STORM DRAINAGE
DIVISION 600
NOTES

1. CURB ALONG APRON TO HAVE VERTICAL FACE AND BE MONOLITHIC WITH APRON.

2. FOR COVER, SEE CATCH BASIN FRAME AND LID SHEET.

3. CATCH BASIN MAY BE PRECAST UNIT OR POURED IN PLACE IF GRADE IS NOT GREATER THAN 2.75%.

4. PRECAST UNITS SHALL HAVE MINIMUM WALL THICKNESS OF 5’

TYPE "A" CATCH BASIN
TYPE "B" CATCH BASIN

NOTES

5. CURB ALONG APRON TO HAVE VERTICAL FACE AND BE MONOLITHIC WITH APRON.

6. FOR COVER, SEE CATCH BASIN FRAME AND LID SHEET.

7. CATCH BASIN MAY BE PRECAST UNIT OR Poured IN PLACE IF GRADE IS BETWEEN 2.76% AND 6.25%

8. PRECAST UNITS SHALL HAVE MINIMUM WALL THICKNESS OF 5"
1. COVER AND GRATING TO BE NEENAH R-33116 OR EQUIVALENT.
2. PRECAST UNITS SHALL HAVE MINIMUM WALL THICKNESS OF 8".

COVER & GRATING FOR B-ALTERNATE CATCH BASIN
TYPE "C" CATCH BASIN

1. FOR COVER SEE CATCH BASIN FRAME AND LID SHEET

2. PRECAST UNITS SHALL HAVE MINIMUM WALL THICKNESS OF 9"

3. CATCH BASIN MAY BE PRECAST UNIT OR Poured IN PLACE IF GRADE IS GREATER THAN 6.26%.

4. CURB ALONG APRON TO HAVE VERTICAL FACE AND BE MONOLITHIC WITH APRON.
TYPE "D" AND "E" (DOUBLE DRIP) CATCH BASINS

PLAN (WITH GRATING REMOVED)

PLAN (WITH GRATING REMOVED)

SECTION L-L

SECTION K-K

SECTION M-M

EXISTING CURB

EDGE OF CONCRETE GUTTER

NORMAL STREET SURFACE

CURB HEIGHT

NORMAL GUTTER LINE

OUTER LINE AT FACE OF CURB

OUTLET

OUTLET

TYPE "D" CATCH BASIN
FOR USE AT LOW POINT

TYPE "E" CATCH BASIN

NOTE: BOTTOM TO BE CONTOURED TO PROVIDE POSITIVE DRAINAGE.

NOTES

1 FOR GRATING NO. 8 CATCH BASIN FRAME AND LID SHEET

2 CURB ALONG APRON TYPE "D" CATCH BASIN TO HAVE VERTICAL FACE AND BE MONOLITHIC WITH APRON.

3 PRECAST UNITS SHALL HAVE MINIMUM WALL THICKNESS OF 3"
FRAME
MIN. WT. - 215 LBS.

DIAMOND DESIGN
FOR FRAME AND LID

SECTION C-C

SECTION E-E

LID

1'-11 3/4"

FRAME AND LID DIAMOND DESIGN

SECTION A-A

SECTION B-B

NOTES
WHEN THIS FRAME IS USED IN PAIRS TO FORM COVERS FOR TYPE "B" CATCH BASINS, EACH PAIR SHALL BE SUPPLIED WITH 6 - 2" X 1/2" MACH. BOLTS AND NUTS, AND ONE STEEL ROD 8" - 4" X 1" THREADED A MIN. OF 2 5/8" AT EACH END WITH 2 NUTS FOR SAME.
THE LUGS SHALL BE OMITTED AND THE CONTACT SURFACES OF THE TWO FRAMES MACHINED TO ENSURE A TRUE RECTANGULAR COVER IN A SINGLE PLANE.
FRAME AND LID SHALL BE NEENAH CATALOG NO. R-3312-A OR EQUIVALENT.

FRAMES AND LIDS FOR TYPE "A", "B" AND "D" CATCH BASINS
NOTE: FRAME AND LID SHALL BE NEENAH CATALOG NO. R-3408-A OR EQUIVALENT FOR TYPE "E" CATCH BASIN AND NO. R-3408-B OR EQUIVALENT FOR TYPE "C" CATCH BASIN.

FRAME FOR TYPE "C" CATCH BASIN

FRAME FOR TYPE "E" CATCH BASIN

LID FOR TYPE "C" AND "E" CATCH BASINS

FRAMES AND LIDS FOR TYPE "C" AND "E" CATCH BASINS
NOTE: CHANGES IN PIPE SIZES SHALL BE MADE BY INSTALLATION OF AN ECCENTRIC REDUCER. CHANGES IN ALIGNMENT SHALL BE MADE BY INSTALLATION OF A BEND OF SUITABLE DIAMETER AND DEFLECTION, INSTALLED ON THE LOW SIDE AND IMMEDIATELY ADJACENT TO MANHOLE T-SECTION OR ECCENTRIC REDUCER.

SECTION C-C

PRECAP OPENING

FOR SEWERS 27" THRU 33"

SECTION D-D

FOR 48" & 54" SEWERS

REINFORCING FOR CONCRETE BEDDING SHALL BE NO. 8 BARS @ 9" CENTERS, BOTH WAYS, 6" BELOW LOWERMOST DIMENSION OF THE "T" SECTION.
STORM MANHOLES TYPE "C" AND "E"
STORM MANHOLE FRAME AND LID — CONST. AROUND MANHOLE
TYPE "A" HEADWALL

ELEVATION

SECTION A-A

INLET END
GROOVE OR BELL UPSTREAM

REET END
TONGUE OR SPIGOT DOWNSTREAM

RIGID PIPE

CIRCULAR SECTIONS
L = 5D + 4T
H = CIRCULAR SECTIONS
D = 4R + 4T + S
L = ELLIPTICAL OR PIPE ARCH
R = ELLIPTICAL OR PIPE ARCH
D = DIAMETER OF PIPE
T = THICKNESS OF BARREL
H = LENGTH OF HEADWALL
L = HEIGHT OF HEADWALL

DIMENSIONS

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<th>DIAMETER</th>
<th>H</th>
<th>L</th>
<th>CONCRETE CUS.</th>
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NOTES

TYPE "A" HEADWALL WHERE REQUIRED WILL BE PROVIDED FOR NONSKewed CULVERTS HAVING A DIAMETER OR RISE OF 36 INCHES OR LESS.

CONCRETE SHALL BE CLASS "A" REINFORCING STEEL BARS SHALL BE 5/8 INCH ROUND.

DIMENSIONS AND QUANTITIES ARE SHOWN FOR CIRCULAR SECTION ONLY.

IT WILL BE NECESSARY TO DETERMINE DIMENSIONS FOR THE TYPE "A" HEADWALL

METAL PIPE ARCHES IN ACCORDANCE WITH THE EQUATIONS LISTED ON THIS DRAWING.

CHAMFER ALL EXPOSED CORNERS 3/4 OF AN INCH.

WHERE THE SOIL BORINGS INDICATE A BEARING CAPACITY OF LESS THAN

2600 POUNDS PER SQUARE FOOT, IT WILL BE NECESSARY TO INCREASE THE

WIDTH OF THE BASE.

MINIMUM COVER FOR REINFORCING STEEL SHALL BE 2 INCHES.
TYPE "C" HEADWALL

NOTES

TYPE C HEADWALL WHERE REQUIRED WILL BE PROVIDED FOR SKEWED AND NONSKEWED CULVERTS HAVING A DIAMETER OR RISE OF 42 TO 84 INCHES INCLUSIVE.

TYPE I IS USED WHEN THE SKEW ANGLE IS 10 DEGREES OR LESS AND TYPE II WHEN THE SKEW ANGLE IS 11 DEGREES AND OVER.

CONCRETE SHALL BE CLASS "A".

REINFORCING STEEL BARS SHALL BE 5/8" ROUND.

DIMENSIONS AND QUANTITIES ARE SHOWN FOR CIRCULAR SECTIONS ONLY.

WHEN USED WITH REINFORCED ELIPSIAS AND DRILLED CONCRETE PIPE OR CORRUGATED METAL ARCHES, IT WILL BE NECESSARY TO DETERMINE SUCH DIMENSIONS AND QUANTITIES WHICH SHALL GENERALLY CONFORM WITH THOSE LISTED FOR THE NEAREST SIZE CIRCULAR PIPE. THE DIMENSIONS ESTABLISHED BY VERTICAL DIAMETER SHALL APPLY TO SPAN.

CHAMFER ALL EXPOSED CORNERS 3/4 OF AN INCH.

WHERE THE SOIL BORINGS INDICATE A BEARING CAPACITY OF LESS THAN 2000 POUNDS PER SQUARE FOOT IT WILL BE NECESSARY TO INCREASE THE WIDTH OF THE FOOTING.

MINIMUM COVER FOR REINFORCING STEEL SHALL BE 2 INCHES.

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<th>d</th>
<th>e</th>
<th>B</th>
<th>L1</th>
<th>L2</th>
<th>h1</th>
<th>h2</th>
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PIPE CRADLE AND CONCRETE ENCASEMENT

NOTES

1. LENGTH OF CRADLE TO BE 10'-0" FOR FILLS UP TO 10'-0" DEEP AND EQUAL TO THE DEPTH OF FILL FOR DEPTHS 10'-0" AND OVER.

2. RIP RAP MAY BE PLACED AT INLET AND OUTLET OF CULVERT AS DETERMINED BY THE ENGINEER.

CONCRETE ENCASEMENT DETAIL

CONCRETE QUANTITIES

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NOTE: OD. OF PIPE SHOWN IS THAT OF PIPE BARREL ONLY.
TYPE A SHALL CONSIST OF SIZES SUCH THAT AT LEAST 95 PERCENT OF THE TOTAL MATERIAL BY WEIGHT SHALL BE LARGER THAN AN 18-INCH SQUARE OPENING. THE MATERIAL SMALLER THAN AN 18-INCH SQUARE OPENING SHALL CONSIST Predominantly OF ROCK SPALLS AND ROCK FINES AND SHALL BE FREE OF SOIL.

NOTE: ALL TYPES MAY BE PLACED WITH OR WITHOUT A 6-INCH BED OF NO. 2 OR 4 CRUSHED GRAVEL, STONE, OR SLAG AS SPECIFIED BY THE ENGINEER.

TYPE B SHALL CONSIST OF SIZES SUCH THAT AT LEAST 95 PERCENT OF THE TOTAL MATERIAL BY WEIGHT SHALL BE LARGER THAN A 9-INCH SQUARE OPENING. THE MATERIAL SMALLER THAN A 9-INCH SQUARE OPENING SHALL CONSIST Predominantly OF ROCK SPALLS AND ROCK FINES AND SHALL BE FREE OF SOIL.

NOTE: DEPTH "D", MEASURED PERPENDICULAR TO SLOPE, SHALL BE AS SPECIFIED BY THE ENGINEER.

TYPE C SHALL CONSIST OF SIZES SUCH THAT AT LEAST 90 PERCENT OF THE TOTAL MATERIAL BY WEIGHT SHALL BE LARGER THAN A 6-INCH SQUARE OPENING, AND SHALL BE FREE OF SOIL. THE AMOUNT OF MATERIAL PASSING A 3-INCH SIEVE SHALL BE NO MORE THAN 15 PERCENT BY WEIGHT OF THE TOTAL MATERIAL.

ROCK CHANNEL PROTECTION
NOTES

1. DRYWELL SHALL EXTEND A MINIMUM OF 3'-0" INTO GRAVEL STRATA. EXACT LOCATION OF GRAVEL STRATA SHALL BE DETERMINED IN THE FIELD BY THE PROJECT ENGINEER.

2. THE SMALLEST DRYWELL SHALL CONSIST OF TWO 3'-0" SECTIONS.

3. ADDITIONAL 3'-0" SECTIONS MAY BE REQUIRED DEPENDING UPON THE DEPTH OF THE GRAVEL STRATA.

4. THE CONTRACTOR SHALL, PRIOR TO ORDERING PIPE SECTIONS FOR DRYWELL, SUBMIT TO THE PROJECT ENGINEER DETAILS OF THE PROPOSED PIPE SECTION FOR HIS WRITTEN APPROVAL. THE PIPE SECTIONS SHALL BE MADE OF REINFORCED CONCRETE.

IN PAVED AREAS MANHOLE FRAME AND LID SHALL BE EQUAL OF NEENAH CATALOG NO. R-1767. FOR NON-TRAFFIC INSTALLATIONS MANHOLE FRAME AND LID SHALL BE EQUAL OF EAST JORDAN IRON WORKS NO. 1810 OR DEBAUL NO. DX-23-25, ABP MANHOLE FRAME AND LID.

PRECAST ADJUSTING RING GROUT INSIDE OF RING

CIRCULAR PRECAST FLAT SLAB TOP

CIRCULAR FLAT SLAB TRANSITION SECTION

COURSE GRAVEL BACKFILL

TYPICAL SLOT OPENING

GRAVEL STRATA

2" MIN. CLEARANCE

COURSE GRAVEL BACKFILL

RING FOOTING TO BE CONSTRUCTED OF CLASS "A" COVENANT