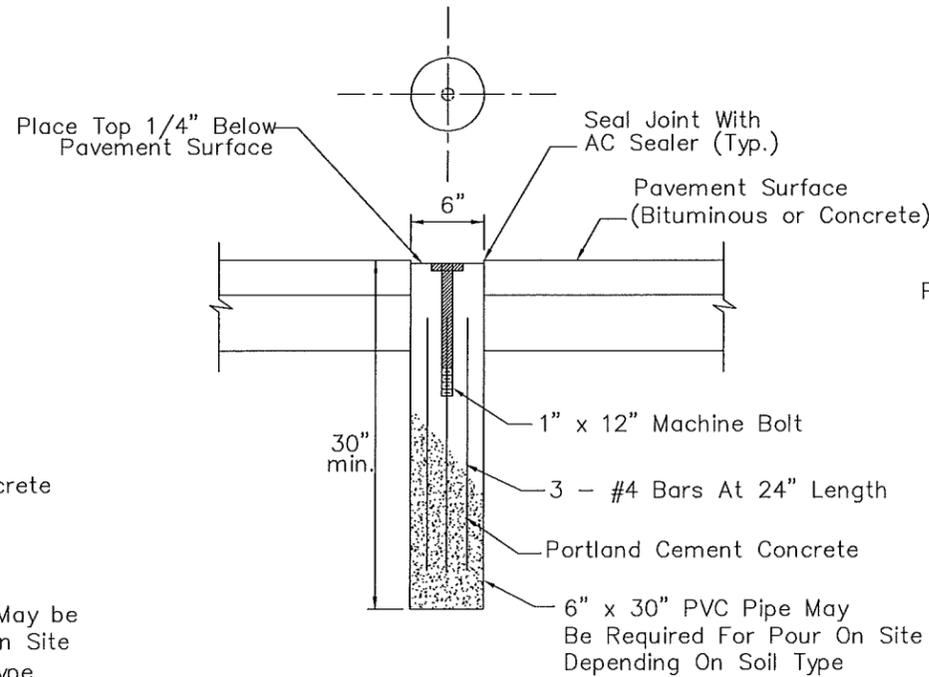
Joints: 1/4" Contraction Joints Shall Be Constructed At 10' Intervals In Accordance With Pertinent Provisions Of 609.06.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
SPEED HUMP DETAIL & ITEM 609 CONCRETE MEDIANS & TRAFFIC ISLANDS			
DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	32
DATE: 1-15	DRAWING FILE: STANDARD-32.DWG		

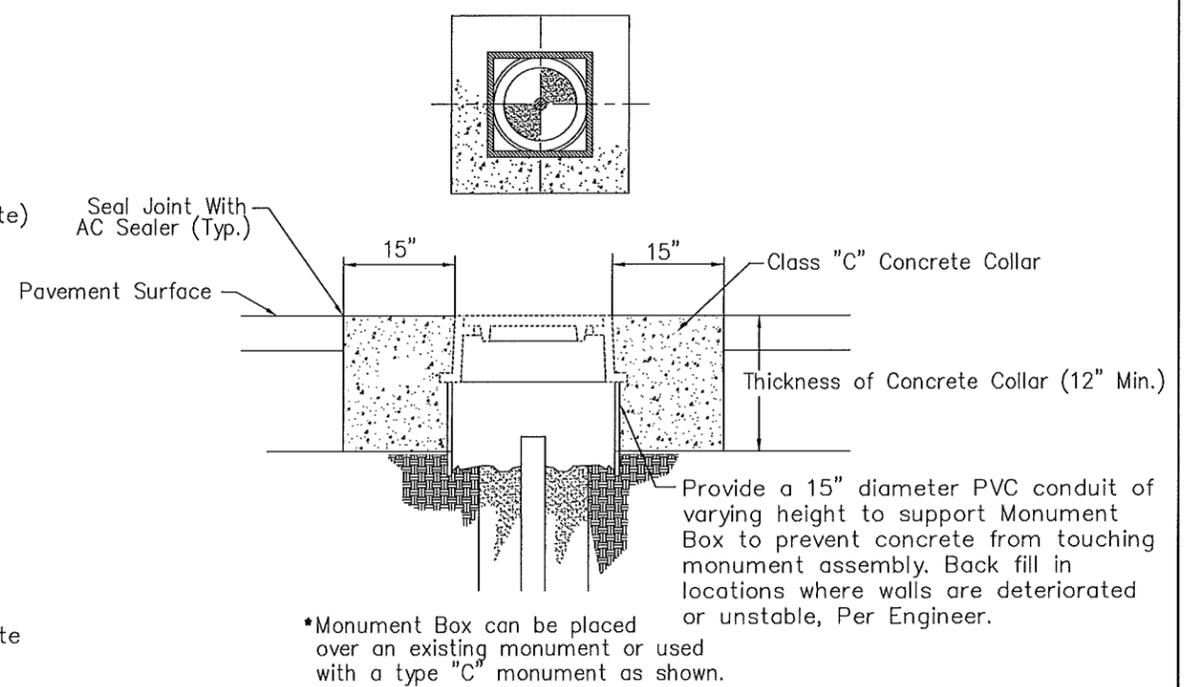


TYPE "A" MONUMENT

For Non Pavement Areas



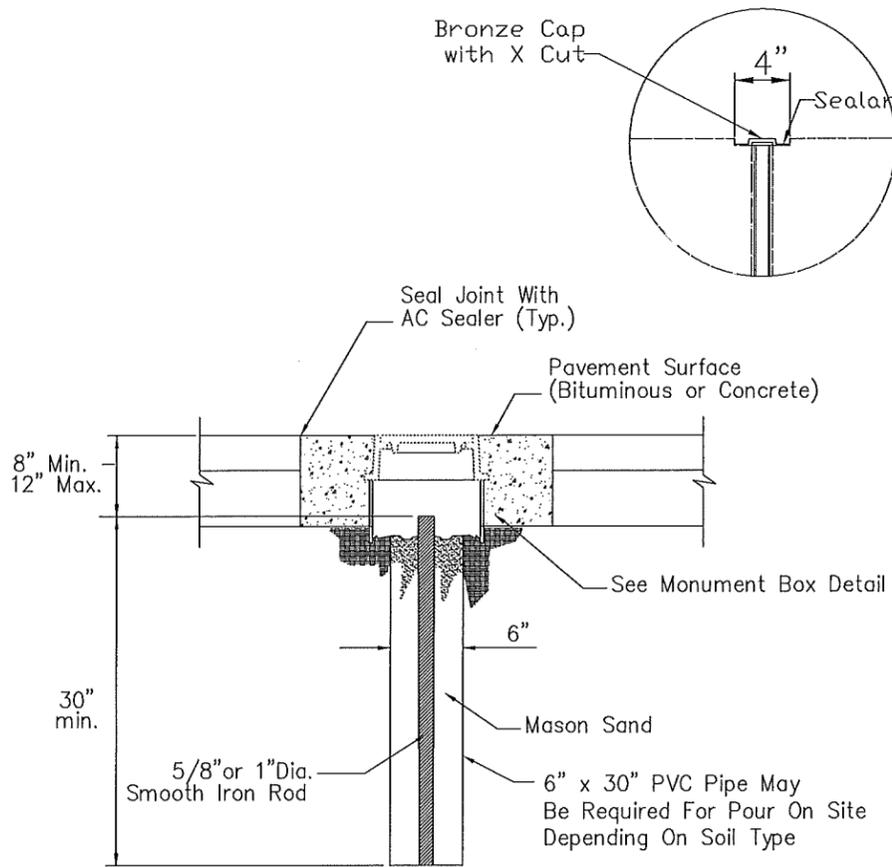
TYPE "B" MONUMENT



MONUMENT BOX ASSEMBLY DETAIL

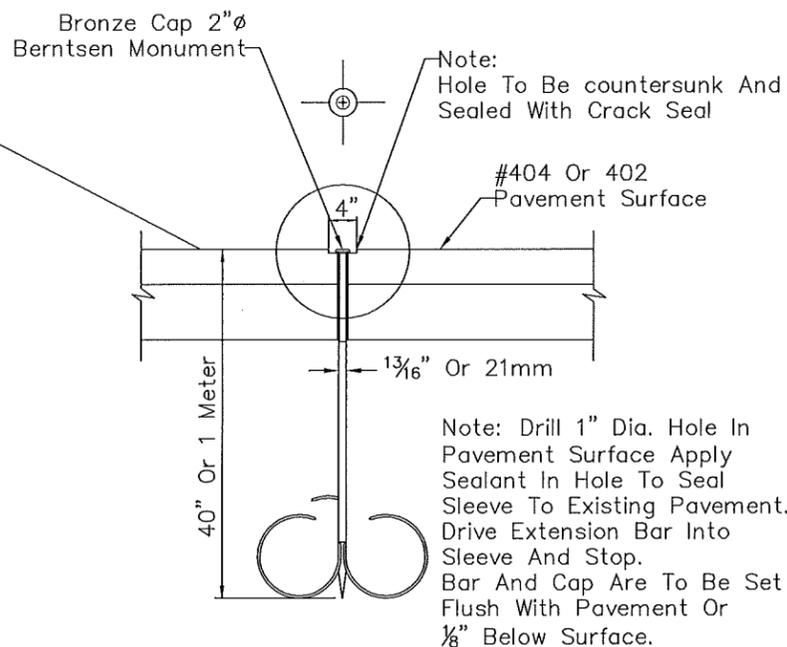
in pavement

East Jordan #8380, Neehah #R-1978-B Or Approved Equal For Monument Box Casting



TYPE "C" MONUMENT

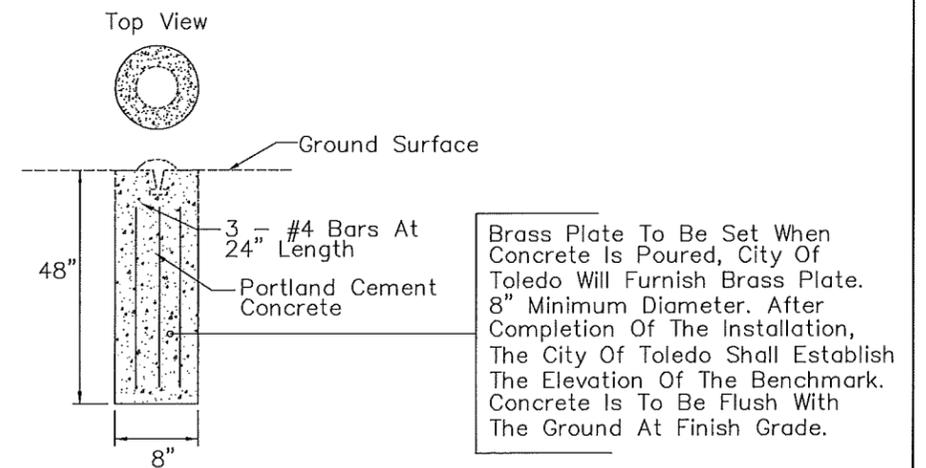
includes Monument Box Assembly, Per Detail This Sheet



TYPE "D" MONUMENT

FENO Anchored Survey Markers

Note:
Type "D" Monument Can Be Bought From:
Berntsen International, Inc.
PO Box 8670 - Madison, WI. 53708-8670 USA
Tel: 800-356-7388 - Fax: 800-249-9794 (North America)
Tel: +1 608.249.8549 - Fax: +1 608.249.9794
Email: www.surveymark@berntsen.com



BENCHMARK DETAIL

Note: New Benchmark Disc shall be set on all new bridge projects.
New disc location shall be as directed by the City's Chief Surveyor.

**CITY OF TOLEDO
CONSTRUCTION STANDARDS**

**BENCHMARK DETAIL,
MONUMENT AND MONUMENT BOX
ASSEMBLY DETAIL**

DRAWN BY:	DESIGNED BY:	SCALE:	33
	R.A.B.	NO SCALE	
DATE:	DRAWING FILE:		
3-14	STANDARD-33.DWG		

FIGURE 1-A: PERPENDICULAR CURB RAMPS

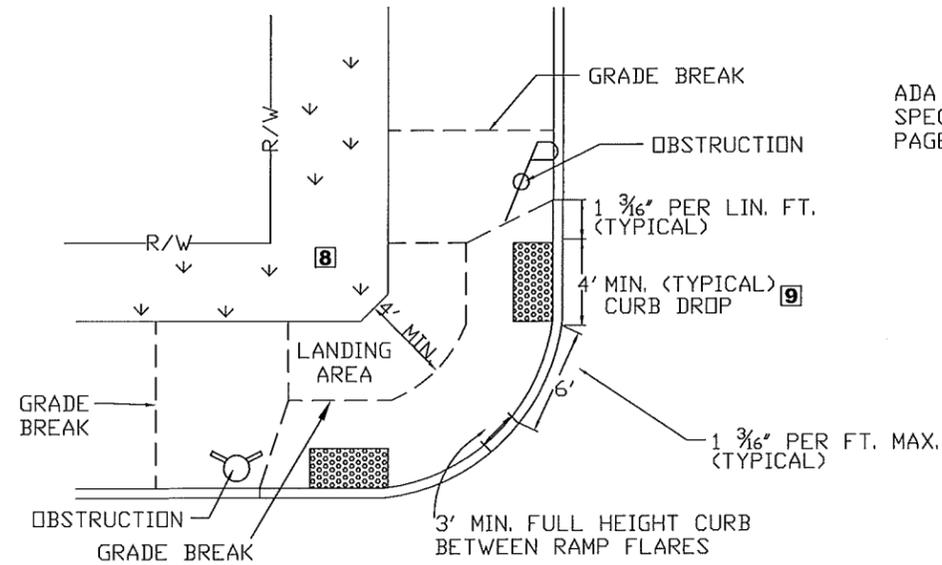


FIGURE 1-B: PERPENDICULAR CURB RAMPS

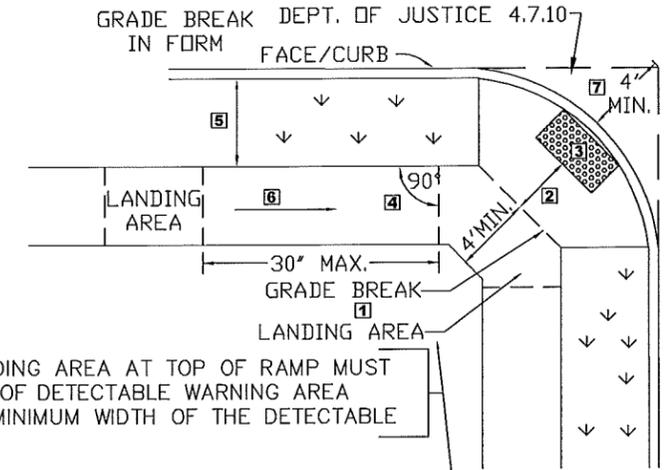
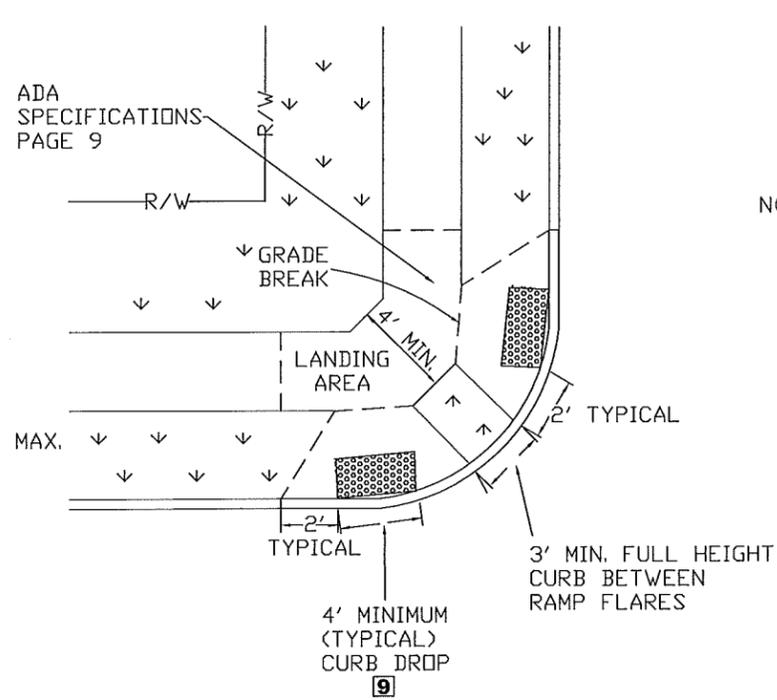


FIGURE 1-C: DIAGONAL CURB RAMPS

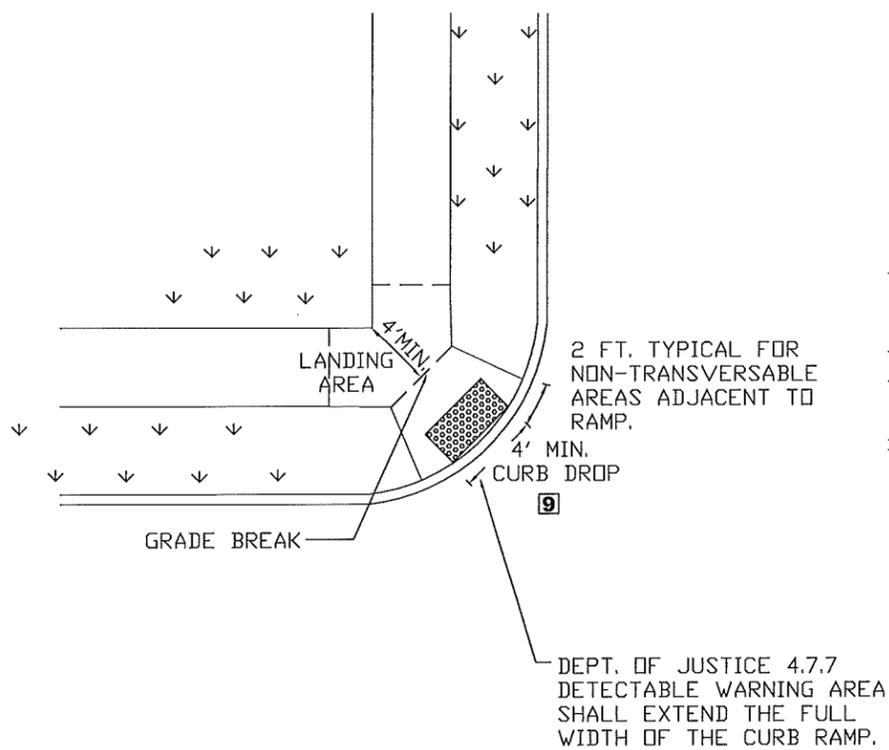
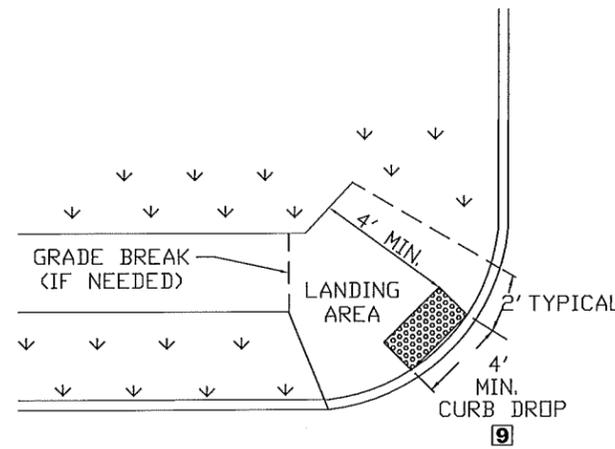


FIGURE 1-D: DIAGONAL CURB RAMPS



DEPARTMENT OF JUSTICE 4.7.2
MAXIMUM SLOPES OF ADJOINING GUTTERS AND/OR ROAD SURFACE IMMEDIATELY ADJACENT TO THE CURB RAMP OR ACCESSIBLE ROUTE SHALL NOT EXCEED 1:20.

NOTES:

- 1 GRADE BREAK FOR LANDING AREA AT TOP OF RAMP MUST BE PARALLEL TO BACK OF DETECTABLE WARNING AREA AND EXTENDED FOR A MINIMUM WIDTH OF THE DETECTABLE WARNING AREA.
- 2 DISTANCE BETWEEN BACK OF DETECTABLE WARNING AREA AND GRADE BREAK FOR LANDING AREA MAY VARY.
- 3 DETECTABLE WARNING DEVICE MUST BE ALIGNED PARALLEL TO BACK OF CURB OR PERPENDICULAR TO CURB RADIUS.
ALTERNATE DETECTABLE WARNING DEVICE ORIENTATION MAY BE ALIGNED PERPENDICULAR TO THE DIRECTION OF TRAVEL ONLY WHEN APPROVED BY THE CITY.
- 4 GRADE BREAK FOR LANDING AREA MUST START PERPENDICULAR TO MAIN LINE WALK.
- 5 DISTANCE BETWEEN BACK OF CURB AND FACE OF MAIN LINE WALK MAY VARY.
- 6 WHERE LONGITUDINAL SLOPE OF MAIN LINE WALK IS GREATER THAN 1/2" PER FT. BUT LESS THAN 1" PER FT., A SECOND LEVEL LANDING AREA ALONG THE MAIN LINE WALK IS REQUIRED AS SHOWN ABOVE, SAID LANDING AREA SHALL HAVE A 4' MINIMUM LENGTH AND EXTEND ACROSS FULL WIDTH OF WALK. MAXIMUM LENGTH OF RAMP SHALL BE 30'.
- 7 DISTANCE FROM FACE OF CURB AT CENTER OF RADIUS TO INTERSECTION OF EXTENDED FACE OF CURB LINES FOR EACH STREET MUST BE 4' MINIMUM TO INSTALL A MULTI-DIRECTIONAL RAMP. WHERE DISTANCE IS LESS THAN 4', 4', IT WILL BE NECESSARY TO INSTALL A SEPARATE RAMP FOR EACH STREET CROSSING.
- 8 RAMPS MUST BE PLACED INSIDE THE R/W LINE EXTENDED AND CURB LINE EXTENDED OR WITHIN A STRIPED CROSSWALK. REFER TO FIGURE 1-A.
- 9 FOR PERPENDICULAR CURB RAMPS, MAXIMUM CROSS SLOPE OF THE ADJOINING GUTTER AND/OR ROAD SURFACE IMMEDIATELY ADJACENT TO THE CURB DROP SHALL NOT EXCEED 1/2" PER FT. FOR DIAGONAL CURB RAMPS, MAXIMUM SLOPE OF THE ADJOINING GUTTER AND/OR ROAD SURFACE IMMEDIATELY ADJACENT TO THE CURB DROP SHALL NOT EXCEED 1/4" PER FT. IN ANY DIRECTION.

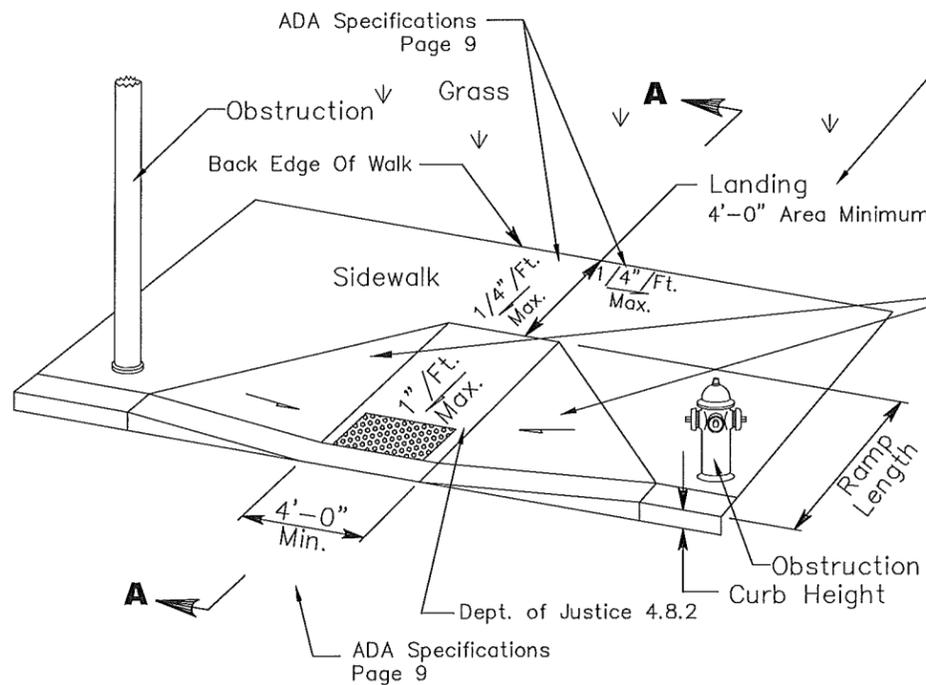
DEPT. OF JUSTICE FIGURE 16

SLOPE	MAX. RISE	MAX. RUN
1:12 TO 1:16	30"	30'
1:16 TO 1:20	30"	40'

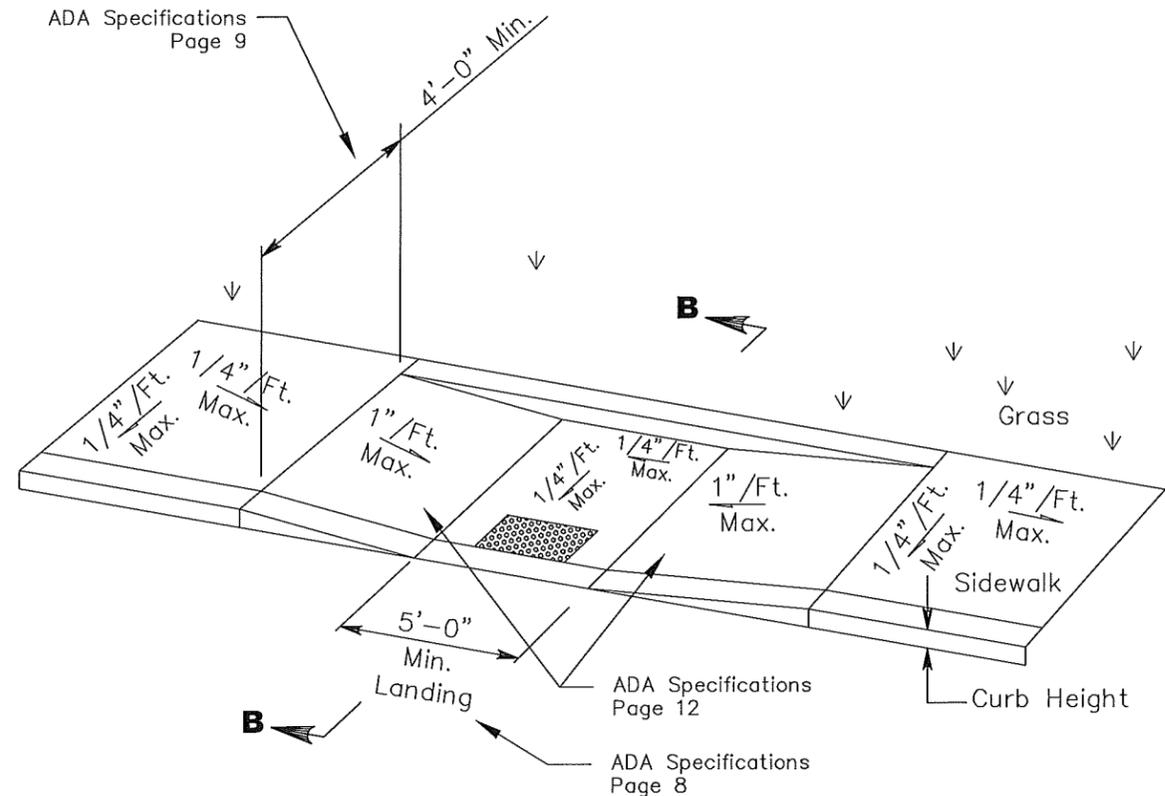
CITY OF TOLEDO
CONSTRUCTION STANDARDS

PEDESTRIAN CURB RAMPS
(SHEET 1 OF 3)

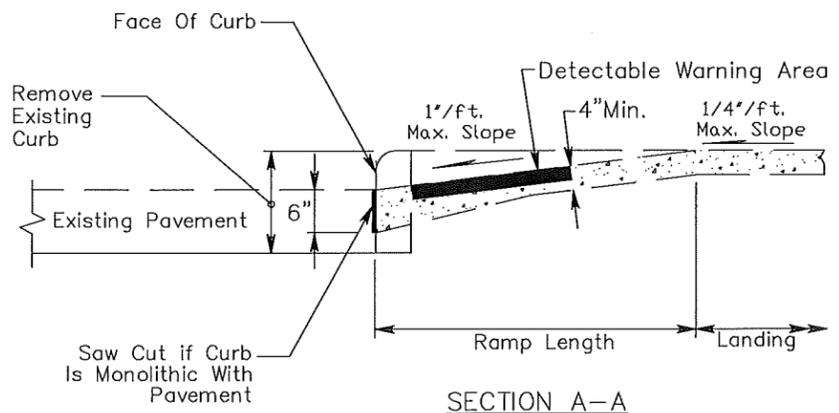
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DATE: 1-16	DRAWING FILE: STANDARD-34.DWG		



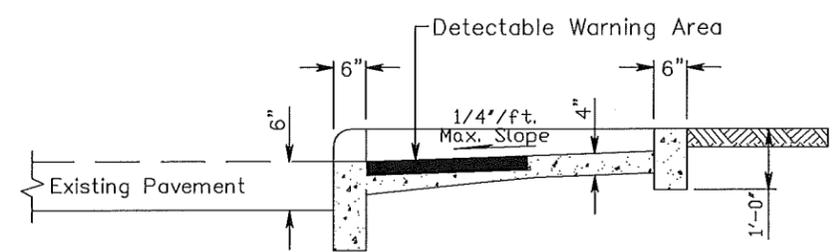
PERPENDICULAR RAMP AND SIDEWALK W/ OBSTRUCTION



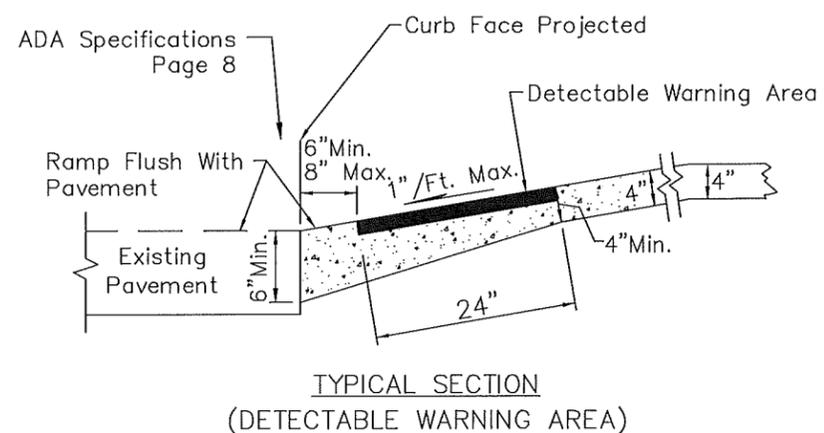
DOUBLE PARALLEL RAMP WITH SIDEWALK



SECTION A-A



SECTION B-B



TYPICAL SECTION (DETECTABLE WARNING AREA)

NOTES:

1. DETECTABLE WARNING AREA MUST BE 6" MIN. TO 8" MAX. FROM THE FACE OF CURB AND PARALLEL TO THE CURB.

DETECTABLE WARNING AREAS SHALL BE PLACED 6" FROM THE EDGE OF PAVEMENT. BOTH LONGITUDINAL AND TRANSVERSE SLOPES IN PEDESTRIAN WALK THROUGH SHALL NOT EXCEED 1/4" PER FT.

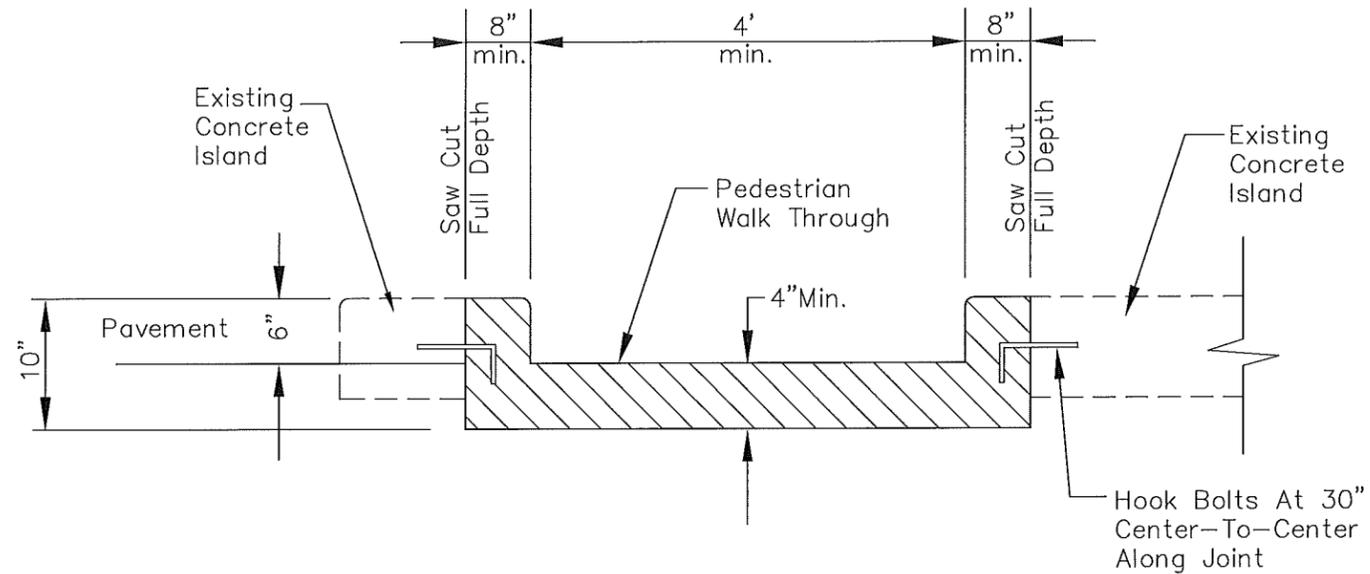
DEPARTMENT OF JUSTICE 4.29.2 DETECTABLE WARNING AREA: SHALL BE 24"x48" AND ORIENTED AS SHOWN IN THESE RAMP DETAILS. IT SHALL BE CAST IN PLACE SYSTEM AS MANUFACTURED BY ARMOR-TILE TACTILE SYSTEMS (RED BRICK COLOR), ADA SOLUTIONS, INC. (RED BRICK COLOR), OR APPROVED EQUAL. IT SHALL CONSIST OF RAISED TRUNCATED DOMES WITH A DIAMETER OF NOMINAL 0.9 IN. (23 MM), A HEIGHT OF NOMINAL 0.2 IN. (5 MM), AND A CENTER-TO-CENTER SPACING OF NOMINAL 2.35 IN. (60 MM).

2. CURB DROP THROUGH ENTIRE RAMP BOTTOM (WIDTH OF DETECTABLE WARNING AREA MUST BE FLUSH WITH THE ADJACENT PAVEMENT.

3. IF A 4 FOOT LANDING AREA CANNOT BE ACHIEVED, A LANDING AREA BETWEEN 3' AND 4' MAY BE USED AT THE DIRECTION OF THE ENGINEER PROVIDED FLARE SLOPES DO NOT EXCEED 1" PER FT.

4. PAYMENT: WALK AND CURB, ITEMS 608 AND 609, SHALL BE MEASURED THROUGH THE CURB RAMP AREA PAID FOR UNDER THEIR RESPECTIVE ITEMS. ITEM 608 - CURB RAMP EACH, SHALL INCLUDE THE COST OF ANY ADDITIONAL MATERIALS, DETECTABLE WARNING AREA, GRADING, FORMING, AND FINISHING. REMOVAL OF EXISTING CURB AND WALK SHALL BE PAID FOR UNDER ITEM 202.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
PEDESTRIAN CURB RAMPS (SHEET 2 Of 3)			
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DATE: 3-14	DRAWING FILE: STANDARD-35.DWG		



PEDESTRIAN WALK THROUGH CONCRETE TRAFFIC ISLAND

NOTES:

1. DETECTABLE WARNING AREA MUST BE 6" MIN. TO 8" MAX. FROM THE FACE OF CURB AND PARALLEL TO THE CURB.

DETECTABLE WARNING AREAS SHALL BE PLACED 6" FROM THE EDGE OF PAVEMENT. BOTH LONGITUDINAL AND TRANSVERSE SLOPES IN PEDESTRIAN WALK THROUGH SHALL NOT EXCEED 1/4" PER FT.

DEPARTMENT OF JUSTICE 4.29.2 DETECTABLE WARNING AREA: SHALL BE 24"x48" AND ORIENTED AS SHOWN IN THESE RAMP DETAILS. IT SHALL BE CAST IN PLACE SYSTEM AS MANUFACTURED BY ARMOR-TILE TACTILE SYSTEMS (RED BRICK COLOR), ADA SOLUTIONS, INC. (RED BRICK COLOR), OR APPROVED EQUAL. IT SHALL CONSIST OF RAISED TRUNCATED DOMES WITH A DIAMETER OF NOMINAL 0.9 IN. (23 MM), A HEIGHT OF NOMINAL 0.2 IN. (5 MM), AND A CENTER-TO-CENTER SPACING OF NOMINAL 2.35 IN. (60 MM).

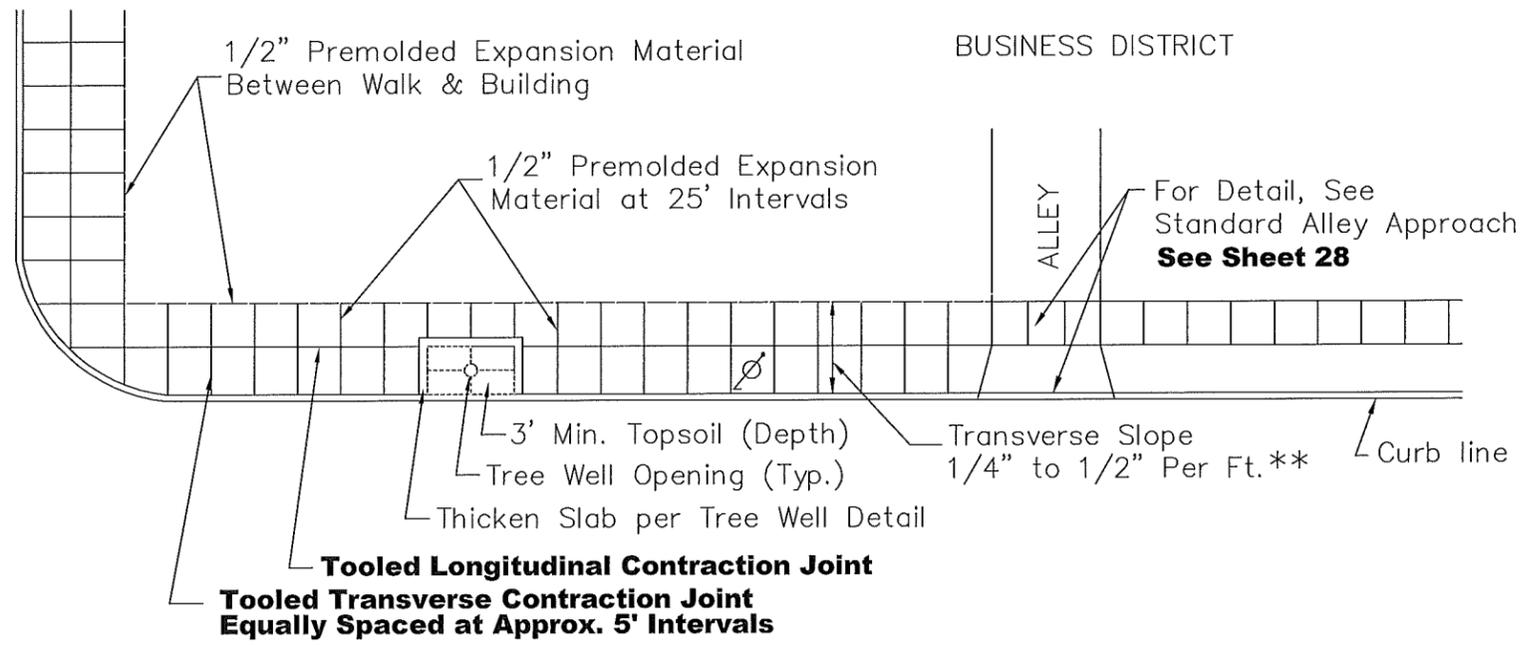
2. CURB DROP THROUGH ENTIRE RAMP BOTTOM (WIDTH OF DETECTABLE WARNING AREA MUST BE FLUSH WITH THE ADJACENT PAVEMENT.
3. IF A 4 FOOT LANDING AREA CANNOT BE ACHIEVED, A LANDING AREA BETWEEN 3' AND 4' MAY BE USED AT THE DIRECTION OF THE ENGINEER PROVIDED FLARE SLOPES DO NOT EXCEED 1" PER FT.
4. PAYMENT: WALK AND CURB, ITEMS 608 AND 609, SHALL BE MEASURED THROUGH THE CURB RAMP AREA PAID FOR UNDER THEIR RESPECTIVE ITEMS. ITEM 608 - CURB RAMP EACH, SHALL INCLUDE THE COST OF ANY ADDITIONAL MATERIALS, DETECTABLE WARNING AREA, GRADING, FORMING, AND FINISHING. REMOVAL OF EXISTING CURB AND WALK SHALL BE PAID FOR UNDER ITEM 202.

CITY OF TOLEDO
CONSTRUCTION STANDARDS

PEDESTRIAN CURB RAMPS
(SHEET 3 OF 3)

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DATE: 2-09	DRAWING FILE: STANDARD-36.DWG	

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NOTES:

Maximum Longitudinal Slope 1/2" Per Ft.

Refer To Previous Sheets For Pedestrian Ramp Construction Details

Maximum Length Of Ramp Is 30 Ft.

Wherever Sign Posts Are Within The Sidewalk, A Plastic Sleeve of the appropriate size (3"-4" typical) shall be placed flush with the concrete surface at the appropriate location. All poles with in the sidewalk shall be wrapped with a 1" flexible expansion material prior to placement of concrete.

No sidewalk shall be placed directly against any rigid structure and/or foundation. A minimum 1/2" preformed expansion material must be placed between the structure and the adjacent sidewalk.

*Except In Cul-De-Sac Area, Where The Minimum Distance Will Be 4'-0".

**In a business district where the width of sidewalk typically exceeds 4 feet, it is necessary to provide a continuous walkway having a minimum width of 4 feet and a maximum cross slope of 1/4" per foot. All remaining adjacent walk shall not exceed the required maximum cross slope of 1/2" per foot.

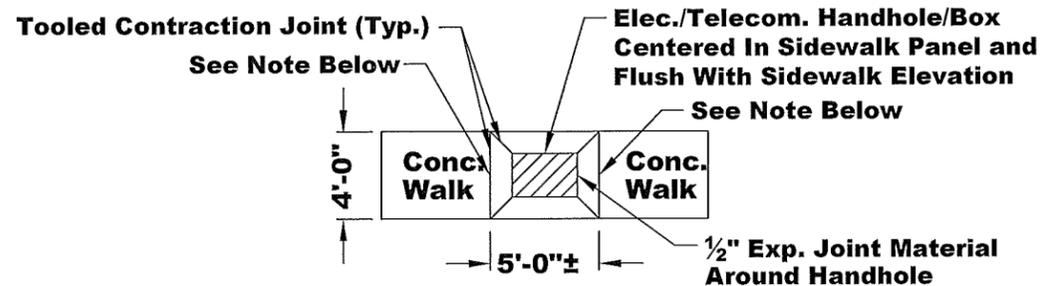
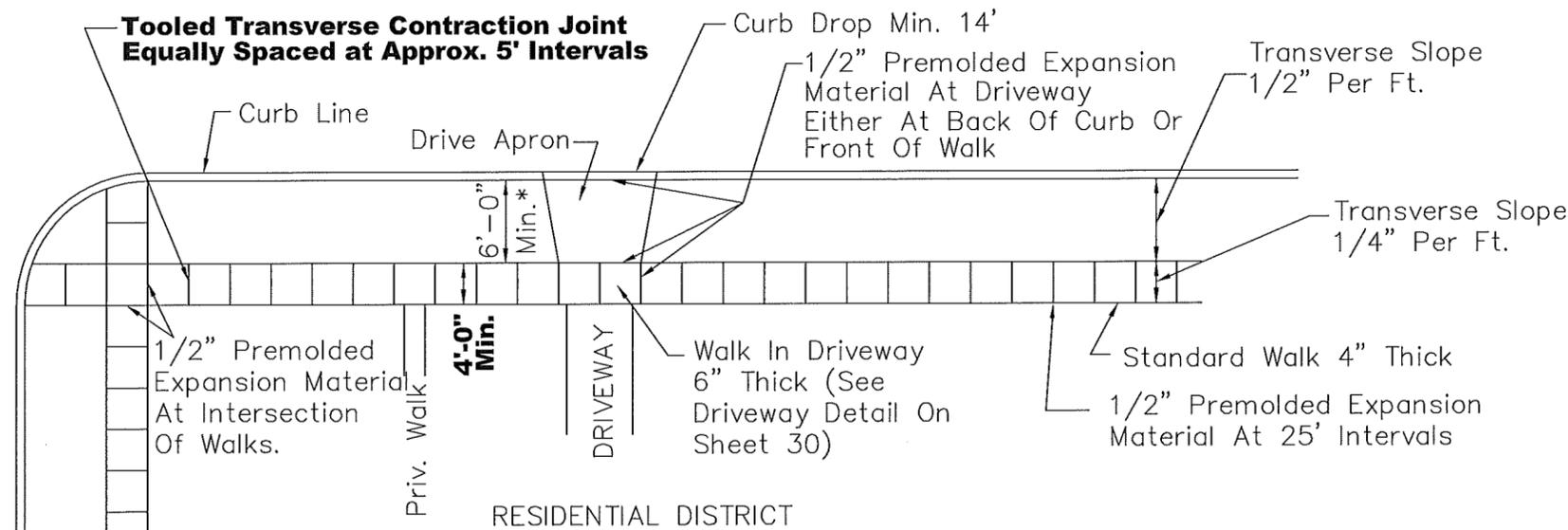
Construct transverse expansion joints in such a manner that the joint will be filled to within one-half inch (1/2") of the surface of the walk, at intervals of not more than twenty-five feet (25'), unless otherwise specified by the Engineer. Place joints at the grooved division lines, truly normal to the grade. Whenever concrete sidewalks abut other walks, steps, curbs, manholes, catch basins, building foundations, etc., provide one-half inch (1/2") thick expansion joints. Effectively separate walk at expansion end of bridge and approach. Clean all concrete from the top of the premolded joints and edge as specified above.

Finishing:

Provide A Final Light Broom Finish

Tree Wells:

Tree Wells in Business District Sidewalk Typically Has a 5 FT X 10 FT Area Opening in the Walk With a Monolithic Curb and Walk Surrounding this Opening. Tree Planting Areas Shall be Backfilled with 3ft Minimum Depth of Topsoil Material, as Specified.



Note: Provide 1/2" Expansion Joint Material If Handhole Panel Is Poured Separate From Adjacent Sidewalk Panels.

SIDEWALK JOINT DETAIL AT HANDHOLE (Not to Scale)

CITY OF TOLEDO CONSTRUCTION STANDARDS			
SIDEWALK CONSTRUCTION			
DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	37
DATE: 12-15	DRAWING FILE: STANDARD-37.DWG		

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NOTES

GENERAL: Locate the top of the integral wall 1" [25] to 3" [75] above ground line.
 TYPE A: Fabricate hand railing and stair posts from nominal size 1 1/2" [38] diameter 0.145" [3.7] wall thickness steel pipe meeting the requirements of the Specification for Welded and Seamless Steel Pipe ASTM A 53 Standard Weight, Schedule Number 40, or aluminum pipe meeting the requirements of the Specification for Aluminum-Alloy Pipe ASTM B 241, 6063 T6 ASA, Schedule Number 40.

Galvanize steel handrails and stair posts after fabrication, as specified in ASTM A 123. Field weld splices for steel railing. Re-galvanize areas on which the spelter coating has been damaged, as specified in AASHTO M 36, Section 24. Metalizing process or repair under the direction of the Engineer with stick-form galvanizing repair compound meeting Federal Specification O-G-93.

Install a single handrail to the right side of the stairs, facing up, unless otherwise shown on the plans.

For stair widths greater than 43" [1100], a handrail is required on both sides of the stairs. Install hand railings on both sides of stairs that are less than 43" [1100] wide, when required by the plans.

Provide splices for aluminum railing with internal sleeves, and after welding, be smooth and water tight.

Cast-in-place or set stair posts in sockets filled with 1:3 proportioned cement mortar. Provide a heavy coating of asphalt varnish or coal-tar pitch paint (both inside and outside) to the portion of aluminum stair posts set into concrete or mortar.

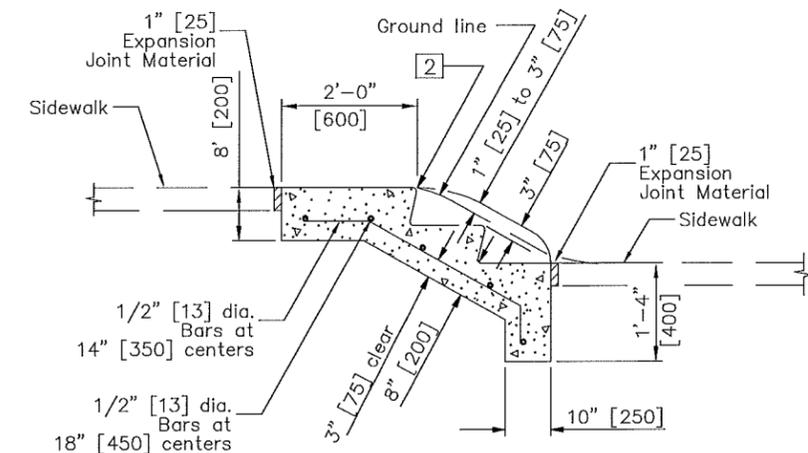
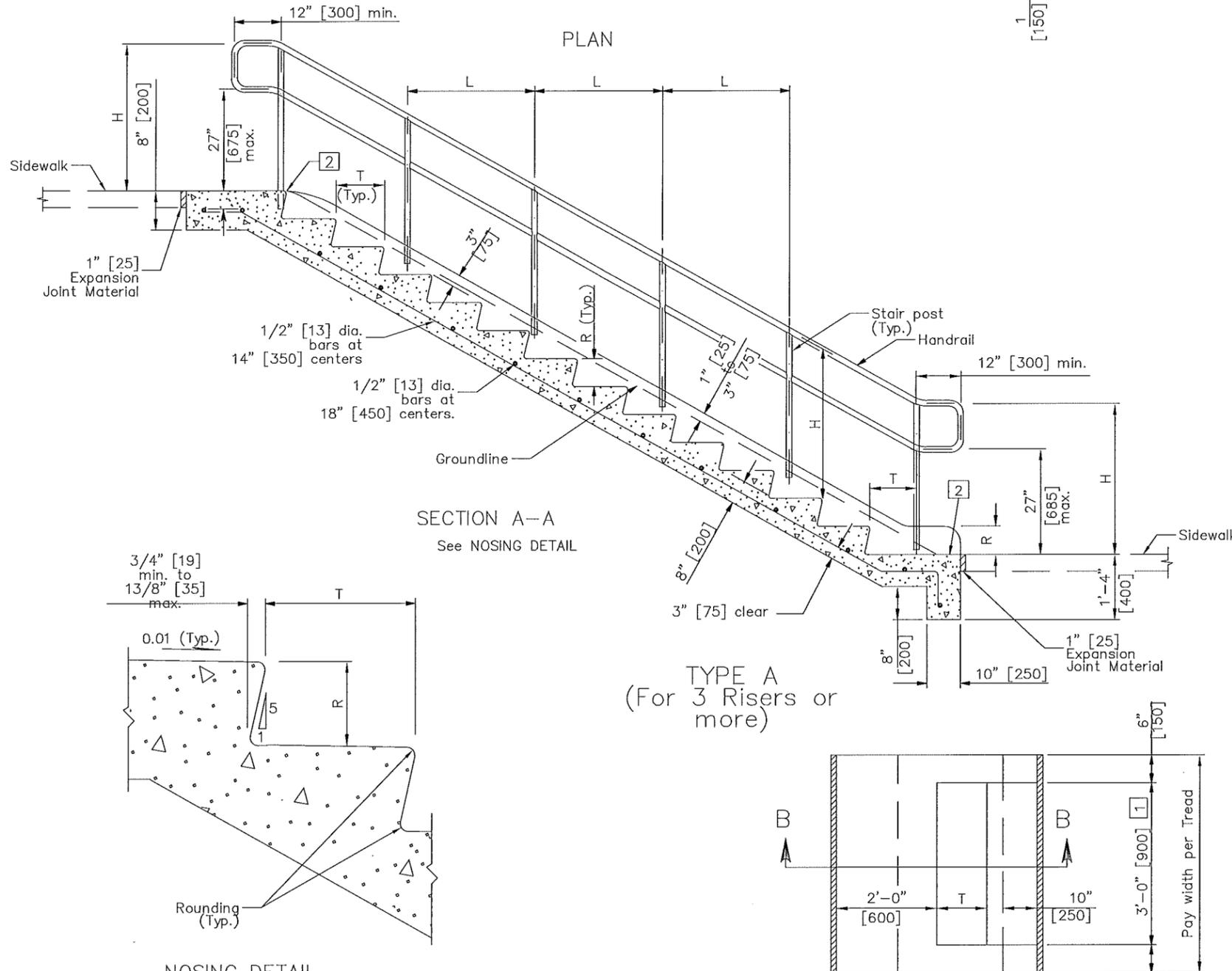
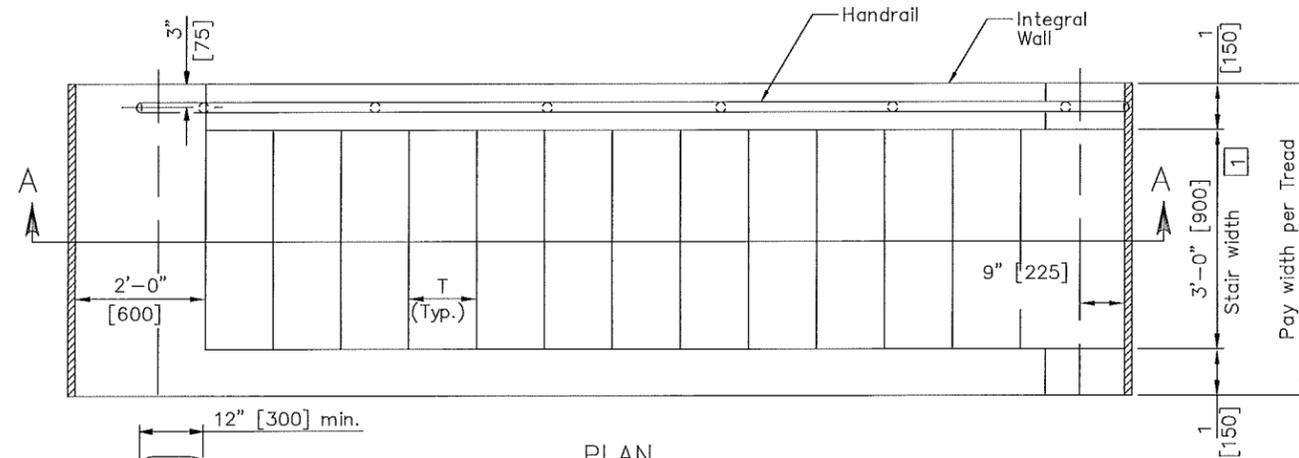
Embed the stair posts a minimum depth 4" [100].

Install stair posts and handrails free of burrs, or sharp projections.

LEGEND

- H ~ 34" [850] min., 38" [950] max.
- R ~ 4" [100] min., 7" [175] max.
- T ~ 11" [275] min., 15" [375] max.
- L ~ Equal interior panel lengths equal. The upper and lower panel lengths may vary. Panel lengths are not to exceed 3'-0" [1.0 m].

- 1 Unless shown otherwise on the plans.
- 2 Measurable tread per CMS 608.08



SECTION B-B
See NOSING DETAIL

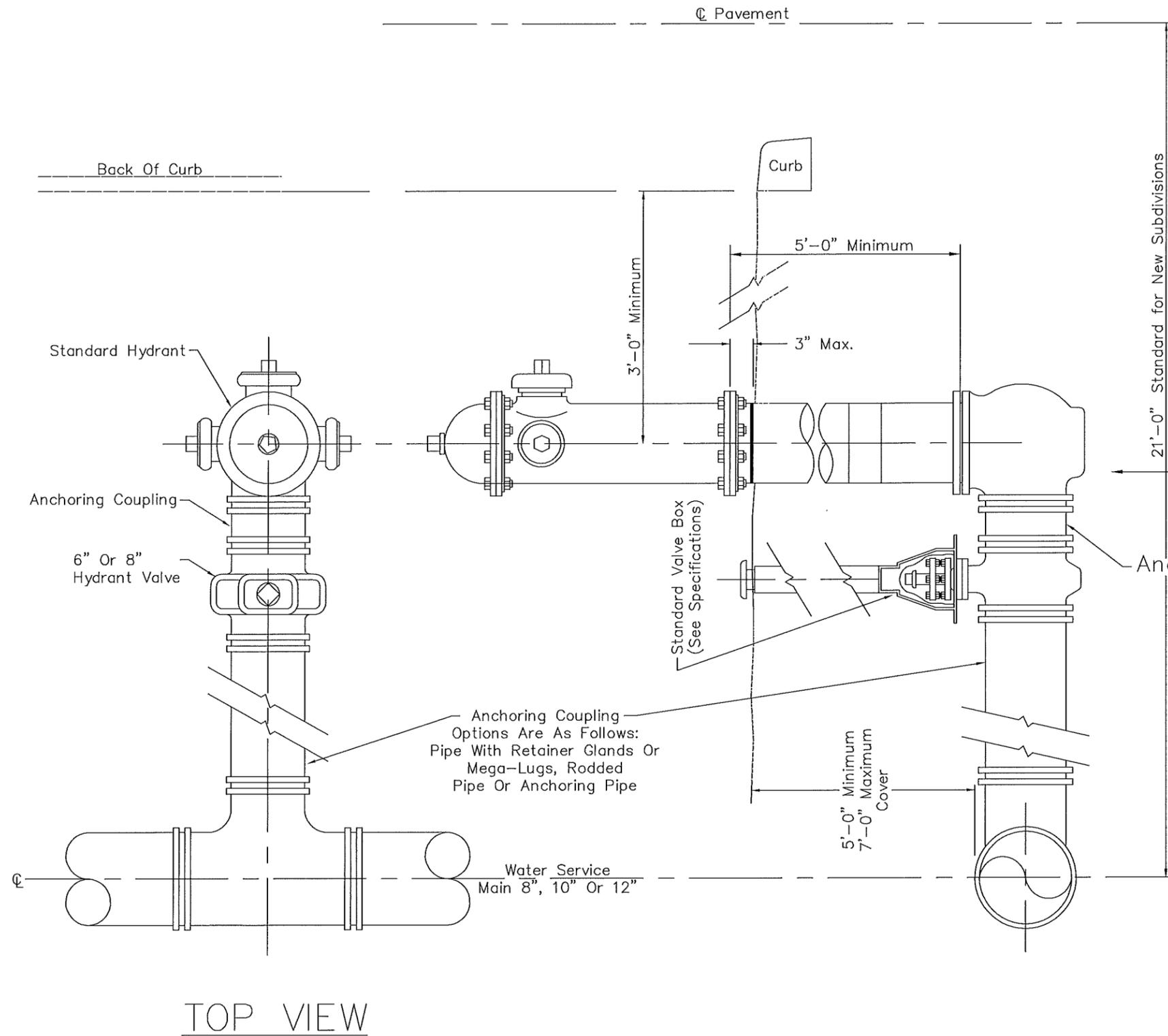
TYPE A
(For 3 Risers or more)

TYPE B (Less than 3 Risers)

**CITY OF TOLEDO
CONSTRUCTION STANDARDS**

**CONCRETE STEPS
(REFERENCED ODOT DRAWING)**

DRAWN BY: D. Focke	DESIGNED BY: ODOT	SCALE: NO SCALE	38
DATE: 3-14	DRAWING FILE: STANDARD-38.DWG		



Residential Application
 8" x 6"
 10" x 6"
 12" x 6" Standard
 Or Hydrant Tee

Industrial Application
 8" x 8"
 10" x 8"
 12" x 8" Standard
 Or Hydrant Tee

Provide Drainage Pit 2'-0" Diameter, 3'-0" Deep At Bottom of Hydrant. Backfill Material Shall Be Granular Material 703.11 Type 3 Size No. 57.

Anchor Coupling - 18" Minimum Laying Length

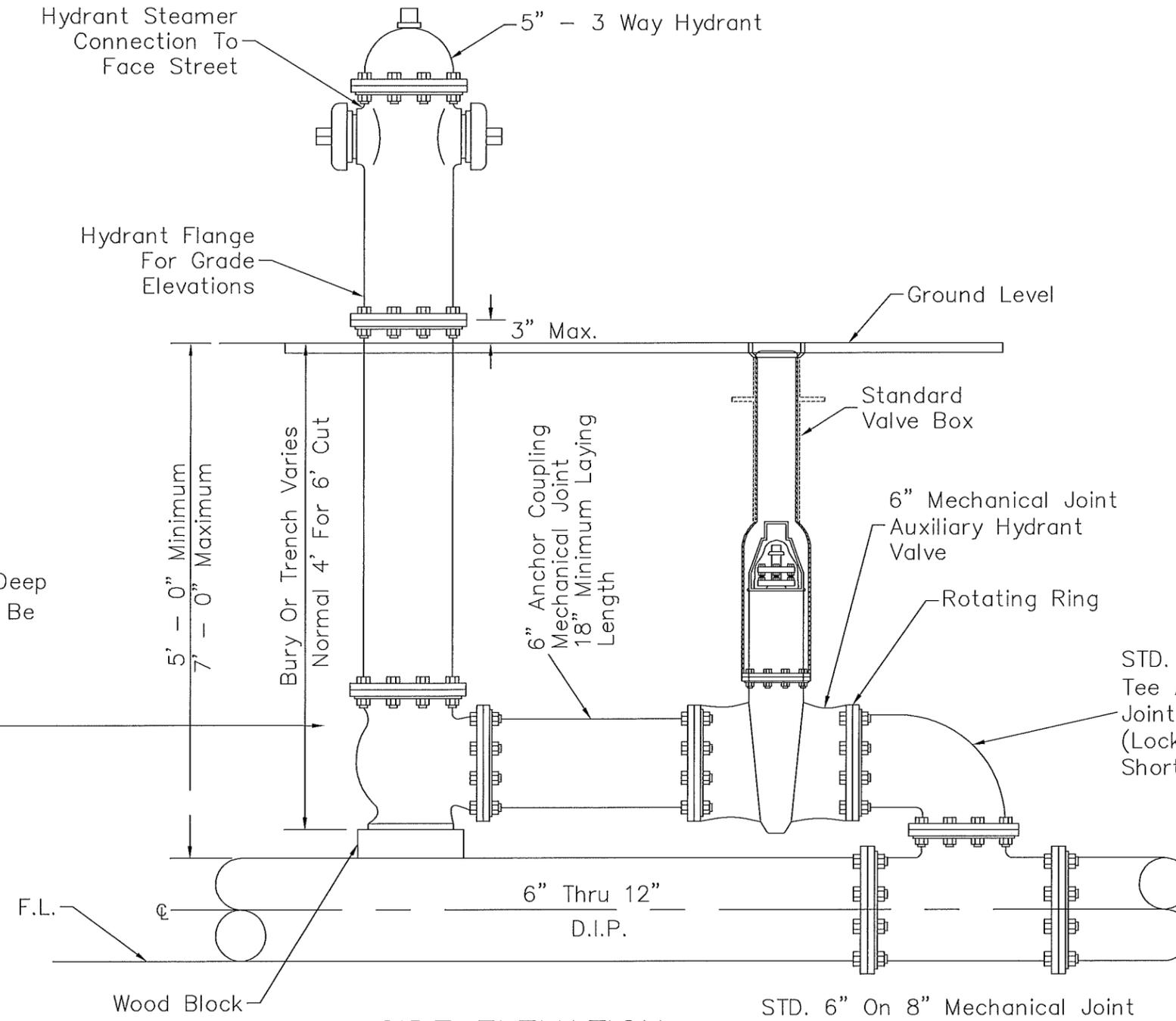
SIDE VIEW

NOTE:
 IF HYDRANT IS LOCATED WITHIN 10 FEET OF A SANITARY SEWER OR STORM SEWER, HYDRANT DRAIN HOLES SHALL BE PLUGGED. DRAINAGE PIT IS NOT REQUIRED.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
HYDRANT ASSEMBLY			
DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	39
DATE: 3-14	DRAWING FILE: STANDARD-39.DWG		

Residential Application
 8" x 6"
 10" x 6"
 12" x 6" Standard
 Or Hydrant Tee

Industrial Application
 8" x 8"
 10" x 8"
 12" x 8" Standard
 Or Hydrant Tee



Provide Drainage Pit 2'-0" Diameter, 3'-0" Deep At Bottom of Hydrant. Backfill Material Shall Be Granular Material 703.11 Type 3 Size No. 57.

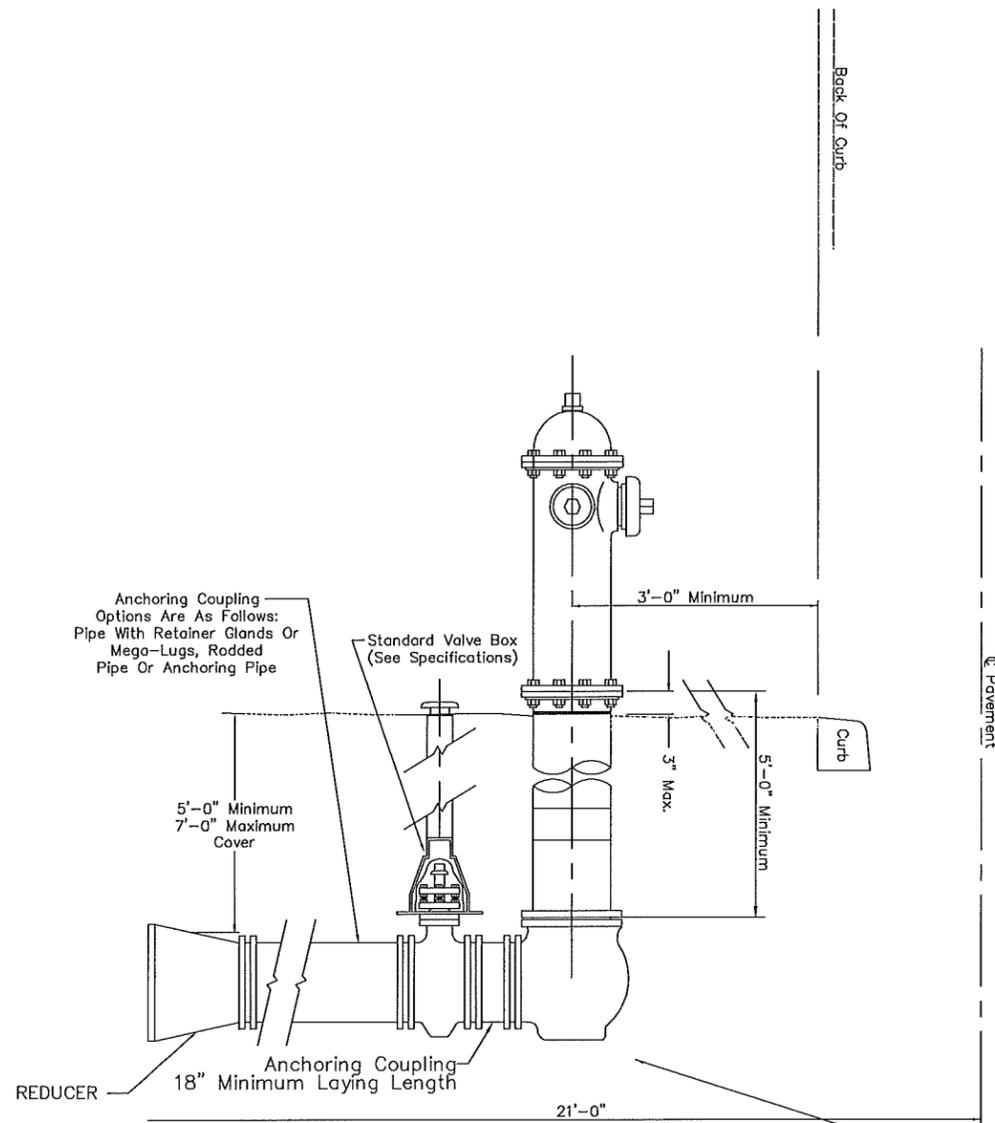
NOTE:
 IF HYDRANT IS LOCATED WITHIN 10 FEET OF A SANITARY SEWER OR STORM SEWER, HYDRANT DRAIN HOLES SHALL BE PLUGGED. DRAINAGE PIT IS NOT REQUIRED.

STD. 6" On 8" Mechanical Joint Tee And 6"-90° Mechanical Joint Anchor Elbow (Lock 90°) Short Side Into Tee

SIDE ELEVATION

ALTERNATE STANDARD HYDRANT ASSEMBLY #1

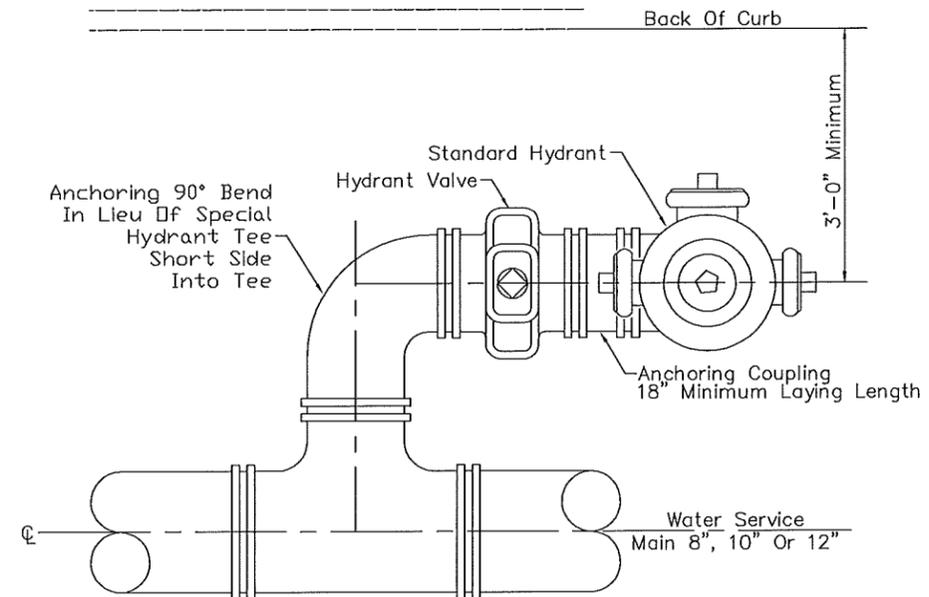
CITY OF TOLEDO CONSTRUCTION STANDARDS			
ALTERNATE HYDRANT ASSEMBLY #1			
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DATE: 3-14	DRAWING FILE: STANDARD-40.DWG		



SIDE VIEW
END OF LINE HYDRANT ASSEMBLY

Note: If Hydrant Is Located Within 10 Feet Of A Sanitary Sewer Or Storm Sewer, Hydrant Drain Holes Shall Be Plugged. Drainage Pit Is Not Required.

PROVIDE DRAINAGE PIT 2'-0" DIAMETER, 3'-0" DEEP AT BOTTOM OF HYDRANT, 703.11 Type 3 Size No. 57. BACKFILL MATERIAL SHALL BE GRANULAR MATERIAL



TOP VIEW

ALTERNATE HYDRANT ASSEMBLY #2

Provide Drainage Pit 2'-0" Diameter, 3'-0" Deep At Bottom of Hydrant. 703.11 Type 3 Size No. 57. Backfill Material Shall Be Granular Material.

NOTE:
IF HYDRANT IS LOCATED WITHIN 10 FEET OF A SANITARY SEWER OR STORM SEWER, HYDRANT DRAIN HOLES SHALL BE PLUGGED. DRAINAGE PIT IS NOT REQUIRED.

Residential Application
8" x 6"
10" x 6"
12" x 6" Standard
Or Hydrant Tee

Industrial Application
8" x 8"
10" x 8"
12" x 8" Standard
Or Hydrant Tee

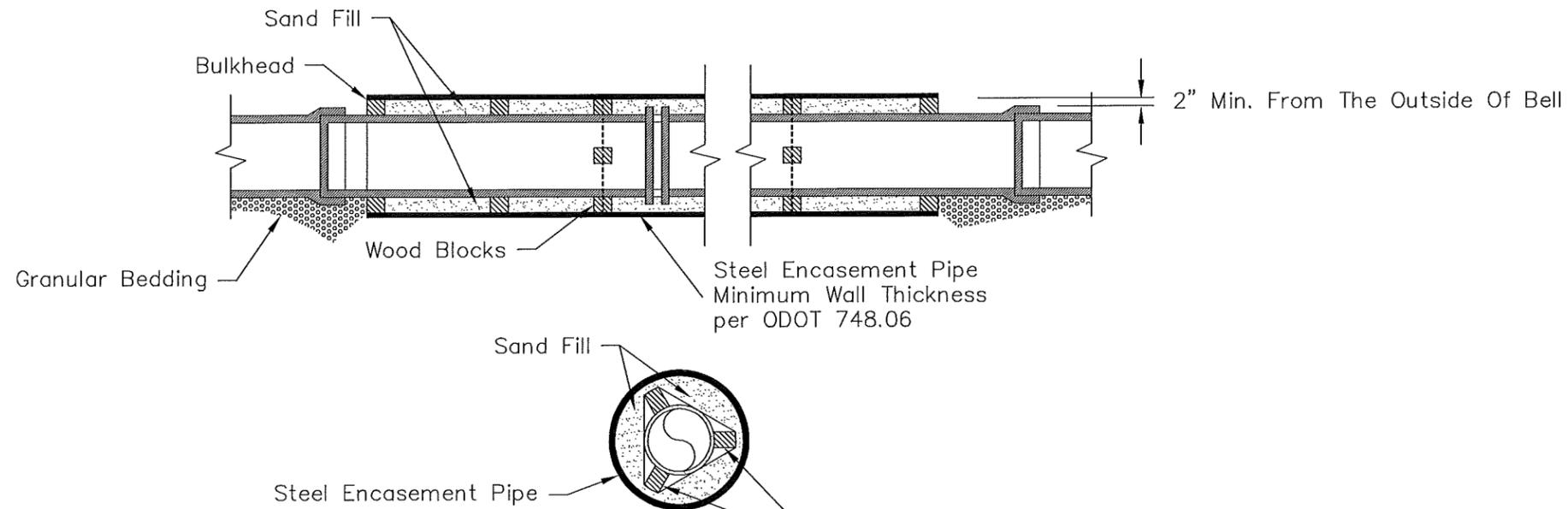
CITY OF TOLEDO CONSTRUCTION STANDARDS			
ALTERNATE HYDRANT ASSEMBLY #2 AND END OF THE LINE HYDRANT			
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DATE: 3-14	DRAWING FILE: STANDARD-41.DWG		

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BORING

Where Required Water Supply Line Shall Be Installed Within Steel Encasement Pipe Meeting ASTM A139 . The Encasement Pipe Shall Be Welded Steel Pipe, Or City Of Toledo, Division Of Engineering Services Approved Equal, And Shall Be Asphalt Coated On The Outside. The Encasement Pipe Shall Have A Minimum Tensile Strength Of 60,000 P.S.I., And A Minimum Yield Strength Of 35,000 P.S.I., Minimum Wall Thickness Shall be per ODOT Item 748.06. The Minimum Diameter Of Encasement Pipe Shall Be The Outside Diameter Of The Bell + Four (4) Inches, Or As Directed By The Engineer.

The Encasement Pipe Shall Be Installed By Boring And Jacking And In Such A Manner So As To Allow The Pipe To Be Laid At The Proper Grade. When Directed By The City Of Toledo, Division Of Engineering Services, This Operation Shall Be Continuous (Around The Clock Until Complete) And Conducted So As Not To Interfere With, Interrupt Or Endanger The Operation Of Traffic Nor Damage, Destroy, Or Endanger The Integrity Of The Roadway/ Railroad Facilities.



NOTE:
Weld All Encasement Pipe Joints
Asphalt Coat Exterior Encasement
Pipe. Fill With Sand From Both
Ends.

Wood Blocks—Band To Each
Length Of Pipe. Allow 1" (Max.)
Clearance Between Blocks And
Casing Pipe For Ease Of Installation

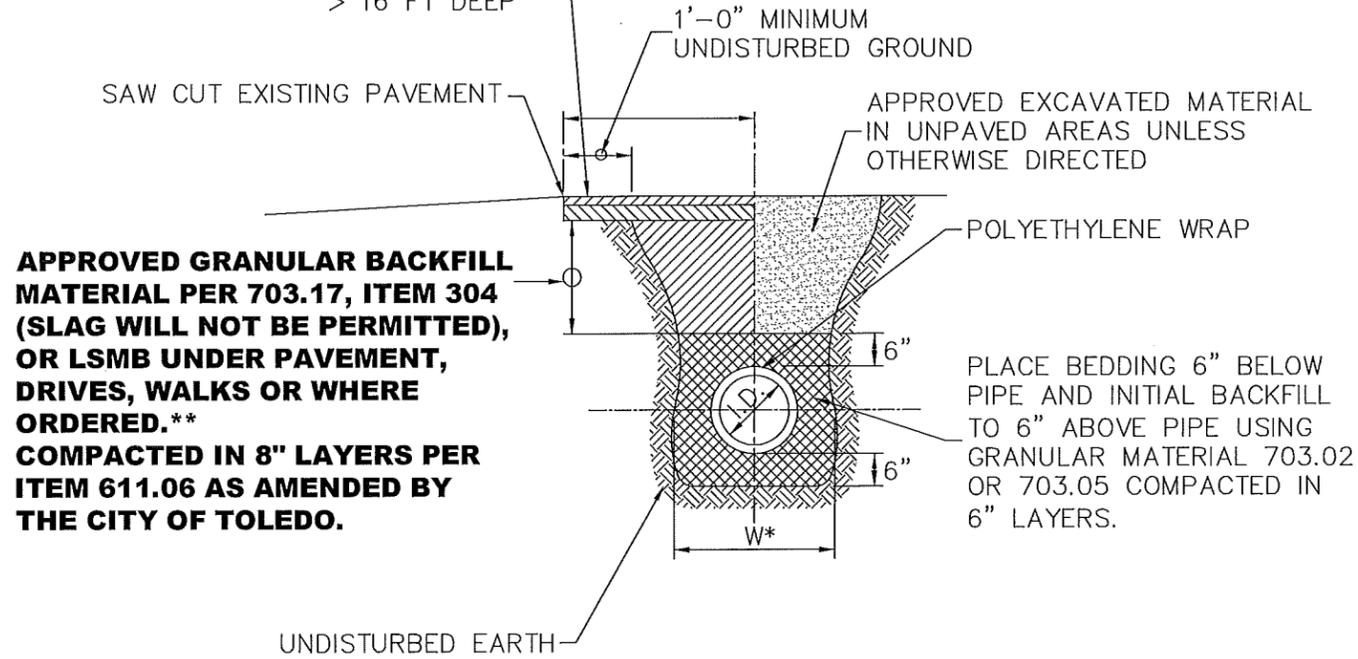
WATER LINE BORING DETAIL
NOT TO SCALE

CITY OF TOLEDO CONSTRUCTION STANDARDS			
WATER LINE BORING DETAIL			
DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	42
DATE: 1-16	DRAWING FILE: STANDARD-42.DWG		

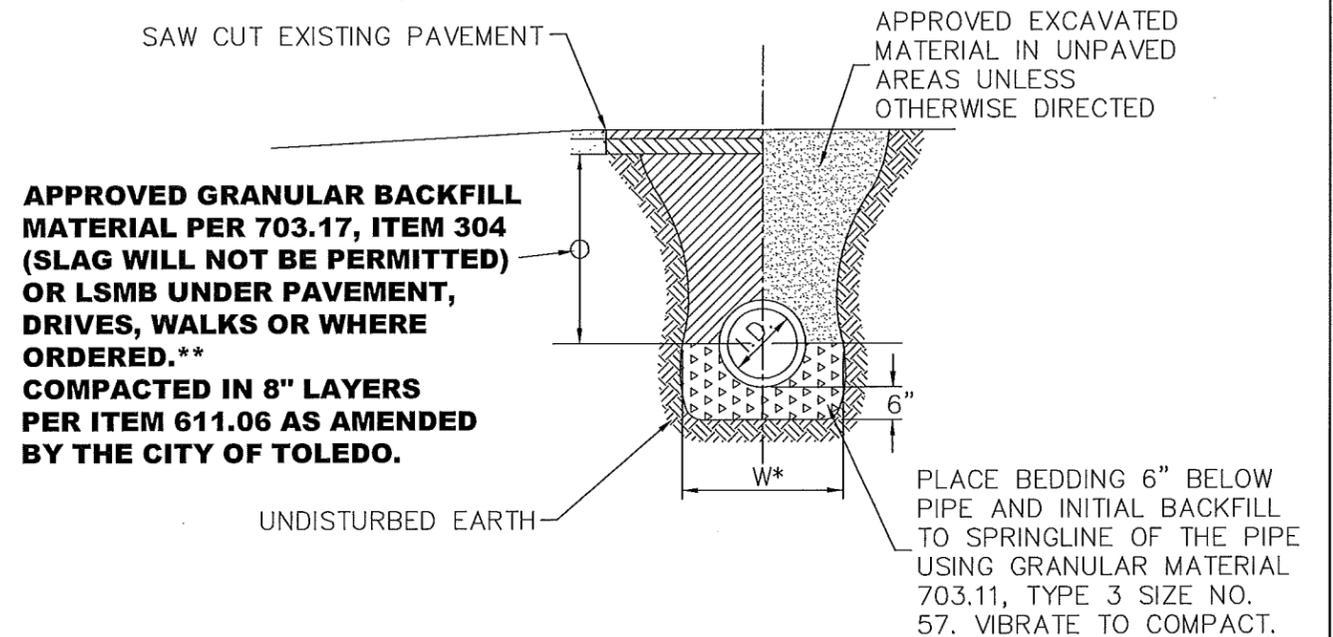
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MAXIMUM PAVEMENT RESTORATION
PAY LIMIT (CURBS, BASES, AND
FLEXIBLE PAVEMENT)
WHEN PAVEMENT RESTORATION IS
A SEPARATE PAY ITEM:
W/2+2.5 FT FOR TRENCH DEPTHS
≤ 16 FT DEEP
W/2+4.5 FT FOR TRENCH DEPTHS
> 16 FT DEEP

**DUCTILE IRON PIPE
TRENCH DETAIL
FLEXIBLE CONDUIT**



**PRESTRESSED CONCRETE
CYLINDER PIPE (PCCP)
TRENCH DETAIL
RIGID CONDUIT**



NOTE

* "W" AS DEFINED IN ITEM 611.05A, AS AMENDED BY THE CITY OF TOLEDO.

**FOR RIGID CONDUIT: $W = \text{PIPE (O.D.)} \times 1.33$
FOR FLEXIBLE CONDUIT: $W = \text{PIPE (O.D.)} \times 1.25 + 12$
CONDUIT DEFINED UNDER 611.03**

** IF ANY PORTION OF THE TRENCH IS UNDER OR WITHIN 3 FEET OF THE PAVEMENT WHEN THE TRENCH DEPTH ≤ 7 FEET.
OR
IF ANY PORTION OF THE TRENCH IS UNDER OR WITHIN 5 FEET OF THE PAVEMENT WHEN THE TRENCH DEPTH > 7 FEET.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
WATER LINE TRENCH DETAILS			
DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	43
DATE: 1-16	DRAWING FILE: STANDARD-43.DWG		

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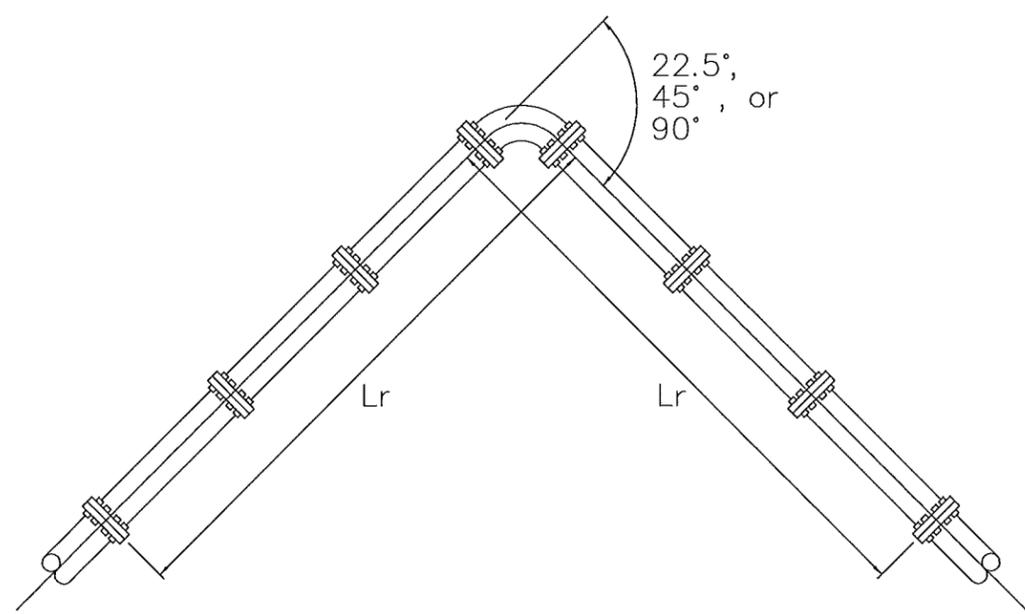


FIGURE 1. HORIZONTAL BEND

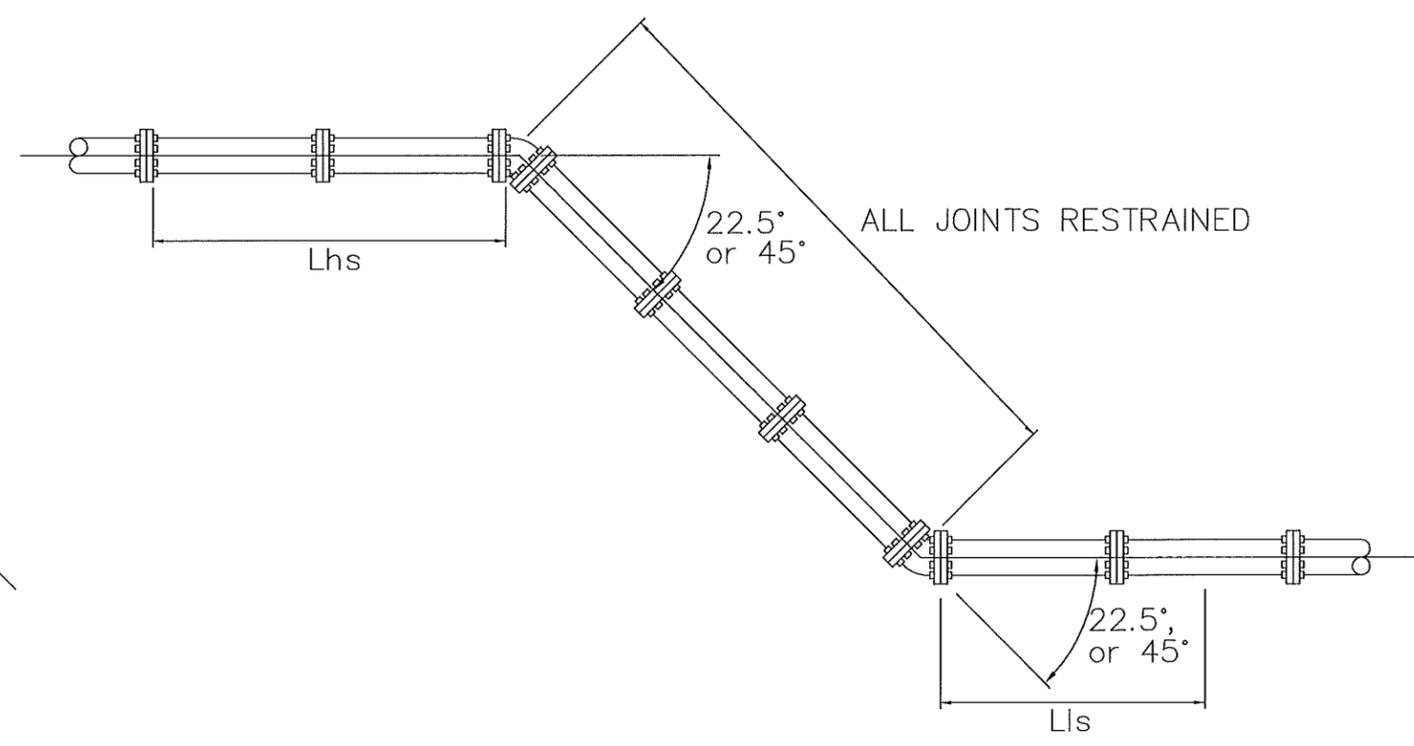


FIGURE 2. VERTICAL DOWN BEND AND OFFSET BEND

SIZE	HORIZONTAL BENDS			VERTICAL BENDS				DEAD END
	90°	45°	22.5°	45°		22.5°		
	Lr	Lr	Lr	Lhs	Lls	Lhs	Lls	
4"	17	7	4	29	6	14	3	70
6"	24	10	5	41	9	20	4	99
8"	32	13	7	54	11	26	6	130
10"	38	16	8	65	13	31	7	156
12"	44	19	9	77	16	37	8	184
16"	57	24	12	99	20	48	10	238
20"	68	29	14	121	24	58	12	290
24"	79	33	16	142	28	68	14	341

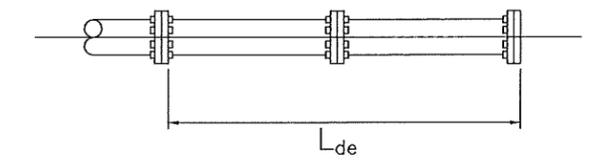


FIGURE 3. DEAD END

DUCTILE IRON PIPE W/ POLYETHYLENE WRAP
 MECHANICAL RESTRAINTS
 200 PSI
 GROUND COVER = 5'

CITY OF TOLEDO CONSTRUCTION STANDARDS			
PIPE RESTRAINT FOR HORIZONTAL AND VERTICAL BENDS AND DEAD ENDS			
DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	44
DATE: 3-14	DRAWING FILE: STANDARD-44.DWG		

LARGE SIZE

	6"	8"	10"	12"	16"	20"	24"	
4"	88 55	210 98	368 131	560 164	1050 223	1680 278	2450 331	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> L_s L_1 </div>
6"		77 57	176 100	297 138	605 204	1001 264	485 320	
8"			73 56	163 102	390 179	683 244	040 303	
10"				69 56	243 145	468 218	742 282	
12"					143 104	327 186	552 256	
16"						134 104	298 189	
20"							128 104	
24"								

REDUCERS
DUCTILE IRON W/ POLYETHYLENE WRAP
Minimum Length Of Pipe Restrained (L_1)(Feet)

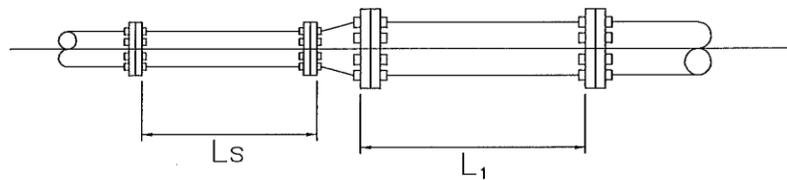


FIGURE 4. REDUCER

L_s : If A Specified Length Of Pipe, L_s (Feet), On The Small Side Of The Reducer Is Free Of Bends, Valves, Tees Or Other Fittings, Restraints Are Not Necessary For The Reducer; Otherwise The Larger Side Of The Reducer Shall Be Restrained The Minimum Length (L_1)(Feet).

RUN SIZE

	4"	6"	8"	10"	12"	16"	20"	24"	
4"	1	1	1	1	1	1	1	1	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> L_{br} </div>
6"		1	1	1	1	1	1	1	
8"			3	1	1	1	1	1	
10"				28	1	1	1	1	
12"					56	10	1	1	
16"						109	72	34	
20"							159	129	
24"								208	

TEES
DUCTILE IRON PIPE W/ POLYETHYLENE WRAP
Minimum Length Of Pipe Restrained (Feet)(L_{br})

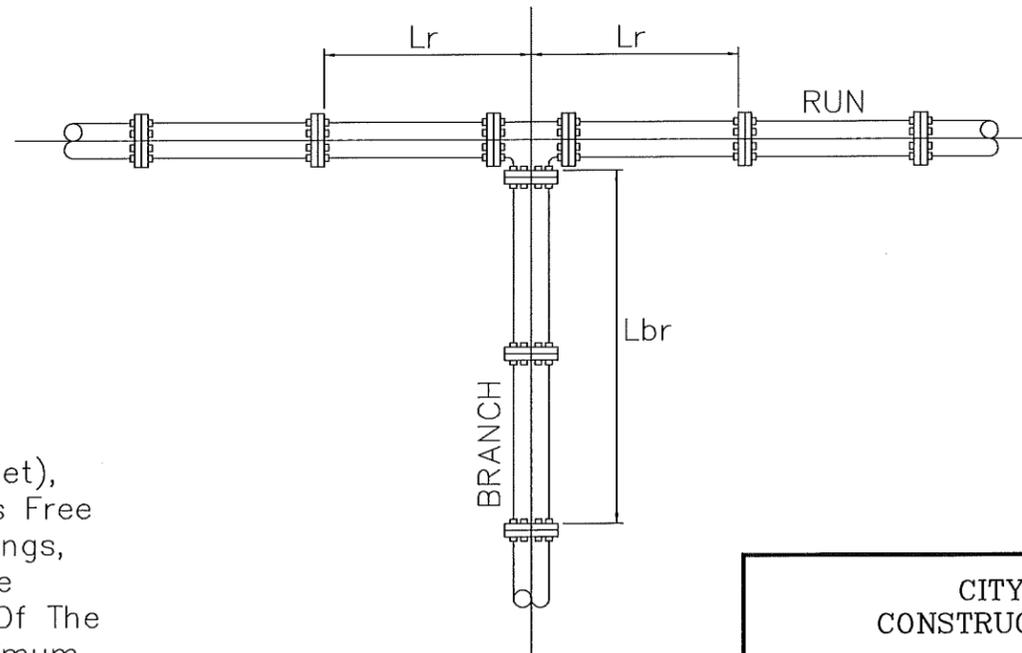


FIGURE 3. TEE

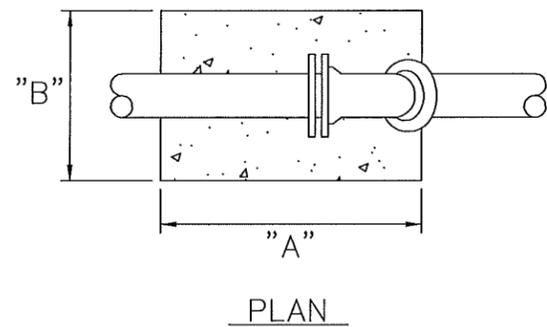
CALCULATIONS ARE BASED ON $L_r \geq 10$. IF $L_r < 10$, CONTACT THE DIVISION OF ENGINEERING SERVICES TO RECALCULATE REQUIRED L_{br} .

CITY OF TOLEDO
CONSTRUCTION STANDARDS

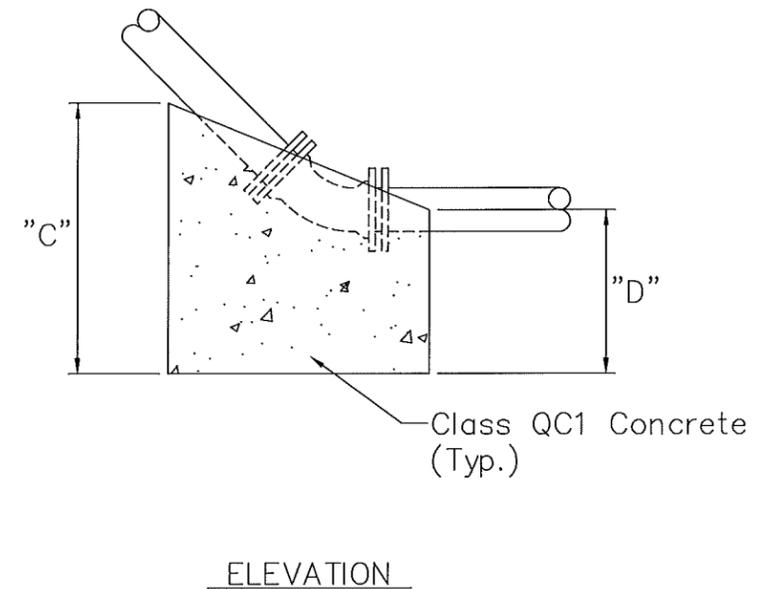
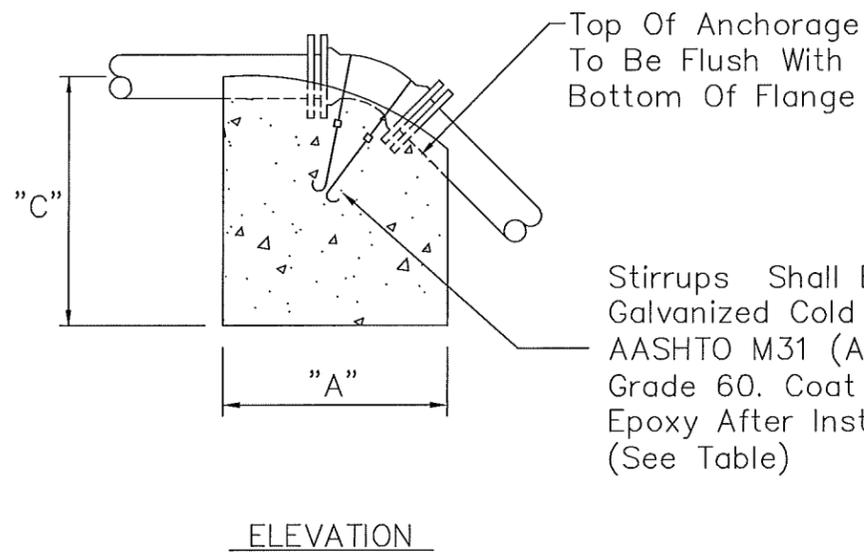
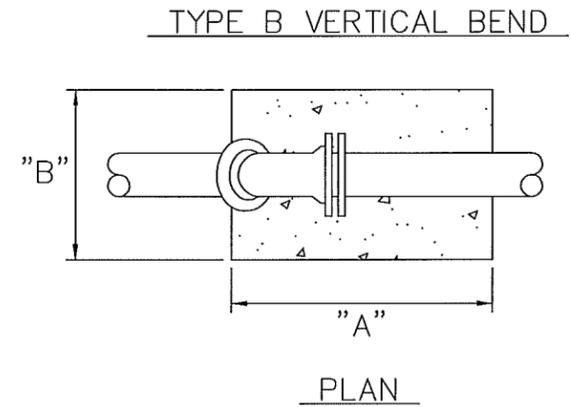
PIPE RESTRAINT FOR
TEES AND REDUCERS

DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	45
DATE: 3-14	DRAWING FILE: STANDARD-45.DWG		

TYPE A VERTICAL BEND



STANDARD BLOCKING



STIRRUPS

PIPE DIA. (IN.)	BEND ANGLE (DEG.)	STIRRUP DIA. (IN.)	STIRRUP EMBMT. (IN.)	STIRRUP BAR #
4	ALL	5/8	17	5
6	ALL	5/8	17	5
8	ALL	5/8	17	5
10	ALL	5/8	17	5
12	11.25 22.5 45	5/8 5/8 7/8	17 17 24	5 5 7
14	11.25 22.5 45	5/8 3/4 1	17 20 27	5 6 8
16	11.25 22.5 45	5/8 7/8 1 1/8	17 24 30	5 7 9

VERTICAL BENDS											
TYPE	SIZE	TYPE A				CONCRETE (CU. YD.)	TYPE B				CONCRETE (CU. YD.)
		A	B	C	A		B	C	D		
2000 PSF SOIL	6"	36"	30"	24"	1	24"	24"	24"	16"	1	
	8"	42"	36"	24"	1	30"	24"	30"	18"	1	
	10"	48"	42"	30"	1	36"	30"	33"	18"	1	
	12"	54"	48"	36"	2	36"	36"	36"	21"	1	
	14"	54"	48"	60"	3	42"	42"	42"	24"	2	
	16"	60"	54"	60"	4	48"	48"	44"	28"	3	
	20"	72"	60"	72"	7	60"	54"	54"	30"	4	
24"	100"	80"	100"	17	86"	72"	78"	38"	12		

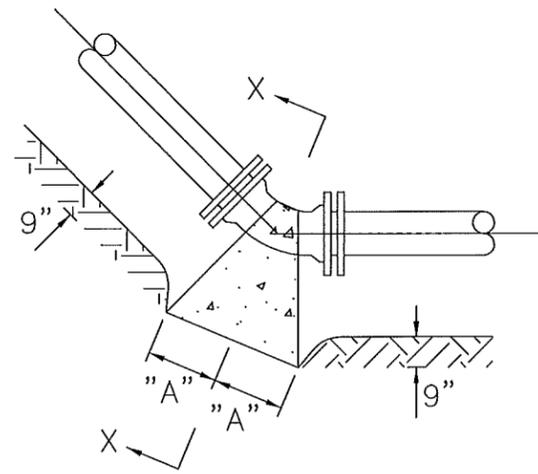
Note:
Based On 100 P.S.I. Static Pressure Plus A.W.W.A. Water Hammer.
All Bearing Surfaces To Be Carried To Undisturbed Ground.
All Pipe Surfaces Shall Be Wrapped With 8 Mil Polyethylene.
For Pipe Sizes > 24", Contact The Division Of Engineering Services To Calculate The Thrust Block Dimensions.

CITY OF TOLEDO
CONSTRUCTION STANDARDS

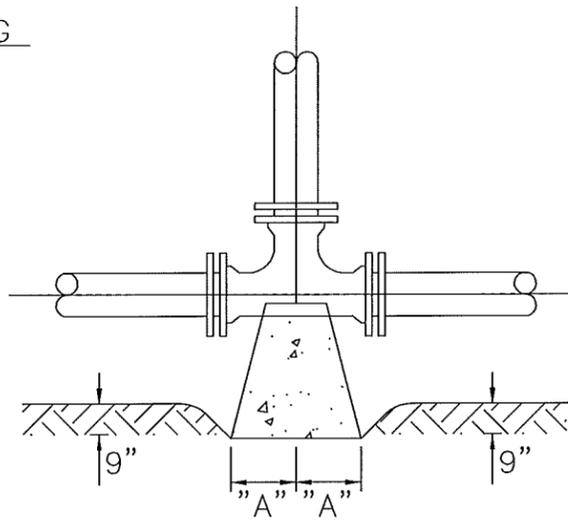
STANDARD BLOCKING FOR
VERTICAL BENDS

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DATE: 1-16	DRAWING FILE: STANDARD-46.DWG		

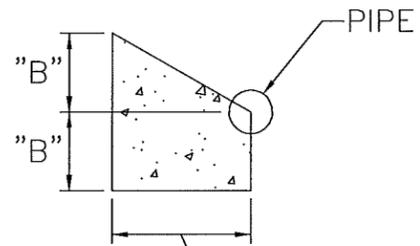
STANDARD BLOCKING



BENDS

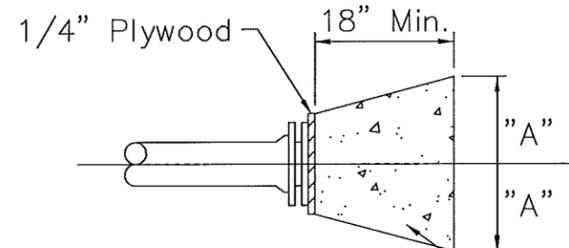


TEES



24" Min. - 12" And Larger Pipe
18" Min. - 10" And Smaller Pipe

SECTION X-X
BENDS AND TEES



PLUGS

Class QC1 Concrete
(Typ.)

HORIZONTAL FITTINGS

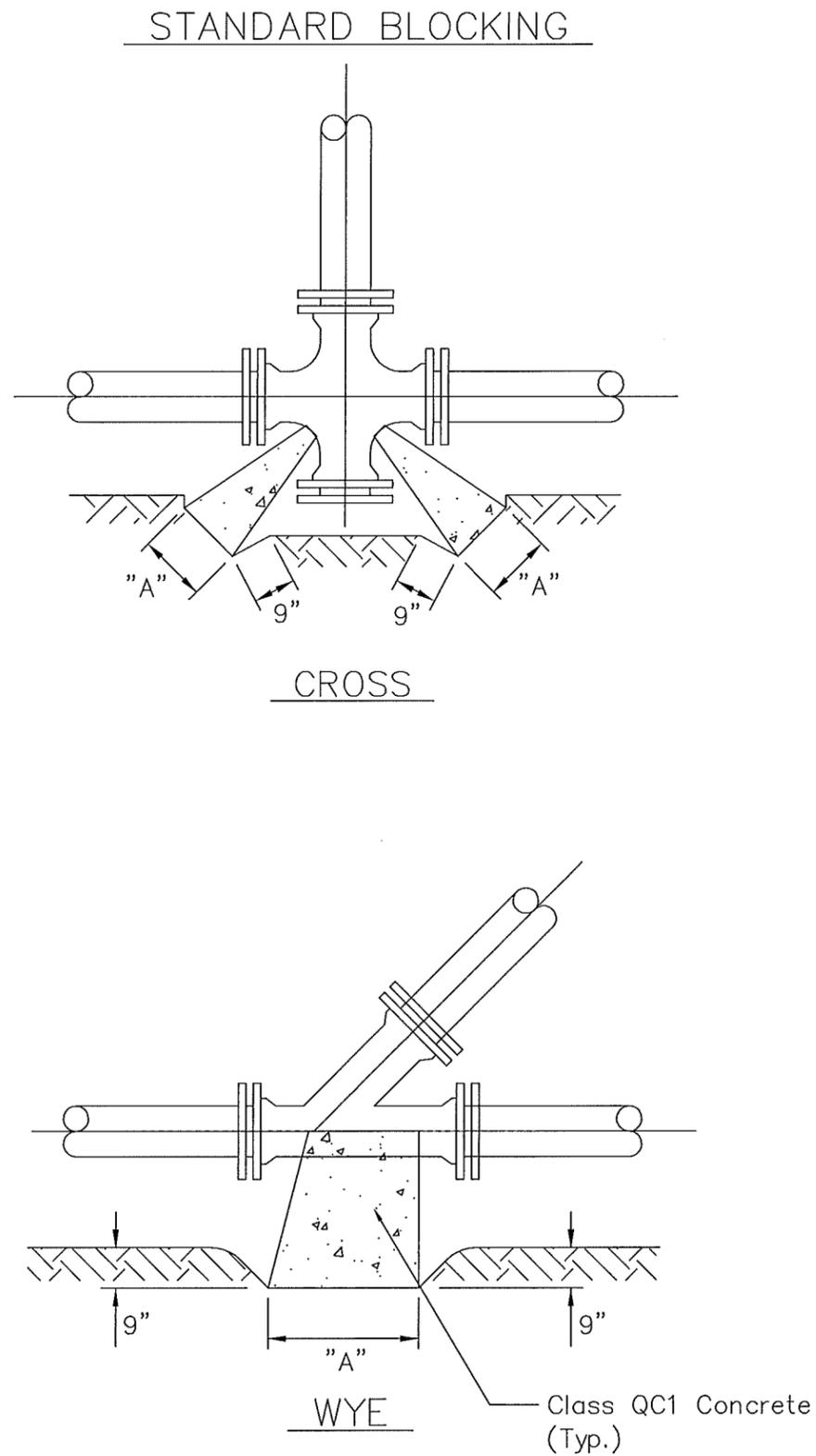
TYPE	SIZE	90°			45°			22.5°			TEES			PLUGS		
		A	B	CONCRETE (CU.YD.)	A	B	CONCRETE (CU.YD.)	A	B	CONCRETE (CU.YD.)	A	B	CONCRETE (CU.YD.)	A	B	CONCRETE (CU.YD.)
2000 PSF SOIL	6"	16"	10"	1	9"	10"	1	6"	8"	1	10"	12"	1	10"	21"	1
	8"	22"	13"	1	12"	13"	1	8"	10"	1	13"	16"	1	12"	29"	1
	10"	26"	17"	1	14"	17"	1	10"	13"	1	16"	20"	1	14"	36"	1
	12"	29"	21"	1	16"	21"	1	11"	16"	1	18"	24"	1	16"	41"	1
	14"	35"	24"	1	19"	24"	1	12"	20"	1	22"	27"	1	18"	48"	1
	16"	38"	27"	2	21"	27"	1	12"	24"	1	24"	30"	1	20"	54"	1
	20"	46"	36"	3	25"	36"	2	15"	30"	1	30"	39"	2	24"	68"	2
	24"	66"	54"	4	35"	55"	3	22"	45"	2	45"	59"	3	34"	98"	3

Note:
Based On 100 P.S.I. Static Pressure Plus A.W.W.A. Water Hammer.
All Bearing Surfaces To Be Carried To Undisturbed Ground.
All Pipe Surfaces Shall Be Wrapped With 8 Mil Polyethylene.
For Pipe Sizes > 24", Contact The Division Of Engineering Services
To Calculate The Thrust Block Dimensions.

CITY OF TOLEDO
CONSTRUCTION STANDARDS

STANDARD BLOCKING FOR
HORIZONTAL BENDS, TEES
AND DEAD ENDS

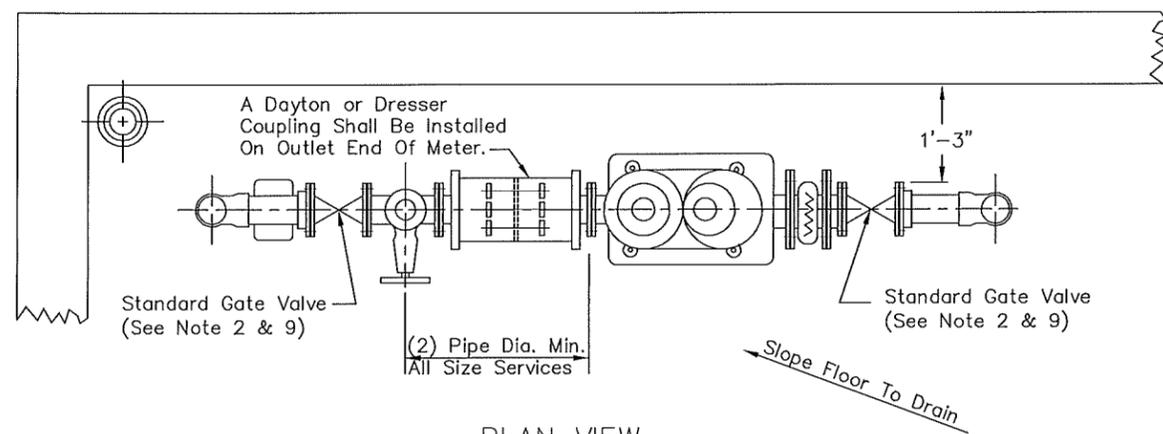
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DATE: 1-16	DRAWING FILE: STANDARD-47.DWG	



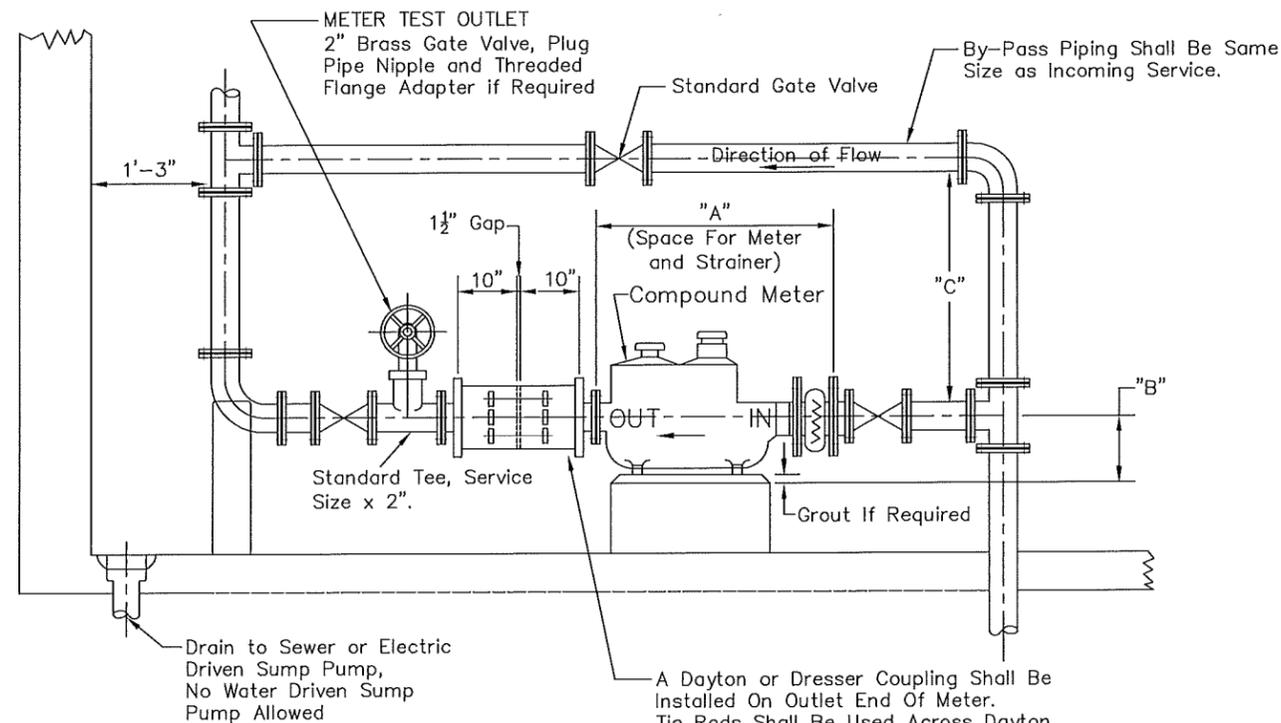
TYPE	SIZE	CROSS			WYE		
		A	B	CONCRETE (CU. YD.)	A	B	CONCRETE (CU. YD.)
2000 PSF SOIL	6"	10"	12"	1	9"	10"	1
	8"	13"	16"	1	12"	13"	1
	10"	16"	20"	1	14"	17"	1
	12"	18"	24"	1	16"	21"	1
	14"	22"	27"	1	19"	24"	1
	16"	24"	30"	1	21"	27"	1
	20"	30"	39"	2	25"	36"	2
24"	43"	58"	3	35"	55"	3	

Note:
Based On 100 P.S.I. Static Pressure Plus A.W.W.A. Water Hammer.
All Bearing Surfaces To Be Carried To Undisturbed Ground.
All Pipe Surfaces Shall Be Wrapped With 8 Mil Polyethylene.
For Pipe Sizes > 24", Contact The Division Of Engineering Services To Calculate The Thrust Block Dimensions.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
STANDARD BLOCKING FOR HORIZONTAL CROSSES AND WYES			
DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE	48
DATE: 1-16	DRAWING FILE: STANDARD-48.DWG		



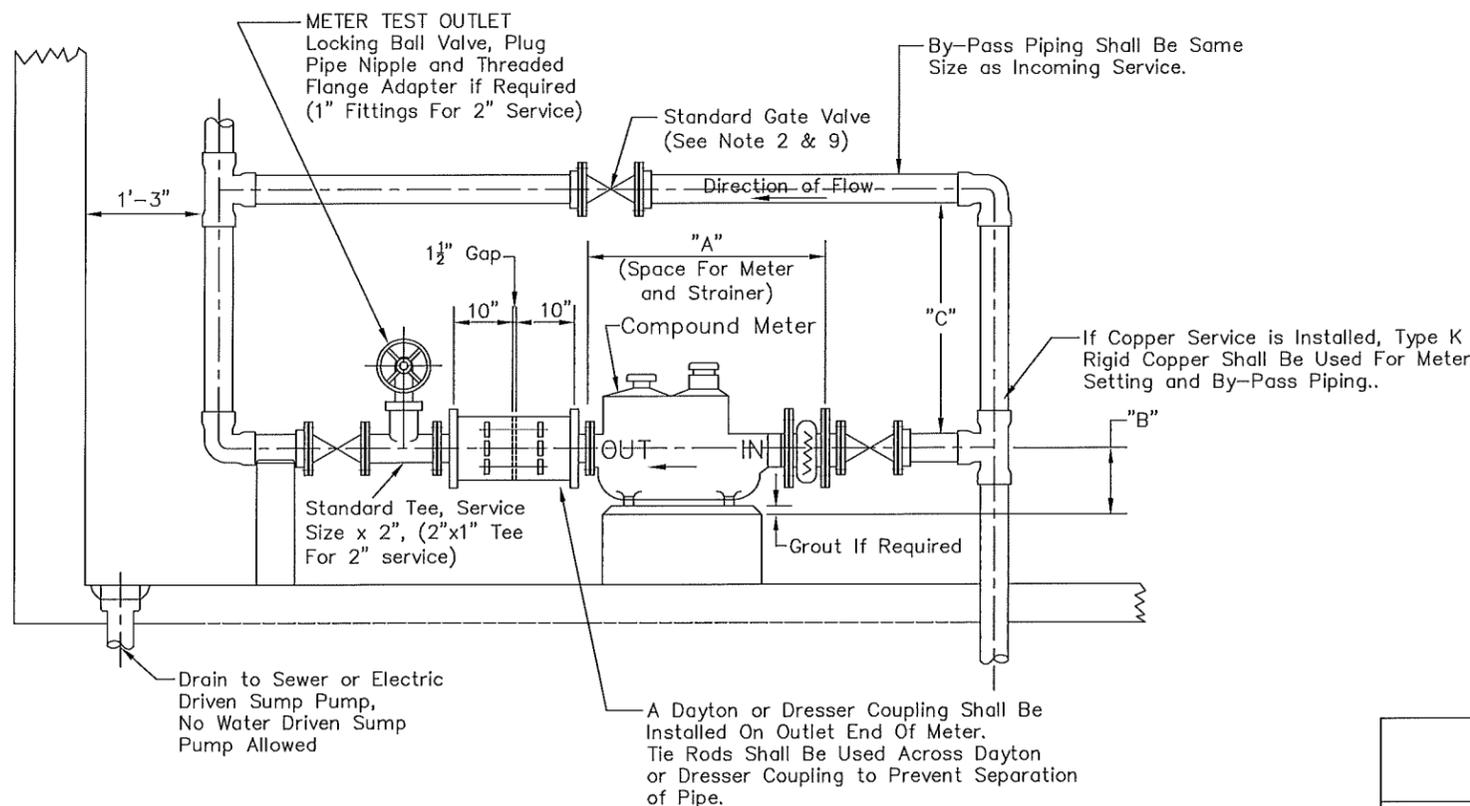
PLAN VIEW
(Dimensions Typical For Both Elevations)



Note: Flanged Fittings And Valve Required For 4" Copper Services Only.
Dayton Or Dresser Coupling For 4" Services Only. See Notes This Sheet.

ELEVATION
(4" Ductile Iron Service shown)
GENERAL NOTES

- 1.) ENTIRE Meter Setting Including Backflow Preventer and Piping To Backflow Preventer Shall Be Adequately Supported.
- 2.) All Valves Shall Be Flanged, Shall Be Wheel Operated With Direction Arrow And CLOSE CLOCKWISE. Inlet And By-pass Valves On 2" Setting Shall Be FORD Ball Valves B11-777 Or Equal.
- 3.) For Any Meter Larger Than 10" It Is Required That Shop Drawings Be Provided To The Division Of Water Distribution For Approval Before Proceeding.
- 4.) Any Deviation From This Plan Shall Be Permitted Only With The Permission Of The Division Of Water Distribution And When Requested, Shop Drawings Shall Be Provided.
- 5.) 2" Service And By-pass Shall Be Type K Copper. 4" Service By-pass And Piping To Backflow Prevention Device May Be Type K Copper Or Minimum Class 52 Ductile Cast Iron Or Pressure Class 350. 6", 8" 10" And 12" Services Shall Be Minimum Class 52 Ductile Cast Iron Or Pressure Class 350.
- 6.) Valves And Fittings 2" And Smaller Shall Be Brass, All Copper Settings Shall Have Brass Nipples On Both Sides Of The Dayton Or Dresser Coupling.
- 7.) There Shall Be A Minimum Of 2 Pipe Diameters From The Outlet End Of The Meter To The Centerline Of The Meter Test Outlet. SEE PLAN VIEW.
- 8.) There Must Be A Minimum Of 5 Pipe Diameters Of Straight Pipe Upstream Of The Compound Meter.
- 9.) Threaded End Valves Shall Be Used On 2" Service.
- 10.) NO Uni-flanges Will Be Permitted.
- 11.) Backflow Prevention Devices Shall Be Installed Downstream Of Meter AND By-pass.
- 12.) No Pro Press Fittings Will Be Permitted.
- 13.) No Water Connection Before Backflow Preventor Will Be Permitted.



Note: Flanged Fittings And Valves Required For 4" Copper Services Only.
See Notes This Sheet.

ELEVATION
(4" Copper Service shown)

BADGER COMPOUND METER SIZES					
	2"	3"	4"	6"	8"
A	22 1/4"	24 1/4"	29 1/2"	33 1/2"	56 1/4"
B	7 1/2"	10 1/2"	10 1/2"	14"	16"
C	3'	3'	3'	3'	5'

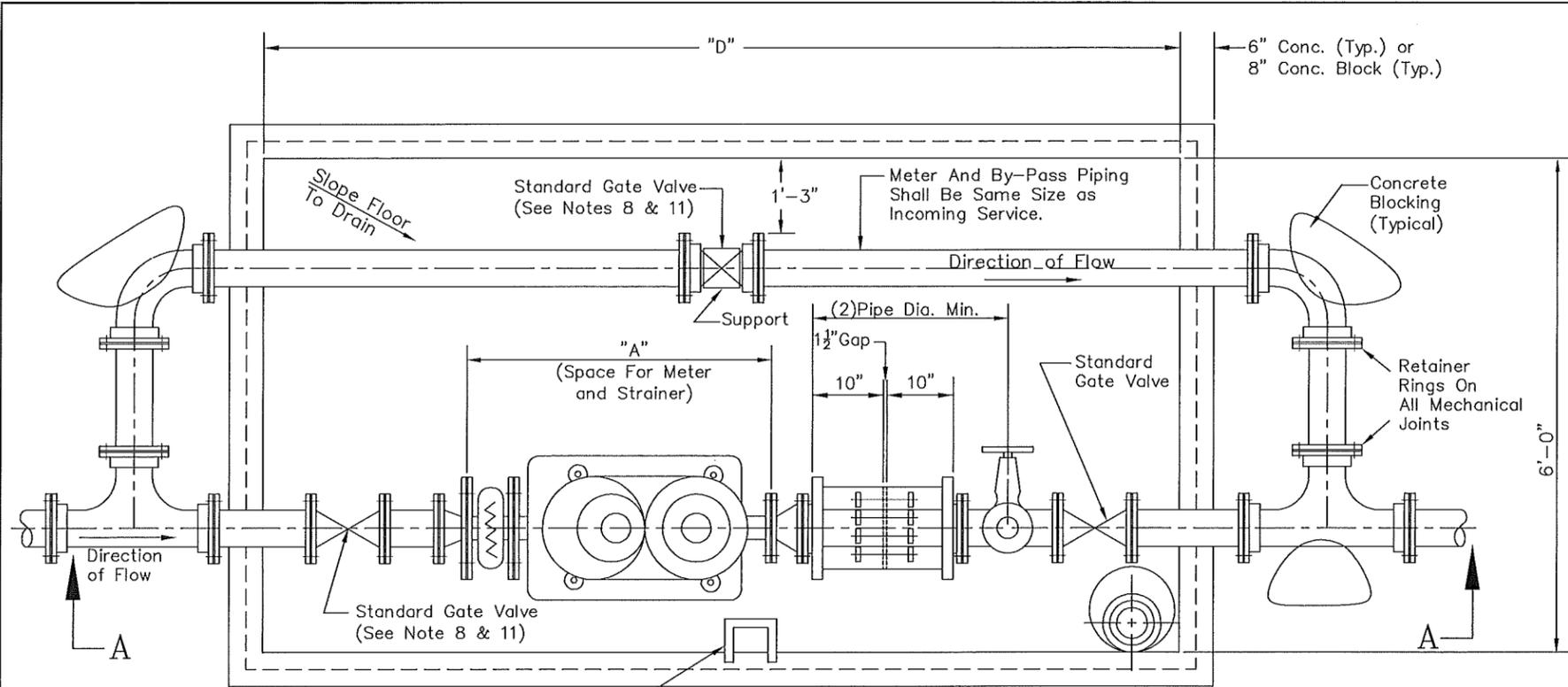
Division of Water Distribution will furnish spool when meter is purchased. DO NOT construct this setting without spool.

**CITY OF TOLEDO
CONSTRUCTION STANDARDS**

**STANDARD INSIDE
METER SETTINGS**

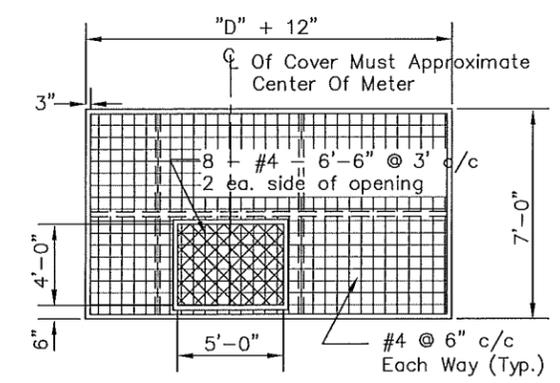
DRAWN BY: DWG	DESIGNED BY:	SCALE: NO SCALE
DATE: 10-14	DRAWING FILE: STANDARD-49.DWG	

When A Meter Setting Requires And/Or Has Undergone A Change Or Modification; The City At Its Discretion, Has The Authority To Mandate The Entire Setting, Including Backflow Preventer. Be Compliant With Current City Of Toledo Standards.



NEENAH Cast Iron Manhole Steps
Type R-1980-C, Placed On 16" Centers
Max. And Approx. 3' From Either Side
Of Access Opening As Shown.

SECTION B-B



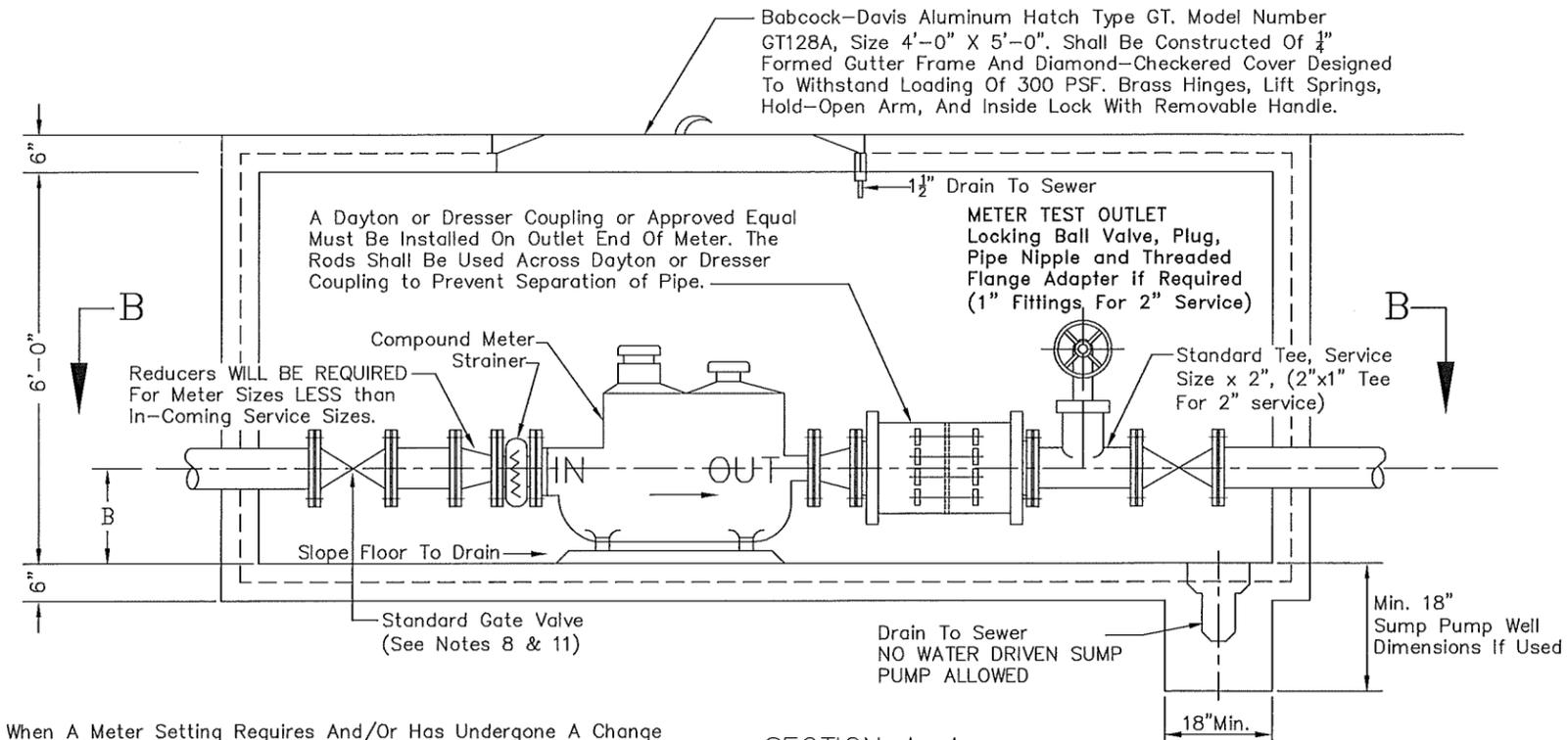
PLAN VIEW

BADGER COMPOUND METER SIZES					
	2"	3"	4"	6"	8"
A	22 1/2"	24 1/2"	29 1/2"	33 1/2"	56 1/2"
B	7 1/2"	10 1/2"	10 1/2"	14"	16"
C	3'	3'	3'	3'	5'
D	Min. 7'	7'	8'	10'	12'

Division of Water Distribution will furnish spool when meter is purchased. DO NOT construct this setting without spool.

GENERAL NOTES

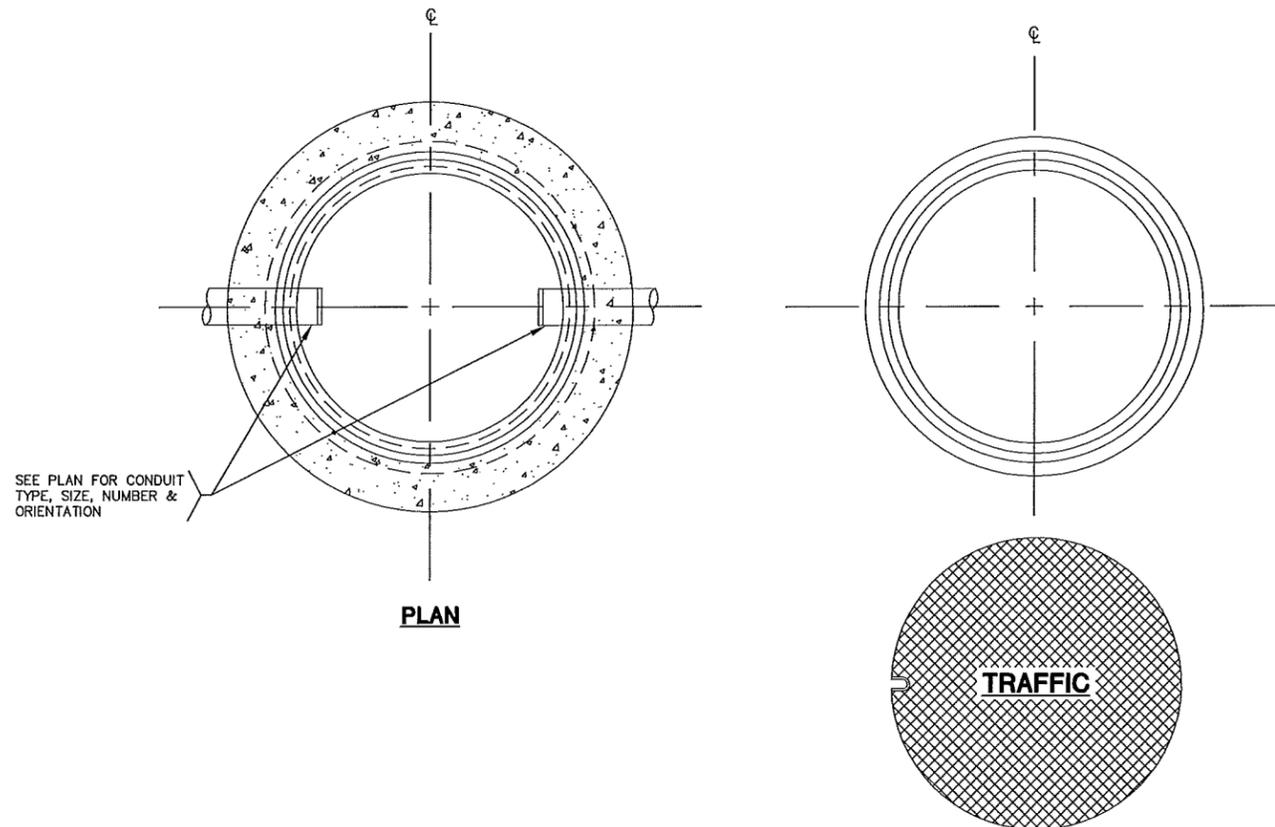
- 1.) This Chamber Is Required For Any Domestic Service Over 150' In Length.
- 2.) ENTIRE Meter Setting Shall Be Adequately Supported.
- 3.) Any Deviation From This Plan Shall Be Permitted Only With The Permission Of The Division Of Water Distribution, And When Requested, Shop Drawings Shall Be Provided. For Any Meter Larger Than 10" It Is Required That Shop Drawings Be Provided To The Division Of Water Distribution For Approval Before Proceeding.
- 4.) 2" Service And By-pass Shall Be Type K Copper. 4" Service, By-pass, and Piping to Backflow Prevention Device May Be Type K Copper Or Minimum Class 52 Ductile Cast Iron Or Pressure Class 350. Pipe & Fittings. 6", 8" 10" And 12" Services Shall Be Minimum Class 52 Ductile Cast Iron Or Pressure Class 350.
- 5.) Construction Shall Be Of O.D.O.T. Reinforced Class C Concrete, However Use Of 8" Solid Concrete Block Will Be Permissible For The Walls If Adequately Water-Proofed. All Pipe And Fittings Shall Be Adequately Supported, Anchored And/Or Blocked To Withstand 150 PSI Test Pressure. Precast Tanks And Vaults Are Also Acceptable With Permission Of The Division Of Water Distribution And Shall Be Of Equal Size Or Larger.
- 6.) For Precast Chambers, The Manufacturer Shall Indicate Which Pipe Cutouts Are For The In-Flow For The Meter Piping And Inflow For The By-Pass Piping.
- 7.) All Holes In The Chamber Shall Be Filled With A Non-Shrinking Grout.
- 8.) All Valves Shall Be Flanged. Shall Be Wheel Operated With Direction Arrow And Shall Close CLOCKWISE. Inlet And By-Pass Valves On 2" Setting Shall Be Ford Ball Valves B11-777 Or Equal.
- 9.) Threaded End Valves Shall Be Used On 2" Service.
- 10.) Drain Shall Be Connected To Storm Sewer Or Chamber Shall Have Electric Driven Sump Pump. No Water Driven Sump Pumps Allowed.
- 11.) There Shall Be A Minimum Of 2 Pipe Diameters From The Outlet End Of The Meter To The Centerline Of The Meter Test Outlet.
- 12.) There Must Be A Minimum Of 5 Pipe Diameters Of Straight Pipe Upstream Of The Compound Meter.
- 13.) NO Uni-flanges Will Be Permitted.
- 14.) For Backflow Prevention To Be Included In This Chamber, Plans Will Be Required For Approval.
- 15.) No Pro Press Fittings Will Be Permitted.
- 16.) No Water Connection Before Backflow Preventor Will Be Permitted.



SECTION A-A

When A Meter Setting Requires And/Or Has Undergone A Change Or Modification; The City At Its Discretion, Has The Authority To Mandate The Entire Setting, Including Backflow Preventer Be Compliant With Current City Of Toledo Standards.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
STANDARD METER CHAMBER			
DRAWN BY: DWG	DESIGNED BY: .	SCALE: NO SCALE	50
DATE: 10-14	DRAWING FILE: STANDARD-50.DWG		



SEE PLAN FOR CONDUIT TYPE, SIZE, NUMBER & ORIENTATION

EXISTING LIVE CABLE TO REMAIN IN SERVICE DURING PULLBOX CONSTRUCTION AND CUTTING AND REMOVAL

EXISTING CONDUIT

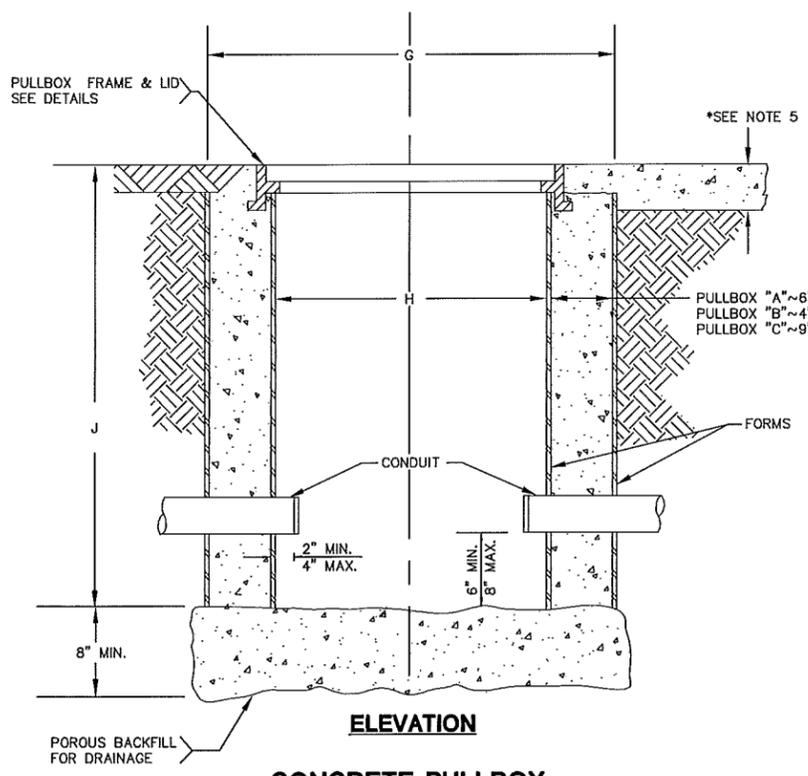
CUT & REMOVE EXISTING CONDUIT. COST TO BE INCLUDED IN PRICE OF PULLBOX

NOTES:

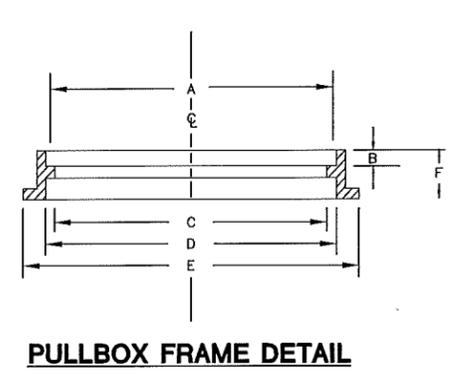
PULLBOXES SHALL CONFORM TO 625.11 WITH THE FOLLOWING EXCEPTIONS OR ADDITIONS:

- PULLBOX FRAME AND LID SHALL BE NEENAH OR APPROVED EQUAL
 TYPE A PULLBOX: R-1792-FL, SOLID LID
 TYPE B PULLBOX: R-1792-DL, SOLID LID
 TYPE C PULLBOX: R-1788-D, SOLID LID
- FORMS SHALL BE TUBULAR WITH 3/8 INCH WALL THICKNESS, SPIRALLY WOUND, LAMINATED FIBER AND CONCENTRICALLY PLACED. DIMENSIONS SHOWN ARE I.D. FORMS WILL REMAIN IN PLACE UPON COMPLETION OF CONSTRUCTION.
- CONCRETE SHALL BE CLASS C MEETING STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, CONSTRUCTION AND MATERIAL SPECIFICATIONS, ITEM 499. CONCRETE FOR PULLBOXES SHALL BE POURED IN PLACE.
- POROUS BACKFILL SHALL BE NO. 6 COARSE AGGREGATE MEETING STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, CONSTRUCTION AND MATERIAL SPECIFICATIONS, ITEM 703.
- WHEN PULLBOX IS INSTALLED IN PAVED AREAS, AN ADEQUATE AREA SHALL BE REMOVED BY SAW CUTTING OR BY REMOVAL BACK TO AN EXPANSION JOINT. PAVEMENT MATCHING THE SURROUNDING AREA SHALL BE PLACED FROM THE PULLBOX RIM DOWN TO THE BOTTOM OF EXISTING PAVEMENT.
- A GROUND ROD SHALL BE INSTALLED IN THE PULLBOX CLOSEST TO THE CONTROLLER. THE PRICE OF THIS GROUND ROD SHALL BE INCLUDED IN THE PRICE OF THE PULLBOX.
- TYPE "A" TRENCH IN SIDEWALK AREAS SHALL INCLUDE THE REMOVAL AND REPLACEMENT OF SIDEWALK UP TO 2' IN WIDTH. IN NO CASE SHALL ANY SECTION OF SIDEWALK, EITHER NEW OR REMAINING, BE LESS THAN 2' IN WIDTH AS A RESULT OF THIS WORK.
- THE WORD "TRAFFIC" SHALL BE INTEGRALLY CAST AS PART OF THE COVER OR SECURELY FASTENED WITH CORROSION RESISTANT HARDWARE.
- TYPE B PULLBOXES SHALL CONFORM TO 725.06, 725.07 OR 725.08 AND SHALL HAVE NOMINAL OPENING DIMENSIONS OF 24 INCHES X 35 INCHES. THE WORD "TRAFFIC" SHALL BE INTEGRALLY CAST AS PART OF THE COVER AND SECURELY FASTENED WITH CORROSION RESISTANT HARDWARE. THE SUPPLIED PULLBOXES SHALL BE ABLE TO SUPPORT A 15,000 LB. MINIMUM VERTICAL LOADING WITHOUT PERMANENT DAMAGE OR DEFLECTION TO THE UNIT. THIS ITEM SHALL INCLUDE BUT IS NOT LIMITED TO THE DISPOSAL OF SURPLUS MATERIAL AND THE RESTORATION OF DISTURBED FACILITIES AND SURFACES.

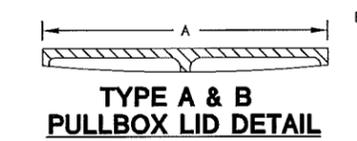
THE LARGEST BEND RADIUS POSSIBLE SHALL BE MAINTAINED FOR THE FIBER OPTIC CABLE AS SPECIFIED BY THIS SPECIFICATION.



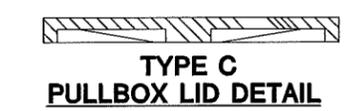
CONCRETE PULLBOX



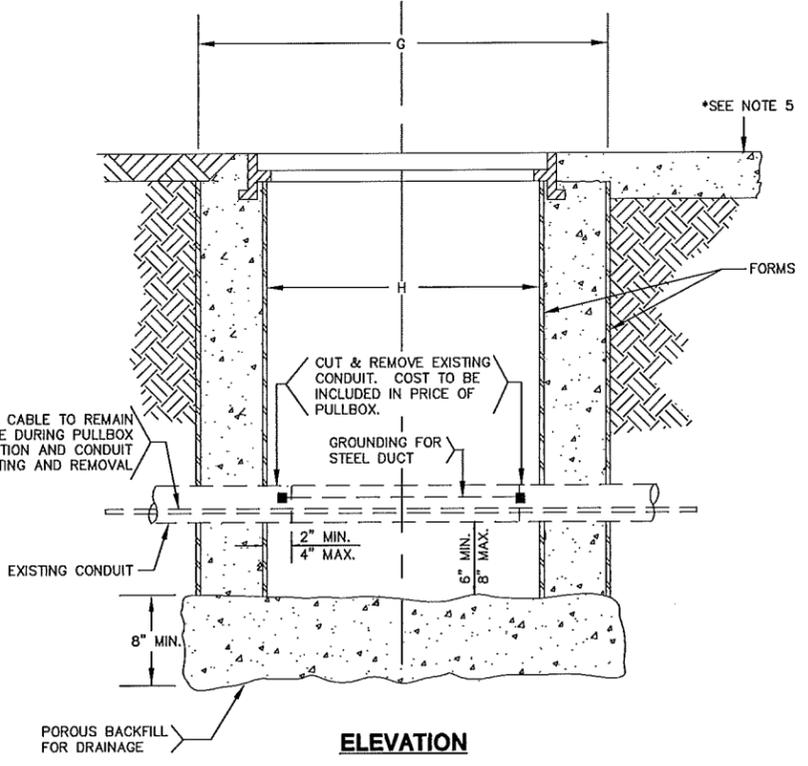
PULLBOX FRAME DETAIL



TYPE A & B PULLBOX LID DETAIL

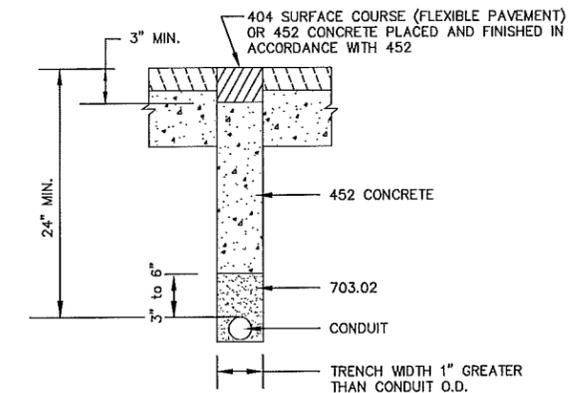


TYPE C PULLBOX LID DETAIL



CONCRETE PULLBOX

INSTALLED OVER EXISTING DUCT



SLOT TRENCH DETAIL

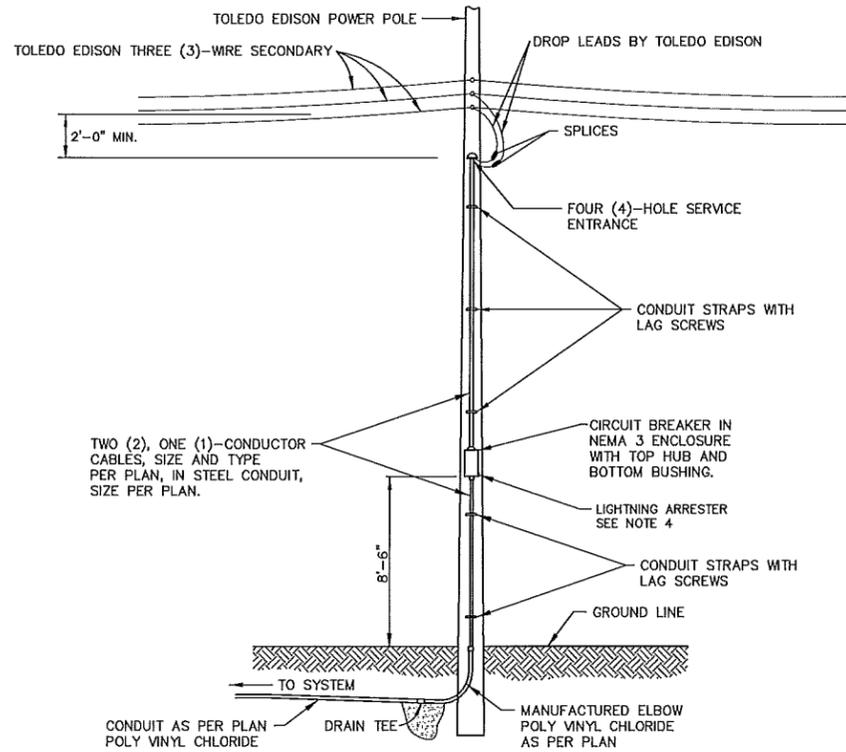
NOTE: TYPE "A" TRENCH IS USED WHEN DEPTH OF PAVED AREA IS <6", SUCH AS IN SIDEWALK AREAS.
 TYPE "B" TRENCH IS USED WHEN DEPTH OF PAVED AREA IS >6", SUCH AS DRIVEWAY AREAS.

PULLBOX TYPE	DIMENSIONS IN INCHES									TYPICALLY USED IN
	A	B	C	D	E	F	G	H	J	
A	25 1/4	1 1/2	23 1/2	25 1/2	29 1/2	4	36	24	36	WALK OR EARTH
B	18 1/4	1 1/2	16 1/2	18 1/2	22 1/2	4	24	16	24	WALK OR EARTH
C	23 5/8	3	21 1/8	24 5/8	34 3/4	7	42	24	36	PAVEMENT

CITY OF TOLEDO
 CONSTRUCTION STANDARDS

PULLBOX WITH NEW OR
 EXISTING CONDUIT

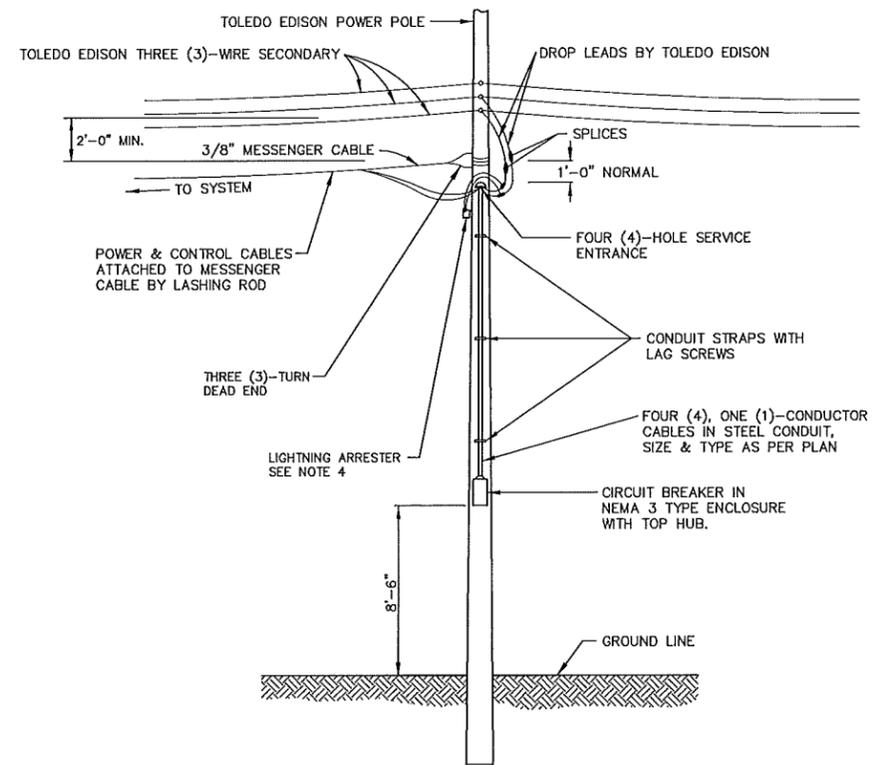
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DATE: 1-16	DRAWING FILE: STANDARD-51.DWG		



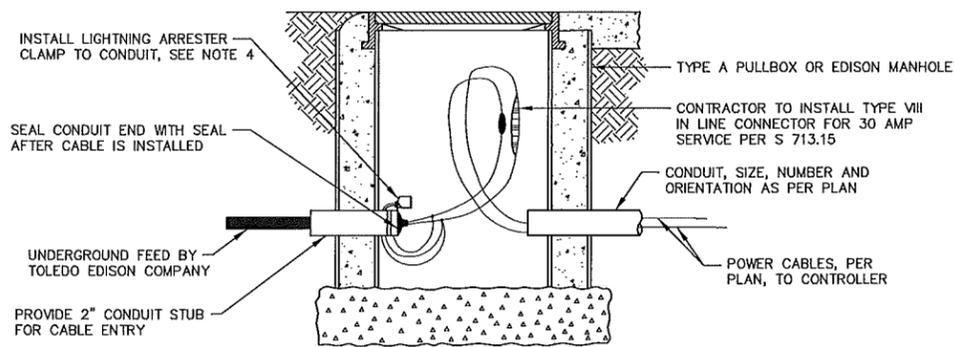
POWER SOURCE DETAIL
FOR
UNDERGROUND FED POWER SERVICE, TYPE A
(NO SCALE)

NOTES:

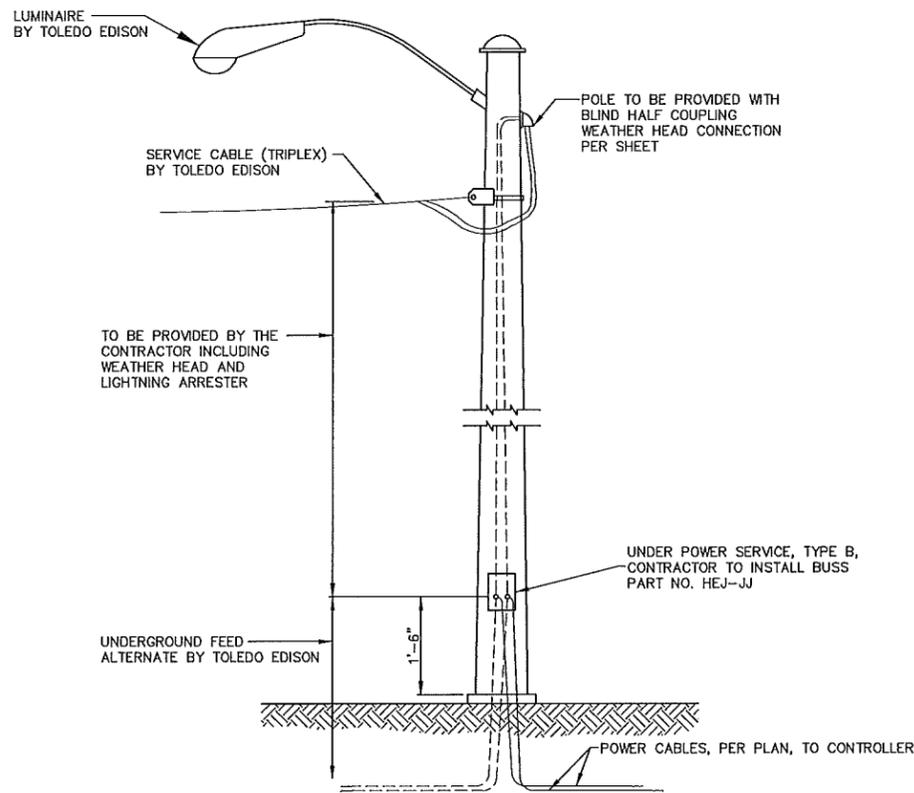
1. THE TYPES AND SIZES OF CABLE AND CONDUIT ABOVE THE SWITCH ENCLOSURE SHALL BE THE SAME AS THAT BELOW THE SWITCH ENCLOSURE FOR UNDERGROUND FED SYSTEMS.
2. ON STEEL POLES, 3/4" WIDE STAINLESS STEEL BANDING SHALL BE USED IN LIEU OF CONDUIT STRAPS.
3. THE SWITCH ENCLOSURE SHALL BE ATTACHED TO WOOD POLES WITH LAG SCREWS AND TO STEEL POLES WITH MACHINE SCREWS AFTER DRILLING AND TAPPING.



POWER SOURCE DETAIL
FOR
AERIALLY FED POWER SERVICE, TYPE C
(NO SCALE)



POWER SOURCE DETAIL
FOR
UNDERGROUND FED POWER SERVICE, TYPE D
(NO SCALE)

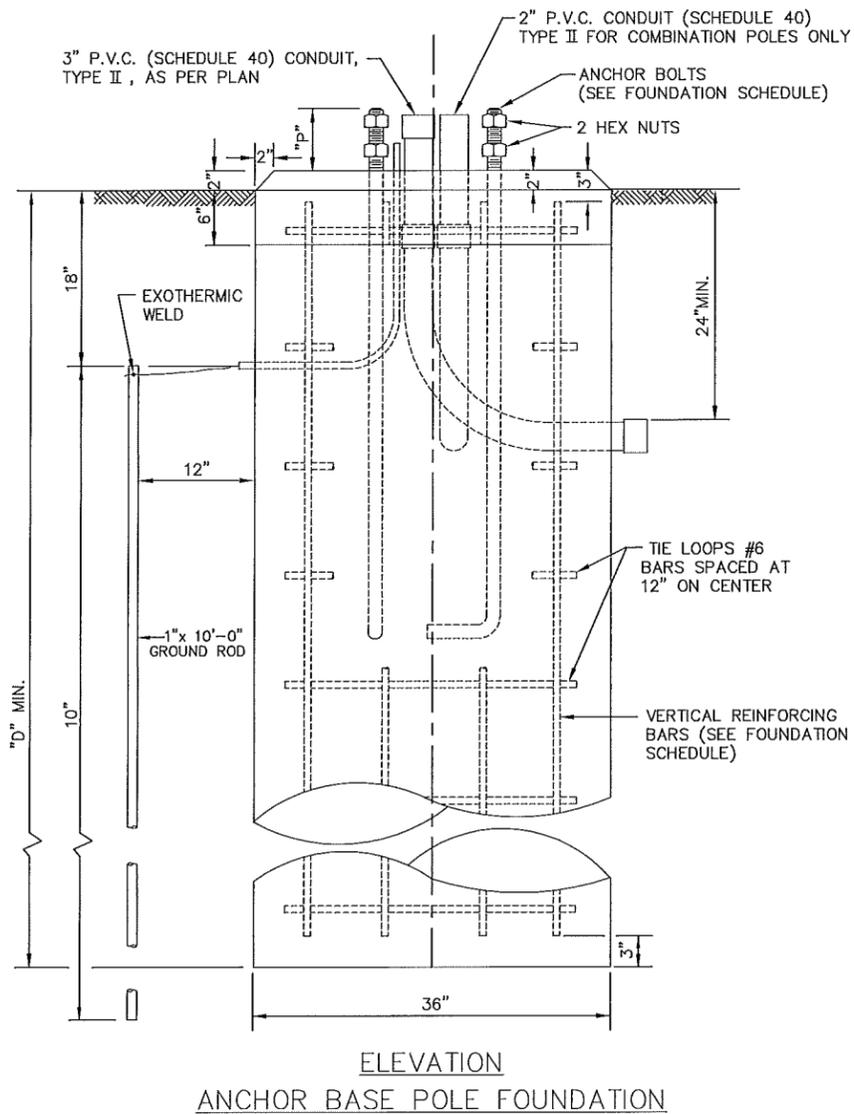
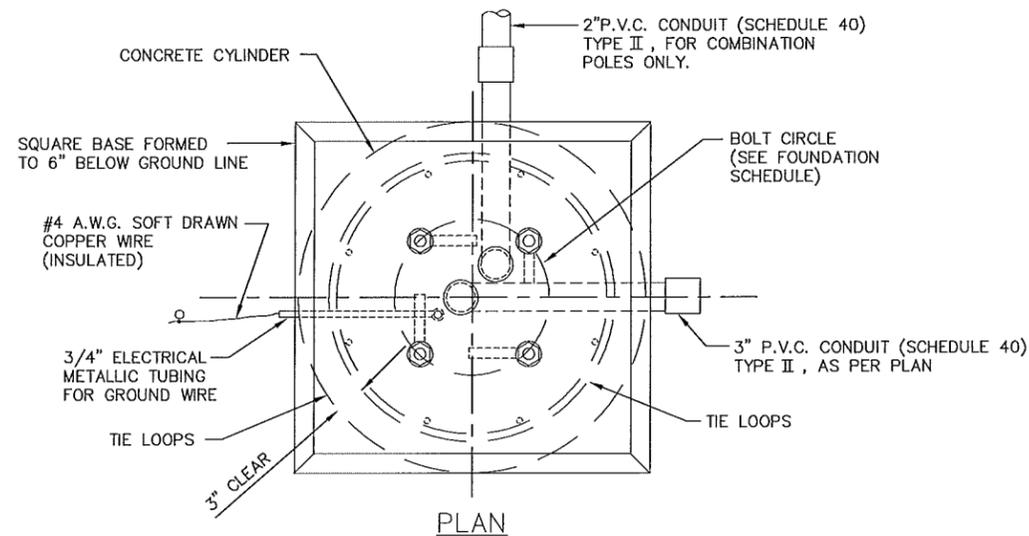


POWER SERVICE DETAIL
FOR
OVERHEAD OR UNDERGROUND FED POWER SERVICE, TYPE B
(NO SCALE)

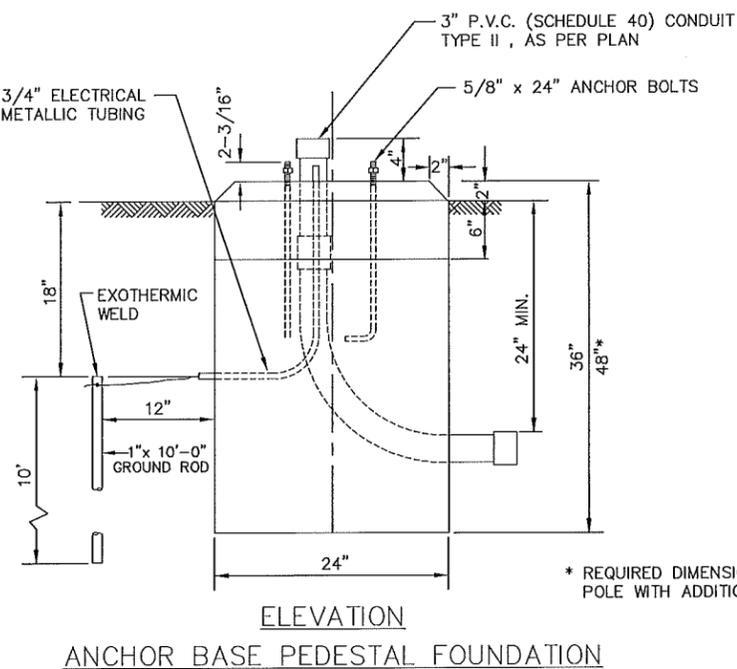
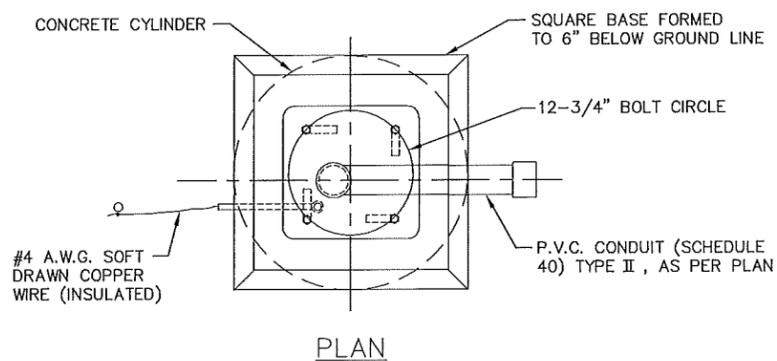
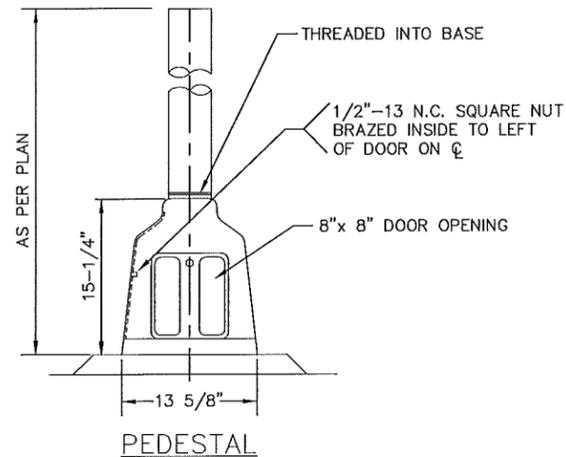
CITY OF TOLEDO
CONSTRUCTION STANDARDS

TYPICAL POWER
SOURCE DETAILS

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DATE: 3-14	DRAWING FILE: STANDARD-52.DWG		



ANCHOR BASE POLE FOUNDATION



ANCHOR BASE PEDESTAL FOUNDATION

NOTES:

- CONDUIT SIZE, NUMBER AND ORIENTATION SHALL BE PROVIDED IN THE FOUNDATION AS SHOWN ON THE PLANS.
- AN ADDITIONAL 2" P.V.C. CONDUIT (SCHEDULE 40) SHALL BE PROVIDED IN EACH COMBINATION POLE FOUNDATION FOR LIGHTING. IF POWER TO THE LUMINAIRES IS NOT TO BE PROVIDED AS PART OF THIS PROJECT, THIS CONDUIT SHALL BE CAPPED AT BOTH ENDS.
- MODIFICATION TO THE FOUNDATION WILL BE REQUIRED WHEN SOIL WITH LOAD BEARING CAPACITY OF LESS THAN 2000 POUNDS PER SQUARE FOOT IS ENCOUNTERED. MODIFICATION TO THE FOUNDATION IS SUBJECT TO THE APPROVAL OF THE ENGINEER.
- FOUNDATION SHALL BE CAST-IN PLACE WITH CLASS "C" CONCRETE. THE FOUNDATION SQUARE BASE (CAP) SHALL BE FORMED TO 6" BELOW GROUND LINE AND BE BUILT AS AN INTEGRAL PART OF FOUNDATION.
- ALL ANCHOR BOLTS SHALL BE PROVIDED WITH STANDARD GALVANIZED STEEL HEX NUTS, LEVELING NUTS, PLAIN AND LOCKWASHERS. ANCHOR BOLTS SHALL BE SECURED DURING THE PLACEMENT OF CONCRETE TO ENSURE ACCURATE BOLT CIRCLE AND BOLT PROJECTION "P".
- WHEN THE FOUNDATION IS PLACED ADJACENT TO A PAVED SURFACE, 1/2" PREFORMED EXPANSION JOINT MATERIAL SHALL BE PLACED BETWEEN THE FOUNDATION AND THE ADJACENT PAVED SURFACE. IN ADDITION;

FOR POLES: THE TOP OF THE FOUNDATION SHALL BE FLUSH WITH THE ADJACENT SURFACE AND SLOPED TO DRAIN.

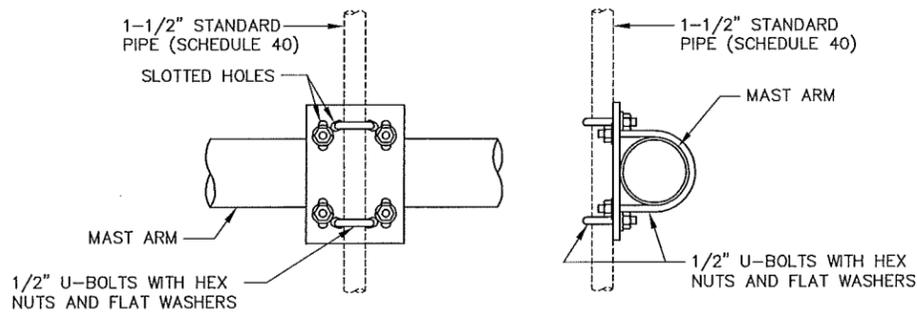
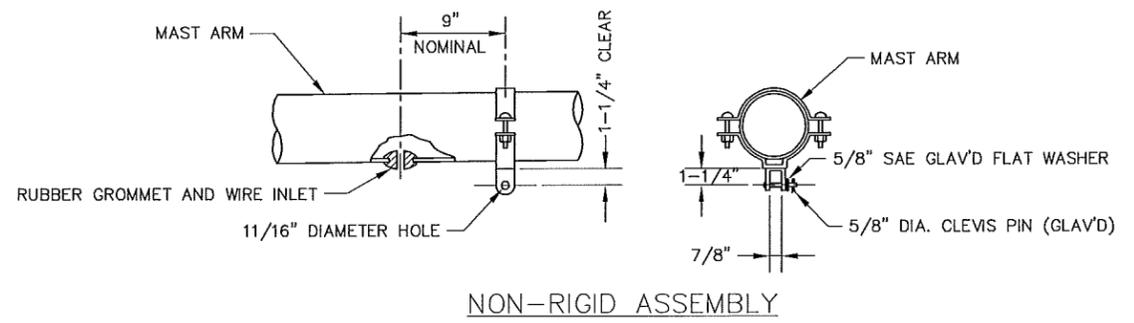
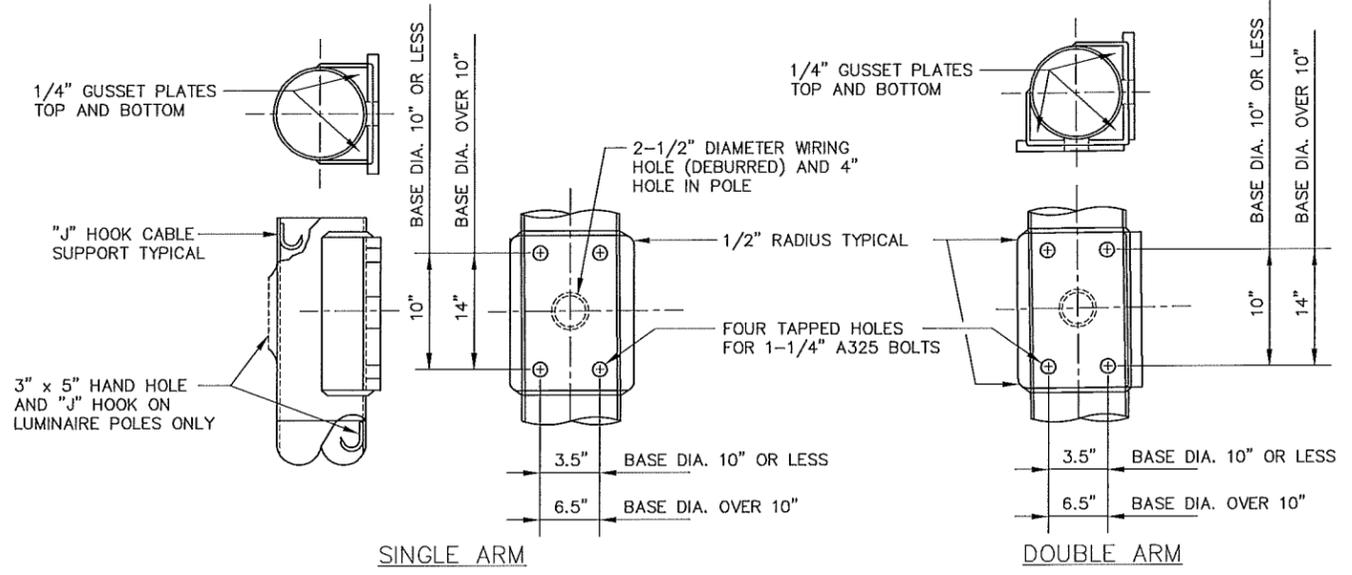
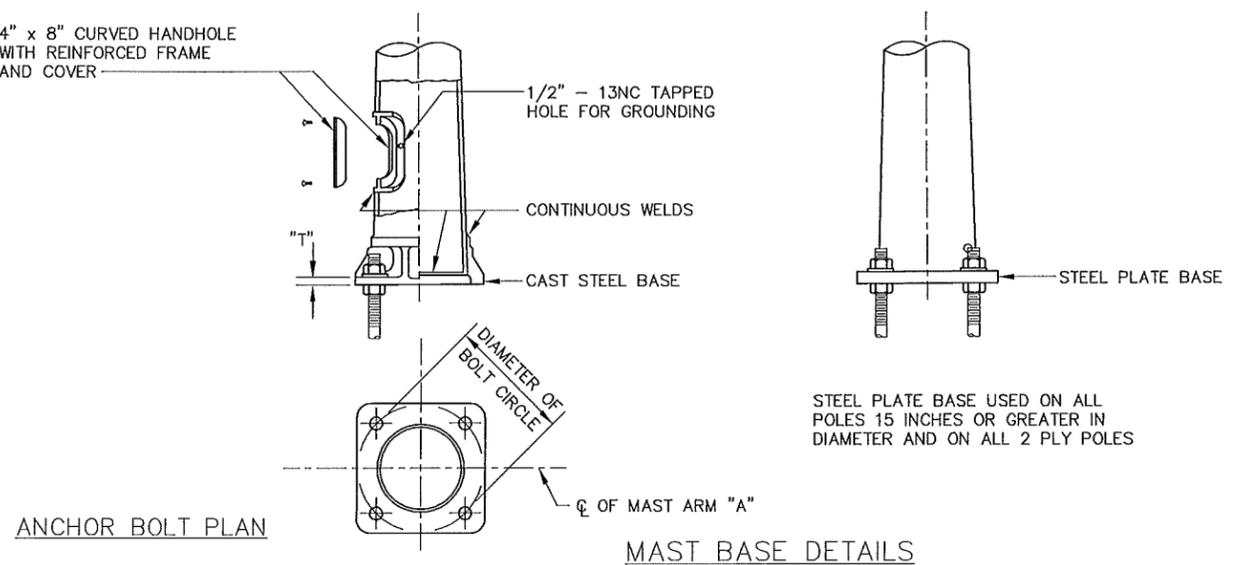
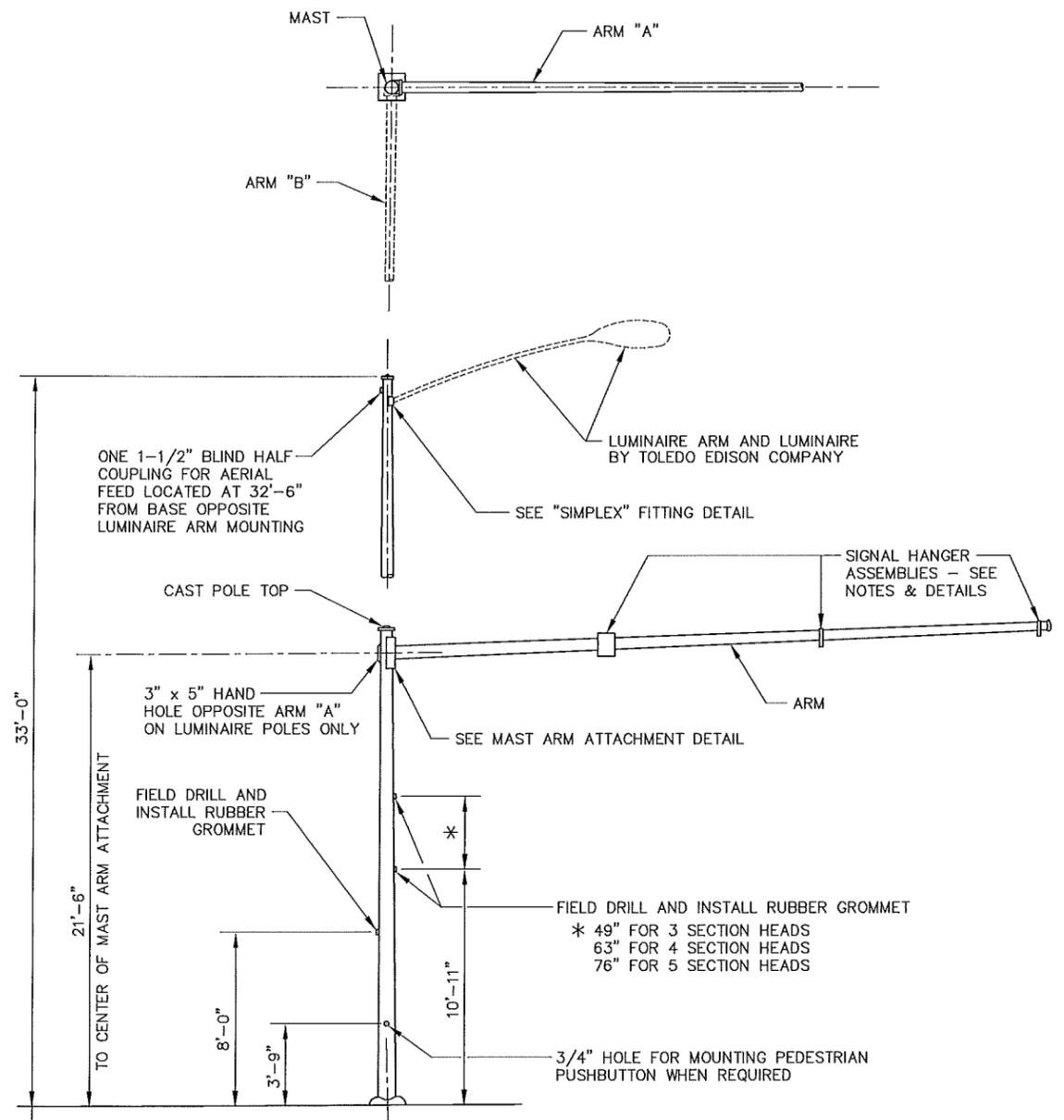
FOR PEDESTALS: THE AREA OF CONTACT WITH THE PEDESTAL BASE SHALL BE LEVEL. IF ADJACENT PAVED SLOPE, THE REMAINDER OF THE FOUNDATION TOP SHALL BE BEVELED TO MEET THE ADJACENT SURFACE.

FOUNDATION TYPE	POLE SIZE	"D" MIN.	BOLT CIRCLE	ANCHOR BOLT SIZE	Vert. Reinf. Bors Dia.	No.	PROJECTION "P"	CONC. CU. YD.
A	7GA. 9.0"	9'	12-1/2"	1-1/4" x 48"	3/4"	8	5-1/8"	2.41
B	7GA. 10.0"	10'	13-1/2"	1-1/2" x 60"	3/4"	8	5-7/8"	2.67
C	7GA. 11.0"	10'	15"	1-1/2" x 60"	3/4"	8	6-1/8"	2.67
D	7GA. 12.0"	10'	16"	1-1/2" x 60"	3/4"	8	6-1/2"	2.67
E	7GA. 13.0"	10'	18"	1-1/2" x 60"	1"	16	6-3/4"	2.67
F	3GA. 9.0"	12'	12-1/2"	1-1/2" x 60"	3/4"	8	5-1/8"	3.20
G	3GA. 10.0"	12'	13-1/2"	1-1/2" x 60"	3/4"	8	5-7/8"	3.20
H	3GA. 11.0"	12'	15"	1-3/4" x 90"	3/4"	8	6-1/8"	3.20
I	3GA. 12.0"	12'	16"	1-3/4" x 90"	3/4"	8	6-3/4"	3.20
J	3GA. 13.0"	12'	18"	1-3/4" x 90"	3/4"	16	7"	3.20
K	3GA. 14.0"	12'	20"	1-3/4" x 90"	3/4"	16	7-1/2"	3.20
L	0GA. 13.0"	13'	18"	2" x 90"	3/4"	16	7-1/4"	3.46
M	7+7GA.13.0"	13'	20"	2" x 90"	3/4"	16	7-3/4"	3.46
N	3+3GA.13.0"	13'	22"	2-1/4" x 96"	3/4"	16	8"	3.46
O	3+3GA.15.0"	15'	22"	2-1/2" x 114"	3/4"	16	8-3/4"	3.46
P	0GA. 14.0"	13'	20"	2" x 90"	3/4"	16	7-3/4"	3.46
Q	0GA. 15.0"	13'	22"	2" x 90"	3/4"	16	8-1/4"	3.46
R	0GA. 16.5"	13'	23-1/2"	2-1/4" x 96"	3/4"	16	8"	3.46
S	7+7GA.16.5"	13'	23-1/2"	2-1/4" x 96"	3/4"	16	8"	3.46

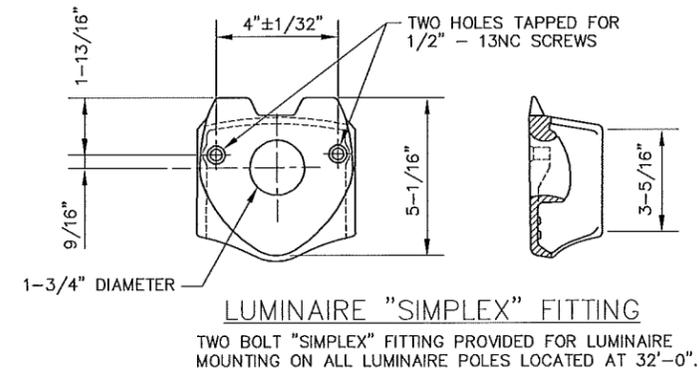
CITY OF TOLEDO
CONSTRUCTION STANDARDS

POLE FOUNDATIONS AND
PEDESTAL FOUNDATIONS DETAILS

DRAWN BY: TRAFFIC	DESIGNED BY:	SCALE: NO SCALE	53
DATE: 3-14	DRAWING FILE: STANDARD-53.DWG		



RIGID ASSEMBLY
MAST ARM MOUNTED SIGNAL HANGER ASSEMBLY

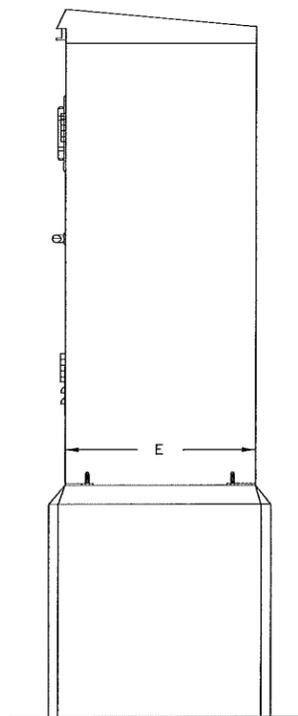
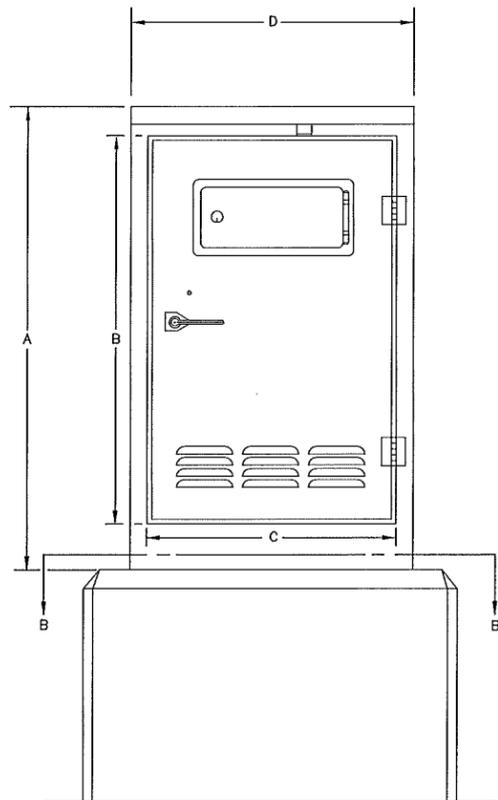
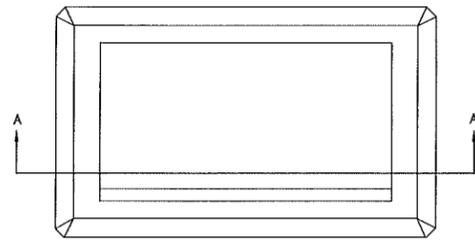


LUMINAIRE "SIMPLEX" FITTING
TWO BOLT "SIMPLEX" FITTING PROVIDED FOR LUMINAIRE MOUNTING ON ALL LUMINAIRE POLES LOCATED AT 32'-0".

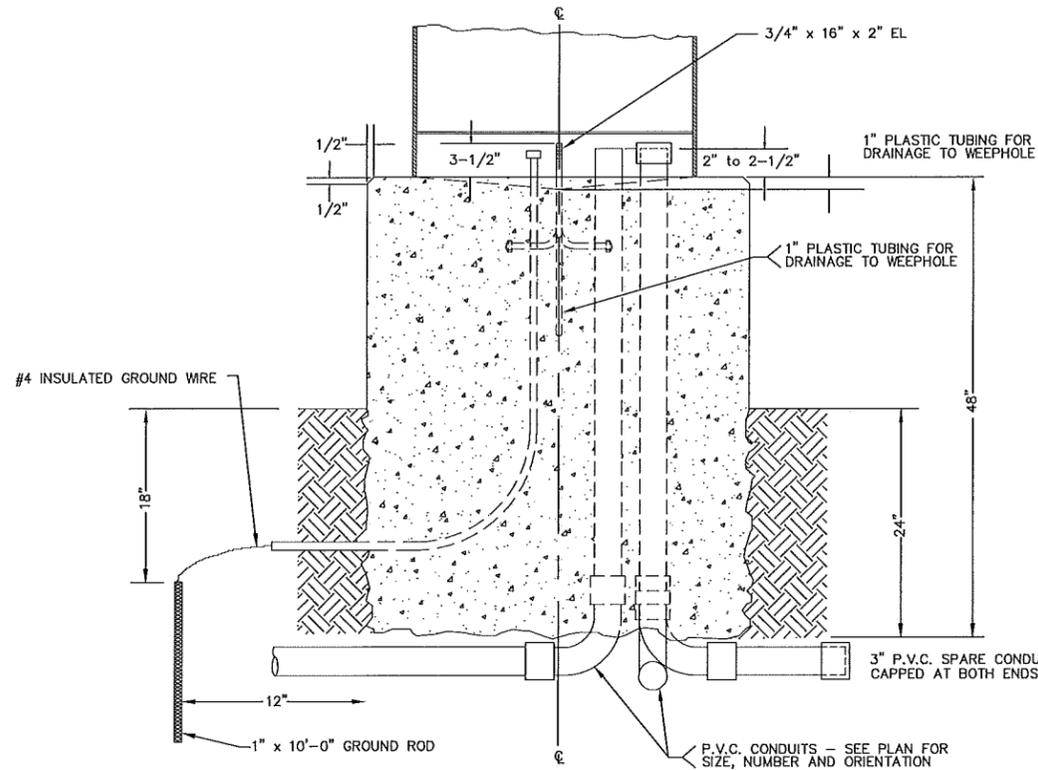
- NOTES**
- SEE PLANS AND, OR QUANTITY SUMMARY SHEETS FOR LOCATIONS AND SIZES OF SIGNAL HEADS. SIGNAL HEAD CLEARANCES SHALL BE 15'-0" MINIMUM TO 19'-0" MAXIMUM.
 - SIGNAL HEAD ATTACHMENTS TO MAST ARMS SHALL BE PROVIDED AS SHOWN ON THE FOLLOWING DETAILS.
 - A. NON-RIGID. MAST ARM MOUNTED SIGNAL HANGER ASSEMBLY.
 - B. RIGID MAST ARM MOUNTED SIGNAL HANGER ASSEMBLY.
 - SEE SPECIFICATIONS AND, OR, GENERALIZATION AND PAINTING REQUIREMENTS
 - STANDARD GAUGES

11 GAUGE	0.1196 INCHES
7 GAUGE	0.1793 INCHES
3 GAUGE	0.2391 INCHES
0 GAUGE	0.2990 INCHES
 - POLES SHALL HAVE A MINIMUM THICKNESS OF 7 GAUGE (0.1793 INCHES.)

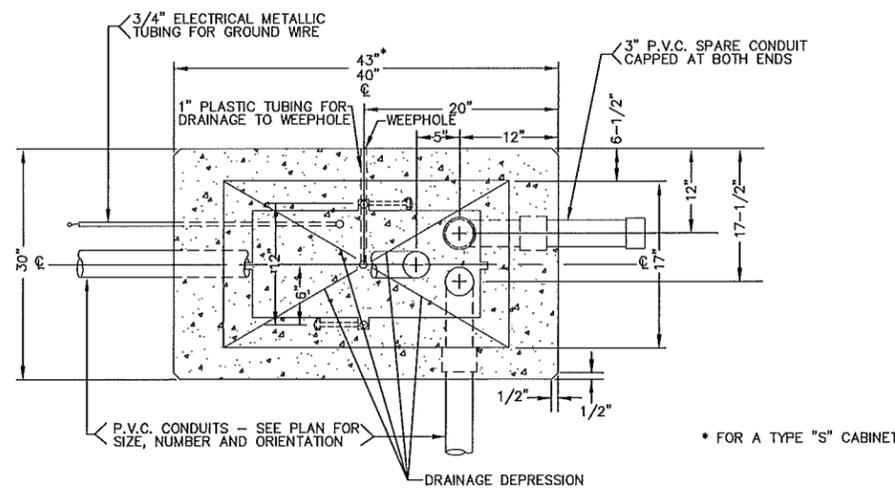
CITY OF TOLEDO CONSTRUCTION STANDARDS			
MAST ARM AND POLE ASSEMBLIES AND DETAILS			
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DATE: 3-14	DRAWING FILE: STANDARD-54.DWG		



CABINET TYPE	A	B	C	D	E	FOUND. TYPE
TYPE "M"	49-5/8"	39-3/4" - 40-1/4"	24-1/4" - 24-3/4"	36"	16-3/4"	M
TYPE "M-SX"	60"	40-1/2" - 47-3/4"	24-1/4" - 24-3/4"	36"	17"	M
TYPE "S"	35-1/2"	30-3/4"	33"	36"	25"	M



SECTION A - A



SECTION B - B

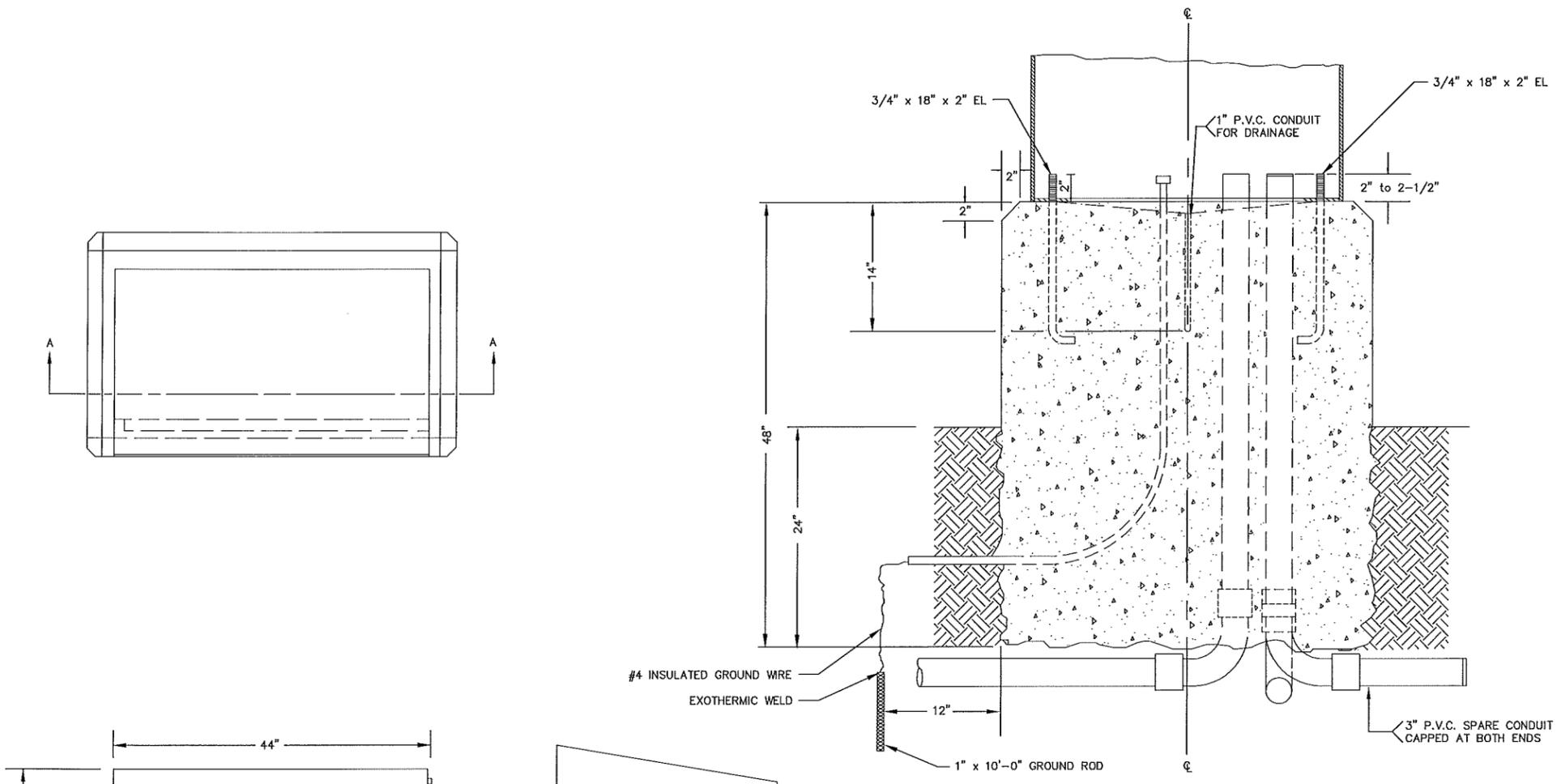
NOTES:

1. THE 120VAC CONVENIENCE OUTLET LAMP ASSEMBLY SHALL BE LOCATED NEAR THE UPPER PART OF THE BACK PANEL SO AS TO ILLUMINATE THE BACK PANEL. THE OUTLET LAMP ASSEMBLIES SHALL NOT INTERFERE WITH THE REMOVAL OR INSTALLATION OF ANY EQUIPMENT. AN ADDITIONAL 120VAC LAMP ASSEMBLY WITH FLEXIBLE GOOSENECK ARM SHALL BE MOUNTED ON THE HINGED SIDE OF THE CABINET JUST BELOW THE METAL SHELF SUPPORTING THE CONTROLLER UNIT.
 2. CABINET SHALL HAVE EAVES VENT (120 VOLT, 60 HERTZ) WITH A THERMO STATICALLY CONTROLLED FAN. THERMOSTAT CONTROL SHALL BE ADJUSTABLE FROM 70 DEGREES F TO 160 DEGREES F.
 3. THE DOOR FILTER FOR LOUVERS AT BOTTOM OF DOOR SHALL BE METAL, WASHABLE AND REMOVABLE.
 4. THE MAIN CABINET DOOR SHALL BE KEYED TO THE CITY OF TOLEDO MASTER, CORBIN KEY NO. 2 (IR6380). THE POLICE PANEL DOOR LOCK SHALL BE KEYED TO THE CITY OF TOLEDO MASTER, BRASS POLICE PANEL KEY. TWO SETS OF KEYS SHALL BE FURNISHED WITH EACH CABINET.
 5. THE CABINET SHALL BE MADE FROM 0.125 INCH THICK ALUMINUM SHEETING IN ITS NATURAL COLOR AND SHALL BE PAINTED WHITE ON THE INSIDE. THE INSIDE OF THE CABINET SHALL BE TREATED WITH A THREE STAGE IRON PHOSPHATE COATING, A ZINC CHROMATE PRIMER COATING, AND A BAKED WHITE ALKALI ENAMEL FINISH APPLIED. ALL COATINGS SHALL BE PROPERLY DRIED AND APPLIED SUCH THAT THE INSIDE WHITE WILL NOT PEEL FOR A GUARANTEED PERIOD OF TWO YEARS. ALL EXTERIOR SEAM WELDS SHALL BE CONTINUOUSLY WELDED. EXTERIOR SEAMS WHICH HAVE INTERIOR WELDS SHALL BE SEALED WITH A SILICONE SEALER. ALL EDGES SHALL BE SMOOTH WITH NO SHARP EDGES. THE CABINET DOOR SHALL BE HINGED USING A HEAVY GAUGE CONTINUOUS HINGE THAT HAS A STAINLESS STEEL HINGE PIN. THE HINGE SHALL BE BOLTED TO THE CABINET SO THE DOOR CAN BE REMOVED. THE BOLTS AND NUTS SHALL BE MADE OF STAINLESS STEEL AND SECURELY FASTENED TO PREVENT VIBRATION FROM LOOSENING OF THE NUTS. THE DOOR SHALL BE EQUIPPED WITH A THREE POINT LOCKING MECHANISM. A STAINLESS STEEL HANDLE WHICH CAN BE PADLOCKED AND SEALED WITH A NEOPRENE GASKET. THE DOOR SHALL BE DESIGNED SUCH THAT THE DOOR CAN BE FIXED IN A OPEN POSITION AT 90, 135 AND 180 DEGREES TO THE CABINET FACE.
 6. A SIGNAL/FLASH SWITCH LOCATED IN THE POLICE DOOR SHALL PLACE THE SIGNALS ON FLASH. THE POWER SWITCH SHALL CONTROL POWER ON OR POWER OFF.
 7. ALL BACK PANEL HARDWARE SHALL BE MOUNTED WITH SCREWS. RIVETS OR OTHER NON-REMOVABLE FASTENERS ARE NOT ACCEPTABLE.
- THE CABINETS SHALL HAVE ADEQUATE SPARE SPACE FOR ONE LOCAL ADAPTER UNIT (LAU) 8"W x 12"H x 18"D. THE LAU WILL BE PROVIDED BY THE CITY OF TOLEDO. THE CABINET SHALL HAVE ONE SOLID SHELF IN THE UPPER RIGHT CORNER OF THE CABINET FOR THE LAU.
8. THE CABINET SHALL BE PROVIDED WITH TWO METAL SHELVES MOUNTED ON ADJUSTABLE BRACKETS TO SUPPORT THE CONTROLLER UNIT AND AUXILIARY EQUIPMENT.
 9. EACH CABINET SHALL HAVE A ZIPLOCK CLOSING PLASTIC ENVELOPE (12" x 14").
 10. THE CABINET SHALL BE BUILT WITH A SLANT ROOF CONSTRUCTION AND BUILT WITH DRIP SHIELD OVER FRONT DOOR.
 11. THE CONTRACTOR SHALL PLACE THE CONDUITS IN THE FOUNDATION AS SHOWN ON THE SIGNAL LAYOUT SHEET.
 12. WHEN THE FOUNDATION IS PLACED ADJACENT TO A PAVED SURFACE, 1/2" PREFORMED EXPANSION JOINT MATERIAL SHALL BE PLACED BETWEEN THE FOUNDATION AND THE ADJACENT PAVED SURFACE.
 13. A 40" x 30" x 4" WORK PAD SHALL BE LOCATED IN FRONT OF EACH CONTROLLER FOUNDATION UNLESS IN AN OTHERWISE PAVED AREA. THE TOP OF THE PAD SHALL BE 1" ABOVE THE GROUND LINE AND SHALL BE SLOPED TO PROVIDE DRAINAGE. THE PRICE OF WORK PAD SHALL BE INCLUDED IN THE PRICE OF THE FOUNDATION.
 14. ANCHOR BOLTS SHALL BE 3/4 INCH IN DIAMETER, 16 INCHES LONG, WITH A 90 DEGREE BEND WITH A 2 INCH LEG (OVERALL LENGTH OF 18 INCHES). THE END OPPOSITE THE LEG SHALL BE THREADED FOR AT LEAST 3 INCHES WITH A 3/4 UNC-10-THREAD. ANCHOR BOLTS SHALL BE STEEL WITH HOT-DIPPED GALVANIZED SURFACE TREATMENT. FOUR ANCHOR BOLTS WITH FOUR PLATED STEEL NUTS AND ONE PLATED FLAT WASHER PER BOLT SHALL BE PROVIDED WITH EACH CABINET. ANCHOR BOLTS SHALL BE INSTALLED DURING THE CONCRETE POUR. THE CITY OF TOLEDO WILL NOT ACCEPT DRILLING AND INSTALLING ANCHOR BOLTS AFTER THE CONCRETE HAS CURED.

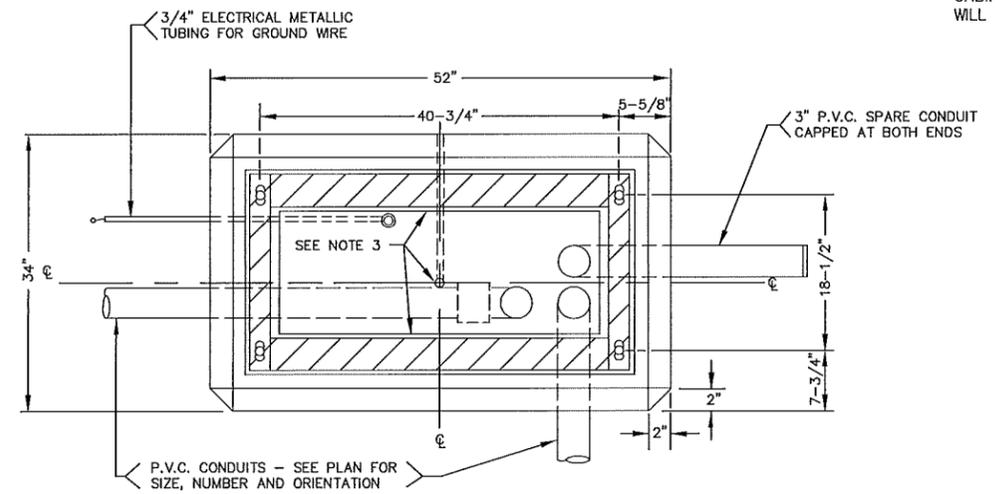
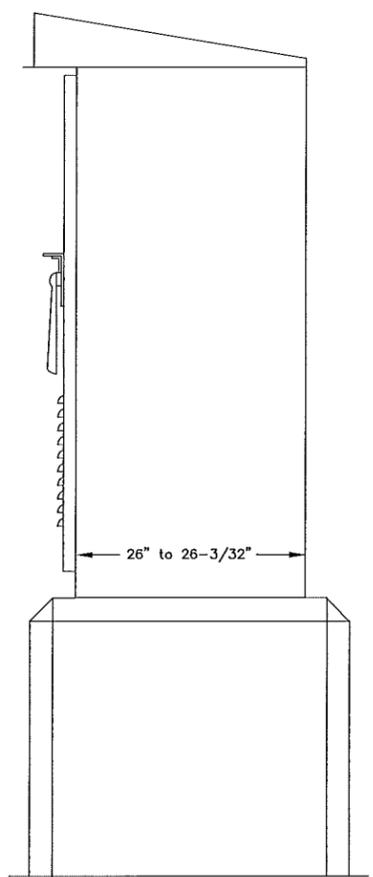
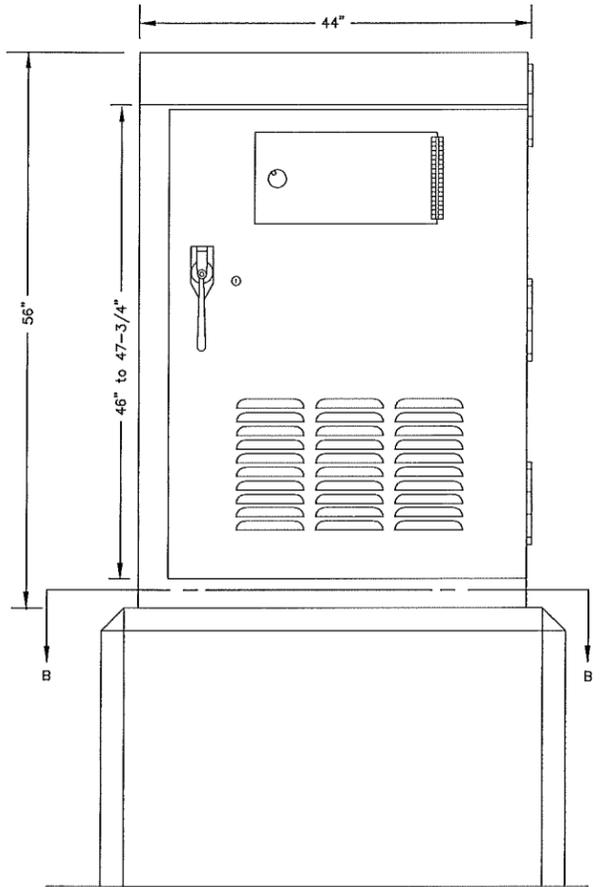
CITY OF TOLEDO
CONSTRUCTION STANDARDS

TYPE "M" AND "M-SX" & "S" CABINET
WITH FOUNDATION DETAILS

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DATE: 12-14	DRAWING FILE: STANDARD-56.DWG		



SECTION A - A



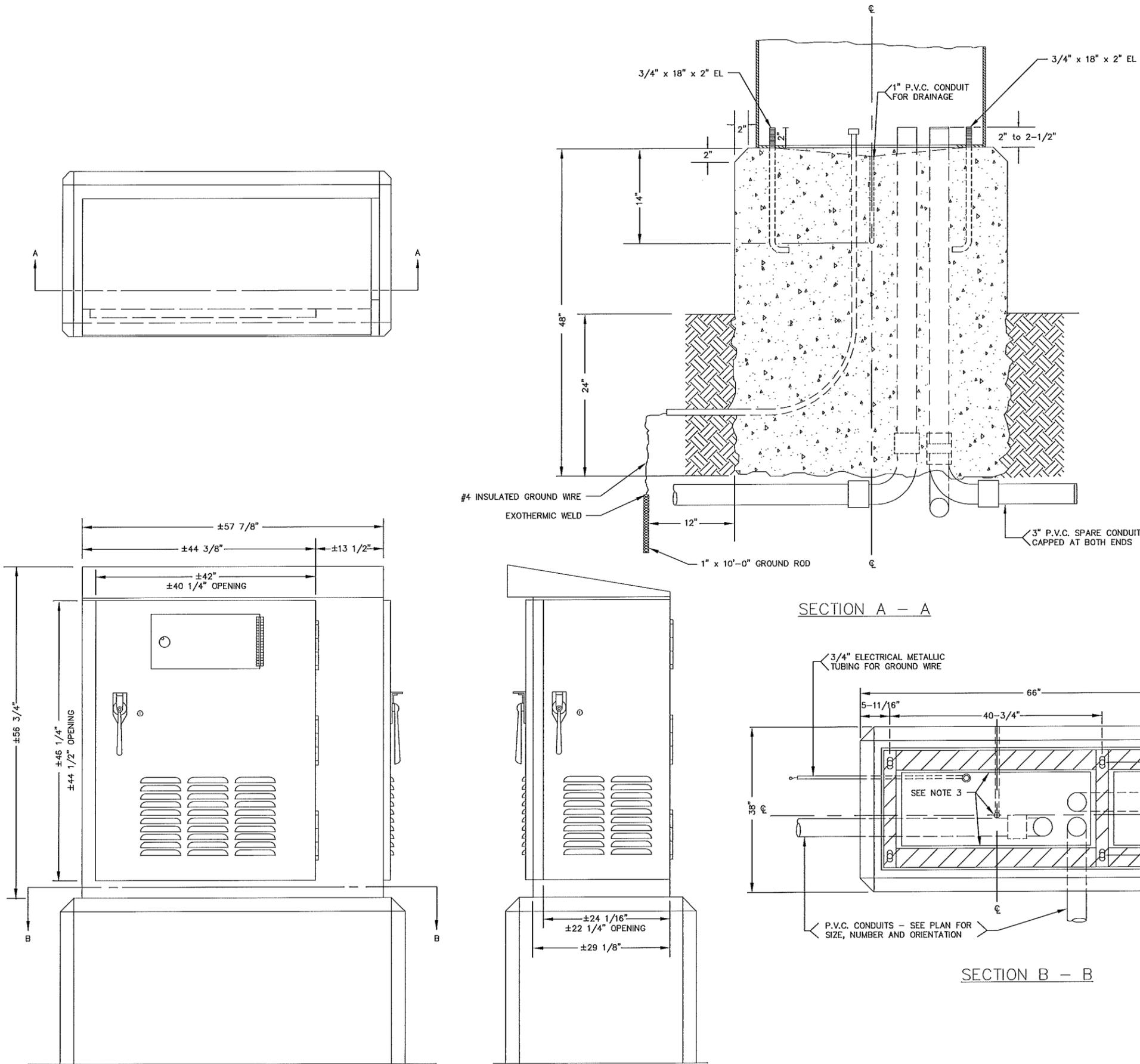
SECTION B - B

NOTES:

1. THE 120VAC CONVENIENCE OUTLET LAMP ASSEMBLY SHALL BE LOCATED NEAR THE UPPER PART OF THE BACK PANEL SO AS TO ILLUMINATE THE BACK PANEL. THE OUTLET LAMP ASSEMBLIES SHALL NOT INTERFERE WITH THE REMOVAL OR INSTALLATION OF ANY EQUIPMENT. AN ADDITIONAL 120VAC LAMP ASSEMBLY WITH FLEXIBLE GOOSENECK ARM SHALL BE MOUNTED ON THE HINGED SIDE OF THE CABINET JUST BELOW THE METAL SHELF SUPPORTING THE CONTROLLER UNIT.
2. CABINET SHALL HAVE EAVES VENT (120 VOLT, 60 HERTZ) WITH A THERMO STATICALLY CONTROLLED FAN. THERMOSTAT CONTROL SHALL BE ADJUSTABLE FROM 70 DEGREES F TO 160 DEGREES F.
3. THE DOOR FILTER FOR LOUVERS AT BOTTOM OF DOOR SHALL BE METAL, WASHABLE AND REMOVABLE.
4. THE MAIN CABINET DOOR SHALL BE KEYED TO THE CITY OF TOLEDO MASTER, CORBIN KEY NO. 2 (IR6380). THE POLICE PANEL DOOR LOCK SHALL BE KEYED TO THE CITY OF TOLEDO MASTER, BRASS POLICE PANEL KEY. TWO SETS OF KEYS SHALL BE FURNISHED WITH EACH CABINET.
5. THE CABINET SHALL BE MADE FROM 0.125 INCH THICK ALUMINUM SHEETING IN ITS NATURAL COLOR AND SHALL BE PAINTED WHITE ON THE INSIDE. THE INSIDE OF THE CABINET SHALL BE TREATED WITH A THREE STAGE IRON PHOSPHATE COATING, A ZINC CHROMATE PRIMER COATING, AND A BAKED WHITE ALKALI ENAMEL FINISH APPLIED. ALL COATINGS SHALL BE PROPERLY DRIED AND APPLIED SUCH THAT THE INSIDE WHITE WILL NOT PEEL FOR A GUARANTEED PERIOD OF TWO YEARS. ALL EXTERIOR SEAM WELDS SHALL BE CONTINUOUSLY WELDED. EXTERIOR SEAMS WHICH HAVE INTERIOR WELDS SHALL BE SEALED WITH A SILICONE SEALER. ALL EDGES SHALL BE SMOOTH WITH NO SHARP EDGES. THE CABINET DOOR SHALL BE HINGED USING A HEAVY GAUGE CONTINUOUS HINGE THAT HAS A STAINLESS STEEL HINGE PIN. THE HINGE SHALL BE BOLTED TO THE CABINET SO THE DOOR CAN BE REMOVED. THE BOLTS AND NUTS SHALL BE MADE OF STAINLESS STEEL AND SECURELY FASTENED TO PREVENT VIBRATION FROM LOOSENING OF THE NUTS. THE DOOR SHALL BE EQUIPPED WITH A THREE POINT LOCKING MECHANISM. A STAINLESS STEEL HANDLE WHICH CAN BE PADLOCKED AND SEALED WITH A NEOPRENE GASKET. THE DOOR SHALL BE DESIGNED SUCH THAT THE DOOR CAN BE FIXED IN A OPEN POSITION AT 90, 135 AND 180 DEGREES TO THE CABINET FACE.
6. A SIGNAL/FLASH SWITCH LOCATED IN THE POLICE DOOR SHALL PLACE THE SIGNALS ON FLASH. THE POWER SWITCH SHALL CONTROL POWER ON OR POWER OFF.
7. ALL BACK PANEL HARDWARE SHALL BE MOUNTED WITH SCREWS. RIVETS OR OTHER NON-REMOVABLE FASTENERS ARE NOT ACCEPTABLE.

THE CABINETS SHALL HAVE ADEQUATE SPARE SPACE FOR ONE LOCAL ADAPTER UNIT (LAU) 8"W x 12"H x 18"D. THE LAU WILL BE PROVIDED BY THE CITY OF TOLEDO. THE CABINET SHALL HAVE ONE SOLID SHELF IN THE UPPER RIGHT CORNER OF THE CABINET FOR THE LAU.
8. THE CABINET SHALL BE PROVIDED WITH TWO METAL SHELVES MOUNTED ON ADJUSTABLE BRACKETS TO SUPPORT THE CONTROLLER UNIT AND AUXILIARY EQUIPMENT.
9. EACH CABINET SHALL HAVE A ZIPLOCK CLOSING PLASTIC ENVELOPE (12" x 14").
10. THE CABINET SHALL BE BUILT WITH A SLANT ROOF CONSTRUCTION AND BUILT WITH DRIP SHIELD OVER FRONT DOOR.
11. THE CONTRACTOR SHALL PLACE THE CONDUITS IN THE FOUNDATION AS SHOWN ON THE SIGNAL LAYOUT SHEET.
12. WHEN THE FOUNDATION IS PLACED ADJACENT TO A PAVED SURFACE, 1/2" PREFORMED EXPANSION JOINT MATERIAL SHALL BE PLACED BETWEEN THE FOUNDATION AND THE ADJACENT PAVED SURFACE.
13. COMPOUND.
14. A 40" x 30" x 4" WORK PAD SHALL BE LOCATED IN FRONT OF EACH CONTROLLER FOUNDATION UNLESS IN AN OTHERWISE PAVED AREA. THE TOP OF THE PAD SHALL BE 1" ABOVE THE GROUND LINE AND SHALL BE SLOPED TO PROVIDE DRAINAGE. THE PRICE OF WORK PAD SHALL BE INCLUDED IN THE PRICE OF THE FOUNDATION.
15. ANCHOR BOLTS SHALL BE 3/4 INCH IN DIAMETER, 16 INCHES LONG, WITH A 90 DEGREE BEND WITH A 2 INCH LEG (OVERALL LENGTH OF 18 INCHES). THE END OPPOSITE THE LEG SHALL BE THREADED FOR AT LEAST 3 INCHES WITH A 3/4 UNC-10-THREAD. ANCHOR BOLTS SHALL BE STEEL WITH HOT-DIPPED GALVANIZED SURFACE TREATMENT. FOUR ANCHOR BOLTS WITH FOUR PLATED STEEL NUTS AND ONE PLATED FLAT WASHER PER BOLT SHALL BE PROVIDED WITH EACH CABINET. ANCHOR BOLTS SHALL BE INSTALLED DURING THE CONCRETE POUR. THE CITY OF TOLEDO WILL NOT ACCEPT DRILLING AND INSTALLING ANCHOR BOLTS AFTER THE CONCRETE HAS CURED.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
TYPE "P" CABINET WITH FOUNDATION (ALUMINUM)			
DRAWN BY: TRAFFIC	DESIGNED BY:	SCALE: NO SCALE	57
DATE: 3-14	DRAWING FILE: STANDARD-57.DWG		

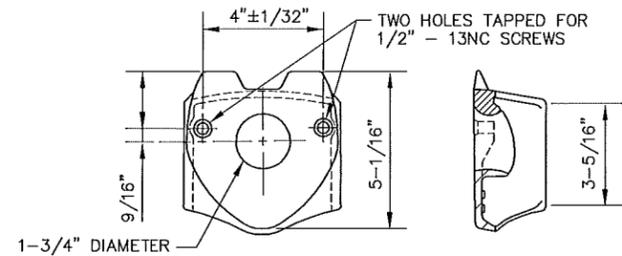


NOTES:

1. THE 120VAC CONVENIENCE OUTLET LAMP ASSEMBLY SHALL BE LOCATED NEAR THE UPPER PART OF THE BACK PANEL SO AS TO ILLUMINATE THE BACK PANEL. THE OUTLET LAMP ASSEMBLIES SHALL NOT INTERFERE WITH THE REMOVAL OR INSTALLATION OF ANY EQUIPMENT. AN ADDITIONAL 120VAC LAMP ASSEMBLY WITH FLEXIBLE GOOSENECK ARM SHALL BE MOUNTED ON THE HINGED SIDE OF THE CABINET JUST BELOW THE METAL SHELF SUPPORTING THE CONTROLLER UNIT.
 2. CABINET SHALL HAVE EAVES VENT (120 VOLT, 60 HERTZ) WITH A THERMO STATICALLY CONTROLLED FAN. THERMOSTAT CONTROL SHALL BE ADJUSTABLE FROM 70 DEGREES F TO 160 DEGREES F.
 3. THE DOOR FILTER FOR LOUVERS AT BOTTOM OF DOOR SHALL BE METAL, WASHABLE AND REMOVABLE.
 4. THE MAIN CABINET DOOR SHALL BE KEYPED TO THE CITY OF TOLEDO MASTER, CORBIN KEY NO. 2 (JR6380). THE POLICE PANEL DOOR LOCK SHALL BE KEYPED TO THE CITY OF TOLEDO MASTER, BRASS POLICE PANEL KEY. TWO SETS OF KEYS SHALL BE FURNISHED WITH EACH CABINET.
 5. THE CABINET SHALL BE MADE FROM 0.125 INCH THICK ALUMINUM SHEETING IN ITS NATURAL COLOR AND SHALL BE PAINTED WHITE ON THE INSIDE. THE INSIDE OF THE CABINET SHALL BE TREATED WITH A THREE STAGE IRON PHOSPHATE COATING, A ZINC CHROMATE PRIMER COATING, AND A BAKED WHITE ALKALI ENAMEL FINISH APPLIED. ALL COATINGS SHALL BE PROPERLY DRIED AND APPLIED SUCH THAT THE INSIDE WHITE WILL NOT PEEL FOR A GUARANTEED PERIOD OF TWO YEARS. ALL EXTERIOR SEAM WELDS SHALL BE CONTINUOUSLY WELDED. EXTERIOR SEAMS WHICH HAVE INTERIOR WELDS SHALL BE SEALED WITH A SILICONE SEALER. ALL EDGES SHALL BE SMOOTH WITH NO SHARP EDGES. THE CABINET DOOR SHALL BE HINGED USING A HEAVY GAUGE CONTINUOUS HINGE THAT HAS A STAINLESS STEEL HINGE PIN. THE HINGE SHALL BE BOLTED TO THE CABINET SO THE DOOR CAN BE REMOVED. THE BOLTS AND NUTS SHALL BE MADE OF STAINLESS STEEL AND SECURELY FASTENED TO PREVENT VIBRATION FROM LOOSENING OF THE NUTS. THE DOOR SHALL BE EQUIPPED WITH A THREE POINT LOCKING MECHANISM. A STAINLESS STEEL HANDLE WHICH CAN BE PADLOCKED AND SEALED WITH A NEOPRENE GASKET. THE DOOR SHALL BE DESIGNED SUCH THAT THE DOOR CAN BE FIXED IN A OPEN POSITION AT 90, 135 AND 180 DEGREES TO THE CABINET FACE.
 6. A SIGNAL/FLASH SWITCH LOCATED IN THE POLICE DOOR SHALL PLACE THE SIGNALS ON FLASH. THE POWER SWITCH SHALL CONTROL POWER ON OR POWER OFF.
 7. ALL BACK PANEL HARDWARE SHALL BE MOUNTED WITH SCREWS. RIVETS OR OTHER NON-REMOVABLE FASTENERS ARE NOT ACCEPTABLE.
- THE CABINETS SHALL HAVE ADEQUATE SPARE SPACE FOR ONE LOCAL ADAPTER UNIT (LAU) 8"W x 12"H x 18"D. THE LAU WILL BE PROVIDED BY THE CITY OF TOLEDO. THE CABINET SHALL HAVE ONE SOLID SHELF IN THE UPPER RIGHT CORNER OF THE CABINET FOR THE LAU.
8. THE CABINET SHALL BE PROVIDED WITH TWO METAL SHELVES MOUNTED ON ADJUSTABLE BRACKETS TO SUPPORT THE CONTROLLER UNIT AND AUXILIARY EQUIPMENT.
 9. EACH CABINET SHALL HAVE A ZIPLOCK CLOSING PLASTIC ENVELOPE (12" x 14").
 10. THE CABINET SHALL BE BUILT WITH A SLANT ROOF CONSTRUCTION AND BUILT WITH DRIP SHIELD OVER FRONT DOOR.
 11. THE CONTRACTOR SHALL PLACE THE CONDUITS IN THE FOUNDATION AS SHOWN ON THE SIGNAL LAYOUT SHEET.
 12. WHEN THE FOUNDATION IS PLACED ADJACENT TO A PAVED SURFACE, 1/2" PREFORMED EXPANSION JOINT MATERIAL SHALL BE PLACED BETWEEN THE FOUNDATION AND THE ADJACENT PAVED SURFACE.
 13. A 40" x 30" x 4" WORK PAD SHALL BE LOCATED IN FRONT OF EACH CONTROLLER FOUNDATION UNLESS IN AN OTHERWISE PAVED AREA. THE TOP OF THE PAD SHALL BE 1" ABOVE THE GROUND LINE AND SHALL BE SLOPED TO PROVIDE DRAINAGE. THE PRICE OF WORK PAD SHALL BE INCLUDED IN THE PRICE OF THE FOUNDATION.
 14. ANCHOR BOLTS SHALL BE 3/4 INCH IN DIAMETER, 16 INCHES LONG, WITH A 90 DEGREE BEND WITH A 2 INCH LEG (OVERALL LENGTH OF 18 INCHES). THE END OPPOSITE THE LEG SHALL BE THREADED FOR AT LEAST 3 INCHES WITH A 3/4 UNC-10-THREAD. ANCHOR BOLTS SHALL BE STEEL WITH HOT-DIPPED GALVANIZED SURFACE TREATMENT. FOUR ANCHOR BOLTS WITH FOUR PLATED STEEL NUTS AND ONE PLATED FLAT WASHER PER BOLT SHALL BE PROVIDED WITH EACH CABINET. ANCHOR BOLTS SHALL BE INSTALLED DURING THE CONCRETE POUR. THE CITY OF TOLEDO WILL NOT ACCEPT DRILLING AND INSTALLING ANCHOR BOLTS AFTER THE CONCRETE HAS CURED.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
TYPE "P-UPS" CABINET WITH MODIFIED FOUNDATION (ALUMINUM)			
DRAWN BY: TRAFFIC	DESIGNED BY:	SCALE: NO SCALE	58
DATE: 12-14	DRAWING FILE: STANDARD-58.DWG		

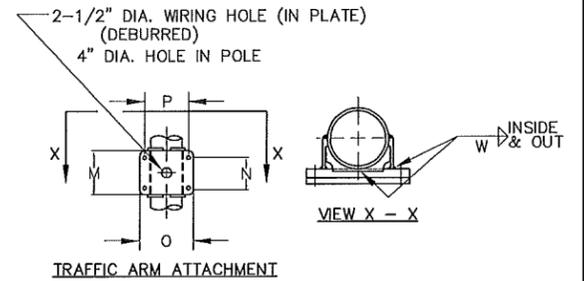
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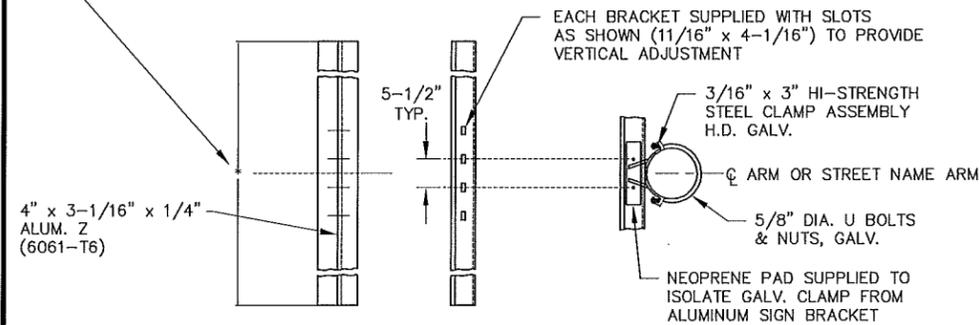
LUMINAIRE "SIMPLEX" FITTING

TWO BOLT "SIMPLEX" FITTING PROVIDED FOR LUMINAIRE MOUNTING ON ALL LUMINAIRE POLES LOCATED AT 32'-0".

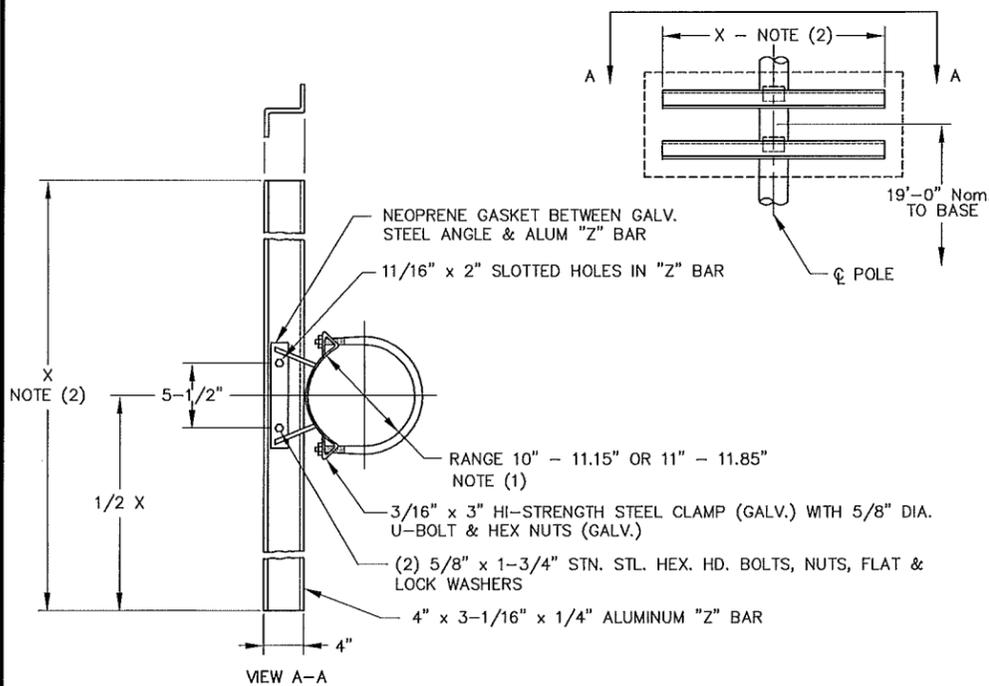
DESIGN NO'S.				POLE GA. & DIAMETER	TRAFFIC ARM				FOUND. TYPE	
33'-0" POLE		24'-0" POLE			ARM SIZES		RISE			
STREET SIGN ATTACH. WITH	WITHOUT	WITH	WITHOUT		SECTION A	SECTION B	C	MIN.	MAX.	
145 LW	145 LO	145 SW	145 SO	OE - 15"	7&7E-11.0"x7.5"x25'-0"	7E- 8.0"x4.92"x22'-0"	46'	15"	29"	Q
155 LW	155 LO	155 SW	155 SO	OE - 16.5"	7&7E-12.0"x8.47"x25'-3"	7E- 9.0"x5.64"x24'-0"	48'	16"	30"	R
165 LW	165 LO	165 SW	165 SO	7 & 7E - 16.5"	3&7E-12.0"x8.47"x25'-3"	3E- 9.14"x5.50"x26'-0"	50'	17"	32"	S
175 LW	175 LO	175 SW	175 SO	7 & 7E - 16.5"	3&7E-12.0"x8.47"x25'-3"	3E- 9.14"x5.22"x28'-0"	52'	17"	32"	S



* NOTE: FOR USE WITH 4'-6" HIGH SIGNS SHOWN AND STREET NAME SIGNS (IF REQUIRED) FOR STREET SIGN ATTACH, LENGTH TO BE SPECIFIED BY SIGN HEIGHT (GENERAL NOTE #5)



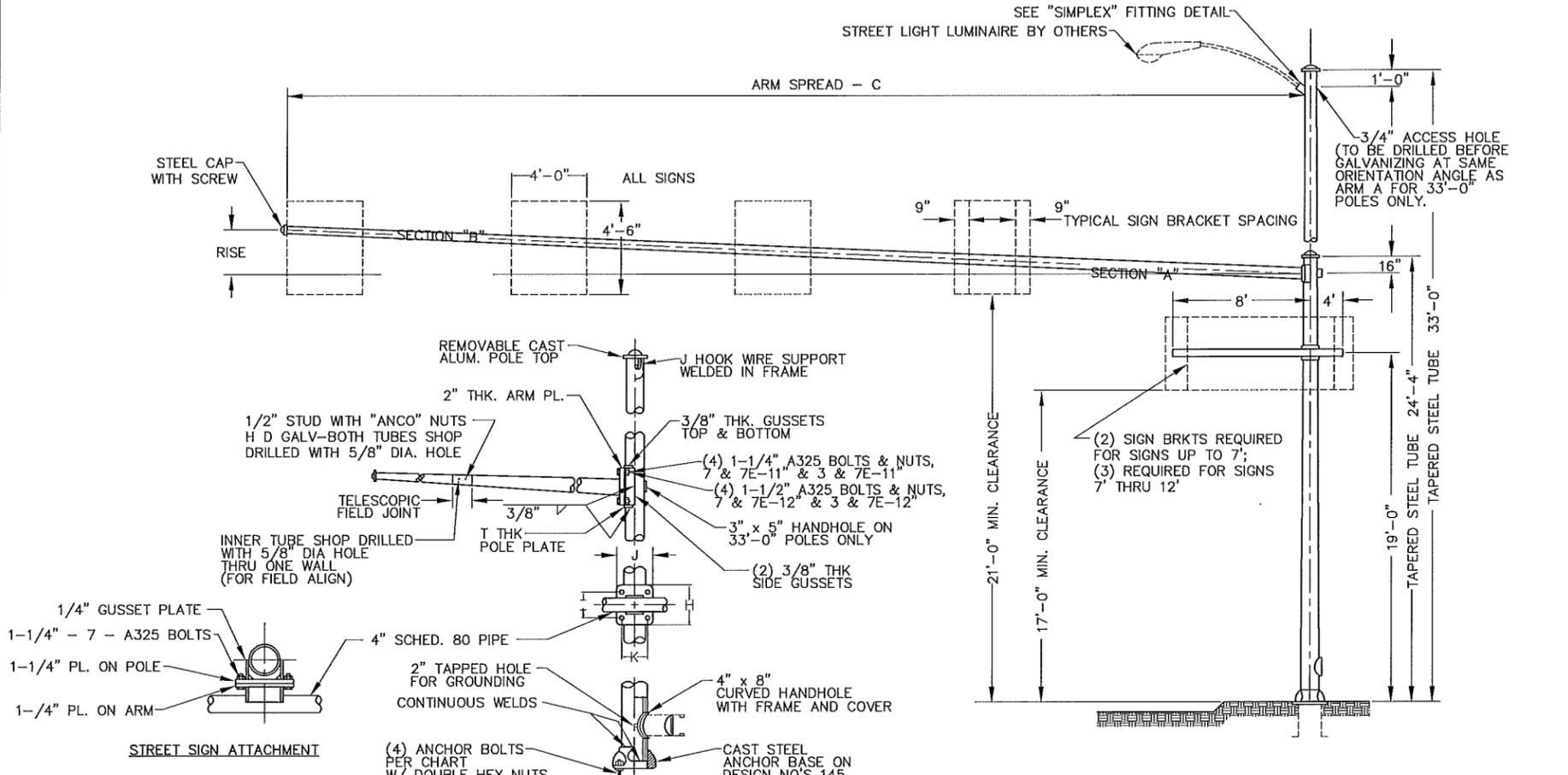
**DETAIL A
SIGN BRACKET DETAIL**



STREET SIGN BRACKET ASSEMBLY

(TO BE USED ON EXISTING POLE WHERE NO CONNECTION IS PROVIDED FOR STREET NAME SIGN)

- NOTES:
 (1) SIGN BRACKETS FURNISHED BASED ON LOCATION AND SIZE OF POLE DESIGNED
 (2) LENGTH SPECIFIED BY SIGN LENGTH



BASE PLATE DATA			
POLE DIA.	B.C. (in.)	SQ. (in.)	ANC. BOLTS
OE - 15"	22	23	2" x 90"
OE - 16.5"	23-1/2	24-1/2	2-1/4" x 96"
7 & 7E - 16.5"	23-1/2	24-1/2	2-1/4" x 96"

- GENERAL NOTES:
 1. SIGN BRACKET DETAILS SHOWN ON DETAIL A
 2. THE BID ITEM FOR EACH CANTILEVER SIGN SUPPORT SHALL INCLUDE THE MAST ARM, AN UPRIGHT POLE SHAFT, AN ANCHOR BASE, FOUR ANCHOR BOLTS AND NUTS, SIGN BRACKET ASSEMBLY, (SIGN BRACKET AND CLAMPS) AND ANY OTHER HARDWARE, ATTACHMENTS, MODIFICATIONS, AND ACCESSORIES REQUIRED TO MAKE A COMPLETE INSTALLATION AS SHOWN HEREON
 3. ALL UPRIGHT POLE SHAFTS AND MAST ARMS SHALL BE ROUND IN CROSS SECTION AND BE UNIFORMLY TAPERED FROM BUTT TO TIP APPROXIMATELY ONE INCH IN DIAMETER FOR EACH SEVEN LINEAL FEET IN LENGTH (0.14 INCHES PER FOOT)
 4. SEE FOUNDATION DETAILS SHEET ATTACHED FOR FOUNDATION DETAILS
 5. SEE PLANS AND/OR QUANTITY SUMMARY SHEETS FOR LOCATIONS AND SIZES OF SIGNS

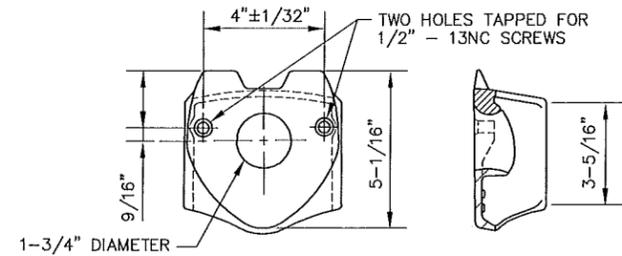
POLE DIA.	STREET SIGN ATTACHMENT				TRAFFIC ARM							
	H (in.)	I (in.)	J (in.)	K (in.)	ARM DIA.	M (in.)	N (in.)	O (in.)	P (in.)	ARM PL (in.)	POLE PL (in.)	W (in.)
OE - 15"	13	10	14-1/2	10-1/4	7 & 7E - 11"	23	12	20-1/2	16-1/2	2	2	3/8
OE - 16.5"	15	12	16-1/2	11-1/2	7 & 7E - 12"	24	13	22	18	2	2	5/16
7 & 7E - 16.5"	15	12	16-1/2	11-1/2	3 & 7E - 12"	30	13	22	18	2	2	5/16

**CITY OF TOLEDO
CONSTRUCTION STANDARDS**

**CANTILEVER SIGN SUPPORT
4 - LANE CONTROL**

DRAWN BY: TRAFFIC	DESIGNED BY:	SCALE: NO SCALE	59
DATE: 12-14	DRAWING FILE: STANDARD-59.DWG		

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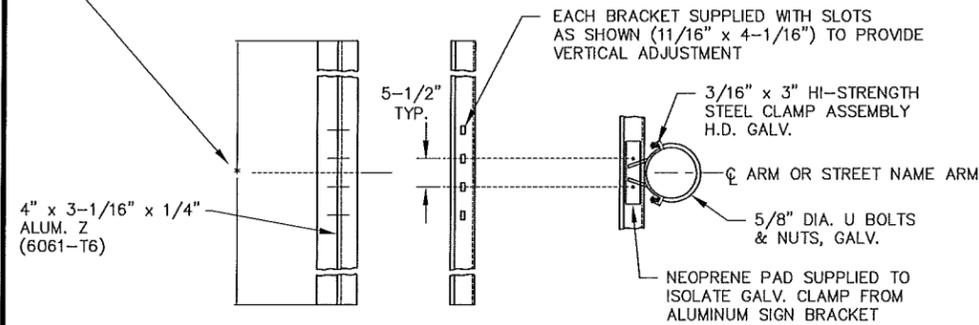


LUMINAIRE "SIMPLEX" FITTING

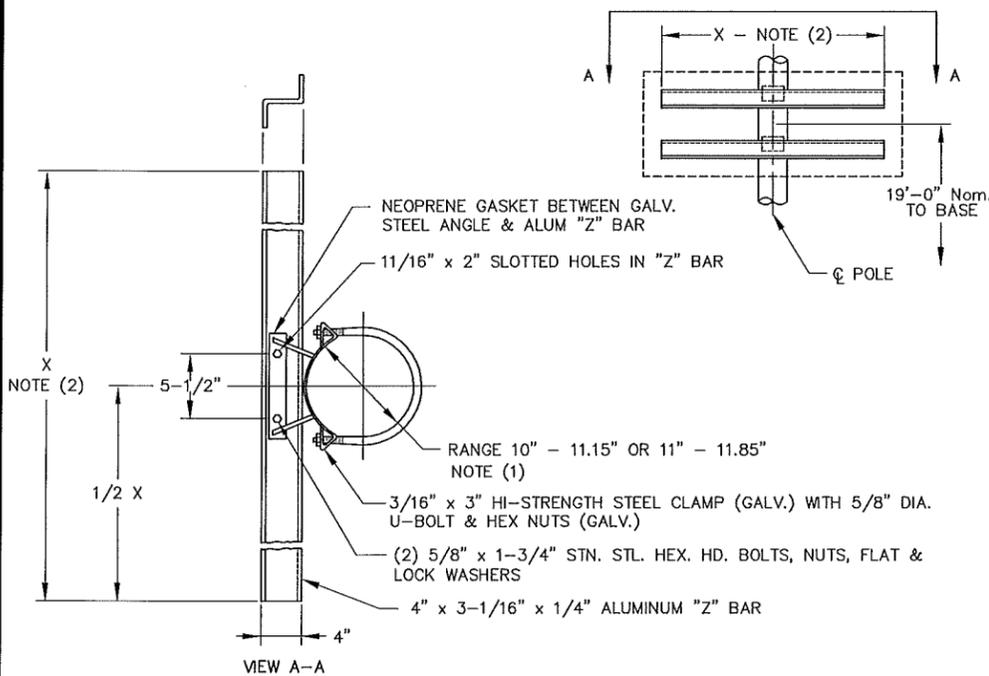
TWO BOLT "SIMPLEX" FITTING PROVIDED FOR LUMINAIRE MOUNTING ON ALL LUMINAIRE POLES LOCATED AT 32'-0".

DESIGN NO'S.				POLE GA. & DIAMETER	TRAFFIC ARM			FOUND. TYPE		
33'-0" POLE		24'-0" POLE			ARM SIZES		RISE			
STREET SIGN ATTACH. WITH	WITHOUT	STREET SIGN ATTACH. WITH	WITHOUT	SECTION A	SECTION B	C	MIN.	MAX.		
85 LW	85 LO	85 SW	85 SO	7 & 7E - 13"	7&7E-9.0"x4.24"x34'-0"		34'	11"	22"	M
95 LW	95 LO	95 SW	95 SO	7 & 7E - 13"	7&7E-9.0"x3.96"x36'-0"		36'	11"	23"	M
105 LW	105 LO	105 SW	105 SO	OE - 14"	7&7E-10.0"x6.5"x25'-0"	7E- 7.0"x5.04"x14'-0"	38'	12"	24"	P
115 LW	115 LO	115 SW	115 SO	OE - 14"	7&7E-10.0"x6.5"x25'-0"	7E- 7.0"x4.76"x16'-0"	40'	13"	25"	P
125 LW	125 LO	125 SW	125 SO	OE - 14"	7&7E-10.0"x6.5"x25'-0"	7E- 7.0"x4.48"x18'-0"	42'	12"	28"	P
135 LW	135 LO	135 SW	135 SO	OE - 14"	7&7E-10.0"x6.5"x25'-0"	7E- 7.0"x4.48"x20'-0"	44'	13"	29"	P

* NOTE: FOR USE WITH 4'-6" HIGH SIGNS SHOWN AND STREET NAME SIGNS (IF REQUIRED) FOR STREET SIGN ATTACH, LENGTH TO BE SPECIFIED BY SIGN HEIGHT (GENERAL NOTE #5)



**DETAIL A
SIGN BRACKET DETAIL**

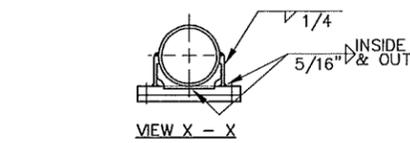


STREET SIGN BRACKET ASSEMBLY

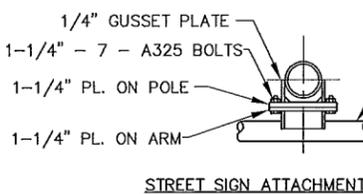
(TO BE USED ON EXISTING POLE WHERE NO CONNECTION IS PROVIDED FOR STREET NAME SIGN)

NOTES:

- (1) SIGN BRACKETS FURNISHED BASED ON LOCATION AND SIZE OF POLE DESIGNED
- (2) LENGTH SPECIFIED BY SIGN LENGTH



TRAFFIC ARM ATTACHMENT

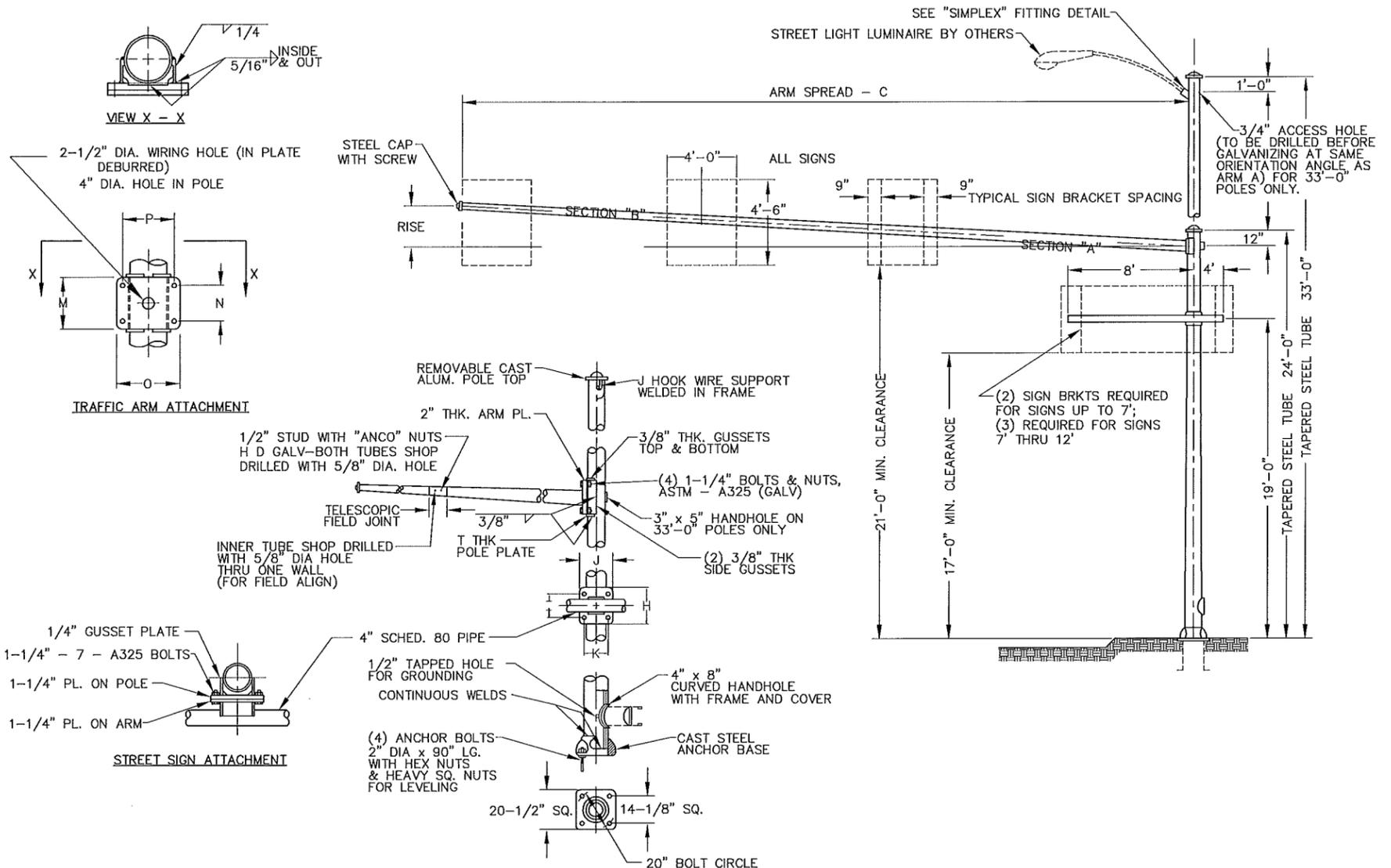


STREET SIGN ATTACHMENT

GENERAL NOTES:

- SIGN BRACKET DETAILS SHOWN ON DETAIL A
- THE BID ITEM FOR EACH CANTILEVER SIGN SUPPORT SHALL INCLUDE THE MAST ARM, AN UPRIGHT POLE SHAFT, AN ANCHOR BASE, FOUR ANCHOR BOLTS AND NUTS, SIGN BRACKET ASSEMBLY, (SIGN BRACKET AND CLAMPS) AND ANY OTHER HARDWARE, ATTACHMENTS, MODIFICATIONS, AND ACCESSORIES REQUIRED TO MAKE A COMPLETE INSTALLATION AS SHOWN HEREON
- ALL UPRIGHT POLE SHAFTS AND MAST ARMS SHALL BE ROUND IN CROSS SECTION AND BE UNIFORMLY TAPERED FROM BUTT TO TIP APPROXIMATELY ONE INCH IN DIAMETER FOR EACH SEVEN LINEAL FEET IN LENGTH (0.14 INCHES PER FOOT)
- SEE FOUNDATION DETAILS SHEET ATTACHED FOR FOUNDATION DETAILS
- SEE PLANS AND/OR QUANTITY SUMMARY SHEETS FOR LOCATIONS AND SIZES OF SIGNS

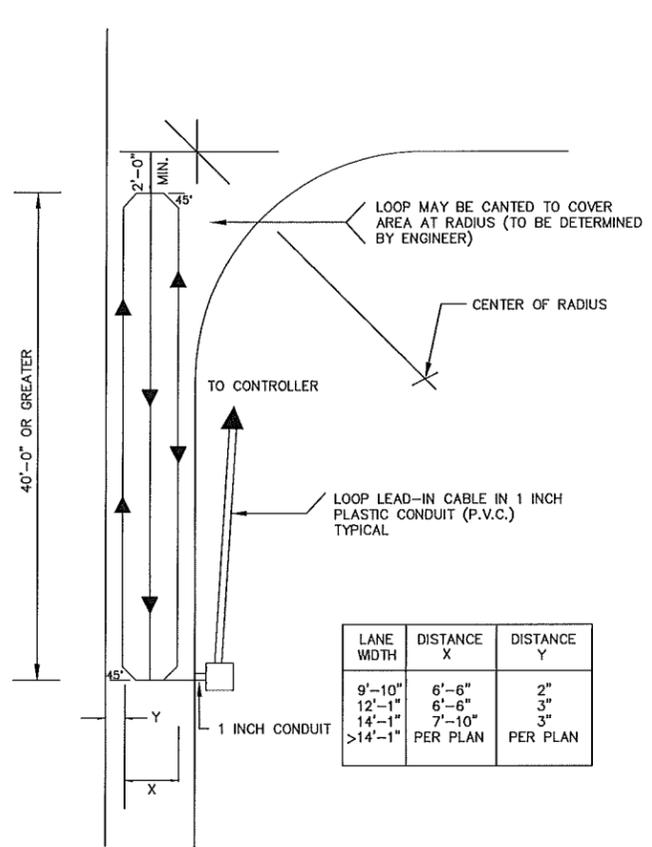
STREET SIGN ATTACHMENT					TRAFFIC ARM					
POLE DIA.	H	I	J	K	ARM DIA.	M	N	O	P	T
7 & 7E - 13"	11"	8-1/2"	17"	14-3/8"	7 & 7E - 10"	21"	11"	19-1/2"	15-1/2"	2"
OE - 14"	12"	9-1/2"	18"	15-3/8"	7 & 7E - 9"	19"	9"	18"	14"	1-1/4"



**CITY OF TOLEDO
CONSTRUCTION STANDARDS**

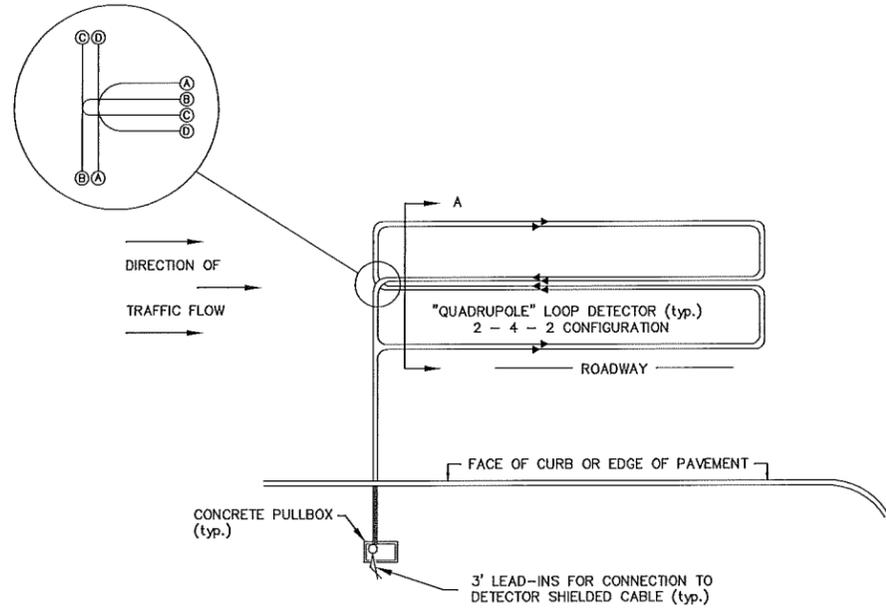
**CANTILEVER SIGN SUPPORT
3 - LANE CONTROL**

DRAWN BY: TRAFFIC	DESIGNED BY:	SCALE: NO SCALE	60
DATE: 12-14	DRAWING FILE: STANDARD-60.DWG		



TYPICAL LOOP INSTALLATION
(NOT TO SCALE)

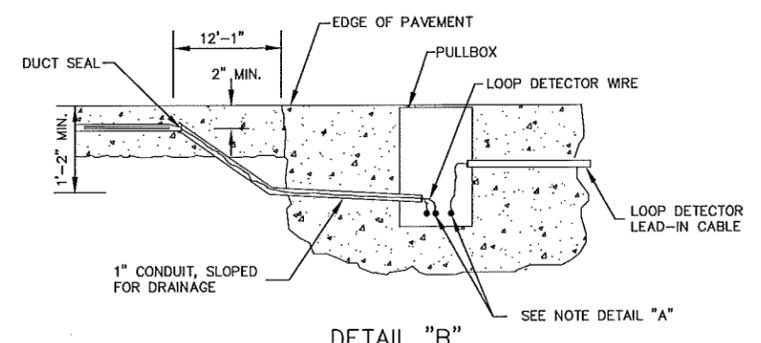
LANE WIDTH	DISTANCE X	DISTANCE Y
9'-10"	6'-6"	2"
12'-1"	6'-6"	3"
14'-1"	7'-10"	3"
>14'-1"	PER PLAN	PER PLAN



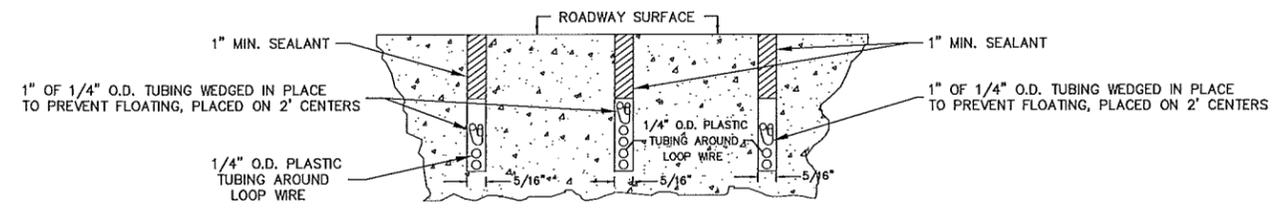
TYPICAL LOOP DETECTOR WIRING SCHEMATICS
(NOT TO SCALE)

- NOTES:**
- LOOP WIRE, TYPE "E"
NO 14 A.W.G. SINGLE CONDUCTOR CABLE, STRANDED TYPE THHN, IN 1/4" O.D. P.V.C. TUBING MANUFACTURED BY ALPINE WIRE AND CABLE COMPANY OR EQUIVALENT (TYPICAL FOR ALL LOOPS).
 - LOOP DETECTOR LEAD-IN CABLE
TWO (2) CONDUCTOR NO. 14 A.W.G. MINIMUM TINNED COPPER, POLYETHYLENE INSULATED, ALUMINUM BONDED TO A POLYESTER FILM SHIELD, STRANDED TINNED COPPER GROUND DRAIN WIRE NO. 16 A.W.G. MINIMUM THICKNESS OF 37 MILS.

EACH LOOP SHALL BE TESTED FOR RESISTANCE TO GROUND WITH A 1,000 VOLT TYPE MEGGER. A RESISTANCE TO GROUND OF LESS THAN TEN (10) MEG-OHMS INDICATES A FAULT AND MUST BE CORRECTED. THE RESISTANCE CHECK MUST BE ACCOMPLISHED IN THE PRESENCE OF THE PROJECT ENGINEER.
 - HOT APPLIED JOINT SEALER AASHTO DESIGNATION M173 AS PER 705.01 OR APPROVED EQUIVALENT SHALL BE USED FOR SEALING THE SAW CUT OR SLOT.
 - DUCT SEAL SHALL BE NASHVA SEALING COMPOUND NO. 101 DUCT SEALER WITH A TEMPERATURE RANGE FROM -35' F TO 200' F. IT SHALL BE FLAME RETARDANT, NON-CORROSIVE, NON-HARDENING AND NON-DAMAGING TO POLYETHYLENE AND SHALL ADHERE TO WOOD, GLASS, PLASTIC, METAL RUBBER AND PAINTED SURFACES.
 - EACH LOOP SHALL BE ONE CONTINUOUS LENGTH TO THE JUNCTION BOX. NO SPLICES WILL BE PERMITTED.
 - THE LEAD WITHIN THE 1" CONDUIT AND PULLBOX SHALL BE TWISTED AT LEAST THREE (3) TURNS PER 1'-0".
 - EACH SET OF CONDUCTORS ASSOCIATED WITH A LOOP SHALL BE LABELED WITH A DURABLE TAG.



DETAIL "B"
INTERFACE BETWEEN EMBEDDED LOOP & ROAD SIDE PULLBOX WITHOUT CURB
(NOT TO SCALE)



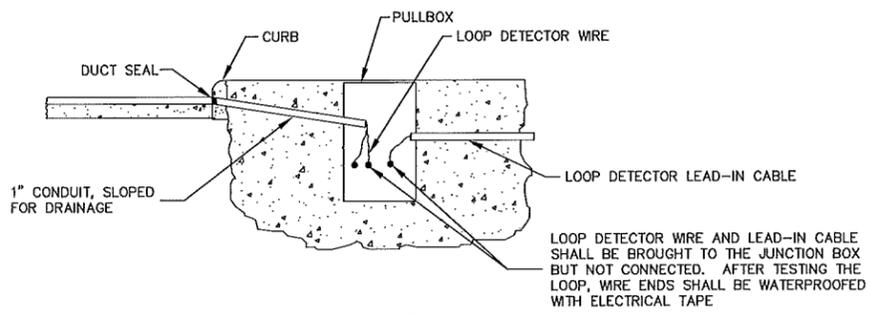
SECTION A-A
TYPICAL LOOP SLOT CONSTRUCTION & SEALING DETAIL
(NOT TO SCALE)

SLOT DEPTH FOR LOOP DETECTORS

4 TURN LOOP	2 3/4" MIN.
2 TURN LOOP	2 1/4" MIN.

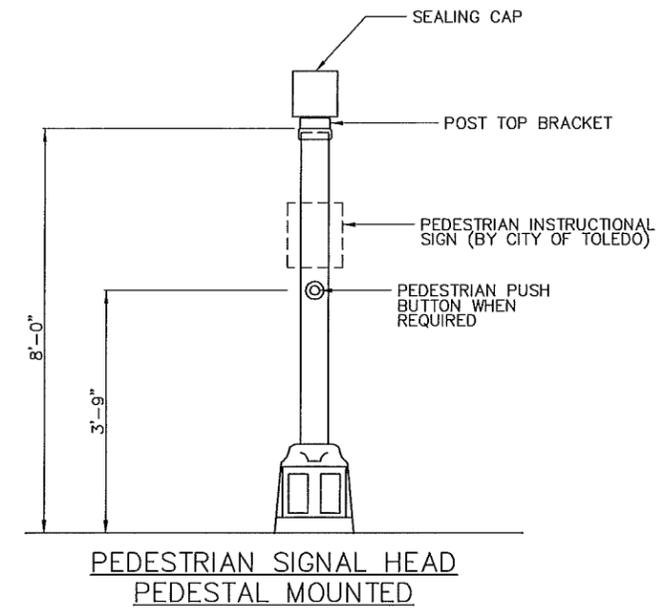
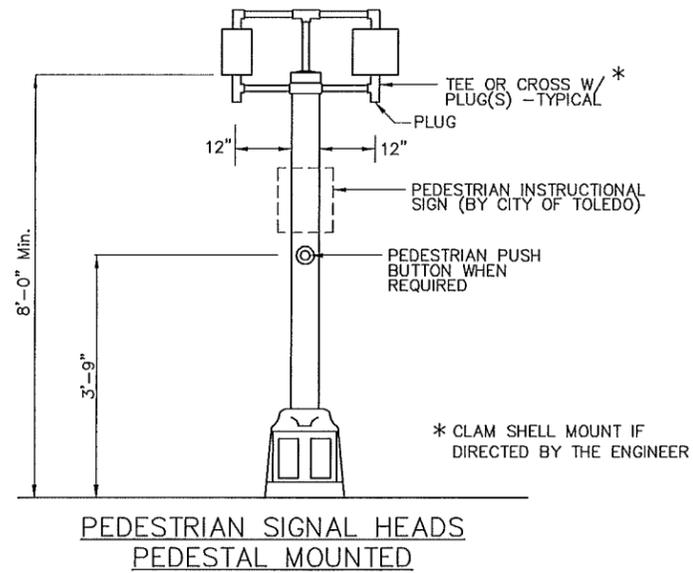
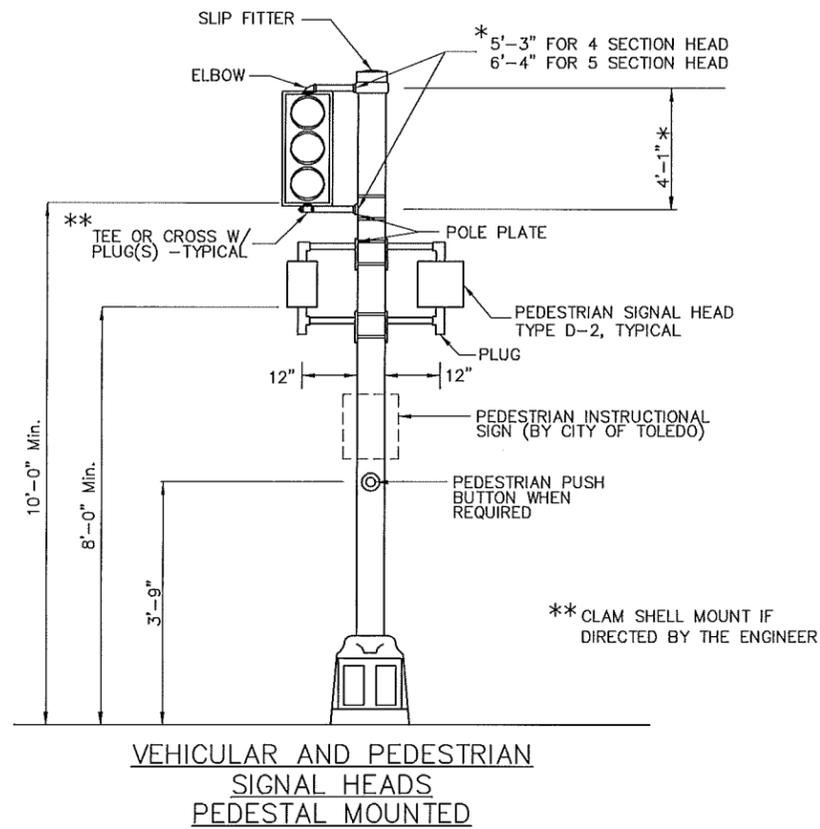
NOTE: IT IS EXTREMELY IMPORTANT THAT THE SAWED SLOT BE THOROUGHLY CLEANED AND COMPLETELY DRY BEFORE APPLYING SEALER.

RECOMMENDED SAW BLADE 14" x 3/8"
(PRODUCES 5/16" SLOT)

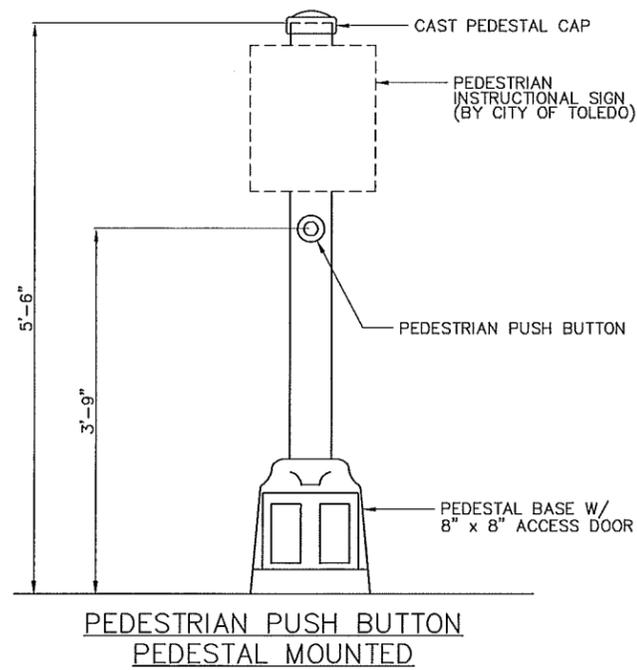
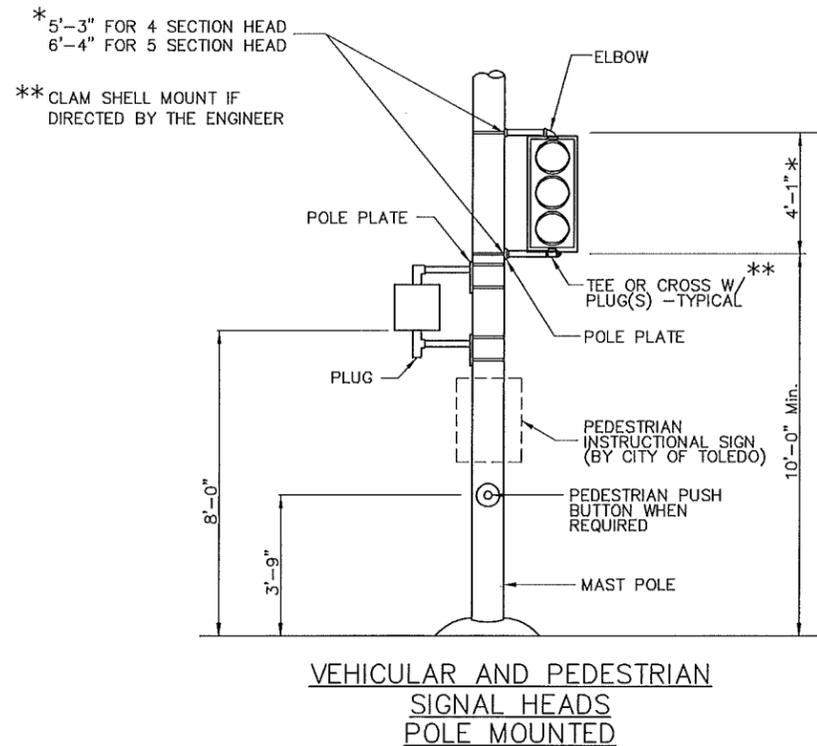


DETAIL "A"
INTERFACE BETWEEN EMBEDDED LOOP & ROAD SIDE PULLBOX WITH CURB
(NOT TO SCALE)

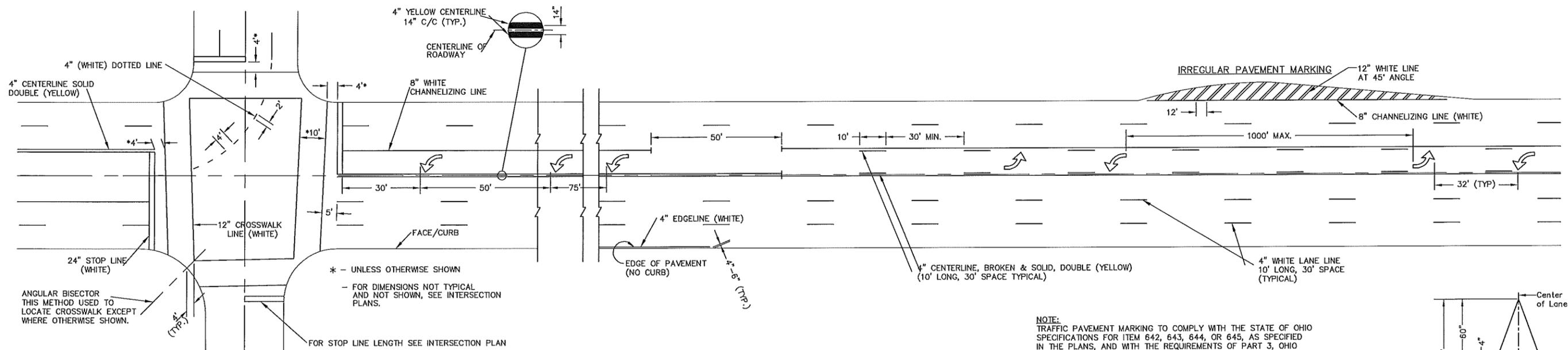
CITY OF TOLEDO CONSTRUCTION STANDARDS			
QUADPOLE EMBEDDED VEHICLE DETECTOR LOOP DETAILS SINGLE LANE APPROACH			
DRAWN BY: TRAFFIC	DESIGNED BY:	SCALE: NO SCALE	61
DATE: 12-14	DRAWING FILE: STANDARD-61.DWG		



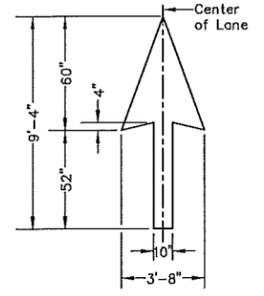
NOTES:
 1. PEDESTRIAN INSTRUCTIONAL SIGN SHALL BE USED IN CONJUNCTION WITH THE PEDESTRIAN PUSH BUTTON, WHEN REQUIRED.



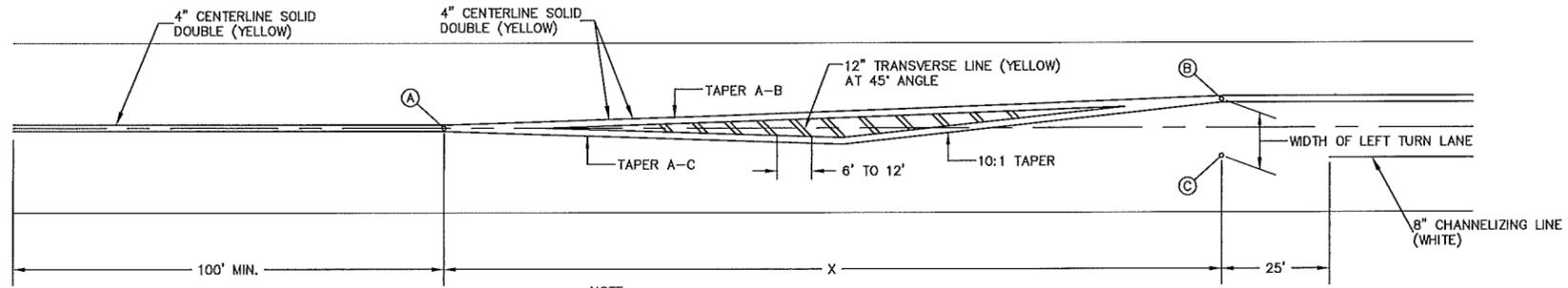
CITY OF TOLEDO CONSTRUCTION STANDARDS			
PUSH BUTTON VEHICULAR AND PEDESTRIAN SIGNAL HEAD INSTALLATIONS			
DRAWN BY: TRAFFIC	DESIGNED BY:	SCALE: NO SCALE	62
DATE: 12-14	DRAWING FILE: STANDARD-62.DWG		



NOTE:
TRAFFIC PAVEMENT MARKING TO COMPLY WITH THE STATE OF OHIO SPECIFICATIONS FOR ITEM 642, 643, 644, OR 645, AS SPECIFIED IN THE PLANS, AND WITH THE REQUIREMENTS OF PART 3, OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS. UNLESS SHOWN OTHERWISE.



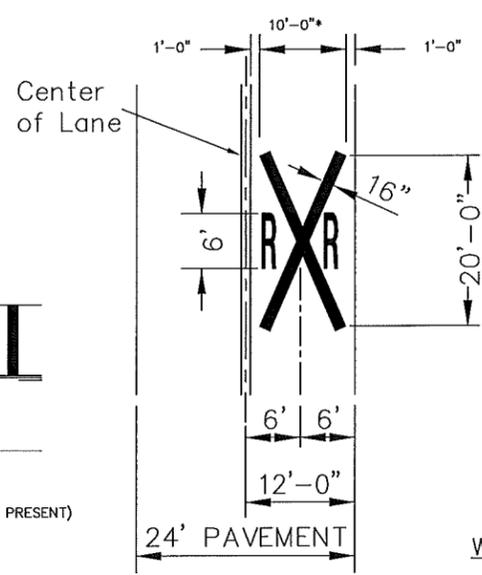
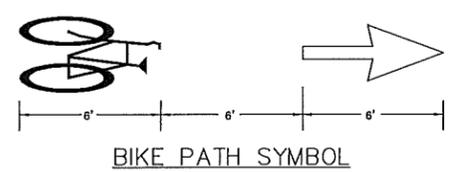
THROUGH ARROW



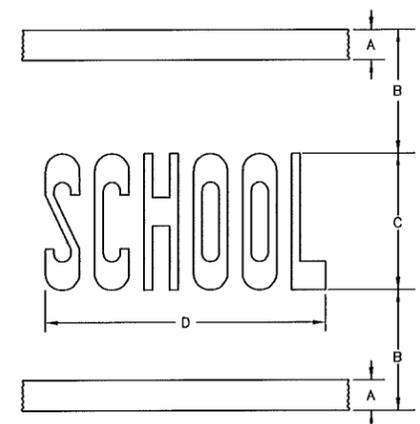
NOTE:
1. TAPER A-B AND TAPER A-C NORMALLY SHALL NOT BE LESS THAN 30:1. THE CRITICAL TAPER SHALL CONTROL THE LENGTH OF "X"

CONVERGING LINES:
 $L = WS$ $S \geq 45\text{mp}$
 $L = \frac{WS^2}{60}$ $S < 45\text{mp}$

TAPER DETAILS



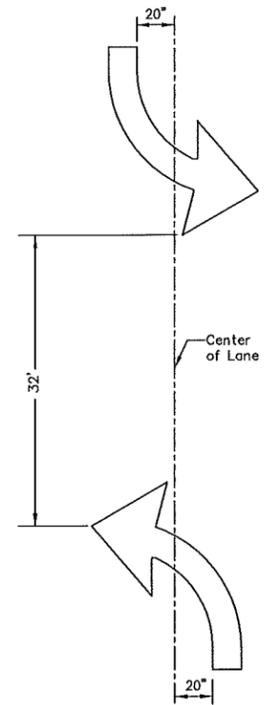
* - WIDTH MAY VARY WITH LANE WIDTH



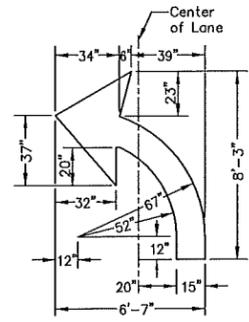
DIMENSIONS (INCHES)				
	A	B	C	D
ONE-LANE	16	72	72	148
TWO-LANE	16	72	120	232

WORD "SCHOOL" PAVEMENT MARKING (WHITE)

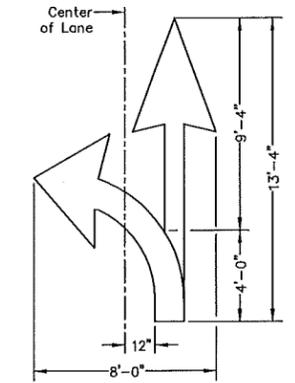
NOTES:
1. THIS MARKING SHALL ONLY BE USED IN CONJUNCTION WITH STANDARD SCHOOL ZONE MARKING.
2. LANE LINES DO NOT PASS THROUGH "SCHOOL" MARKING ON TWO-LANE INSTALLATIONS.
3. ALL LETTERS SHOULD BE IN ACCORDANCE WITH THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND THE OHIO SIGN DESIGN MANUAL.



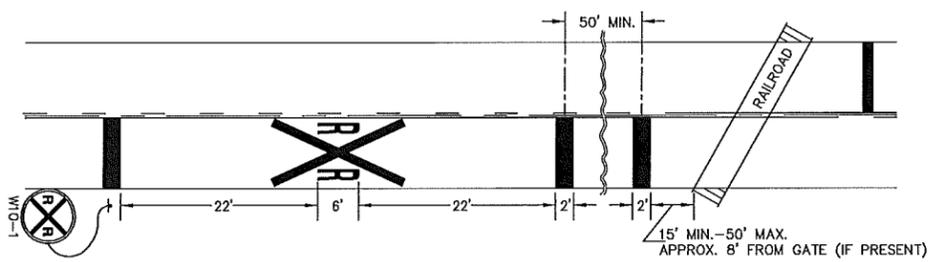
TWO-WAY LEFT TURN ARROWS



TURN ARROW



COMBINED ARROWS



TYPICAL PAVEMENT MARKING AT RAILROAD CROSSINGS (WHITE)

NOTES:
1. ON MULTI-LANE ROADS, THE TRANSVERSE BANDS SHOULD EXTEND ACROSS ALL APPROACH LANES AND INDIVIDUAL R & R SYMBOLS SHOULD BE USED IN EACH APPROACH LANE.

CITY OF TOLEDO CONSTRUCTION STANDARDS			
STANDARD PAVEMENT MARKINGS			
DRAWN BY: TRAFFIC	DESIGNED BY:	SCALE: NO SCALE	63
DATE: 12-14	DRAWING FILE: STANDARD-63.DWG		