

Exhibit A

City of Tuscola

Design and Construction Standards

March, 2011

CITY OF TUSCOLA DESIGN AND CONSTRUCTION STANDARDS

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DESIGN STANDARDS

SECTION A

TABLE 1

Street Design Standards For Cul-de-sac
and Loop Type Streets

Right-of-way (feet)	60 feet
Pavement width (feet)	27 feet
Minimum stopping sight distance (feet)	200 feet
Maximum cul-de-sac length	500 feet
Minimum cul-de-sac radius (right-of-way) turnaround	60 feet
Minimum cul-de-sac radius (pavement) turnaround	50 feet

TABLE 2

Street Design Standards for All
Local Streets Except cul-de-sacs
and Loop Type Streets

Right-of-way (feet)	60 feet
Pavement width (feet)	22 feet (without curb and gutters; provided suitable storm drainage facili- ties are installed)
Minimum stopping sight distance (feet)	200 feet
Minimum center line radius of streets with an angle of turn of:	
(1) Between 80 and 100	50 feet
(2) Less than 80 or more than 100	200 feet

TABLE 3

Collector Street Design Standards

Right-of-way (feet)	80 feet
Pavement width (feet)	22 feet (with seven foot shoulders)
Minimum stopping sight distance (feet)	250 feet
Minimum spacing when inter- secting with an arterial (feet)	1,320 feet

TABLE 4

Intersecting Design Standards

Maximum approach speed (miles per hour)	25
Clear sight distance (feet)	90 feet
Minimum curb radius	
(1) Local – local	20 feet
(2) Local – collector	25 feet
(3) Collector – collector	30 feet
(4) Collector, marginal access – arterial	35 feet
Minimum centerline, offset of adjacent intersections (feet)	
(1) Local – local	150 feet
(2) Local – collector	200 feet
(3) Collector – collector	300 feet
(4) Collector, marginal access – arterial	1,320 feet

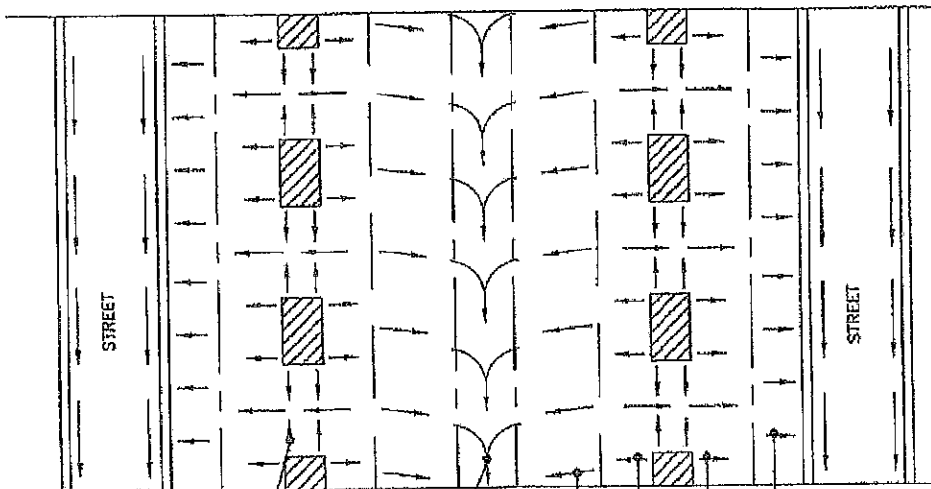
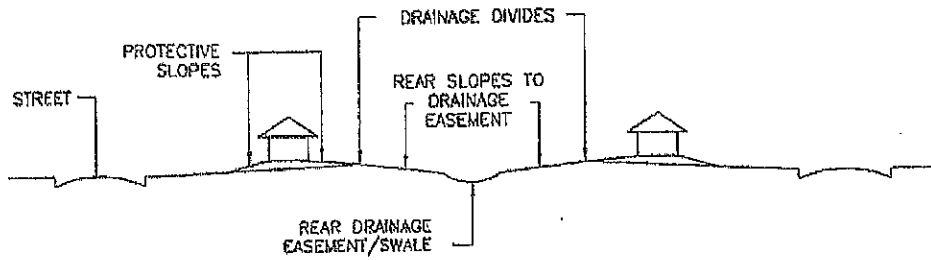
TABLE 5

Intersection Design Standards

Maximum approach speed Residential (miles per hour)	25
Maximum approach speed Nonresidential (miles per hour)	30
Clear sight distance (feet)	90 feet
Minimum curb radius	
(1) Local – local	20 feet all cases
(2) Local – collector	25 feet all cases
(3) Collector – collector	30 feet all cases
(4) collector – arterial	35 feet all cases
Minimum centerline, offset of adjacent intersections (feet)	
(1) Local - local	150 feet all cases
(2) Local – collector	200 feet all cases
(3) Collector – collector	300 feet all cases
(4) Collector – arterial	1,320 feet all cases
Minimum angle of intersection	75% (Prefer 90%)

GENERAL CONSTRUCTION

SECTION B



SIDE SLOPE 4% MIN.
 SWALE SLOPE 1% MIN.
 REAR SLOPE 2% MIN.
 PARKWAY SLOPE 2% MIN.
 PROTECTIVE FRONT SLOPE 3% MIN.
 PROTECTIVE REAR SLOPE 3% MIN FOR 25 FT.

NOTE:
 GROUND AT HOUSE PAD SHALL
 BE NOT LESS THAN 18 INCHES
 ABOVE THE STREET PAVEMENT
 CENTERLINE ELEVATION.

TYPICAL RESIDENTIAL LOT GRADING

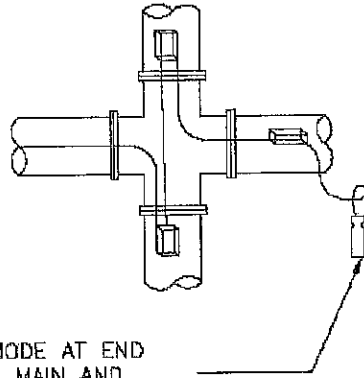
CITY OF TUSCOLA
 DESIGN & CONSTRUCTION
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Revised 11/08

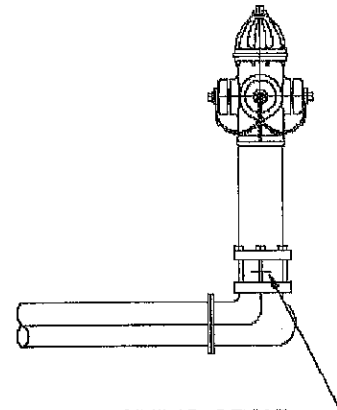
WATER MAIN CONSTRUCTION

SECTION C

STANDARD DESIGN TRACER DETAIL FOR P.V.C. PIPE



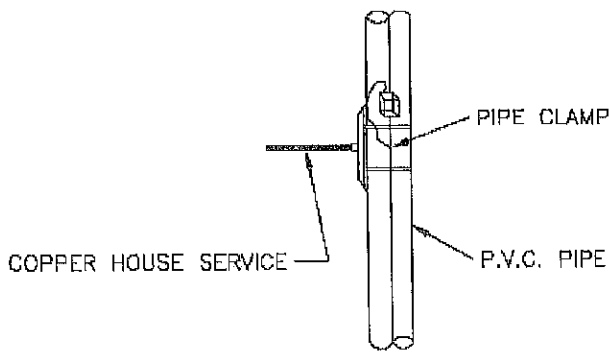
PLACE 17 LBS. ANODE AT END
OF PLASTIC WATER MAIN AND
EVERY 2000 FT OR AS REQUIRED.



$\frac{1}{2}$ " PIPE CLAMP OR SIMILAR DEVICE.

INTERSECTION CROSSING

FIRE HYDRANT

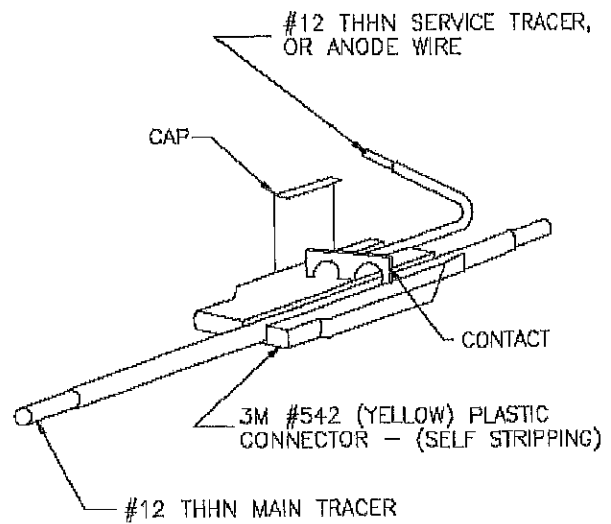


COPPER HOUSE SERVICE

PIPE CLAMP

P.V.C. PIPE

HOUSE SERVICE



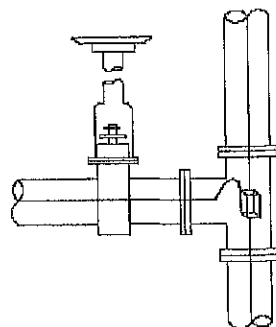
#12 THHN SERVICE TRACER,
OR ANODE WIRE

CAP

CONTACT

3M #542 (YELLOW) PLASTIC
CONNECTOR - (SELF STRIPPING)

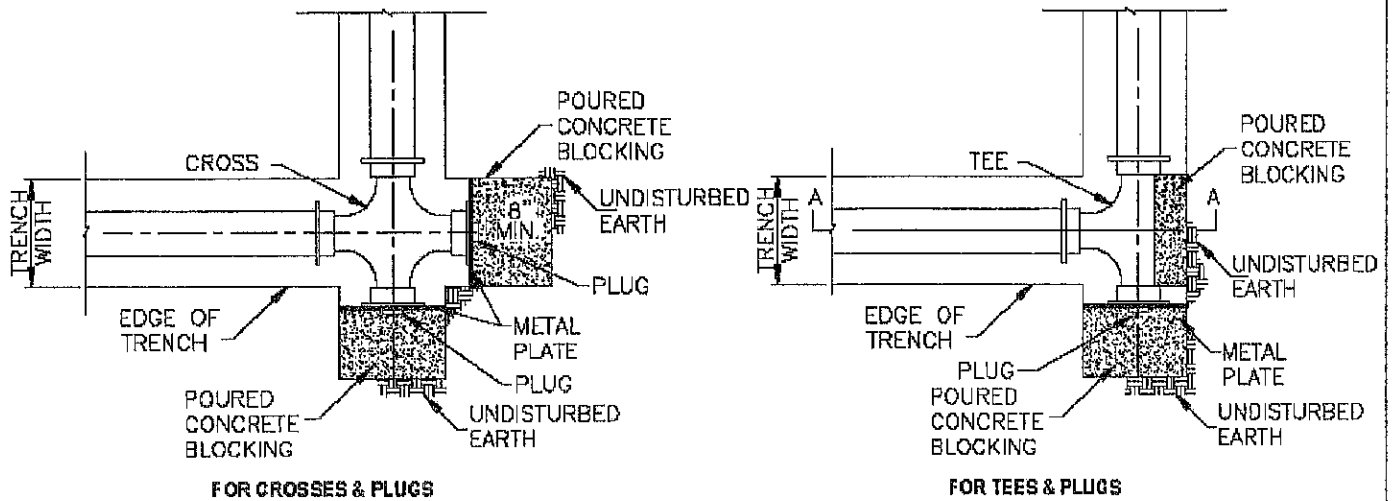
#12 THHN MAIN TRACER



TEE

CITY OF TUSCOLA
DESIGN & CONSTRUCTION
STANDARDS

STANDARD DESIGN CONCRETE BLOCKING WATERMAIN - 6" TO 10"

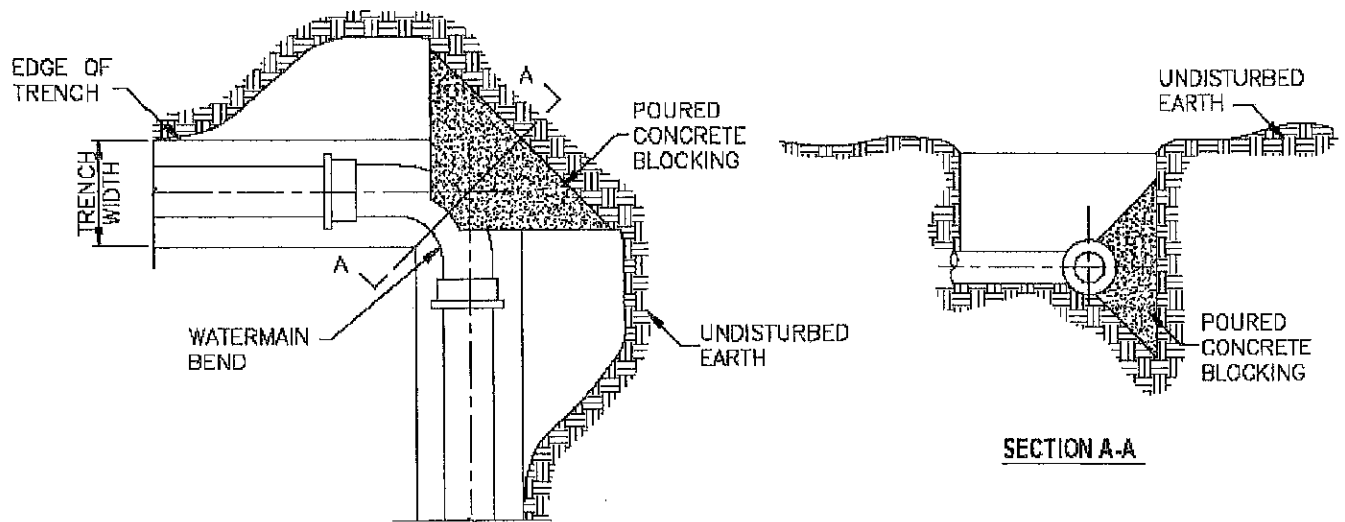


FOR CROSSES & PLUGS

FOR TEES & PLUGS

PLAN

PLAN



FOR WATERMAIN BENDS

SECTION A-A

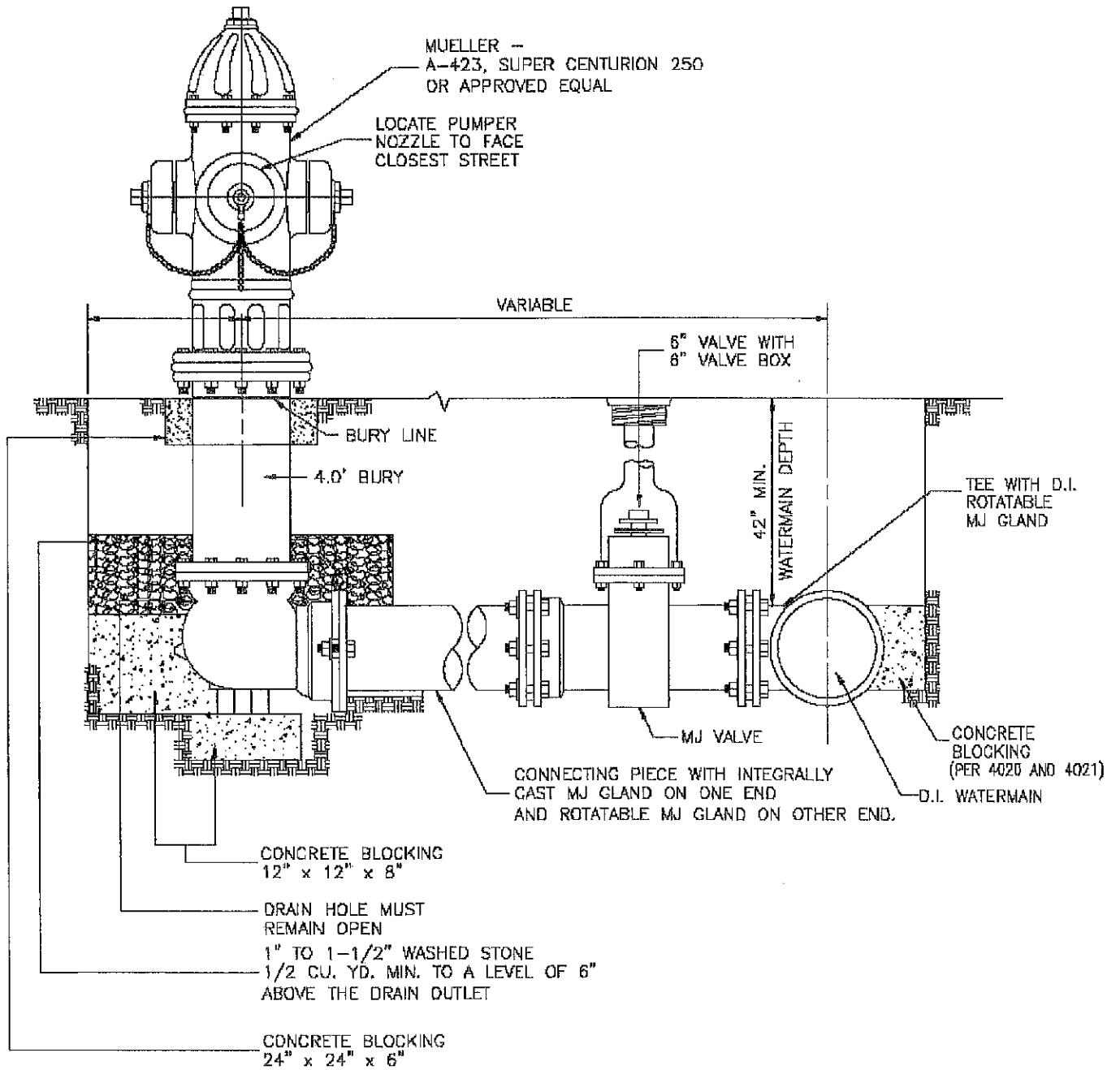
PLAN

NOTES:

1. CONCRETE BLOCKING SHALL BE SIMILAR FOR ALL BENDS.
2. PRECAST CONCRETE BLOCKING MAY BE USED WITH APPROVAL OF ENGINEER.
3. WRAP CONNECTION ENDS IN PLASTIC SHEETING, NOT LESS THAN 4mil THICKNESS, PRIOR TO POURING CONCRETE BLOCKING.

CITY OF TUSCOLA
DESIGN & CONSTRUCTION
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STANDARD DESIGN TYPICAL FIRE HYDRANT SETTING

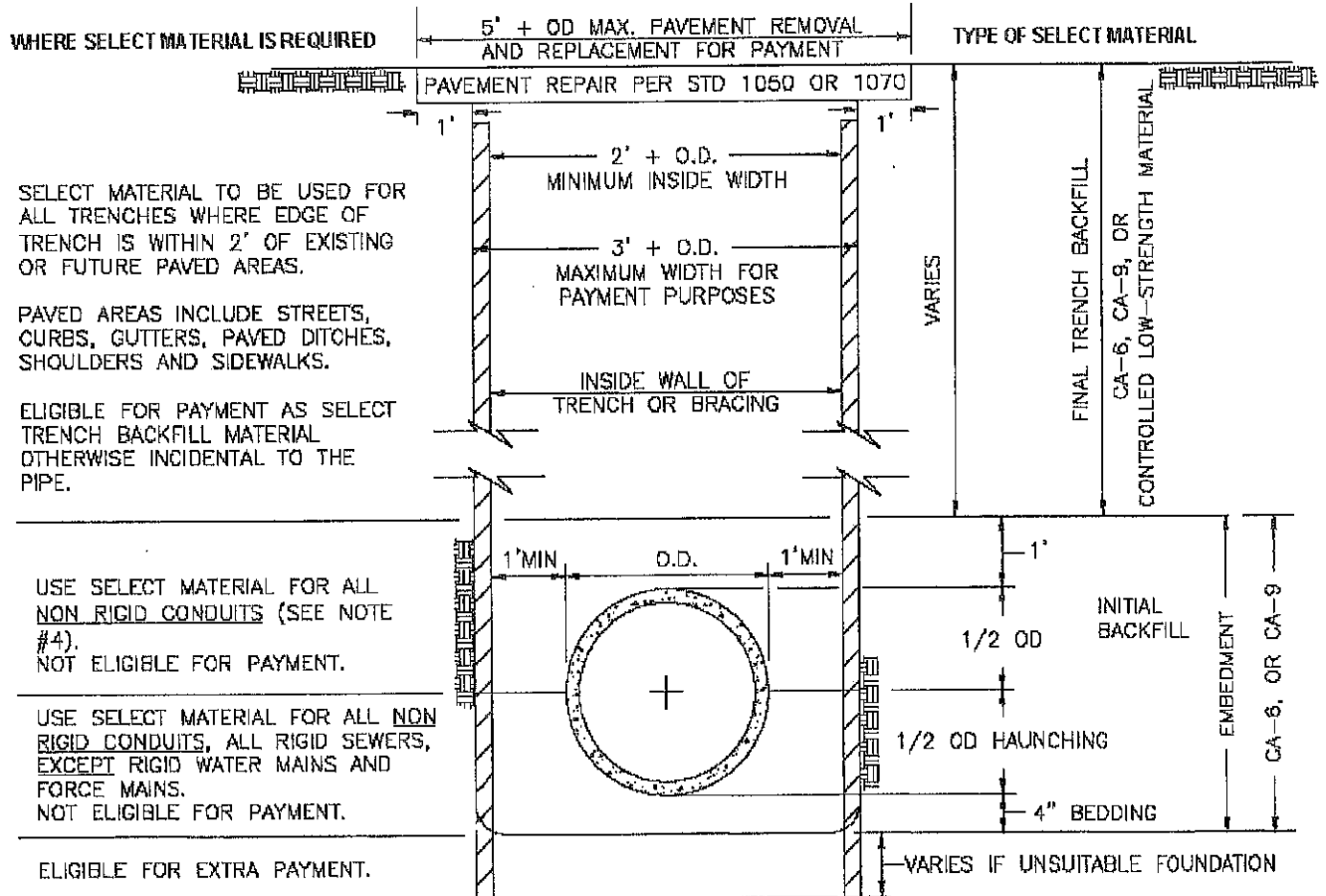


CITY OF TUSCOLA
DESIGN & CONSTRUCTION
STANDARDS

SANITARY SEWER CONSTRUCTION

SECTION D

STANDARD DESIGN TRENCH BACKFILL AND BEDDING



NOTES:

1. WHEN EDGE OF TRENCH IS WITHIN 2' OF ANY PAVED AREA, UNIFORM LAYERS OF SELECT MATERIAL NOT EXCEEDING 8" THICK SHALL BE PLACED AND COMPACTED BY RAMMING OR TAMPING WITH TOOLS APPROVED BY THE ENGINEER TO 95% OF STANDARD PROCTOR DENSITY.
2. WHEN EDGE OF TRENCH IS BEYOND 2' OF ANY PAVED AREA, UNIFORM LAYERS OF SUITABLE EXCAVATED MATERIAL NOT EXCEEDING 12" THICK SHALL BE PLACED AND COMPACTED BY RAMMING OR TAMPING TO THE SATISFACTION AND APPROVAL OF THE ENGINEER.
3. CA-7, CA-11, CA-13, OR CA-16 MAY BE USED FOR TRENCH BACKFILL WHEN AN APPROPRIATE GEOTECHNICAL FABRIC IS USED TO LINE THE TRENCH.
4. NON RIGID CONDUITS ARE DEFINED AS FLEXIBLE THERMOPLASTIC PIPE AND/OR CORRUGATED METAL PIPE.
5. BELLS HOLES WILL BE DUG. NO PIPE WILL ACCEPTED WHERE THE BELLS OF THE PIPE ARE SUPPORTING THE WEIGHT OF THE PIPE.

CITY OF TUSCOLA
DESIGN & CONSTRUCTION
STANDARDS

SHEET #1 OF 2

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**STANDARD DESIGN
TRENCH BACKFILL AND BEDDING
OR
SANITARY SEWERS, STORM SEWERS
& WATERMAINS
TABLE 1**

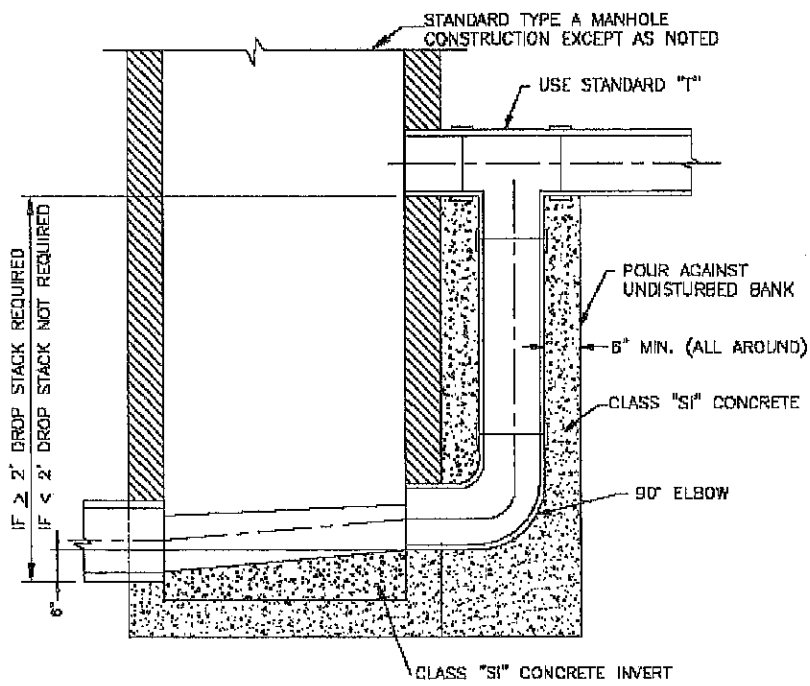
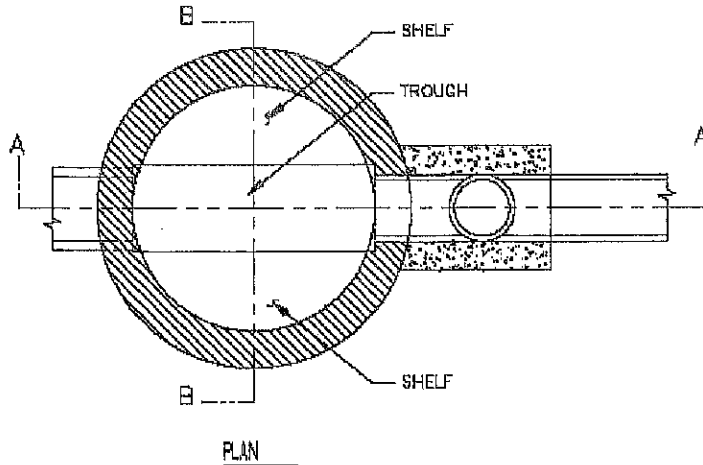
INSIDE DIAMETER OF CONDUIT IN INCHES "D"	MAXIMUM TRENCH WIDTH IN FEET FOR PAYMENT	FINAL BACKFILL CY \ FOOT PER FOOT OF DEPTH WHERE ELIGIBLE FOR PAYMENT	PERMANENT PAVEMENT REMOVAL AND REPLACEMENT SY \ FOOT
6	3.58	0.13	0.62
8	3.78	0.14	0.84
10	3.97	0.15	0.88
12	4.17	0.15	0.69
14	4.36	0.16	0.71
15	4.46	0.17	0.72
16	4.56	0.17	0.73
18	4.75	0.18	0.75
20	4.94	0.18	0.77
21	5.04	0.19	0.78
24	5.33	0.20	0.81
27	5.63	0.21	0.85
28	5.72	0.21	0.86
30	5.92	0.22	0.88
33	6.21	0.23	0.91
36	6.50	0.24	0.94
42	7.08	0.26	1.01
48	7.67	0.28	1.07
54	8.25	0.31	1.14
60	8.83	0.33	1.20
66	9.42	0.35	1.27
72	10.00	0.37	1.33
78	10.58	0.39	1.40
84	11.17	0.41	1.46
90	11.75	0.44	1.53
96	12.33	0.46	1.59
102	12.92	0.48	1.66
108	13.50	0.50	1.72
120	14.67	0.54	1.85

CITY OF TUSCOLA
DESIGN & CONSTRUCTION
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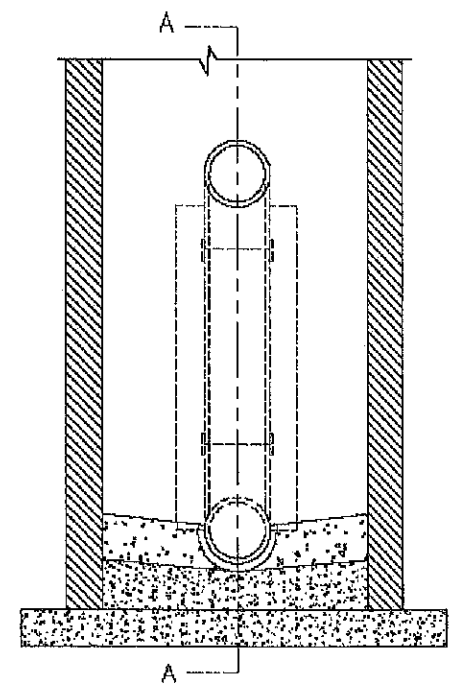
SHEET #2 OF 2

Revised 11/08

STANDARD DESIGN DROP STACK



SECTION A-A



SECTION B-B

NOTES:

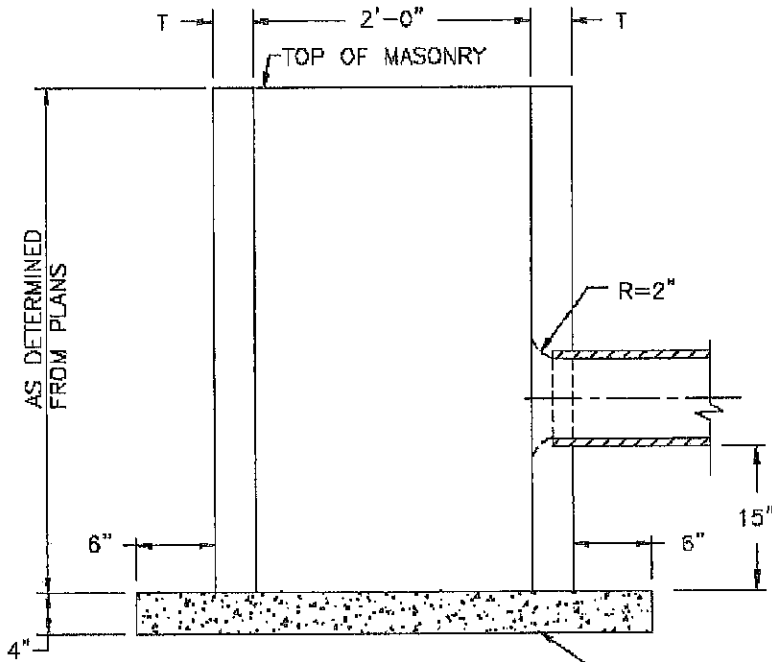
1. ENTIRE EXCAVATION TO BE BACKFILLED WITH TRENCH BACKFILL MATERIAL, IN ACCORDANCE WITH STANDARD #2050, IF ANY EDGE OF EXCAVATION IS WITHIN 2' OF ANY PAVED SURFACE.
2. BACKFILL AROUND PIPE SHALL BE IN ACCORDANCE WITH STANDARD #2050.
3. Poured concrete around drop stack pipe will not be required if drop stack is precast with manhole.
4. TO BE USED IN CONJUNCTION WITH TYPE "A" MANHOLES WHERE SEWER ENTERS 2'-0" OR MORE ABOVE LOWEST INVERT. NOT TO BE USED FOR INLET OR CATCH BASIN CONNECTIONS.
5. THIS DETAIL APPLIES TO INCOMING SEWER OF 18" DIAMETER OR LESS.
6. FOR INCOMING SEWER SMALLER THAN 12" USE VERTICAL PIPE OF SAME DIAMETER. FOR INCOMING SEWER 12" OR GREATER, USE 12" VERTICAL PIPE.

CITY OF TUSCOLA
DESIGN & CONSTRUCTION
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ROADWAY CONSTRUCTION

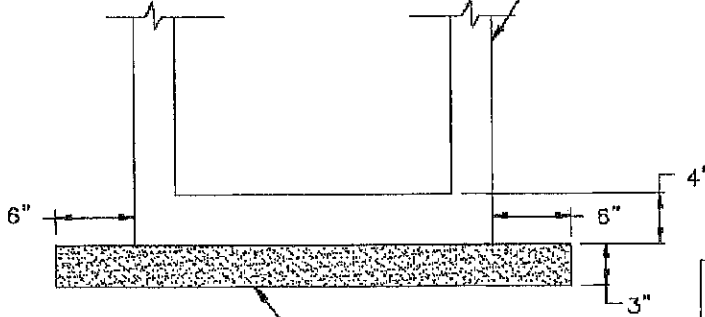
SECTION E

STANDARD DESIGN CATCH BASIN TYPE C



PLAN

CLASS "SI" CONCRETE
OR
PRECAST REINFORCED
CONCRETE INLET WITH
SAND CUSHION



PLAN

SAND
CUSHION

ALTERNATE MATERIALS FOR WALLS	T (MIN.)
PRECAST REINFORCED CONCRETE RISERS	3"
MONOLITHIC CONCRETE	6"

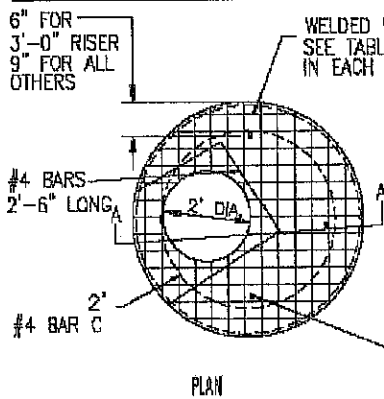
NOTES:

1. ALL MASONRY JOINTS IN THE STRUCTURE SHALL BE SEALED USING PERMAGUM ROPE MASTIC OR APPROVED EQUAL. ADJUSTING RINGS AND THE CASTING SHALL BE SEALED USING 2 LOOPS OF 3/4" PERMAGUM ROPE MASTIC.
2. HALF TRAP REQUIRED IF OUTLET IS TO A COMBINATION SEWER SYSTEM SEE STANDARD 3010.

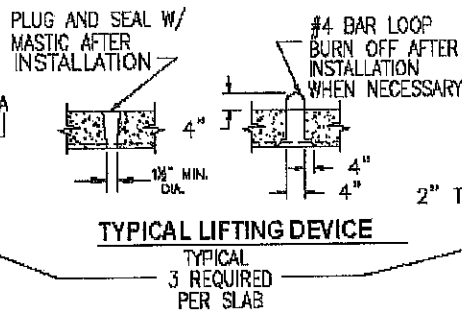
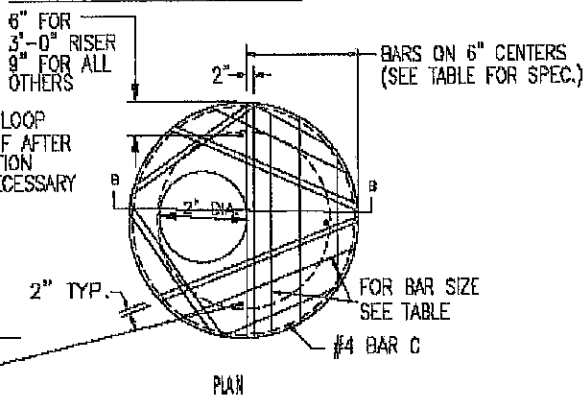
CITY OF TUSCOLA
DESIGN & CONSTRUCTION
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STANDARD DESIGN PRECAST REINFORCED CONCRETE FLAT SLAB TOP FOR MANHOLES AND CATCH BASINS

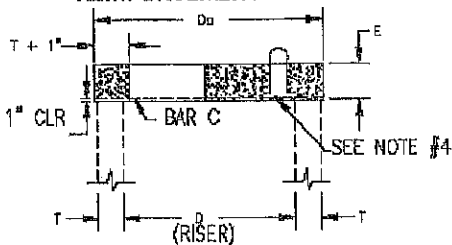
TYPICAL LIFTING DEVICE LOCATION



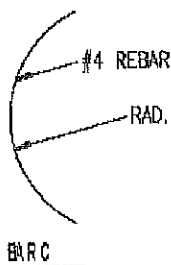
TYPICAL LIFTING DEVICE LOCATION



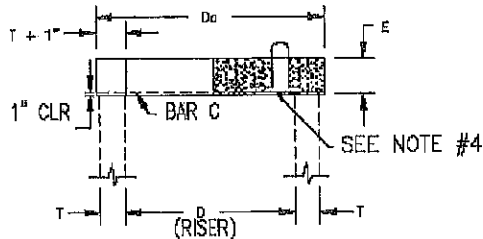
WELDED WIRE FABRIC REINFORCEMENT



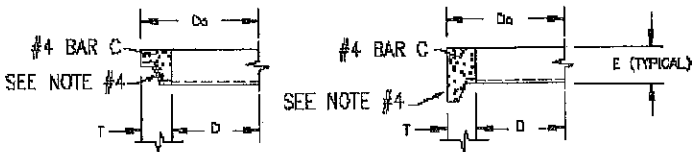
SECTION A-A



RE-BAR REINFORCEMENT



SECTION B-B



ALTERNATE JOINT CONFIGURATIONS TABLE

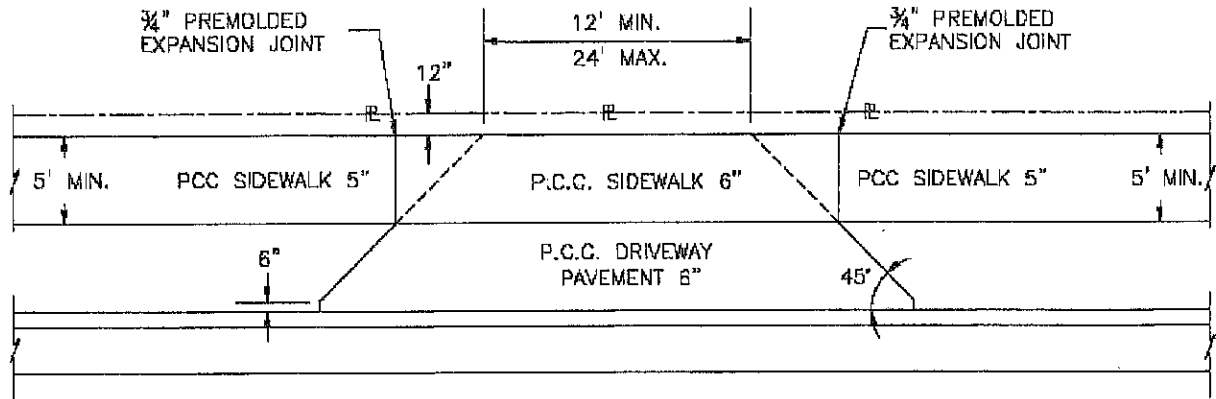
D	T	SANITARY		STORM		REINFORCEMENT		#4 BAR C	
		D0 (MIN.)	E	D0 (MIN.)	E	"As" WWF EACH DIRECTION or BAR SIZE	LENGTH	RADIUS	
3'	SEE STORM 200E	D+2T	6"	D+2T	6"	.20 SQ. IN./LIN. FT.	#4	4'	1'-7"
3'-6"		D+2T	6"	D+2T	6"	.35 SQ. IN./LIN. FT.	#5	4'-3"	1'-10"
4'		D+2T	6"	D+2T	6"	.35 SQ. IN./LIN. FT.	#5	4'-6"	2'-2"
5'		D+2T	6"	D+2T	8"	.35 SQ. IN./LIN. FT.	#5	5'	2'-8"

NOTES:

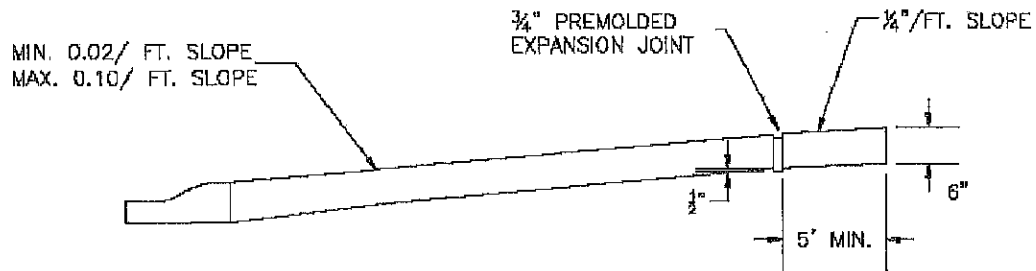
1. THE FLAT SLAB TOP MAY BE USED IN LIEU OF THE TAPERED TOPS SHOWN IN STANDARDS #3010, #3012, #3020, OR #3021 AT THE OPTION OF THE CONTRACTOR OR WHEN FIELD CONDITIONS PROHIBIT THE USE OF TAPERED TOPS.
2. JOINT CONFIGURATION AND DIMENSIONS SHALL MATCH AND FIT THE RISER JOINT DETAIL.
3. LIFTING DEVICES OTHER THAN SHOWN MAY BE USED UPON APPROVAL BY THE ENGINEER.
4. ALL MASONRY JOINTS IN THE STRUCTURE SHALL BE SEALED USING PERMAGUM ROPE MASTIC OR APPROVED EQUAL. ADJUSTING RINGS AND THE CASTING SHALL BE SEALED USING 2 LOOPS OF 3/4" PERMAGUM ROPE MASTIC.

CITY OF TUSCOLA
DESIGN & CONSTRUCTION
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STANDARD DESIGN DRIVEWAY APPROACH



P.L.A.R.



TYPICAL SECTION

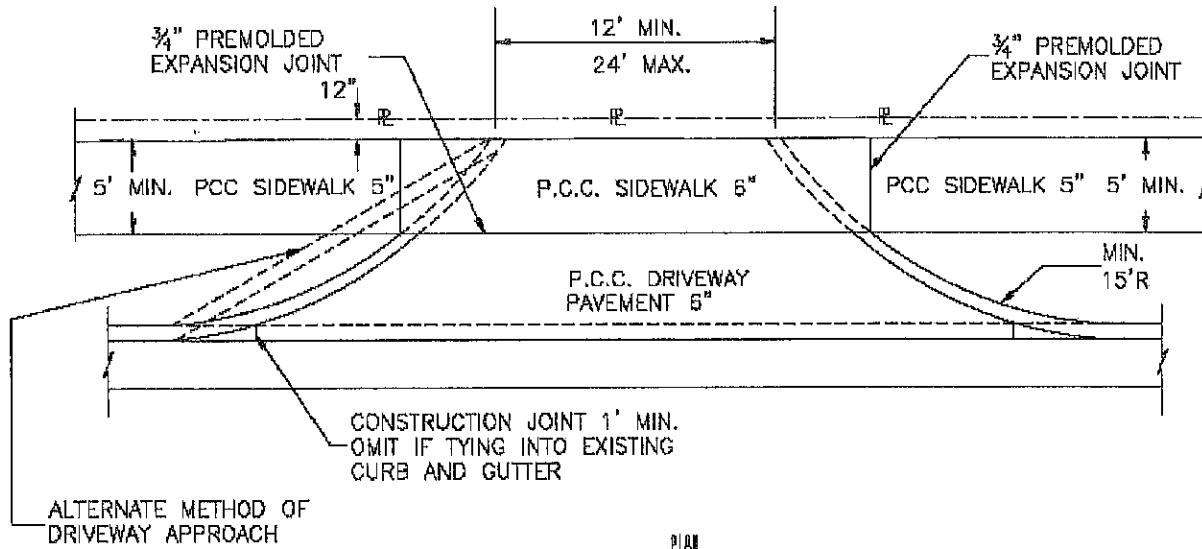
NOTES:

1. IF SIDEWALK CURRENTLY EXISTS, IT SHALL BE REMOVED AND REPLACED TO THE LIMITS SHOWN WITH 6" THICK SIDEWALK.
2. MATCH EXISTING SIDEWALK WIDTH IF LESS THAN 5' WIDTH IN ESTABLISHED RESIDENTIAL AREA.

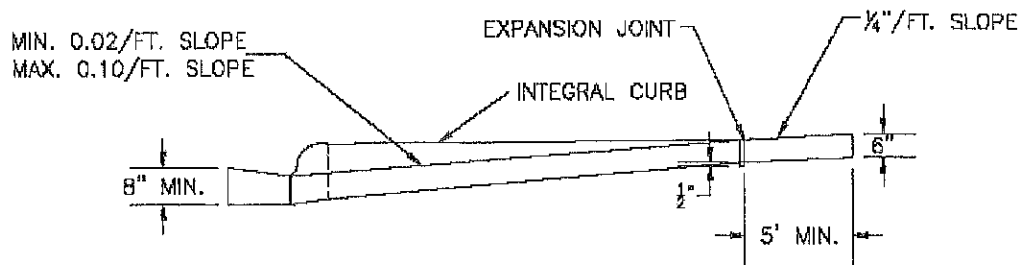
CITY OF TUSCOLA
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STANDARD DESIGN DRIVEWAY APPROACH



PLAN



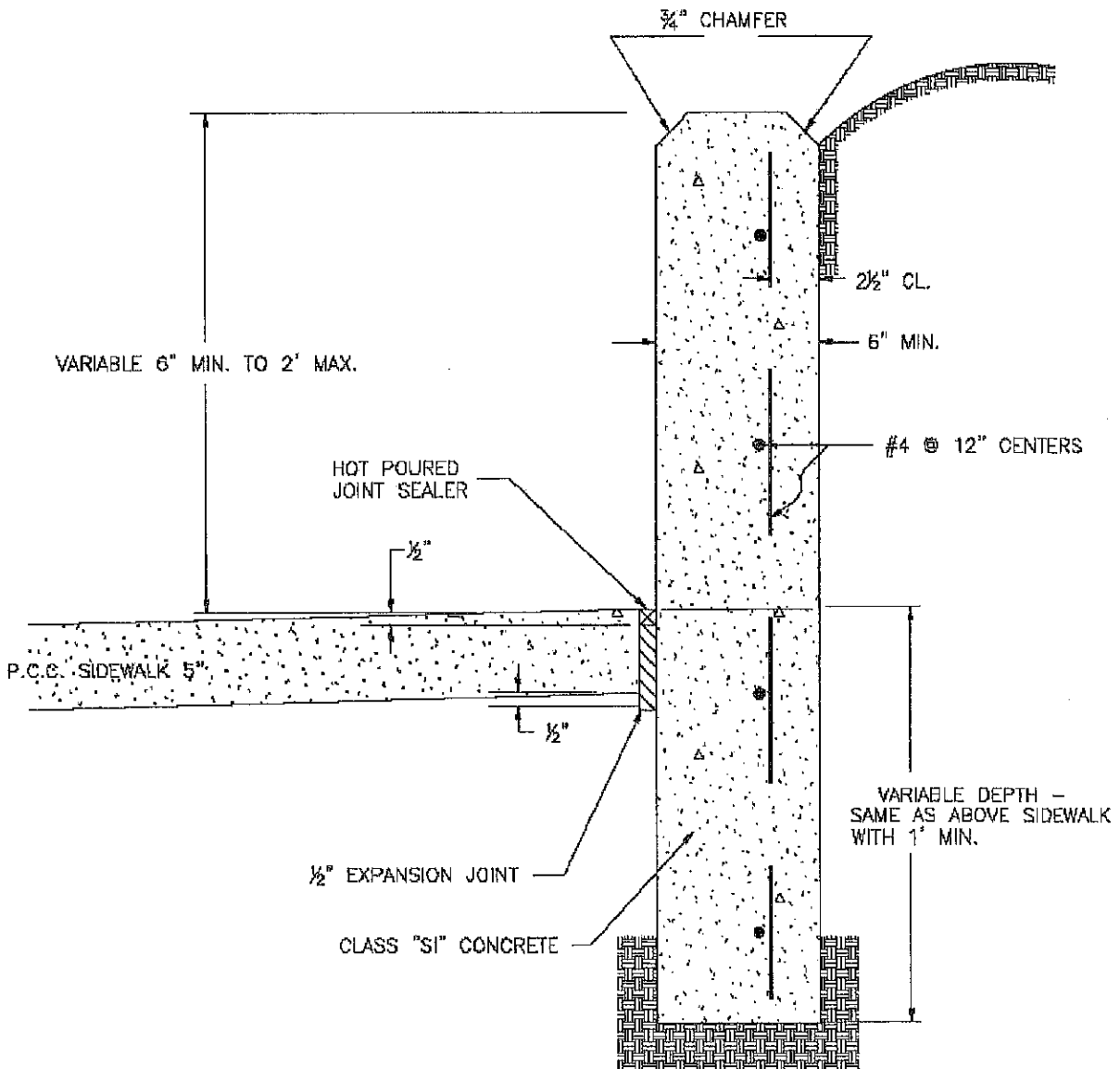
TYPICAL SECTION

NOTES:

1. RADIUS CURB IS ONLY PROVIDED ON STREET WITH CURB AND GUTTER.
2. IF SIDEWALK CURRENTLY EXISTS, IT SHALL BE REMOVED AND REPLACED TO THE LIMITS SHOWN WITH 6" THICK SIDEWALK.

CITY OF TUSCOLA
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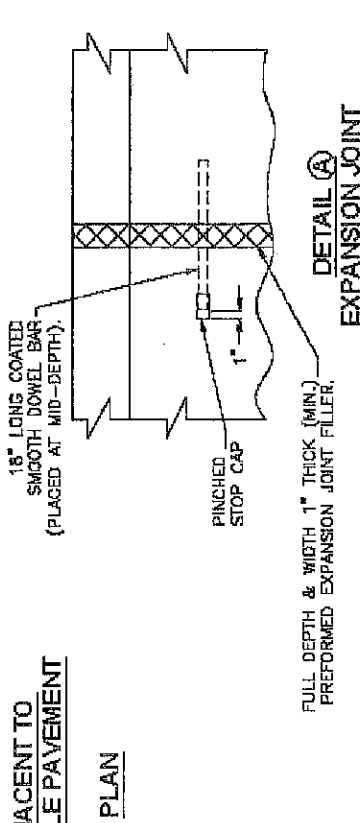
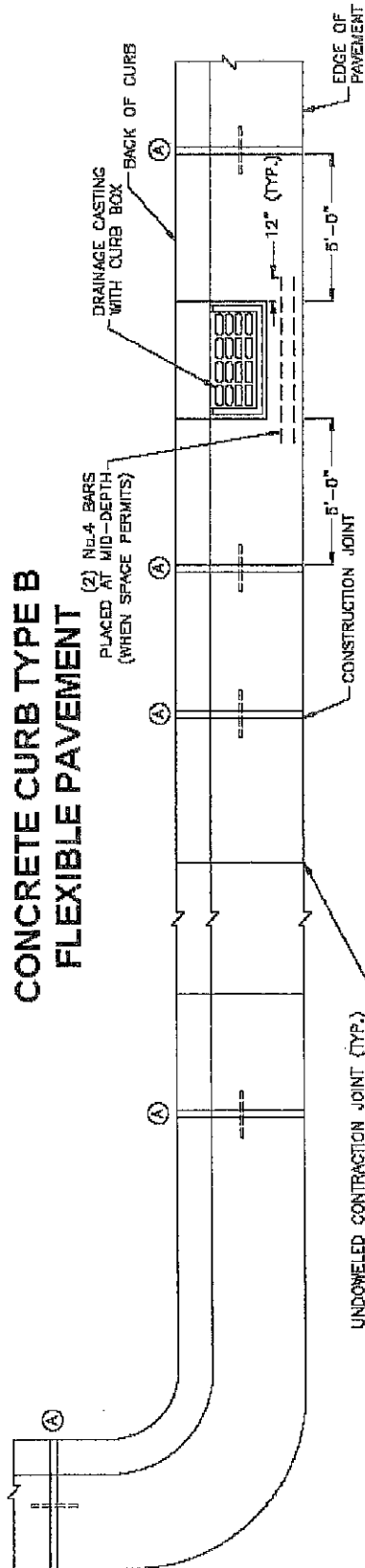
STANDARD DESIGN CURB WALL



CITY OF TUSCOLA
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**STANDARD DESIGN
 CONCRETE CURB TYPE B
 FLEXIBLE PAVEMENT**



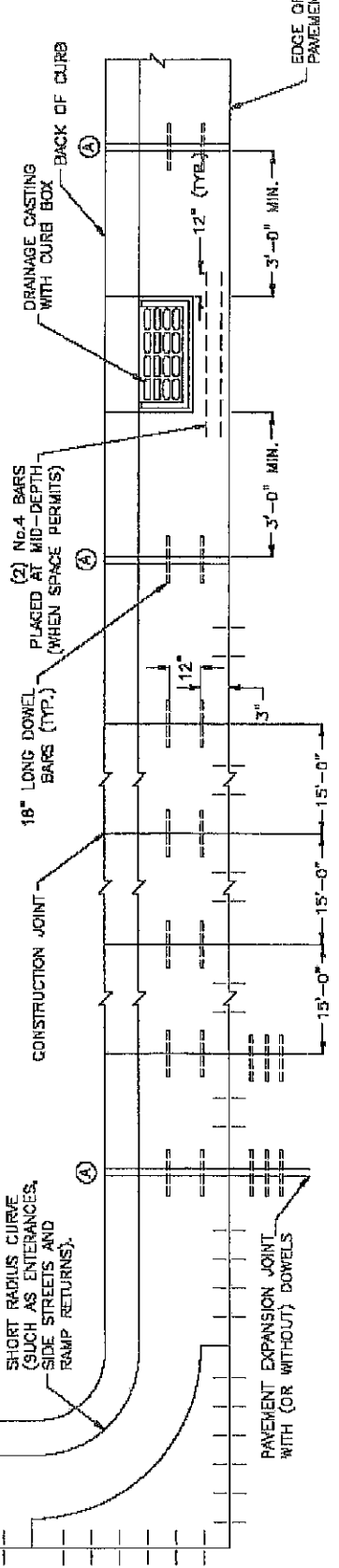
**ADJACENT TO
 FLEXIBLE PAVEMENT**

PLAN

- UNDOWELED CONTRACTION JOINT (TYP.)
 CONSTRUCTION OPTION:
 1. FORM WITH 3/8" THICK STEEL TEMPLATE
 2" DEEP, AND SEAL.
 2. SAW 2" DEEP AT 4 TO 24 HOURS,
 AND SEAL.
 3. INSERT 3/8" THICK PREFORMED
 JOINT FILLER FULL DEPTH & WIDTH.

- DOWELED CONTRACTION JOINT (TYP.)
 (PLACED IN PROLONGATION WITH PAVEMENT JOINTS)
 CONSTRUCTION OPTION:
 1. FORM WITH 3/8" THICK STEEL TEMPLATE
 2" DEEP, AND SEAL.
 2. SAW 2" DEEP AT 4 TO 24 HOURS, AND SEAL.

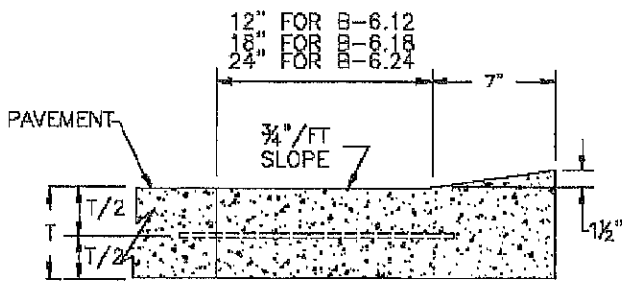
SHORT RADIUS CURVE
 (SUCH AS ENTERANCES,
 SIDE STREETS AND
 RAMP RETURNS).



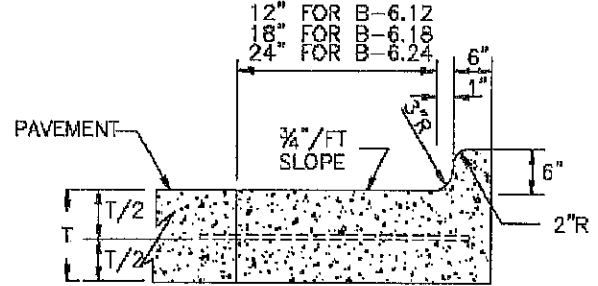
**ADJACENT TO PCC PAVEMENT
 OR PCC BASE COURSE**

PLAN

STANDARD DESIGN COMBINATION CONCRETE CURB AND GUTTER

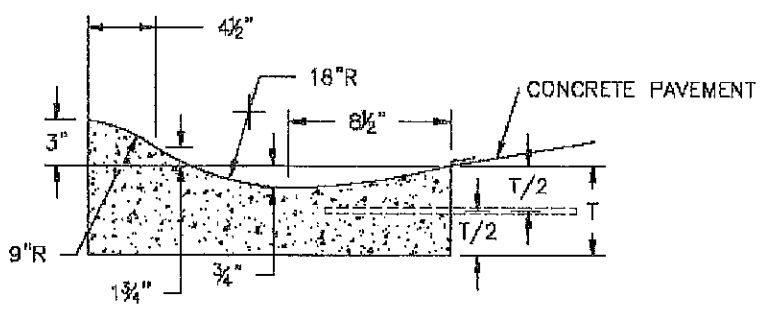


DEPRESSED CURB



BARRIER CURB

COMBINATION CURB AND GUTTER



MOUNTABLE CURB

NOTES:

1. "T" = SAME AS ADJACENT PAVEMENT OR 8", WHICHEVER IS GREATER.
2. FOR PCC PAVEMENT TIE BARS SHALL BE A #4 DEFORMED BAR 24" LONG AT 24" CENTERS.
3. THE CURB OR CURB AND GUTTER MAY BE POURED USING AN APPROVED MECHANICAL SLIP FORM CURB MACHINE. IF SLIP FORM, THE PLACEMENT OF ANY REQUIRED TIE BARS OR DOWEL BARS SHALL BE INSTALLED AS DIRECTED BY THE CITY ENGINEER.
4. BITUMINOUS PAVEMENT ADJACENT TO GUTTER WILL BE LAID 1/4" HIGHER THAN EDGE OF GUTTER.

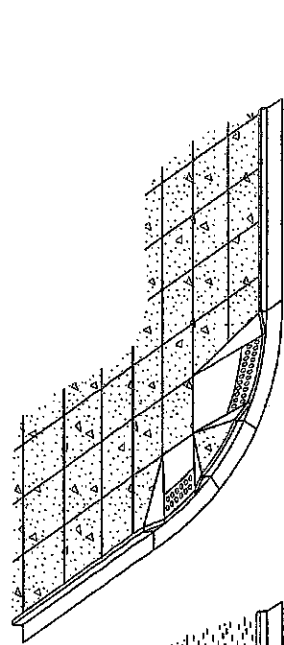
CITY OF TUSCOLA
DESIGN & CONSTRUCTION
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SHEET #1 OF 2

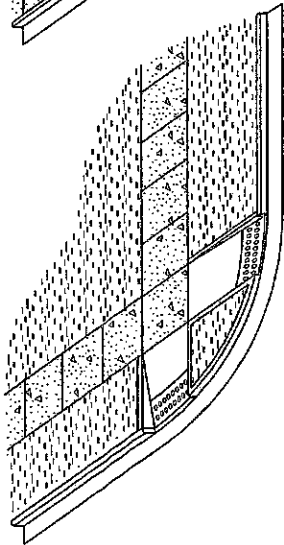
Revised 11/08

CURB RAMPS FOR SIDEWALKS

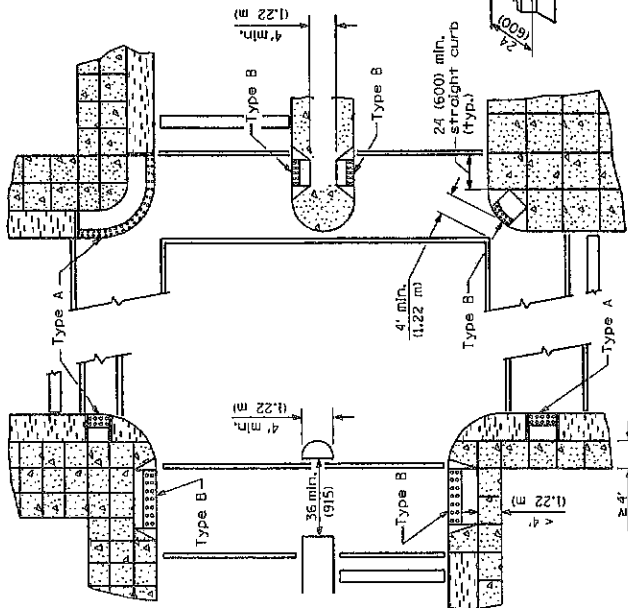
PAGE 1 OF 2



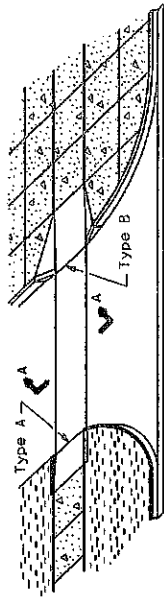
TYPE B RAMPS



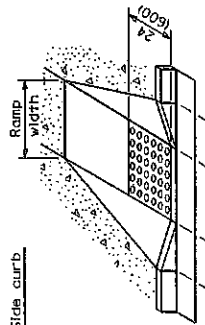
TYPE A RAMPS



RECOMMENDED LOCATION OF RAMPS



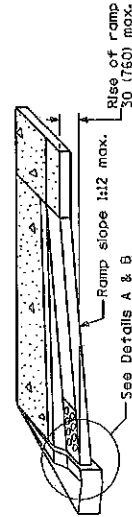
RAMPS AT ALLEYS OR ENTRANCES



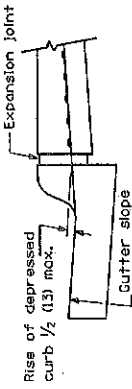
TYPE B

TYPE A

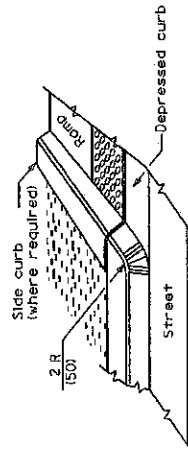
DETAILS OF RAMPS



RAMP PROFILE



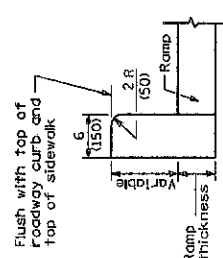
DETAIL A



DETAIL B

LEGEND

- Sidewalk
- Ramp
- Detectable Warnings
- Non walking area



DETAIL OF SIDE CURB
(Side curb may be constructed monolithically with ramp)

GENERAL NOTES

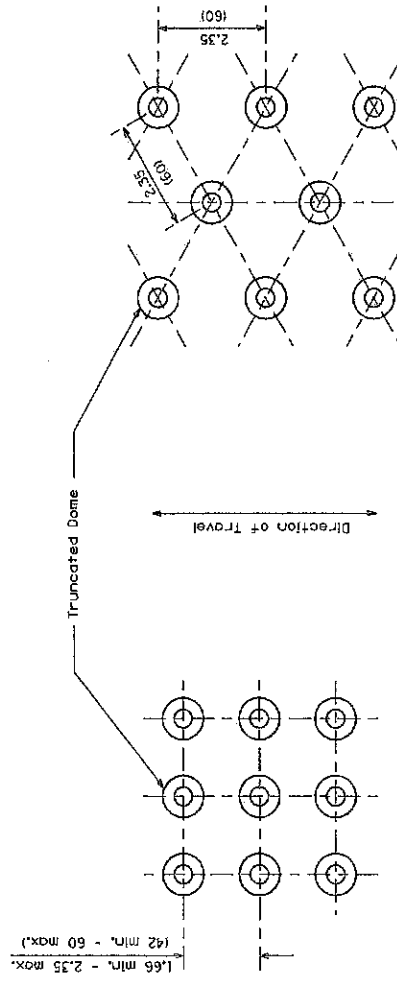
Detectable warnings shall be installed at curb ramps, medians and pedestrian refuge islands, at-grade railroad crossings, transit platform edges, and other locations where pedestrians are required to cross a hazardous vehicular way. Detectable warnings shall also be installed at alleys and commercial entrances when permanent traffic control devices are present.

The maximum slope of the side flare for Type B ramps shall be 1:12. However, if the width of the landing area between the ramp and the curb or obstruction is less than 4'-0" (1.22 m) then the maximum slope shall be 1:12.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H). All dimensions are in inches (millimeters) unless otherwise shown.

CURB RAMPS FOR SIDEWALKS

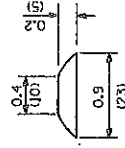
PAGE 2 OF 2



SQUARE PATTERN
(Parallel Alignment)

TRIANGULAR PATTERN

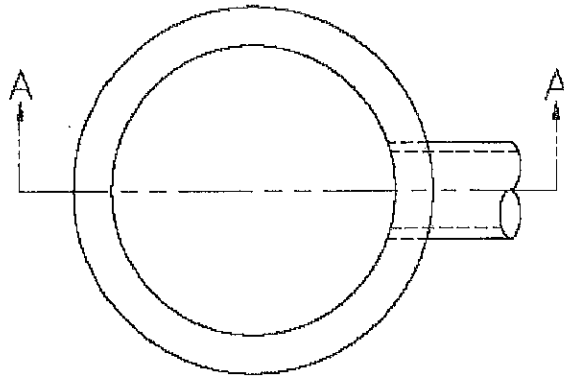
DETECTABLE WARNINGS DETAIL



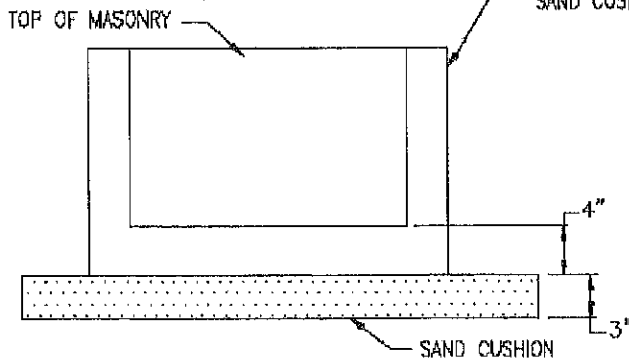
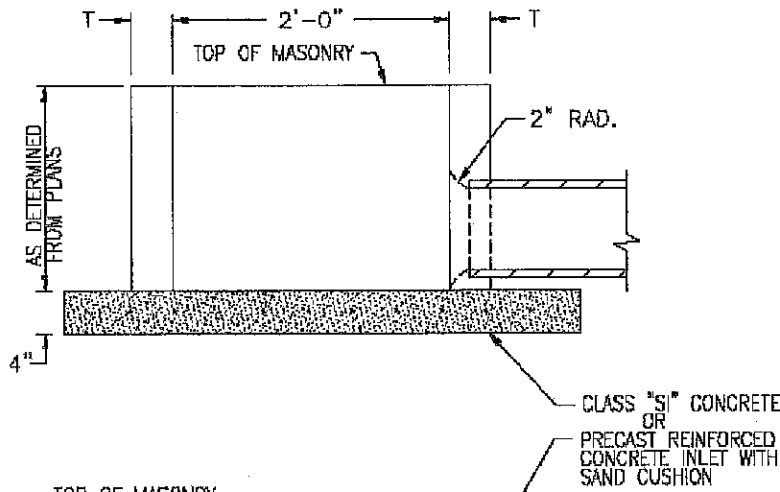
TRUNCATED DOME DETAIL

CITY OF TUSCOLA
DESIGN & CONSTRUCTION
STANDARDS

**STANDARD DESIGN
INLET
TYPE A**



PLAN



SECTION A-A

ALTERNATE MATERIALS FOR WALLS	T
PRECAST REINFORCED CONCRETE SECTION	3"
MONOLITHIC CONCRETE	6"

NOTES:

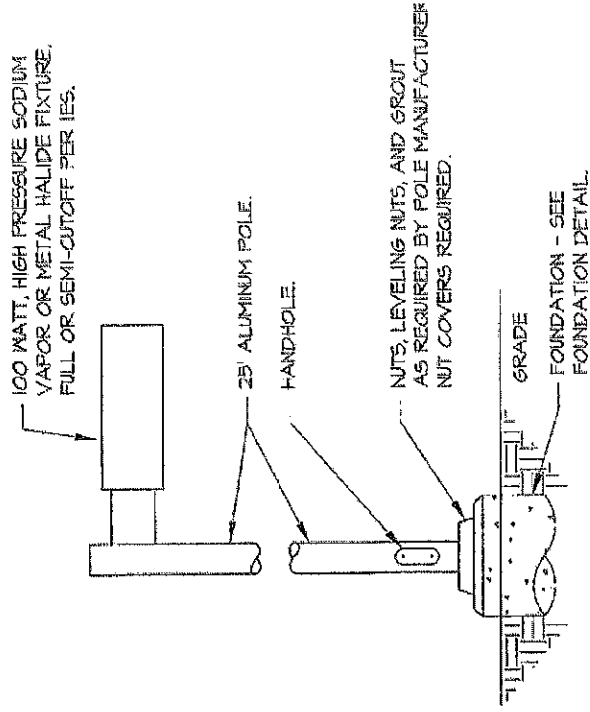
1. WHEN USING A PRECAST REINFORCED CONCRETE INLET, THE CONTRACT UNIT PRICE SHALL INCLUDE FURNISHING AND PLACING SAND CUSHION.
2. THE CONTRACT UNIT PRICE SHALL INCLUDE THE FRAME AND LID OR GRATE SPECIFIED ON PLANS.
3. ALL CONCRETE JOINTS IN THE STRUCTURE SHALL BE SEALED USING PERMAGUM ROPE MASTIC OR APPROVED EQUAL. ADJUSTING RINGS AND THE CASTING SHALL BE SEALED USING 2 LOOPS OF 3/4" PERMAGUM ROPE MASTIC.

CITY OF TUSCOLA
DESIGN & CONSTRUCTION
STANDARDS

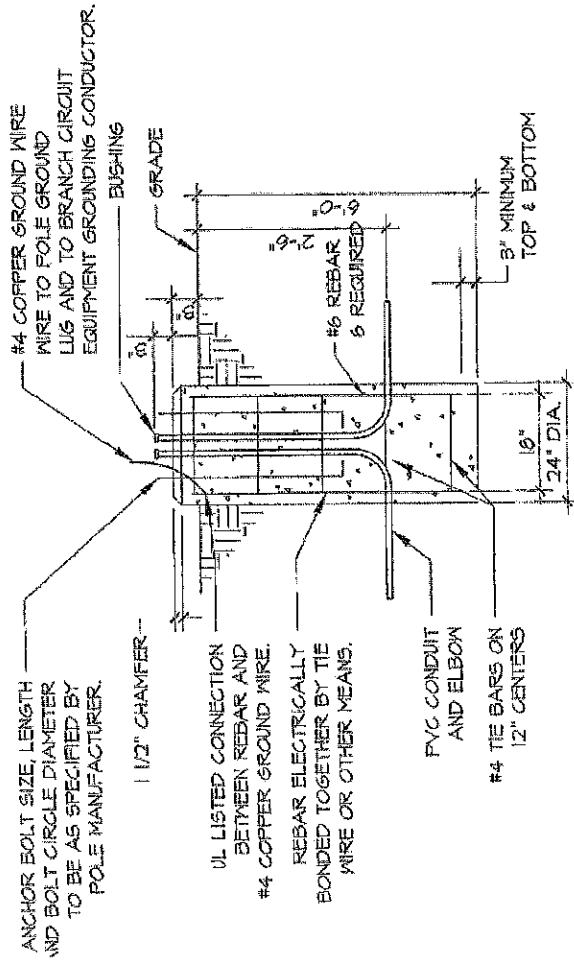
ROADWAY LIGHTING

SECTION F

STANDARD DESIGN LIGHTING DETAILS



LIGHT POLE DETAIL



LIGHT POLE FOUNDATION

CITY OF TUSCOLA
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STANDARDS