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DETAIL NO.



STANDARD DETAIL
ENGLISH

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DETAIL NO.

**400 SERIES
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- 424 24" AND 30" MANHOLE FRAME AND COVER
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- 501-4 HEADWALL IRRIGATION 18" TO 60" PIPE
- 501-5 HEADWALL - DROP INLET
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**500 SERIES
IRRIGATION AND STORM DRAIN INFORMATION (CTD)**

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- 507 ENCASED CONCRETE PIPE (SHALLOW INSTALLATION)
- 510 CORRUGATED METAL PIPE AND INSTALLATION
- 520 STORM DRAIN MANHOLE BASE (48" OR SMALLER)
- 521 STORM DRAIN MANHOLE BASE (51" OR LARGER)
- 522 STORM DRAIN MANHOLE SHAFT
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- 534-4 CATCH BASIN - TYPE 'E' (DETAILS)
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- 536-1 COMMON DETAILS AND SECTIONS FOR CURB OPENING CATCH BASINS
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- 537 CATCH BASIN - TYPE 'G'
- 538 CATCH BASIN - TYPE 'H'
- 539 GRATES FOR CATCH BASINS - TYPE 'G' AND 'H'
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- 552 CONCRETE CUT-OFF WALLS
- 555 EROSION PROTECTION/RIPRAP

DETAIL NO.



STANDARD DETAIL
ENGLISH

INDEX (PAGE 2 OF 2)

DETAIL NO.

1. THESE DETAILS HAVE BEEN PREPARED IN AN EFFORT TO STANDARDIZE THE CONSTRUCTION DETAILS USED BY VARIOUS CONTRACTING AGENCIES IN MARICOPA COUNTY. THEY ARE TO BE USED IN CONJUNCTION WITH THE CURRENT METRIC EDITION OF THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" SPONSORED AND DISTRIBUTED BY THE MARICOPA ASSOCIATION OF GOVERNMENTS.
2. MANY NOTES WITHIN THESE DETAILS REFER TO VARIOUS SECTIONS OF THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION." WHERE THIS REFERENCE IS MADE, ONLY THE ABBREVIATION "SECT." IS USED. AN EXAMPLE OF THIS REFERENCE WOULD BE: "CLASS 'A' CONCRETE PER SECT. 725."
3. MANY NOTES WITHIN THESE DETAILS REFER TO OTHER DETAILS WITHIN THIS BOOK. WHERE THIS REFERENCE IS MADE, THE ABBREVIATION "DETAIL" IS USED. AN EXAMPLE OF THIS WOULD BE: "SEE DETAIL 391 FOR VALVE BOX INSTALLATION."
4. MANY DETAILS COVER MORE THAN ONE SHEET. THESE SHEETS HAVE BEEN GIVEN THE SAME NUMBER WITH A SUFFIX NUMBER, EXAMPLE: 391-1 AND 391-2.
5. AN EFFORT HAS BEEN MADE TO INCLUDE THE MOST COMMONLY USED CONSTRUCTION DETAILS IN THIS BOOK. ITEMS WHICH REQUIRE DESIGN CONSIDERATION BY THE DESIGNING ENGINEER HAVE NOT BEEN INCLUDED.
6. SOME OF THE DETAILS PRINTED HEREIN MAY BE USED BY SOME OF THE AGENCIES BUT NOT OTHERS. THE DESIGNING ENGINEER SHOULD THEREFORE CONTACT THE AGENCY WITHIN WHOSE JURISDICTION HE IS WORKING FOR DIRECTION AS TO WHICH DETAIL OR PORTIONS OF DETAILS SHOULD BE USED.
7. DETAIL DRAWINGS ARE NOT TO SCALE.

DETAIL NO.

101



STANDARD DETAIL
ENGLISH

GENERAL INFORMATION

REVISED

DETAIL NO.

101

CONCRETE PVMT. SECTION		MANHOLE		SINGLE CURB	
SUBGRADE SEAL SECTION		SEWER CLEANOUT		MAIL BOX	
SELECT MATERIAL SECTION		RAILROAD		EXISTING WATER LINE	
AGGREGATE BASE SECTION		IRRIGATION LINE		EXISTING TELEPHONE LINE	
BITUMINOUS PVMT. SECTION		IRRIGATION STANDPIPE		EXISTING SEWER LINE	
EXISTING PAVEMENT		"L" HEADWALL		EXISTING GAS LINE	
OBLITERATE PAVEMENT		TELEPHONE OR TEL. LINE		EXISTING STORM DRAIN LINE	
CONCRETE PAVEMENT		POWER OR JOINT LINE		EXISTING IRRIGATION LINE	
BITUMINOUS PAVEMENT		DOWN GUY & ANCHOR			
		STREET LIGHT			
SECTION LINE		STREET SIGN			
ROADWAY CENTER LINE		TRAFFIC SIGN			
SURVEY MONUMENT		TRAFFIC SIGNAL LIGHT			
FIRE HYDRANT		SIDEWALK			
WATER METER		CURB & GUTTER			
WATER OR GAS VALVE		VALLEY GUTTER			
GAS METER		SINGLE GUTTER			

DETAIL NO.

110



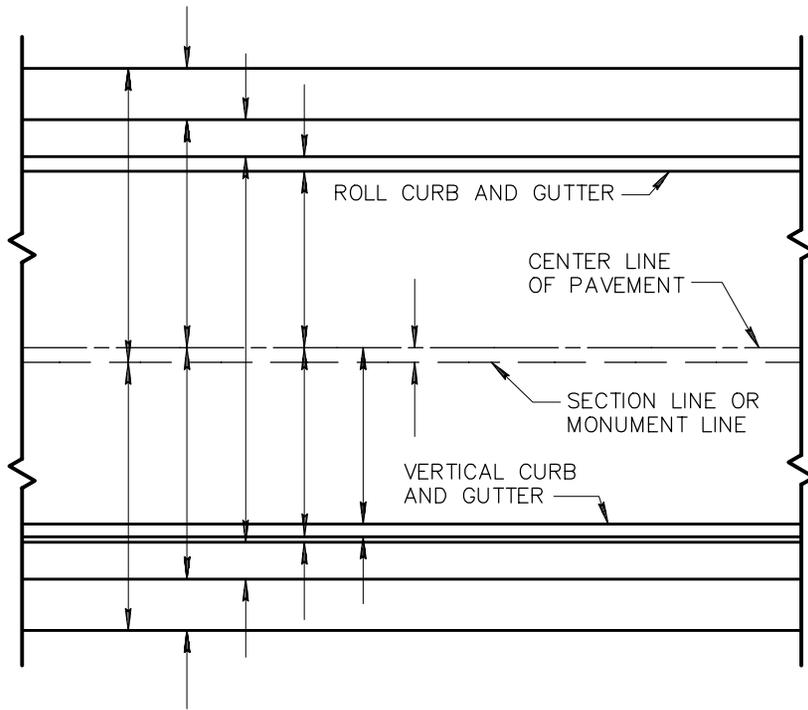
STANDARD DETAIL
ENGLISH

PLAN SYMBOLS

REVISED

DETAIL NO.

110



DIMENSION SHOULD BE GIVEN ONCE ON EACH SHEET AND SHOULD BE PLACED NEAR THE CENTER OF THE SHEET. IF ANY OF THE GIVEN CONDITIONS CHANGE, THEY SHOULD BE REDIMENSIONED AT THE POINT OF CHANGE.

GIVEN DIMENSIONS IN ORDER STARTING WITH THE LONGEST AND ENDING WITH THE SHORTEST, AS SHOWN IN THE SKETCH.

GIVE COMPLETE DIMENSIONS.

IF THE CENTERLINE OF PAVEMENT DOES NOT FALL ON THE SECTION LINE OR MONUMENT LINE OF THE STREET, DIMENSION AS ABOVE AND SHOW THE DIFFERENCE BETWEEN THE SECTION OR MONUMENT LINE AND THE CENTERLINE.

DETAIL NO.

112



MARICOPA
ASSOCIATION of
GOVERNMENTS

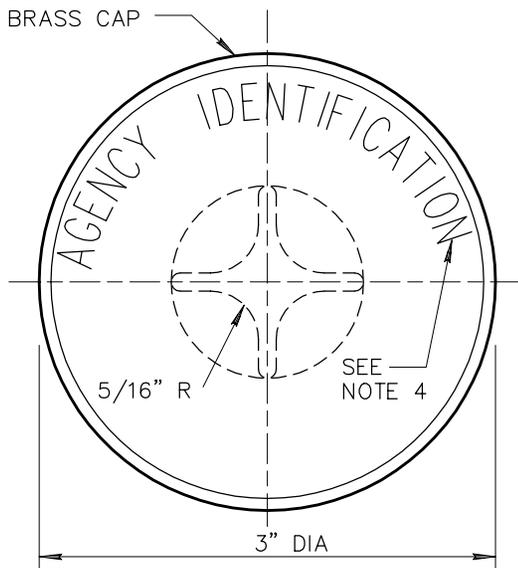
STANDARD DETAIL
ENGLISH

**DIMENSIONING
FOR ROAD IMPROVEMENT PLANS**

REVISED

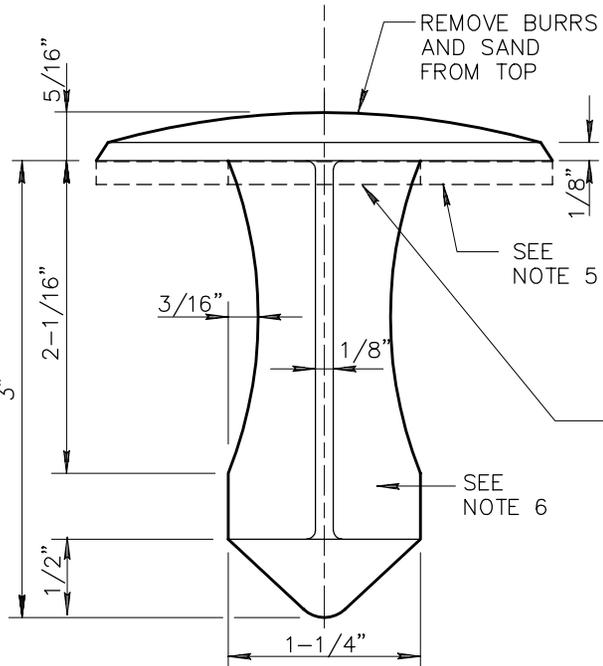
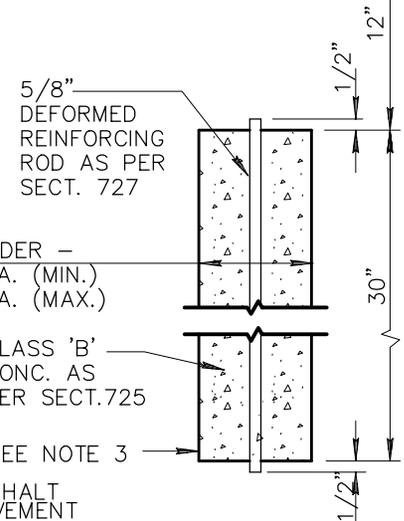
DETAIL NO.

112

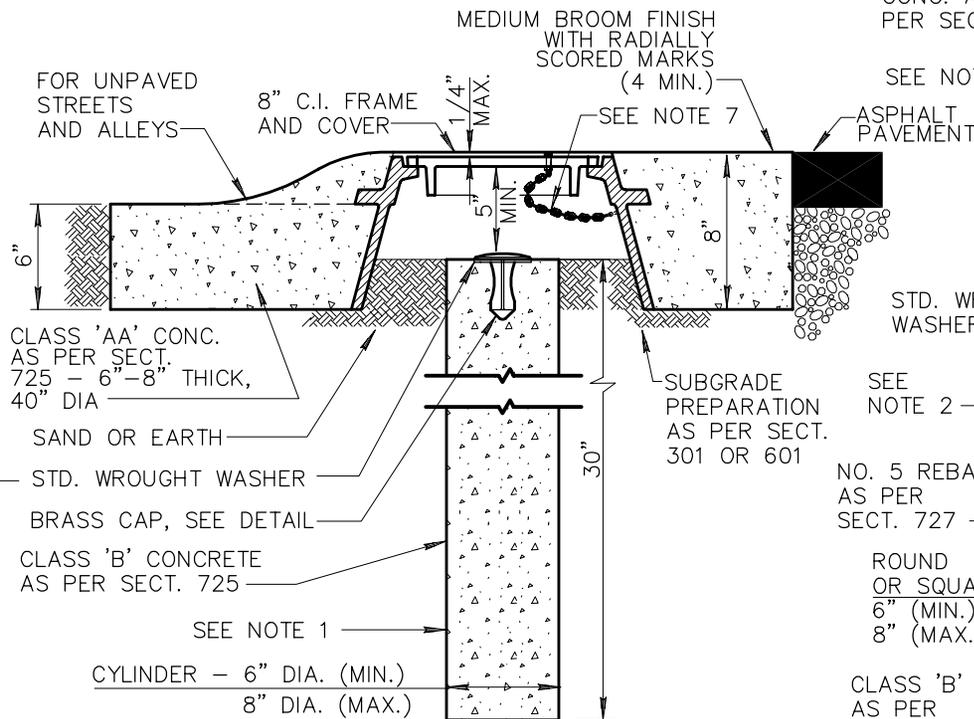


NOTES:

1. TYPE 'A' TO BE USED AT INTERSECTIONS OF MAJOR STREETS & COLLECTOR STREETS, AND AT OTHER SPECIAL POINTS IF REQUIRED BY ENGINEER, AS SHOWN ON PLANS.
2. TYPE 'B' TO BE USED AT INTERSECTION OF STREET CENTERLINES (EXCEPT WHERE TYPE 'A' IS SPECIFIED), CORNERS OR CHANGES IN ALIGNMENT OF SUBDIVISION BOUNDARIES (WHEN THEY FALL IN PAVEMENT), P.C.'S AND P.T.'S OF CURVES. WHEN P.I. FALLS IN PAVEMENT, THEN THE P.I. SHALL BE MONUMENTED.
3. TYPE 'C' TO BE USED AT CORNERS OF, AND CHANGE IN ALIGNMENT OF, SUBDIVISION BOUNDARIES WHERE CORNERS OR CHANGE POINTS FALL OUTSIDE OF PAVED AREAS OR IN ALLEYS.
4. LETTERS TO BE APPROX. 1/32" WIDE & 1/32" DEEP.
5. USE STANDARD WROUGHT IRON WASHER 3" O.D. x 11/64" THICK WITH 1-3/8" HOLE
6. CAP TO BE CONSTRUCTED OF RED BRASS OR BRONZE.
7. FRAME & COVER TO INCLUDE CHAIN PER DET. 270. (OPTIONAL PER AGENCY REQUIREMENTS.)



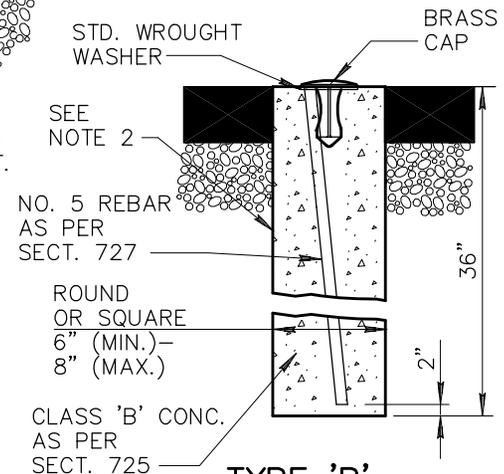
CAP DETAIL



TYPE 'A'

(WITH FRAME PER DETAIL 270)

TYPE 'C'



TYPE 'B'

(WITHOUT FRAME)

DETAIL NO.

120-1



STANDARD DETAIL
ENGLISH

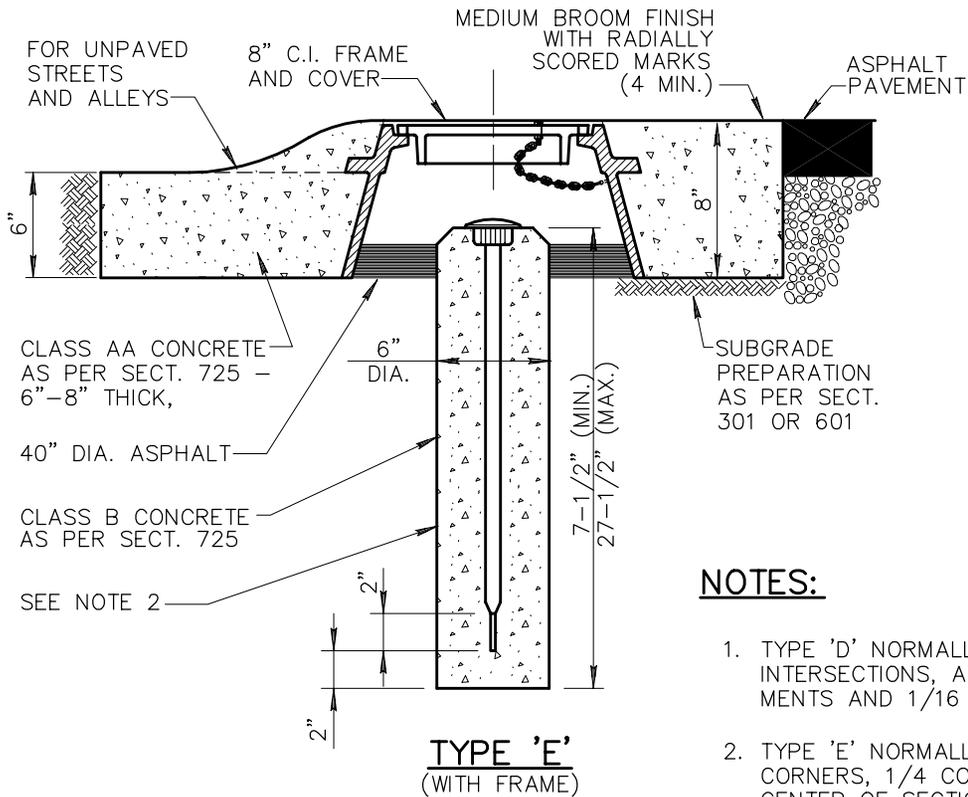
SURVEY MARKER

REVISED

01-01-2001

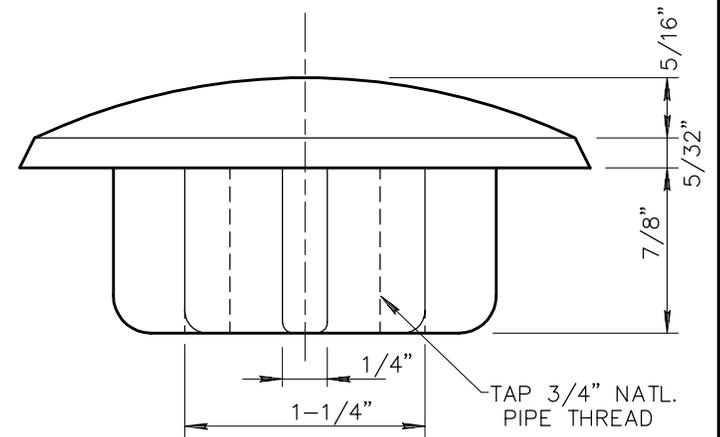
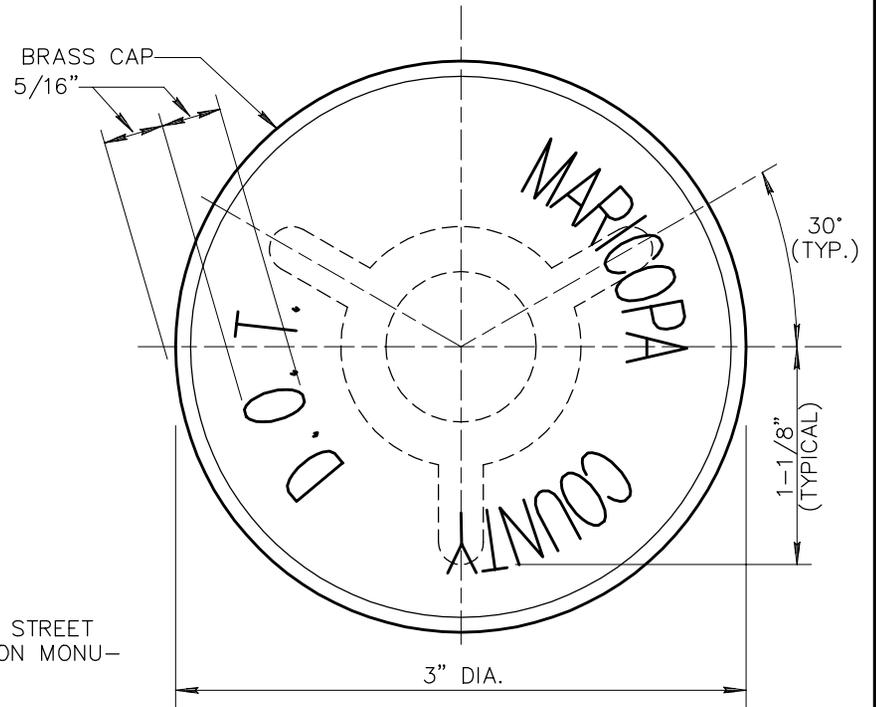
DETAIL NO.

120-1

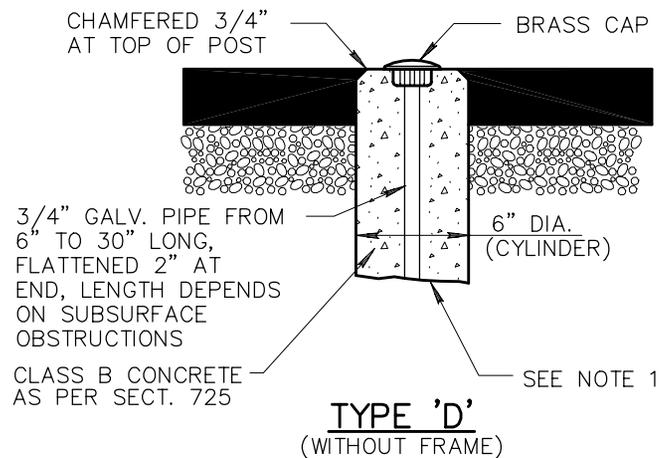


NOTES:

1. TYPE 'D' NORMALLY USED AT STREET INTERSECTIONS, AS SUBDIVISION MONUMENTS AND 1/16 CORNERS.
2. TYPE 'E' NORMALLY USED ON SECTION CORNERS, 1/4 CORNERS AND AT THE CENTER OF SECTIONS. CONCRETE POST IS CHAMFERED 3/4" AT TOP. MINIMUM LENGTH OF POST 7-1/2", MAXIMUM LENGTH 27-1/2". LENGTH DEPENDS ON SUBSURFACE OBSTRUCTIONS SUCH AS OLD CONCRETE PAVING, ROCK, ETC. 3/4" GALVANIZED PIPE SET IN THIS POST SHALL BE A MINIMUM OF 6" LONG AND A MAXIMUM OF 24" EXCLUSIVE OF COUPLING, SEE PLANS.
3. CAP TO BE CONSTRUCTED OF RED BRASS OR BRONZE.
4. FRAME AND COVER TO INCLUDE CHAIN PER STD. DETAIL 270.



CAP DETAIL



DETAIL NO.

120-2



STANDARD DETAIL
ENGLISH

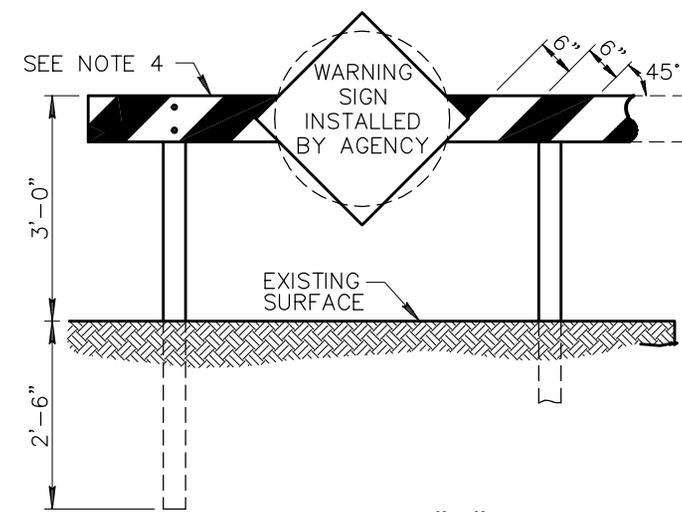
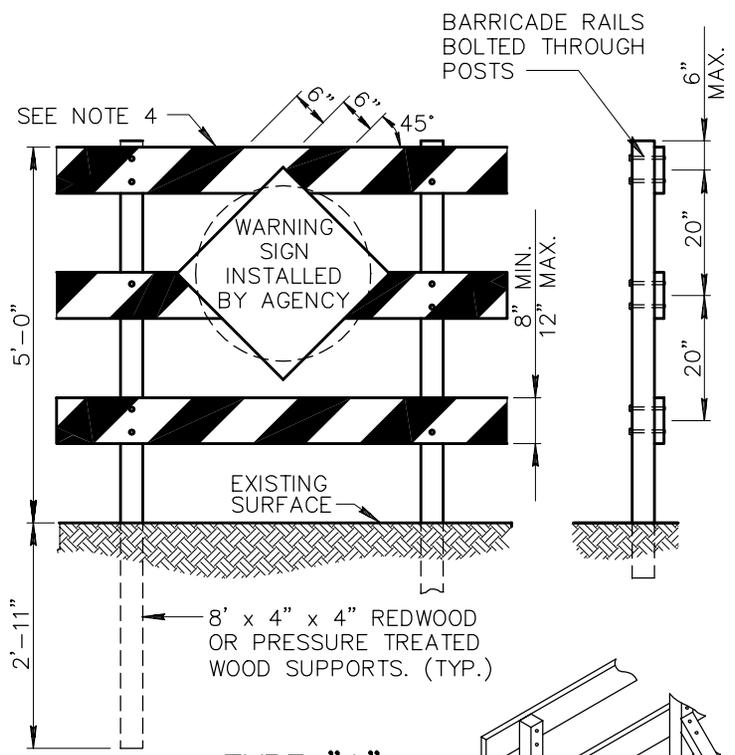
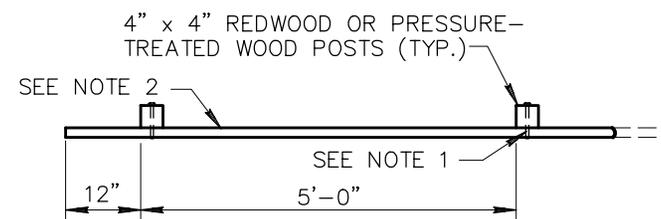
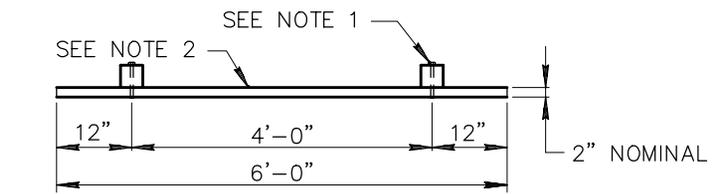
SURVEY MARKER
(FOR UNINCORPORATED AREAS OF COUNTY)

REVISED

01-01-2001

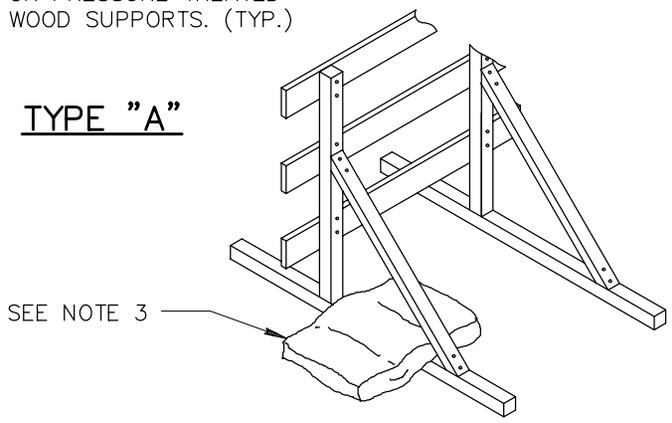
DETAIL NO.

120-2



TYPE "A"

TYPE "B"



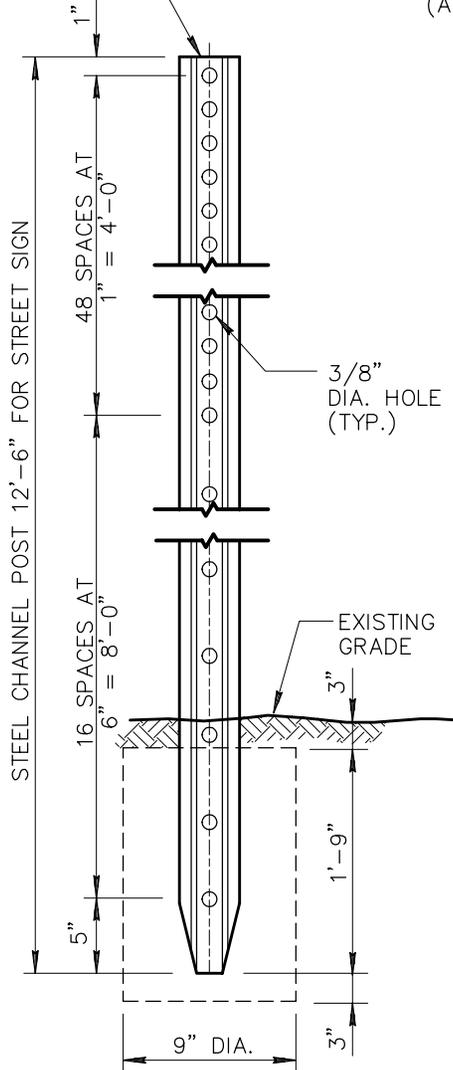
NOTES:

1. FASTEN WITH 1/2" x 5" LAG SCREWS WITH 2 FLAT WASHERS OR (2) 5/8" BOLTS, WITH 4 FLAT WASHERS.
2. 2" x 8" DOUGLAS FIR PLANK (LENGTH TO BE DETERMINED ON PLANS.)
3. WHEN BARRICADE (TYPE "A") IS CONSTRUCTED ON BASES INSTEAD OF POSTS SET INTO THE GROUND, IT MAY BE DESIRABLE TO BALLAST THE BASES WITH SAND BAGS OR BY STAKING TO PROVIDE RESISTANCE TO OVERTURNING DURING PERIODS OF HIGH WINDS.
4. TWO COATS OF WHITE PAINT PER SECTION 790 SHALL BE APPLIED TO ALL EXPOSED SURFACES OF THE BARRICADE. AN ADDITIONAL, TWO COATS OF ORANGE PAINT PER SECTION 790 SHALL BE APPLIED TO CREATE THE ALTERNATE ORANGE AND WHITE STRIPES. HIGHWAY SAFETY SPHERES (BEADS) PER ADOT 708-2.02 SHALL BE APPLIED BY HAND TO ALL CROSS MEMBERS, FRONT AND BACK AND ON BOTH COLORS, IMMEDIATELY AFTER PAINTING. THE STRIPES SHALL SLOPE DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS.

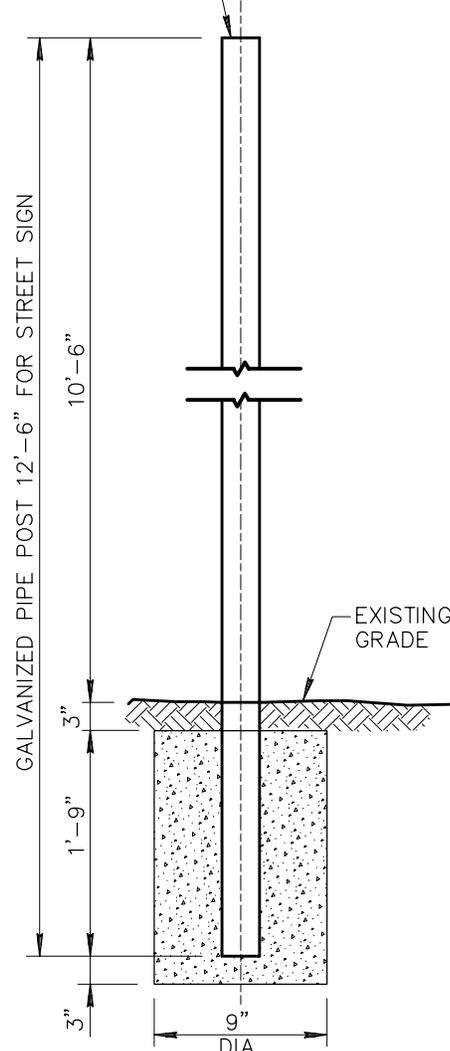
FLANGED STEEL 'U'
CHANNEL (2 LBS. OR 3 LBS.
PER SQUARE FOOT
AS SPECIFIED)

2-1/2" DIA. STANDARD
PIPE GALVANIZED OR
2-3/8" O.D. STANDARD
PIPE GALVANIZED
(AS SPECIFIED)

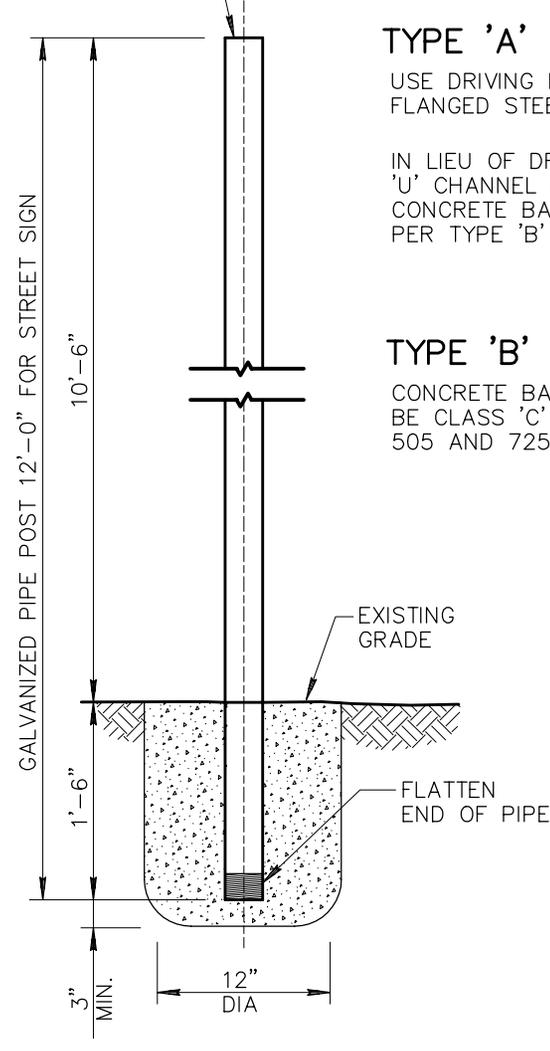
2" DIA.
STANDARD PIPE
GALVANIZED



TYPE 'A'



TYPE 'B'



TYPE 'C'

NOTES

TYPE 'A'

USE DRIVING HEAD FOR DRIVING ALL
FLANGED STEEL 'U' CHANNEL POSTS.

IN LIEU OF DRIVING FLANGED STEEL
'U' CHANNEL POSTS MAY BE SET IN
CONCRETE BASE FOUNDATION AS
PER TYPE 'B' BASE.

TYPE 'B' & TYPE 'C'

CONCRETE BASE FOUNDATIONS SHALL
BE CLASS 'C' CONCRETE AS PER SECT.
505 AND 725.

DETAIL NO.

131



STANDARD DETAIL
ENGLISH

STREET SIGN BASE

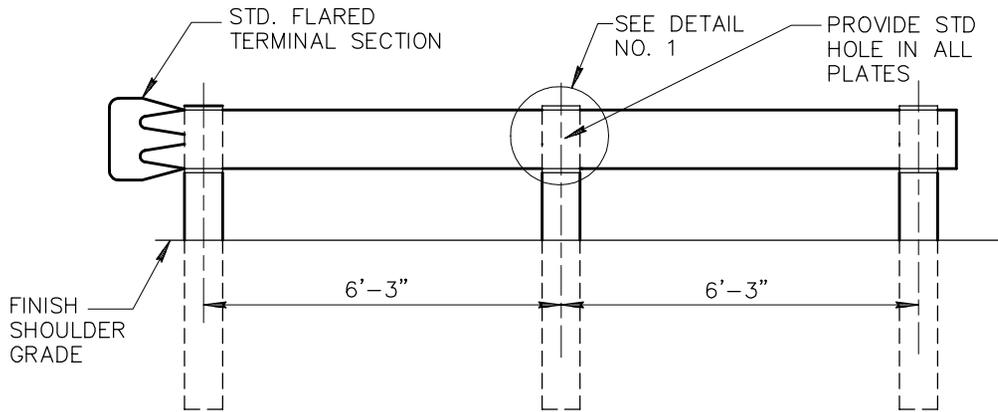
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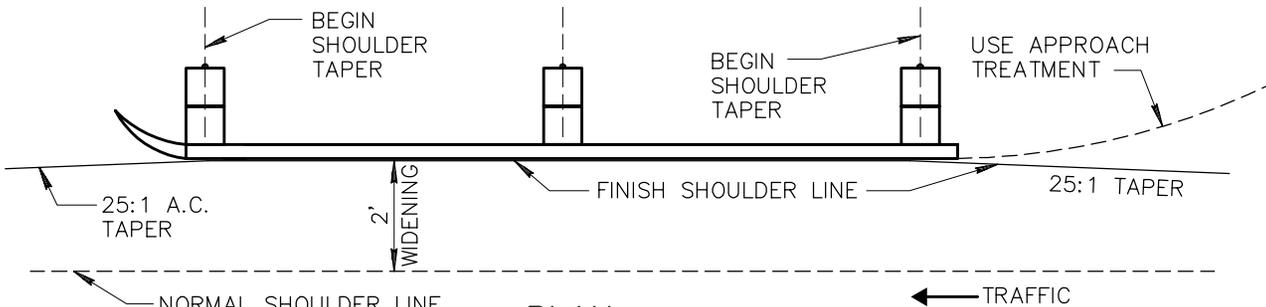
131

NOTES

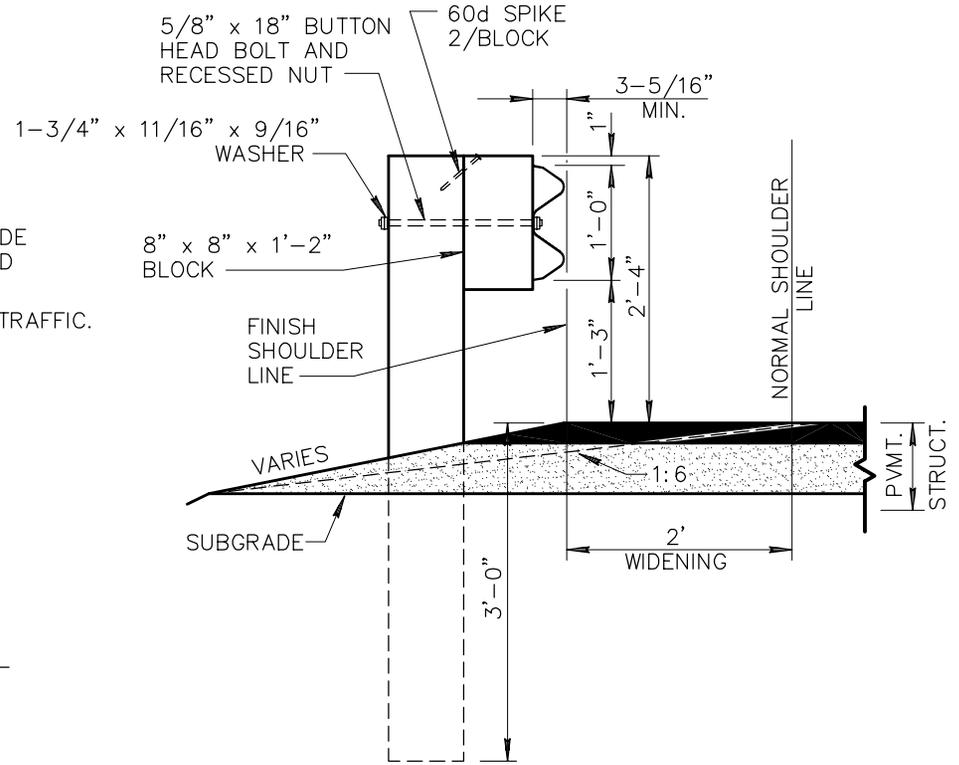
1. POSTS AND BLOCKS SHALL BE 8" x 8" ROUGH WOOD, PRESSURE TREATED AND UNPAINTED. HOLES SHALL BE BORED BEFORE TREATMENT. SEE SECT. 415
2. ALL GUARD RAIL PLATE, FITTINGS, HARDWARE, ETC. SHALL BE GALVANIZED.
3. TYPE 'A' GUARD RAIL INSTALLED ON NORMAL SHOULDER LINE.
4. TYPE 'B' GUARD RAIL INSTALLED ON WIDENED ROADWAY SHOULDER LINE.
5. TYPE 'B' INSTALLATION SHOWN. TYPE 'A' INSTALLATION SAME EXCEPT THAT INSIDE FACE OF GUARD RAIL SHALL FALL ON THE NORMAL SHOULDER LINE AS INDICATED BY PLAN DRAWING.
6. INSTALL LAP PLATES SO THAT EXPOSED EDGES ARE AWAY FROM APPROACHING TRAFFIC.



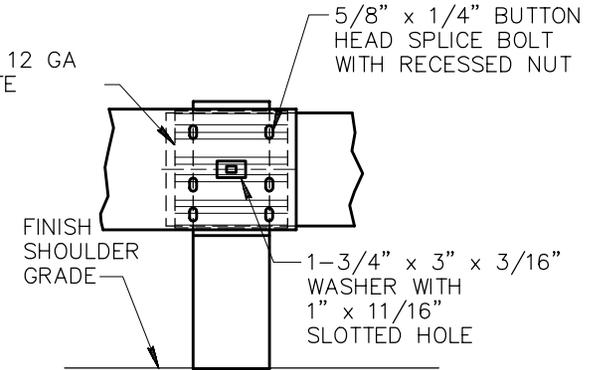
FACE ELEVATION



PLAN



SIDE ELEVATION



DETAIL NO. 1

DETAIL NO.

135-1



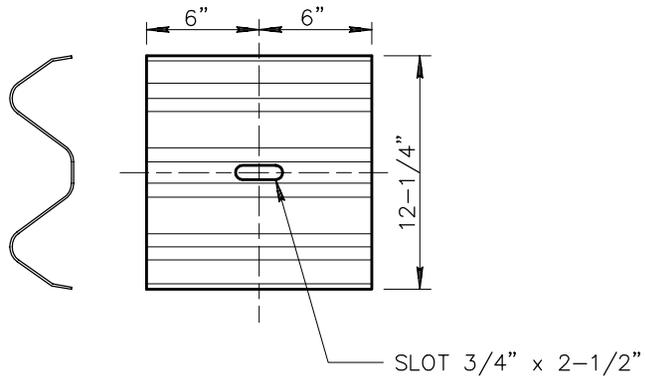
STANDARD DETAIL
ENGLISH

STEEL GUARD RAIL

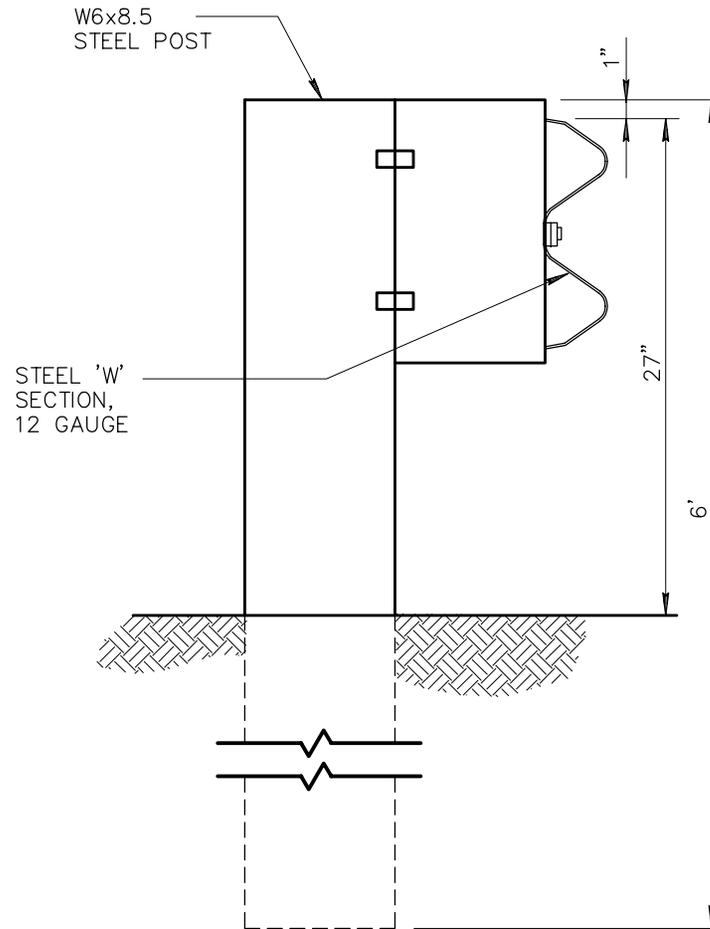
REVISED

DETAIL NO.

135-1



'W' SECTION BACK-UP PLATE
FOR STEEL POSTS



'W' BEAM (STEEL POST)

DETAIL NO.
135-2

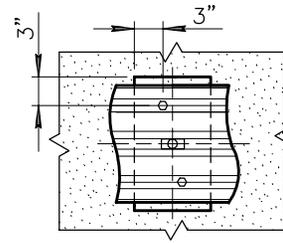
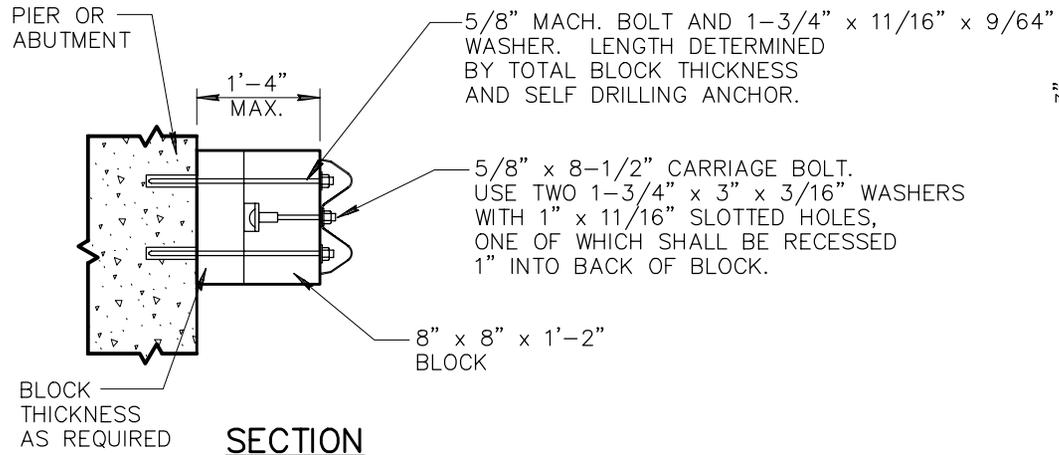


STANDARD DETAIL
ENGLISH

STEEL GUARD RAIL

REVISED

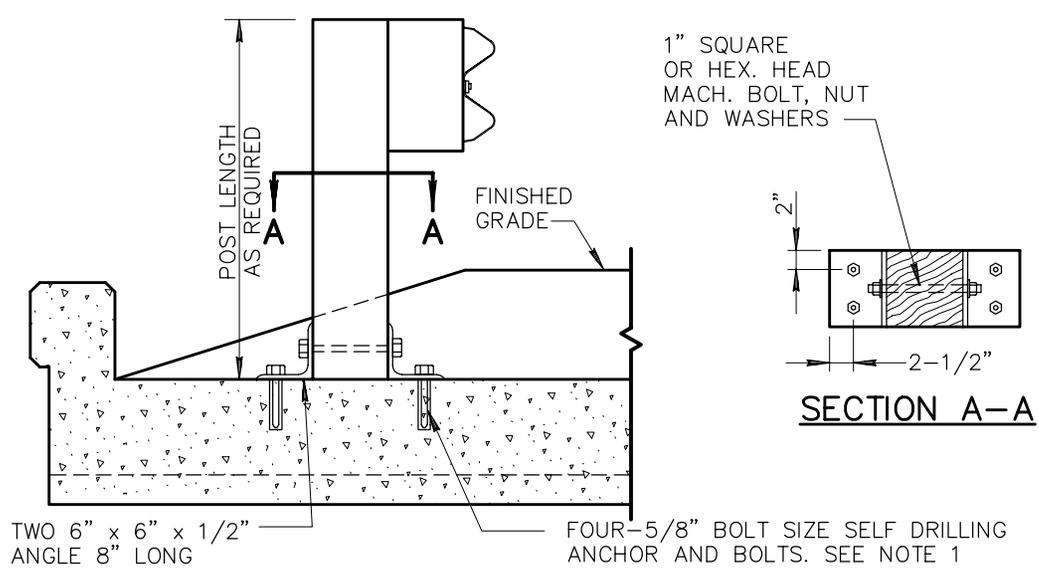
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135-2



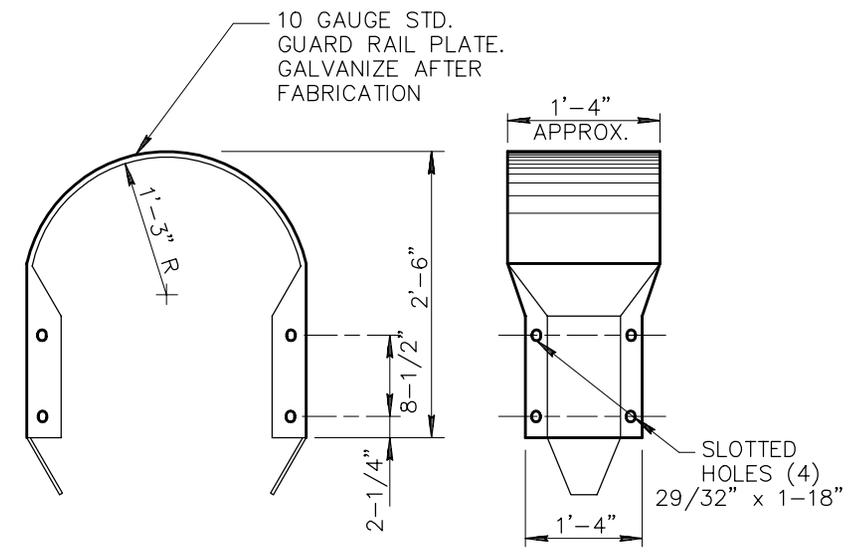
NOTE

1. 5/8" BOLT SIZE SELF DRILLING ANCHOR SHALL HAVE A MINIMUM 1500# PULL OUT STRENGTH IN 2500 P.S.I. CONCRETE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

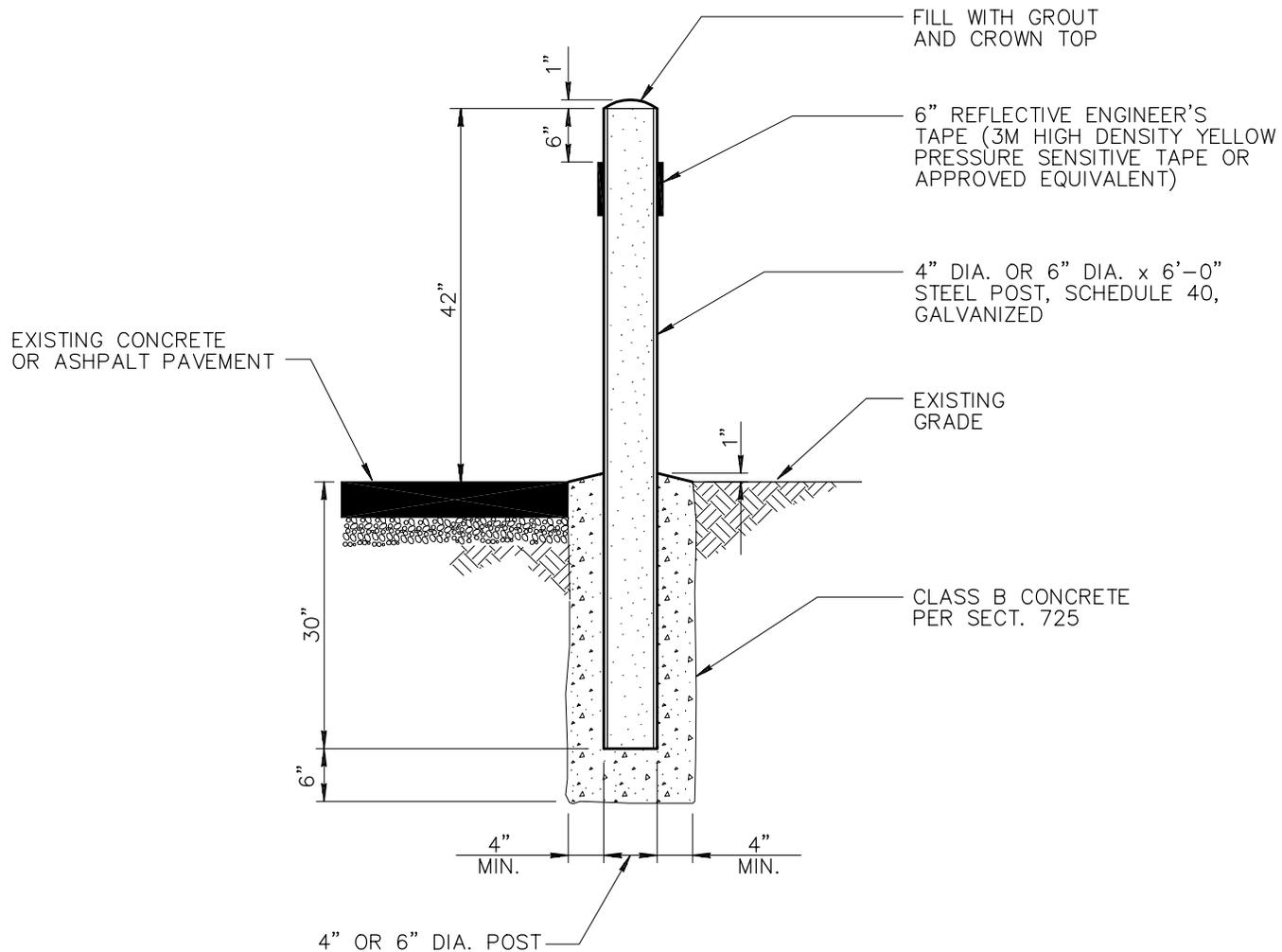
DETAIL NO. 4
ATTACHMENT OF GUARD RAIL TO STRUCTURES



DETAIL NO. 1
GUARD RAIL POST INSTALLATION ON STRUCTURES



DETAIL NO. 5
BUFFER END SECTION



SAFETY POST SECTION

DETAIL NO.

140



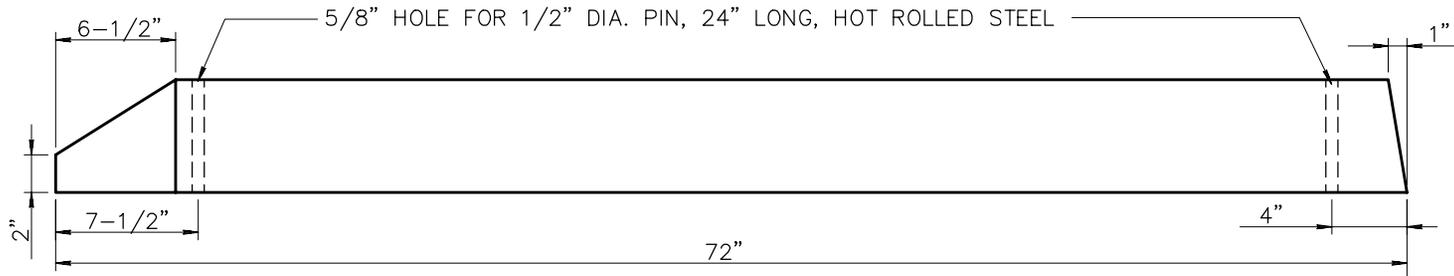
STANDARD DETAIL
ENGLISH

SAFETY POST

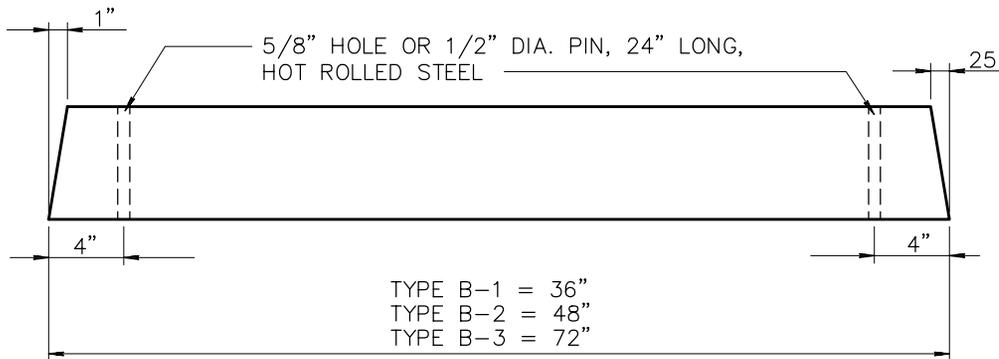
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DETAIL NO.

140

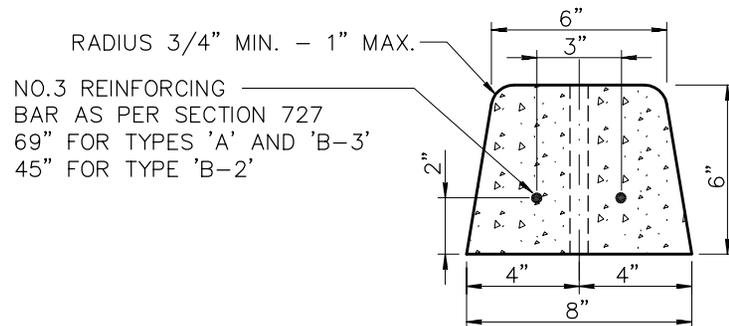


TYPE A



TYPE B-1 = 36"
 TYPE B-2 = 48"
 TYPE B-3 = 72"

TYPE B-1, B-2, AND B-3



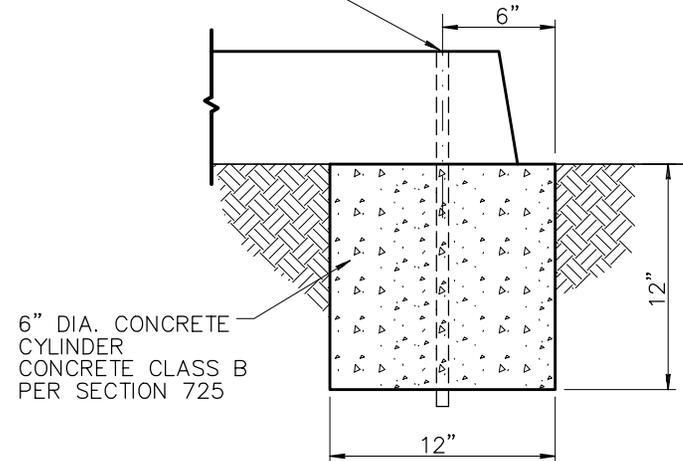
RADIUS 3/4" MIN. - 1" MAX.
 NO. 3 REINFORCING BAR AS PER SECTION 727
 69" FOR TYPES 'A' AND 'B-3'
 45" FOR TYPE 'B-2'

TYPICAL SECTION

NOTES:

1. DIMENSIONAL AND REINFORCEMENT CHANGES WILL BE PERMITTED UPON PRIOR WRITTEN APPROVAL OF THE ENGINEER.
2. UNLESS OTHERWISE NOTED, CONCRETE SHALL BE CLASS 'A' PER SECTION 725.

1/2" DIA. PINS -
 24" LONG, HOT
 ROLLED STEEL



**SAFETY CURB
 INSTALLATION ON DIRT**

DETAIL NO.

150



MARICOPA
 ASSOCIATION of
 GOVERNMENTS

STANDARD DETAIL
 ENGLISH

PRECAST SAFETY CURB

REVISED

DETAIL NO.

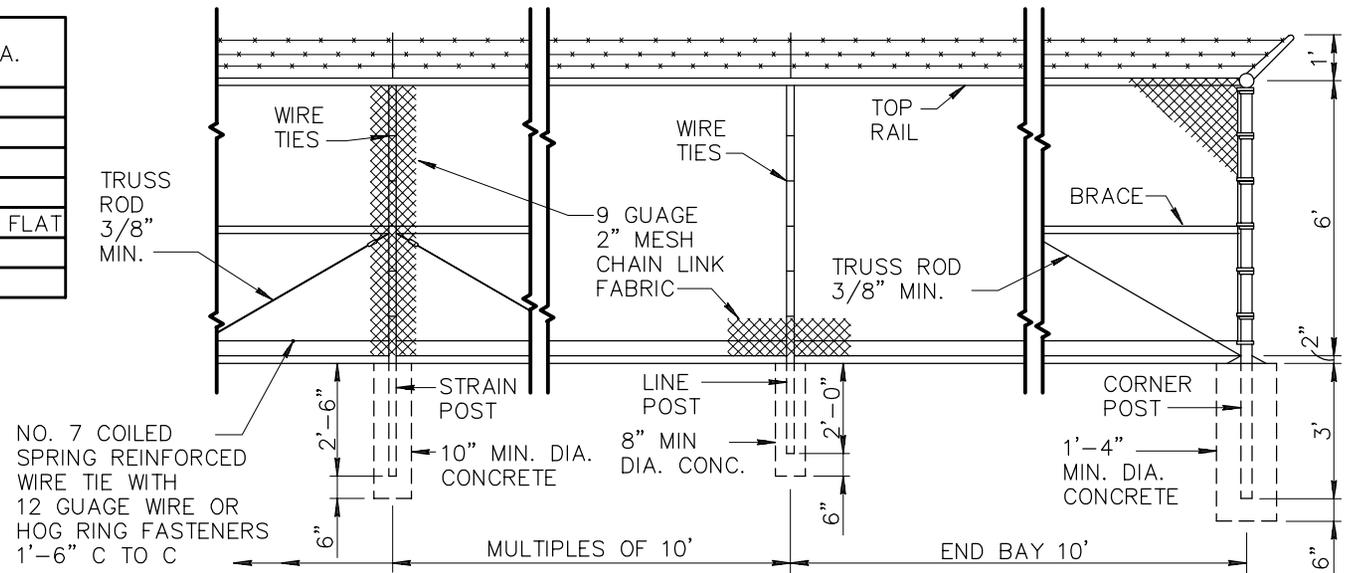
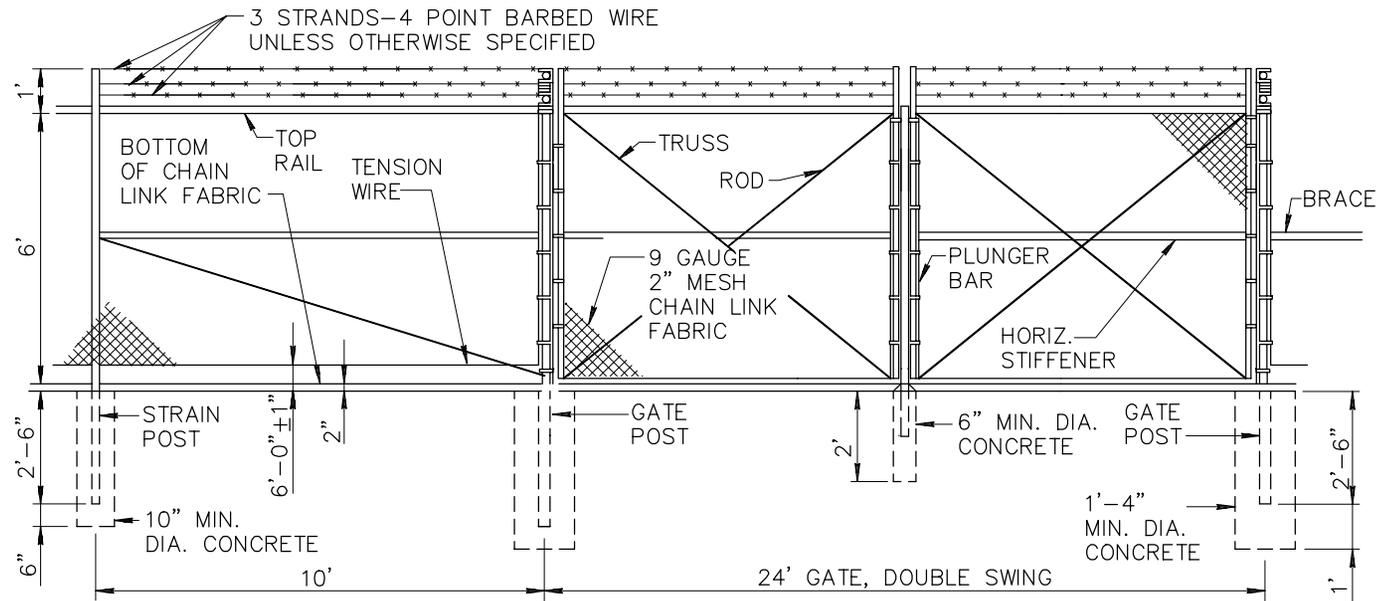
150

NOTES

1. ALL CONCRETE SHALL BE CLASS 'C' PER SECT. 725.
2. FITTINGS NOT SPECIFICALLY DETAILED SHALL BE HEAVY DUTY DESIGN.
3. STRAIN POSTS SHALL BE SPACED AT 500' MAXIMUM SPACING.
4. BOTH CORNER AND STRAIN POSTS SHALL HAVE STRAIN PANELS.
5. ALL POSTS SHALL BE CAPPED.
6. MEMBER SIZES SHALL BE THE FOLLOWING:

MEMBER	AISC SIZE	OUTSIDE DIA.
CORNER POST	2-1/2"	2.875"
LINE POST	1-1/2"	1.900"
STRAIN POST	1-1/2"	1.900"
BRACE	1-1/4"	1.666"
STRETCH BAR	3/16"x3/4" FLAT	3/16"x3/4" FLAT
GATE POST	3-1/2"	4.000"
TOP RAIL	1-1/4"	1.666"

7. CONSTRUCTION AND MATERIALS SHALL CONFORM TO SECT. 420 AND 722, RESPECTIVELY. SEE TABLE 722 FOR WEIGHTS OF MEMBERS.



NO. 7 COILED SPRING REINFORCED WIRE TIE WITH 12 GAUGE WIRE OR HOG RING FASTENERS 1'-6" C TO C

DETAIL NO.

160



STANDARD DETAIL
ENGLISH

6' CHAIN LINK
FENCE AND GATE

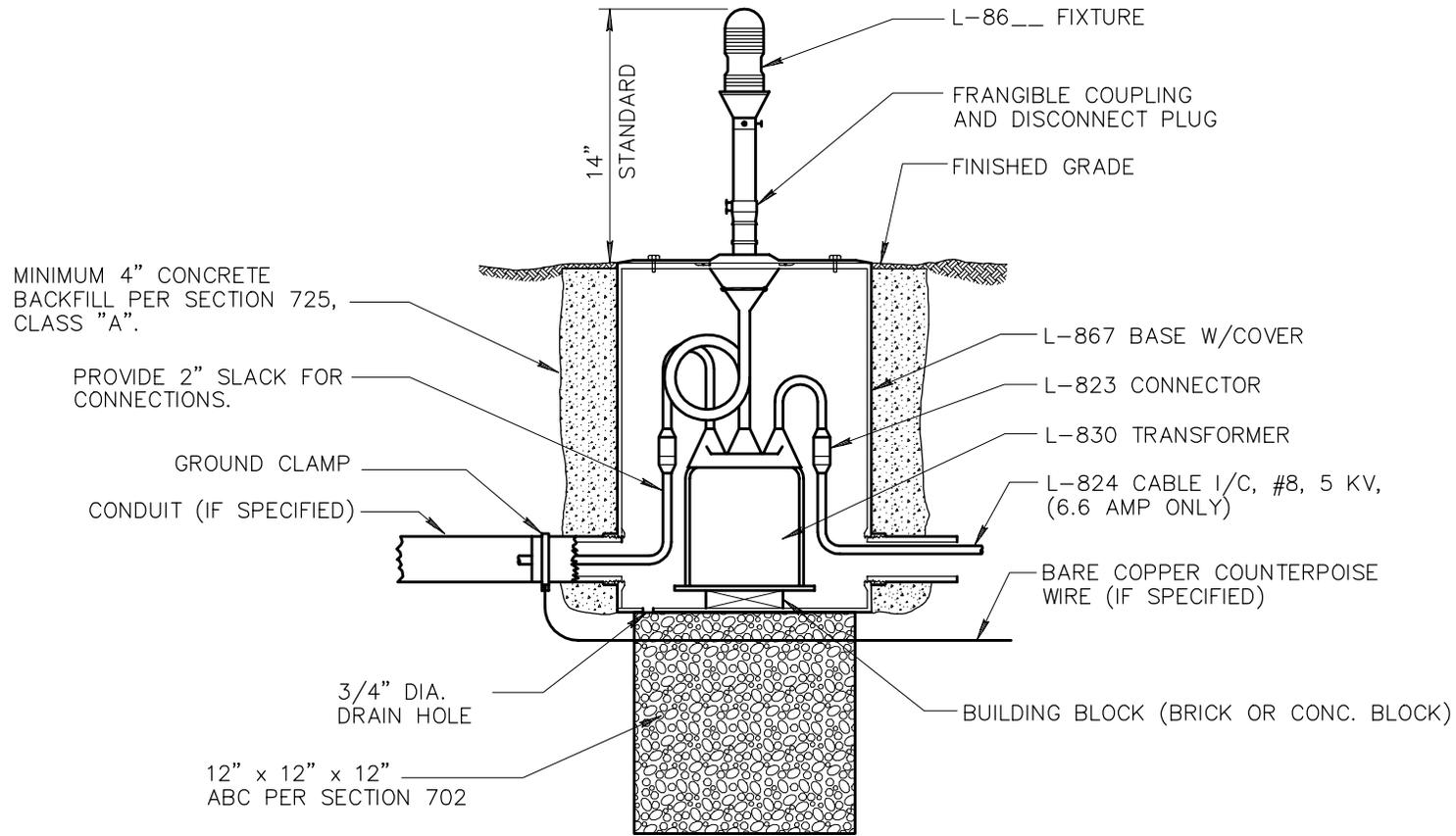
REVISED

DETAIL NO.

160

NOTE:

L-xxx NUMBERS DESIGNATES FAA SPECIFICATION NO.



DETAIL NO.

170



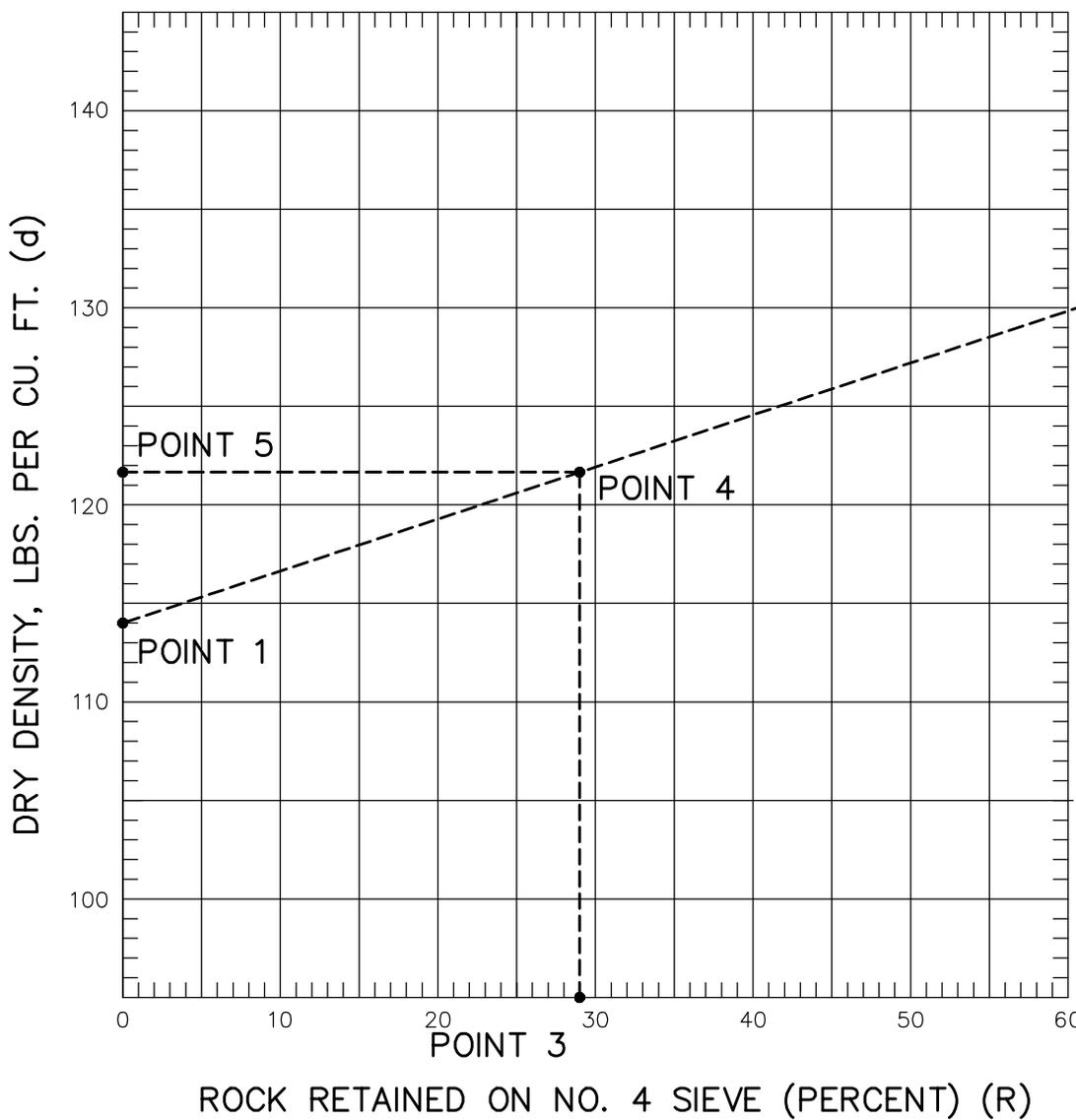
STANDARD DETAIL
ENGLISH

TYPICAL RUNWAY OR TAXIWAY
EDGE LIGHTING DETAIL

REVISED

DETAIL NO.

170



USE THE FOLLOWING FORMULA TO DETERMINE MAXIMUM DENSITY:

$$D = \frac{(100-R)d + 0.9RS \times 62.4}{100}$$

OR USE THE GRAPH

AS SHOWN BELOW:

WHERE:

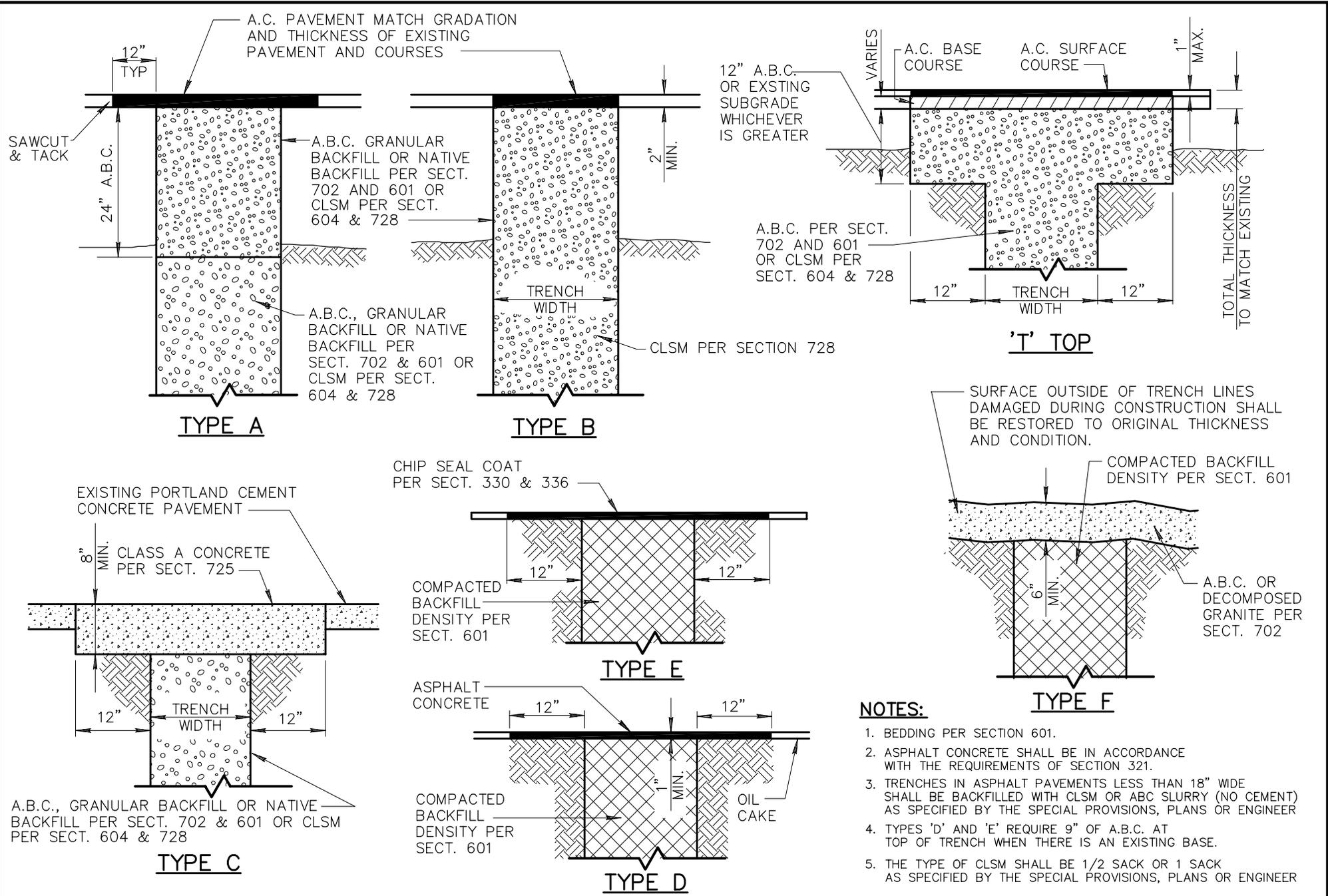
- D = DRY DENSITY OF SAMPLE CONTAINING R PERCENT ROCK, LBS. PER CU. FT.
- R = PERCENT ROCK RETAINED ON A NO. 4 SIEVE.
- d = DRY DENSITY OF PORTION PASSING NO. 4 SIEVE LBS. PER CU.FT.
- S = BULK SPECIFIC GRAVITY OF ROCK.

EXAMPLE:

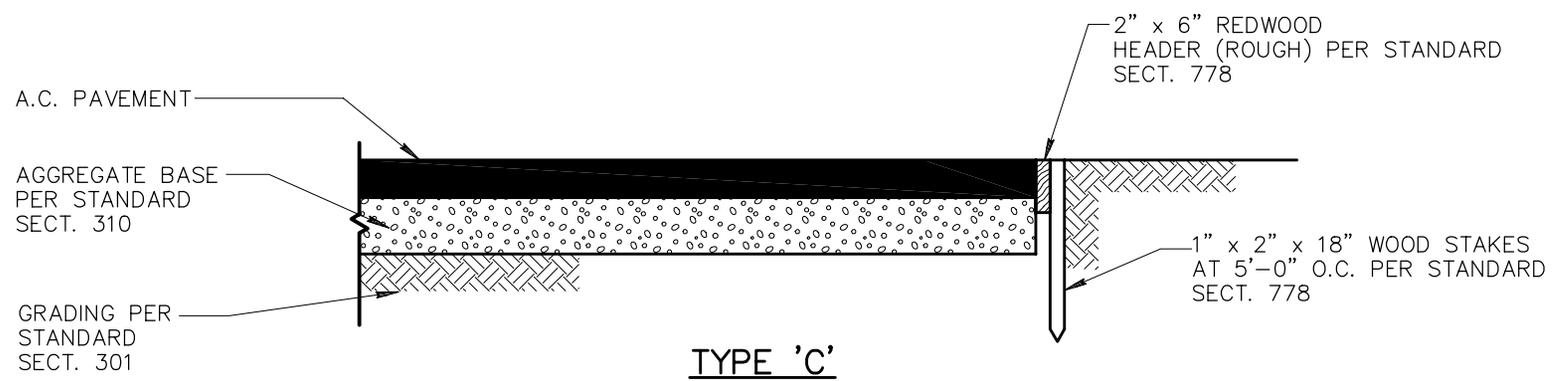
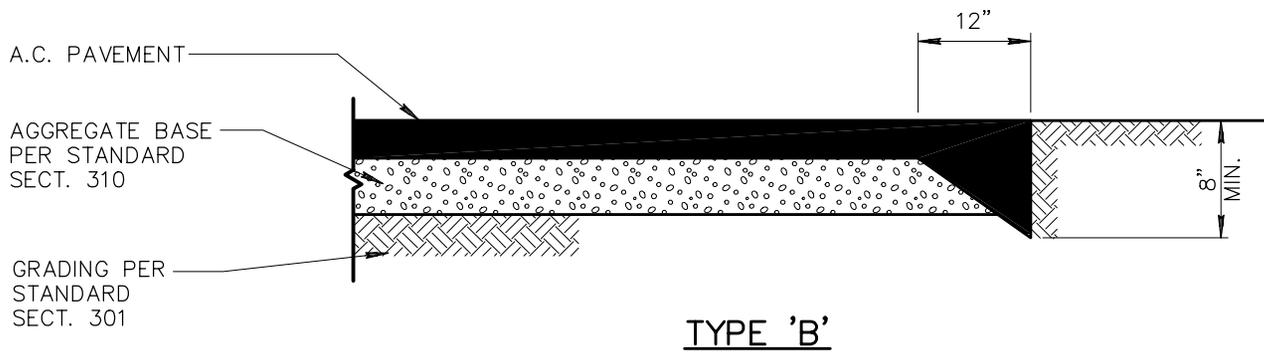
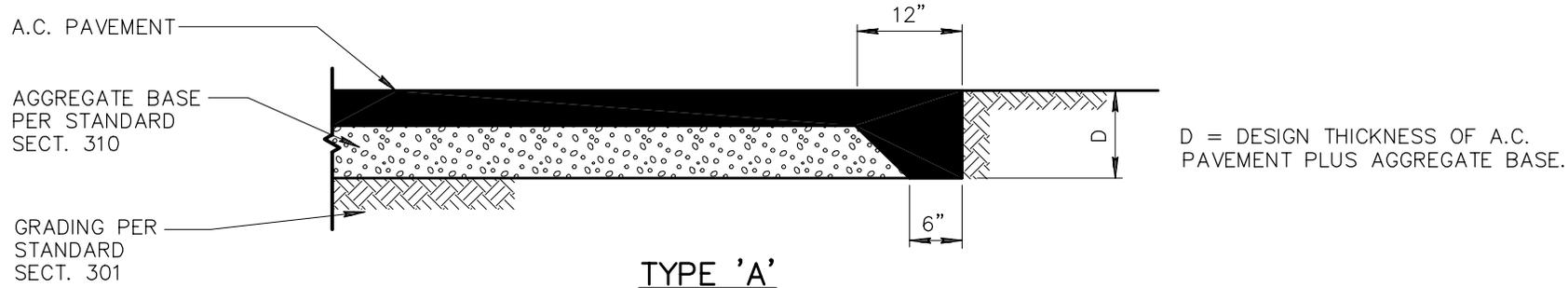
GIVEN A MATERIAL THAT HAS A DRY DENSITY OF 114 LBS PER CU. FT, A SPECIFIC GRAVITY OF 2.5, AND GIVEN THAT ONLY 29% OF A PORTION PASSES THROUGH A NO. 4 SIEVE, WHAT IS THE DRY DENSITY OF THE SAMPLE ?

SOLUTION:

- STEP 1: PLOT THE DRY DENSITY OF MATERIAL PASSING A NO. 4 SIEVE (d) ON LEFT SIDE OF GRAPH (POINT 1) (EXAMPLE: POINT 1 SHOWS d = 114 LBS. PER. CU.FT.);
- STEP 2: PLOT THE BULK SPECIFIC GRAVITY OF ROCK (S) ON RIGHT MONOBAR (POINT 2) (EXAMPLE POINT 2 SHOWS S = 2.5);
- STEP 3: CONNECT POINTS 1 AND 2 TO FORM LINE 1-2;
- STEP 4: PLOT THE PERCENT OF ROCK RETAINED ON A NO. 4 SIEVE ON THE BOTTOM OF THE GRAPH (POINT 3); (EXAMPLE: POINT 3 SHOWS R = 29 PERCENT)
- STEP 5: DRAW HORIZONTAL LINE FROM POINT 4 TO LEFT SIDE OF GRAPH (POINT 5);
- STEP 6: READ POINT 5 FOR THE VALUE OF THE DRY DENSITY (D). (EXAMPLE: POINT 5 SHOWS D = 121.6 LBS. PER CU.FT.)



- NOTES:**
1. BEDDING PER SECTION 601.
 2. ASPHALT CONCRETE SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 321.
 3. TRENCHES IN ASPHALT PAVEMENTS LESS THAN 18" WIDE SHALL BE BACKFILLED WITH CLSM OR ABC SLURRY (NO CEMENT) AS SPECIFIED BY THE SPECIAL PROVISIONS, PLANS OR ENGINEER
 4. TYPES 'D' AND 'E' REQUIRE 9" OF A.B.C. AT TOP OF TRENCH WHEN THERE IS AN EXISTING BASE.
 5. THE TYPE OF CLSM SHALL BE 1/2 SACK OR 1 SACK AS SPECIFIED BY THE SPECIAL PROVISIONS, PLANS OR ENGINEER



DETAIL NO.
201

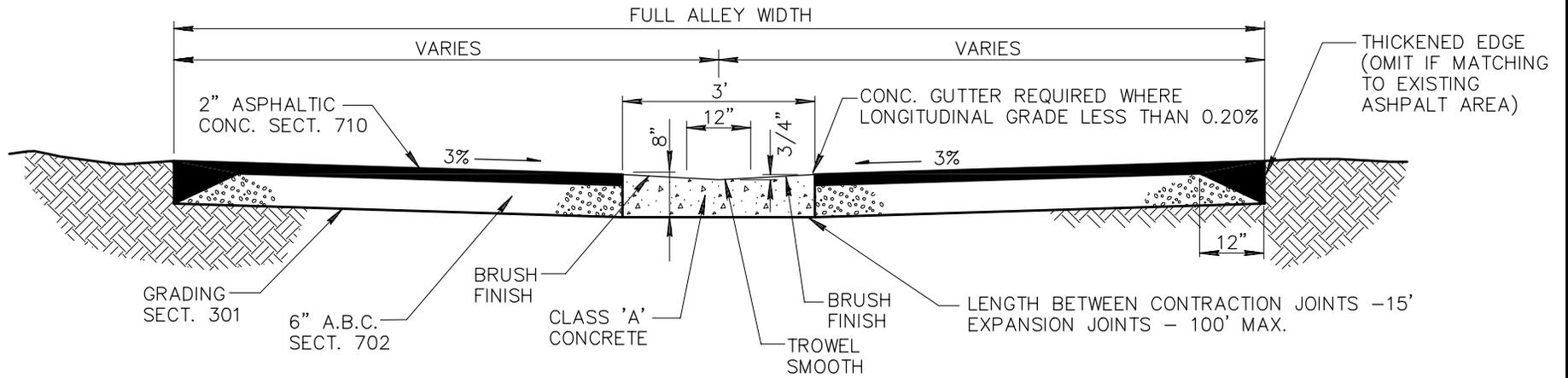


STANDARD DETAIL
ENGLISH

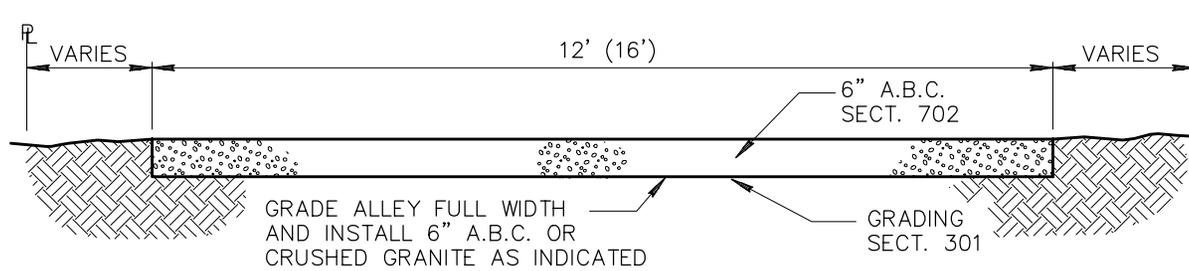
PAVEMENT SECTION AT TERMINATION

REVISED

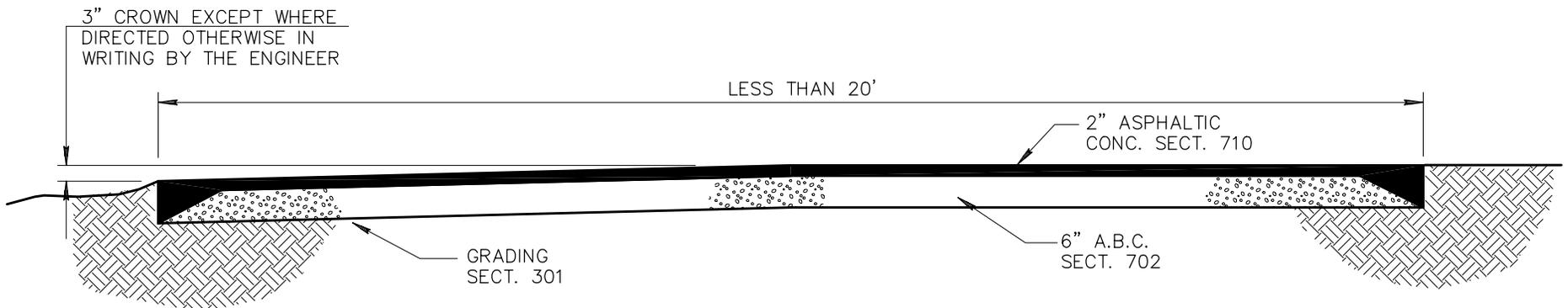
DETAIL NO.
201



PAVED ALLEY DETAIL



UNPAVED ALLEY DETAIL



RESIDENTIAL ALLEY DETAIL

DETAIL NO.

202



STANDARD DETAIL
ENGLISH

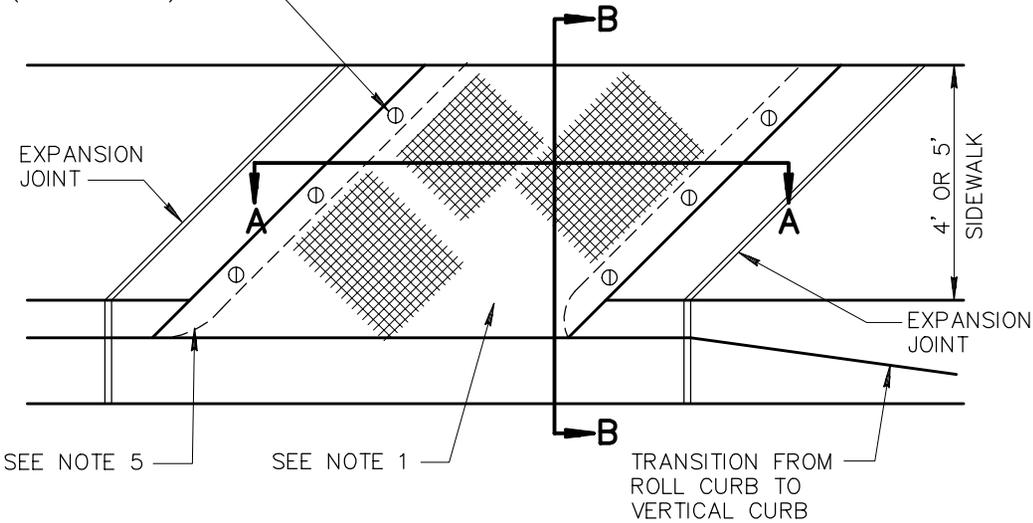
ALLEY DETAILS (PAVED AND UNPAVED)

REVISED

DETAIL NO.

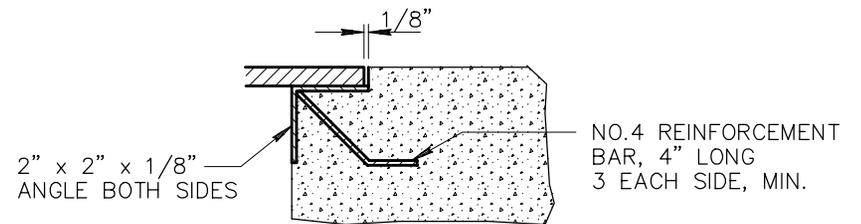
202

3/8" FLATHEAD STAINLESS STEEL
CAP SCREW COUNTERSINK
(6 EACH MIN.)

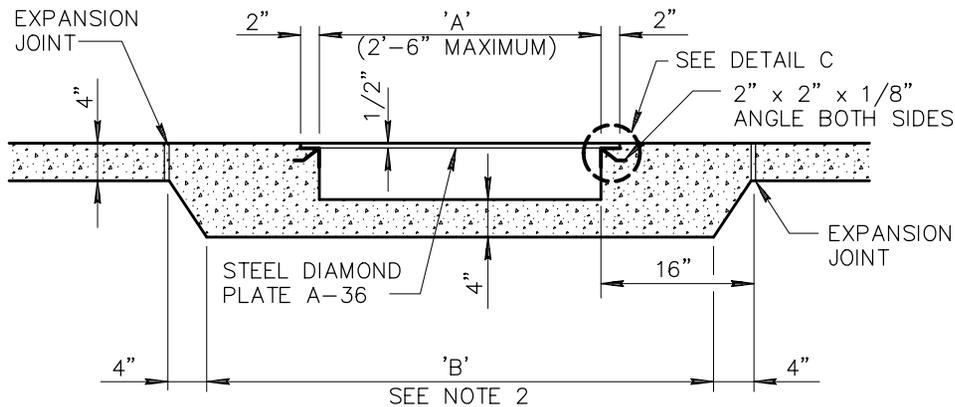


NOTES:

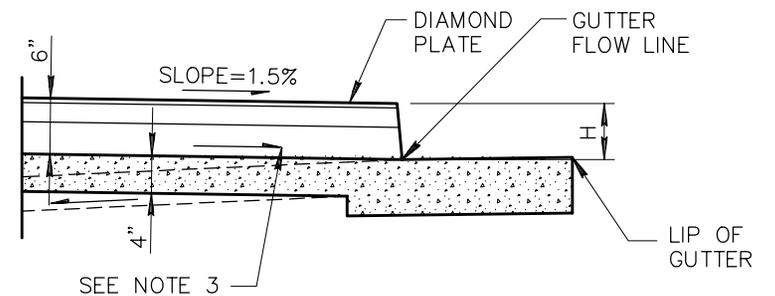
1. ANGLE EQUALS 45° UNLESS SPECIFIED ON PLAN.
2. DIMENSION 'B' EQUALS 'A' + 2'
3. (———>) INDICATES DIRECTION OF FLOW.
4. PAINT STEEL ACCORDING TO SECTION 790. PAINT NUMBER 1-A OR 1-B.
5. R EQUALS 1" UNLESS OTHERWISE DIRECTED.
6. H EQUALS CURB FACE HEIGHT.
7. FOR ROLL CURB AND GUTTER, USE 2' TRANSITIONS TO VERTICAL CURB.
8. CONCRETE SHALL BE CLASS B PER SECT. 725 AND INSTALLED PER SECT. 505.



DETAIL C



SECTION 'A-A'



SECTION 'B-B'

DETAIL NO.

203



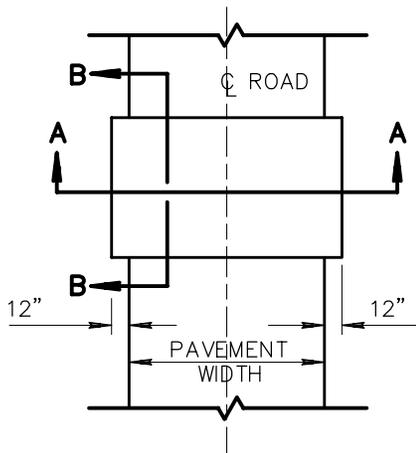
STANDARD DETAIL
ENGLISH

SCUPPERS

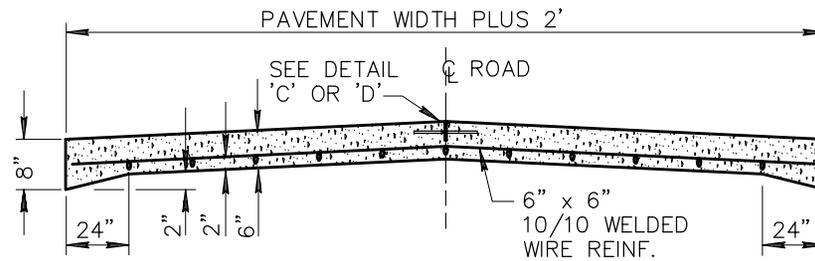
REVISED

DETAIL NO.

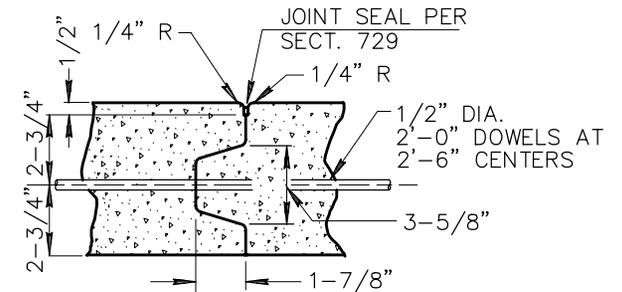
203



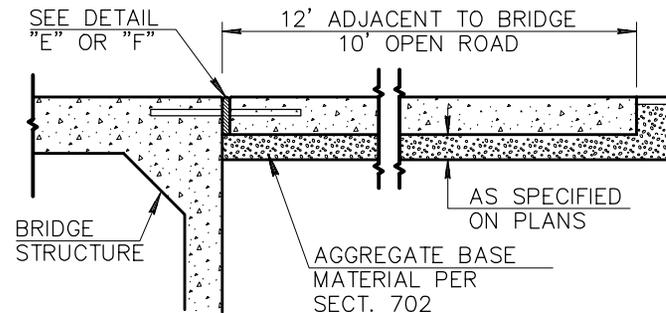
PLAN OF CONCRETE EQUIPMENT CROSSING



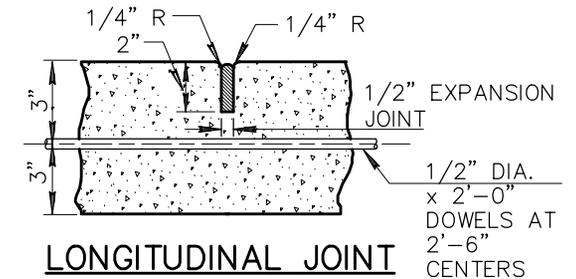
SECTION A-A



LONGITUDINAL JOINT DETAIL 'C'



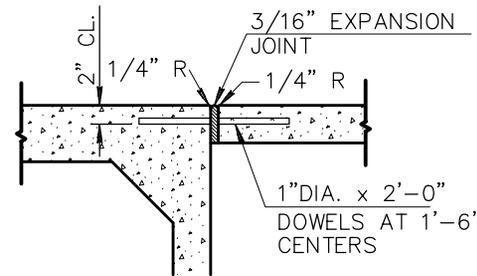
SECTION B-B



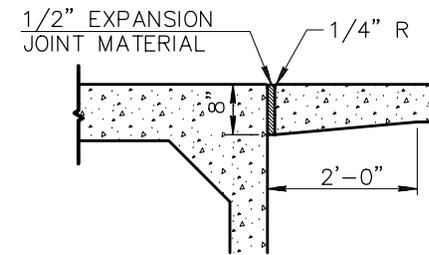
LONGITUDINAL JOINT DETAIL 'D'

NOTES:

1. WHEN EQUIPMENT CROSSING LIES ADJACENT TO BRIDGE OR BOX CULVERT, CONSTRUCT THE EQUIPMENT CROSSING TO WIDTH OF BRIDGE ROADWAY.
2. ALL DOWELS IN CENTER JOINTS SHALL BE DEFORMED BARS AND SHALL HAVE UNBROKEN BOND. THEY SHALL BE HELD SECURELY IN PLACE, PARALLEL TO THE SUBGRADE AND PERPENDICULAR TO THE CENTER LINE OF THE ROAD.
3. THE EDGING TOOL USED FOR ALL LONGITUDINAL JOINTS SHALL BE SO CONSTRUCTED AS TO PROVIDE A SMOOTH TROWELED SURFACE 3" WIDE ON EACH SIDE OF THE JOINT.
4. IF APPROVED BY THE ENGINEER, OTHER DEFORMATIONS MAY BE USED IN LONGITUDINAL JOINT - DETAIL 'C'.
5. DETAIL 'C' TO BE USED ONLY WHEN FULL WIDTH CAN NOT BE POURED IN ONE POUR. USE DETAIL 'D' IF FULL WIDTH IS POURED IN ONE POUR.



JOINT AT NEW BRIDGE DETAIL 'F'



JOINT AT EXISTING BRIDGE DETAIL 'E'

DETAIL NO.

204



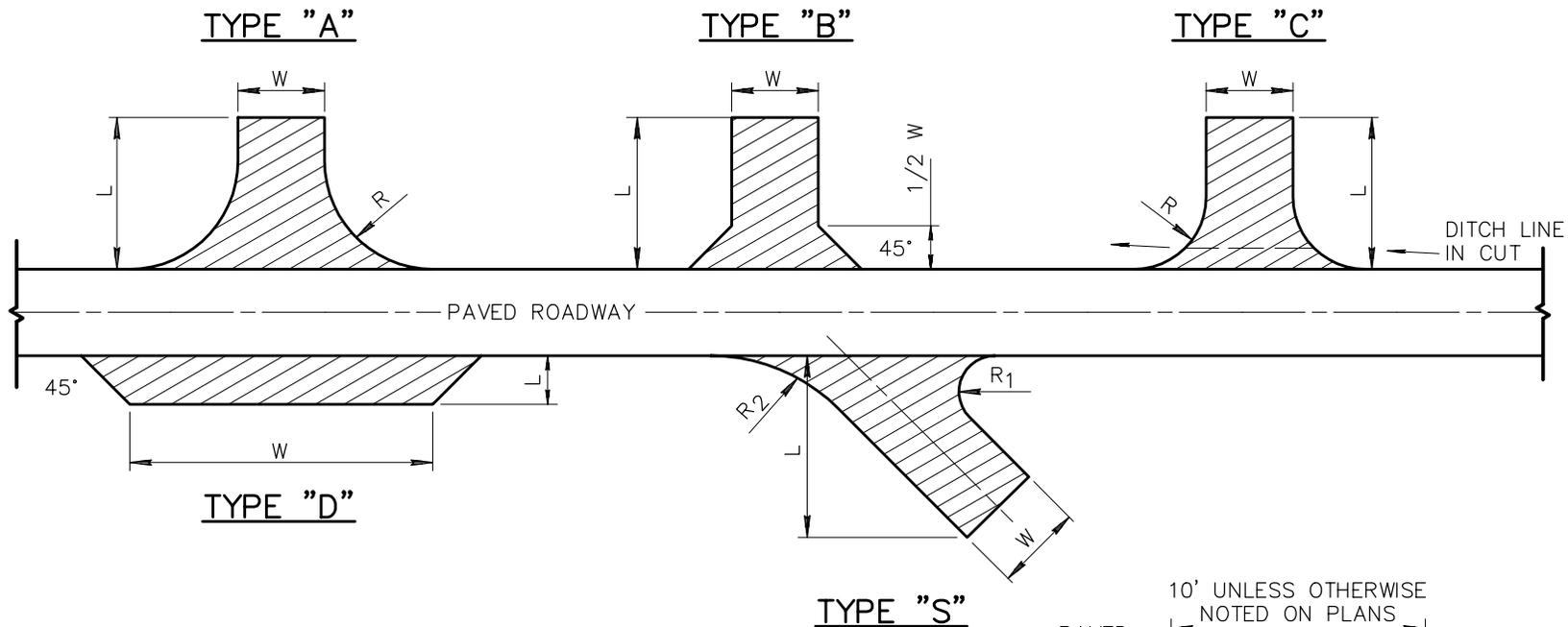
STANDARD DETAIL
ENGLISH

EQUIPMENT CROSSING

REVISED

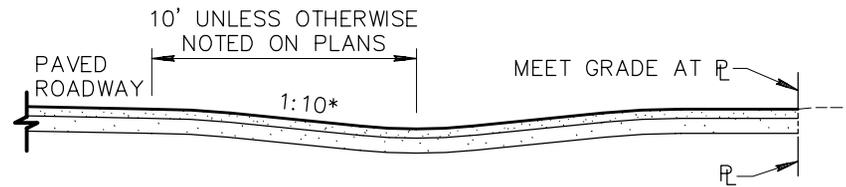
DETAIL NO.

204

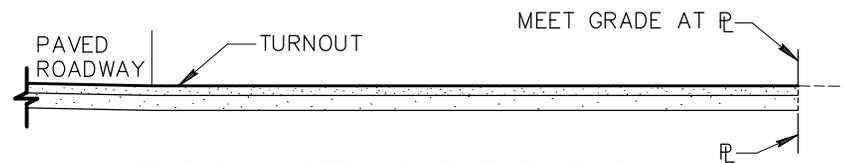


NOTES:

1. W - INDICATES WIDTH OF PAVED SURFACE OF TURNOUT.
L - INDICATES LENGTH OF PAVED SURFACE OF TURNOUT.
R - RADIUS.
2. SIZE AND TYPE OF TURNOUT SHALL BE NOTED ON PLANS AS FOLLOWS:
90° - NO RADII: WxL-SURFACE-TYPE; (12' x 30'-A.C.-TYPE "B" TURNOUT).
90° - WITH A RADIUS: WxLxR-SURFACE-TYPE; (12' x 20' x 15'-A.C.-TYPE "C"
TURNOUT). OTHER THAN 90° WITH 2 RADII-TYPE "S": WxLxR₁xR₂-SURFACE-TYPE;
(12' x 20' x 15'-A.C.-TYPE "S" TURNOUT).
OR IT MAY BE NOTED ON PLANS IN CONVENTIONAL TERMS.
3. TURNOUTS TO BE STRAIGHT TYPE UNLESS OTHERWISE NOTED ON PLANS.
4. A.C. AND BASE MATERIAL THICKNESS FOR TURNOUTS SHALL BE THE SAME AS SHOWN ON THE ROADWAY SECTION, UNLESS OTHERWISE NOTED.
5. ANY EXCAVATION OR EMBANKMENT FOR TURNOUTS IS INCLUDED IN THE ROADWAY QUANTITIES.
6. TURNOUTS ARE TO BE PLACED WHERE SHOWN ON PLANS, OR AS DIRECTED BY THE ENGINEER.



TYPICAL VALLEY GUTTER TURNOUT



TYPICAL STRAIGHT TURNOUT

* UNLESS OTHERWISE NOTED ON PLANS

DETAIL NO.

205



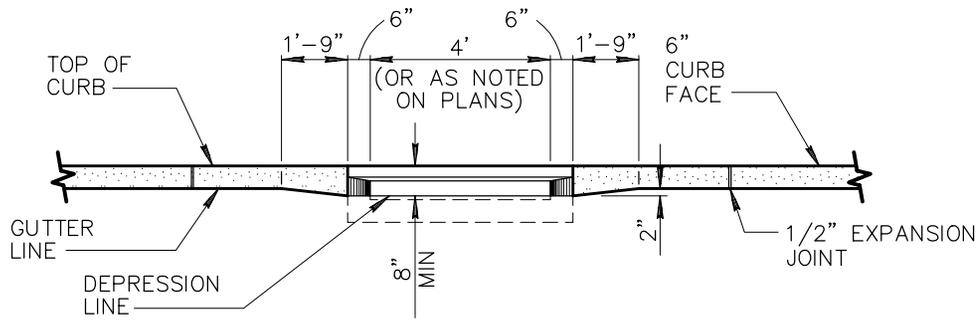
STANDARD DETAIL
ENGLISH

PAVED TURNOUTS

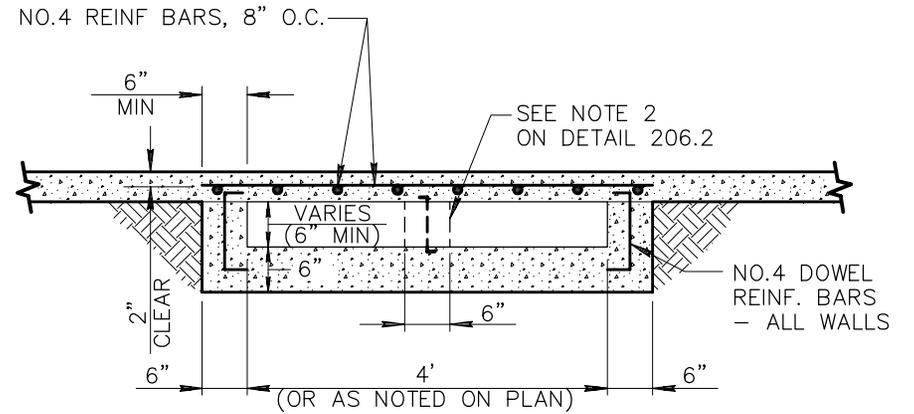
REVISED

DETAIL NO.

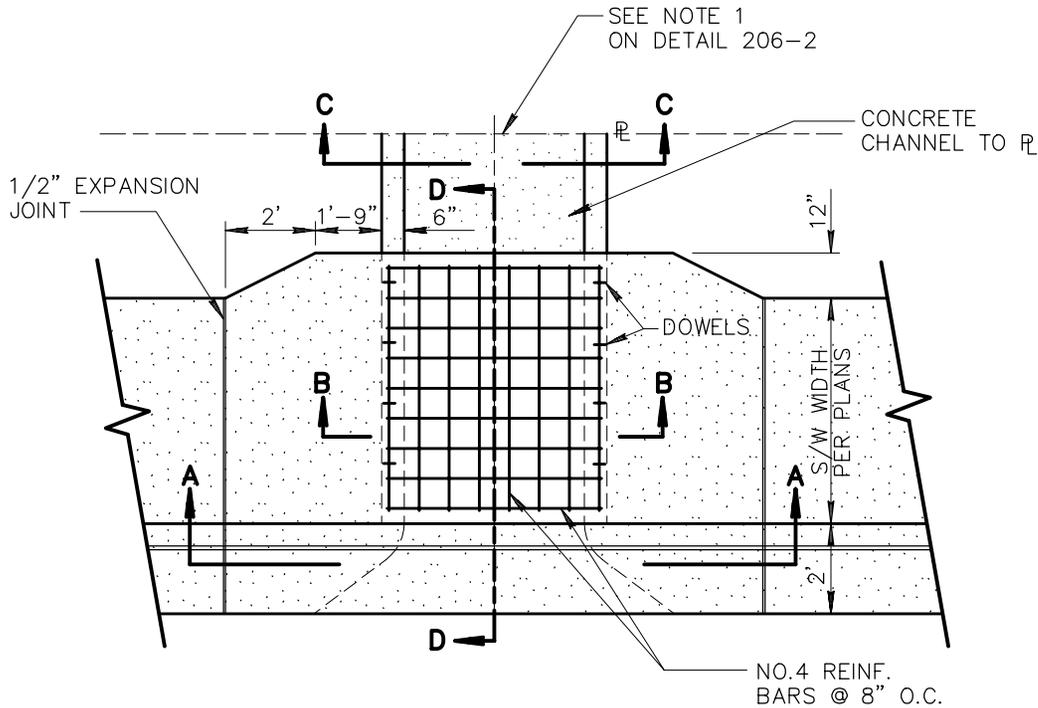
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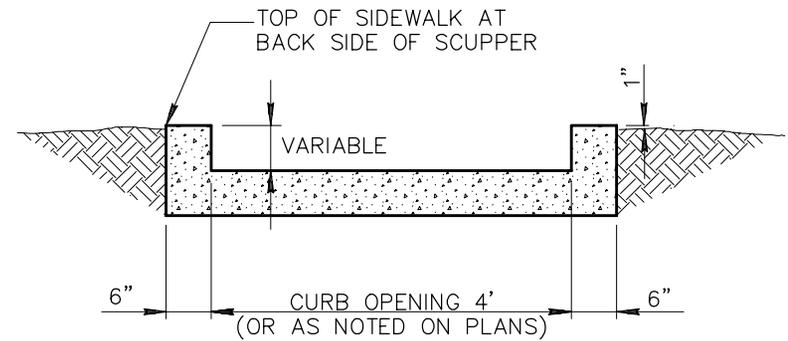
SECTION A-A



SECTION B-B



SCUPPER PLAN VIEW



**SECTION C-C
SPILLWAY**

NOTE:

1. UNLESS OTHERWISE NOTED, CONCRETE SHALL BE CLASS 'B' PER SECTION 725.

DETAIL NO.
206-1

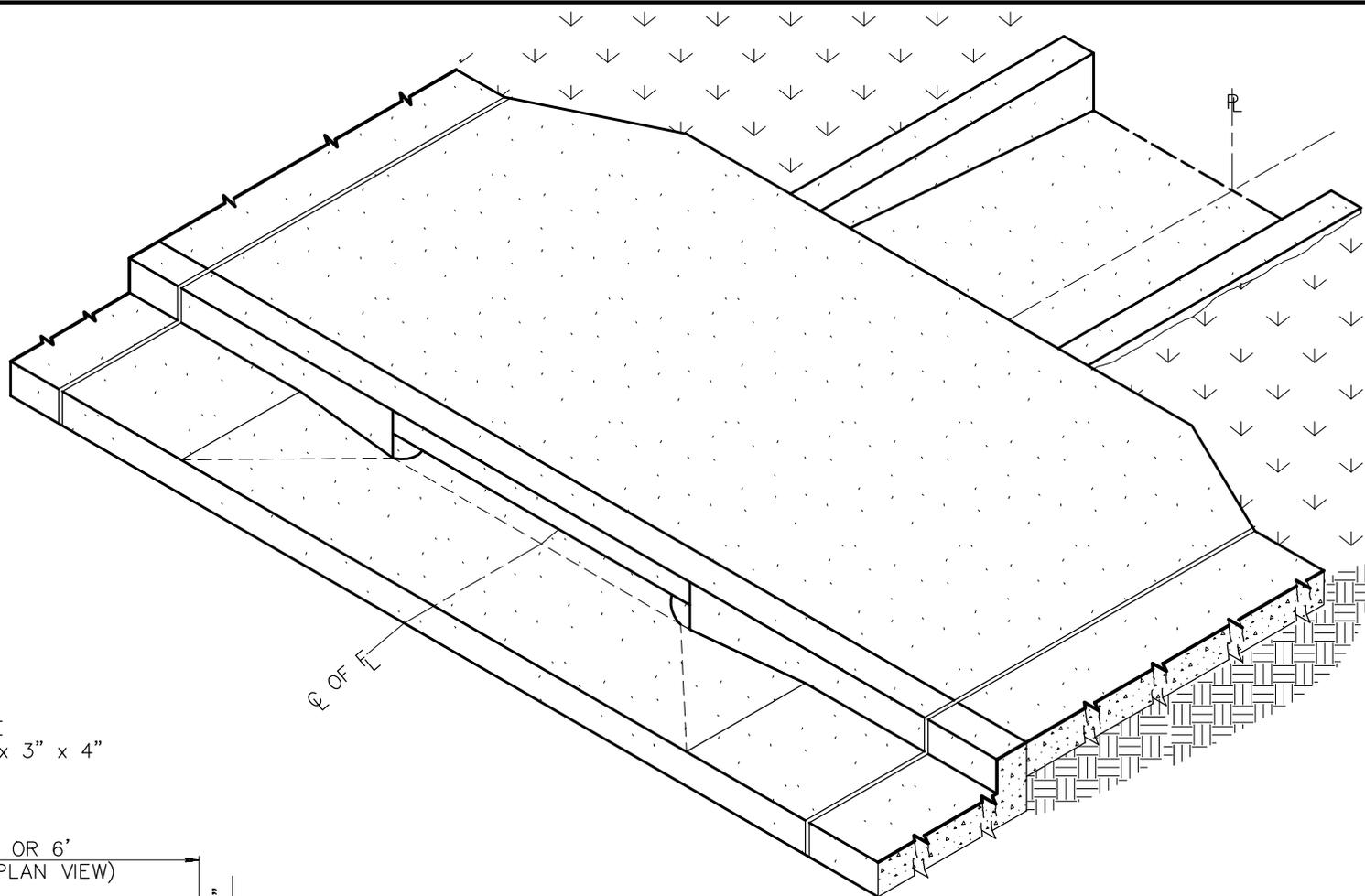


STANDARD DETAIL
ENGLISH

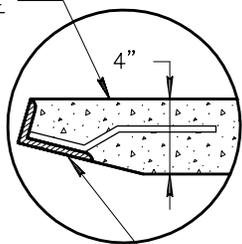
CONCRETE SCUPPER

REVISED

DETAIL NO.
206-1



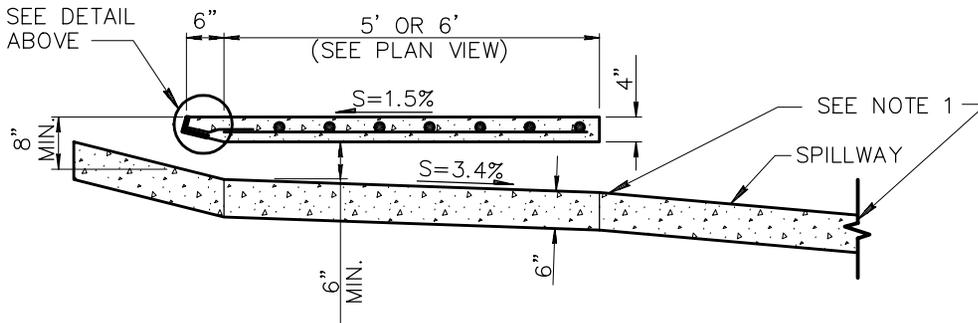
ANCHOR BAR
WELDED TO
ANGLE



ANGLE
1/2" x 3" x 4"

ℓ OF ℓ'

SEE DETAIL
ABOVE



SECTION D-D

NOTES:

1. TRANSITION TO SPILLWAY/CHANNEL AS PER APPROVED PLANS.
2. A CENTER WALL SHALL BE INSTALLED IN SCUPPERS WIDER THAN 4' OR IF MORE THAN 1 SCUPPER IS BUILT IN SERIES.
3. EXPANSION JOINT FILLER SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER, A.S.T.M. D-1751.
4. UNLESS OTHERWISE NOTED, CONCRETE SHALL BE CLASS 'B' PER SECTION 725.

DETAIL NO.

206-2



**MARICOPA
ASSOCIATION of
GOVERNMENTS**

STANDARD DETAIL
ENGLISH

CONCRETE SCUPPER

REVISED

DETAIL NO.

206-2

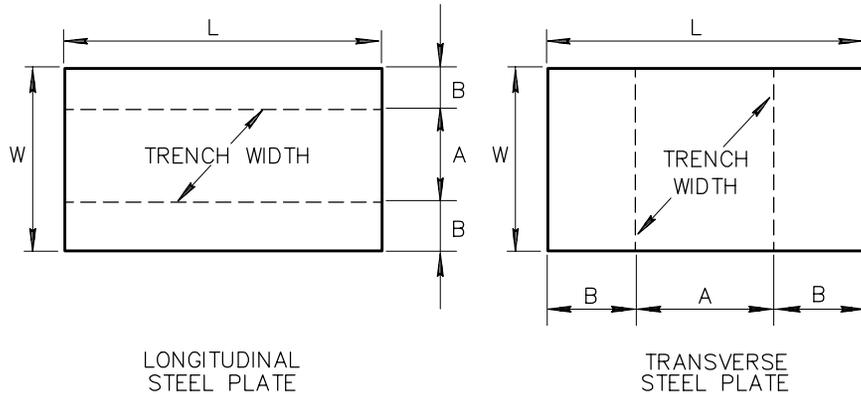
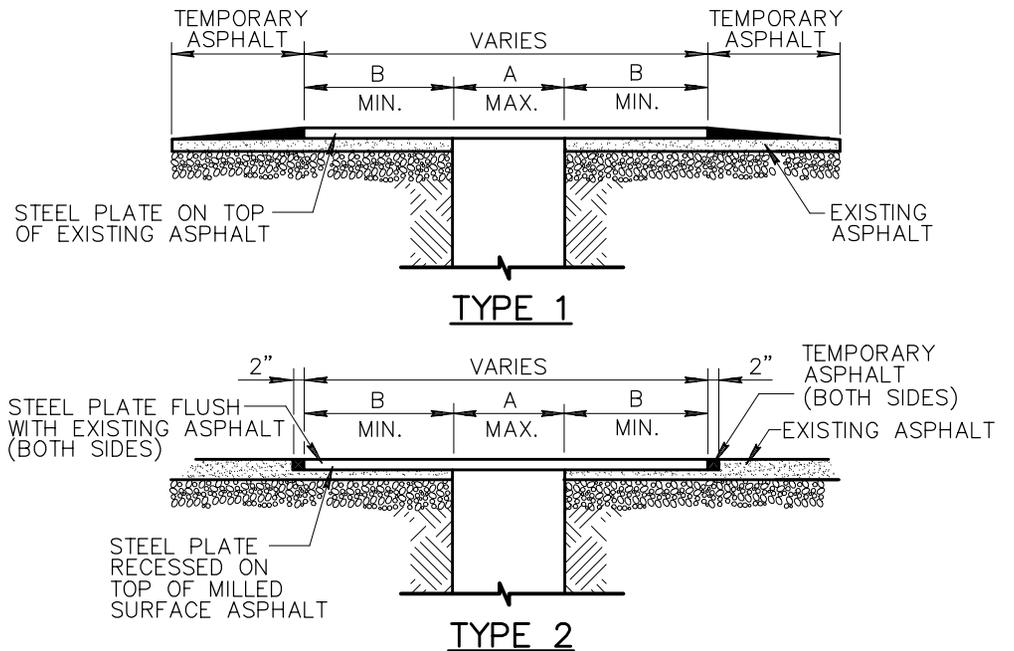


PLATE SIZE						
LONGITUDINAL					TRANSVERSE	
(A)	(B)	THICKNESS	(W)	(L)	(A)	(B)
12"	18"	1"	4'	8'	58"	19"
12"	18"	1"	4'	10'	58"	31"
24"	18"	1"	5'	10'	70"	25"
36"	18"	1"	6'	10'	44"	38"
48"	18"	1"	7'	10'	52"	34"
60"	18"	1"	8'	10'	58"	31"
12"	18"	1-1/4"	4'	15'	88"	47"
24"	18"	1-1/4"	5'	12'	104"	20"
36"	18"	1-1/4"	6'	12'	66"	39"
36"	18"	1-1/4"	6'	16'	66"	63"
48"	18"	1-1/4"	7'	12'	76"	33"
48"	18"	1-1/4"	7'	16'	76"	58"
60"	18"	1-1/4"	8'	12'	86"	29"
60"	18"	1-1/4"	8'	15'	86"	47"
60"	18"	1-1/4"	8'	16'	86"	63"
60"	18"	1-1/4"	8'	20'	86"	77"
60"	18"	1-3/8"	8'	20'	102"	69"

NOTES:

1. USE TYPE 1 PLATE INSTALLATION WHERE POSTED SPEED LIMIT IS LESS THAN 30 MPH. USE TYPE 2 PLATE INSTALLATION WHERE POSTED SPEED LIMIT IS 30 MPH OR GREATER.
2. FOR TYPE 2 PLATE INSTALLATION, THE STEEL PLATE SHALL BE RECESSED BY MILLING INTO THE EXISTING ASPHALT TO SET FLUSH WITH THE SURFACE OF THE EXISTING ASPHALT. FULL DEPTH CUTTING OF PAVEMENT SECTION OUTSIDE OF TRENCH IS NOT PERMITTED. MILLING DEPTH SHALL MATCH THICKNESS OF PLATE. THE GAP BETWEEN THE EDGE OF THE PLATE AND THE ADJACENT EXISTING ASPHALT PAVEMENT MUST BE FILLED WITH TEMPORARY ASPHALT.
3. TRENCH WIDTHS ARE BASED ON AN ANALYSIS PER THE 14TH EDITION OF STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES BY AASHTO. AN ASSUMED AXLE LOADING OF 12 TONS WITH A 30% IMPACT FACTOR WAS USED. THE AXLE LENGTH IS 6 FEET; THEREFORE THE NUMBER OF WHEELS CARRIED BY A PLATE DEPENDS ON THE ROADWAY WIDTH.
4. STEEL PLATE MUST BE ABLE TO WITHSTAND H-20 TRAFFIC LOADINGS WITHOUT ANY MOVEMENT.
5. PLATES SHALL BE FABRICATED FROM ASTM A36 STEEL (MIN).
6. PLATES SHALL BE SECURED FROM LATERAL MOVEMENT AND VERTICAL VIBRATION (ASSOCIATED NOISE) WHILE IN USE BY TEMPORARY ASPHALT (COLD MIX.)



DETAIL NO.

211



STANDARD DETAIL
ENGLISH

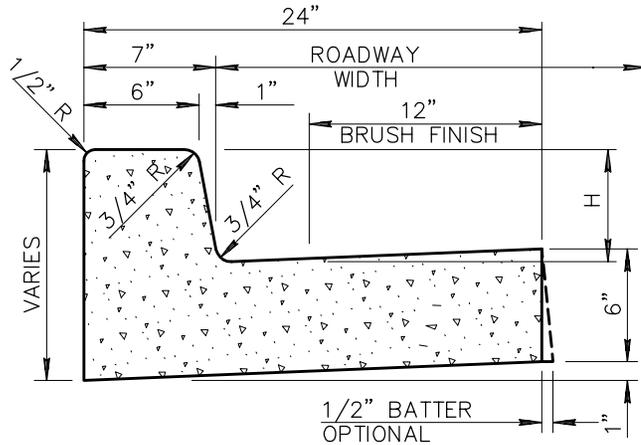
STANDARD TRENCH PLATING DETAIL

REVISED

DETAIL NO.

211

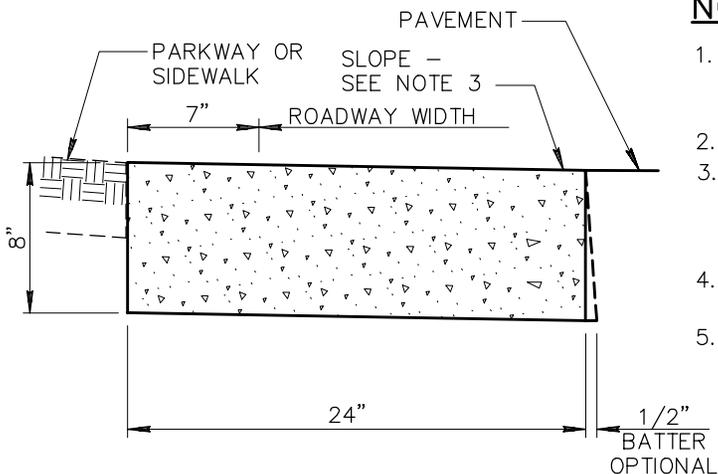
VERTICAL CURB AND GUTTER (TYPE A)



NOTES: (TYPE A)

1. ALL EXPOSED SURFACES TO BE TROWEL FINISHED EXCEPT AS SHOWN. SEE SECT. 340.
2. H=6" OR AS SPECIFIED ON PLANS.
3. CONTRACTION JOINT SPACING 10' MAXIMUM.
4. EXPANSION JOINTS AS PER SECT. 340.
5. CLASS 'B' CONCRETE PER 725.

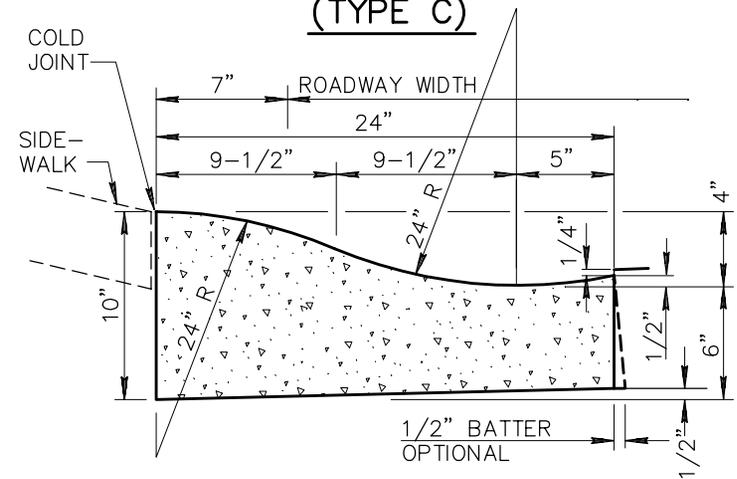
RIBBON CURB (TYPE B)



NOTES: (TYPE B)

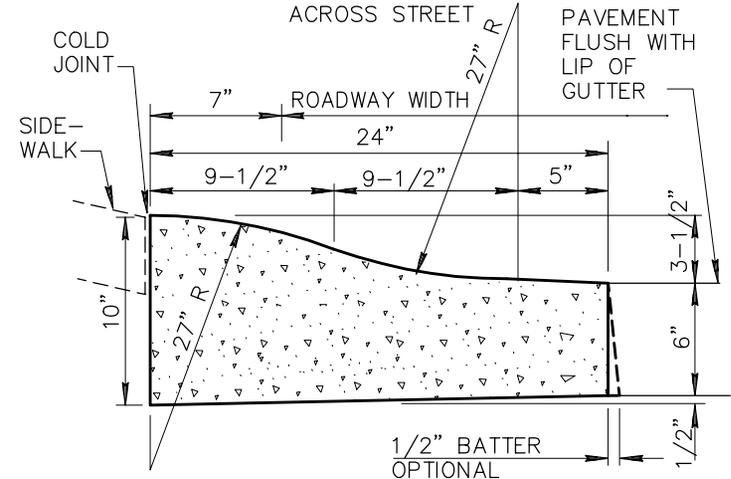
1. CONSTRUCT CURB AND INSTALL 1/2" MASTIC EXPANSION JOINTS, A.S.T.M. D-1751. SECT. 340.
2. BROOM FINISH ALL SURFACES.
3. RIBBON CURB MAY SLOPE TOWARDS PAVEMENT OR PARKWAY AS INDICATED ON PLANS.
4. CONTRACTION JOINT SPACING 10' MAXIMUM.
5. CONCRETE SHALL BE CLASS 'B' PER SECT. 725 AND INSTALLED PER SECT. 505.

ROLL CURB AND GUTTER (TYPE C)



(TYPE D)

SPECIAL SECT. USE FOR HIGH
SIDE CURB WITH SHEET DRAINAGE
ACROSS STREET



NOTES: (C & D)

1. ALL WORK AND MATERIALS SHALL CONFORM TO SECT. 304, 505 AND 725. BROOM FINISH TO EXPOSED SURFACE.
2. CONTRACTION JOINT SPACING 10' MAXIMUM.
3. EXPANSION JOINTS AS PER SECT. 340.
4. CLASS 'B' CONCRETE PER 725.

DETAIL NO.

220



STANDARD DETAIL
ENGLISH

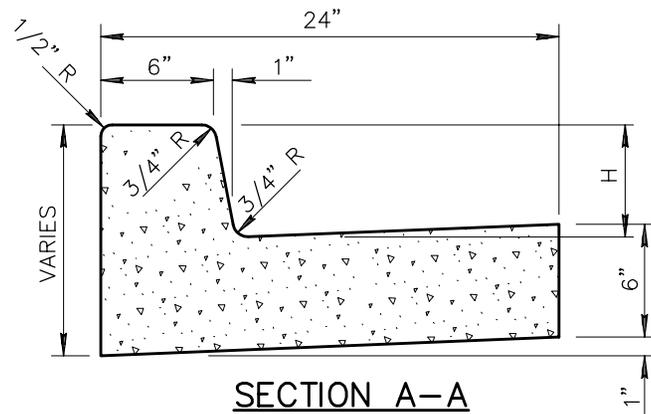
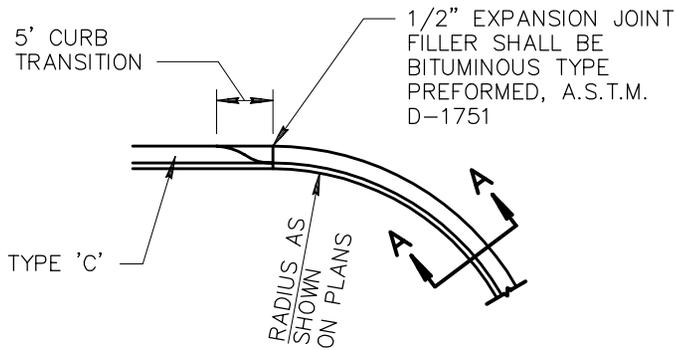
**CURB AND GUTTER
TYPES A, B, C AND D**

REVISED

DETAIL NO.

220

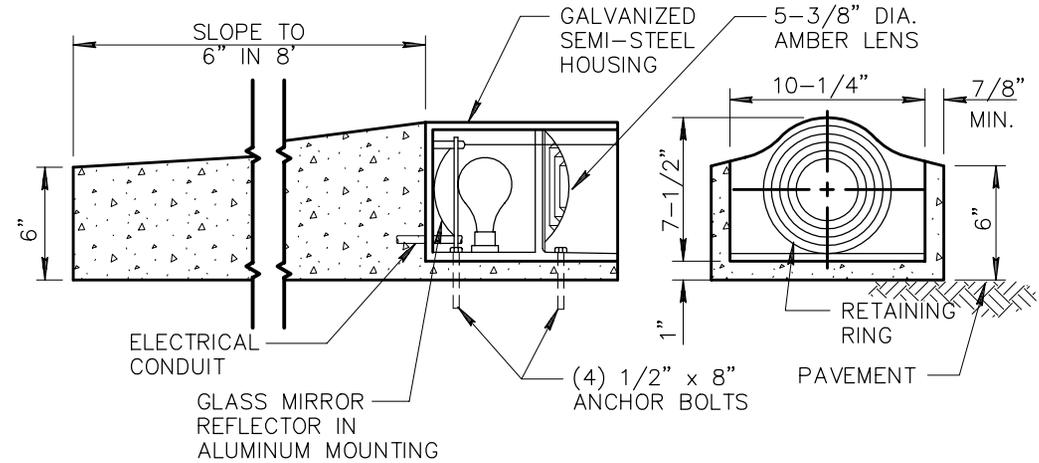
CURB AND GUTTER TRANSITION



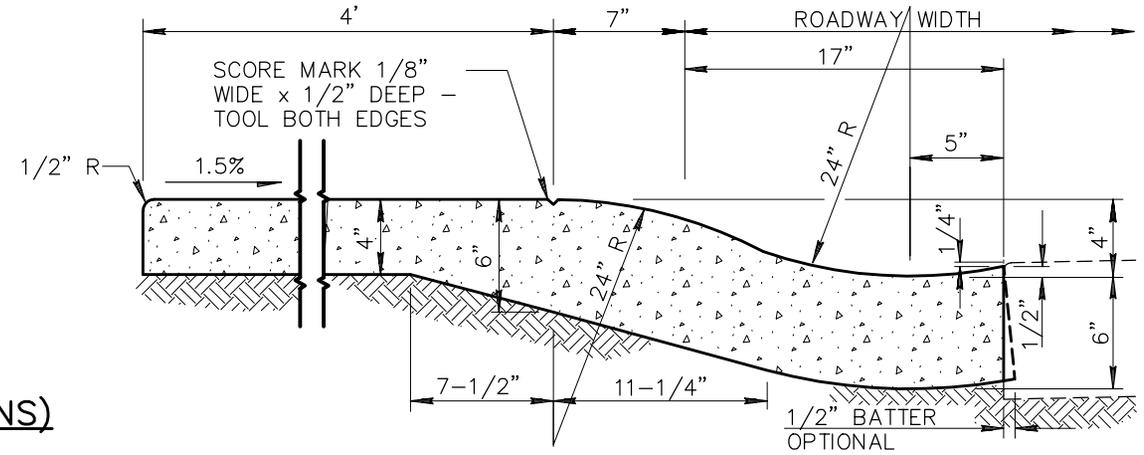
NOTES: (CURB AND GUTTER TRANSITIONS)

1. THE CURB TRANSITION WILL BE PAID FOR AS TYPE 'C'. WHEN A PROJECT CONSISTS OF TYPE 'C' CURB AND GUTTER THROUGHOUT, THE ENTIRE RETURN SHALL BE MEASURED AND PAID FOR AS TYPE 'A'.
2. WHERE PROPOSED CONSTRUCTION IS TO BE CONNECTED TO EXISTING CURB AND GUTTER, THE TRANSITION SHALL BE INDICATED ON PLANS.
3. CLASS 'B' CONCRETE PER SECT. 725.

CURB WARNING BEACON



INTEGRAL ROLL CURB, GUTTER AND SIDEWALK



NOTES:

1. CONCRETE TO BE MONOLITHIC POUR. EXPOSED SURFACE FINISH AS PER SIDEWALK AND GUTTER DETAIL.
2. CONTRACTION JOINT SPACING 16' MAXIMUM.
3. EXPANSION JOINTS PER SECT. 340.
4. CLASS 'B' CONCRETE PER SECT. 725.

DETAIL NO.

221



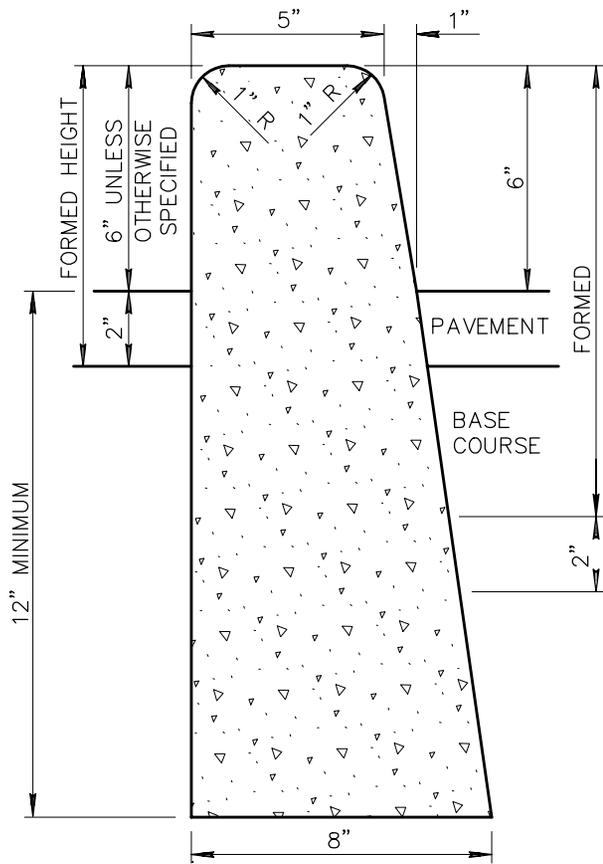
STANDARD DETAIL
ENGLISH

CURB AND GUTTER
(TRANSITION, INTEGRAL & WARNING BEACON)

REVISED

DETAIL NO.

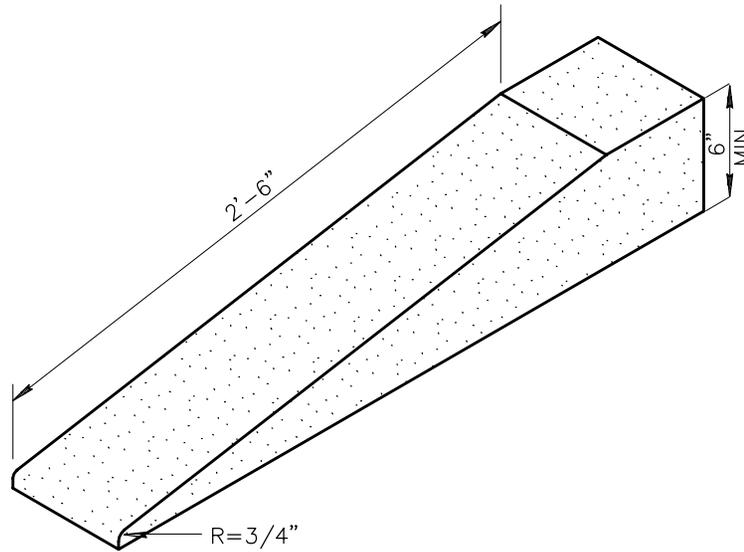
221



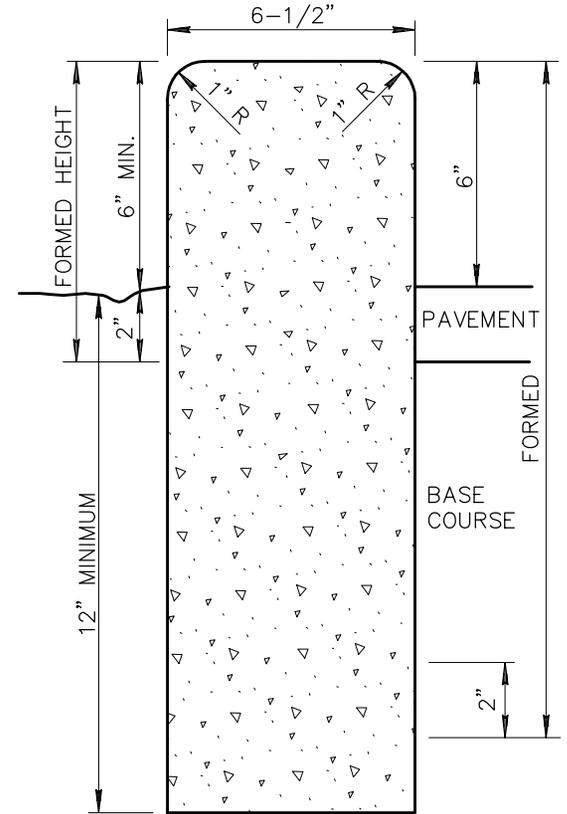
TYPE 'A'

NOTES:

1. ALL VERTICAL SURFACES TO BE FORMED.
2. VERTICAL SURFACES DOWN FROM 2" BELOW UNDISTURBED SOIL MAY BE PLACED AGAINST NEAT CUT IF APPROVED BY THE ENGINEER AND CONCRETE WILL NOT EXTEND MORE THAN 1" BEYOND THEORETICAL FACE.
3. ALL EXPOSED SURFACES TO BE STRIPPED GREEN AND TROWEL FINISHED.
4. CONCRETE CURBS CONFORM TO SECT. 340.
5. MAXIMUM SPACING OF CONTRACTION JOINTS IS 10'
6. CONCRETE TO BE CLASS 'B' PER SECT. 725.



TYPICAL CURB TERMINATION



TYPE 'B'

DETAIL NO.

222



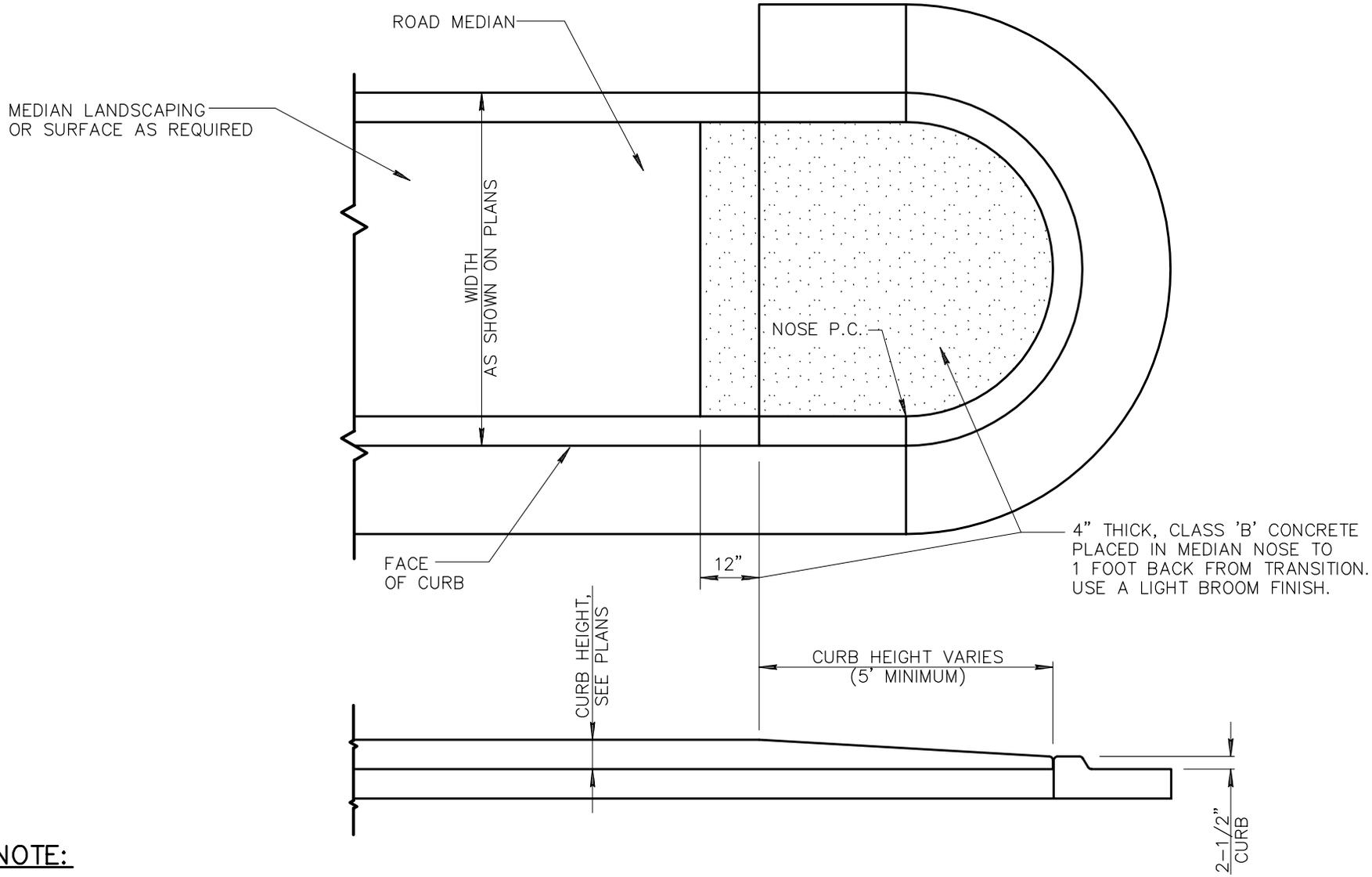
STANDARD DETAIL
ENGLISH

**SINGLE CURB –
TYPES A, B AND TERMINATION**

REVISED

DETAIL NO.

222



NOTE:
 LENGTH OF TRANSITION SHALL BE EQUAL TO RADIUS OF MEDIAN NOSE, (5' MINIMUM). FOR LOCATION SEE PLANS.

DETAIL NO.
223

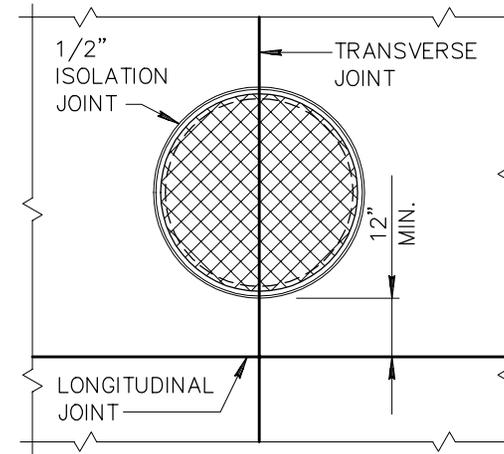
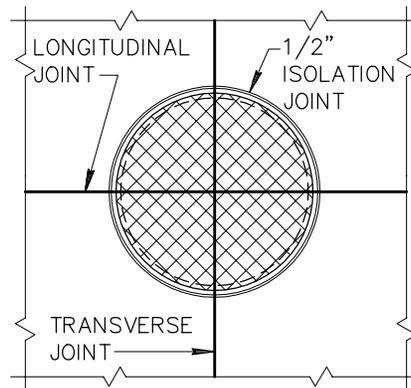
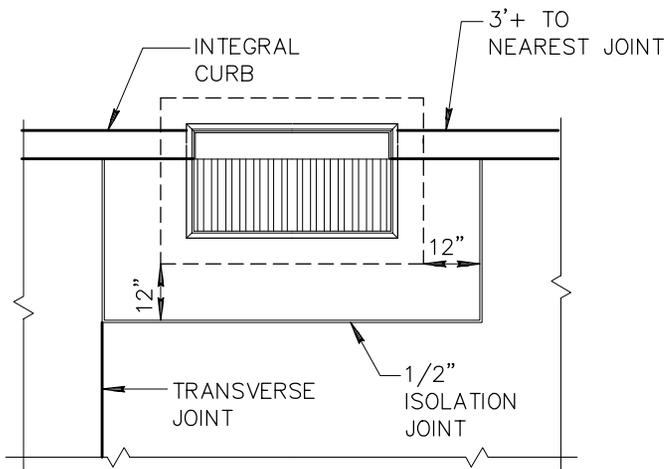
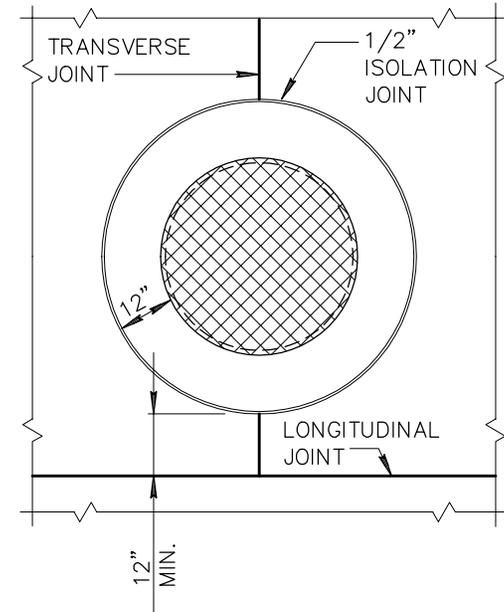
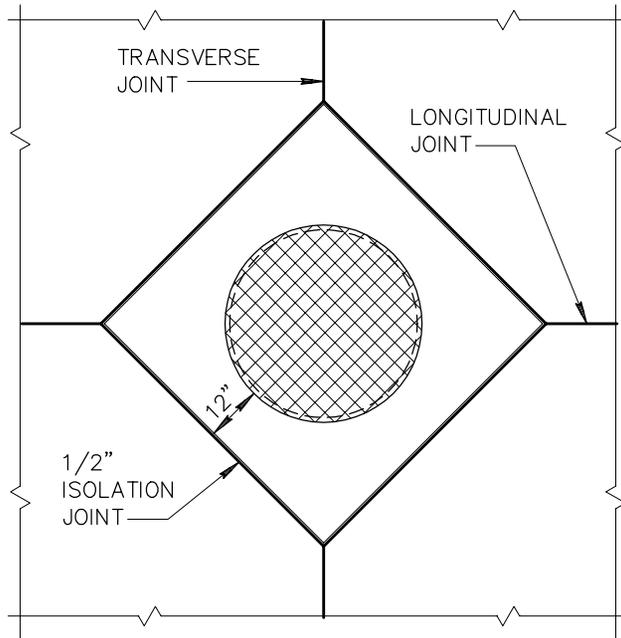
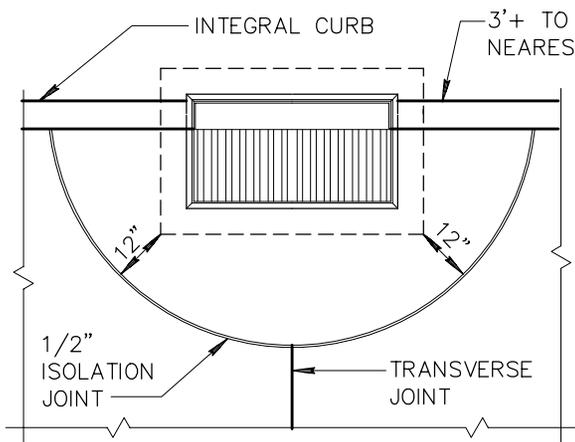


STANDARD DETAIL
 ENGLISH

MEDIAN NOSE TRANSITION

REVISED

DETAIL NO.
223



DRAINAGE INLET

MANHOLE COVERS

MANHOLE COVERS

DETAIL NO.

224



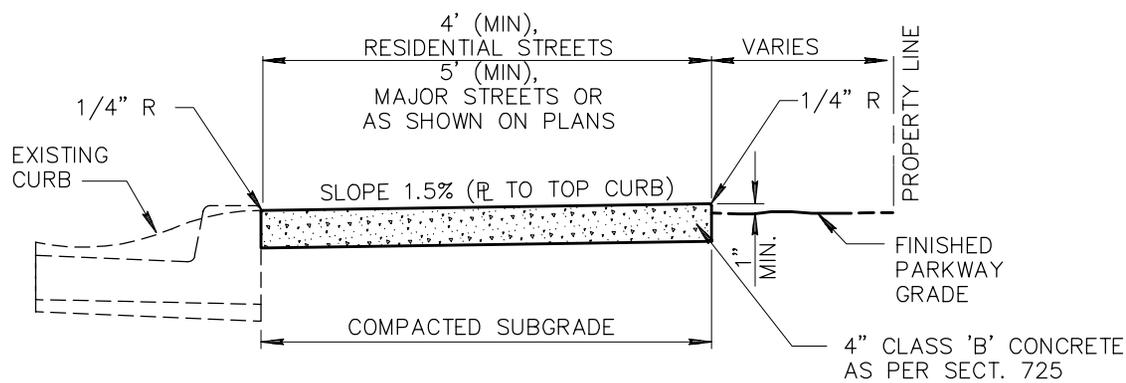
STANDARD DETAIL
ENGLISH

**JOINT FOR DRAINAGE INLETS
AND MANHOLE COVERS**

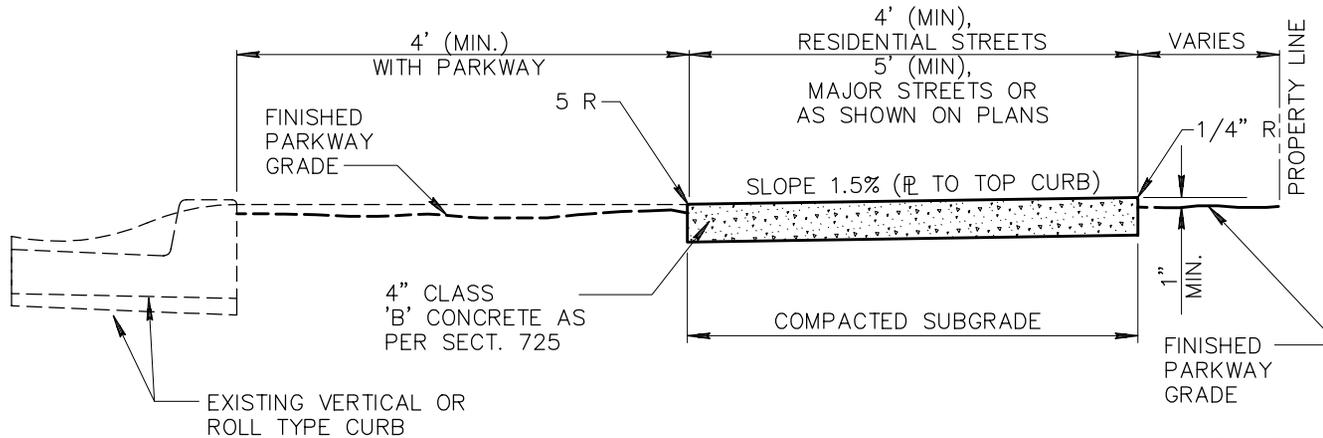
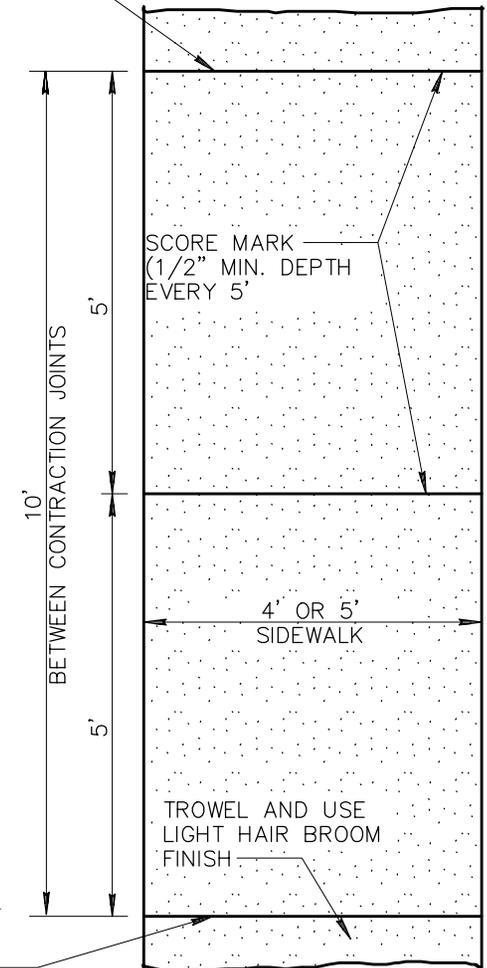
REVISED

DETAIL NO.

224



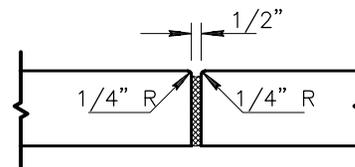
CONTRACTION JOINT
CURB AND GUTTER
JOINT SHALL MATCH
SIDEWALK JOINTS



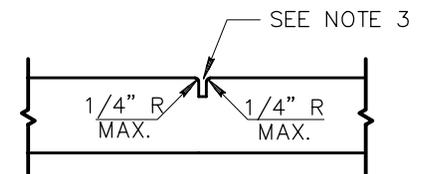
CONTRACTION JOINT
CURB AND GUTTER
JOINT SHALL MATCH SIDEWALK
JOINTS

NOTES:

1. SIDEWALK CONSTRUCTION SHALL CONFORM TO SECT. 340.
2. EXPANSION JOINT FILLER SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER, A.S.T.M. D-1751.
3. LARGE AGGREGATE, IN CONTRACTION JOINT, SHALL BE SEPARATED TO A DEPTH OF 1", FINISH DEPTH SHALL BE A MINIMUM OF 3/4".
4. EXPANSION JOINT 100' MAXIMUM SPACING PER SECT. 340.



EXPANSION JOINT



CONTRACTION JOINT

DETAIL NO.

230



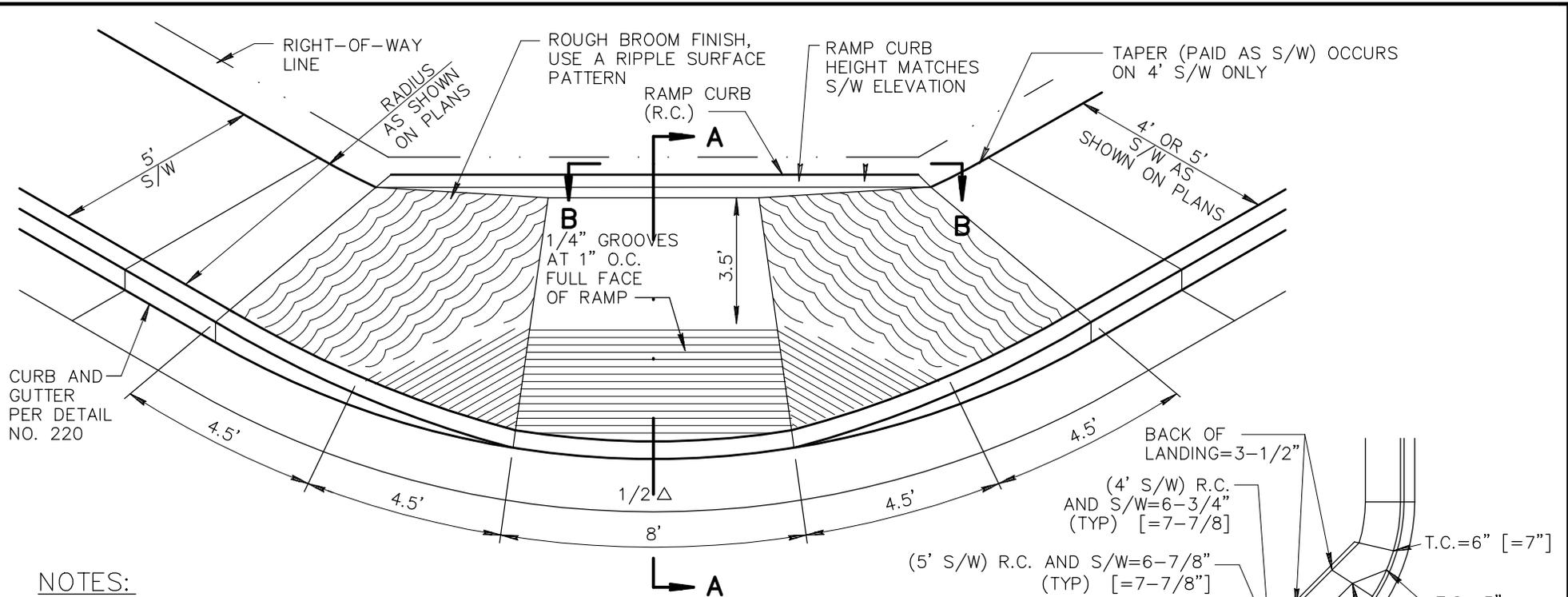
STANDARD DETAIL
ENGLISH

SIDEWALKS

REVISED

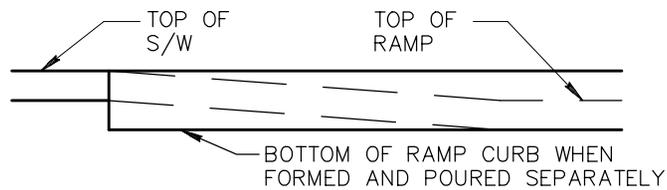
DETAIL NO.

230

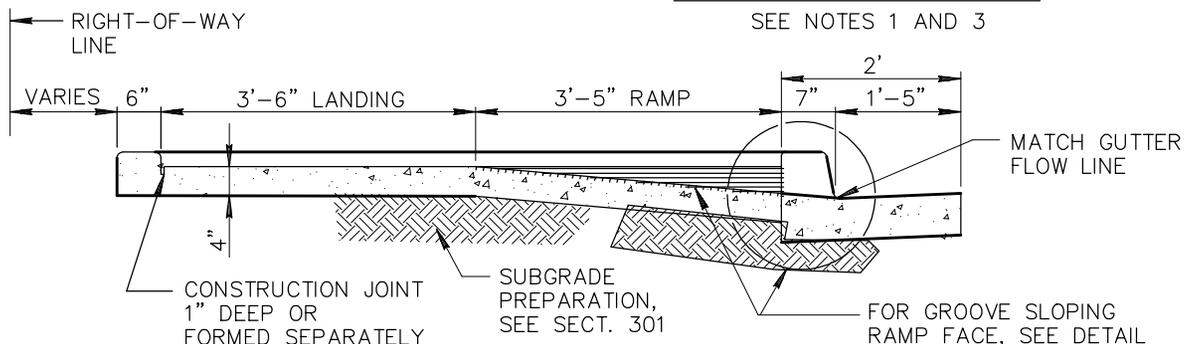


NOTES:

- CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER AND ARE LOCATED RADIALLY. GUTTER ELEVATION=0.
- CLASS 'B' CONCRETE CONSTRUCTION AS PER SECTION 725.
- WHEN CURB HEIGHTS OF 7" ARE SHOWN ON PLANS, USE DIMENSIONS SHOWN IN []'S.



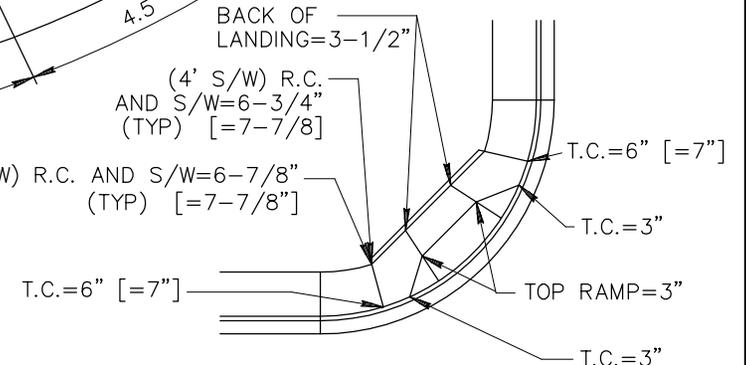
SECTION B-B



SECTION A-A

CONTROL ELEVATIONS

SEE NOTES 1 AND 3



DETAIL NO.

231



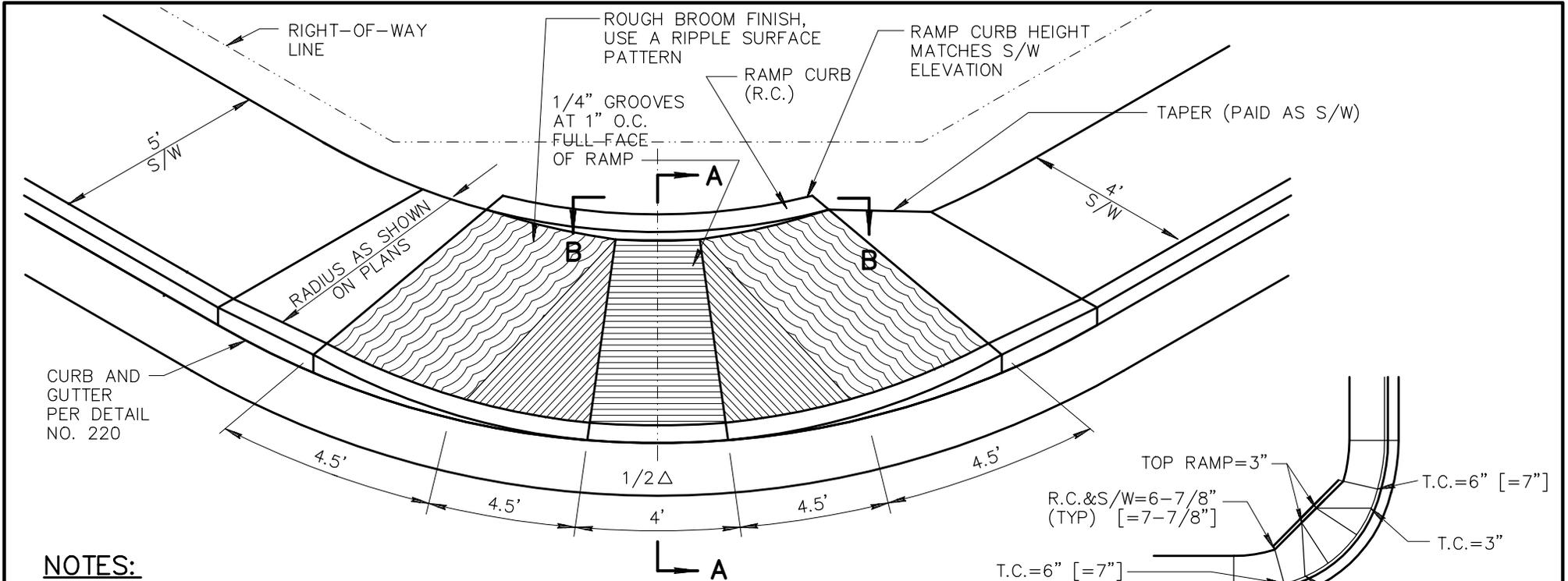
STANDARD DETAIL
ENGLISH

SIDEWALK RAMPS - TYPE 'A'

REVISED

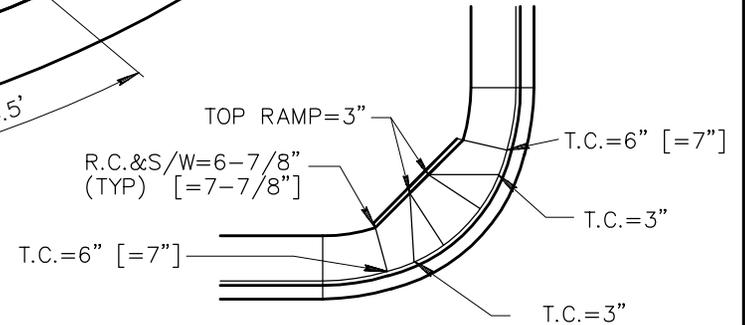
DETAIL NO.

231



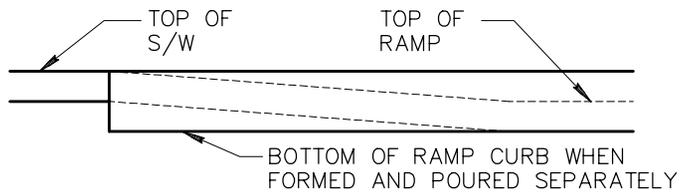
NOTES:

1. CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER AND ARE LOCATED RADIALLY. GUTTER ELEVATION=0.
2. CLASS 'B' CONCRETE CONSTRUCTION AS PER SECT. 725.
3. WHEN CURB HEIGHTS OF 7" ARE SHOWN ON PLANS, USE DIMENSIONS SHOWN IN []'S.

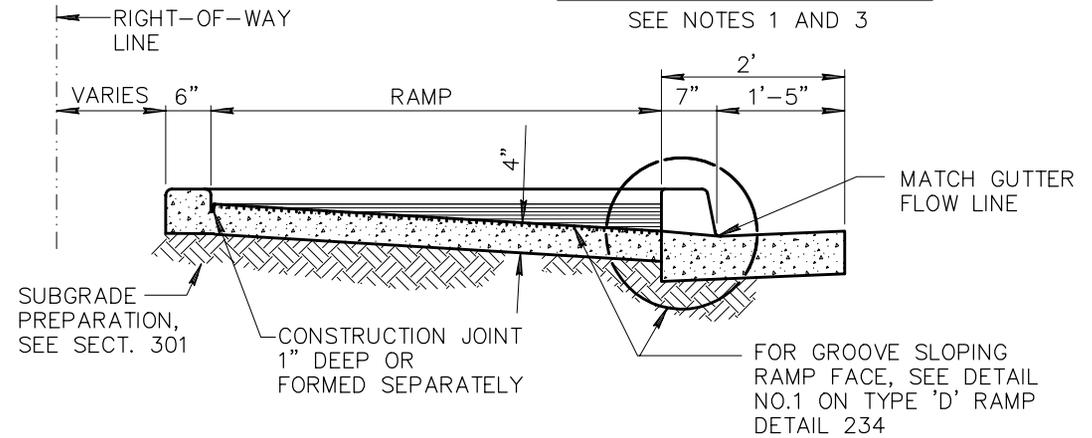


CONTROL ELEVATIONS

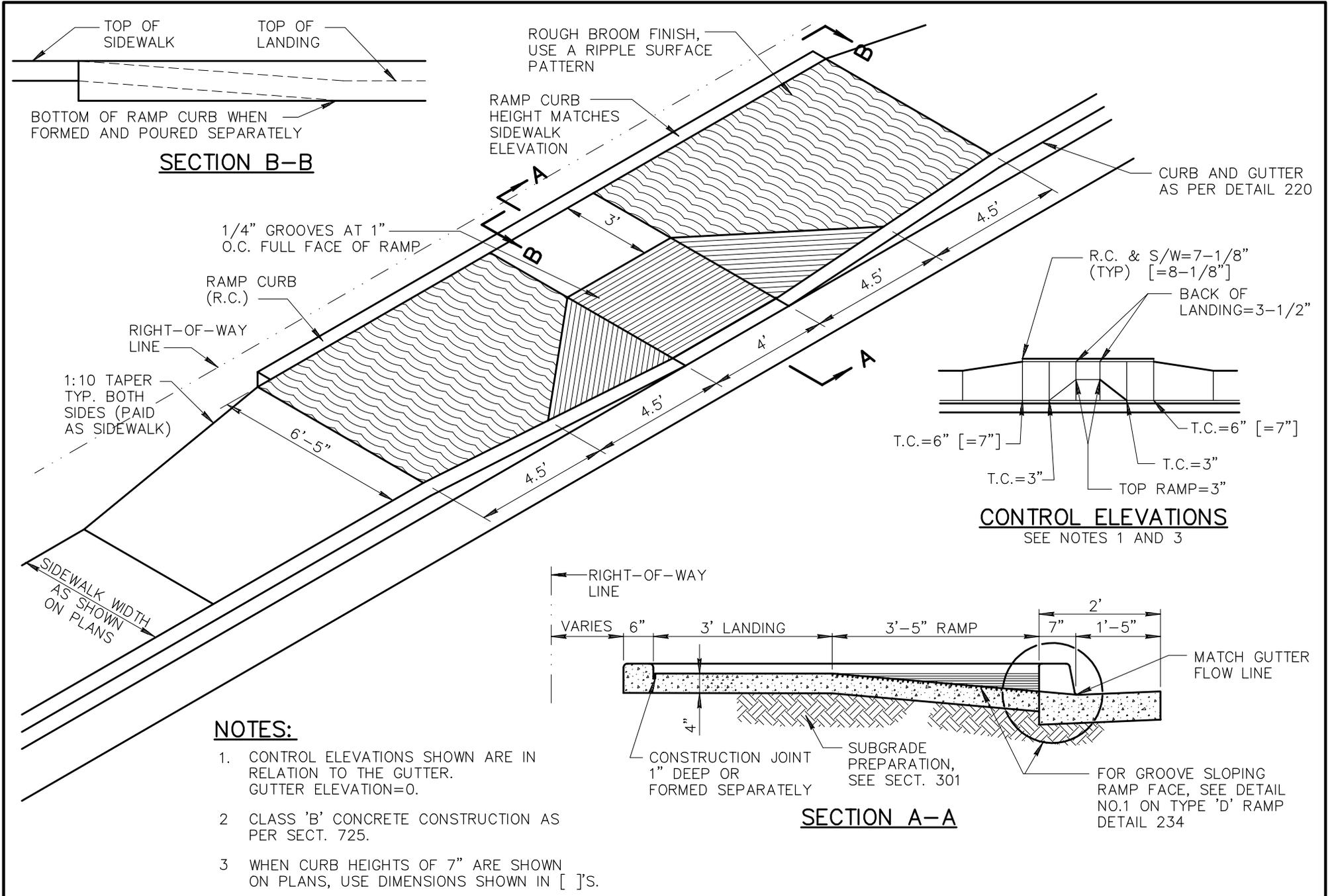
SEE NOTES 1 AND 3



SECTION B-B



SECTION A-A



DETAIL NO.

233



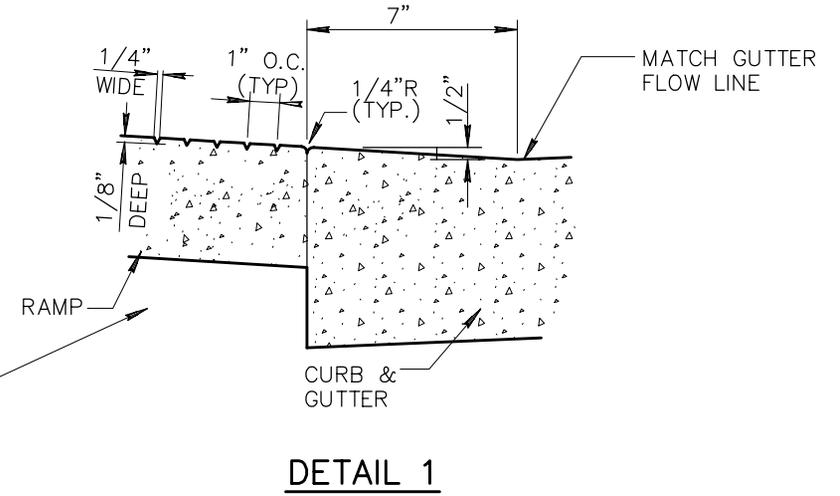
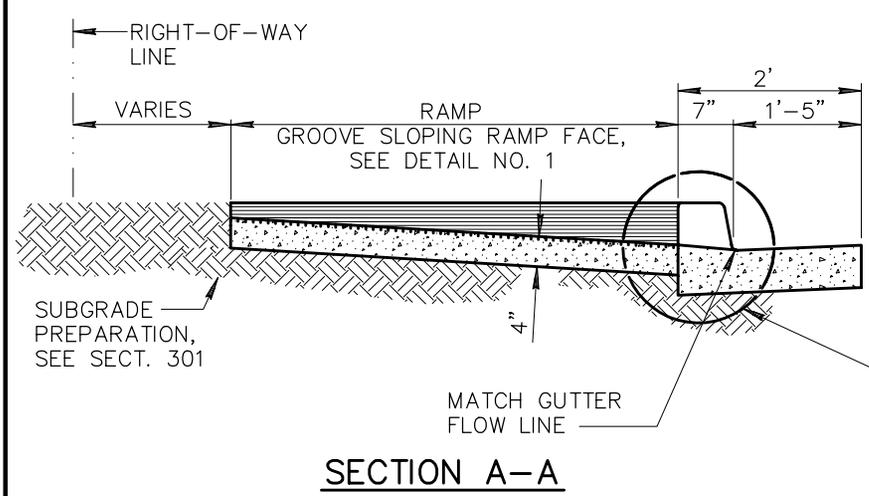
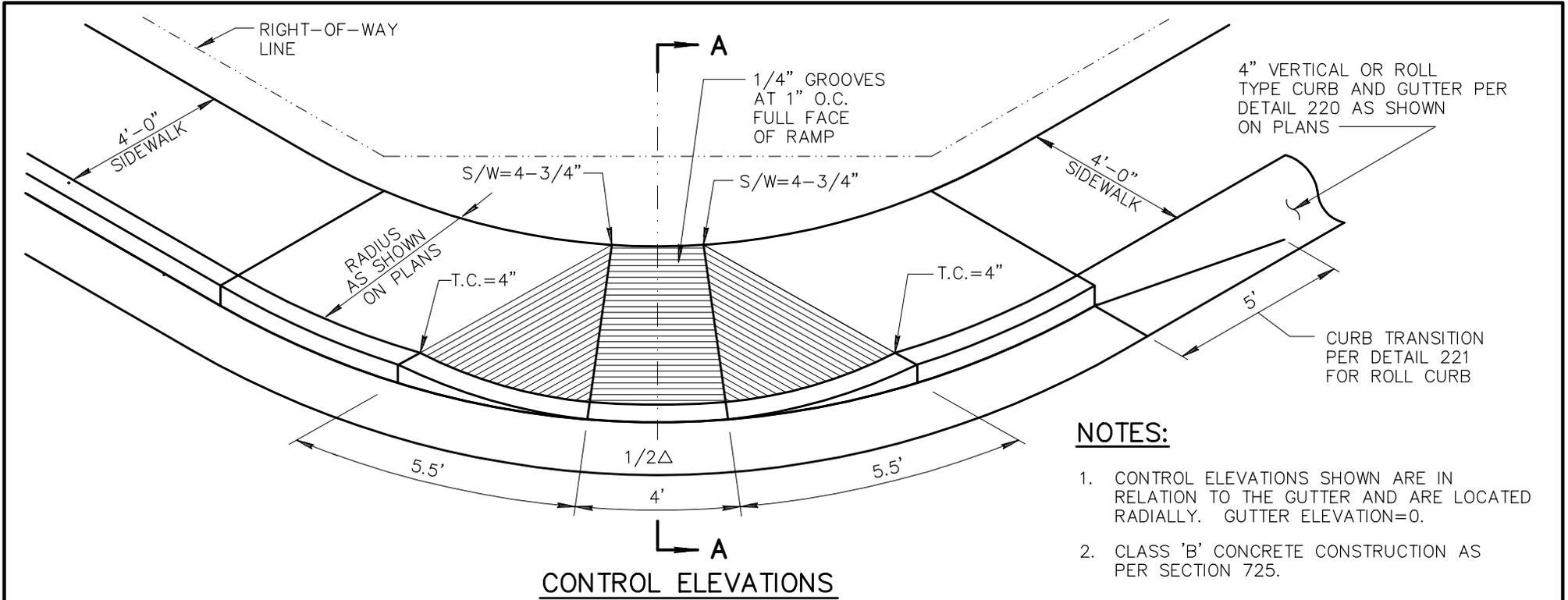
STANDARD DETAIL
ENGLISH

SIDEWALK RAMPS - TYPE 'C'

REVISED

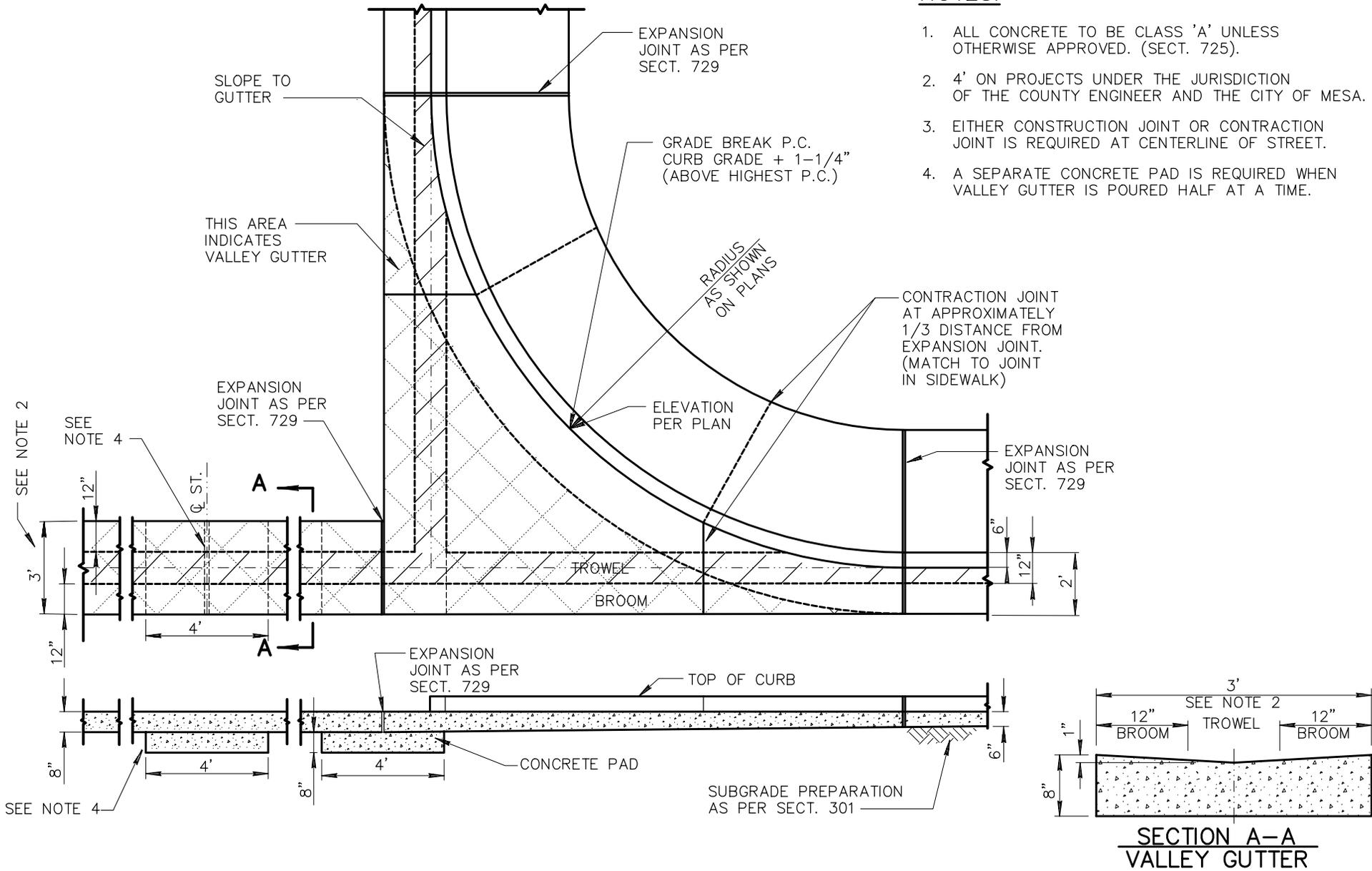
DETAIL NO.

233



NOTES:

1. ALL CONCRETE TO BE CLASS 'A' UNLESS OTHERWISE APPROVED. (SECT. 725).
2. 4' ON PROJECTS UNDER THE JURISDICTION OF THE COUNTY ENGINEER AND THE CITY OF MESA.
3. EITHER CONSTRUCTION JOINT OR CONTRACTION JOINT IS REQUIRED AT CENTERLINE OF STREET.
4. A SEPARATE CONCRETE PAD IS REQUIRED WHEN VALLEY GUTTER IS POURED HALF AT A TIME.



DETAIL NO.
240

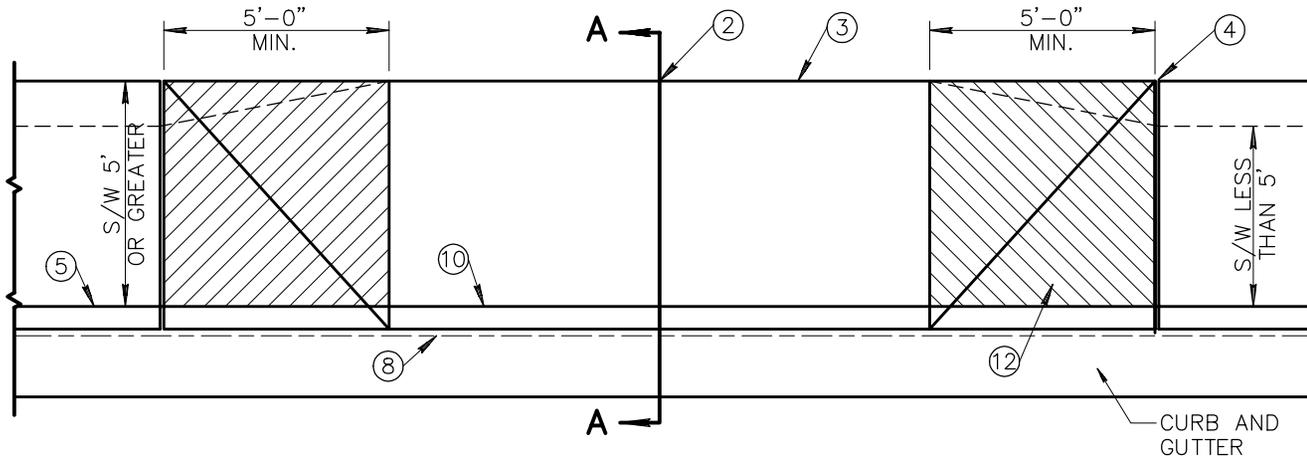


STANDARD DETAIL
ENGLISH

VALLEY GUTTER

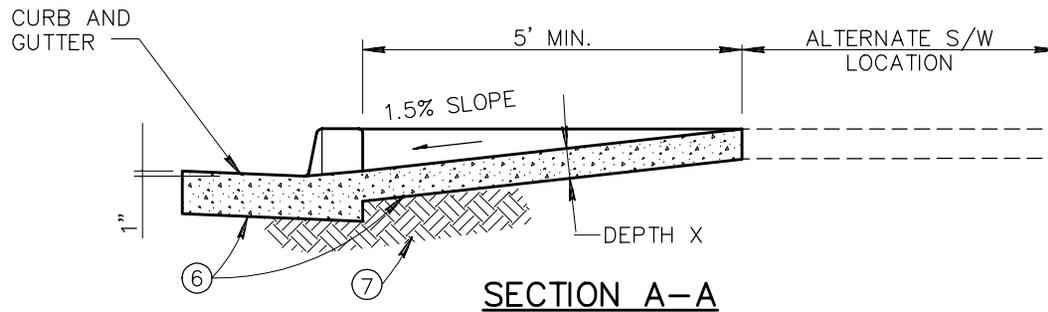
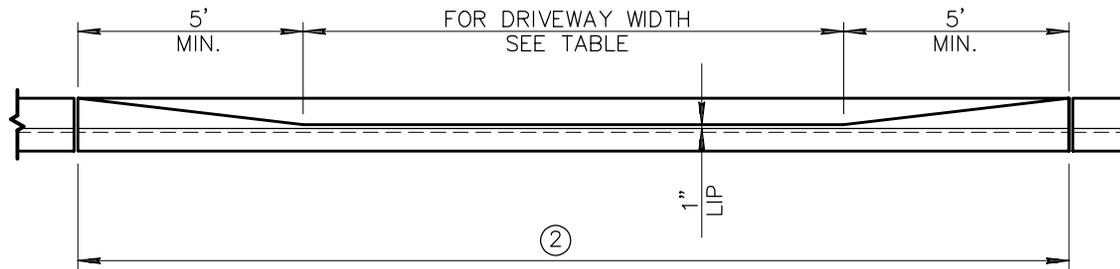
REVISED

DETAIL NO.
240



NOTES:

1. DEPRESSED CURB SHALL BE PAID FOR AT THE UNIT PRICE BID FOR THE TYPE OF CURB USED AT THAT LOCATION.
2. WHEN WIDTH EXCEEDS 22' PROVIDE A CONTRACTION JOINT ON D/W CENTERLINE.
3. BACK OF D/W OR FACE OF FUTURE S/W.
4. MASTIC EXPANSION JOINT THROUGH CURB AND GUTTER. EXPANSION JOINT FILLER SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER A.S.T.M. D-1751.
5. BACK OF CURB - CONSTRUCTION JOINT OR SCORE MARK.
6. CLASS 'B' CONCRETE, SECT. 725.
7. SUBGRADE PREPARATION, SECT. 301.
8. FLOW LINE OF GUTTER.
9. DEPRESSED CURB.
10. SECT. A-A AND ELEVATION, D/W VERTICAL CURB AND GUTTER OR ROLL TYPE CURB AND GUTTER.
11. ROLL TYPE CURB AND GUTTER NOT PERMITTED IN THE CITY OF MESA
12. 1/4" GROOVES AT 1" O.C. FULL WIDTH OF 5' WARP SECTION, EACH SIDE OF DRIVEWAY. SEE DETAIL NO. 1 ON TYPE 'D' RAMP DETAIL NO. 234.



COMMERCIAL AND INDUSTRIAL				
DRIVEWAY WIDTH	MIN.	MAX.	CLASS	DEPTH ^x
COMMERCIAL	* 16'	40'	B	6"
INDUSTRIAL	* 16'	40'	B	6"
* 24' MIN. FOR TWO WAY TRAFFIC				
RESIDENTIAL				
DRIVEWAY WIDTH	MIN.	MAX.	CLASS	DEPTH ^x
MAJOR STREET	16'	30'	B	5"
COLLECTOR STREET	* 12'	30'	B	5"
LOCAL STREET	12'	30'	B	5"
* 16' DESIRABLE				

DETAIL NO.

250



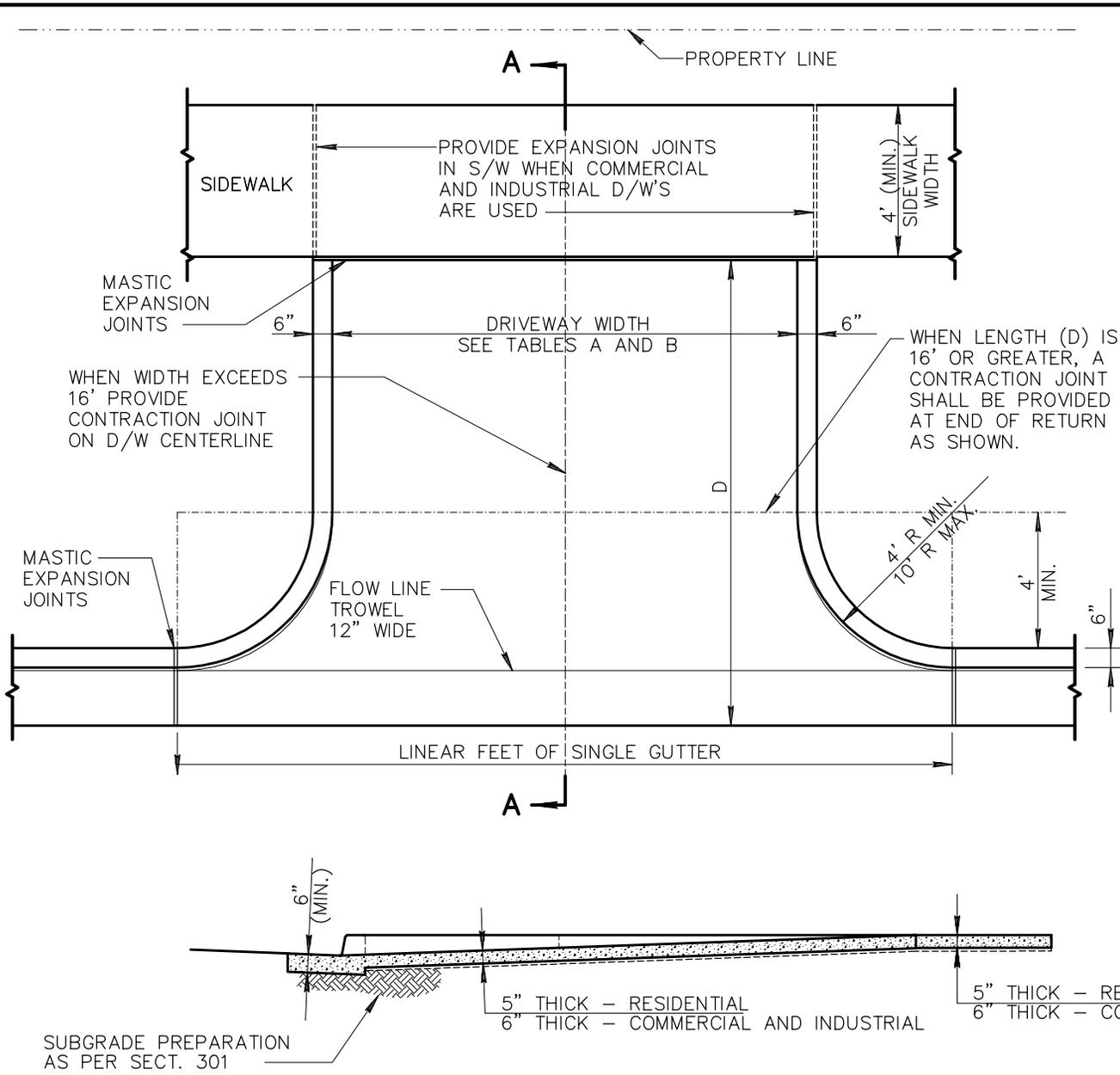
STANDARD DETAIL
ENGLISH

DRIVEWAY ENTRANCES

REVISED

DETAIL NO.

250



SECTION A-A

TABLE A		
ZONING	DRIVEWAY WIDTH	
	MIN.*	MAX.
COMMERCIAL AND INDUSTRIAL		
COMMERCIAL	16'	40'
INDUSTRIAL	16'	40'
* 24' WHERE 2-WAY TRAFFIC IS ANTICIPATED		

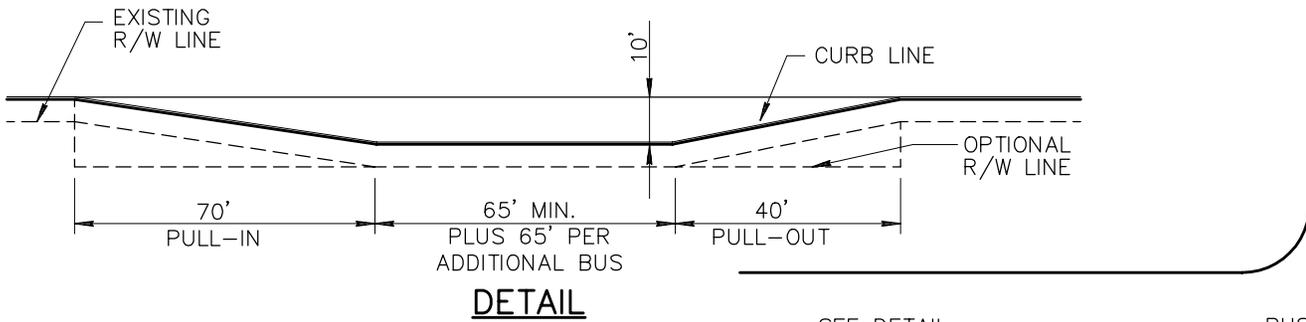
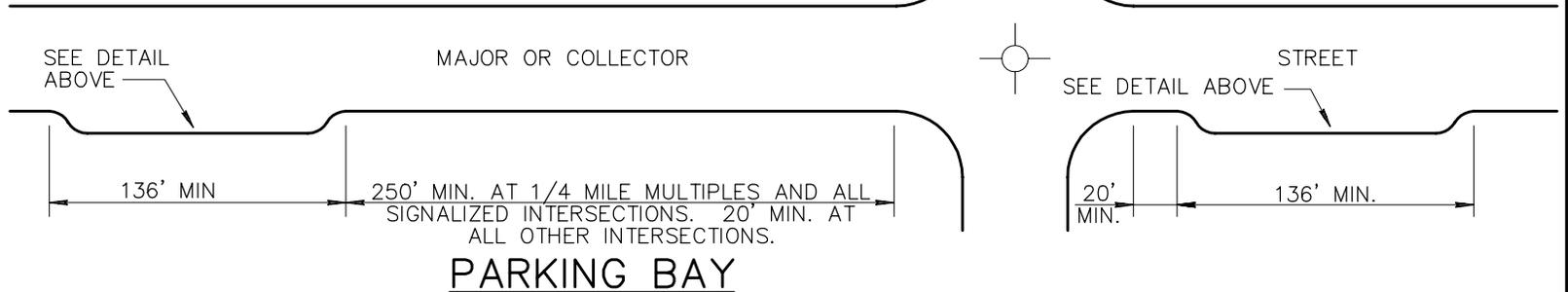
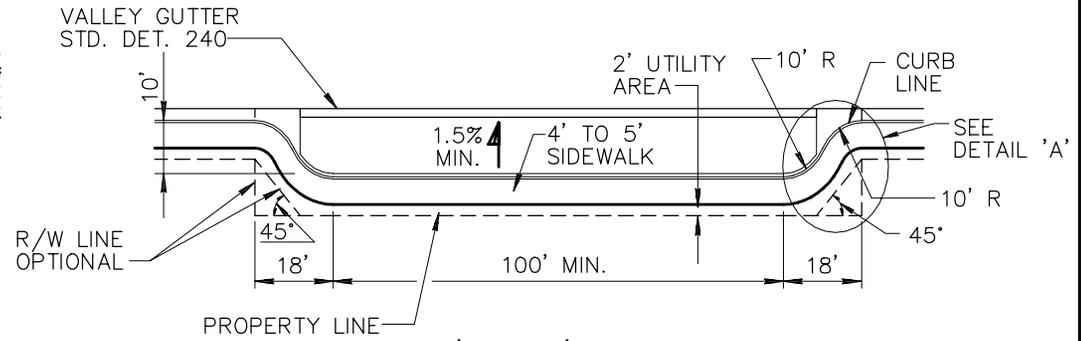
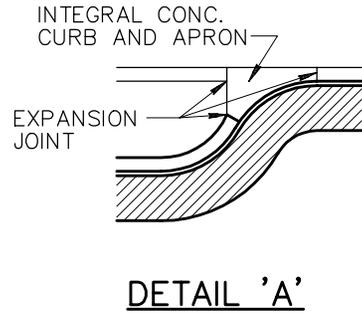
TABLE B		
ZONING	DRIVEWAY WIDTH	
	MIN.*	MAX.
RESIDENTIAL		
MAJOR STREET	16'	30'
COLLECTOR STREET	12'	30'
LOCAL STREET	12'	30'
* 16' WIDTH IS DESIRABLE		

NOTES:

1. EXPANSION JOINT FILLER SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER, A.S.T.M. D-1751.
2. THIS TYPE D/W TO BE USED ONLY UPON APPROVAL OF ENGINEER.
3. CLASS 'B' CONCRETE CONSTRUCTION AS PER SECT. 725

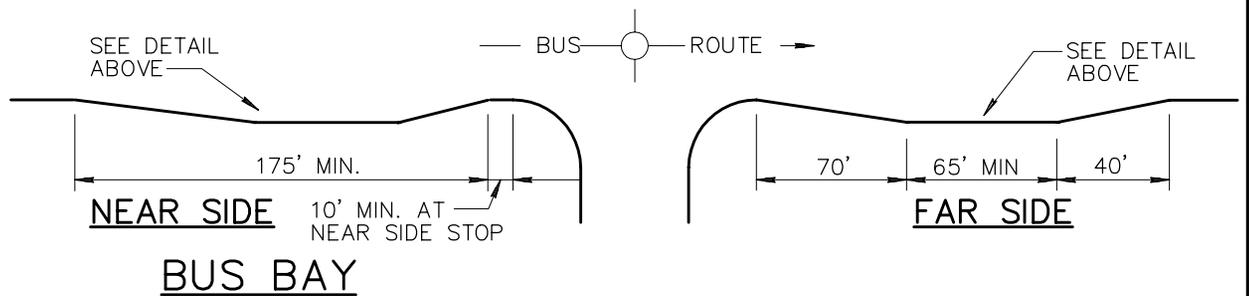
NOTES: (PARKING BAY)

1. SUFFICIENT RIGHT-OF-WAY MUST BE AVAILABLE TO CONSTRUCT PARKING BAY.
2. PARKING BAYS WILL NOT BE ALLOWED WHERE THEY CONFLICT WITH BUS STOPS.



NOTES: (BUS BAY)

1. SUFFICIENT RIGHT-OF-WAY MUST BE AVAILABLE TO CONSTRUCT BUS BAY.
2. RADII, SIDEWALK, CURB AND GUTTER, PAVING SLOPE AND CONCRETE APRON SHALL BE CONSTRUCTED AS FOR PARKING BAYS.



DETAIL NO.

252



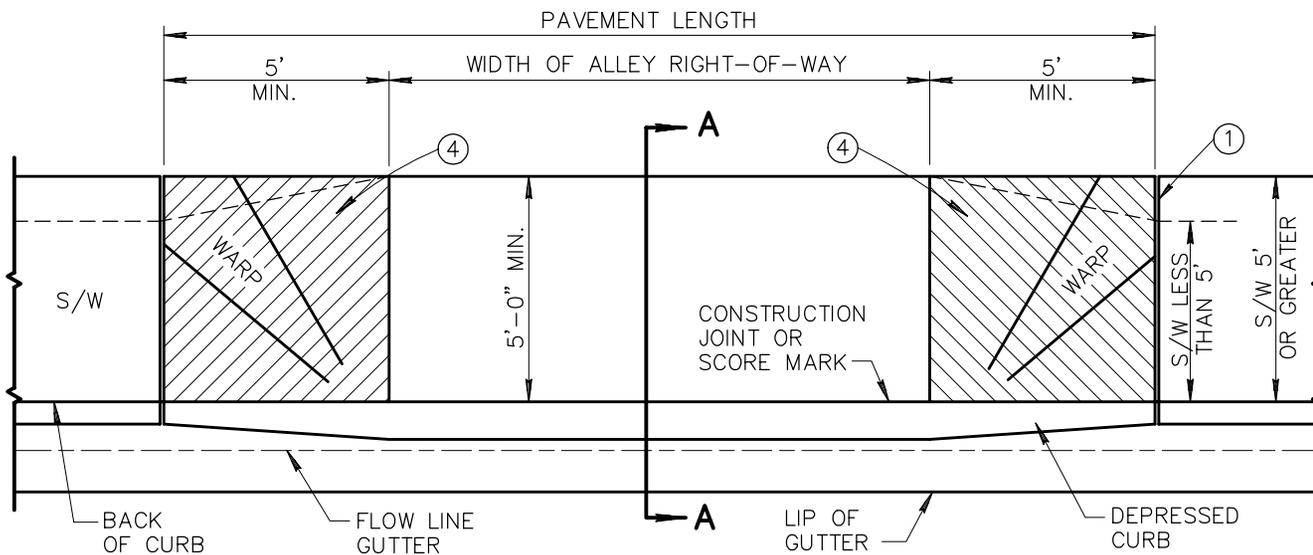
STANDARD DETAIL
ENGLISH

BUS AND PARKING BAYS

REVISED

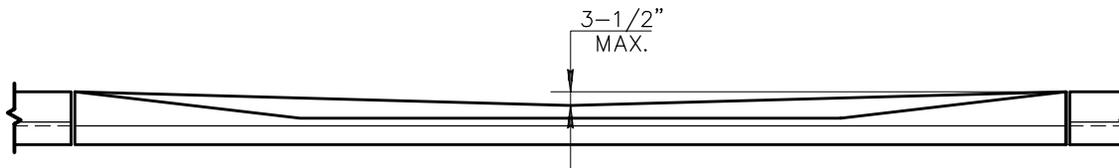
DETAIL NO.

252

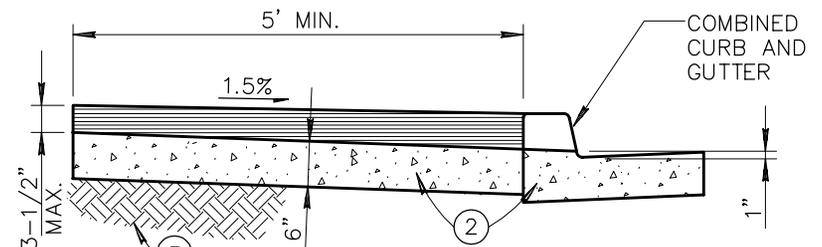


NOTES:

1. EXPANSION JOINT FILLER SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER A.S.T.M. D-1751. BETWEEN SIDEWALK AND ALLEY ENTRANCE AND THROUGH CURB AND GUTTER.
2. CLASS 'B' CONCRETE, PER SECT. 725.
3. SUBGRADE PREPARATION, PER SECT. 301.
4. 1/4" GROOVES AT 1" O.C. FULL WIDTH OF 5' WARP SECTION, EACH SIDE OF ALLEY ENTRANCE. SEE DETAIL NO. 1 ON TYPE 'D' RAMP DETAIL NO. 234.



ELEVATION



SECTION A-A

DETAIL NO.

260



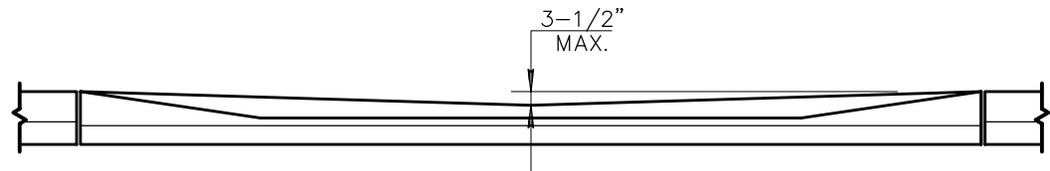
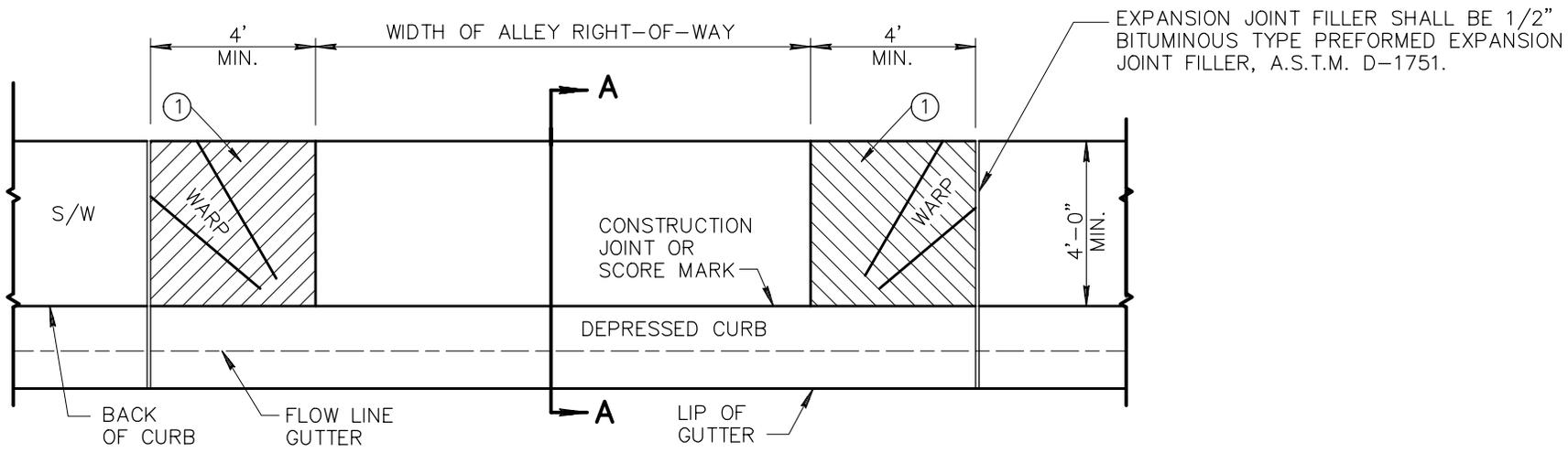
STANDARD DETAIL
ENGLISH

**ALLEY ENTRANCE
(WITH COMBINED CURB AND GUTTER)**

REVISED

DETAIL NO.

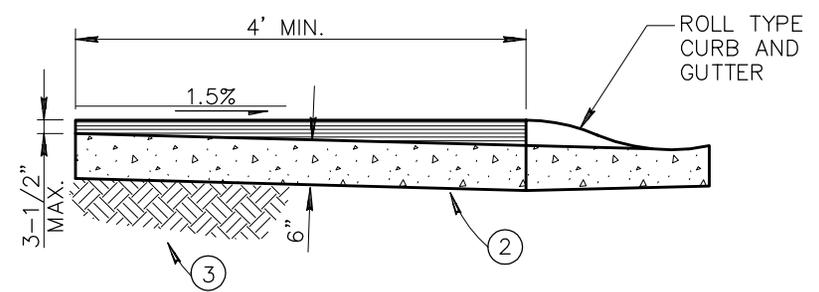
260



ELEVATION

NOTES:

1. 1/4" GROOVES AT 1" O.C. FULL WIDTH OF 4' WARP SECTION, EACH SIDE OF ALLEY ENTRANCE. SEE DETAIL NO. 1 ON TYPE 'D' RAMP DETAIL 234.
2. CLASS 'B' CONCRETE CONSTRUCTION PER SECT. 725.
3. SUBGRADE PREPARATION, PER SECT. 301.



SECTION A-A

DETAIL NO.
261



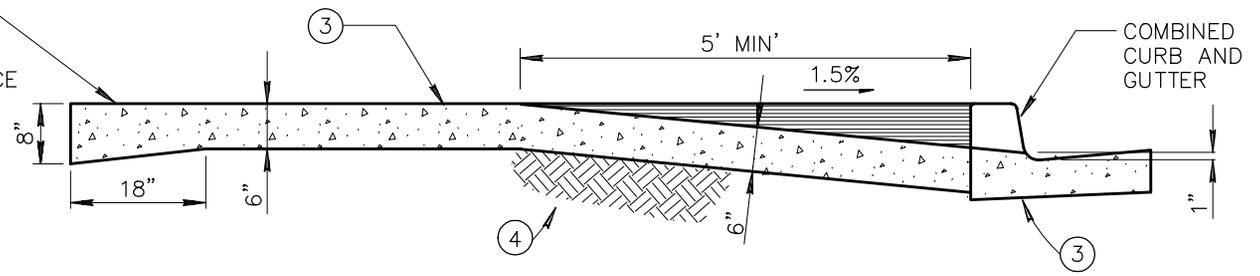
STANDARD DETAIL
ENGLISH

**ALLEY ENTRANCE
(WITH ROLL TYPE CURB AND GUTTER)**

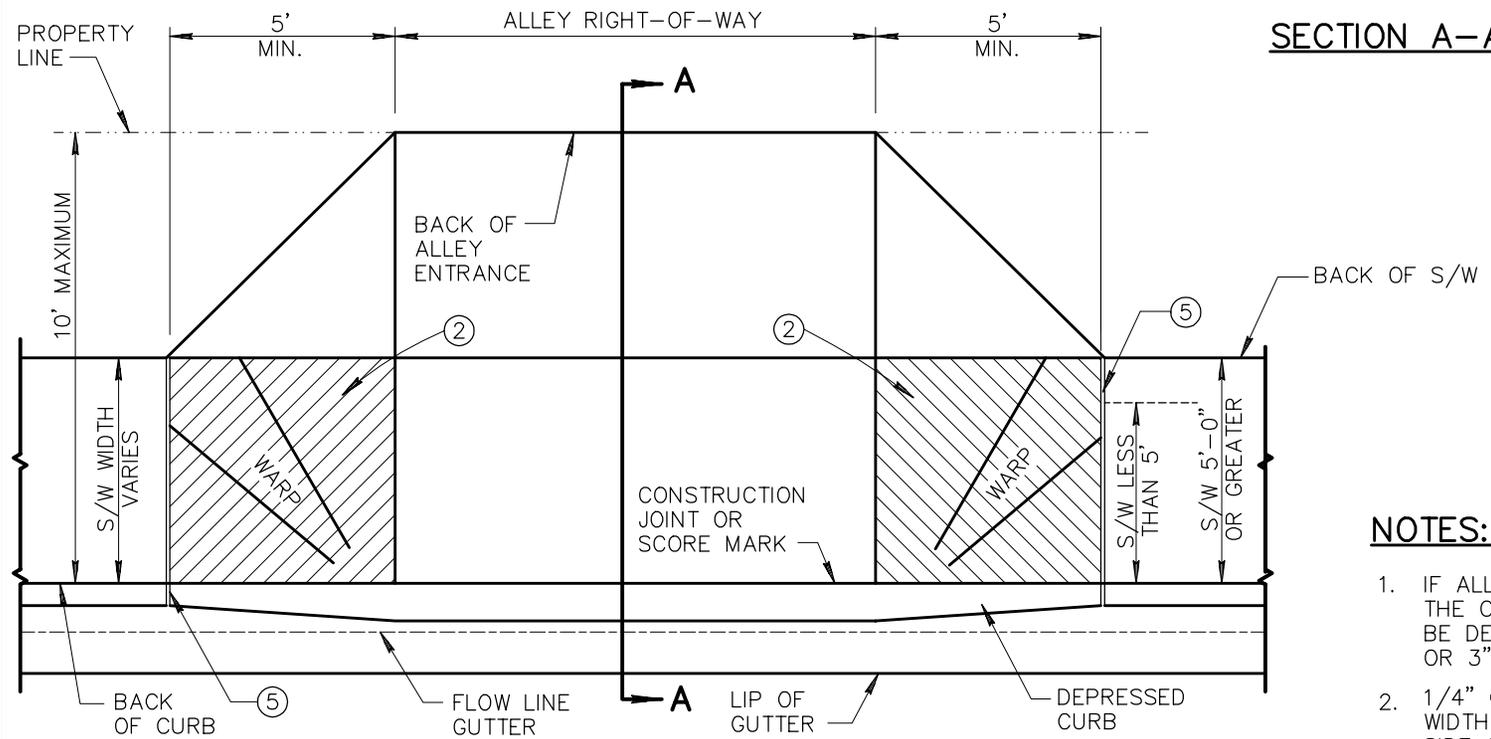
REVISED

DETAIL NO.
261

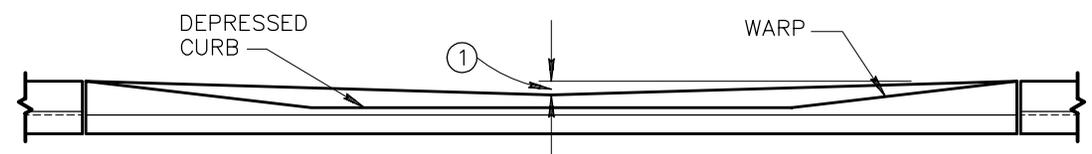
THICKEN CONCRETE FROM 6" TO 8" IN 18" AT BACK OF ALLEY ENTRANCE



SECTION A-A



PLAN



ELEVATION

NOTES:

1. IF ALLEY ENTRANCE IS USED FOR DRAINAGE, THE CENTER BACK OF ALLEY ENTRANCE MAY BE DEPRESSED 2" FOR 4" CURB OR 3" FOR 6" CURB.
2. 1/4" GROOVES AT 1" O.C. FULL WIDTH OF 5' WARP SECTION, EACH SIDE OF ALLEY ENTRANCE. SEE DETAIL NO. 1 ON TYPE 'D' RAMP DETAIL NO. 234.
3. CLASS 'B' CONCRETE CONSTRUCTION PER SECT. 725.
4. SUBGRADE PREPARATION, PER SECT. 301.
5. EXPANSION JOINT (TYP.)

DETAIL NO.
262

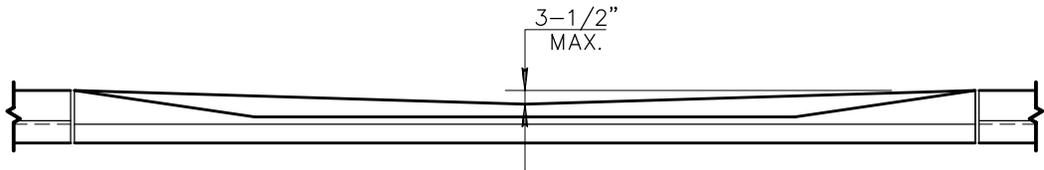
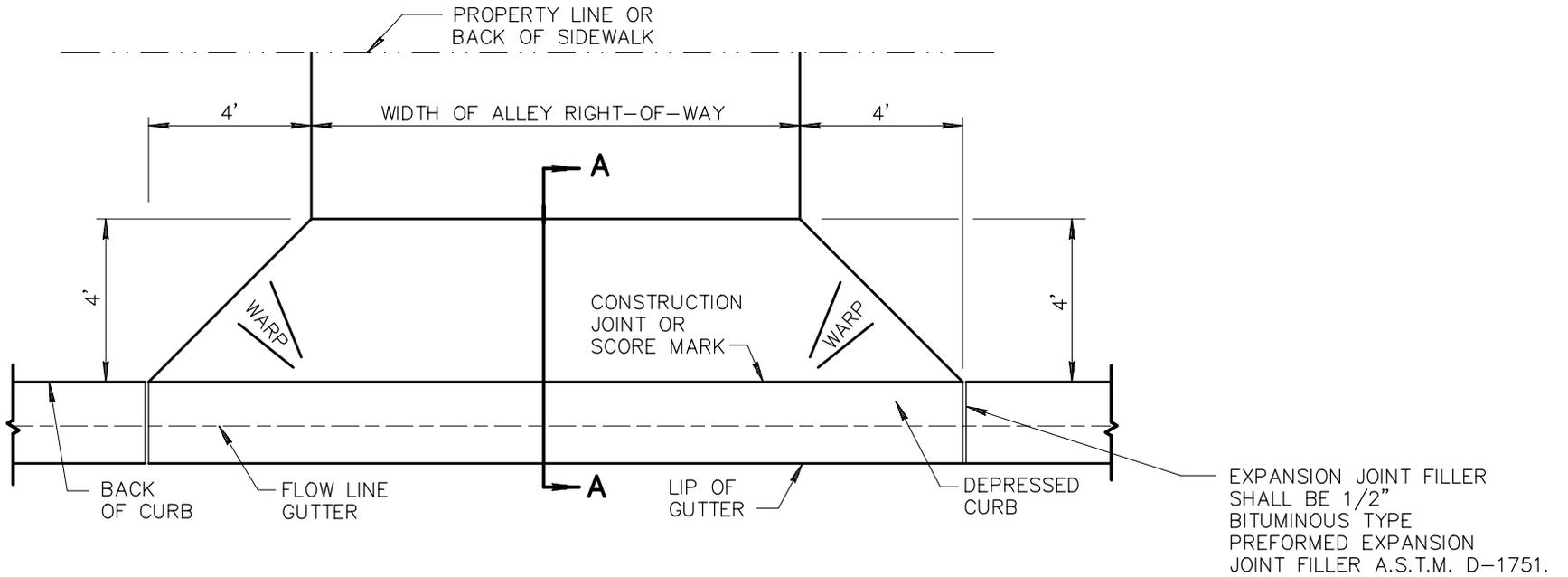


STANDARD DETAIL
ENGLISH

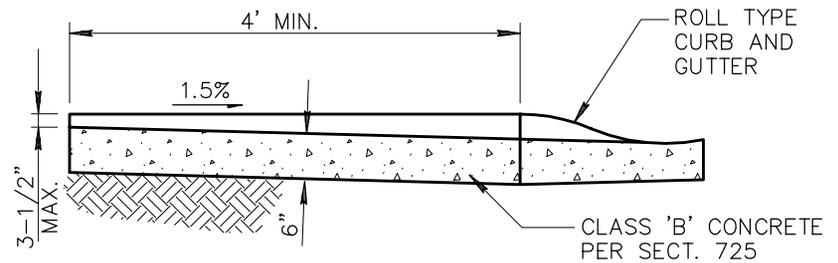
**WING TYPE ALLEY ENTRANCE
(WITH COMBINED CURB AND GUTTER)**

REVISED

DETAIL NO.
262



ELEVATION



SECTION A-A

DETAIL NO.

263



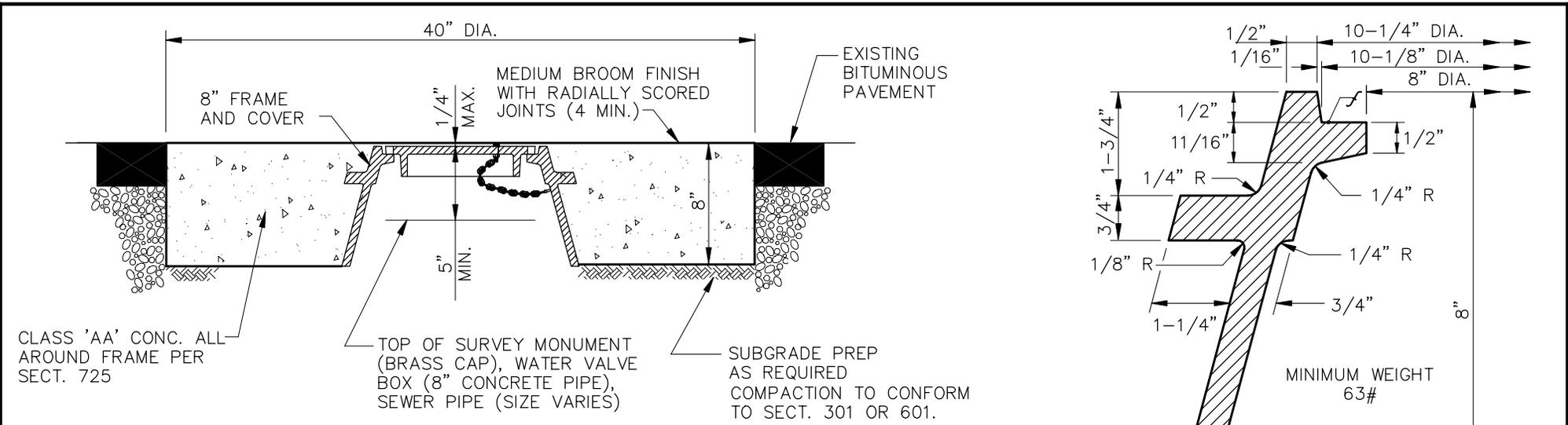
STANDARD DETAIL
ENGLISH

**WING TYPE ALLEY ENTRANCE
(WITH ROLL TYPE CURB AND GUTTER)**

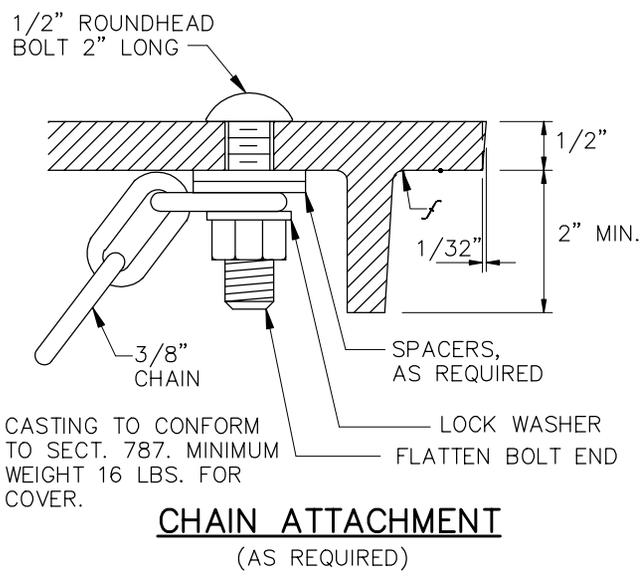
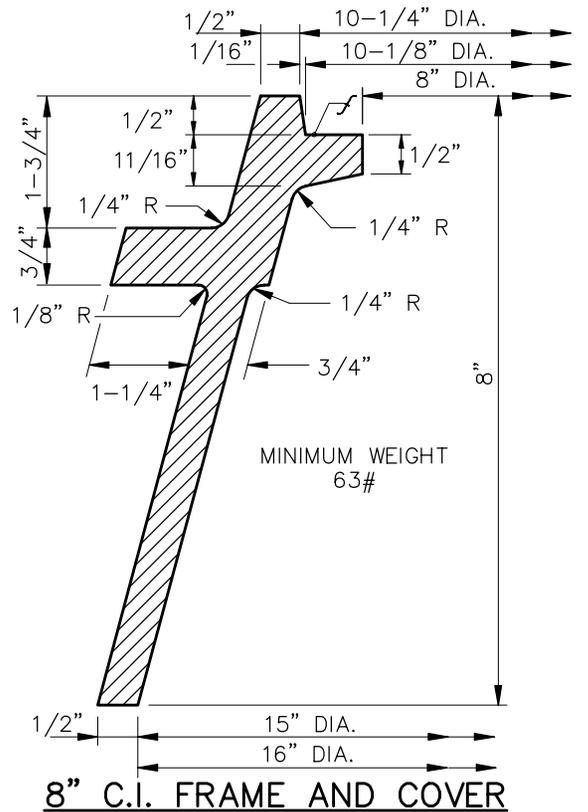
REVISED

DETAIL NO.

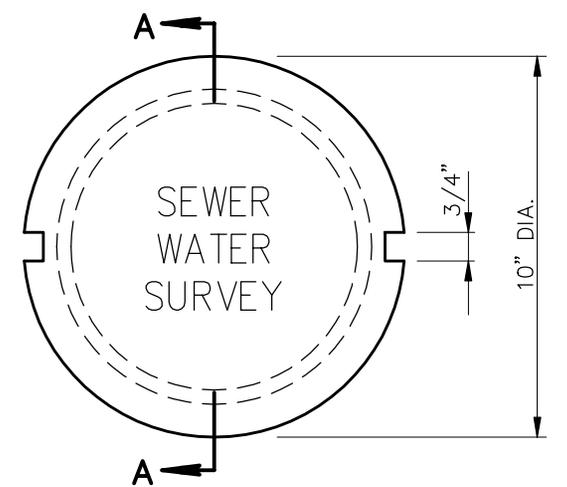
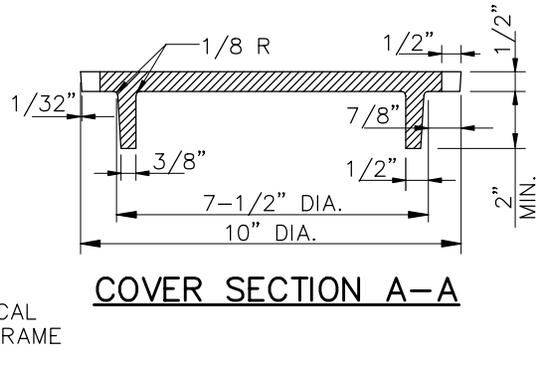
263

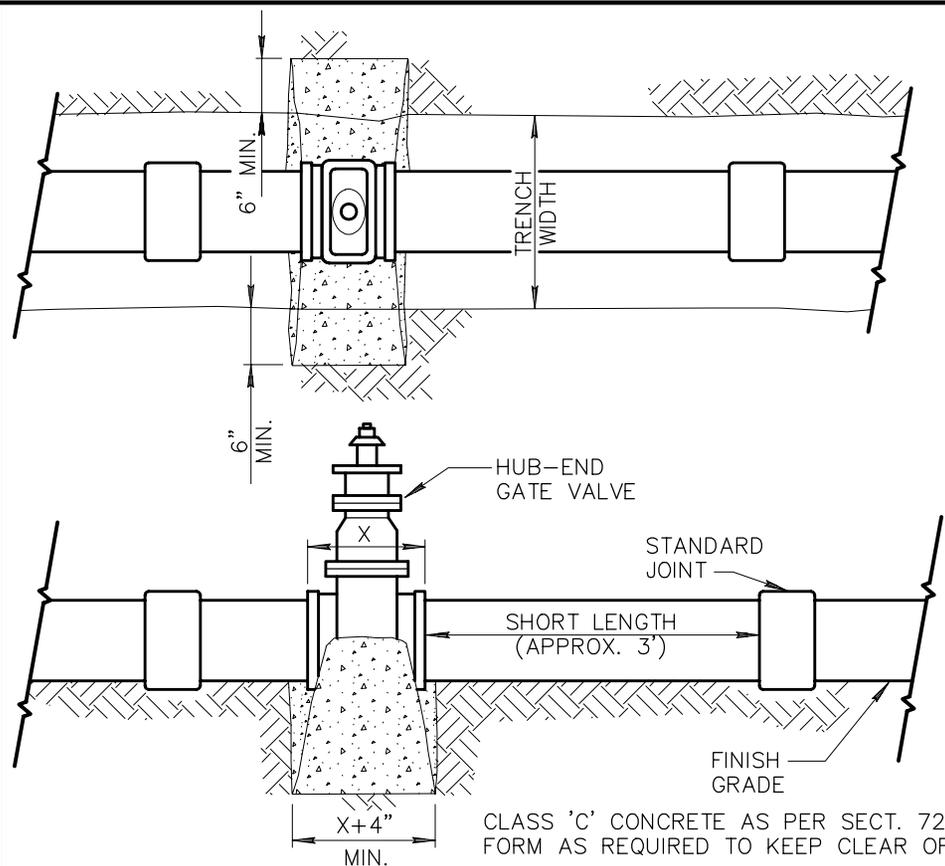


WATER VALVE, SURVEY MONUMENT, OR SEWER CLEAN OUT FRAME & GRADE ADJUSTMENT

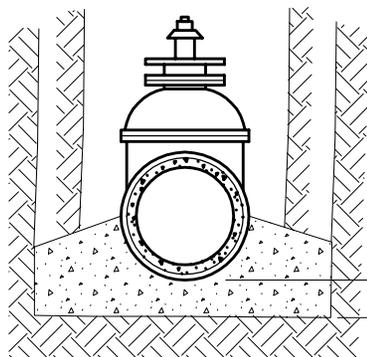
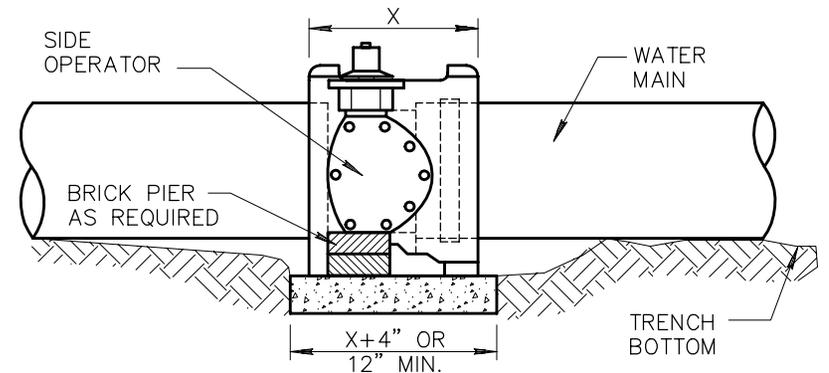
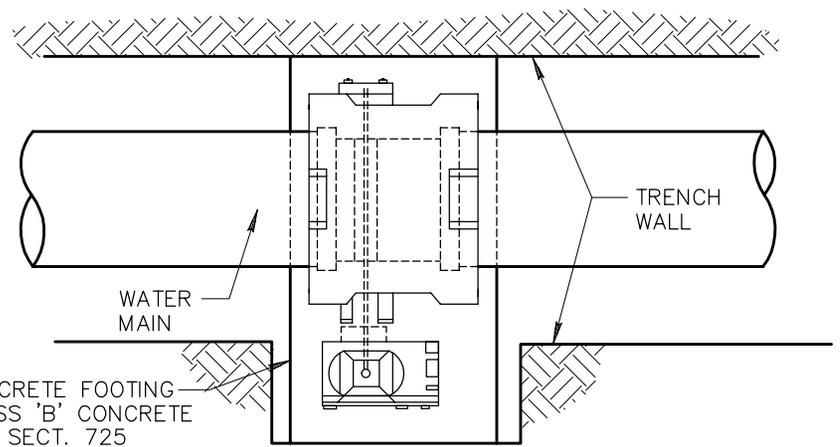


LETTERS ON COVER TO BE AS FOLLOWS:
 "SEWER", "WATER", OR "SURVEY" AS DIRECTED
 TOTAL WIDTH OF WORD "SEWER" OR "WATER"
 3-3/4". TOTAL WIDTH OF WORD "SURVEY"
 4-1/2". LETTER SIZE 5/8" x 3/4", RAISED 1/16"
 ABOVE LEVEL OF COVER, TYPE OF LETTERS
 TO BE SUBMITTED FOR APPROVAL.



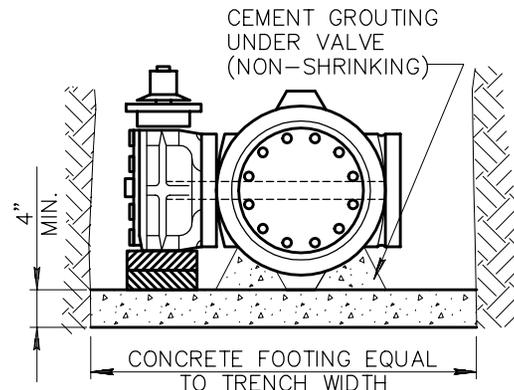


CLASS 'C' CONCRETE AS PER SECT. 725
FORM AS REQUIRED TO KEEP CLEAR OF JOINTS.



NOTE:
THIS DETAIL COVERS WATER GATE VALVES, 4" TO 12" INCLUSIVE REGARDLESS OF TYPE OF PIPE USED. LARGER LINES TO BE DETAILED ON PLANS.

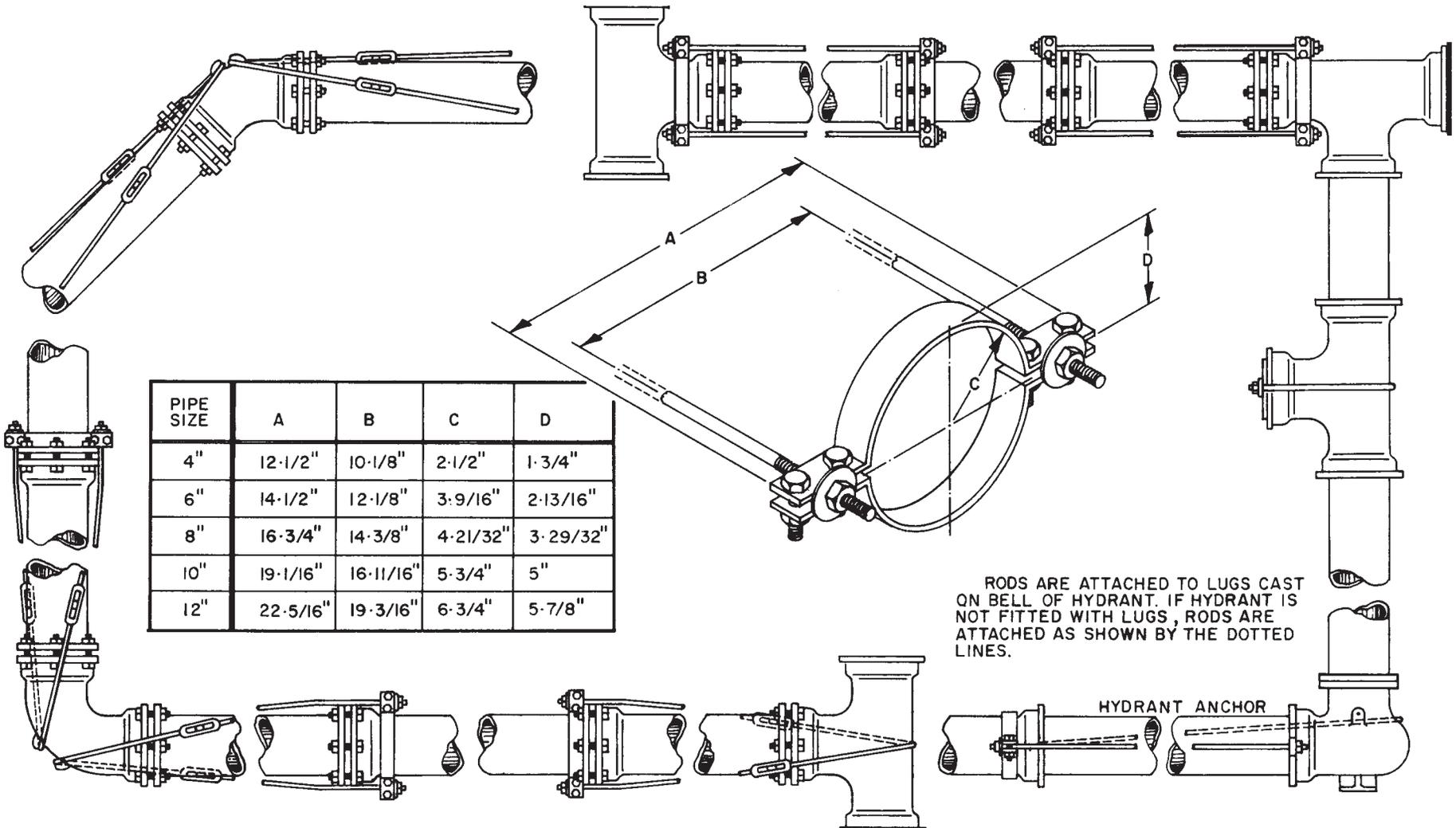
WATER GATE VALVE



BUTTERFLY VALVE

NOTES:

1. THIS DETAIL COVERS BUTTERFLY VALVE INSTALLATION, 3" TO 12" INCLUSIVE, REGARDLESS OF TYPE OF PIPE OR JOINT USED. LARGER LINES TO BE DETAILED ON PLANS.
2. VALVE BOX AND COVER REQUIRED PER DETAILS 270 AND 391.



PIPE SIZE	A	B	C	D
4"	12-1/2"	10-1/8"	2-1/2"	1-3/4"
6"	14-1/2"	12-1/8"	3-9/16"	2-13/16"
8"	16-3/4"	14-3/8"	4-21/32"	3-29/32"
10"	19-1/16"	16-11/16"	5-3/4"	5"
12"	22-5/16"	19-3/16"	6-3/4"	5-7/8"

RODS ARE ATTACHED TO LUGS CAST ON BELL OF HYDRANT. IF HYDRANT IS NOT FITTED WITH LUGS, RODS ARE ATTACHED AS SHOWN BY THE DOTTED LINES.

HYDRANT ANCHOR

THIS DETAIL IS FOR USE ONLY ON UNDERGROUND INSTALLATIONS WHERE THE USE OF CONCRETE THRUST BLOCKING PER DETAIL 380 CANNOT BE USED BECAUSE OF OBSTRUCTIONS, OR REQUIREMENTS OF THE SPECIFICATIONS...

- * CLAMPS SHALL BE 1/2 BY 2 INCHES FOR PIPE 4 AND 6 INCHES IN DIAMETER; 5/8 BY 2-1/2 INCHES FOR PIPE 8 AND 10 INCHES; 5/8 BY 3 INCHES FOR PIPE 12 INCHES. BOLT HOLES SHALL BE 1/16 INCH IN DIAMETER LARGER THAN BOLTS.
- * RODS SHALL BE 3/4 INCHES IN DIAMETER FOR PIPES 4,6 AND 8 INCHES IN DIAMETER; 7/8 INCHES FOR PIPE 10 INCHES AND 1 INCH IN DIAMETER FOR PIPE 12 INCHES.
- * BOLTS SHALL BE 5/8 INCHES IN DIAMETER FOR PIPE 4, 6 AND 8 INCHES IN DIAMETER; 3/4 INCHES FOR PIPE 10 INCHES AND 7/8 INCHES IN DIAMETER FOR PIPE 12 INCHES
- * WASHERS MAY BE CAST IRON OR STEEL, ROUND OR SQUARE, DIMENSIONS FOR CAST IRON WASHERS ARE 5/8 BY 3 INCHES FOR PIPE 4, 6, 8 AND 10 INCHES IN DIAMETER AND 3/4 BY 3-1/2 INCHES FOR PIPE 12 INCHES. DIMENSIONS FOR STEEL WASHERS ARE 1/2 BY 3 INCHES FOR PIPE 4, 6, 8 AND 10 INCHES IN DIAMETER AND 1/2 BY 3-1/2 INCHES FOR PIPE 12 INCHES IN DIAMETER. HOLES SHALL BE 1/8 INCH LARGER THAN THE RODS.

FOR PIPE LARGER THAN 12 INCHES IN DIAMETER, RESTRAINT DETAILS SHALL BE SUBMITTED FOR APPROVAL PRIOR TO INSTALLATION.

1. ALL TIE RODS, ROD COUPLINGS, TURNBUCKLES, BOLTS AND NUTS FOR THESE JOINTS SHALL BE OF CARBON STEEL EQUIVALENT TO A.S.T.M. A-307, GRADE B, WITH CADMIUM PLATING IN ACCORDANCE WITH A.S.T.M. A-165. EXCEPT THAT THE MIN. THICKNESS OF THE PLATING SHALL BE .0002 OF AN INCH. CADMIUM PLATED BOLTS SHALL HAVE CLASS 2A THREADS AND THE NUTS, ROD COUPLINGS AND TURNBUCKLES SHALL HAVE 2B THREADS.
2. HIGH STRENGTH, HEAT TREATED CAST IRON TEE-HEAD BOLTS WITH HEXAGON NUTS, ALL IN ACCORDANCE WITH THE STRENGTH REQUIREMENTS OF A.W.W.A. C-111, MAY BE USED IN LIEU OF THE CADMIUM PLATED BOLTS AND NUTS.
3. THE SKETCHES IN THIS SERIES OF FIGURES SHOW ACCEPTABLE METHODS OF PROVIDING ANCHORAGE. THERE IS NO PARTICULAR SIGNIFICANCE TO BE ATTACHED TO WHETHER THE SKETCH SHOWS A BELL AND SPIGOT JOINT OR A STANDARD MECHANICAL JOINT. THE ANCHORING PROCEDURE ILLUSTRATED APPLIES IN MOST CASES TO EITHER TYPE OF JOINT. IN SOME CASES, DIMENSIONS OF THE PARTICULAR PIPE OR HUB AND SPACE AVAILABLE FOR WORKING AROUND THE PARTICULAR JOINT WILL INFLUENCE THE CHOICE OF METHODS USED.
4. IN CERTAIN ASSEMBLIES OF RODS AND CLAMPS SHOWN, RODS RUN FROM A LUG ON THE FITTING (OR A CLAMP BEHIND THE HUB OF A BELL) TO A CLAMP AGAINST A FACE OF A BELL. NOTE THAT THIS ARRANGEMENT ANCHORS ONLY ONE JOINT. THE STABILITY OF THE JOINT WHERE THE CLAMP IS AGAINST THE FACE OF THE BELL DEPENDS ON HAVING SOIL ABOVE A RELATIVELY LONG PIECE OF PIPE ON BOTH SIDES OF THE JOINT. CONSEQUENTLY, IF THE DISTANCE BETWEEN THE FIRST AND SECOND JOINTS IS LESS THAN 12 FEET, THE SECOND JOINT SHOWN SHALL BE ANCHORED BY A CLAMP BEHIND THE HUB OF THE BELL AND RODS TO A CLAMP AT THE FACE OF THE NEXT BELL.
5. COATING TYPE: A.H.D. ASPHALTIC PRIMER 719(A). - ALL EXPOSED METAL.

SHEET 2 OF 2

DETAIL NO.

302-2



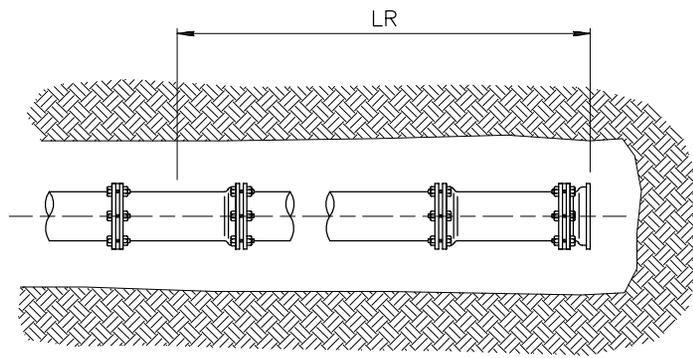
STANDARD DETAIL
ENGLISH

JOINT RESTRAINT WITH TIE RODS

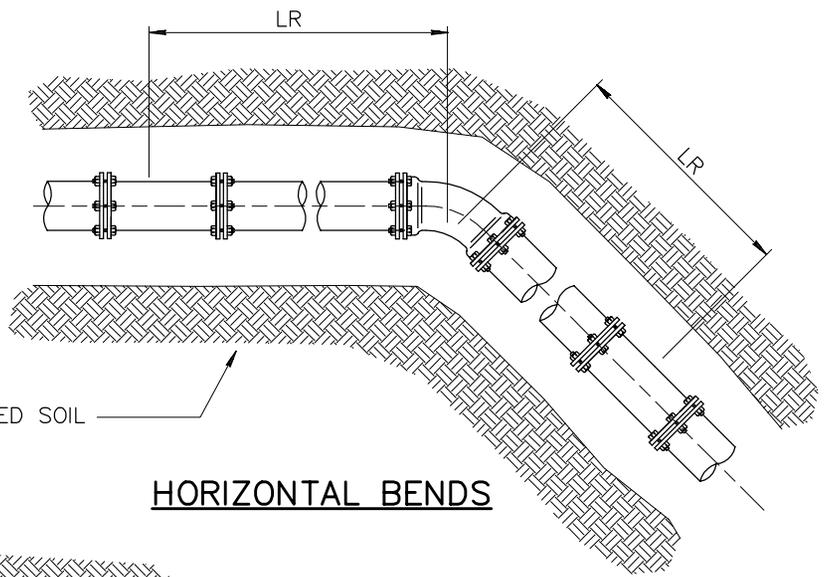
REVISED

DETAIL NO.

302-2

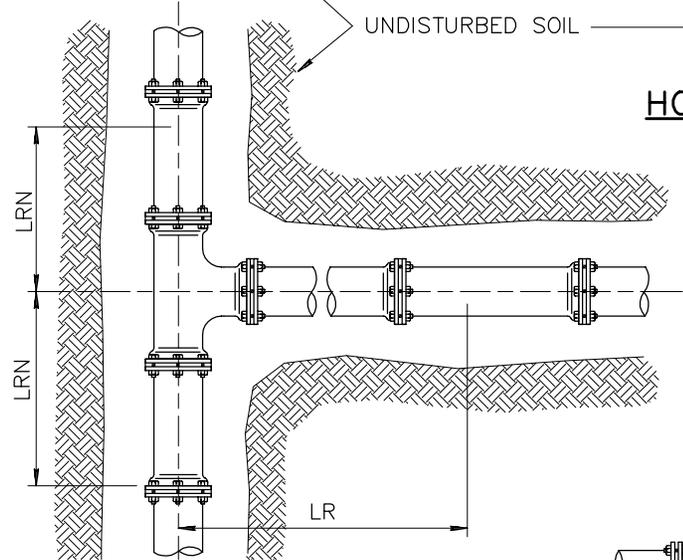


DEAD ENDS

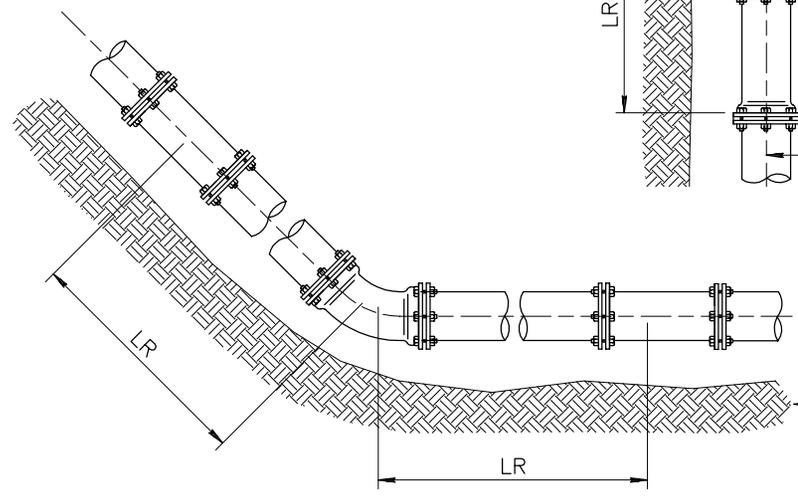


HORIZONTAL BENDS

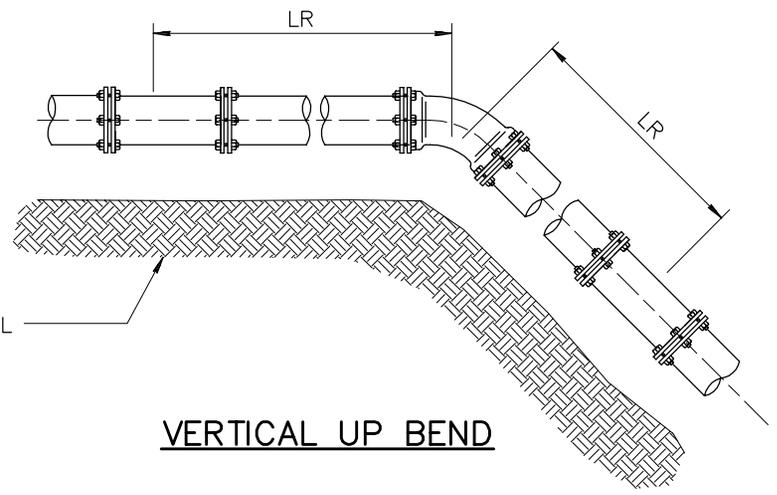
LRN = SHORTEST LENGTH OF PIPE RESTRAINED TO THE RUN OF THE TEE FITTING (BOTH SIDES OF TEE).



TEES



VERTICAL DOWN BENDS



VERTICAL UP BEND

UNDISTURBED SOIL

UNDISTURBED SOIL

RESTRAINED LENGTHS, LR, FOR DUCTILE IRON PIPE

NOMINAL PIPE SIZE INCHES	HORIZONTAL BENDS			TEES		VERTICAL OFFSETS						DEAD ENDS
						90° BEND FITTINGS		45° BEND FITTINGS		22-1/2° BEND FITTINGS		
	90°	45°	22-1/2°	LRN=0'	LRN=10'	DOWN BEND	UP BEND	DOWN BEND	UP BEND	DOWN BEND	UP BEND	
4	18	7	4	30	8	31	18	13	7	6	3	31
6	25	10	5	43	20	44	25	18	10	9	5	44
8	32	13	6	56	34	58	32	24	13	11	6	58
10	38	16	8	68	45	69	38	29	16	14	8	69
12	45	19	9	80	57	81	45	34	19	16	9	81
14	51	21	10	91	68	92	51	38	21	18	10	92
16	57	24	11	103	79	104	57	43	24	21	11	104
18	62	26	12	113	90	115	62	48	26	23	12	115
20	68	28	14	125	100	126	68	52	28	25	14	126
24	79	33	16	145	121	147	79	61	33	29	16	147

RESTRAINED LENGTHS, LR, FOR DUCTILE IRON PIPE WITH POLYETHYLENE WRAP

NOMINAL PIPE SIZE INCHES	HORIZONTAL BENDS			TEES		VERTICAL OFFSETS						DEAD ENDS
						90° BEND FITTINGS		45° BEND FITTINGS		22-1/2° BEND FITTINGS		
	90°	45°	22-1/2°	LRN=0'	LRN=10'	DOWN BEND	UP BEND	DOWN BEND	UP BEND	DOWN BEND	UP BEND	
4	26	11	5	69	18	72	26	30	11	14	5	72
6	36	15	7	99	47	102	36	42	15	20	7	102
8	47	19	9	130	78	133	47	55	19	26	9	133
10	56	23	11	157	103	159	56	66	23	32	11	159
12	65	27	13	185	131	187	65	77	27	37	13	187
14	74	31	15	211	156	214	74	89	31	42	15	214
16	82	34	16	238	183	241	82	100	34	48	16	241
18	90	37	18	263	207	266	90	110	38	53	18	266
20	98	41	20	289	233	292	98	121	41	58	20	292
24	113	47	22	337	280	340	113	141	47	68	22	340

NOTES:

1. ALL JOINTS WITHIN THE SPECIFIED LENGTH LR MUST BE RESTRAINED.
ALL LENGTHS ARE GIVEN IN FEET.
2. THE MAXIMUM TEST PRESSURE SHALL NOT EXCEED 200 PSI
3. THE MINIMUM DEPTH OF BURY SHALL BE 3' TO TOP OF PIPE.
4. RESTRAINED LENGTHS MAY BE REDUCED WHEN SUPPORTED BY ENGINEERING CALCULATIONS.

DETAIL NO.

303-2



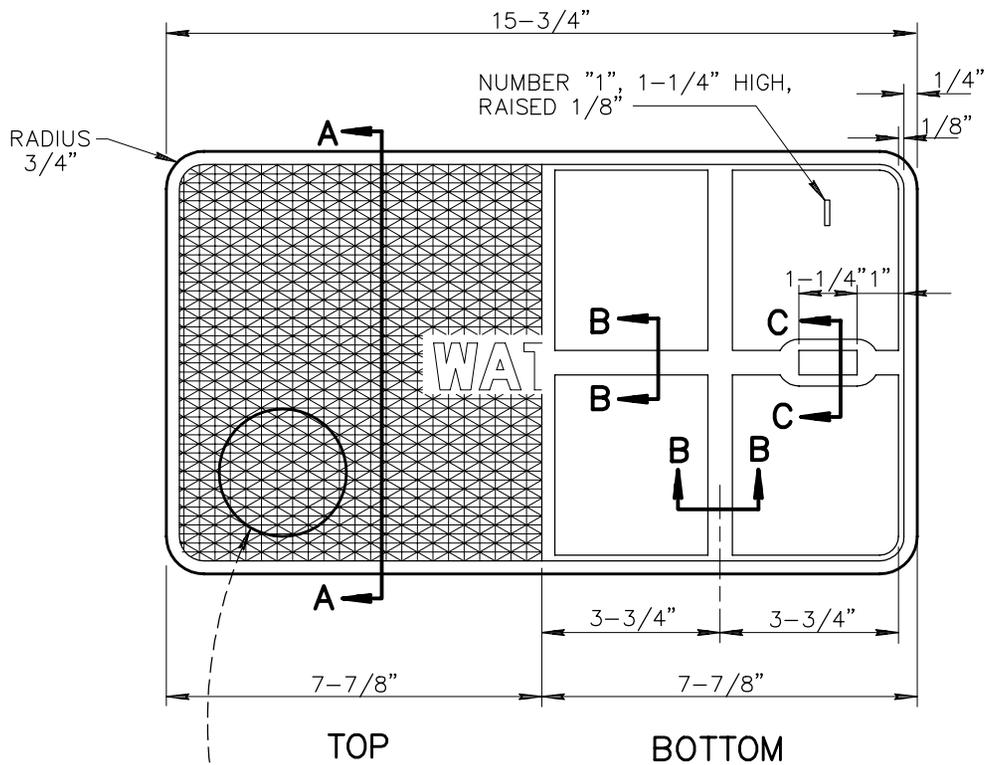
STANDARD DETAIL
ENGLISH

**JOINT RESTRAINT FOR DUCTILE IRON AND
POLYETHYLENE WRAPPED DUCTILE IRON WATER PIPES**

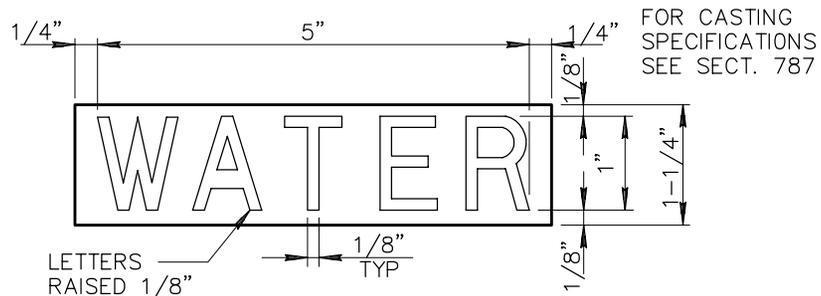
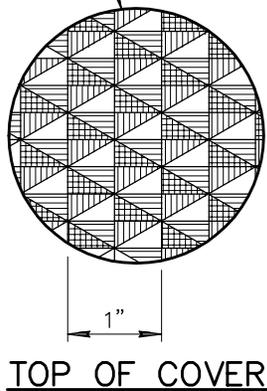
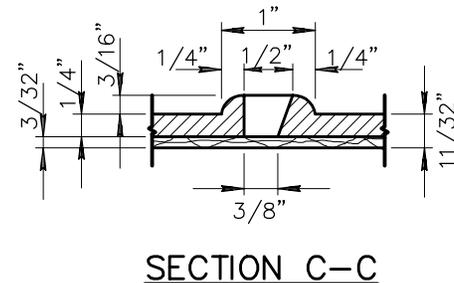
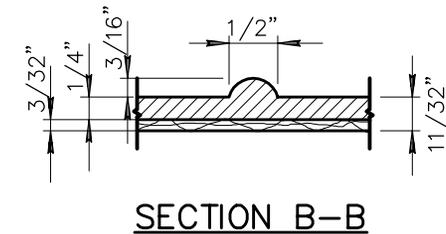
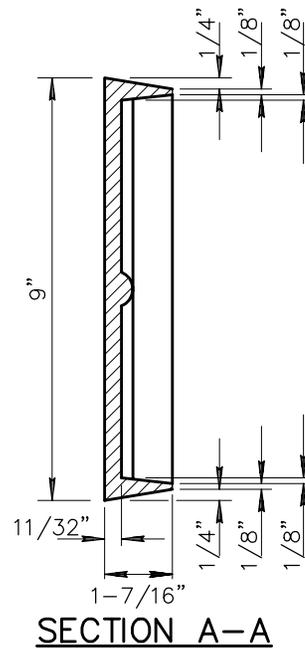
REVISED

DETAIL NO.

303-2



PLAN



DETAIL NO.
310

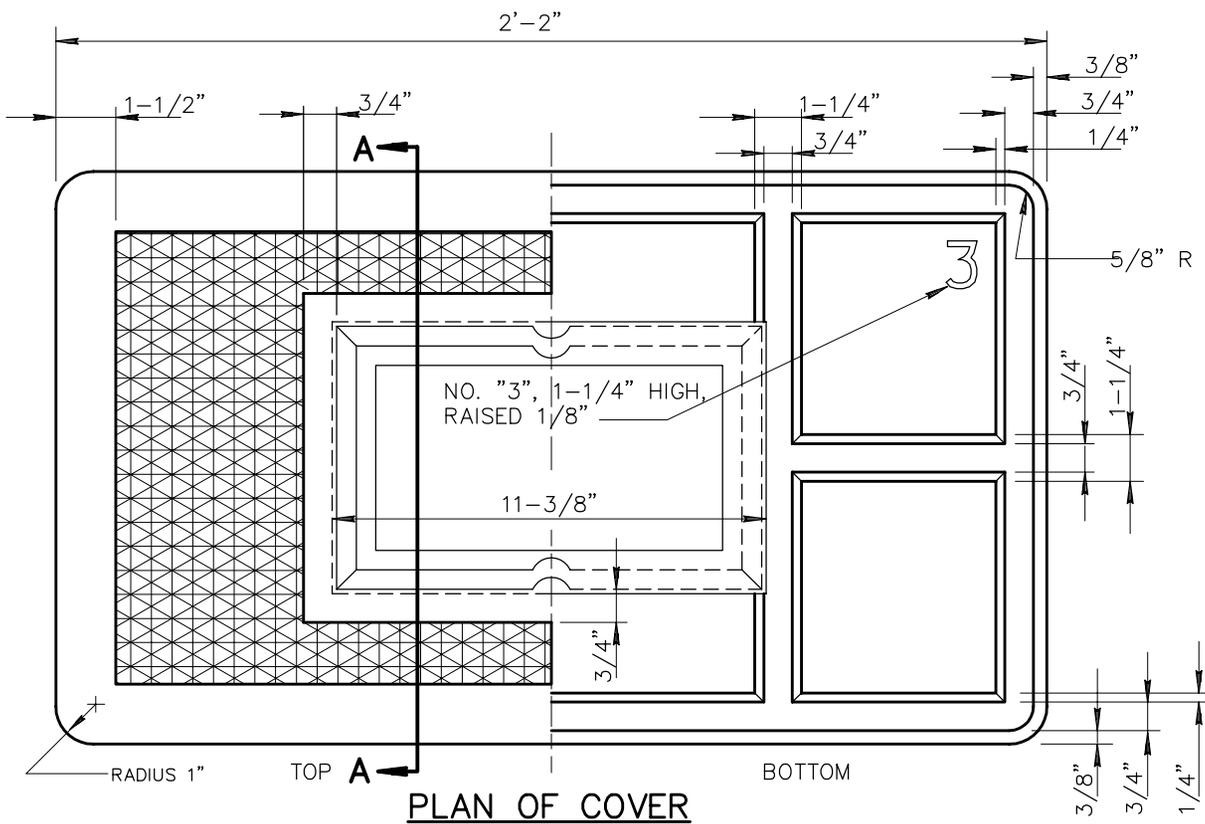


STANDARD DETAIL
ENGLISH

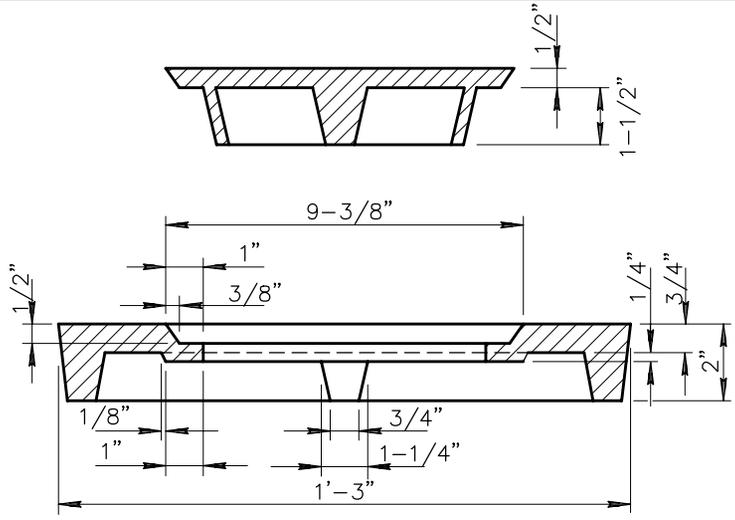
CAST IRON WATER METER BOX
COVER NO. 1

REVISED

DETAIL NO.
310



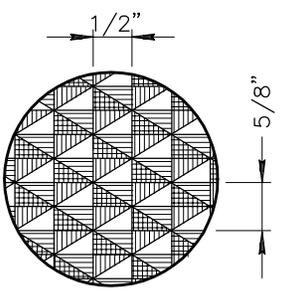
PLAN OF COVER



SECTION A-A

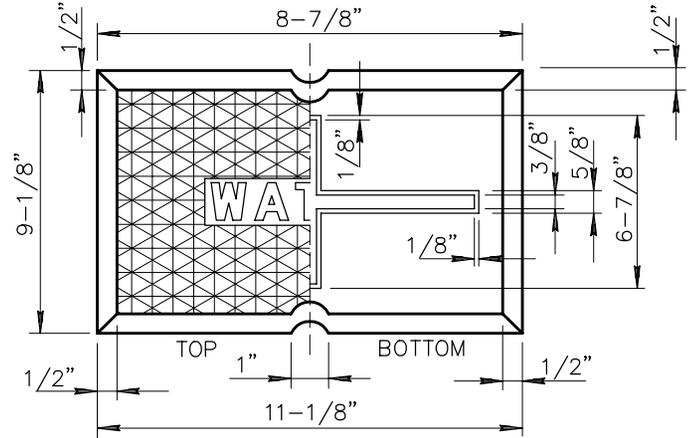
NOTES:

1. INSPECTION PLATE IS SAME AS USED WITH METER BOX COVER NO. 4.
2. FOR CASTING SPECIFICATIONS, SEE SECTION 787.
3. THE BEARING EDGES OF THESE CASTINGS SHALL BE MACHINED TO INSURE A FULL BEARING ON A FLAT SURFACE.

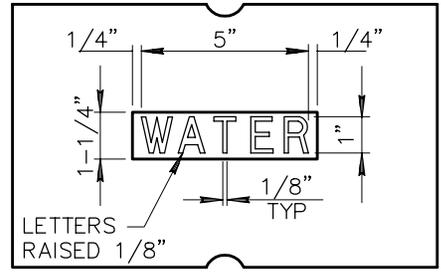


DETAIL

TOP OF COVER & PLATE



INSPECTION PLATE



LETTERING DETAIL

DETAIL NO.
312

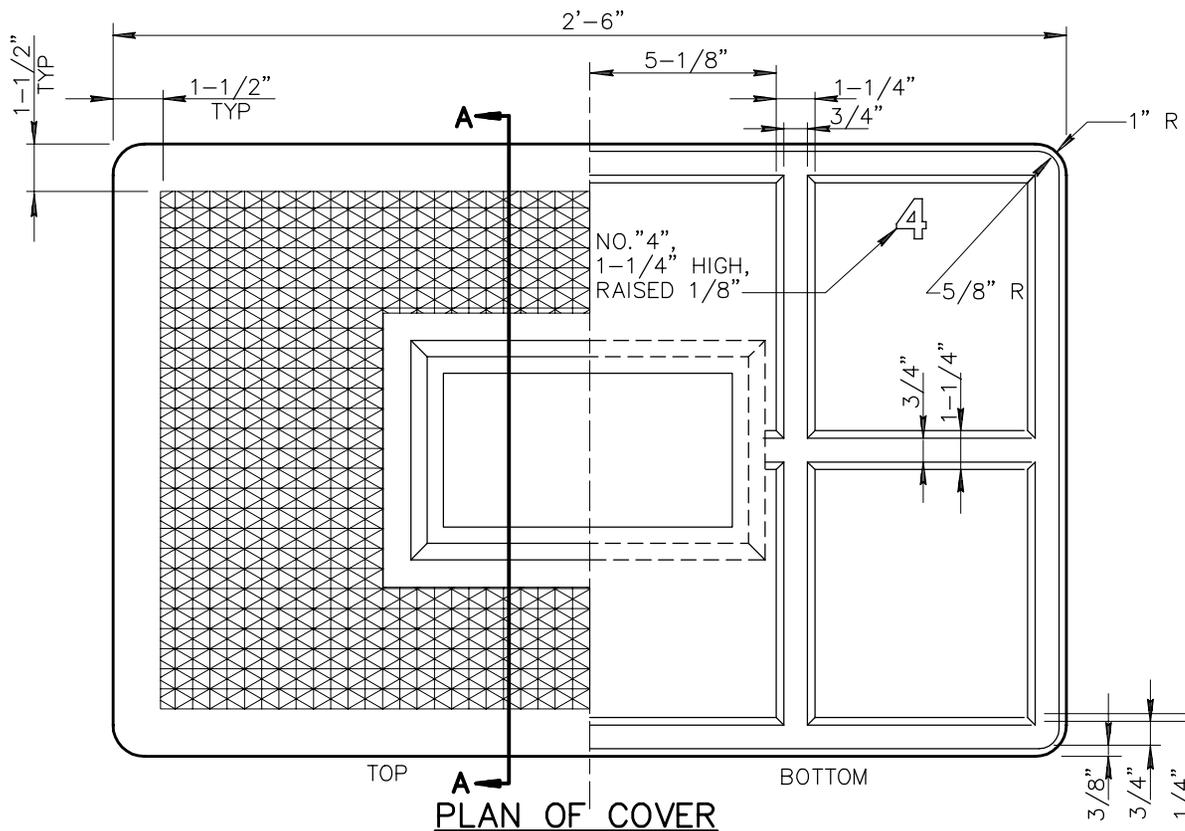


STANDARD DETAIL
ENGLISH

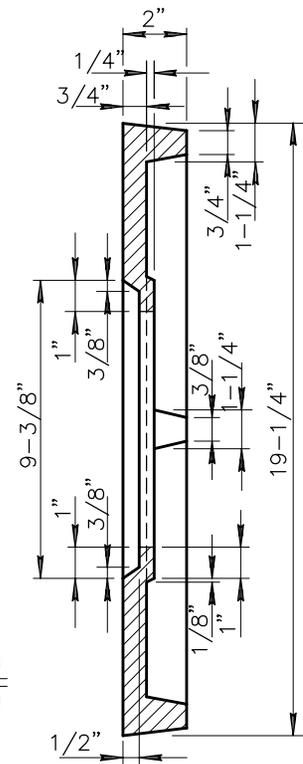
**CAST IRON WATER METER BOX
COVER NO. 3**

REVISED

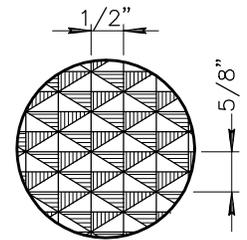
DETAIL NO.
312



PLAN OF COVER



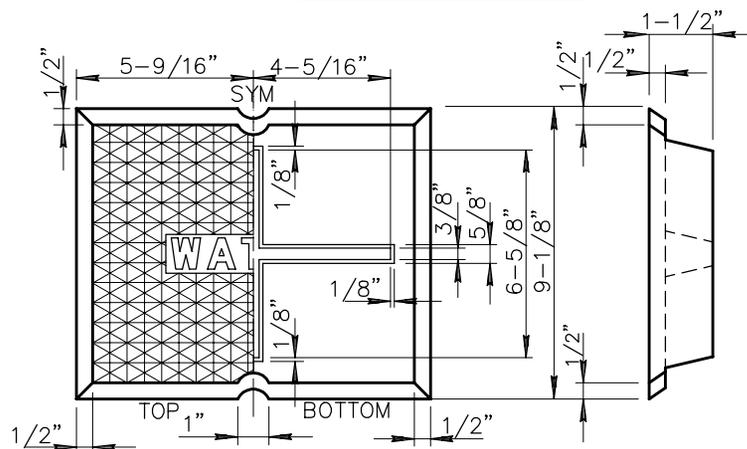
SECTION A-A



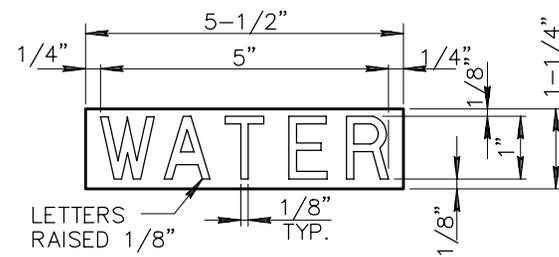
TOP OF COVER

NOTES:

1. FOR CASTING SPECIFICATIONS, SEE SECT. 787. THE BEARING
2. THE BEARING EDGES OF THESE CASTINGS SHALL BE MACHINED TO INSURE A FULL BEARING ON A FLAT SURFACE.



INSPECTION PLATE



LETTERING DETAIL

DETAIL NO.

313



**MARICOPA
ASSOCIATION of
GOVERNMENTS**

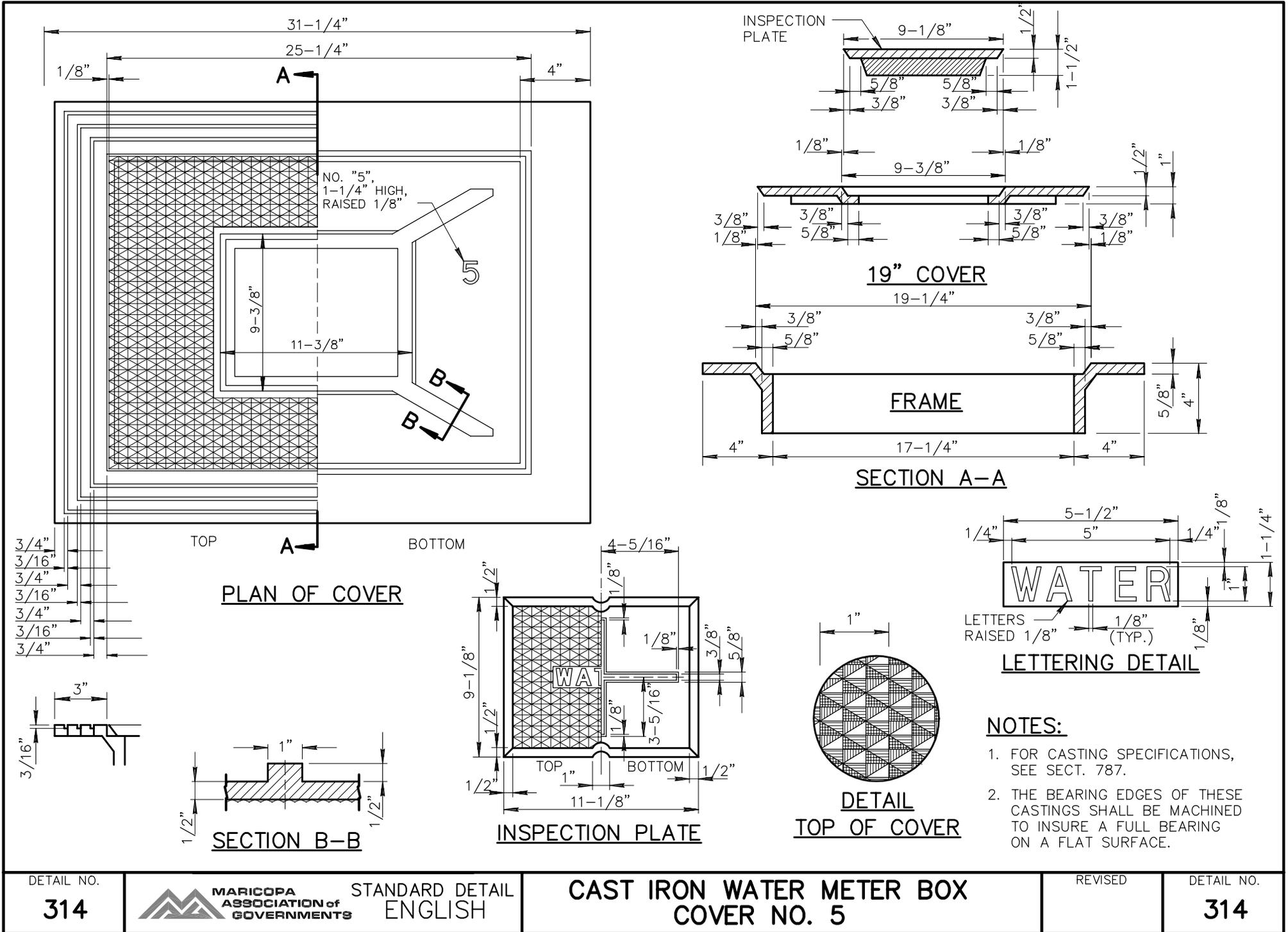
STANDARD DETAIL
ENGLISH

**CAST IRON WATER METER BOX
COVER NO. 4**

REVISED

DETAIL NO.

313



DETAIL NO.

314



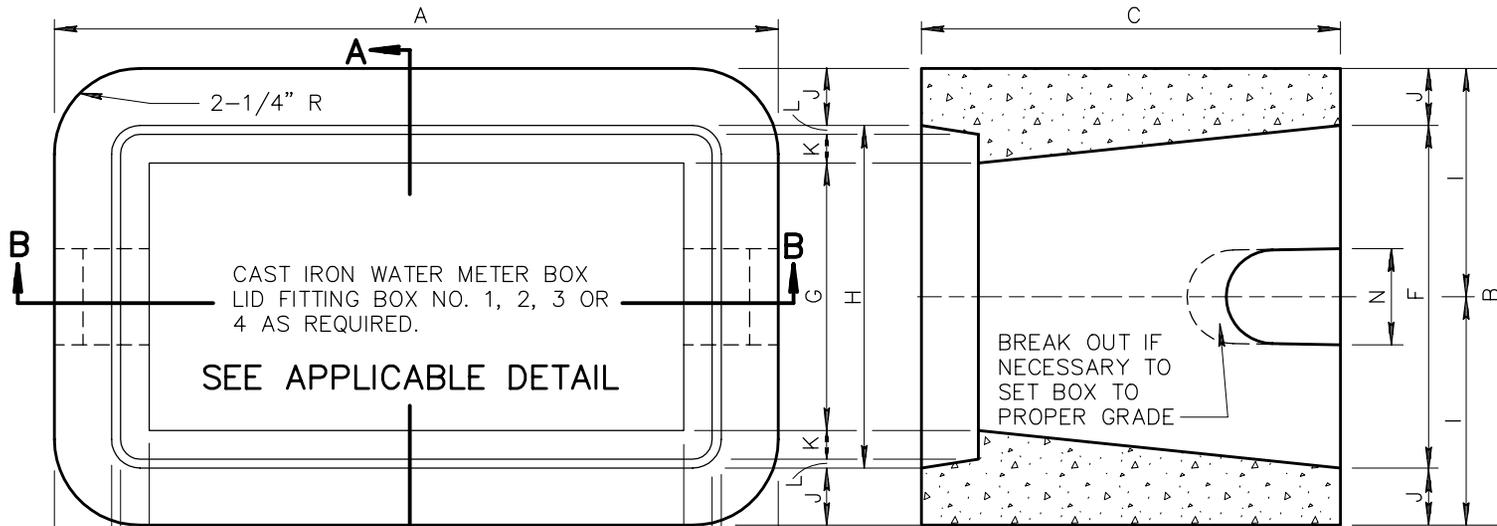
STANDARD DETAIL
ENGLISH

**CAST IRON WATER METER BOX
COVER NO. 5**

REVISED

DETAIL NO.

314

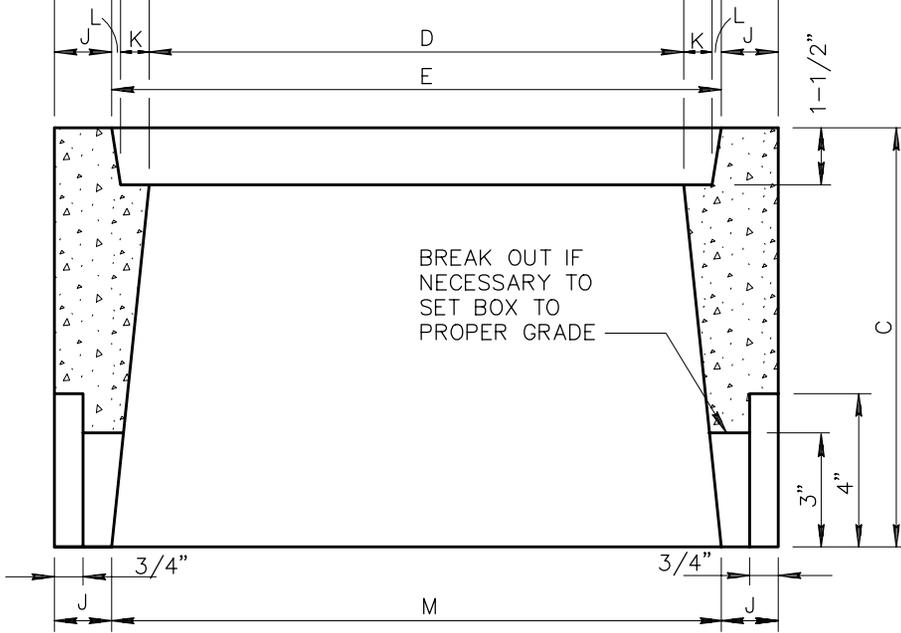


PLAN VIEW

SECTION A-A

NOTES:

1. THE METER BOXES SHALL CONFORM TO THE DIMENSIONS AS SHOWN AND SHALL BE MADE OF PORTLAND CEMENT CONCRETE POURED AND TAMPED (OR VIBRATED) IN TRUE FORMS.
2. USE CLASS 'AA' CONCRETE PER SECT. 725.



SECTION B-B

METER BOX DIMENSIONS				
DIMS	BOX NUMBER			
	1	2	3	4
A	19"	24-1/2"	29-1/2"	33-1/2"
B	12"	16-3/4"	18-1/2"	22-3/4"
C	11"	12"	13"	12"
D	14"	19"	23-3/4"	27-3/4"
E	16"	22"	26-1/2"	30-1/2"
F	9"	13-1/4"	15"	19-3/4"
G	7"	11-1/4"	12-3/4"	17"
H	9"	14-1/4"	15-1/2"	19-3/4"
I	6"	8-3/8"	9-1/4"	11-3/8"
J	1-1/2"	1-3/4"	1-3/4"	1-1/2"
K	3/4"	1-1/8"	1"	1"
L	1/4"	3/8"	3/8"	3/8"
M	16"	21"	25-1/2"	30-1/2"
N	2-1/2"	3-1/2"	4"	4"
	5/8" OR 3/4" METER	1" METER	1-1/2" METER	2" METER

DETAIL NO.

320



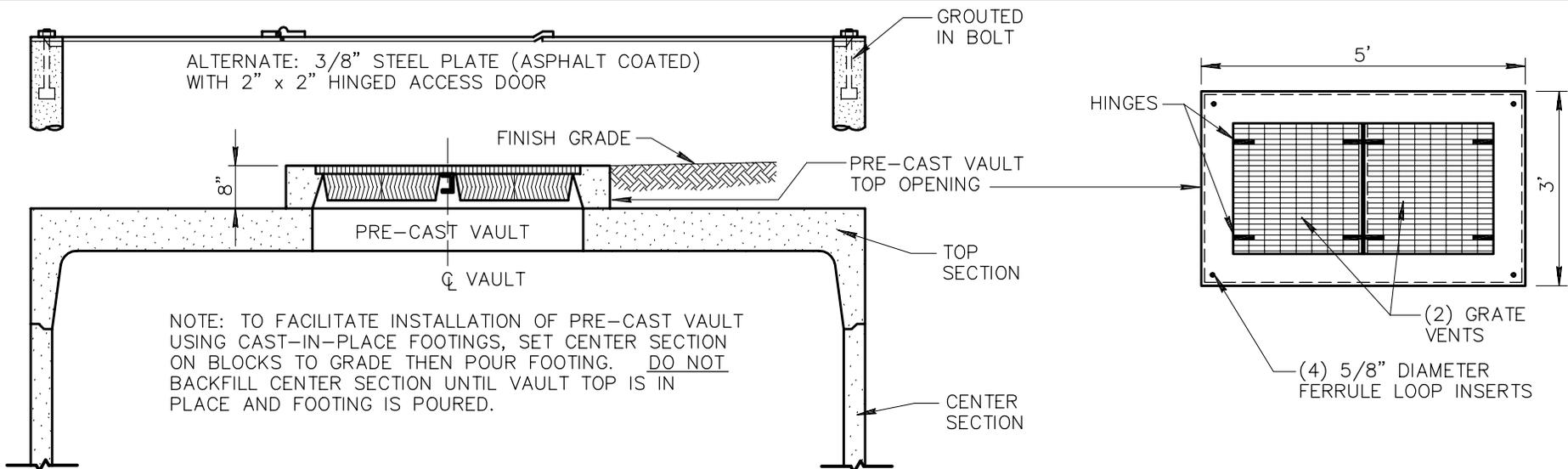
STANDARD DETAIL
ENGLISH

CONCRETE WATER METER BOXES

REVISED

DETAIL NO.

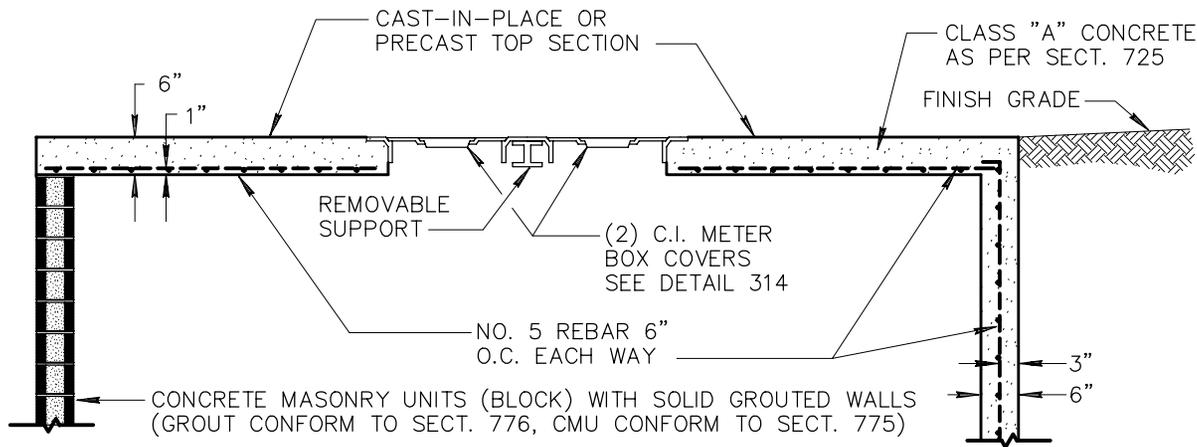
320



NOTE: TO FACILITATE INSTALLATION OF PRE-CAST VAULT USING CAST-IN-PLACE FOOTINGS, SET CENTER SECTION ON BLOCKS TO GRADE THEN POUR FOOTING. DO NOT BACKFILL CENTER SECTION UNTIL VAULT TOP IS IN PLACE AND FOOTING IS POURED.

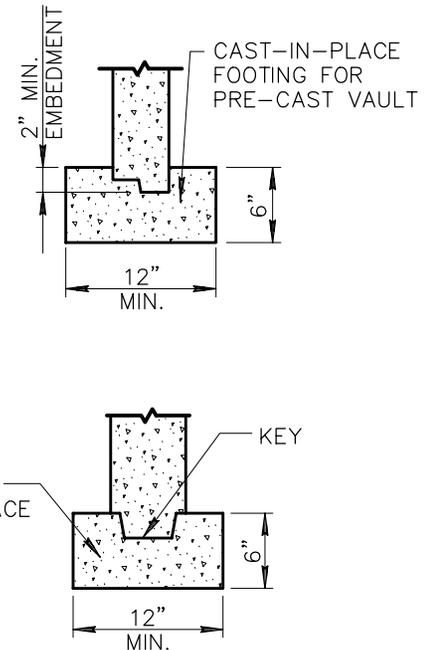
PRE-CAST VAULT SECTION

NOTE: PRECAST REINFORCED VAULT SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND DETAILS AS APPROVED BY ENGINEER.



BLOCK MASONRY MAY BE USED IN LIEU OF CAST-IN-PLACE VAULT WALLS, NO. 4 REBAR IN EVERY OTHER CORE.

CAST-IN-PLACE VAULT SECTION



DETAIL NO.

321



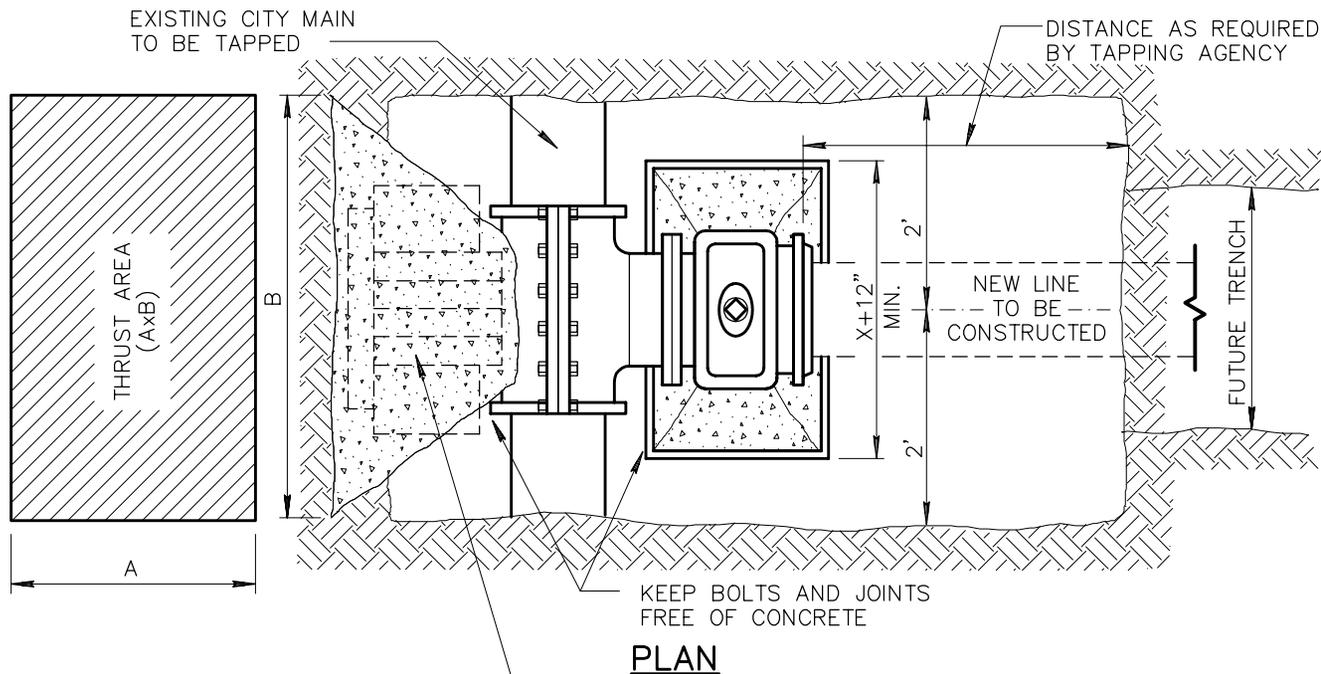
STANDARD DETAIL
ENGLISH

STANDARD WATER METER VAULT

REVISED

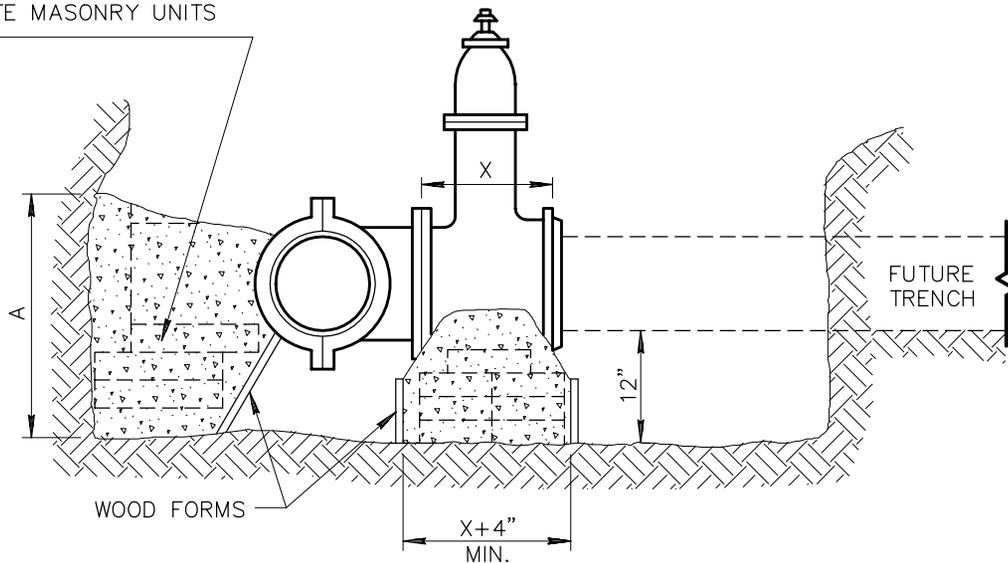
DETAIL NO.

321



PLAN

OPTIONAL BLOCKING - 2" x 8" x 12" SOLID CONCRETE MASONRY UNITS AS INDICATED.



ELEVATION

NOTES:

1. TAPPING SLEEVE TO BE PLACED A MINIMUM OF 8" FROM ANY BELL COUPLING, VALVE, FITTING OR OTHER OBSTRUCTION
2. CONTRACTOR SHALL EXCAVATE AS SHOWN AND SHALL SET TAPPING SLEEVE AND VALVE AND TIGHTEN ALL BOLTS PRIOR TO THE PRESSURE TEST.
3. ALL TAPPING SLEEVES AND VALVES MUST BE PRESSURE TESTED PRIOR TO BLOCKING OR TAPPING. THE TEST MUST BE WITNESSED AND APPROVED BY THE INSPECTOR.
4. BLOCKS ARE TO EXTEND TO UNDISTURBED GROUND AND BE INSTALLED BEFORE THE TAP IS MADE. ALL FLANGE BOLTS SHALL BE FREE AND CLEAR OF CONCRETE.
5. CONCRETE THRUST BLOCKS SHALL BE CLASS 'B' PER SECT. 725. NORMALLY, CURE TIME FOR CONCRETE IS 24 HOURS BEFORE BACKFILLING.
6. TAPS SHALL BE MADE BY CITY CREWS AT PREVAILING RATES OR BY APPROVED CONTRACTORS WHEN ALLOWED BY AGENCY.
7. THIS DETAIL COVERS TAPPING SLEEVES 4" THROUGH 16" IN SIZE ON DUCTILE IRON, CAST IRON AND ASBESTOS CEMENT PIPE. ANY OTHER SIZE OR TYPE OF PIPE WILL REQUIRE A SEPARATE SUBMITTAL AND APPROVAL BY THE ENGINEER.

SIZE OF PIPE BEING CONNECTED	MINIMUM THRUST AREA REQUIRED EQUALS (AxB) (SQURE FEET)
4" AND LESS	3
6"	4
8"	6
10"	9
12"	13
16"	23

DETAIL NO.

340



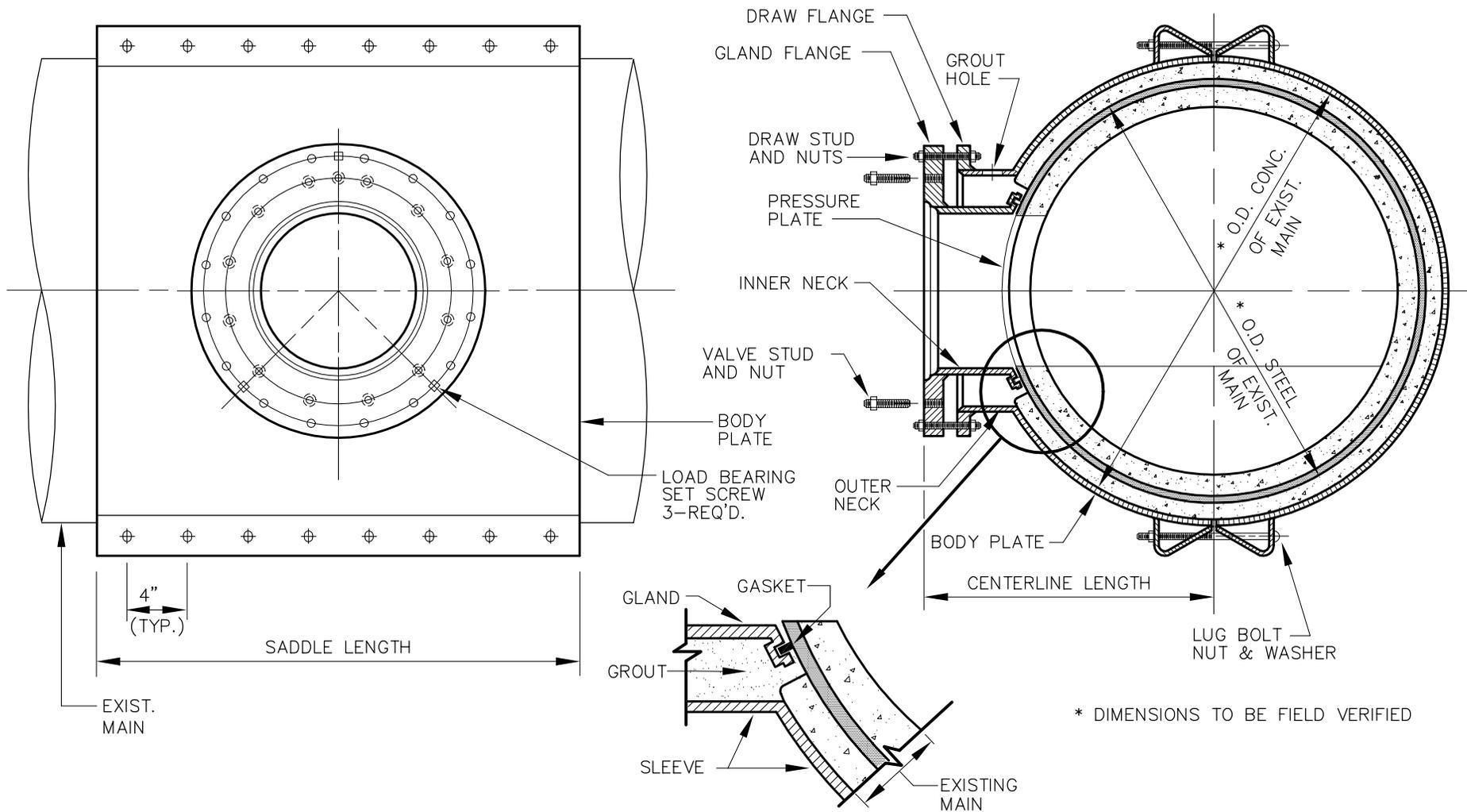
STANDARD DETAIL
ENGLISH

**INSTALLING TAPPING
SLEEVES AND VALVES**

REVISED

DETAIL NO.

340



DETAIL NO.

342



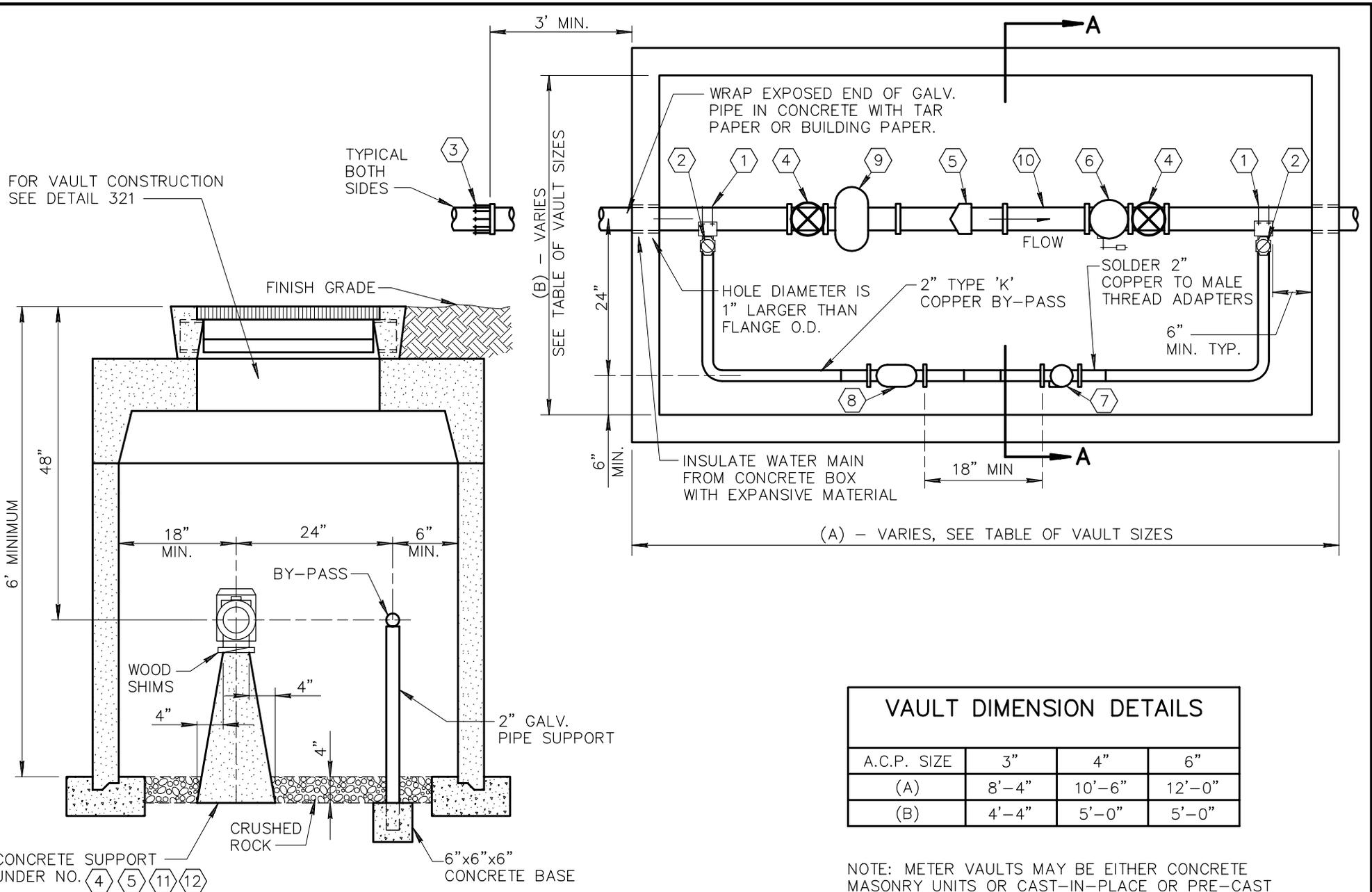
STANDARD DETAIL
ENGLISH

CONCRETE PRESSURE PIPE
TAPPING SLEEVE

REVISED

DETAIL NO.

342



FOR VAULT CONSTRUCTION
SEE DETAIL 321

TYPICAL
BOTH
SIDES

FINISH GRADE

6' MINIMUM
48"

18" MIN. 24" 6" MIN.

BY-PASS

WOOD
SHIMS

4" 4"

2" GALV.
PIPE SUPPORT

CRUSHED
ROCK

6" x 6" x 6"
CONCRETE BASE

CONCRETE SUPPORT
UNDER NO. 4 5 11 12

SECTION A-A

3' MIN.
(B) - VARIES
SEE TABLE OF VAULT SIZES
24"
6" MIN.
18" MIN.

WRAP EXPOSED END OF GALV.
PIPE IN CONCRETE WITH TAR
PAPER OR BUILDING PAPER.

HOLE DIAMETER IS
1" LARGER THAN
FLANGE O.D.
2" TYPE 'K'
COPPER BY-PASS
SOLDER 2"
COPPER TO MALE
THREAD ADAPTERS
6" MIN. TYP.

INSULATE WATER MAIN
FROM CONCRETE BOX
WITH EXPANSIVE MATERIAL

(A) - VARIES, SEE TABLE OF VAULT SIZES

VAULT DIMENSION DETAILS			
A.C.P. SIZE	3"	4"	6"
(A)	8'-4"	10'-6"	12'-0"
(B)	4'-4"	5'-0"	5'-0"

NOTE: METER VAULTS MAY BE EITHER CONCRETE
MASONRY UNITS OR CAST-IN-PLACE OR PRE-CAST
CONCRETE, SEE DETAIL 321 FOR VAULT
CONSTRUCTION.

DETAIL NO.
345-1



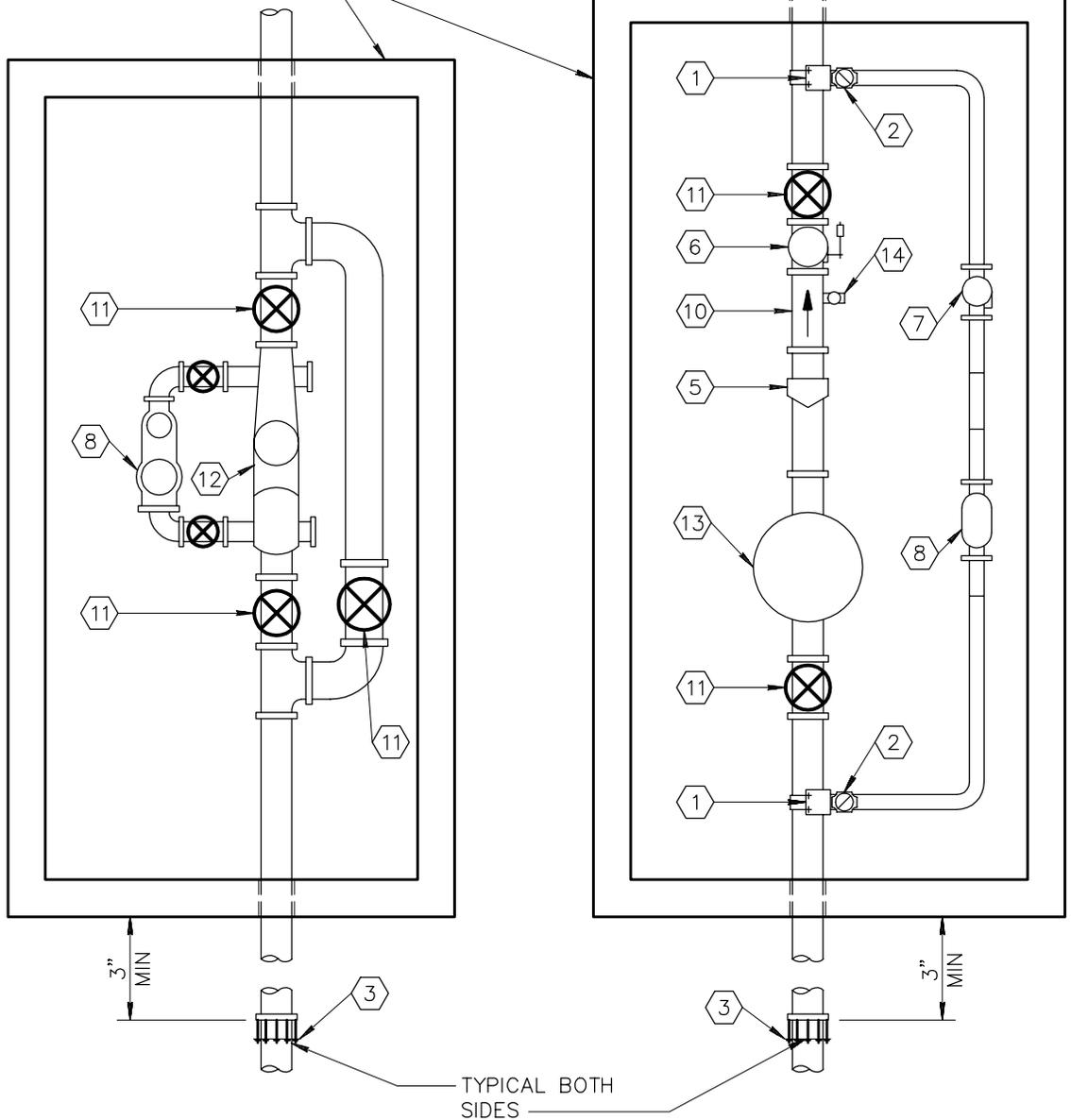
STANDARD DETAIL
ENGLISH

3", 4", 6" WATER METER

REVISED

DETAIL NO.
345-1

FOR VAULT CONSTRUCTION
SEE DETAIL 321



LEGEND

- ① DOUBLE STRAP ALL BRONZE SERVICE SADDLES.
- ② CORP. STOP, 2" (BALL TYPE).
- ③ ADAPTER, FLANGED, TO MECH. JOINT FOR A.C.P.
- ④ GATE VALVE, FLANGED, WITH HAND WHEEL, OPEN LEFT.
- ⑤ TURBOMETER: ROCKWELL SERIES 'W' OR HERSEY SERIES 'M.H.R.' OR NEPTUNE TRIDENT TURBINE.
- ⑥ FLANGED SWING CHECK VALVE WITH EXTERNAL LEVER AND WEIGHT.
- ⑦ 2" BRONZE CHECK VALVE.
- ⑧ 2" TURBOMETER: ROCKWELL 'W-160' OR HERSEY 'M.H.R.' OR NEPTUNE TRIDENT TURBINE.
- ⑨ STRAINER (3", 4", 6") AVAILABLE FROM METER MANUFACTURER, INSTALL ONLY WHEN 'TURBO' IS USED.
- ⑩ FLANGED SPOOL (3 PIPE DIAMETERS IN LENGTH).
- ⑪ O.S.&Y. GATE VALVE, FLANGED WITH HAND WHEEL OPEN LEFT, AND RISING STEM.
- ⑫ TURBOMETER U.L. APPROVED: ROCKWELL W-5000 DR. OR W-2000 DR. OR HERSEY F.M.-C.T. OR NEPTUNE TURBINE-F.S.-U.L.
- ⑬ 6" OR 10" STRAINER, U.L. APPROVED.
- ⑭ 2" THREADED OUTLET AND GATE VALVE.

NOTES

1. FOR LARGER METERS, SPECIAL VAULT DESIGN IS REQUIRED.
2. USE OF REMOTE READING DEVICE AT OPTION OF UTILITIY.
3. CERTAIN AGENCIES AND/OR UTILITIES PREFER TO CONSTRUCT VAULT, CONTACT AGENCY INVOLVED PRIOR TO VAULT CONSTRUCTION.

DETAIL NO.
345-2

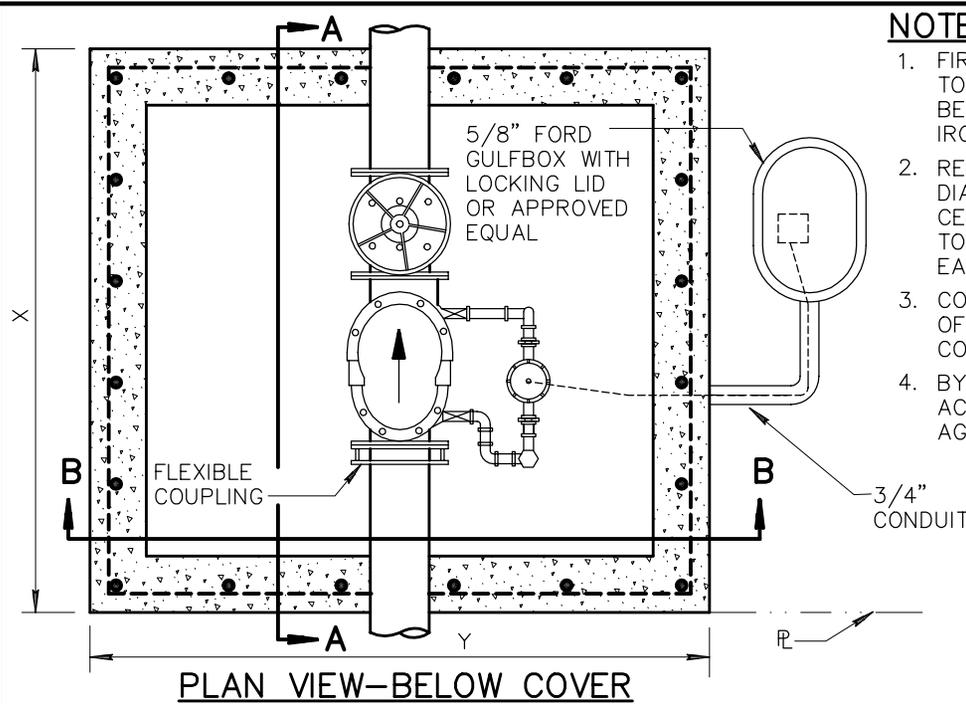


STANDARD DETAIL
ENGLISH

**4", 6" WATER METER
WITH ON-SITE FIRE HYDRANTS**

REVISED

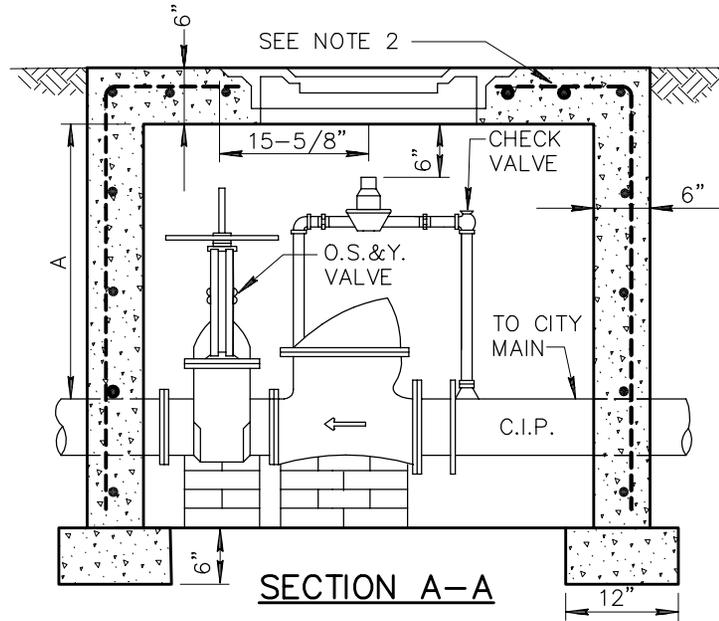
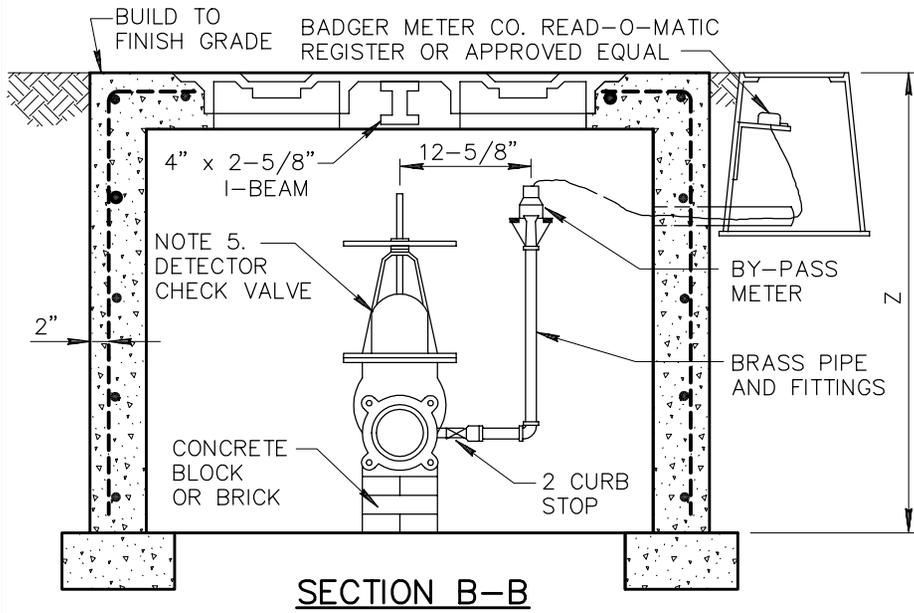
DETAIL NO.
345-2



NOTES:

1. FIRELINE FROM CITY MAIN TO PROPERTY LINE SHALL BE CONSTRUCTED OF CAST IRON PIPE.
2. REINFORCING TO BE 1/2" DIAMETER REBAR ON 6" CENTERS EACH WAY ON TOP AND 12" CENTERS EACH WAY ON THE SIDES.
3. COVERS TO CONSIST OF TWO METER BOX COVERS DET. 314.
4. BY-PASS METER TO BE ACCORDING TO GOVERNING AGENCY.
5. CHECK VALVE TO BE GLOBE MODEL "A" GRINNEL, HERSEY MODEL D.C., VIKING MODEL "A" OR APPROVED EQUAL.
6. VAULT SHALL BE CONSTRUCTED IN OWNERS PROPERTY AGAINST THE FRONT PROPERTY LINE OR ANOTHER APPROVED LOCATION. WALLS AND FENCES SHALL NOT OBSTRUCT ACCESS.
7. CITY CONTROL VALVE TO BE REQUIRED AT MAIN.
8. PARTS OF PIPE TO BE EMBEDDED IN CONC. SHALL BE WRAPPED WITH 30 LB ASPHALT ROOFING FELT.
9. REMOTE READING DEVICE SHALL BE OF SELF GENERATING ELECTRICAL TYPE. HYDRAULIC OR MECHANICAL DRIVE REGISTERS WILL NOT BE ACCEPTABLE.
10. CONCRETE TO BE CLASS 'B' PER SECT. 725.

DIA. OF PIPE	X	Y	Z	BY-PASS METER SIZE	A
4"	60"	66"	49"	5/8" x 3/4"	30"
6"	66"	72"	49"	5/8" x 3/4"	30"
8"	72"	72"	58"	1"	36"
10"	78"	72"	69"	1-1/2"	36"



DETAIL NO.

346



STANDARD DETAIL
ENGLISH

FIRE LINE DETECTOR CHECK VAULT

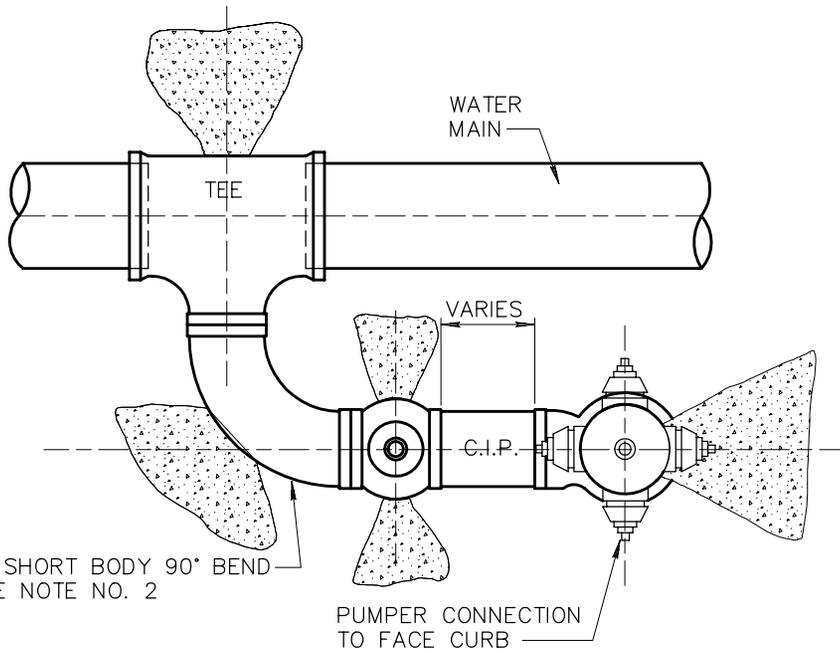
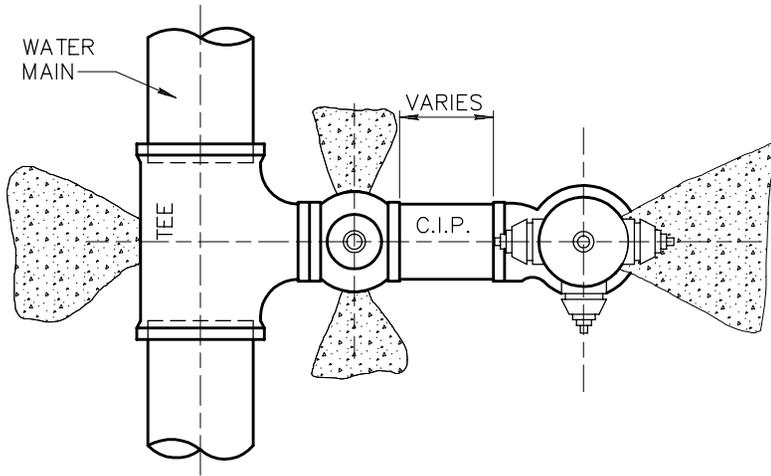
REVISED

DETAIL NO.

346

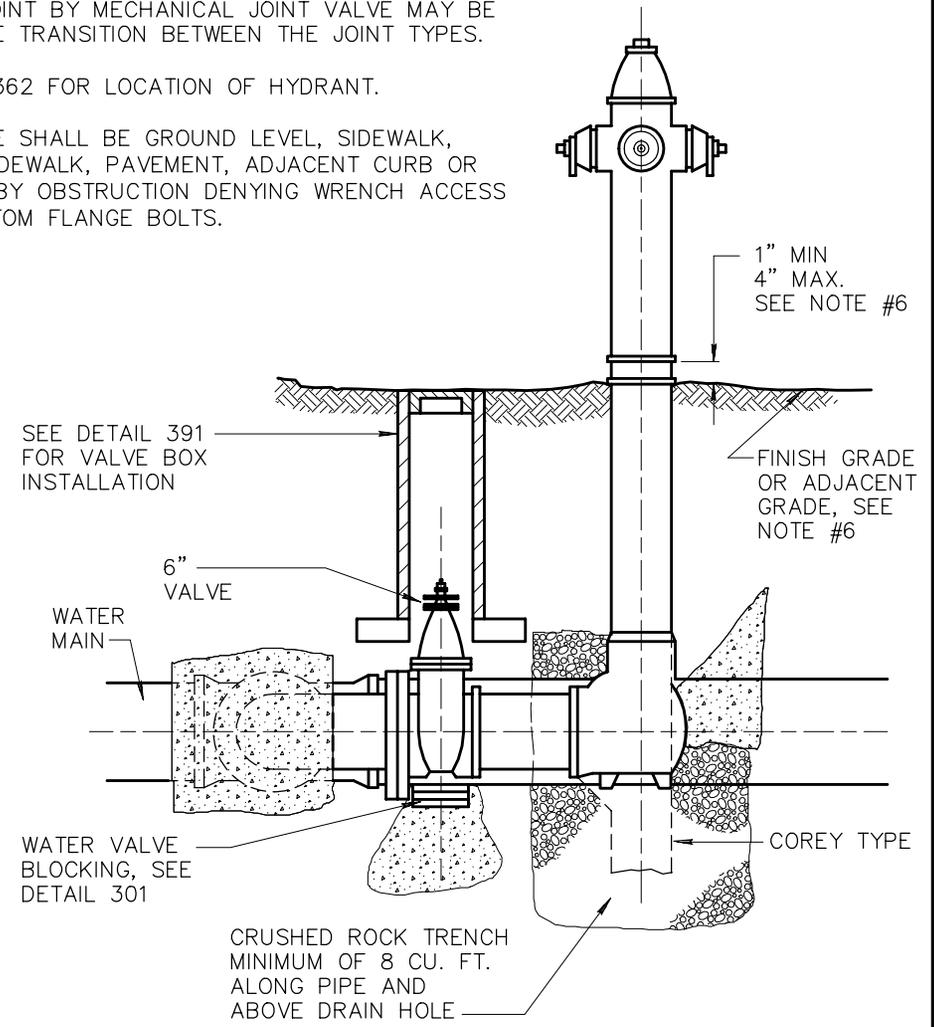
NOTES:

1. JOINTS BETWEEN THE VALVE AND THE MAIN SHALL BE FLANGED TYPE. JOINTS BETWEEN THE VALVE AND HYDRANT SHALL BE RESTRAINT OR MECHANICAL TYPE.
2. 90° BEND NOT REQUIRED IF SUFFICIENT ROOM FOR PERPENDICULAR INSTALLATION.
3. FOR CONCRETE THRUST BLOCKS, SEE DETAIL 380.
4. A FLANGE JOINT BY MECHANICAL JOINT VALVE MAY BE USED AS THE TRANSITION BETWEEN THE JOINT TYPES.
5. SEE DETAIL 362 FOR LOCATION OF HYDRANT.
6. FINISH GRADE SHALL BE GROUND LEVEL, SIDEWALK, ADJACENT SIDEWALK, PAVEMENT, ADJACENT CURB OR OTHER NEARBY OBSTRUCTION DENYING WRENCH ACCESS TO THE BOTTOM FLANGE BOLTS.



6" SHORT BODY 90° BEND
SEE NOTE NO. 2

PUMPER CONNECTION
TO FACE CURB



DETAIL NO.
360



STANDARD DETAIL
ENGLISH

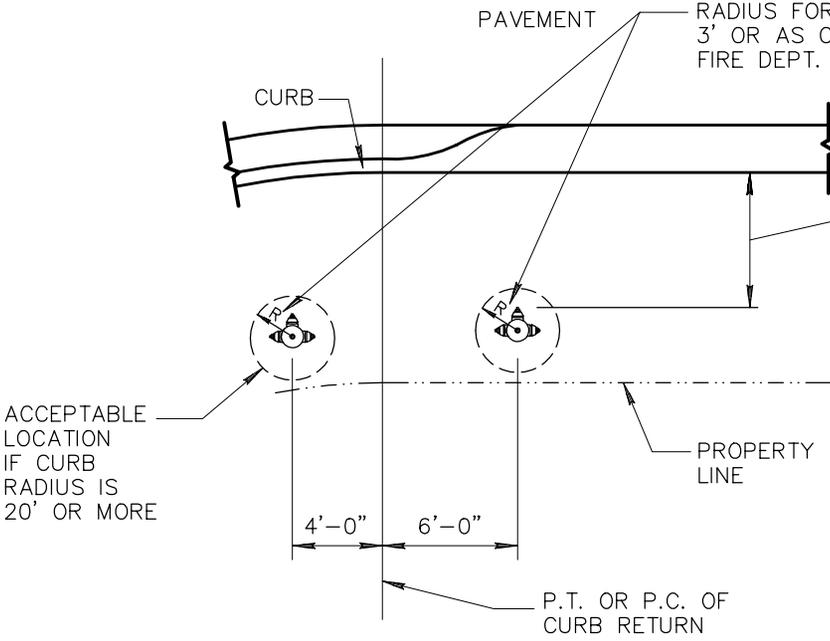
FIRE HYDRANT INSTALLATION

REVISED

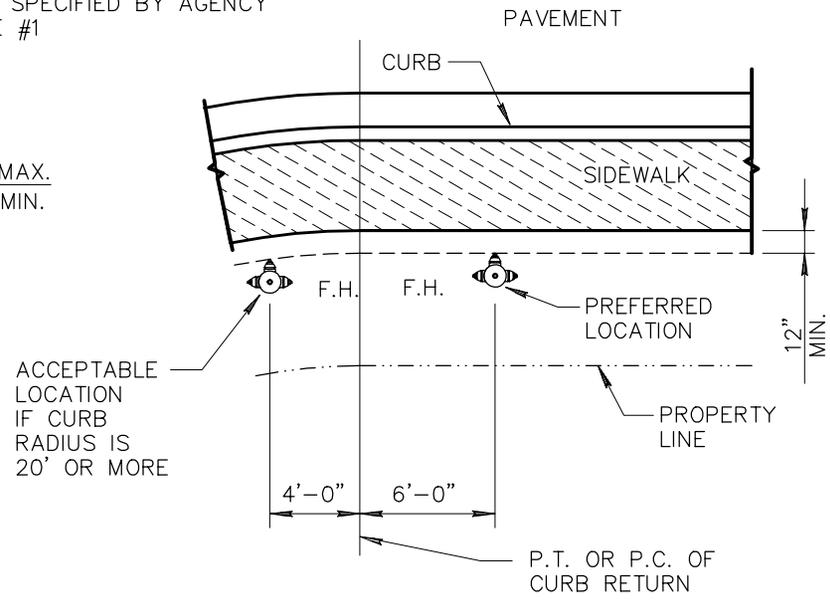
DETAIL NO.
360

NOTES:

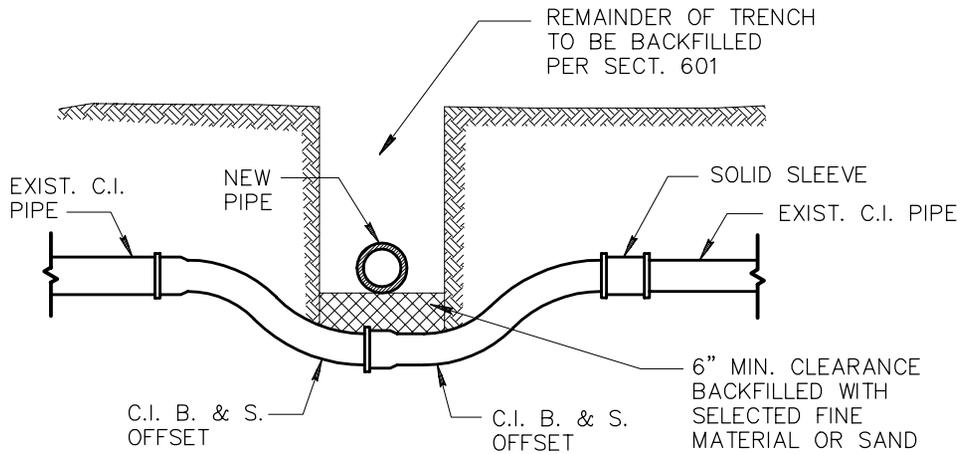
1. OBSTRUCTIONS SUCH AS UTILITY POLES, STREET SIGNS, IRRIGATION BOXES, FENCES, ETC., MUST NOT BE PLACED BETWEEN CURB AND HYDRANT AND WITHIN THE RADIUS FOR FIRE DEPT. ACCESS.
2. DIMENSIONS SHOWN ON CONSTRUCTION DRAWINGS SUPERSEDE LOCATIONS SHOWN HERE.
3. ON LOCATIONS IN MIDBLOCK, THE FIRE HYDRANT WILL BE ALIGNED WITH A PROPERTY LINE.



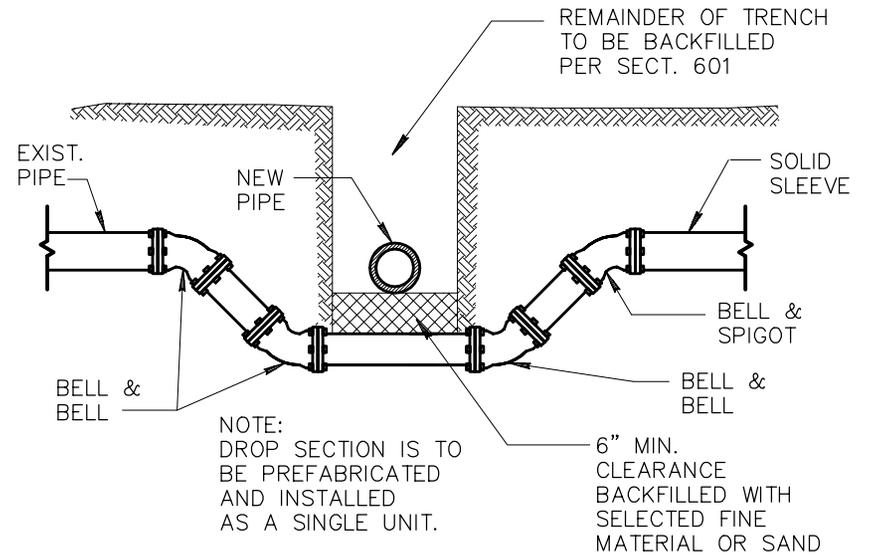
PARKWAY AREA OR NO SIDEWALK



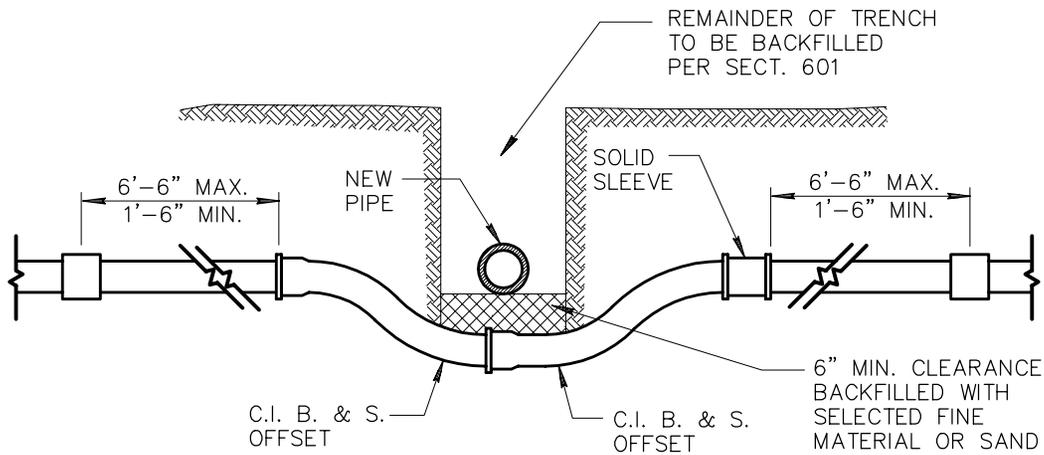
AREA WITH SIDEWALK



CAST IRON



CAST IRON MECHANICAL JOINT



ASBESTOS CEMENT

NOTES:

1. THIS DETAIL COVERS MOVING OF WATER MAINS 2" TO 12" ONLY.
2. THRUST BLOCKING AS PER DET. 380 & 381.
3. IF OFFSET IS TO GO OVER OBSTRUCTION, JOINT RESTRAINTS MUST BE USED.
4. PIPE IS TO BE CAST IRON OR DUCTILE IRON.

DETAIL NO.

370



STANDARD DETAIL
ENGLISH

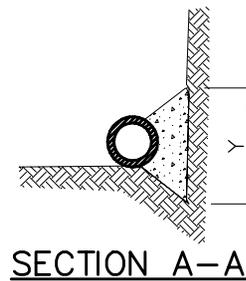
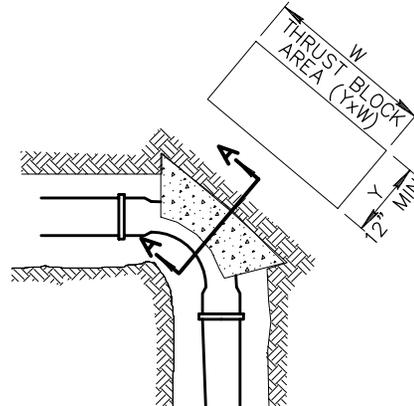
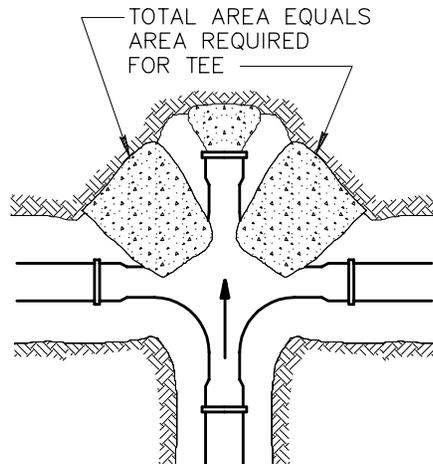
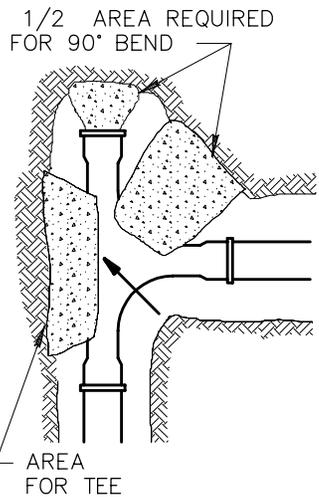
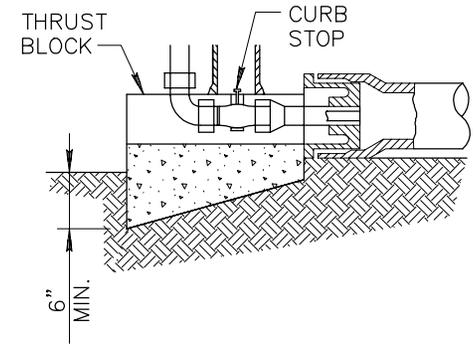
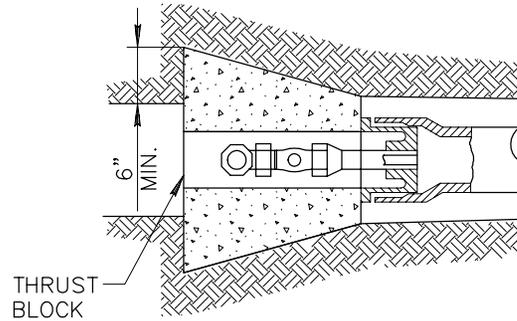
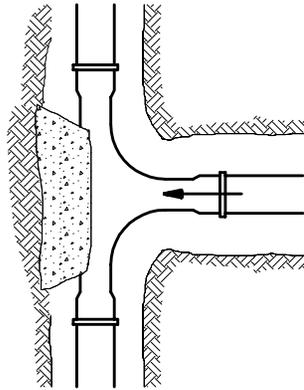
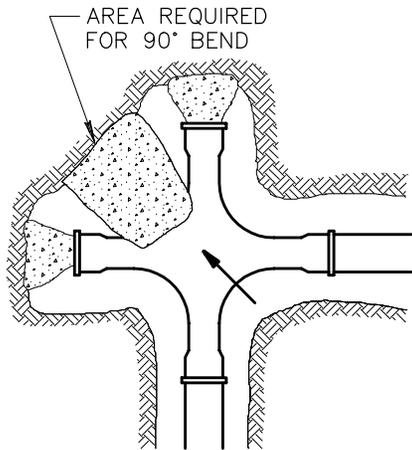
VERTICAL REALIGNMENT OF WATER MAINS

REVISED

DETAIL NO.

370

TYPICAL LOCATIONS OF THRUST BLOCKS



NOTES:

1. TABLE IS BASED ON 200 P.S.I. TEST PRESSURE AND 3,000 LBS/SQ. FT. SOIL. IF CONDITIONS ARE FOUND TO INDICATE SOIL BEARING IS LESS, THE AREAS SHALL BE INCREASED ACCORDINGLY.
2. AREAS FOR PIPES LARGER THAN 16" SHALL BE CALCULATED FOR EACH PROJECT.
3. FORM ALL NON-BEARING VERTICAL SURFACES.
4. THRUST BLOCKS ARE TO EXTEND TO UNDISTURBED GROUND. CONCRETE TO BE CLASS 'C', SECT. 725.

PIPE SIZE	WATER PIPE	
	TEE, DEAD END, 90° BEND	45° & 22 1/2° BENDS
4" OR LESS	3	3
6"	4	3
8"	6	3
10"	10	5
12"	14	7
16"	24	12

DETAIL NO.

380



STANDARD DETAIL
ENGLISH

THRUST BLOCKS FOR WATER LINES

REVISED

DETAIL NO.

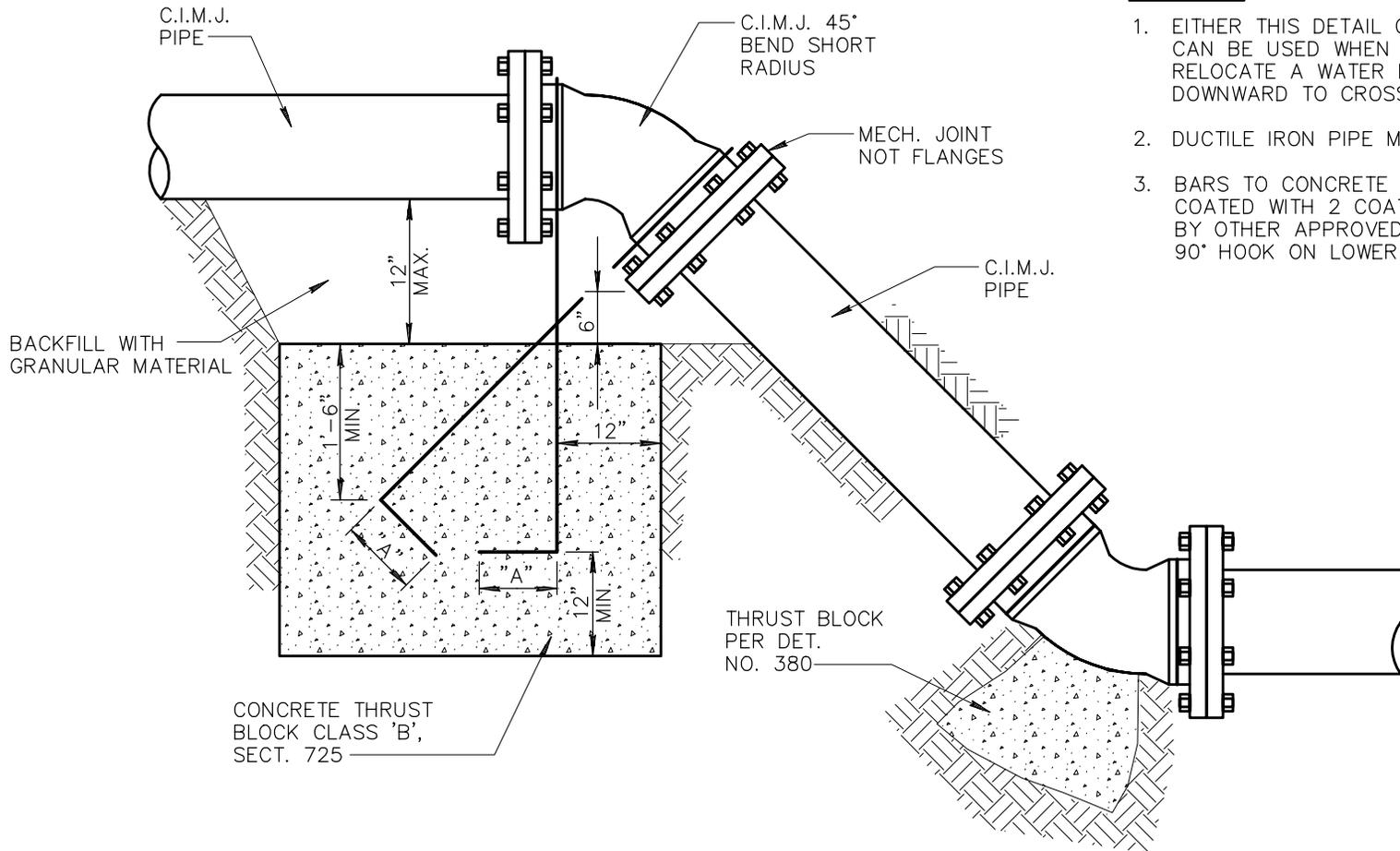
380

PIPE SIZE	MIN BAR SIZE	"A"-DIMENSION HOOK	MIN. * BLOCK DIM.
6"	#6	6"	3' x 3' x 3'
8"	#6	9"	4' x 4' x 2.5'
12"	#8	9"	4' x 4' x 5'

* FOR 125 P.S.I. WORKING PRESSURE.

NOTES:

1. EITHER THIS DETAIL OR RESTRAINT RODS CAN BE USED WHEN IT IS ALLOWED TO RELOCATE A WATER LINE UPWARD OR DOWNWARD TO CROSS A CONFLICT.
2. DUCTILE IRON PIPE MAY BE USED.
3. BARS TO CONCRETE THRUST BLOCK TO BE COATED WITH 2 COATS COAL TAR, EPOXY OR BY OTHER APPROVED METHOD. BARS TO HAVE 90° HOOK ON LOWER END, AS PER TABLE.



DETAIL NO.

381



STANDARD DETAIL
ENGLISH

ANCHOR BLOCKS FOR VERTICAL BENDS

REVISED

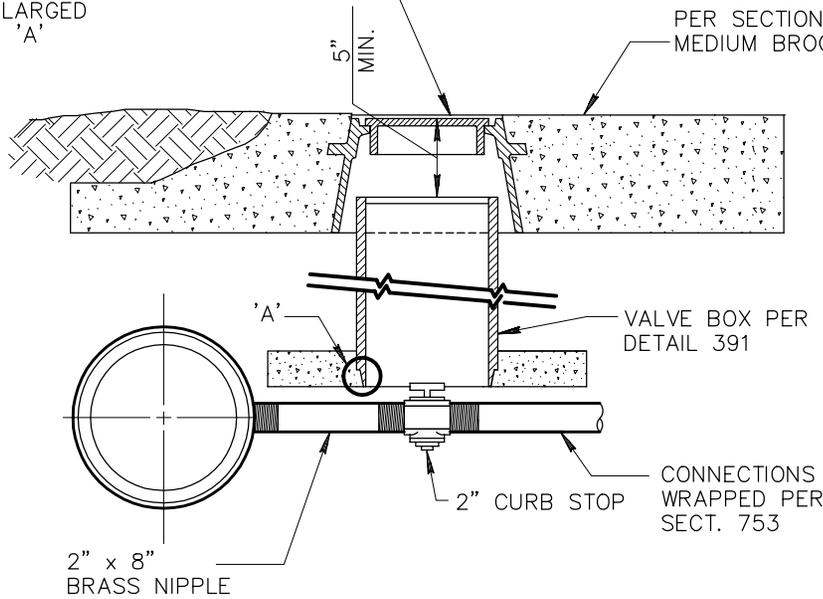
DETAIL NO.

381



FRAME AND COVER PER
DETAIL 270

POURED CONCRETE COLLAR 8" THICK
AND 40" SQUARE OR ROUND, VALVE BOX
CENTER. CLASS 'AA' CONCRETE AS
PER SECTION 725. RADIALLY SCORE JOINTS (4" MIN)
MEDIUM BROOM FINISH



TYPE 'A'

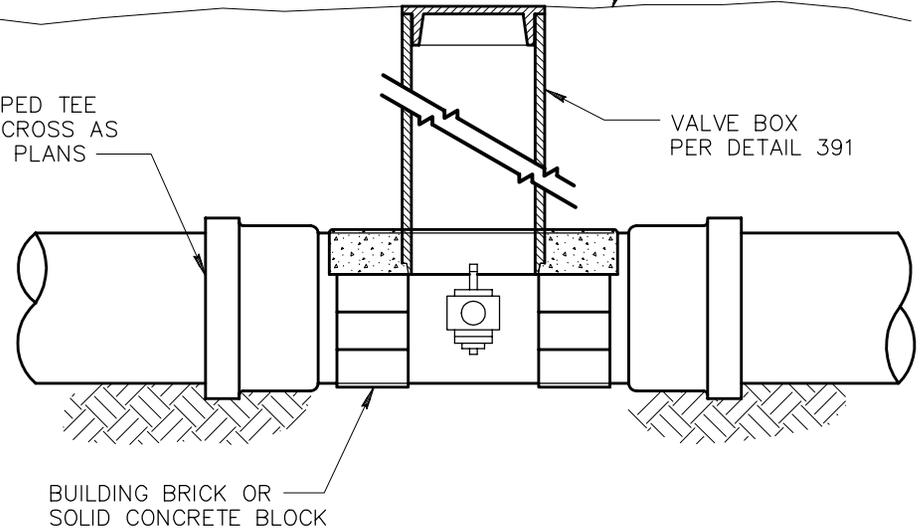
NOTES:

1. CURB STOP TO BE MUELLER ORISEAL (H-10283), FORD BALL VALVE B11-777, HAYES BULLETIN 400, J. JONES (J-1900) OR APPROVED EQUAL.
2. REDUCER MAY BE USED WHEN CONNECTING TO SMALLER GALVANIZED PIPE.
3. THIS DETAIL IS TO BE USED WHEN CONNECTING EXISTING GALVANIZED PIPE TO ASBESTOS CEMENT PIPE OR CAST IRON PIPE.

FINISH
PARKWAY
GRADE

TAPPED TEE
OR CROSS AS
PER PLANS

VALVE BOX
PER DETAIL 391



TYPE 'B'

NOTE:

1. VALVE BOX TO BE SUPPORTED ON BRICKS TO PREVENT VERTICAL LOADS FROM BEING TRANSMITTED TO THE SMALL PIPE.

DETAIL NO.

389



STANDARD DETAIL
ENGLISH

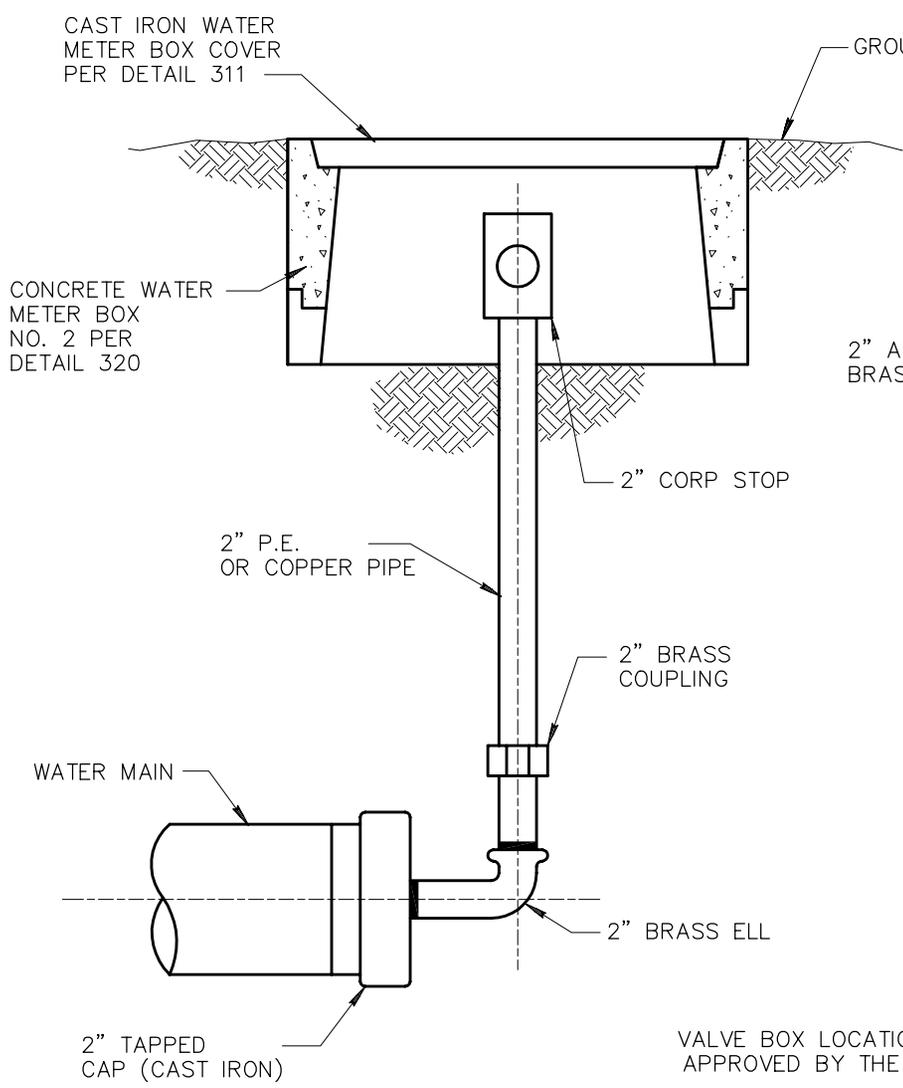
**CURB STOP WITH VALVE BOX
AND COVER**

REVISED

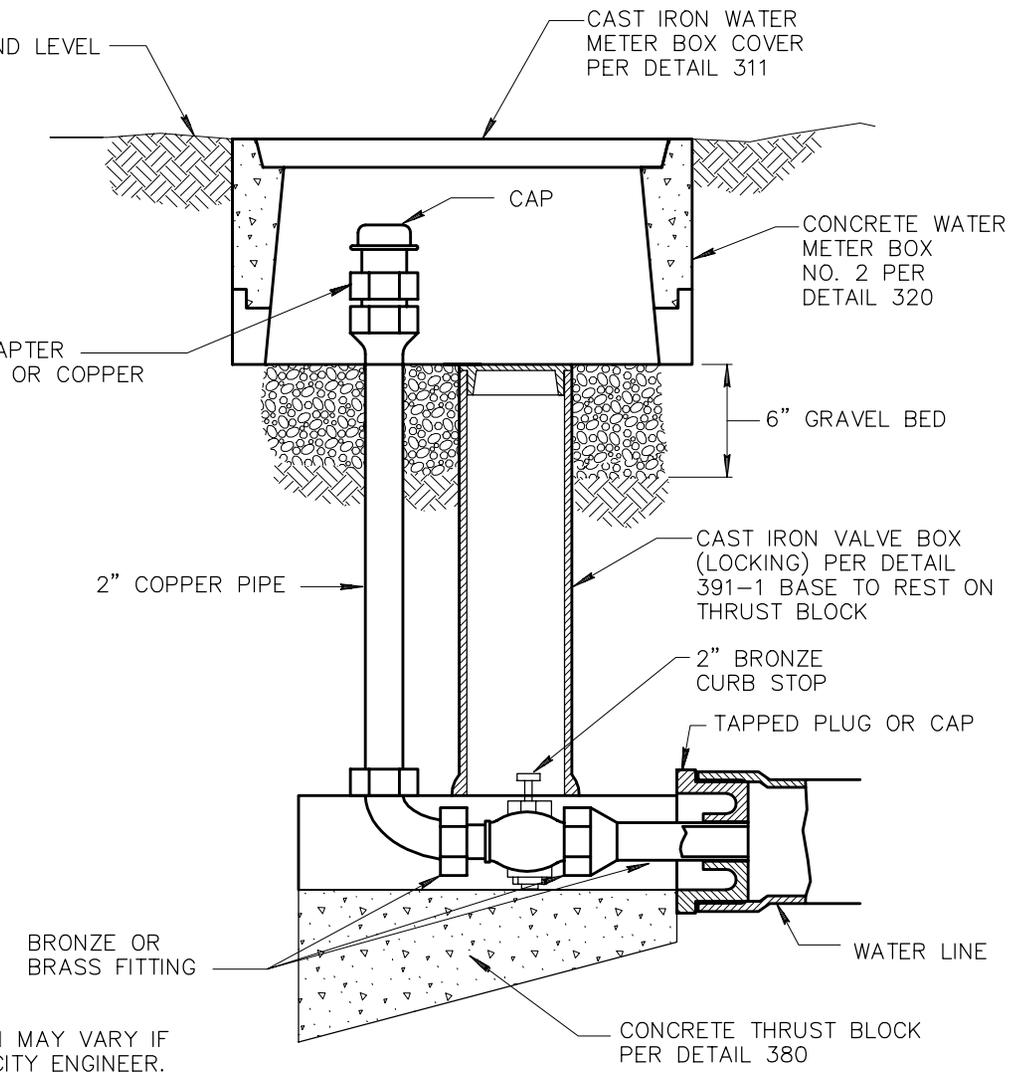
01-01-2001

DETAIL NO.

389



TYPE 'A'



TYPE 'B'

VALVE BOX LOCATION MAY VARY IF APPROVED BY THE CITY ENGINEER.

DETAIL NO.
390

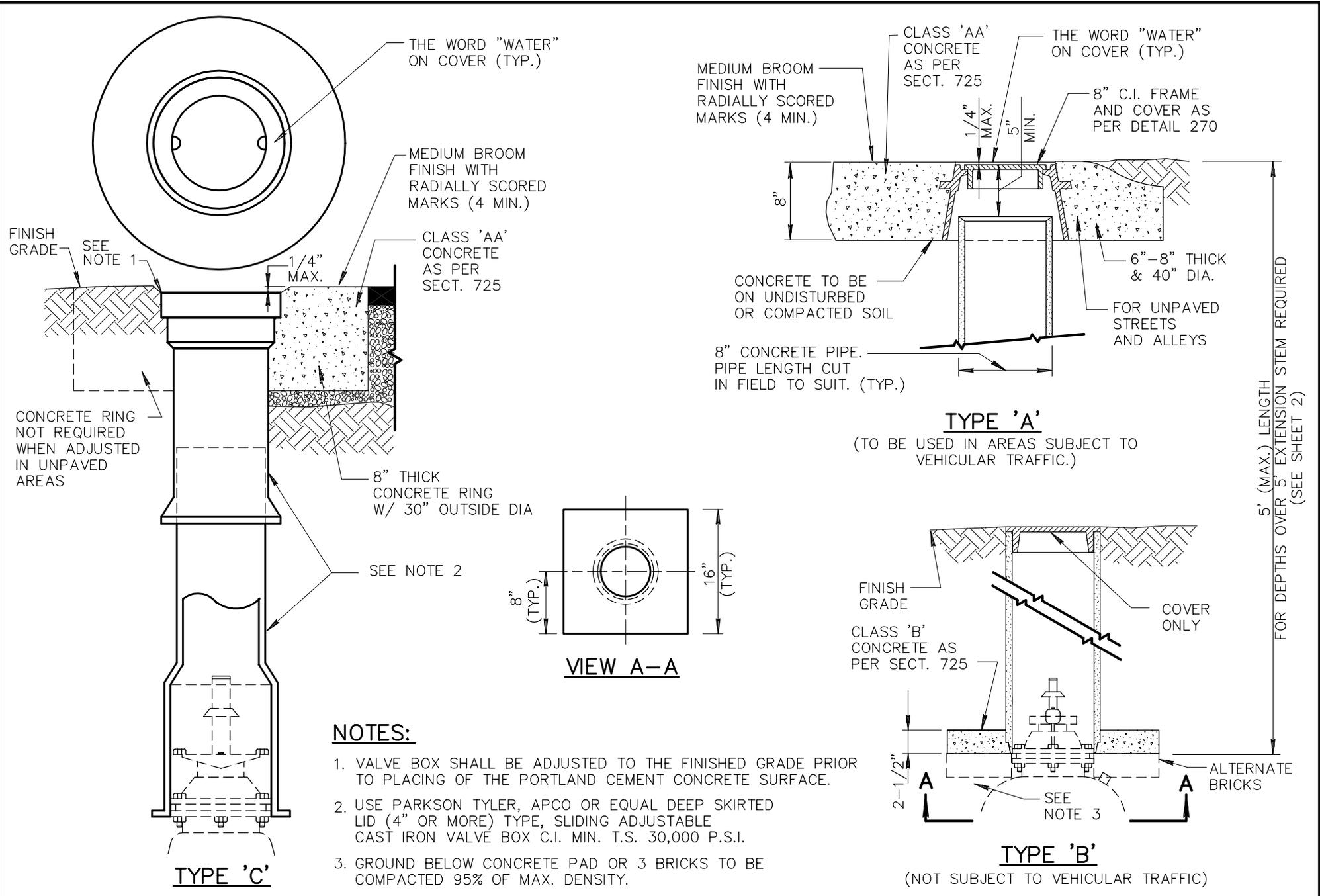


STANDARD DETAIL
ENGLISH

CURB STOP WITH FLUSHING PIPE

REVISED

DETAIL NO.
390

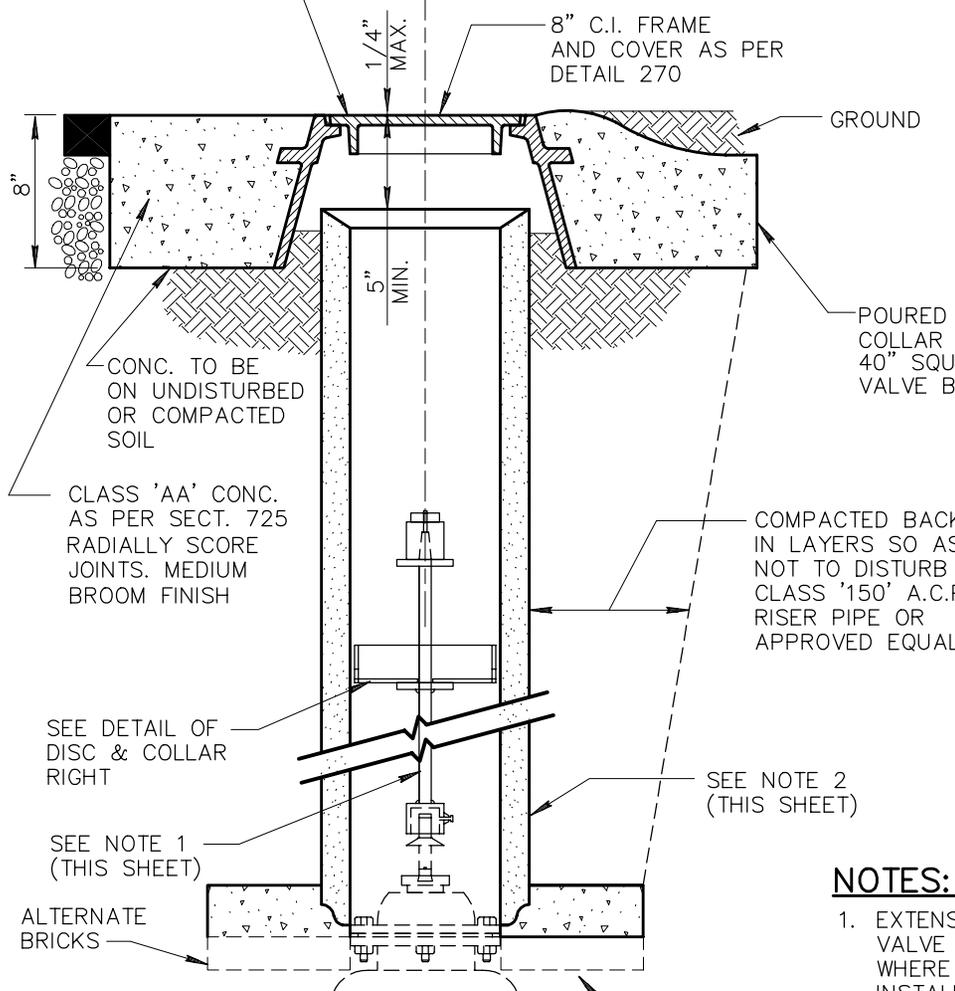


NOTES:

1. VALVE BOX SHALL BE ADJUSTED TO THE FINISHED GRADE PRIOR TO PLACING OF THE PORTLAND CEMENT CONCRETE SURFACE.
2. USE PARKSON TYLER, APCO OR EQUAL DEEP SKIRTED LID (4" OR MORE) TYPE, SLIDING ADJUSTABLE CAST IRON VALVE BOX C.I. MIN. T.S. 30,000 P.S.I.
3. GROUND BELOW CONCRETE PAD OR 3 BRICKS TO BE COMPACTED 95% OF MAX. DENSITY.

THE WORD 'WATER'
ON COVER (TYP.)

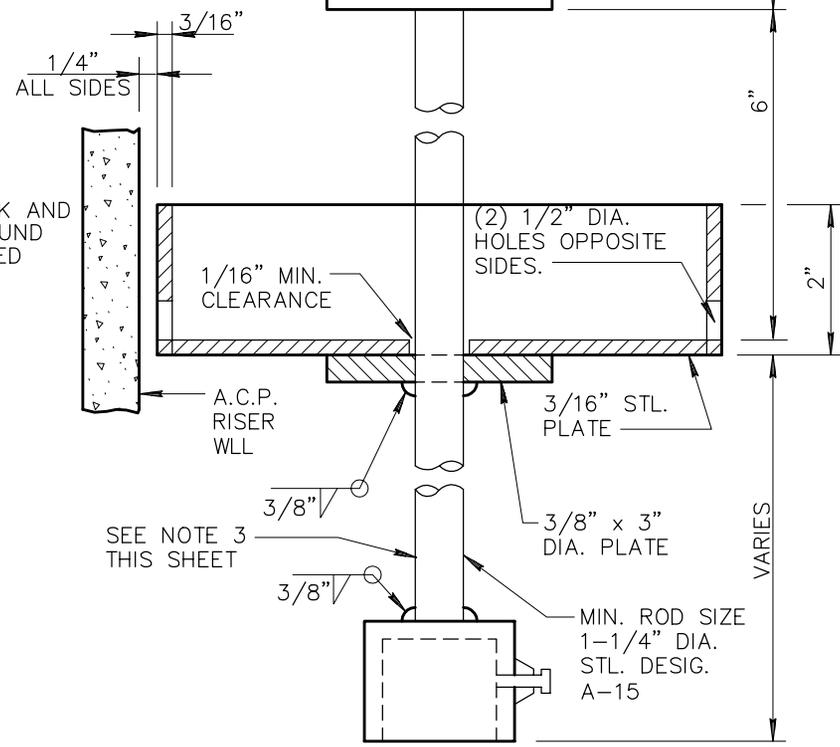
CENTER LINE OF VALVE BOX TO BE
PLUMB OVER ϕ OF OPERATING NUT



TOP VALVE BOX COVER

2" SQUARE OPER. NUT TO BE HELD DOWN WITH NUT ON THREADED SHAFT AS STD. VALVE STEM NUT ATTACHMENT

THIS PART OF STEM SQUARE WITH 4 SIDES TAPERED



NOTES:

1. EXTENSION STEM: WITH SQUARE SOCKET ON BOTTOM TO FIT 2" SQUARE VALVE NUT. EXTENSION TO VALVE STEMS REQUIRED ON ALL VALVES INSTALLED WHERE OPERATING NUT IS OVER 5' BELOW SURFACE. LENGTH TO FIT EACH INSTALLATION. OPERATING NUT TO BE HELD ON TOP OF EXTENSION WITH STOP NUT.
2. IF TWO OR MORE JOINTS OF A.C.P. ARE USED TO MAKE RISER, USE STANDARD A.C. PIPE RUBBER GASKET COUPLING TO JOIN PIPE. WHERE RISER LENGTH EXCEEDS 10' USE 12" A.C. PIPE.
3. STEM PAINTING: ALL STEEL TO HAVE PRIME COAT OF PAINT NO. 1-D AND ONE HEAVY APPLICATION (FINISH COAT) OF PAINT NO. 9 AS PER SECT. 790.

DETAIL NO.
391-2

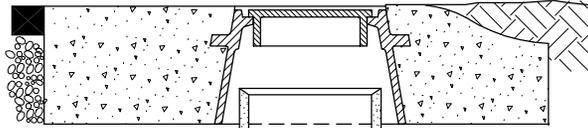


STANDARD DETAIL
ENGLISH

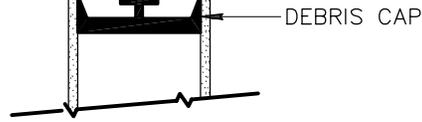
**VALVE BOX INSTALLATION
AND GRADE ADJUSTMENT**

REVISED
01-01-2001

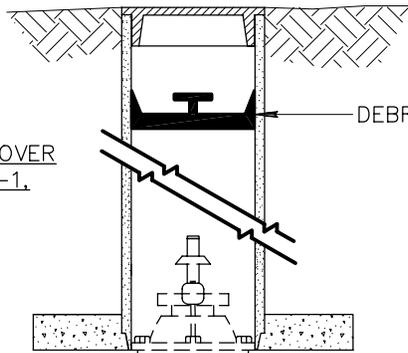
DETAIL NO.
391-2



VALVE BOX AND COVER
FOR DETAIL 391-1,
TYPE A

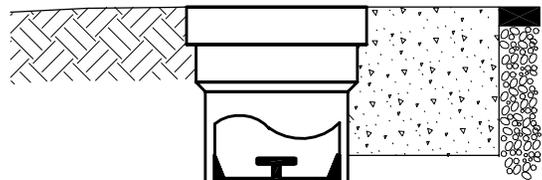


TYPE 'A'



VALVE BOX AND COVER
FOR DETAIL 391-1,
TYPE B

TYPE 'B'



VALVE BOX AND COVER
FOR DETAIL 391-1,
TYPE C



TYPE 'C'

NOTES:

1. THE DEBRIS CAP SHALL BE DESIGNED AND INSTALLED TO PREVENT DEBRIS SUCH AS DIRT, DUST SAND, ETC., FROM PASSING AROUND THE CAP AND DOWN INTO THE VALVE HOUSING. THE CAP SHALL BE HELD IN PLACE BY A MECHANISM WHICH WILL NOT DAMAGE THE VALVE HOUSING. ONCE INSTALLED THE CAP MUST WITHSTAND, WITHOUT SLIPAGE, A MINIMUM VERTICAL FORCE OF 50 POUNDS AT A LOADING RATE OF 1 INCH/MINUTE.
2. THE CAP SHALL BE MANUFACTURED OF CORROSIVE RESISTANT MATERIALS.
3. DEBRIS CAP SHALL BE INSTALLED AS CLOSE UNDER THE CAST IRON COVER WITHOUT INTERFERING WITH COVER OPERATION.
4. THE CAP SHALL BE CAPABLE OF SECURELY HOLDING A STANDARD LOCATING COIL, "SCOTCH MARK" 4 DISK MARKER BY 3M OR EQUAL.
5. THE CAP SHALL BE CONSTRUCTED TO ALLOW THE DEVICE TO BE SECURED BY A LOCK. THE LOCK (PAD, BARREL, ETC.) SHALL BE SUPPLIED BY THE AGENCY.
6. THE HANDLE AND/OR BODY OF THE CAP SHALL BE INTEGRALLY COLORED IF REQUIRED BY THE AGENCY. IF REQUIRED, THE COLOR SHALL CONFORM TO THE ONE CALL LOCATING SERVICE (BLUE STAKE) COLORS (ARS 40-360.21).
7. THE CAP SHALL BE INSTALLED IN ALL VALVE HOUSINGS AS REQUIRED BY THE CONTRACT DOCUMENTS OR BY THE AGENCY'S POLICIES.
8. THE DEBRIS CAP SHALL BE MANUFACTURED BY SW SERVICES, INC. PHOENIX, ARIZONA OR EQUAL.

DETAIL NO.

392



MARICOPA
ASSOCIATION of
GOVERNMENTS

STANDARD DETAIL
ENGLISH

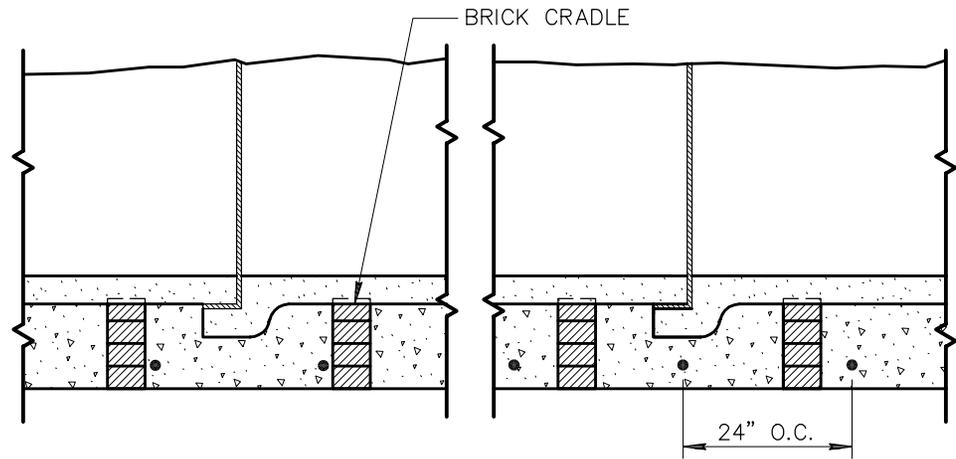
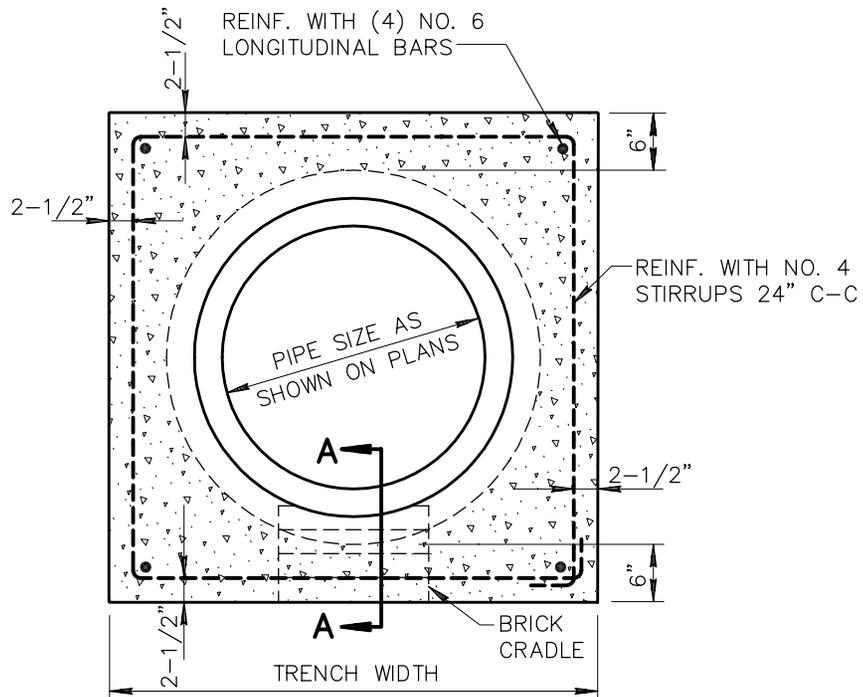
DEBRIS CAP INSTALLATION

REVISED

01-01-2001

DETAIL NO.

392



SECTION A-A

NOTES:

1. LAY PIPE TO LINE AND GRADE ON BRICK CRADLE.
2. PLACE CLASS 'C' CONCRETE PER SECT. 725 & 505, IN SUCH A MANNER AS NOT TO FLOAT THE PIPE.

DETAIL NO.

402



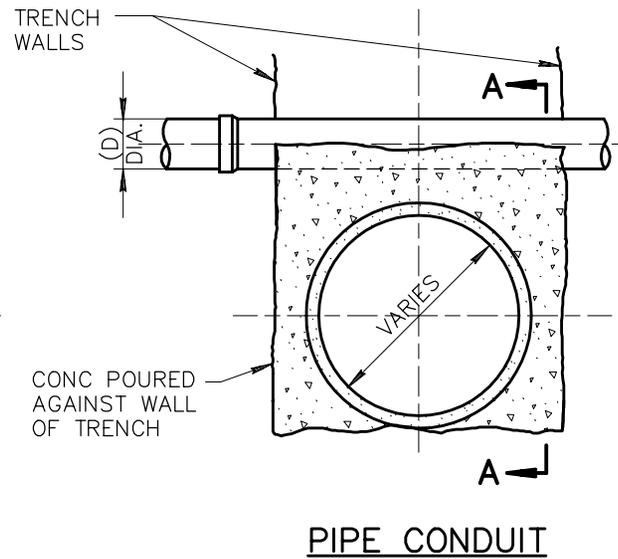
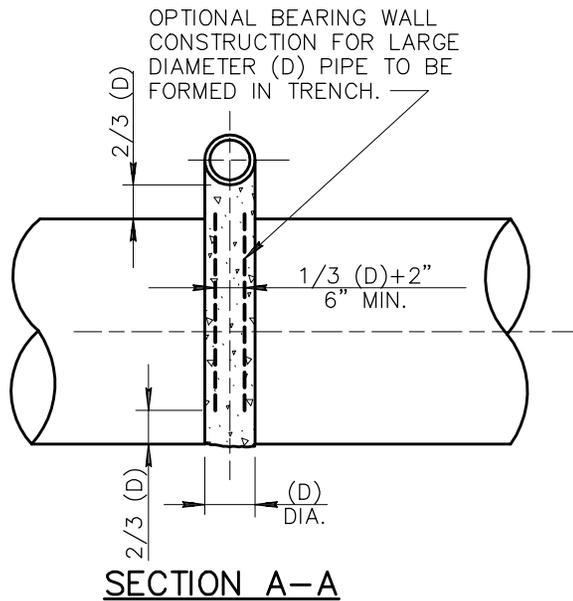
STANDARD DETAIL
ENGLISH

ENCASED PIPE FOR CANAL CROSSINGS

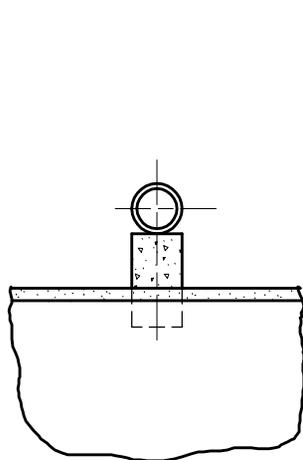
REVISED

DETAIL NO.

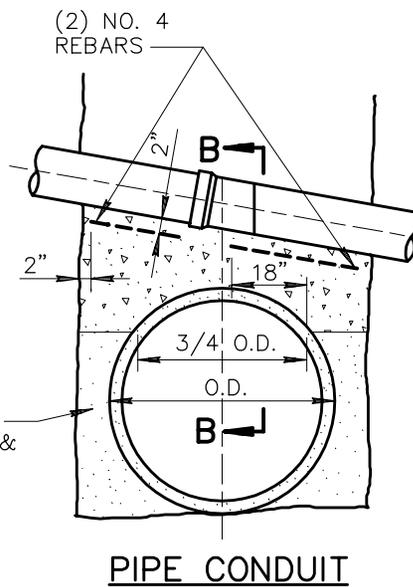
402



TYPE 'A'



SEE SECT. 601 FOR BACKFILL & COMPACTION



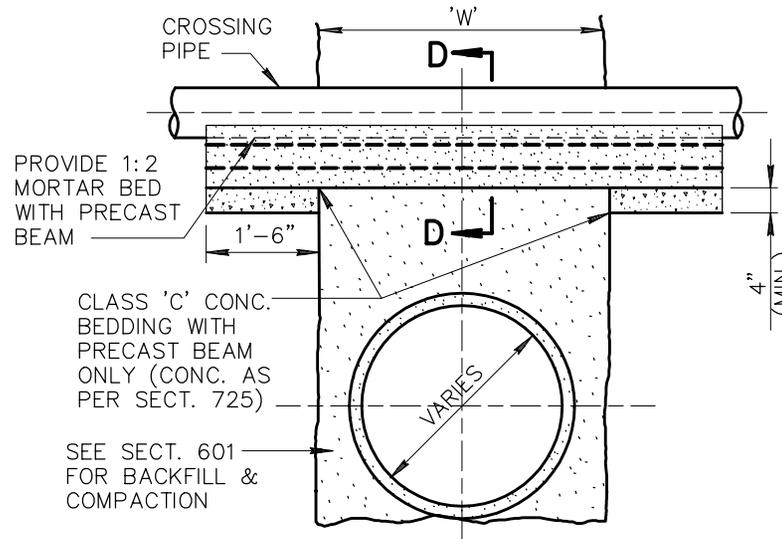
TYPE 'B'

NOTES:

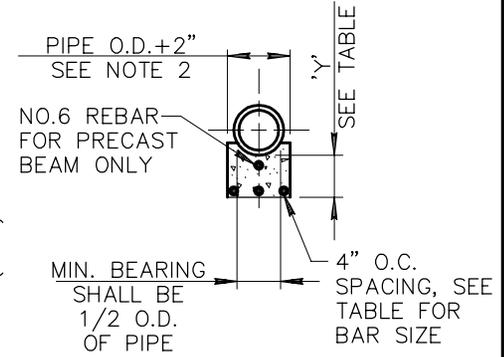
1. TYPE 'A' PIPE SUPPORT MAY BE USED FOR ANY TYPE CROSSING CONDITION.
2. TYPE 'C' PIPE SUPPORT MAY BE USED FOR CROSSING PIPES WITH A BELL DIAMETER OF 18" OR LESS IF SUFFICIENT CLEARANCE OVER STORM SEWER IS AVAILABLE AND TOTAL SPAN IS LESS THAN 34'
3. INTERMEDIATE PIPE SUPPORT SHALL BE USED IN CONJUNCTION WITH TYPE 'C' PIPE SUPPORT IF TOTAL SPAN EXCEEDS MAX. 'W' IN TABLE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL SUPPORTS BOTH PERMANENT AND TEMPORARY. TEMPORARY SUPPORTS SHALL NOT BE A SEPARATE PAY ITEM.
5. PERMANENT PIPE SUPPORTS MAY BE DECREASED FROM PLAN QUANTITIES OR EXTENDED TO INCLUDE SOME LISTED BELOW AS TEMPORARY SUPPORTS IF CONDITIONS WARRANT THESE CHANGES AT THE TIME OF CONSTRUCTION. DECISION SHALL BE MADE BY THE ENGINEER.
6. WHEN TYPE 'A' PIPE SUPPORT IS USED AND WHENEVER SO DIRECTED BY THE ENGINEER, THE CONTRACTOR SHALL PIERCE THE WALL WITH SUITABLE OPENINGS TO PREVENT UNEQUAL PRESSURE RESULTING FROM FLOODING OF THE BACKFILL. THE VOLUME OF THE PIERCED OPENING SHALL NOT EXCEED 1/2 THE VOLUME OF THE SUPPORTING WALL.
7. USE TYPE 'B' PIPE SUPPORT INSTEAD OF TYPE 'C' WHEN CLEARANCE IS LESS THAN 'Y' IN TABLE, BETWEEN PIPES.
8. CLASS 'A' CONCRETE AS PER SECT. 725 UNLESS OTHERWISE NOTED.

SCHEDULE OF REQUIRED SUPPORTS	
PERMANENT	TEMPORARY
SEWER LINES	CAST IRON PIPE CONC. IRRIG. PIPE BURIED TELCO. GAS PIPES
OTHER UTILITIES AS NOTED ON THE PLANS OR AS REQUIRED BY THE ENGINEER AT TIME OF CONSTRUCTION.	CONC. STORM DRAIN CONC. BOX CULVERT TRAFFIC CONTROL CONDUIT WATER & SEWER LINES

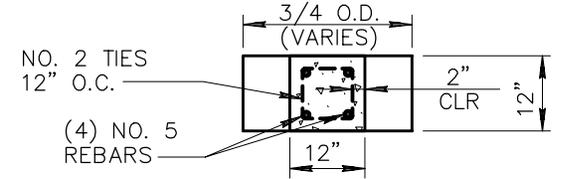
TABLE				
'W'	DEPTH OF COVER ON SUPPORTS			
	0' TO 8'		8' TO 16'	
	BAR NO.	Y	BAR NO.	Y
TO 6'	5	8"	6	11"
7'	5	9"	6	12"
8'	5	10"	6	13"
9'	6	11"	6	14"
10'	6	12"	7	15"
11'	6	13"	7	16"
12'	6	14"	7	17"
13'	7	15"	7	19"
14'	7	16"	8	20"
15'	7	17"	8	21"
16'	7	18"		
17'	8	19"		



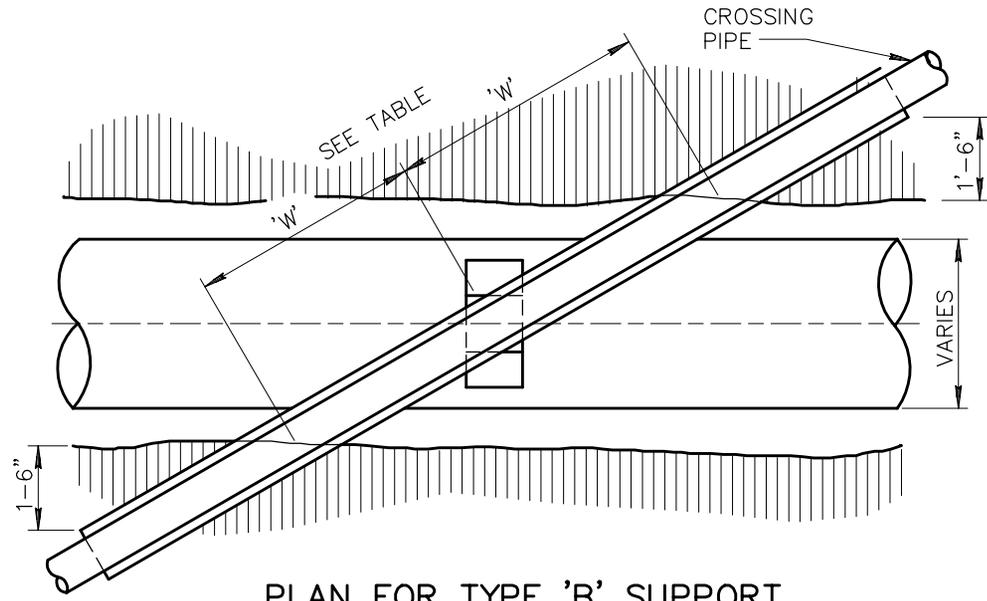
TYPE 'C'



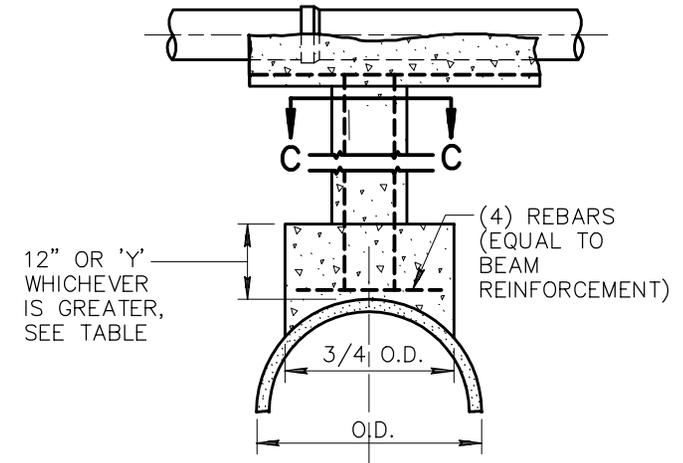
SECTION D-D



SECTION C-C



PLAN FOR TYPE 'B' SUPPORT



INTERMEDIATE SUPPORT FOR TYPE 'B' CROSSINGS

DETAIL NO.
403-2

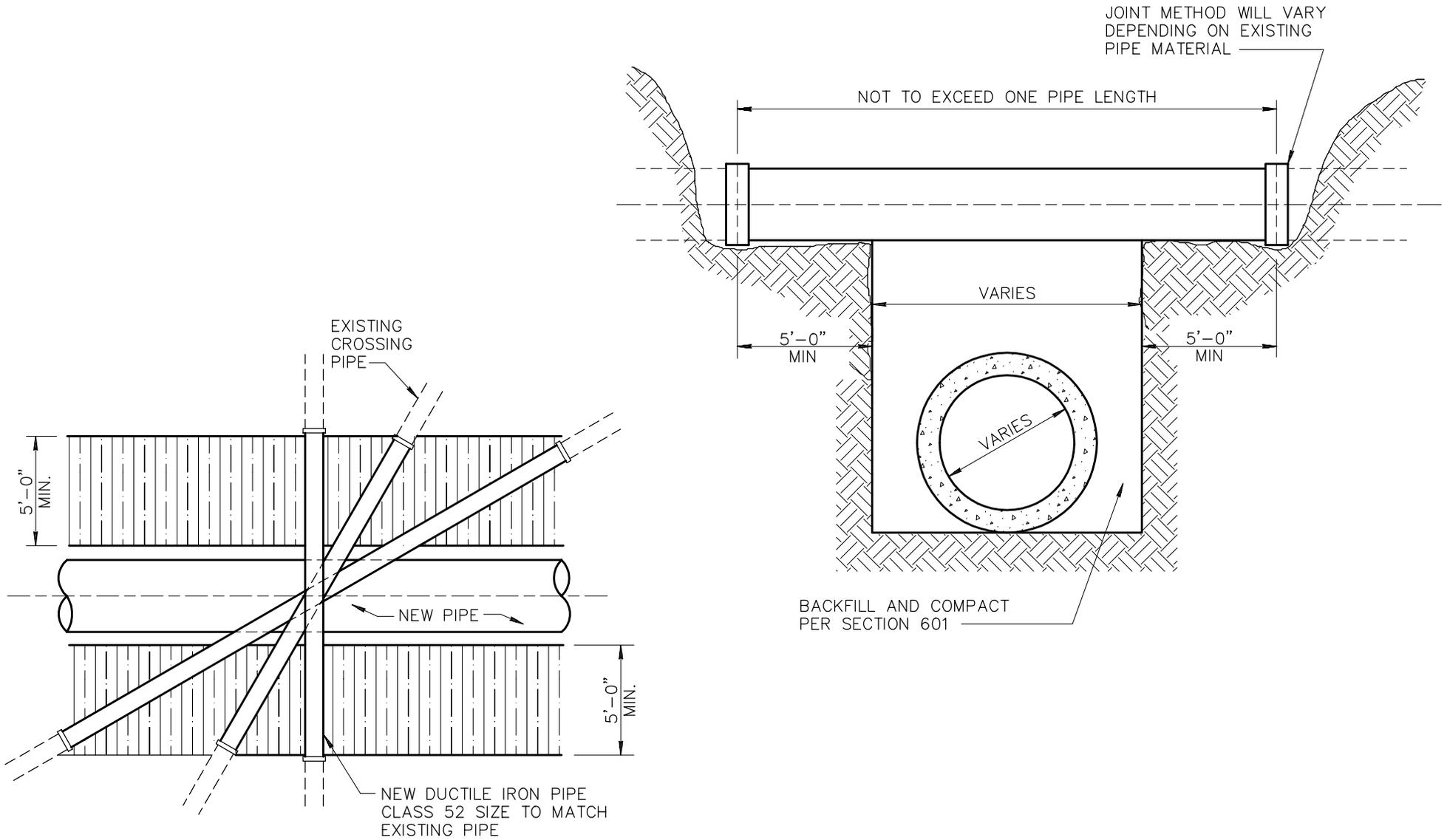


STANDARD DETAIL
ENGLISH

PIPE SUPPORTS ACROSS TRENCHES

REVISED

DETAIL NO.
403-2



DETAIL NO.
403-3



STANDARD DETAIL
ENGLISH

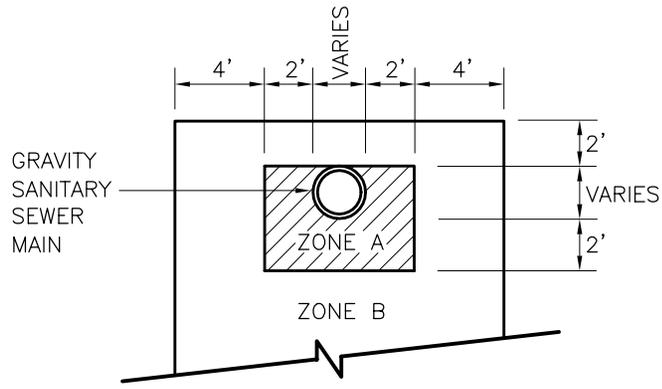
ALTERNATE TO PIPE SUPPORT

REVISED

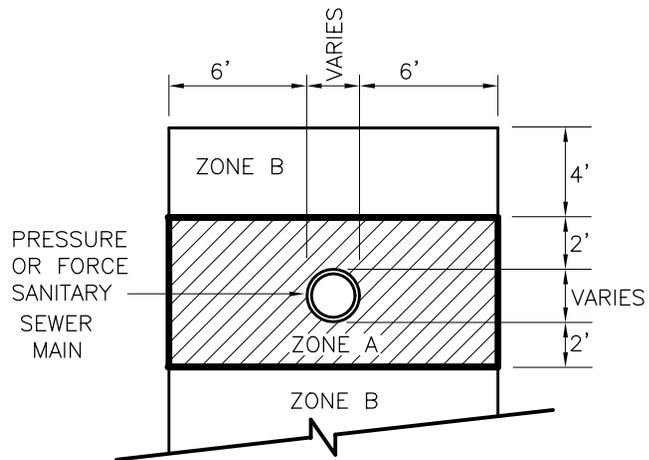
DETAIL NO.
403-3

NOTES:

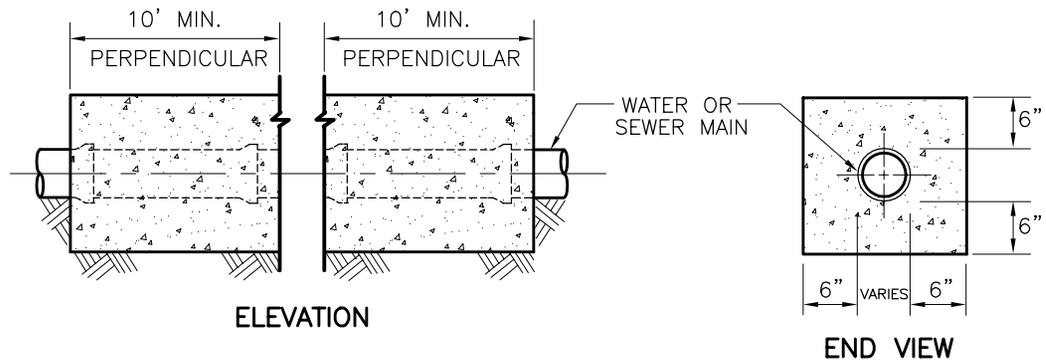
1. SEPARATION DISTANCES AND/OR OTHER EXTRA PROTECTION SHALL BE REQUIRED TO PROTECT WATER MAINS FROM CONTAMINATION BY SANITARY SEWER MAINS.
2. THIS CRITERIA APPLIES TO PARALLEL MAINS AS WELL AS CROSSINGS.
3. SEE CROSS SECTION DETAIL FOR LIMITS OF SEPARATION/EXTRA PROTECTION. ALL DISTANCES ARE MEASURED PERPENDICULARLY FROM THE OUTSIDE OF THE PIPES.
 - A. NO WATER MAINS SHALL FALL WITHIN ZONE A.
 - B. EXTRA PROTECTION SHALL BE REQUIRED WHEN THE WATER MAIN FALLS WITHIN ZONE B. EXTRA PROTECTION SHALL CONSIST OF CONSTRUCTING THE SANITARY SEWER MAIN WITH MECHANICAL JOINT OR RESTRAINED JOINT DUCTILE IRON PIPE FOR A DISTANCE OF TEN FEET ON EITHER SIDE OF THE WATER MAIN. THE DUCTILE IRON PIPE SHALL COMPLY WITH THE AGENCY'S REQUIREMENTS FOR SEWER INSTALLATION. IN THE CASE OF A CROSSING, THE NUMBER OF JOINTS SHALL BE HELD TO A MINIMUM WITH ONE FULL JOINT OF PIPE CENTERED OVER/UNDER THE OTHER. AN ALTERNATE PROTECTION MAY CONSIST OF ENCASING BOTH PIPES IN CONCRETE AS SHOWN HEREIN.
 - C. NO ADDITIONAL PROTECTION WILL BE REQUIRED OUTSIDE OF THE ZONE A AND B.
4. SEPARATION REQUIREMENTS FOR 4" OR 6" INDIVIDUAL HOUSE SERVICE CONNECTIONS SHALL COMPLY WITH THE AGENCY'S PLUMBING CODES.
5. RECLAIMED WATER SHALL BE CONSIDERED AS POTABLE WATER WHEN PLACED NEXT TO A SANITARY SEWER AND CONSIDERED A SANITARY SEWER WHEN PLACED NEXT TO A POTABLE WATER MAIN.
6. CLASS 'C' CONCRETE AS PER SECTION 725.



CROSS SECTION DETAIL FOR GRAVITY SANITARY SEWER



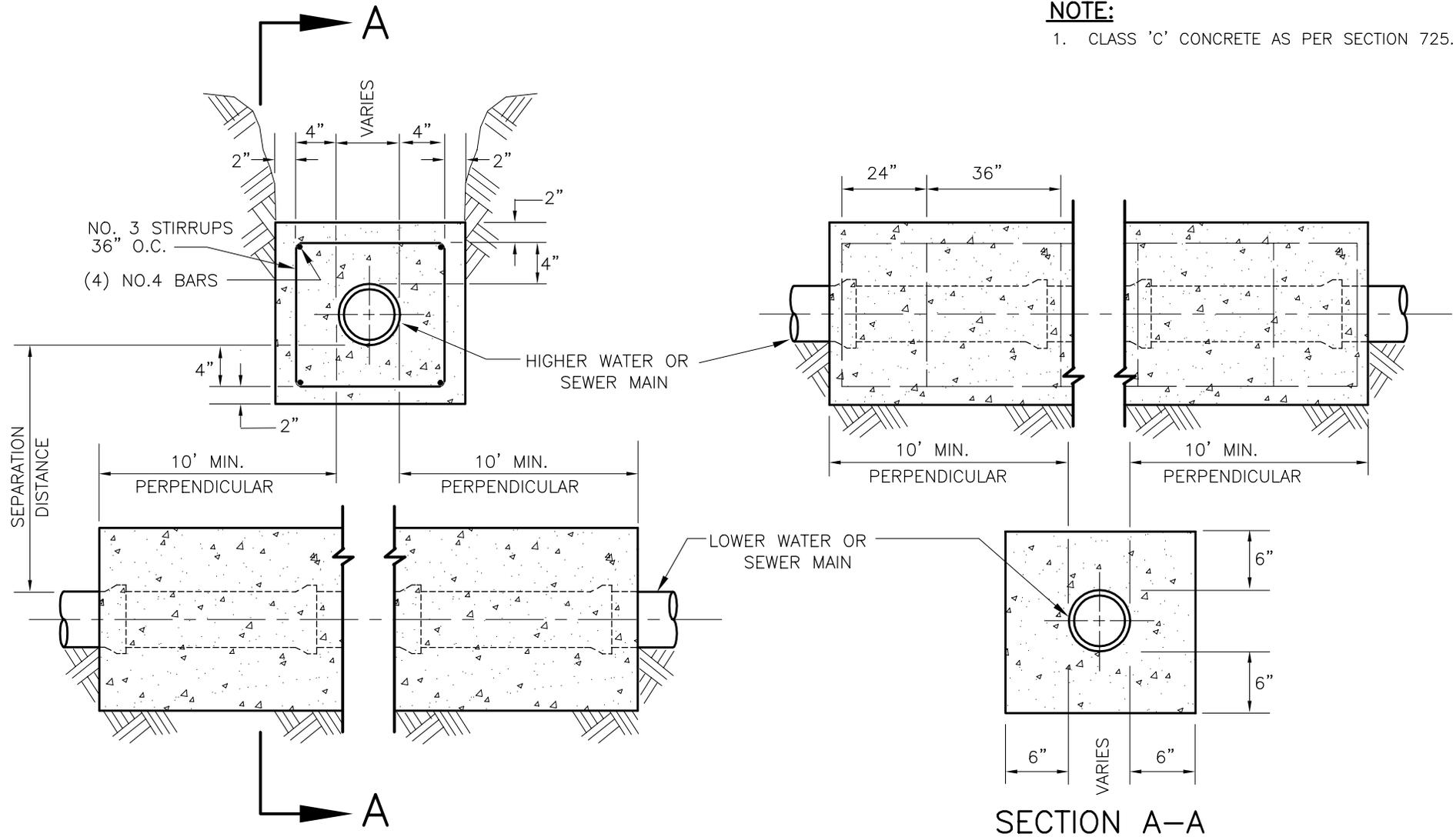
CROSS SECTION DETAIL FOR PRESSURE OR FORCE SANITARY SEWER



ENCASEMENT FOR PARALLEL PIPES

NOTE:

1. CLASS 'C' CONCRETE AS PER SECTION 725.



ENCASEMENT FOR PIPE CROSSING

DETAIL NO.
404-2

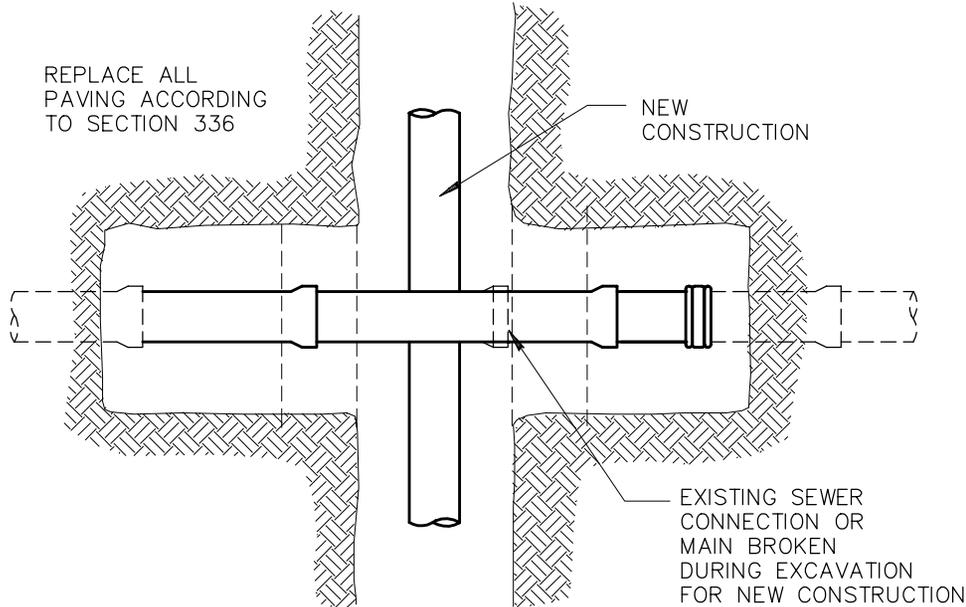


STANDARD DETAIL
ENGLISH

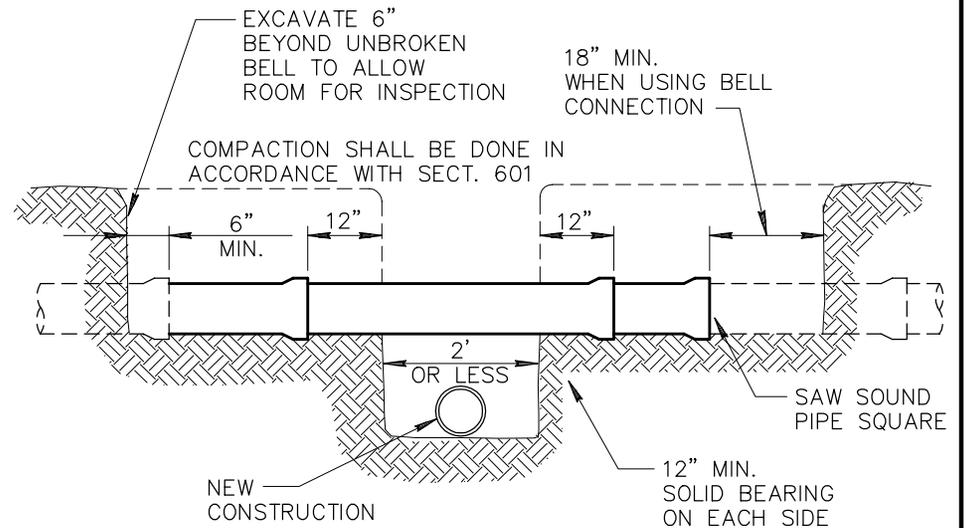
**WATER AND SANITARY SEWER
SEPARATION/PROTECTION**

REVISED

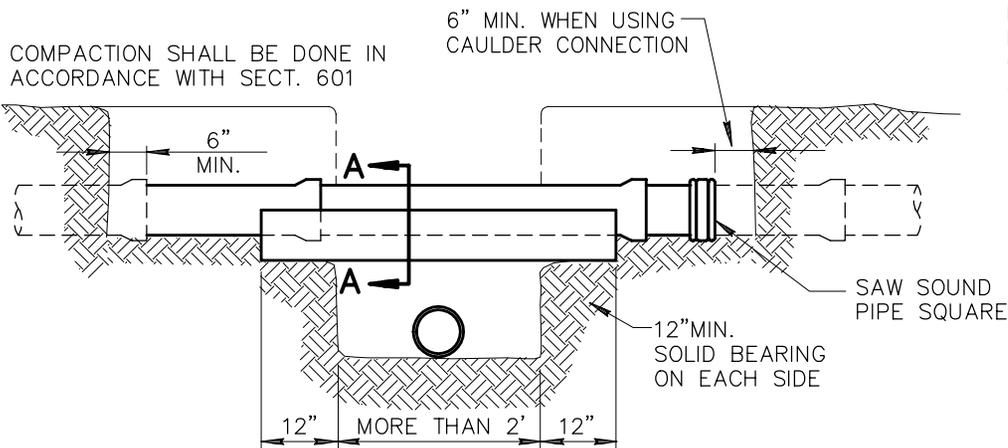
DETAIL NO.
404-2



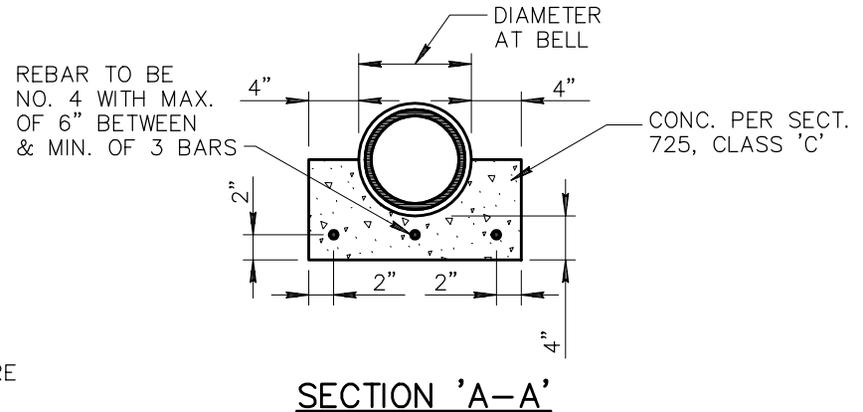
PLAN VIEW OF REPLACEMENT



REPLACEMENT WHEN NEW TRENCH 2' WIDE OR LESS



REPLACEMENT WHEN NEW TRENCH MORE THAN 2' WIDE



REBAR TO BE NO. 4 WITH MAX. OF 6" BETWEEN & MIN. OF 3 BARS

NOTES:

1. BROKEN PIPE SHALL BE REPLACED WITH A MINIMUM OF ONE FULL JOINT AND TWO SHORT LENGTHS WITH UNBROKEN BELLS. CONSTRUCTION AND JOINTS TO BE MADE AS PER SECTION 615.

DETAIL NO.

405



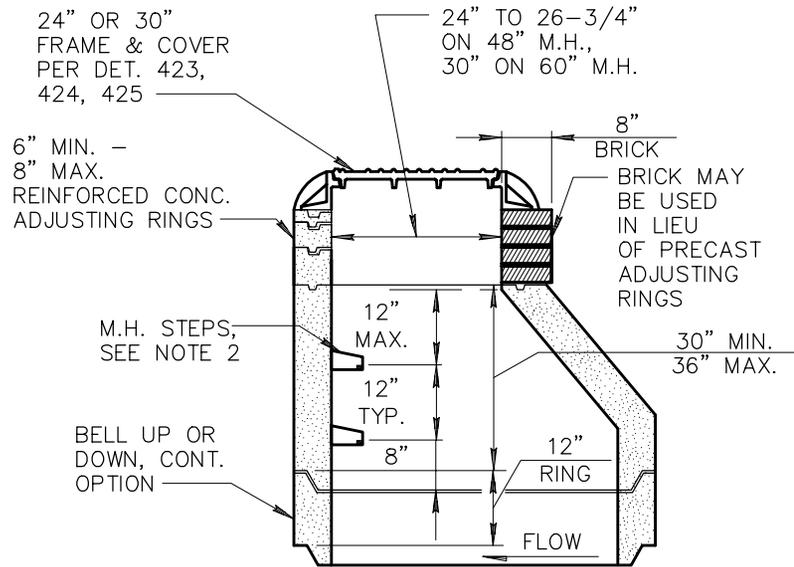
STANDARD DETAIL
ENGLISH

BROKEN SEWER LINE REPLACEMENT

REVISED

DETAIL NO.

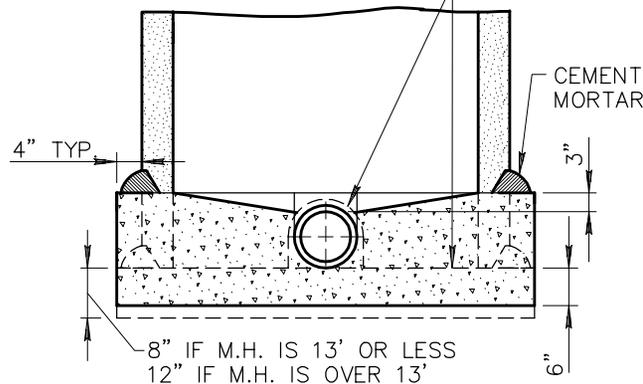
405



TYPE 'A' TOP

(PRE-CAST ECCENTRIC CONICAL TOP M.H.)

** ALTERNATE BASE WITH KNOCKOUTS FOR PIPES. CLEARANCE AROUND PIPES 1" MIN. - 3" MAX. EXCEPT LOWER CORNERS



NOTES:

1. PRE-CAST, REINFORCED M.H. SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH A.S.T.M. C-478 EXCEPT AS MODIFIED HEREIN.
2. M.H. STEPS SHALL BE INSTALLED AT SITE OF M.H. SECTION MANUFACTURE. MINIMUM CLEARANCE EACH SIDE OF M.H. LEG SHALL BE 1". STEPS SHALL BE MOUNTED WITH 2 TO 1 SAND/CEMENT DRY PACK MORTAR. (SEE DET. 428 FOR M.H. STEP.) STEPS REQUIRED IN 48" DIAMETER MANHOLE. STEPS NOT REQUIRED IN 60" DIAMETER MANHOLE.
3. USE LOW ALKALI CEMENT ONLY.

DETAIL NO.
420-1



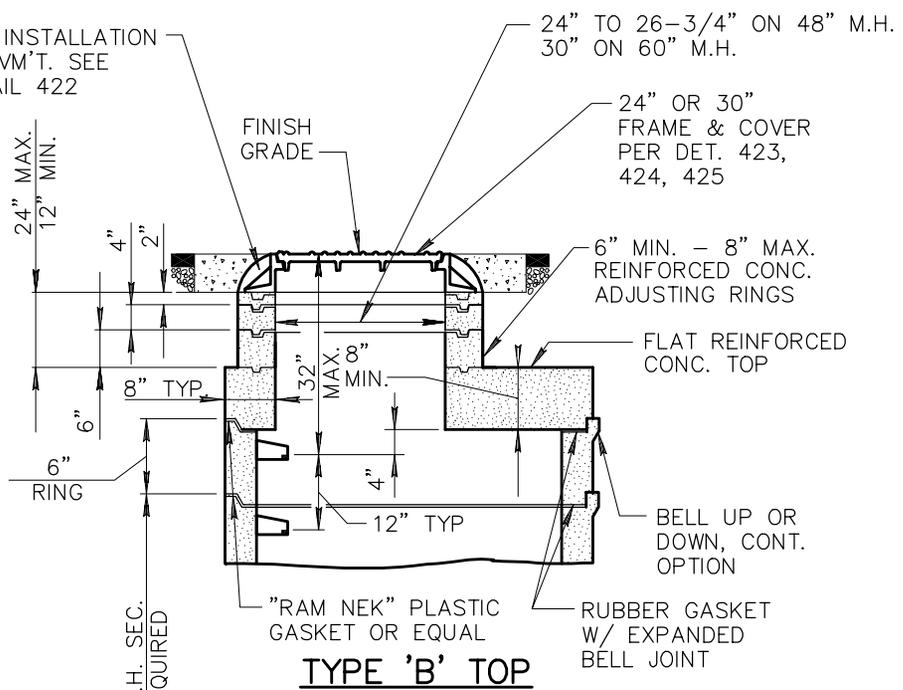
STANDARD DETAIL
ENGLISH

PRE-CAST CONCRETE SEWER MANHOLE

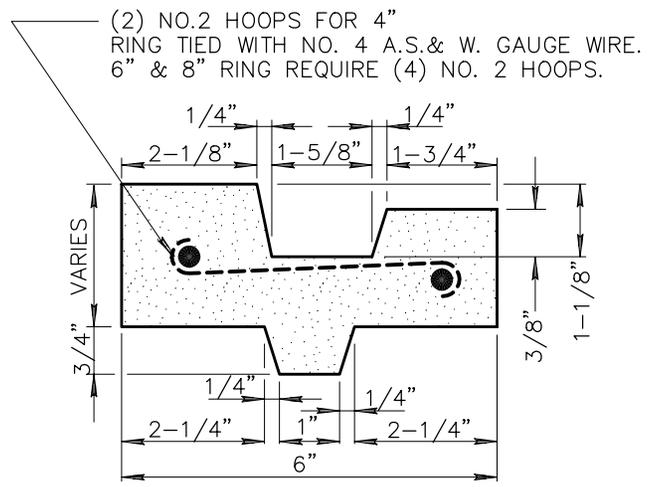
REVISED
01-01-2001

DETAIL NO.
420-1

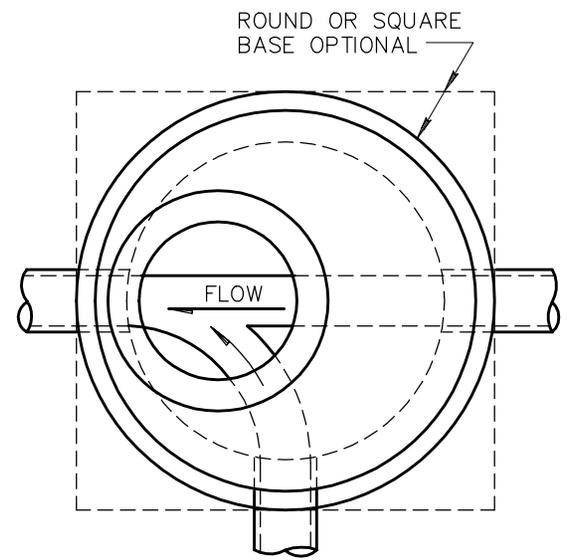
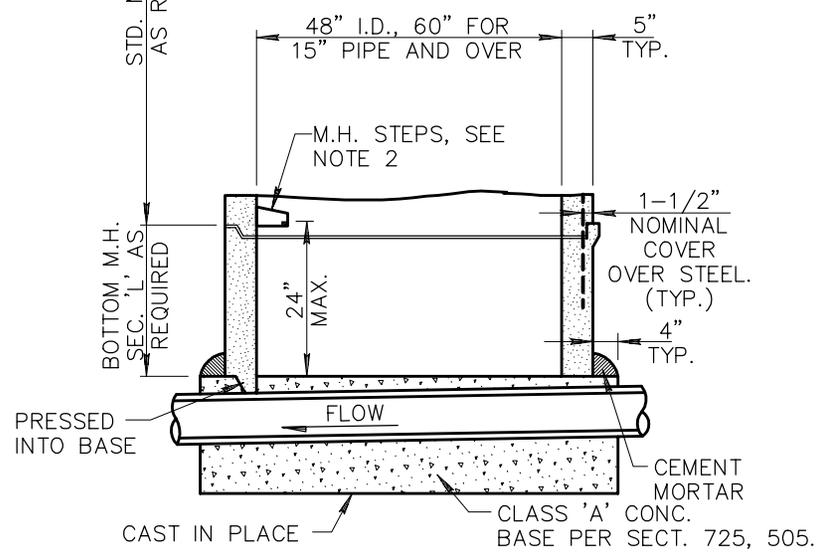
FOR INSTALLATION
IN P.V.M.'T. SEE
DETAIL 422



TYPE 'B' TOP



ADJUSTING RING DETAIL



DETAIL NO.
420-2



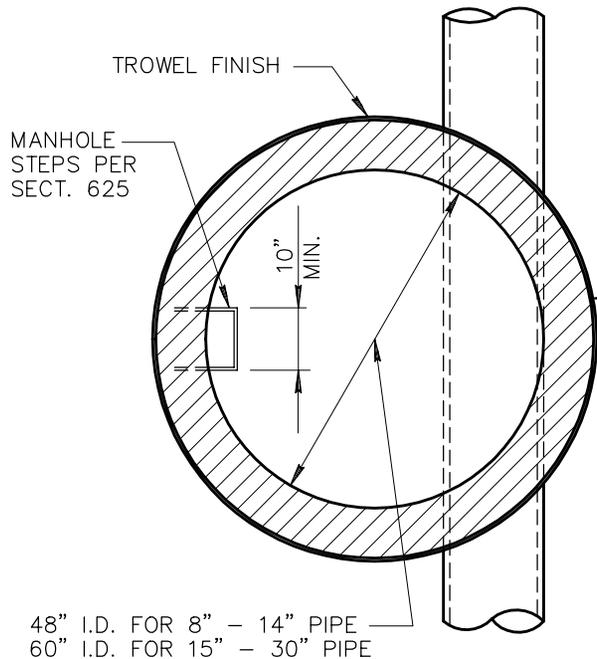
STANDARD DETAIL
ENGLISH

PRE-CAST CONCRETE SEWER MANHOLE

REVISED
01-01-2001

DETAIL NO.
420-2

PIPE SIZE & ELEVATION
AS SHOWN ON PLANS

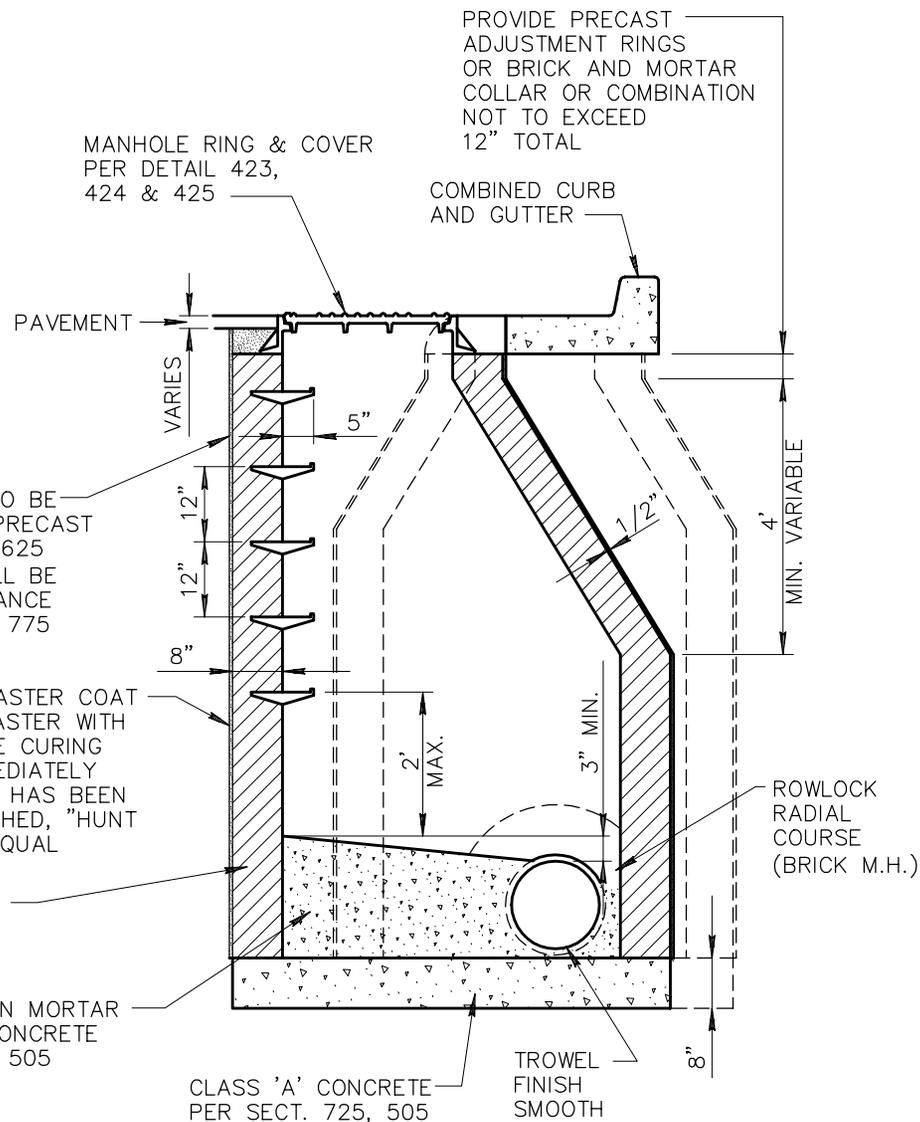


48" I.D. FOR 8" - 14" PIPE
60" I.D. FOR 15" - 30" PIPE

MANHOLE TO BE
BRICK OR PRECAST
PER SECT. 625
BRICK SHALL BE
IN ACCORDANCE
WITH SECT. 775

1:3 CEMENT PLASTER COAT
OUTSIDE OF PLASTER WITH
MEMBRANE TYPE CURING
COMPOUND IMMEDIATELY
AFTER PLASTER HAS BEEN
PLACED & FINISHED, "HUNT
PROCESS" OR EQUAL

COURSE BRICK IN MORTAR
OR CLASS 'C' CONCRETE
PER SECT. 725, 505



PROVIDE PRECAST
ADJUSTMENT RINGS
OR BRICK AND MORTAR
COLLAR OR COMBINATION
NOT TO EXCEED
12" TOTAL

MANHOLE RING & COVER
PER DETAIL 423,
424 & 425

COMBINED CURB
AND GUTTER

PAVEMENT

VARIES

5"

12"

12"

8"

2"
MAX.

3"
MIN.

4"
MIN. VARIABLE

ROWLOCK
RADIAL
COURSE
(BRICK M.H.)

CLASS 'A' CONCRETE
PER SECT. 725, 505

TROWEL
FINISH
SMOOTH

DETAIL NO.

421



STANDARD DETAIL
ENGLISH

OFFSET MANHOLE 8" TO 30" PIPE

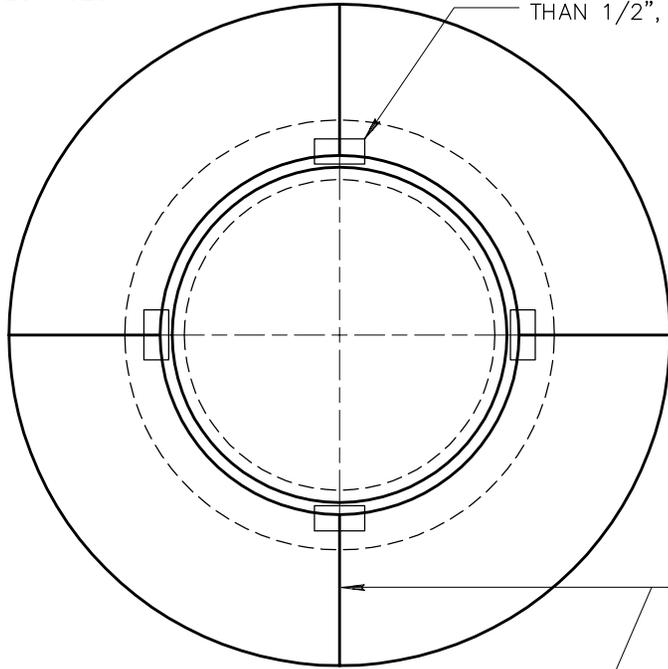
REVISED

DETAIL NO.

421

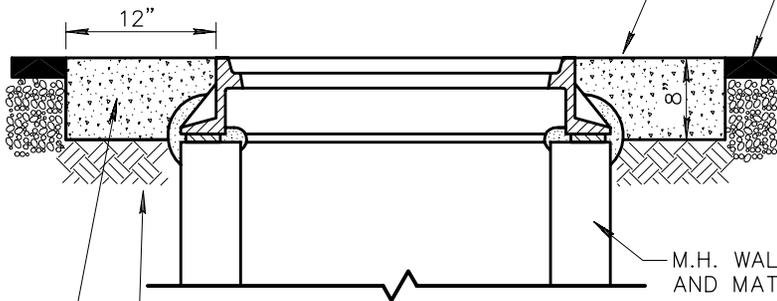
M.H. FRAME AND COVER PER SECT. 625

FOUR STEEL SPACERS, 4"x2" THICKNESS AS REQUIRED FROM 1/2" to 2" WHEN THICKNESS IS LESS THAN 1/2" USE MORTAR, WHEN GREATER THAN 1/2", USE BRICK.



MEDIUM BROOM FINISH WITH RADIALLY SCORED MARKS (4 MIN.)

EXISTING OR RECENTLY INSTALLED PAVEMENT

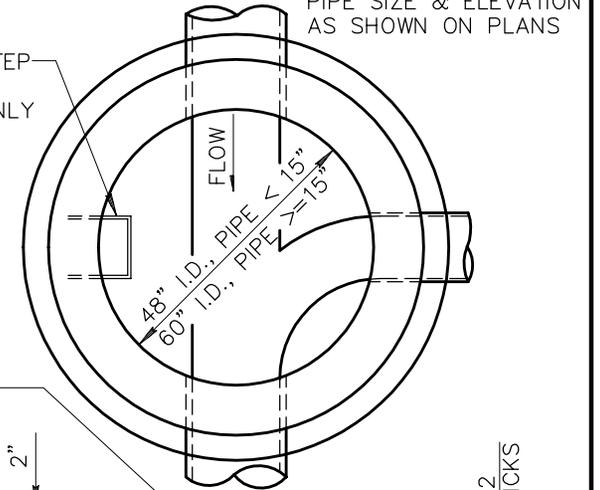


M.H. WALL THICKNESS AND MATERIAL VARIES

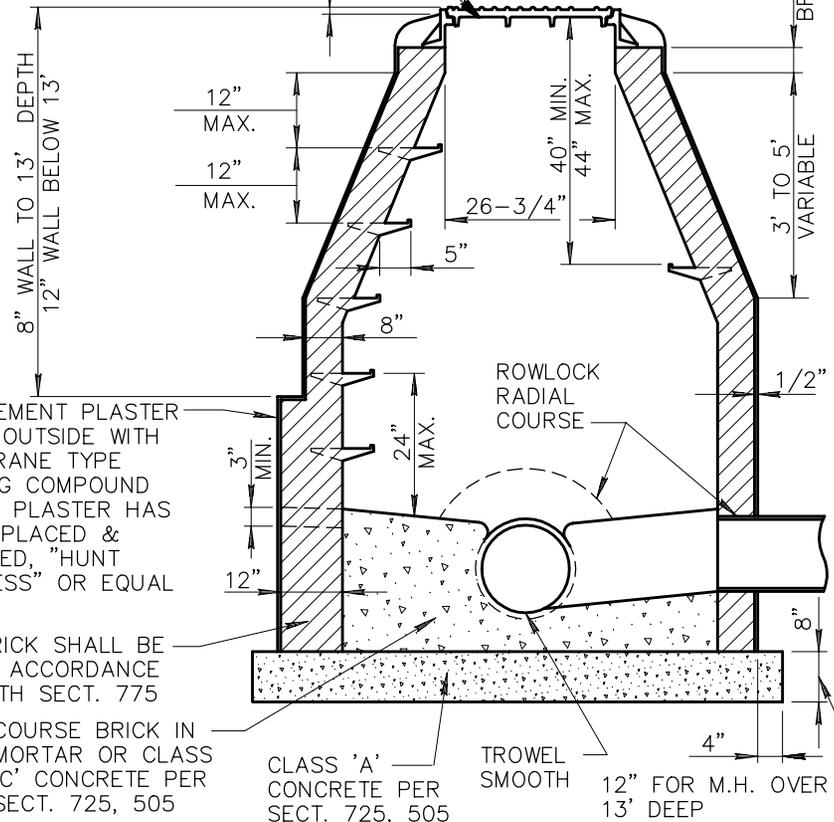
SUBGRADE PREPARATION TO CONFORM TO SECT. 301 OR 601

CLASS 'AA' CONCRETE AS PER SECT. 725, 505

M.H. STEP IS 48" M.H. ONLY



M.H. RING & COVER STD. DETAIL 423, 424 & 425



1:3 CEMENT PLASTER COAT OUTSIDE WITH MEMBRANE TYPE CURING COMPOUND AFTER PLASTER HAS BEEN PLACED & FINISHED, "HUNT PROCESS" OR EQUAL

BRICK SHALL BE IN ACCORDANCE WITH SECT. 775

COURSE BRICK IN MORTAR OR CLASS 'C' CONCRETE PER SECT. 725, 505

CLASS 'A' CONCRETE PER SECT. 725, 505

TROWEL SMOOTH 12" FOR M.H. OVER 13' DEEP

DETAIL NO.

422



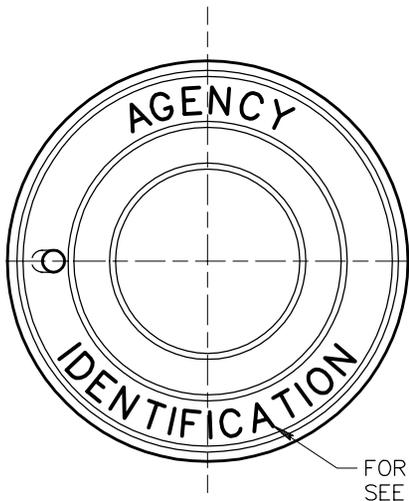
STANDARD DETAIL
ENGLISH

BRICK SEWER MANHOLE
AND COVER FRAME ADJUSTMENT

REVISED
01-01-2001

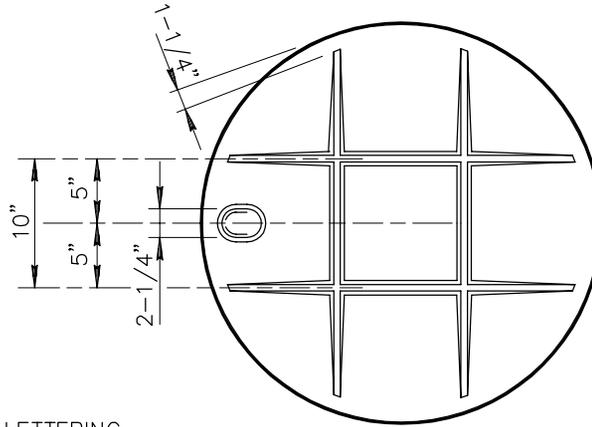
DETAIL NO.

422

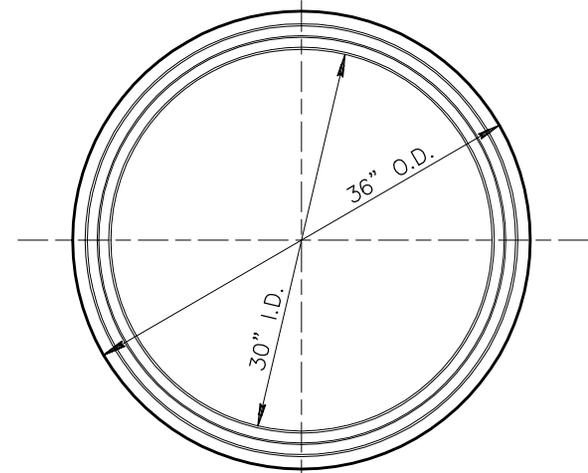


FOR COVER LETTERING
SEE NOTE ON DETAIL 424

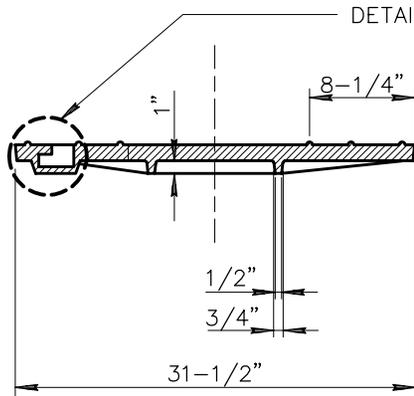
FACE OF COVER
CAST IRON



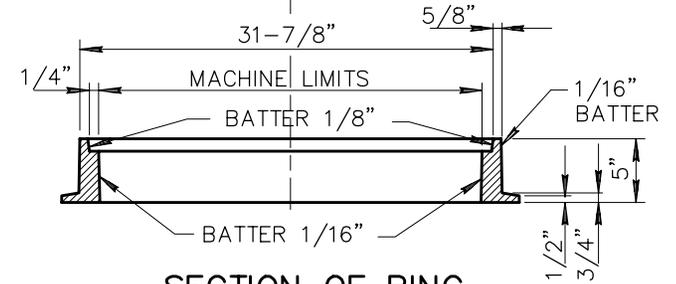
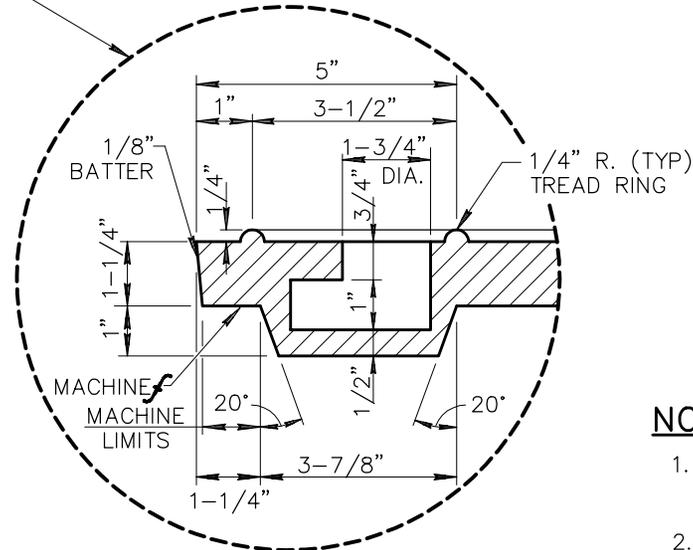
BACK OF COVER



CAST IRON
MANHOLE RING



SECTION OF COVER
APPROX. WEIGHT 276 LBS.



SECTION OF RING
APPROX. WEIGHT 210 LBS.

NOTES:

1. WEIGHT OF CASTING SHALL BE NO MORE THAN 2% LESS THAN THE APPROXIMATE WEIGHT SPECIFIED.
2. CASTINGS SHALL CONFORM TO SECT. 787.

DETAIL NO.

423



STANDARD DETAIL
ENGLISH

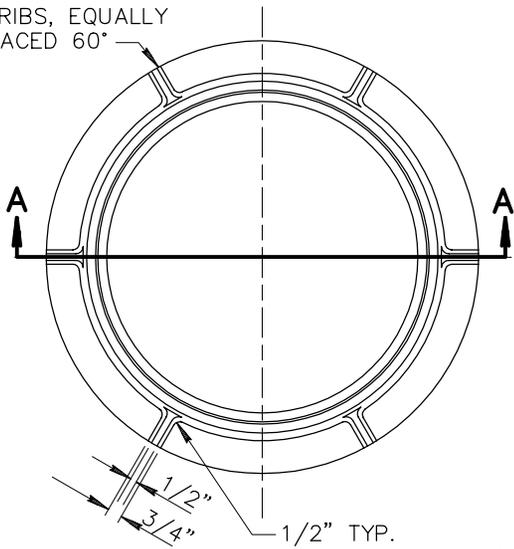
WATER TIGHT 30"
MANHOLE FRAME AND COVER

REVISED

DETAIL NO.

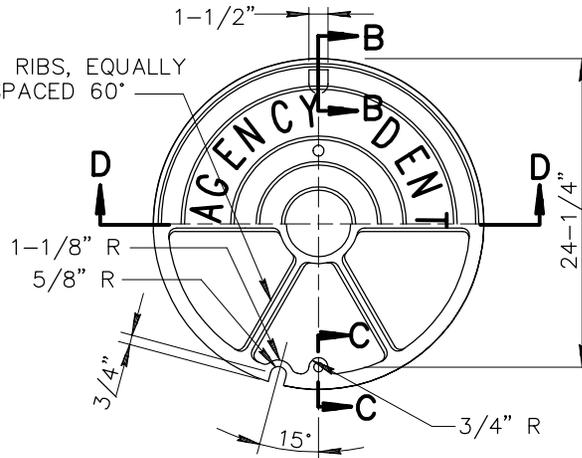
423

6 RIBS, EQUALLY SPACED 60°



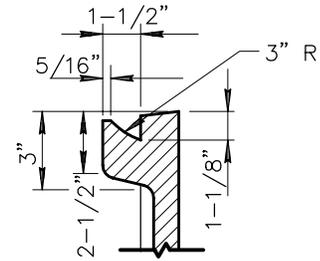
TOP VIEW

6 RIBS, EQUALLY SPACED 60°

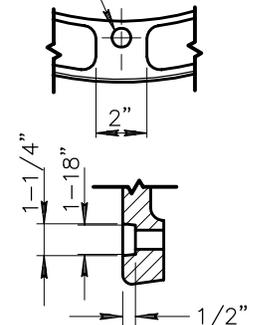


BOTTOM VIEW

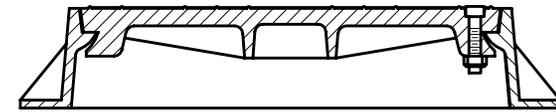
3/4" DRILL



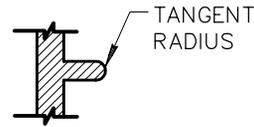
SECTION 'B-B'



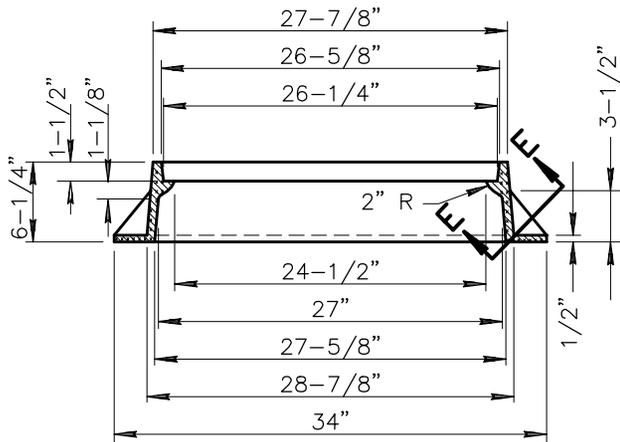
SECTION 'C-C'



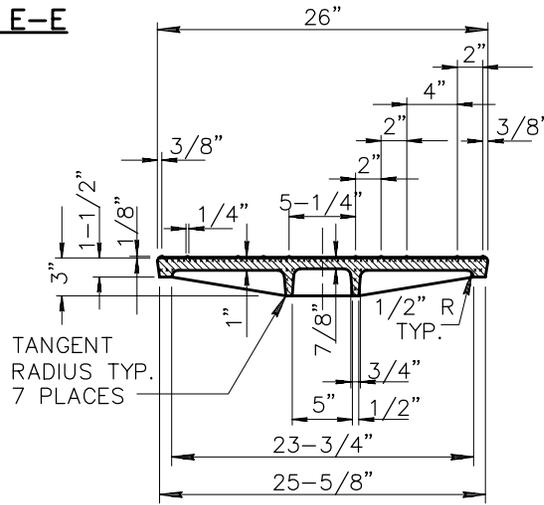
SECTION VIEW OF FRAME AND COVER WITH CAM LOCKING DEVICE



SECTION E-E



SECTION 'A-A'



SECTION 'D-D'

NOTES:

1. MATERIAL SHALL CONFORM TO A.S.T.M. STANDARDS
B 179-65 ALLOY SN122A
B 179-65 ALLOY CN42A
B 108-65 ALLOY SC103A
(ALL 3 ACCEPTABLE)
2. LETTERING ON MANHOLE COVER TO CONTAIN NAME OF AGENCY AND UTILITY FOR WHICH MANHOLE IS NEEDED. (I.E. "PHOENIX SANITARY SEWER"), OR AS DIRECTED. THE TOTAL WIDTH OF INDIVIDUAL LETTERS TO BE SUCH THAT LETTERS AND WORDS ARE EQUALLY SPACED AND BALANCED TO FORM A COMPLETE CIRCLE WITH SPACERS BEFORE AND AFTER THE WORD IDENTIFYING THE AGENCY INVOLVED. LETTERS TO BE 2" RAISED 1/8" ABOVE LEVEL OF COVER. TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL.
3. WEIGHT OF CASTINGS SHALL BE NO MORE THAN 2% LESS THAN THE APPROXIMATE WEIGHT SPECIFIED.
4. CASTINGS SHALL CONFORM TO SECT. 787.
5. SHALL CONFORM TO SECT. 625.3.1 - (FRAME AND COVER).

DETAIL NO.

425



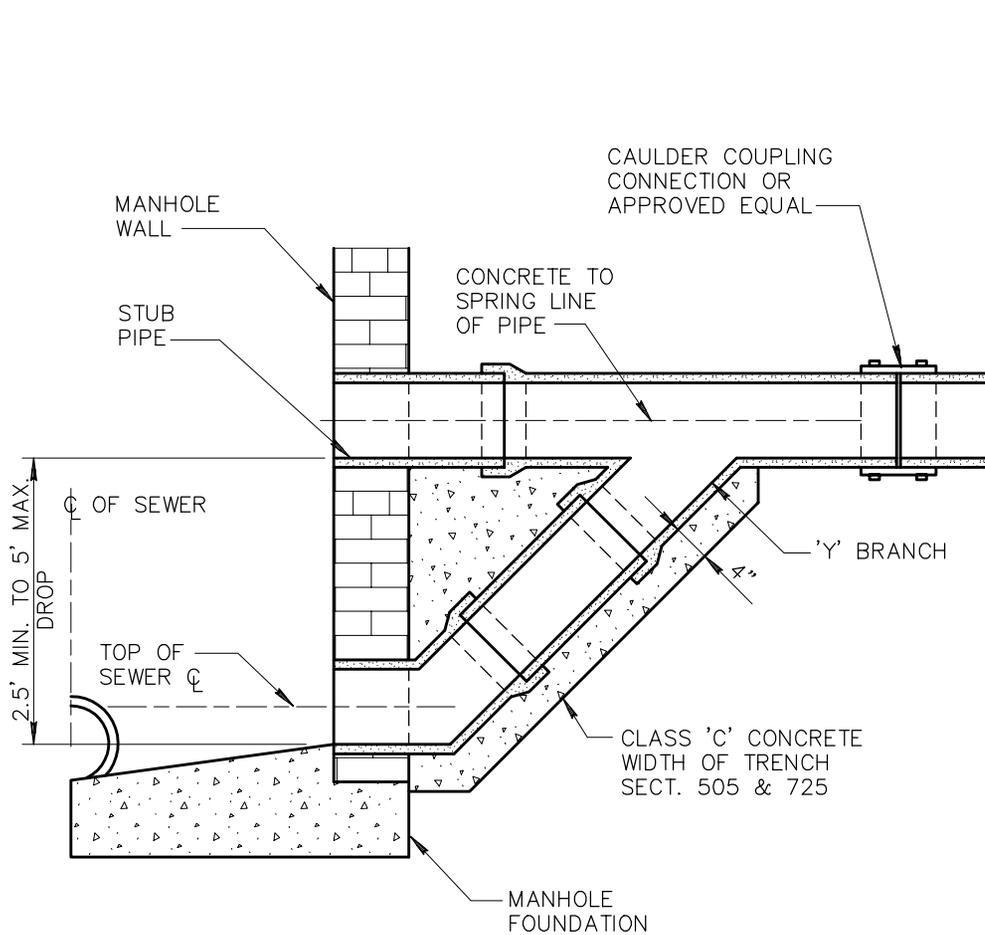
STANDARD DETAIL
ENGLISH

**24" ALUMINUM
MANHOLE FRAME AND COVER**

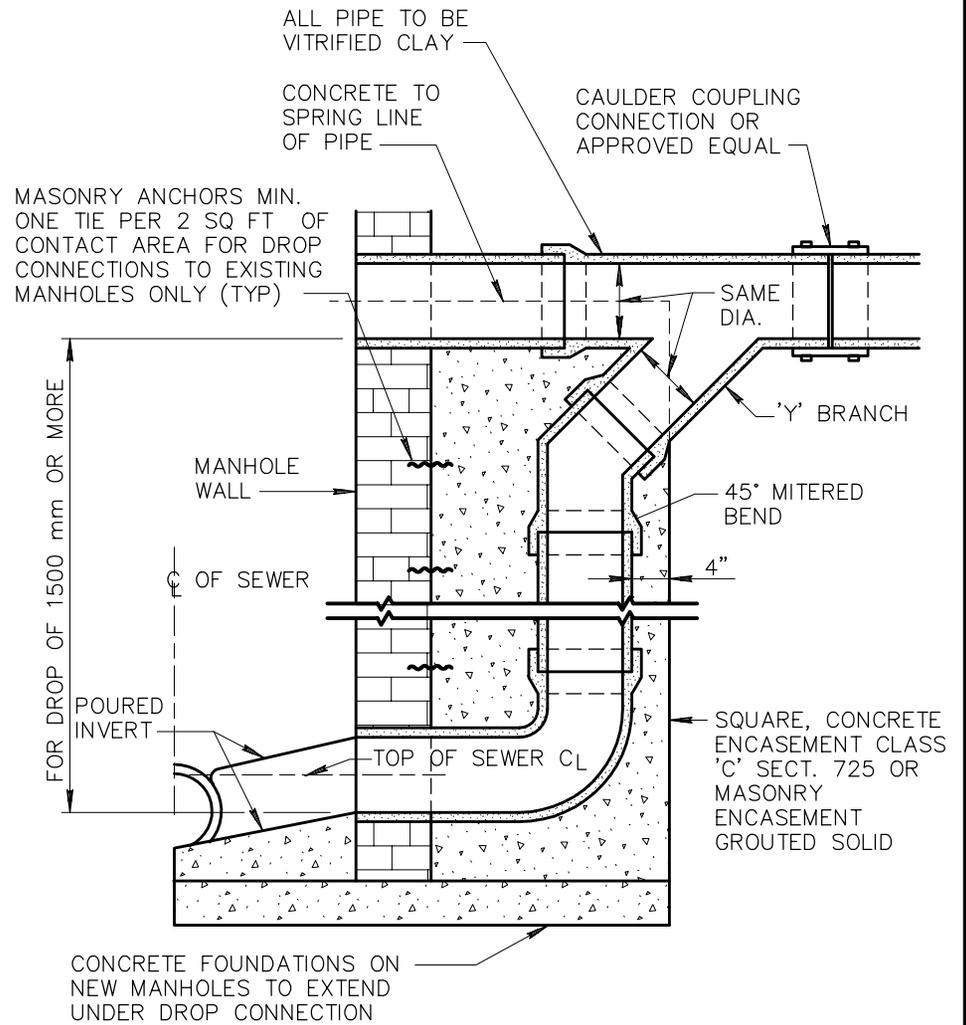
REVISED

DETAIL NO.

425



TYPE A
2.5' TO 5' DROP



TYPE B
5' OR MORE

DETAIL NO.

426



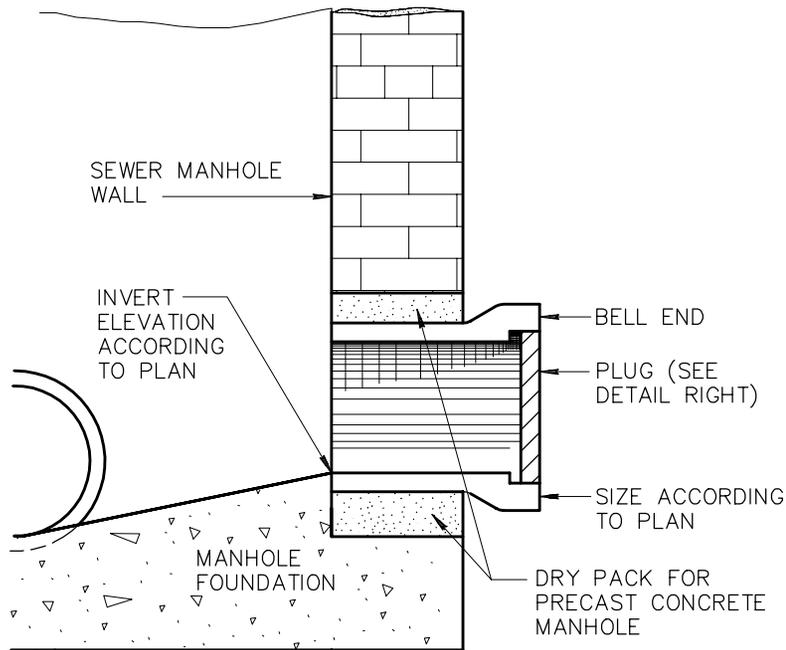
STANDARD DETAIL
ENGLISH

DROP SEWER CONNECTIONS

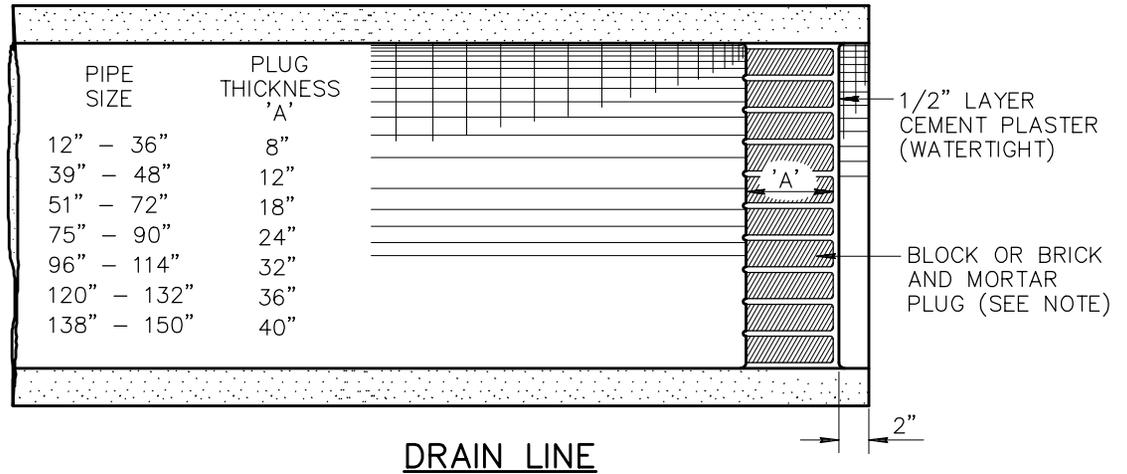
REVISED

DETAIL NO.

426



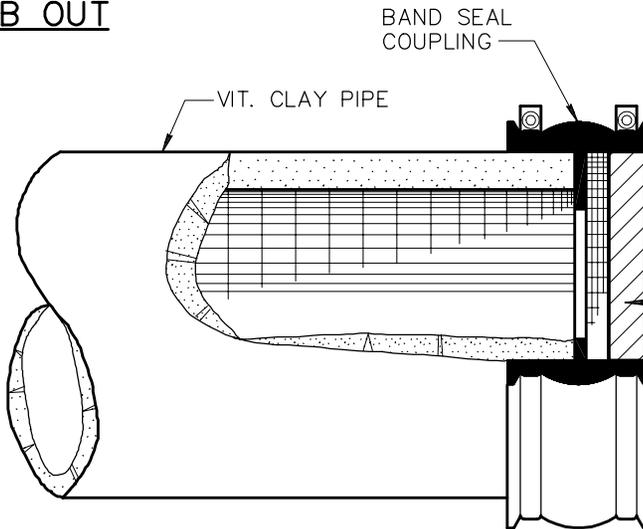
TYPICAL STUB OUT



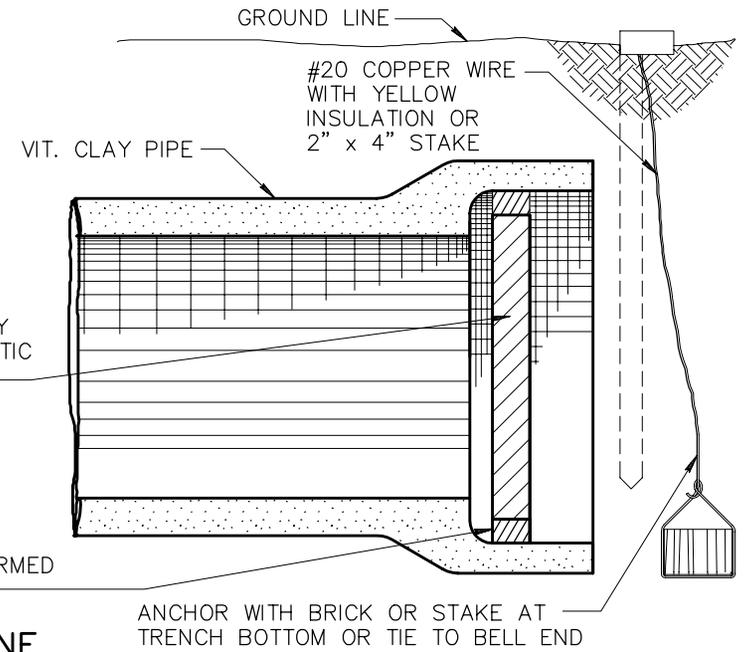
DRAIN LINE

NOTES:

- NOTE: COMPACT SOIL AT END OF PIPE TO 95% OF MAXIMUM DENSITY.
- IF DEPTH OF COVER IS LESS THAN 5' OR GREATER THAN 10' INCREASE PLUG THICKNESS A MIN. OF 4".



SEWER LINE



DETAIL NO.

427



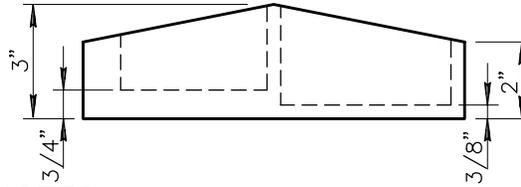
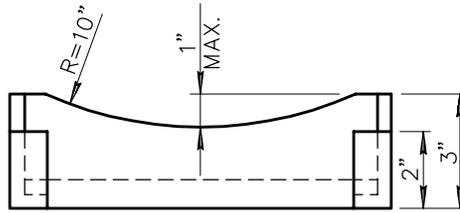
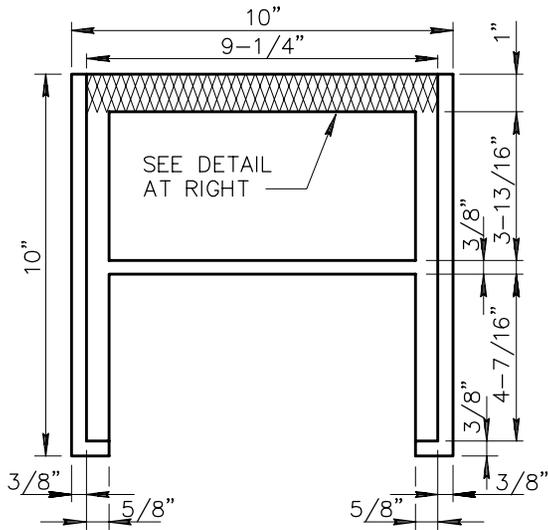
STANDARD DETAIL
ENGLISH

STUB OUT AND PLUGS

REVISED

DETAIL NO.

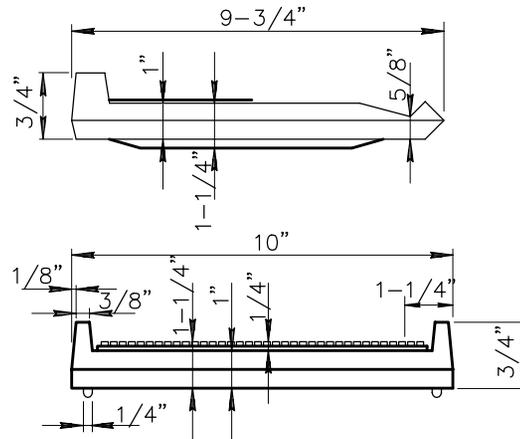
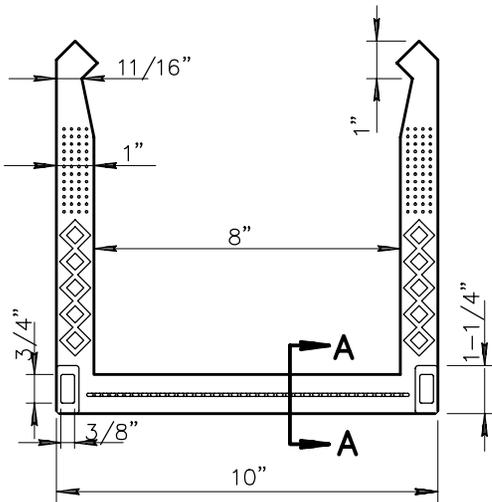
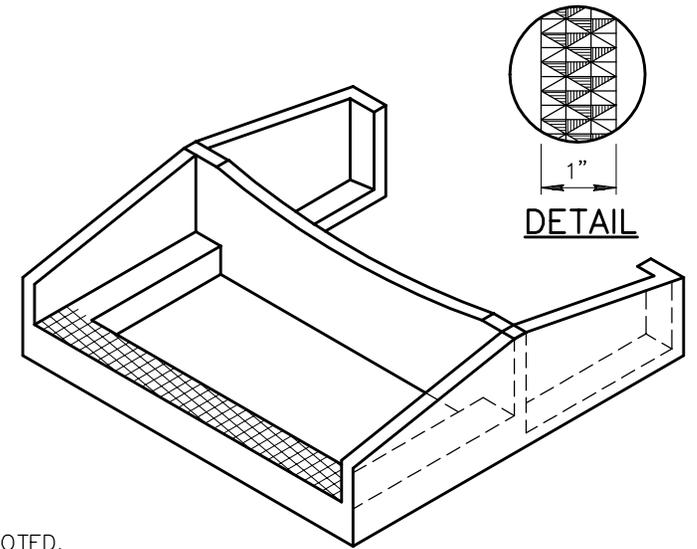
427



NOTES

1. ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE NOTED.
2. CASTING AS PER SECT. 787.

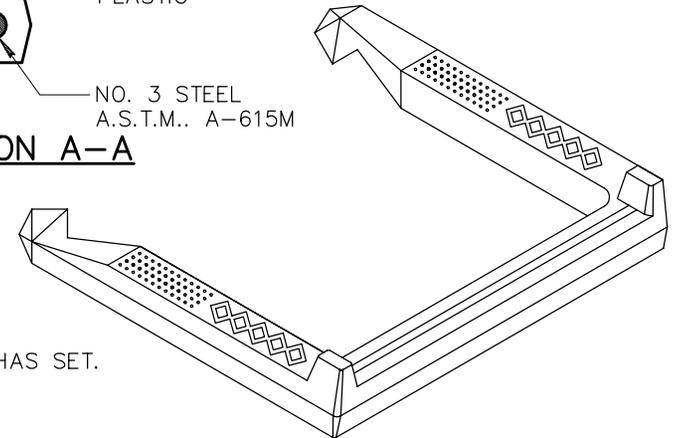
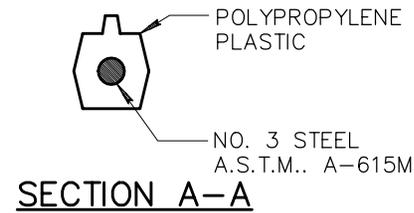
CAST IRON MANHOLE STEP



NOTES

1. STEPS SHALL BE PLACED INTO WET CONCRETE WALL DURING MANUFACTURE OR MORTARED INTO HOLES AFTER CONCRETE HAS SET.
2. POLYPROPYLENE MUST MEET REQUIREMENTS OF A.S.T.M. 2146, TYPE II, GRADE 16906.

POLYPROPYLENE MANHOLE STEP



DETAIL NO.

428



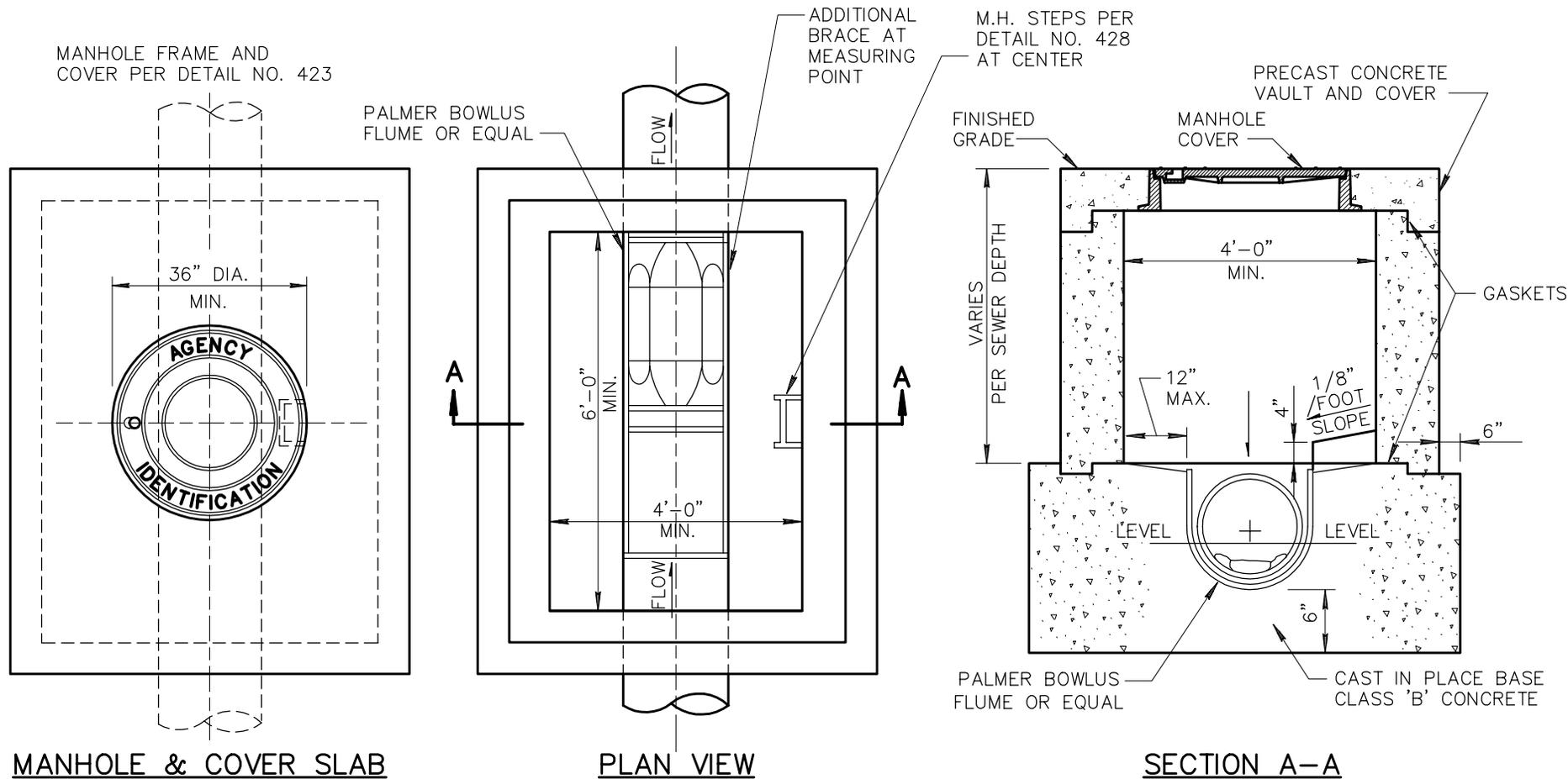
STANDARD DETAIL
ENGLISH

MANHOLE STEPS

REVISED

DETAIL NO.

428



MANHOLE & COVER SLAB

PLAN VIEW

NOTE: WITH COVER REMOVED.

SECTION A-A

NOTE: LADDER NOT SHOWN IN SECTION VIEW.
SECTION SHOWN WITH COVER IN PLACE.

NOTES:

- THIS CONTROL VAULT WITH MANHOLE AND COVER SHALL BE USED ON 6" AND 8" DIAMETER SEWER WITH FLOWS IN THE RANGE OF 40 TO 340 GPM.
- VAULT TO BE CONSTRUCTED ON STRAIGHT RUN OF BUILDING SEWER. ACCESSIBLE AND SAFELY LOCATED ON THE OWNERS PROPERTY ADJACENT TO A PUBLIC RIGHT-OF-WAY.
- THE PALMER BOWLUS FLUME SHALL BE INSTALLED PER THE MANUFACTURERS RECOMMENDATIONS.
- THE PRE-CAST CONCRETE VAULT SHALL BE RECTANGULAR WITH MINIMUM INSIDE DIMENSIONS OF 4" WIDE AND 6" LONG AND AT A DEPTH OF THE DESIGN OF THE BUILDING SEWER.
- A SHOP DRAWING SHALL BE SUBMITTED TO THE CONTRACTING AGENCY FOR APPROVAL BEFORE INSTALLATION OF THE VAULT AND THE PALMER BOWLUS FLUME WILL BE ALLOWED.

DETAIL NO.

429



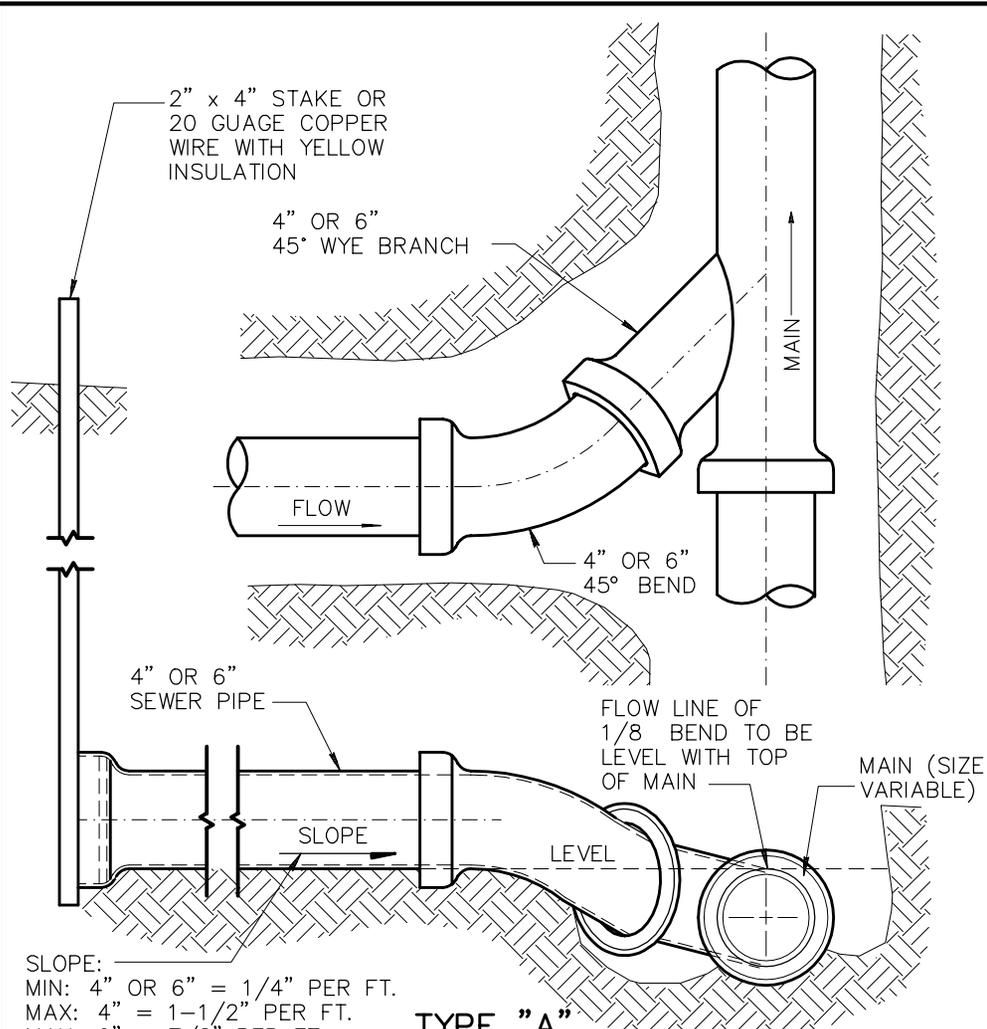
STANDARD DETAIL
ENGLISH

**INDUSTRIAL WASTE CONTROL
VAULT WITH MANHOLE**

REVISED

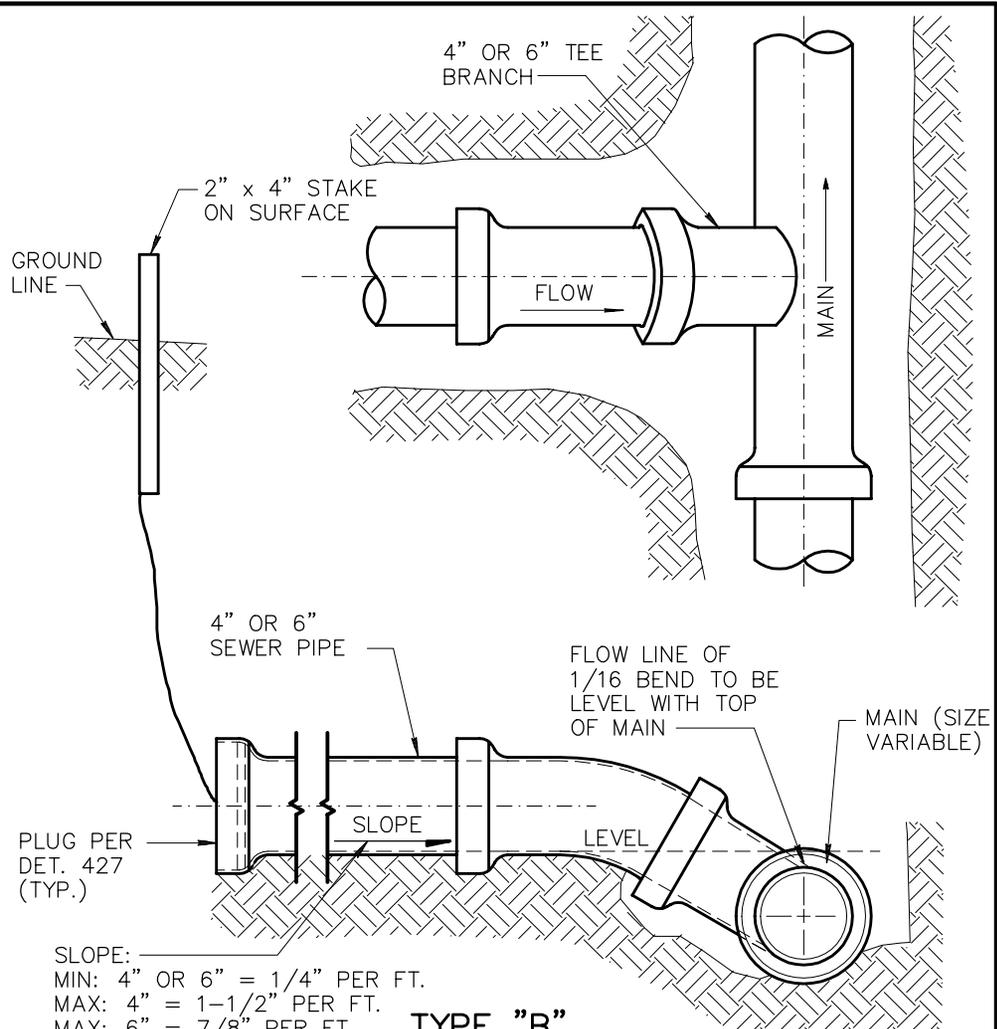
DETAIL NO.

429



SLOPE:
 MIN: 4" OR 6" = 1/4" PER FT.
 MAX: 4" = 1-1/2" PER FT.
 MAX: 6" = 7/8" PER FT.

TYPE "A"

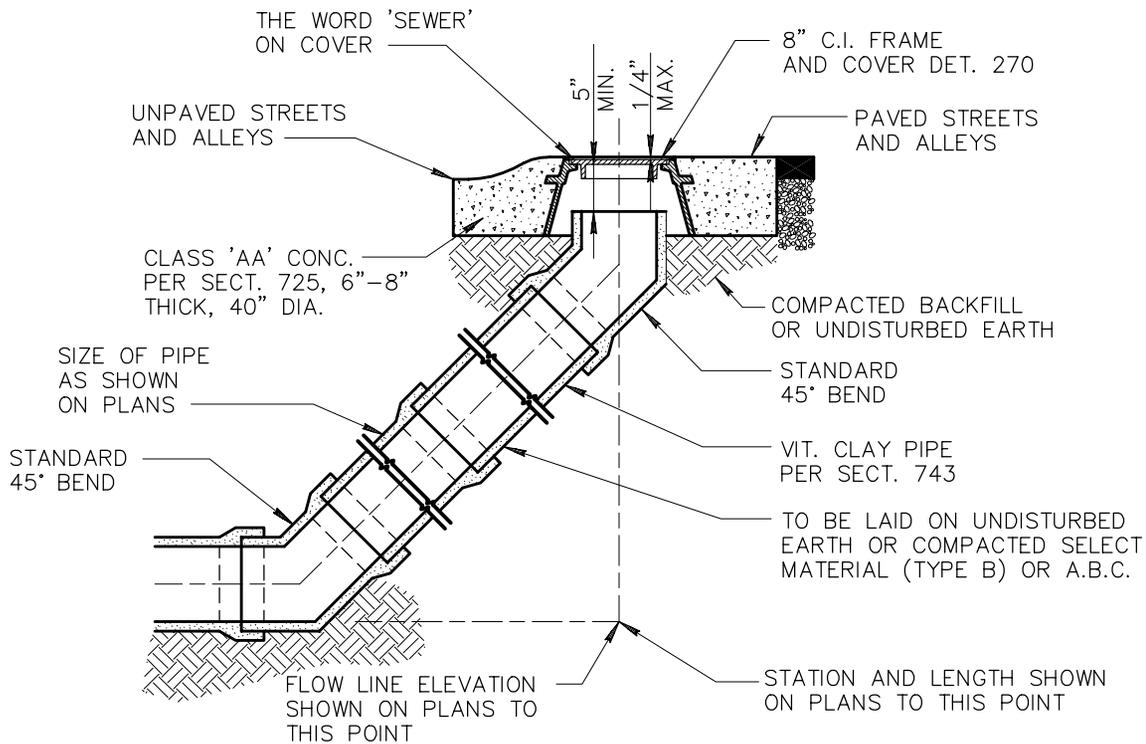


SLOPE:
 MIN: 4" OR 6" = 1/4" PER FT.
 MAX: 4" = 1-1/2" PER FT.
 MAX: 6" = 7/8" PER FT.

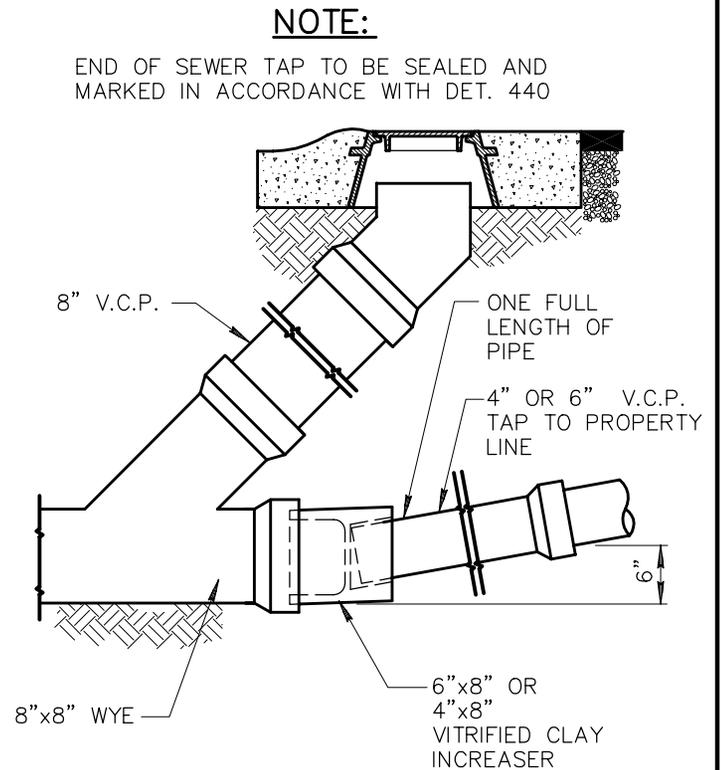
TYPE "B"

1. CONSTRUCTION DETAIL APPLIES WHERE CONTRACTOR BUILDS HOUSE CONNECTION. TAP EXTENDS TO PROPERTY LINE IN ALLEYS OR STREETS OR TO EASEMENT LINE.
2. SIZE OF TAP SHALL BE DESIGNATED ON PLANS.
3. DETAILS SHOWN MUST BE MET FOR MINIMUM CONDITION OF LESS THAN 5'.
4. CONSTRUCT TAP AT MINIMUM SLOPE IF COVER WILL BE LESS THAN 5' AT PROPERTY LINE.

5. IF DEPTH REQUIRES, MINIMUM SLOPE CAN BE REDUCED TO 1/8" PER FOOT PROVIDED STUB IS STAKED TO GRADE.
6. FOR DEEPER LATERAL OR TRUNK SEWER CONDITION, THE WYE AND 1/8 BEND OR THE TEE AND 1/16 BEND WILL BE ROTATED TOWARD THE VERTICAL POSITION AS REQUIRED TO OBTAIN 5' COVER OVER TAP AT PROPERTY LINE OR EASEMENT LINE.
7. END OF TAP TO BE SEALED AND MARKED AS NOTED.



CLEANOUT INSTALLATION



SEWER TAP AT CLEANOUT

DETAIL NO.

441



STANDARD DETAIL
ENGLISH

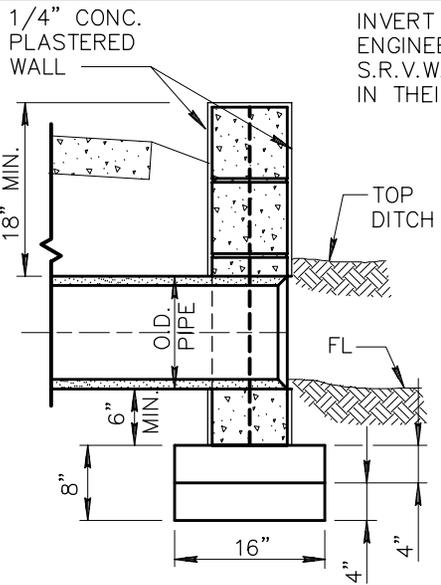
SEWER CLEANOUT

REVISED

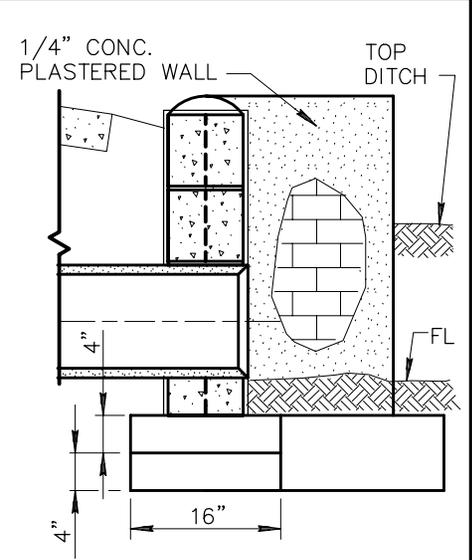
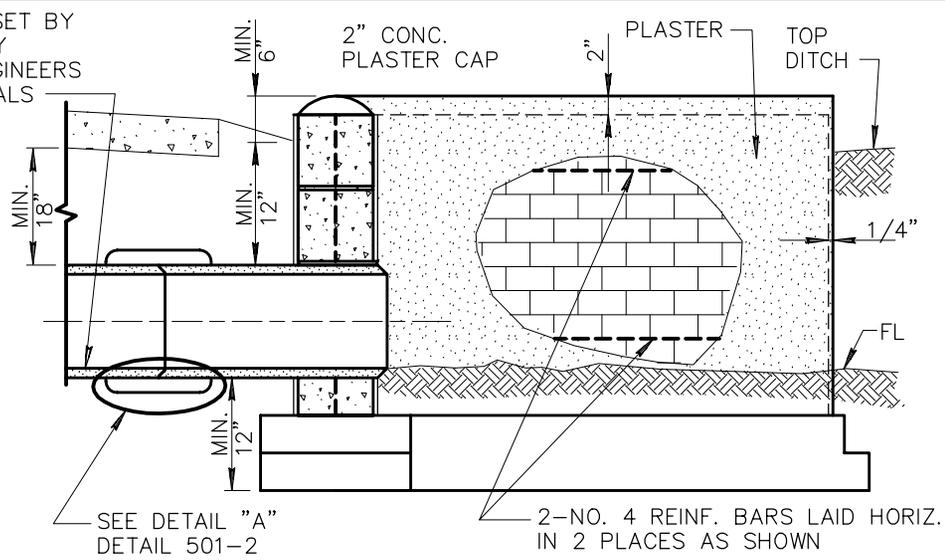
01-01-2001

DETAIL NO.

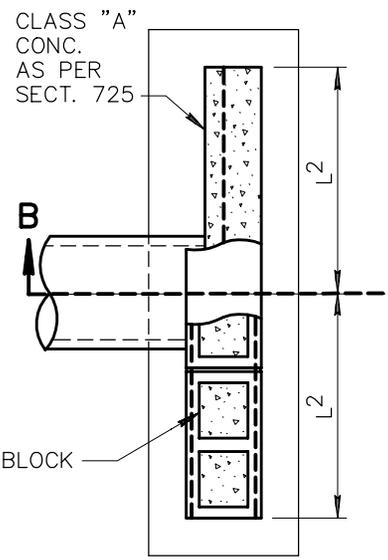
441



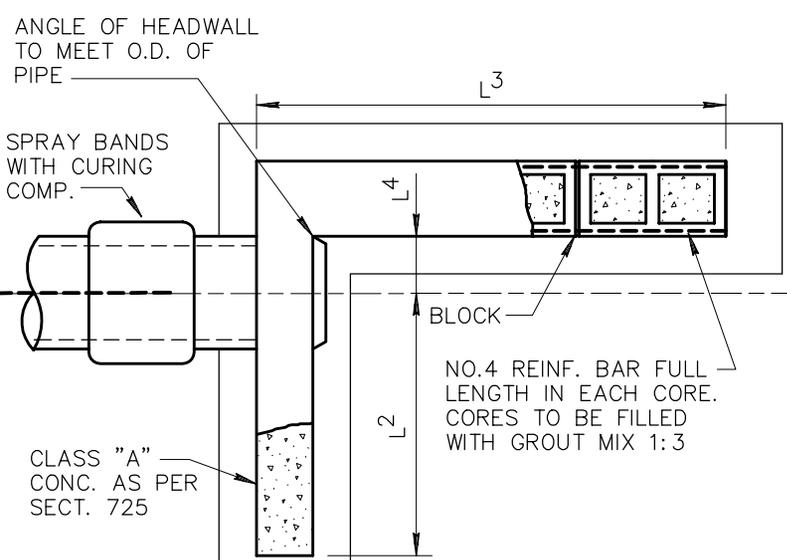
INVERT GRADE SET BY ENGINEER OR BY S.R.V.U.A. ENGINEERS IN THEIR LATERALS



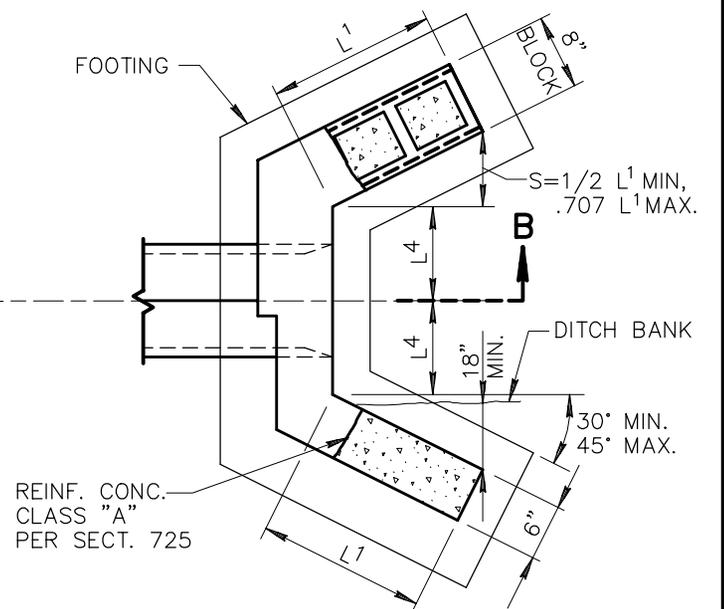
SECTION B-B



STRAIGHT TYPE



'L' TYPE PLAN



'U' TYPE

DETAIL NO. 501-1

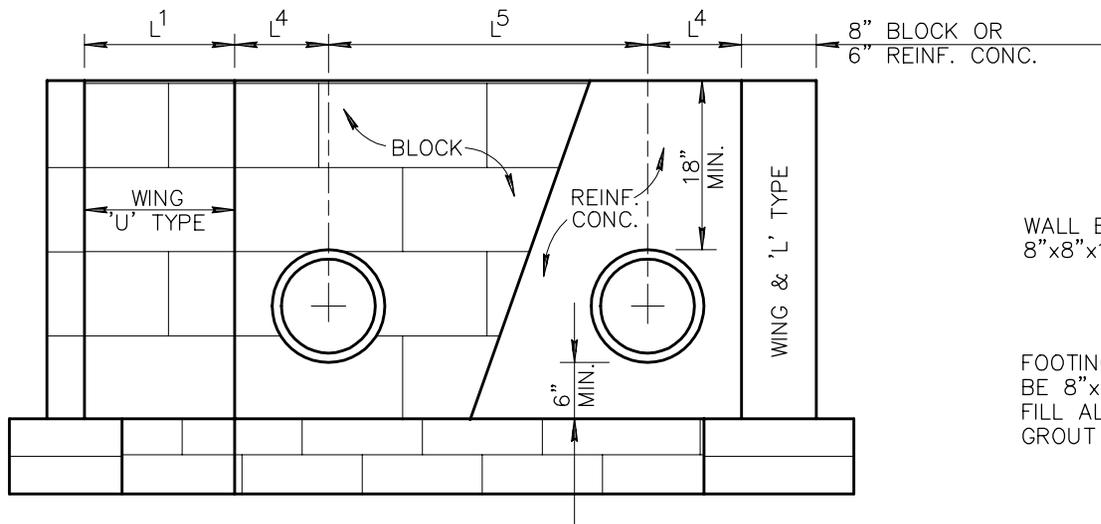


STANDARD DETAIL ENGLISH

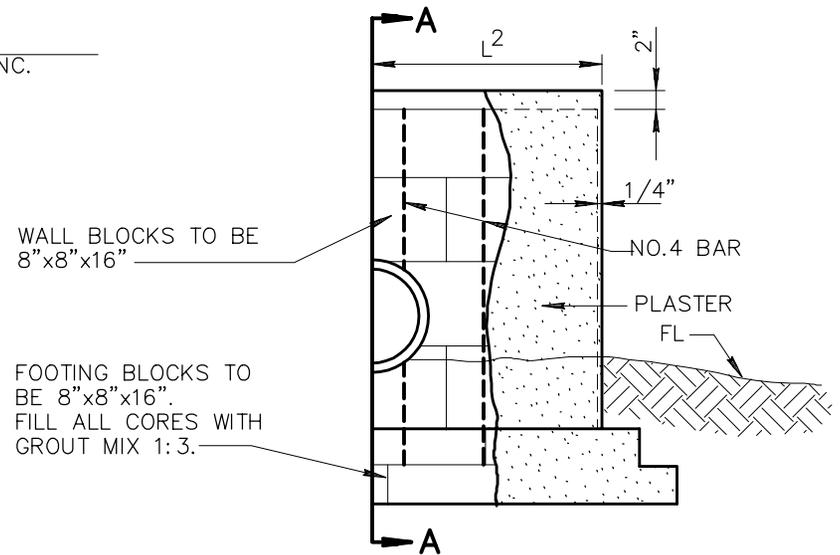
HEADWALL

REVISED

DETAIL NO. 501-1



DOUBLE PIPE HEADWALL



ELEVATION

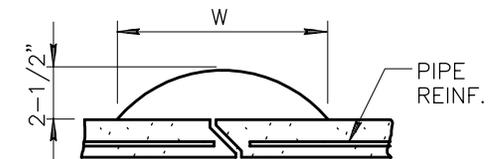
CONCRETE MASONRY UNITS (BLOCK) HEADWALLS JOINED WITH CEMENT MORTAR AND CONCRETE PLASTERED BOTH SIDES OF WALL FULL HEIGHT AND SHALL BE CURED PER SECT. 726.

NOTES:

1. ALL CONCRETE SHALL BE CLASS 'A' PER SECT. 505 & 725.
2. CONCRETE MASONRY UNITS (BLOCK) PER SECT. 510, 775 & 776.
3. CONCRETE REINF. SHALL BE NO.4 BAR 12" O.C. BOTH WAYS.

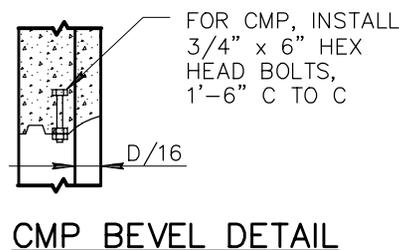
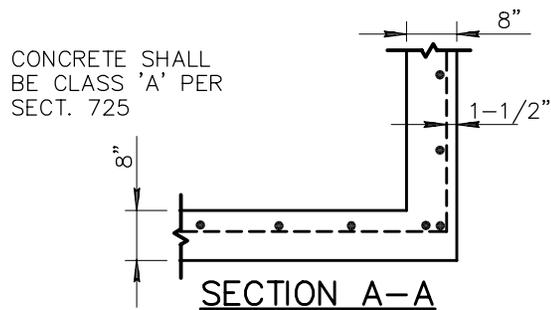
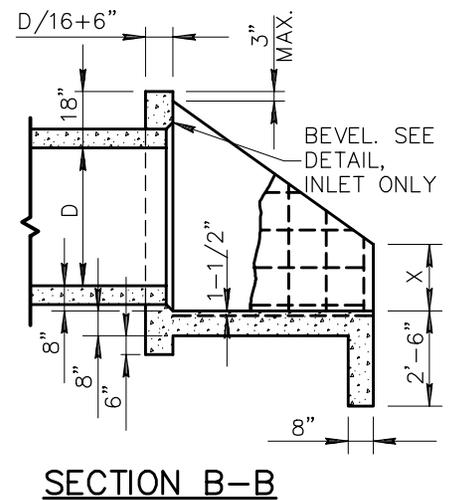
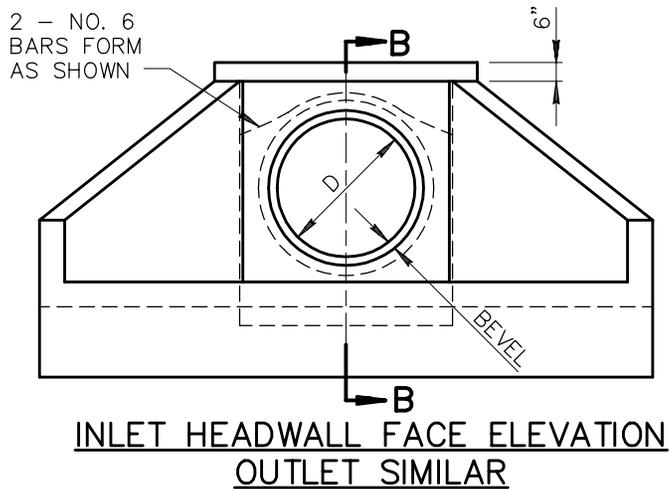
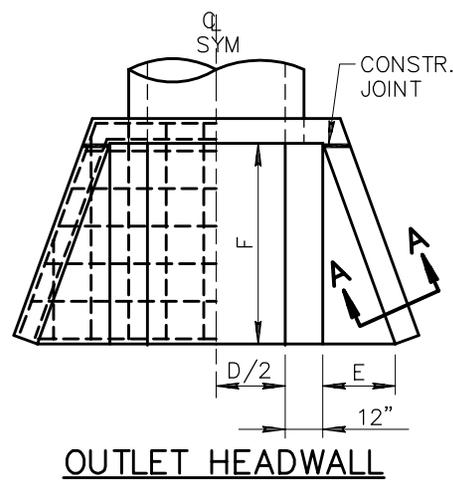
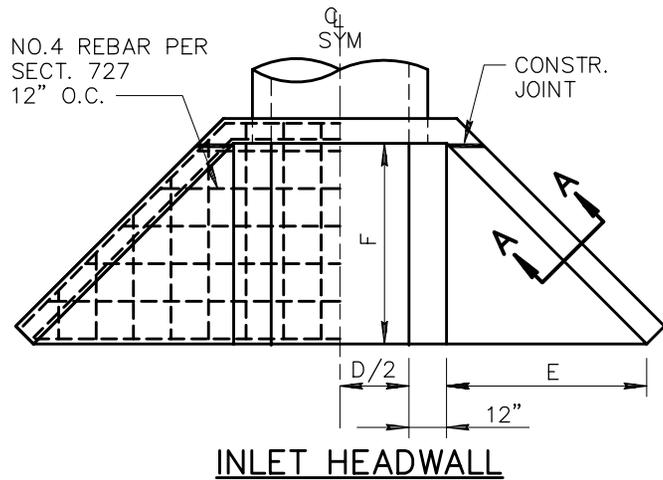
HEADWALL DIMENSIONS					
*NOMINAL PIPE SIZE	L ¹	L ²	L ³	L ⁴	L ⁵
12"	1'-4"	2'-0"	3'-8"	0'-10"	2'-10"
15"	2'-0"	2'-8"	4'-0"	1'-0"	3'-0"
18"	2'-0"	3'-8"	4'-8"	1'-2"	3'-4"
21"	2'-8"	4'-0"	5'-4"	1'-3"	3'-8"
24"	2'-8"	4'-0"	5'-4"	1'-6"	3'-11"
30"	2'-8"	5'-4"	6'-8"	1'-10"	4'-7"
36"	3'-4"	6'-8"	8'-0"	1'-10"	5'-2"
42"	4'-0"	8'-0"	9'-4"	2'-2"	5'-9"

* NOMINAL PIPE SIZE GIVEN FOR REINFORCED CONC. PIPE.



PIPE SIZE	W
12" - 21" INCL.	11"
24" - 42" INCL.	13"

DETAIL "A"



1:1 1/2 EMBANKMENT SLOPE

D	TYPE *	DIMENSIONS		
		F	E	X
42"	1 (IN)	5'-2"	5'-2"	1'-9"
	2 (OUT)	5'-2"	1'-11"	1'-9"
48"	3 (IN)	5'-8"	5'-8"	1'-11"
	4 (OUT)	5'-8"	2'-1"	1'-11"
54"	5 (IN)	6'-2"	6'-2"	2'-1"
	6 (OUT)	6'-2"	2'-3"	2'-1"
60"	7 (IN)	6'-8"	6'-8"	2'-3"
	8 (OUT)	6'-8"	2'-5"	2'-3"
66"	9 (IN)	7'-2"	7'-2"	2'-5"
	10 (OUT)	7'-2"	2'-7"	2'-5"
72"	11 (IN)	7'-8"	7'-8"	2'-7"
	12 (OUT)	7'-8"	2'-9"	2'-7"
78"	13 (IN)	8'-2"	8'-2"	2'-9"
	14 (OUT)	8'-2"	3'-0"	2'-9"
84"	15 (IN)	8'-8"	8'-8"	2'-11"
	16 (OUT)	8'-8"	3'-2"	2'-11"

1:4 EMBANKMENT SLOPE

D	TYPE *	DIMENSIONS		
		F	E	X
42"	17 (IN)	8'-8"	8'-8"	3'-0"
	18 (OUT)	8'-8"	3'-2"	3'-0"
48"	19 (IN)	8'-8"	8'-8"	3'-6"
	20 (OUT)	8'-8"	3'-2"	3'-6"
54"	21 (IN)	8'-8"	8'-8"	4'-0"
	22 (OUT)	8'-8"	3'-2"	4'-0"
60"	23 (IN)	9'-4"	9'-4"	4'-4"
	24 (OUT)	9'-4"	3'-5"	4'-4"
66"	25 (IN)	9'-8"	9'-8"	4'-9"
	26 (OUT)	9'-8"	3'-6"	4'-9"
72"	27 (IN)	9'-8"	9'-8"	5'-3"
	28 (OUT)	9'-8"	3'-6"	5'-3"
78"	29 (IN)	10'-0"	10'-0"	5'-8"
	30 (OUT)	10'-0"	3'-8"	5'-8"
84"	31 (IN)	10'-8"	10'-8"	6'-0"
	32 (OUT)	10'-8"	3'-11"	6'-0"

* (IN) REFERS TO INLET
(OUT) REFERS TO OUTLET

DETAIL NO.
501-3

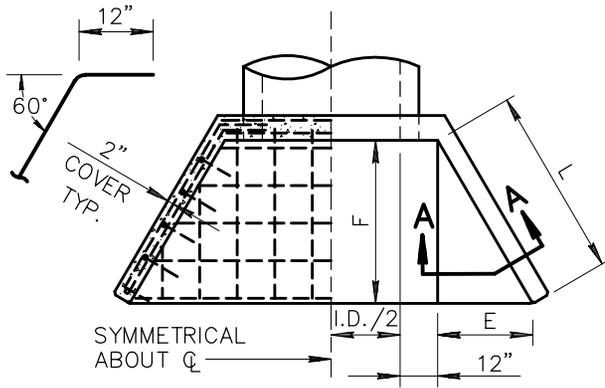


STANDARD DETAIL
ENGLISH

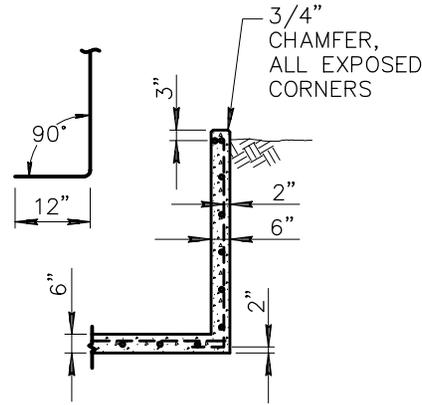
HEADWALL 42" TO 84" PIPE

REVISED

DETAIL NO.
501-3

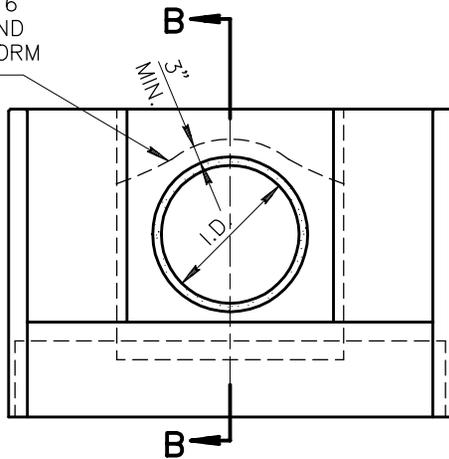


PLAN

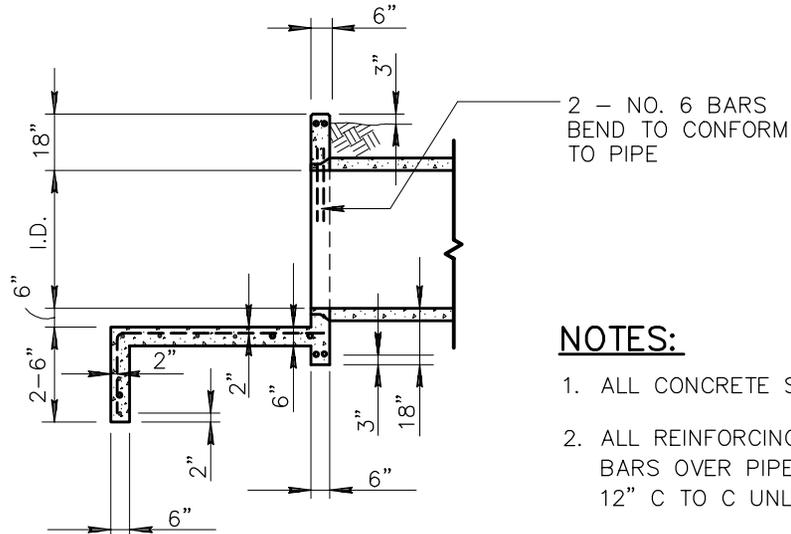


SECTION A-A

2 - NO. 6 BARS BEND TO CONFORM TO PIPE



ELEVATION



2 - NO. 6 BARS BEND TO CONFORM TO PIPE

SECTION B-B

PIPE I.D.	DIMENSIONS		
	L	E	F (APPROX)
18"	2'-0"	1'-0"	1'-9"
24"	2'-0"	1'-0"	1'-9"
30"	3'-0"	1'-6"	2'-7"
36"	4'-0"	2'-0"	3'-6"
42"	5'-0"	2'-6"	4'-4"
48"	6'-0"	3'-0"	5'-2"
54"	7'-0"	3'-6"	6'-1"
60"	8'-0"	4'-0"	6'-11"

NOTES:

1. ALL CONCRETE SHALL BE CLASS 'A' PER SECT. 725.
2. ALL REINFORCING BARS SHALL BE NO. 4 EXCEPT NO. 6 BARS OVER PIPE. BAR SPACING APPROXIMATELY 12" C TO C UNLESS OTHERWISE NOTED.
3. 30° WING WALL FLARE SHOWN; 45° NORMALLY DESIRABLE.

DETAIL NO.
501-4

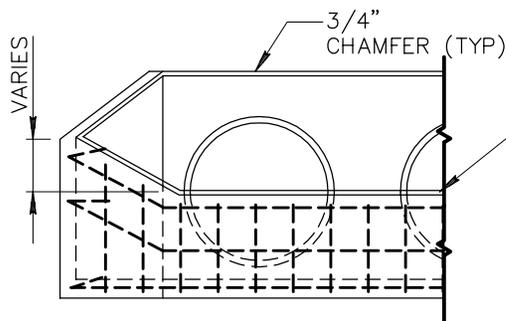
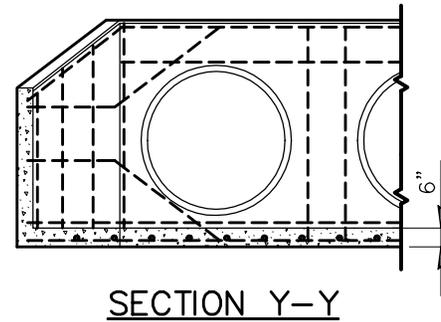
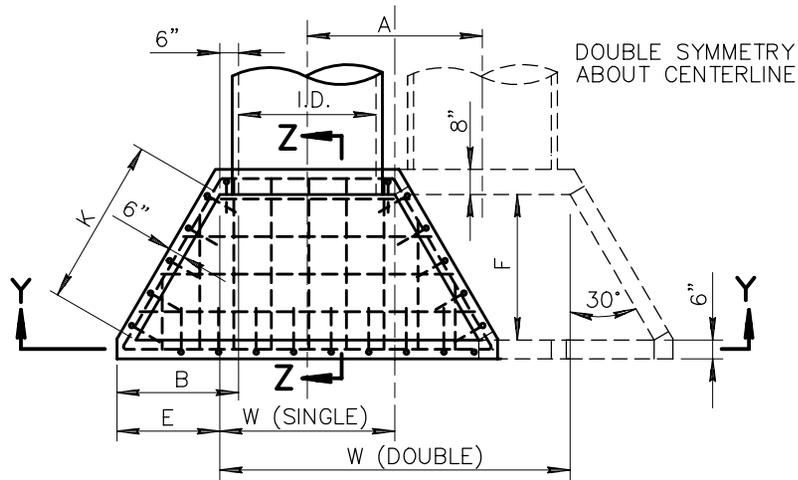


STANDARD DETAIL
ENGLISH

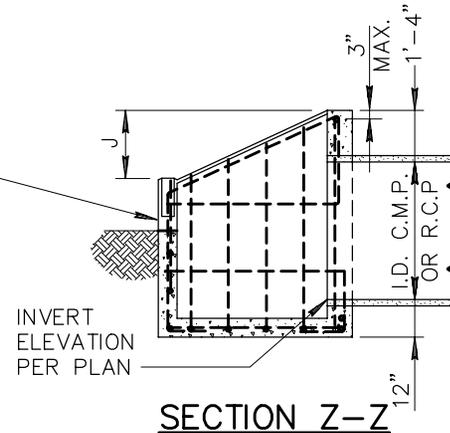
HEADWALL IRRIGATION
18" TO 60" PIPE

REVISED

DETAIL NO.
501-4



ELEVATION PER PLAN



INVERT ELEVATION PER PLAN

PIPE	DIMENSIONS							
	W		A	B	E	F	J	K
	SINGLE	DOUBLE						
18"	2'-6"	5'-2"	2'-8"	1'-3"	0'-9"	1'-3.5/8"	9"	1'-6"
24"	3'-0"	6'-6"	3'-6"	1'-7.1/2"	1'-1.1/2"	1'-11.3/8"	11"	2'-3"
30"	3'-6"	7'-10"	4'-4"	2'-0"	1'-6"	2'-7.1/4"	1'-1"	3'-0"
36"	4'-0"	9'-2"	5'-2"	2'-4.1/2"	1'-10.1/2"	3'-3"	1'-4"	3'-9"
42"	4'-6"	10'-6"	6'-0"	2'-9"	2'-3"	3'-10.3/4"	1'-6"	4'-6"

NOTES:

1. HIGH POINT OF HEADWALL SHALL NOT PROJECT MORE THAN 3" ABOVE SLOPE.
2. ALL CONCRETE SHALL BE CLASS 'A' PER SECT. 725.
3. ALL REINFORCING BARS SHALL BE NO. 4, 12" C TO C AND 3" CLEAR TO INSIDE OF FLOOR AND WALLS.

DETAIL NO.
501-5

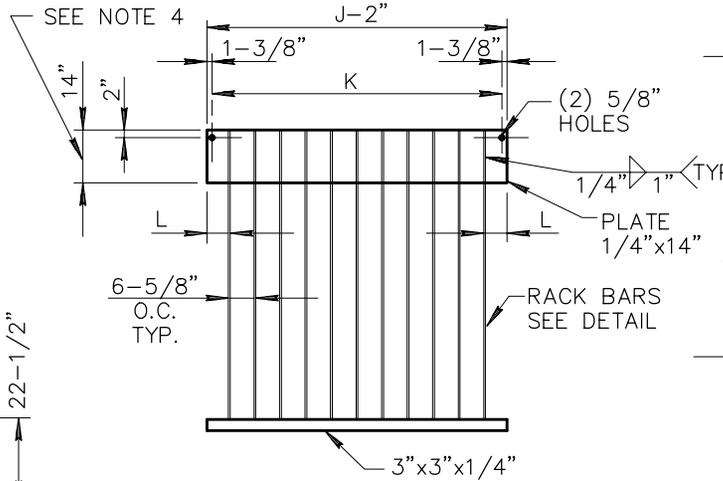
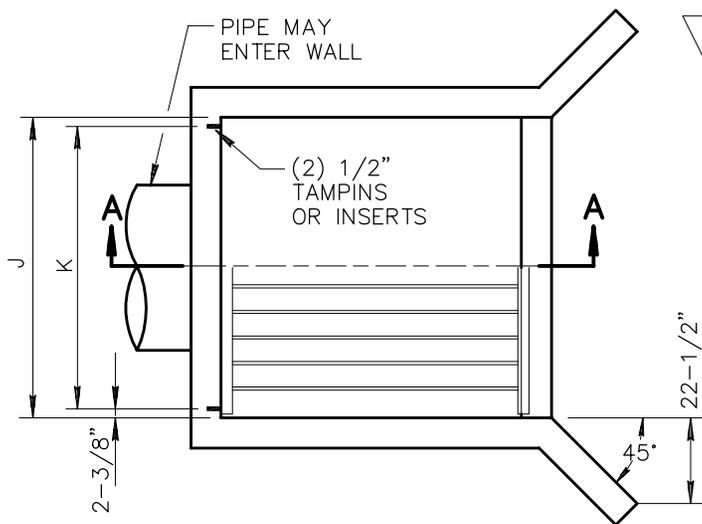


STANDARD DETAIL
ENGLISH

HEADWALL DROP INLET

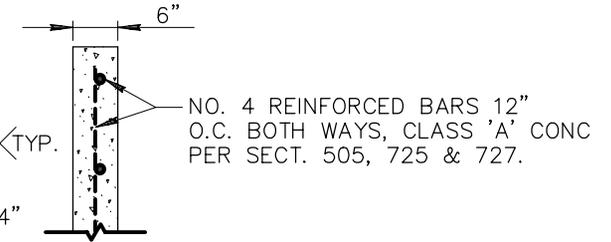
REVISED

DETAIL NO.
501-5

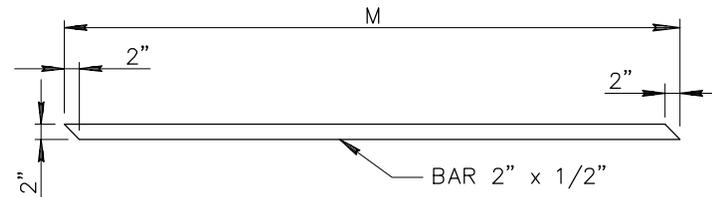
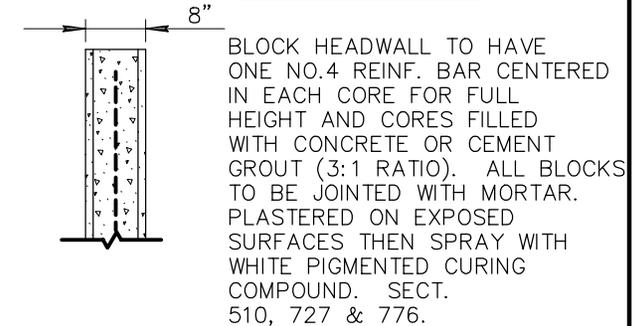


TRASH RACK

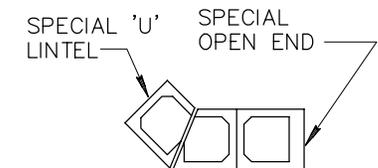
POURED WALLS



BLOCK WALLS



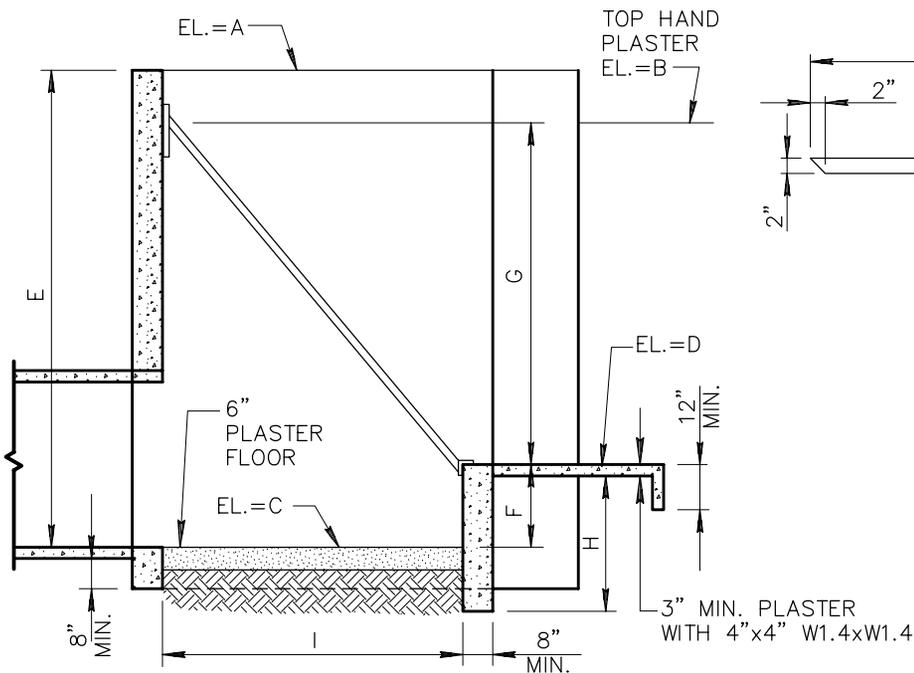
RACK BARS



45° BLOCK CORNER

NOTES:

1. REMOVE ALL SCALE FROM RACK BARS. METAL SPRAY OR PAINT WITH ONE COAT ZINC CHROMATE OR RED LEAD PRIMER (INDUSTRIAL QUALITY). OVERCOAT WITH GREY INDUSTRIAL ENAMEL SECT. 790.
2. SHAPE, COMPACT AND PLASTER NEW DITCH FROM HEADWALL TO UNDISTURBED EXISTING DITCH. PLASTER TO EXTEND TO MINIMUM ELEVATION NOTED 3 FEET BEYOND CONNECTION TO UNDISTURBED EXISTING DITCH.
3. ELEVATIONS A, B, C & D AND DIMENSIONS E, F, G, H, I, J, K, L & M WILL BE SHOWN ON PLANS. DIMENSIONS SHOULD PROVIDE STANDARD SIZE BLOCK.
4. 14" PLATE SHALL NOT EXTEND BELOW TOP OF PIPE.



SECTION A-A

DETAIL NO.
502-1

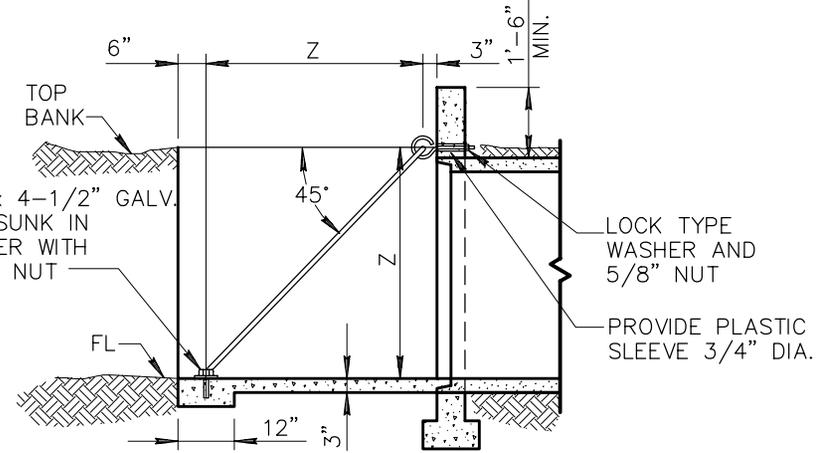
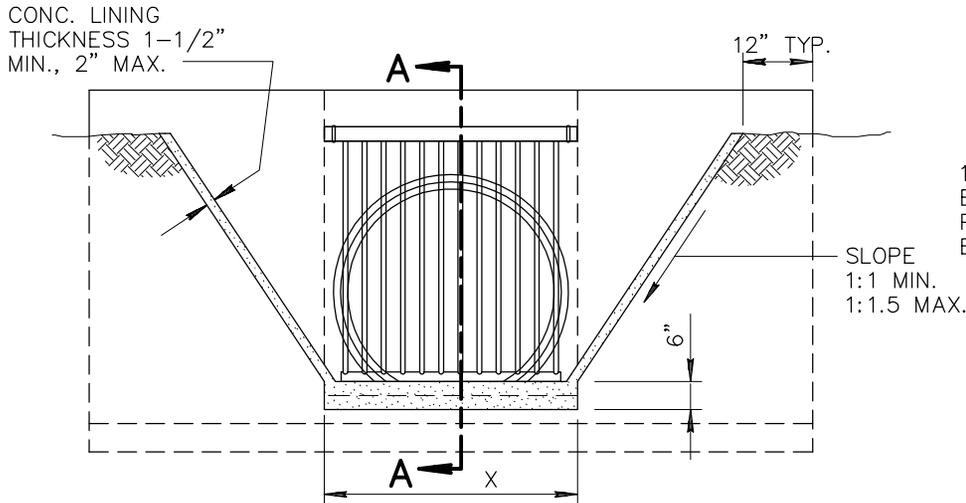
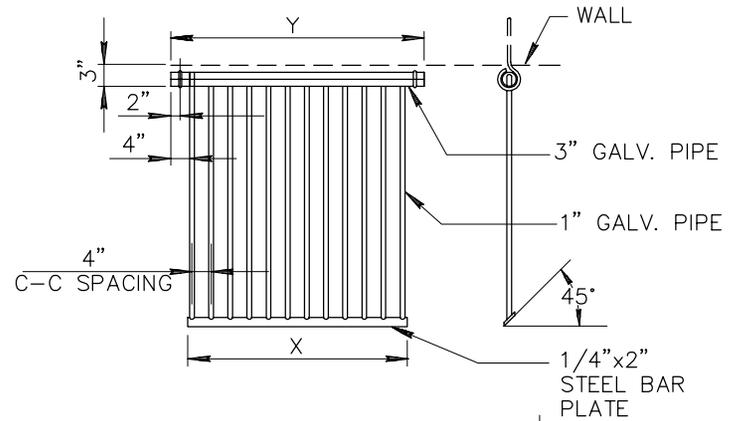
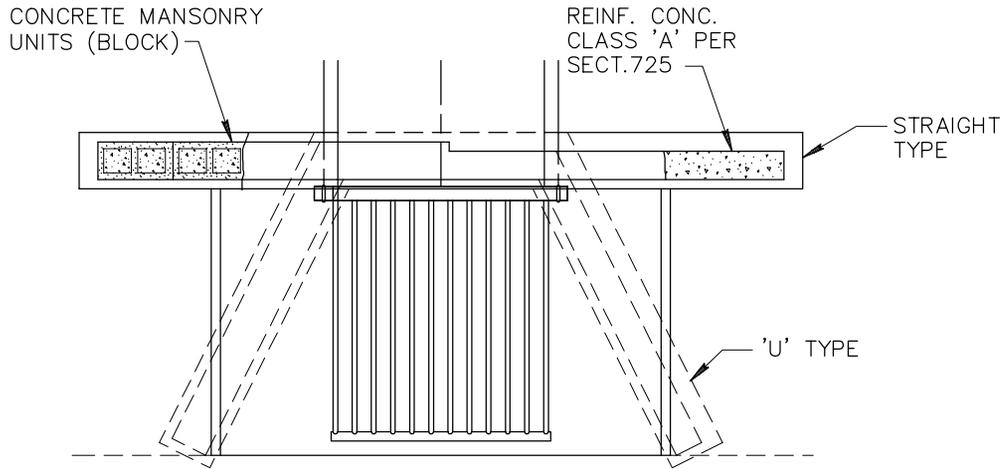


STANDARD DETAIL
ENGLISH

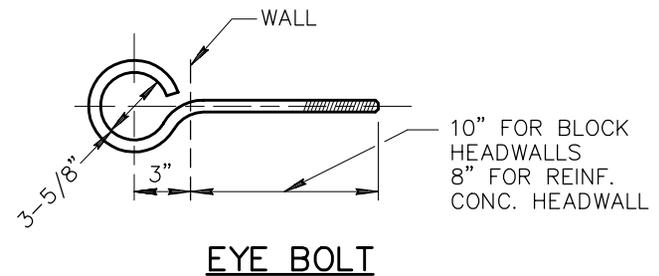
TRASH RACK

REVISED

DETAIL NO.
502-1



TYPE BASED ON PIPE SIZE						
TYPE	PIPE SIZE	NO. OF BARS	LENGTH OF BARS	DIMENSIONS		
				X	Y	Z
A	18"	6	3'-7"	1'-9"	2'-5"	2'-5"
	24"	8	3'-7"	2'-5"	3'-1"	2'-5"
B	30"	10	4'-4.1/4"	3'-1"	3'-9"	2'-11.1/2"
C	36"	10	5'-1.1/2"	3'-1"	3'-9"	3'-6"
D	42"	12	5'-10.5/8"	3'-9"	4'-5"	4'-0.1/2"
E	48"	14	6'-7.3/4"	4'-5"	5'-1"	4'-7"



DETAIL NO.
502-2



STANDARD DETAIL
ENGLISH

TRASH RACK

REVISED

DETAIL NO.
502-2

NOTE:
PAINT COVER BOTH SIDES
ONE PRIME COAT, TWO
FINISH COATS, SECT.
790, PAINT NO. 9

10 GAUGE SHEET
STEEL COVER

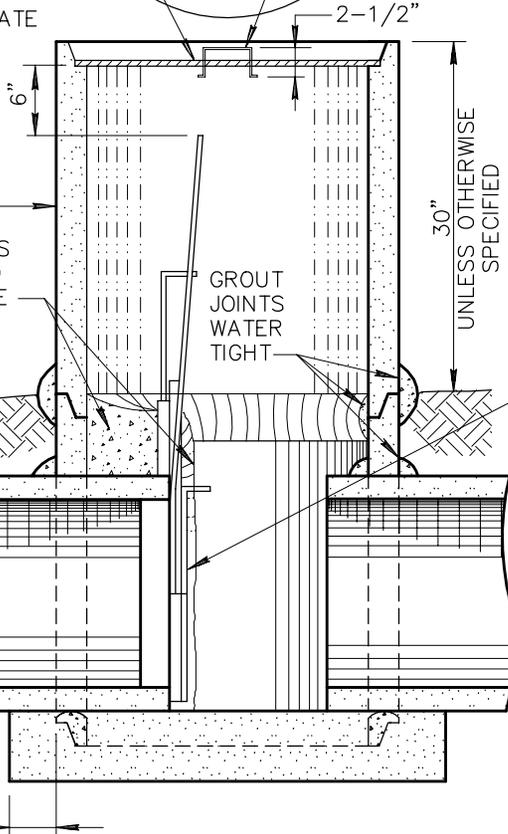
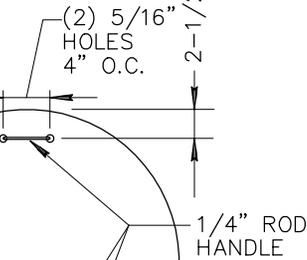
HANDLE EXTENDS
6" BELOW
TOP WHEN GATE
IS OPEN

STANDARD
CONCRETE
PIPE

CONCRETE AS
REQUIRED TO
SECURE GATE

FINISH
GRADE

VARIABLE

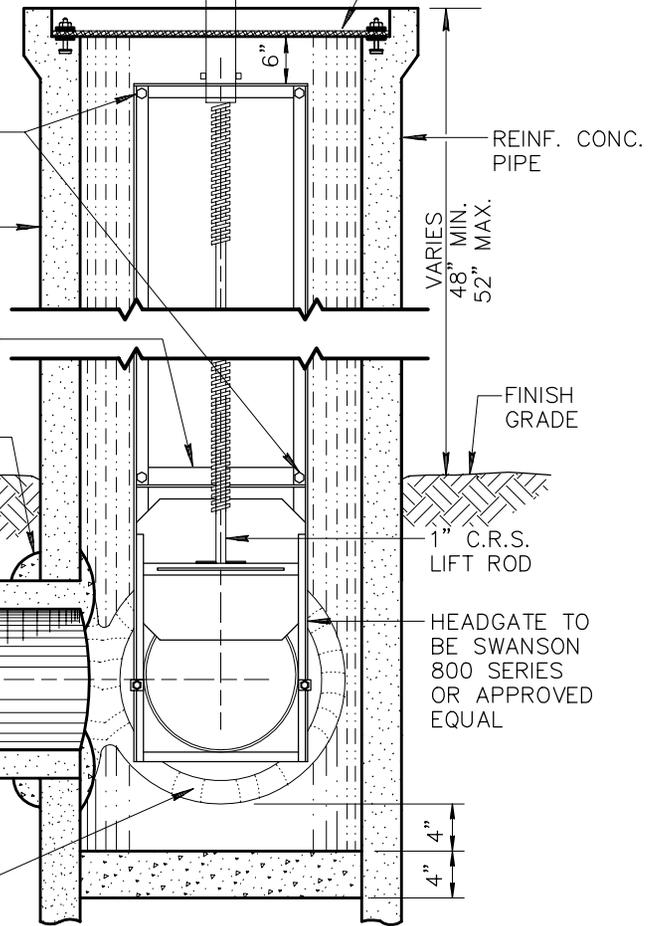
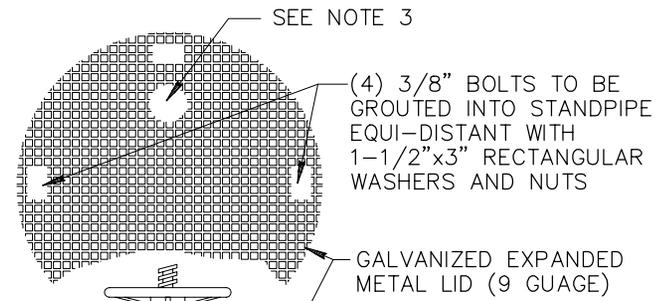


TYPE 'A'

NOTES:

1. BRACE TO BE INSTALLED EVERY 2' FROM TOP OF HEADGATE FRAME. BOTTOM BRACE TO BE HIGH ENOUGH TO ENABLE FULL OPENING OF HEADGATE.
2. INSTALL 1/2" BOLTS INTO LEAD PLUG DRILLED TO WITHIN 1" OF OUT SIDE OF STANDPIPE. SPACERS TO BE INSTALLED AT EACH BOLT BETWEEN HEADGATE FRAME AND INSIDE OF STAND PIPE.
3. LOCATION OF 2" HOLE FOR GATE STEM TO BE DETERMINED AFTER INSTALLATION OF GATE.
4. CONCRETE SHALL BE CLASS A PER SECT. 725.

PAINT ARROW ON OUTSIDE OF STANDPIPE INDICATING DIRECTION "TO OPEN" HEADGATE.



TYPE 'B'

DETAIL NO.

503



STANDARD DETAIL
ENGLISH

IRRIGATION STANDPIPE

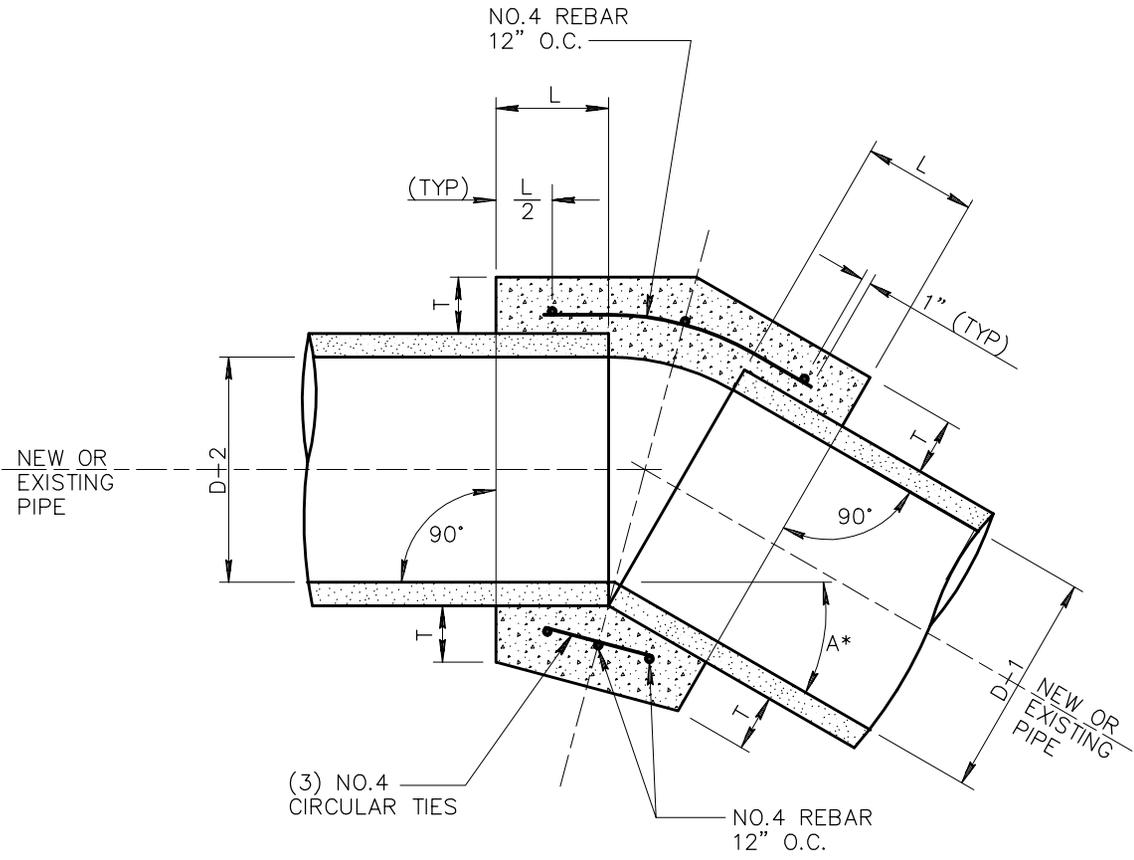
REVISED

DETAIL NO.

503

NOTES:

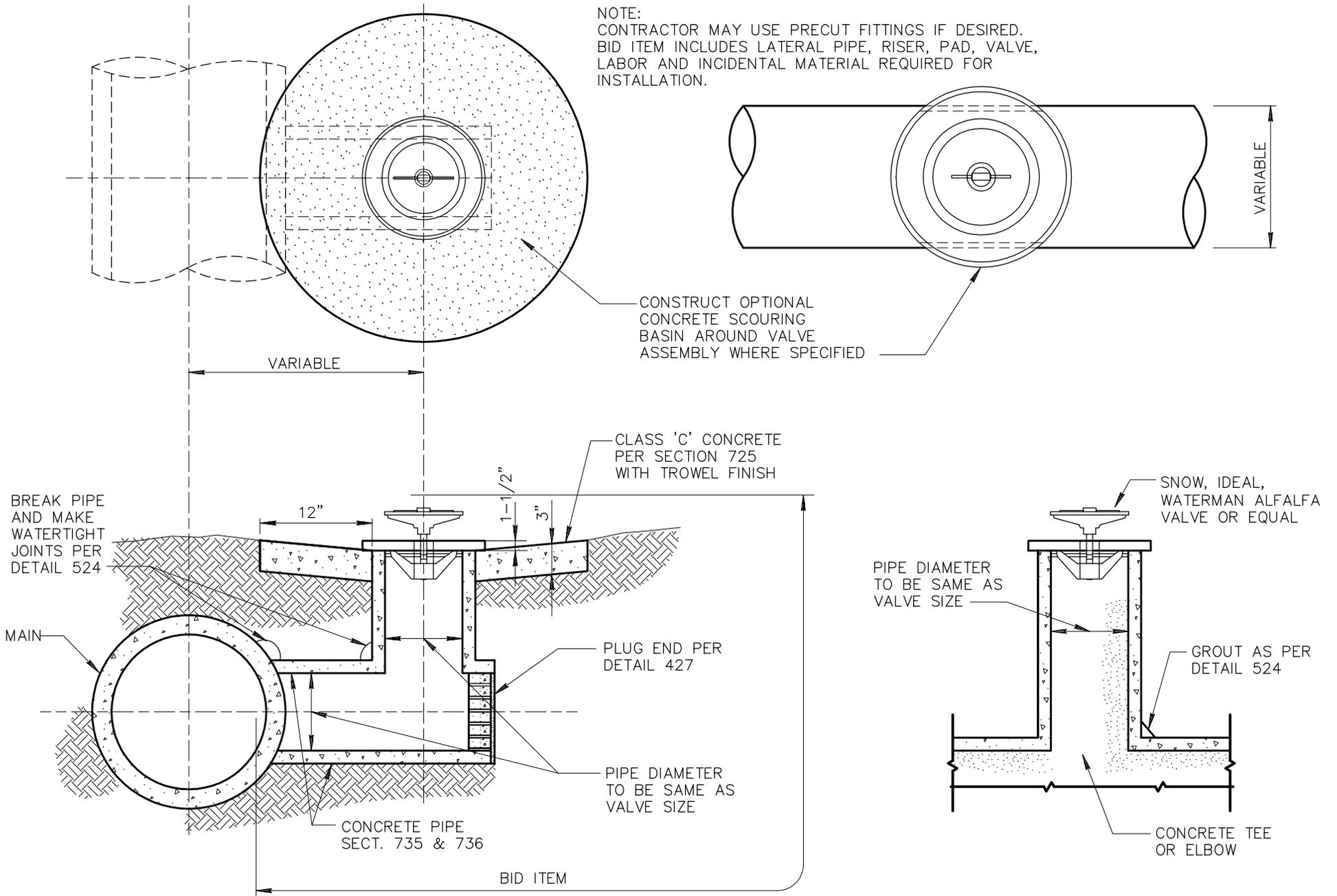
1. A CONCRETE COLLAR IS REQUIRED WHERE PIPES OF DIFFERENT DIAMETERS OR MATERIALS ARE JOINED, OR WHERE THE CHANGE IN ALIGNMENT OR GRADE EXCEEDS THAT ALLOWED FOR ON ORDINARY JOINTS.
2. WHERE PIPES OF DIFFERENT DIAMETERS ARE JOINED WITH A CONCRETE COLLAR, L AND T SHOULD BE THOSE OF THE LARGER PIPE. D=D-1, OR D-2 WHICHEVER IS GREATER.
3. FOR PIPE SIZES NOT LISTED AND LESS THAN 66" USE NEXT SIZE LARGER.
4. OMIT REINFORCING ON PIPE 24" OR LESS IN DIAMETER.
5. WHERE REINFORCING IS REQUIRED, THE DIAMETER OF THE CIRCULAR TIES SHALL BE....
OUTSIDE DIAMETER OF PIPE+T.
6. FIELD CLOSURES OF PIPE OF THE SAME DIAMETER AND WITHOUT CHANGE IN GRADE OR ALIGNMENT SHALL BE MADE WITH A CONCRETE COLLAR.
7. CONCRETE SHALL BE CLASS B PER SECT. 725.



A*=ANGLE OF DEFLECTION

TABLE		
D	L	T
12"	1.0'	4"
18"	1.0'	5"
24"	1.0'	6"
36"	1.5'	8"
48"	1.5'	10"
57"	1.5'	10"
60"	1.75'	11"
66"	1.75'	11"

NOTE:
 CONTRACTOR MAY USE PRECUT FITTINGS IF DESIRED.
 BID ITEM INCLUDES LATERAL PIPE, RISER, PAD, VALVE,
 LABOR AND INCIDENTAL MATERIAL REQUIRED FOR
 INSTALLATION.



DETAIL NO.

506



STANDARD DETAIL
 ENGLISH

IRRIGATION VALVE INSTALLATION

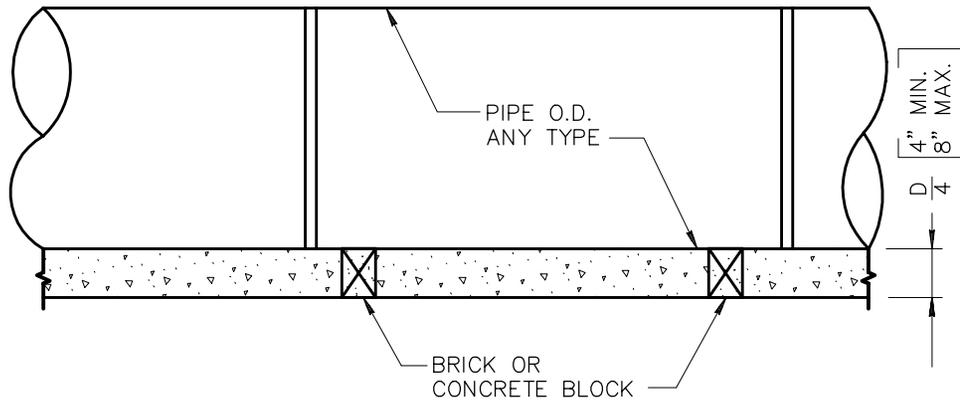
REVISED

DETAIL NO.

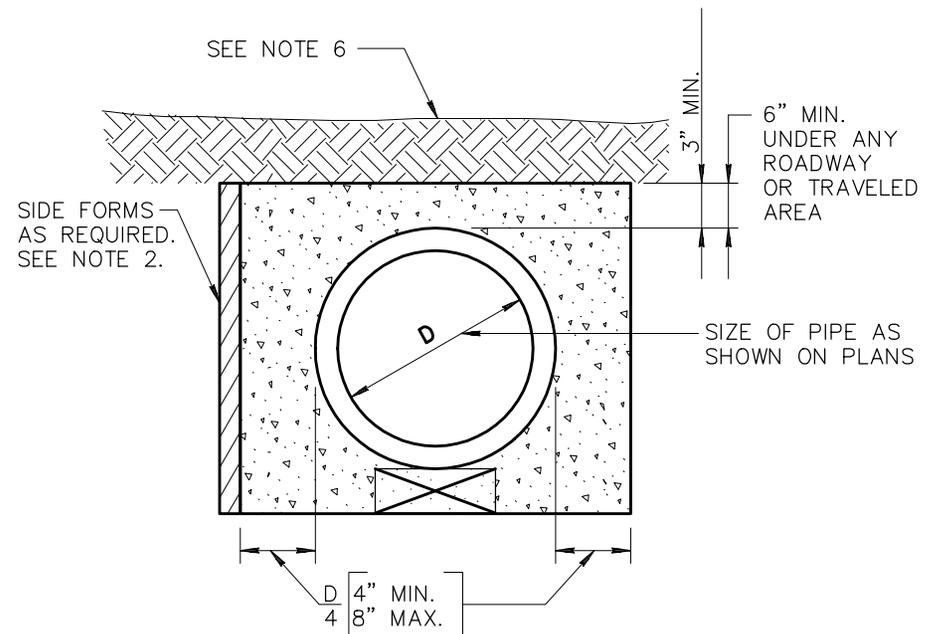
506

NOTES:

1. THIS DETAIL SHALL BE REQUIRED WHEN NEW OR EXISTING PIPE INSTALLATIONS WILL BE SUBJECT TO DAMAGE ANYTIME IN THE FUTURE DUE TO LACK OF PROPER COVER, AS DETERMINED BY THE ENGINEER.
2. FOR PIPE OVER 18" I.D. WOOD, METAL OR GYPSUM BOARD FORMS MUST BE USED TO FORM THE SIDES OF THE ENCASEMENT. GYPSUM BOARD FORMS MAY BE LEFT IN THE GROUND BELOW THE TOP OF THE ENCASEMENT. THIS SHALL BE OPTIONAL WITH POURING AGAINST TRENCH WALLS FOR ENCASEMENT OF 18" AND SMALLER PIPE.
3. FOR ALL SITUATIONS WHERE SIDE FORMS ARE USED, TRENCH WALLS SHALL BE OVER-EXCAVATED TO ALLOW SUFFICIENT ROOM TO OPERATE PROPER MECHANICAL COMPACTION EQUIPMENT.
4. CONCRETE WHICH SPILLS BEYOND 12" FROM THE SIDES OF THE PIPE FOR ANY REASON SHALL BE REMOVED BACK TO THE PROPER LINE PRIOR TO BACKFILLING.
5. SEE SECTION 601 FOR TRENCH PREPARATION.
6. CONCRETE TO BE CLASS 'A' PER SECT. 725.
7. COVER TO BE APPROVED BY ENGINEER.



LONGITUDINAL SECTION



END SECTION

DETAIL NO.

507



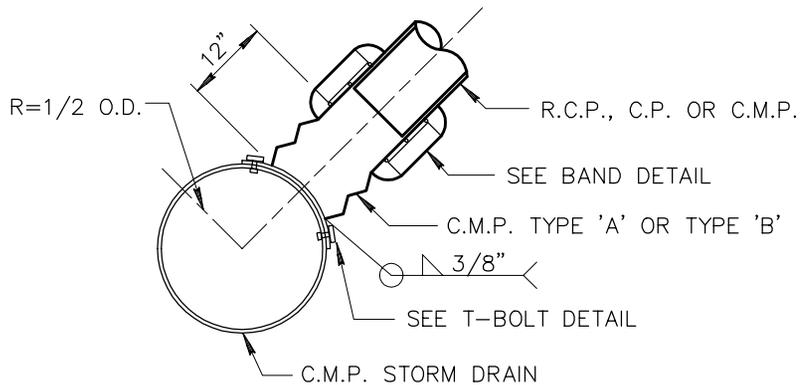
STANDARD DETAIL
ENGLISH

**ENCASED CONCRETE PIPE
(FOR SHALLOW INSTALLATION)**

REVISED

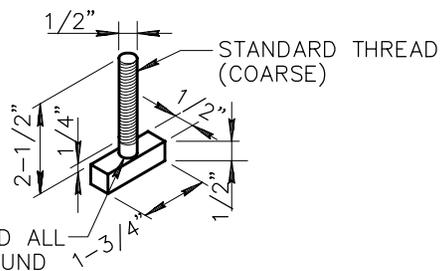
DETAIL NO.

507

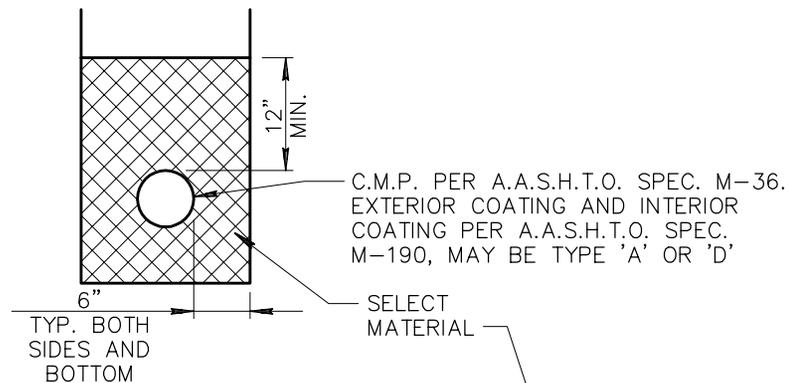


CONNECTOR CROSS SECTION

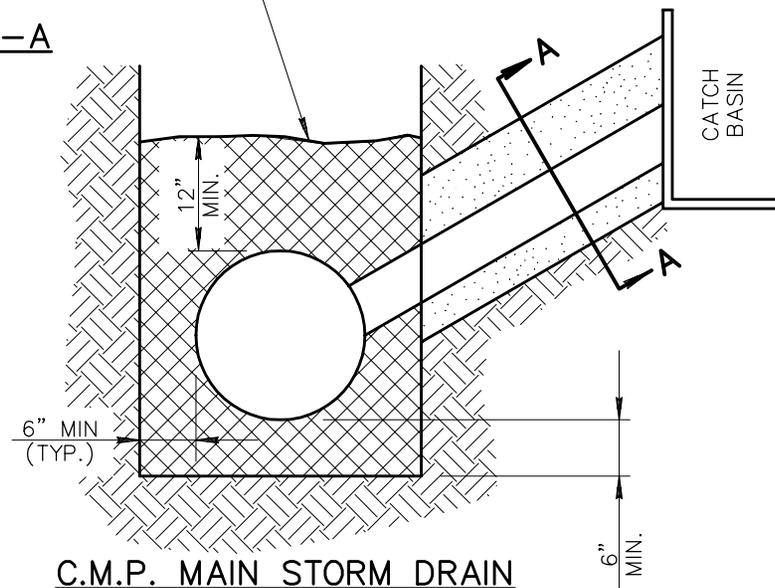
NOTE:
USE 5/8" WASHER AND NUT, ALL PIECES
(NUTS, WASHERS, AND FABRICATED BOLTS)
TO BE GALVANIZED AS PER A.S.T.M. A-123
LATEST REVISION.



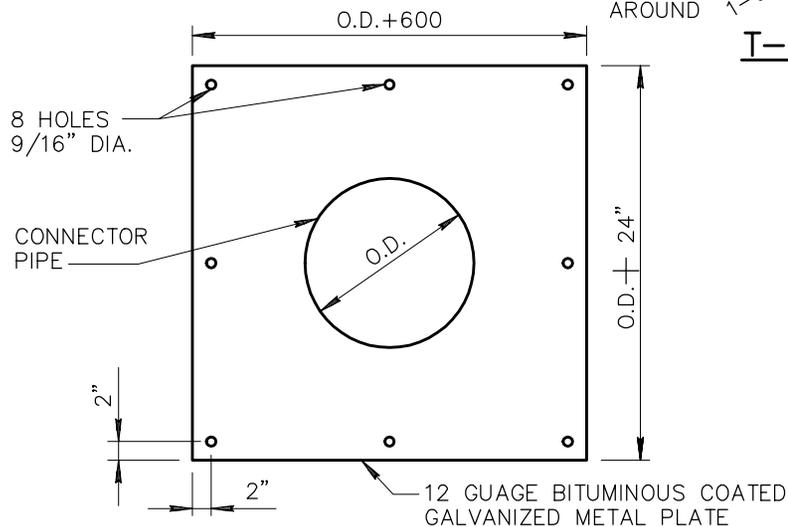
T-BOLT



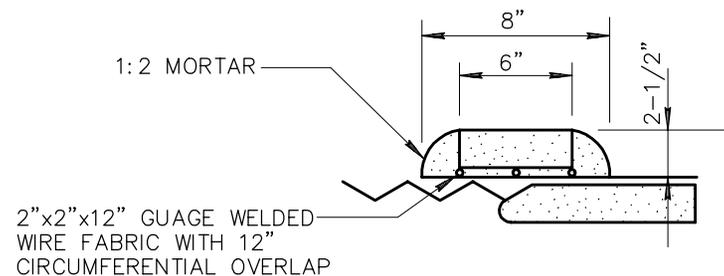
SECTION A-A



C.M.P. MAIN STORM DRAIN



**C.M.P. CONNECTION TO MAIN STORM DRAIN
24" PIPE AND SMALLER**



BAND DETAIL

DETAIL NO.

510



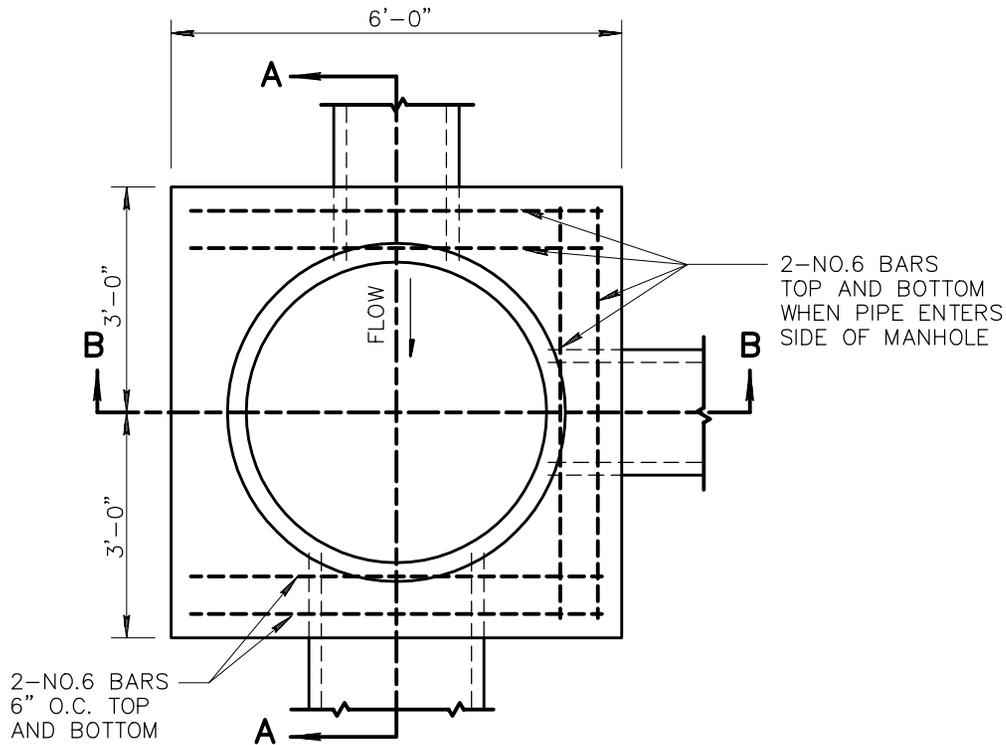
STANDARD DETAIL
ENGLISH

**CORRUGATED METAL PIPE
AND INSTALLATION**

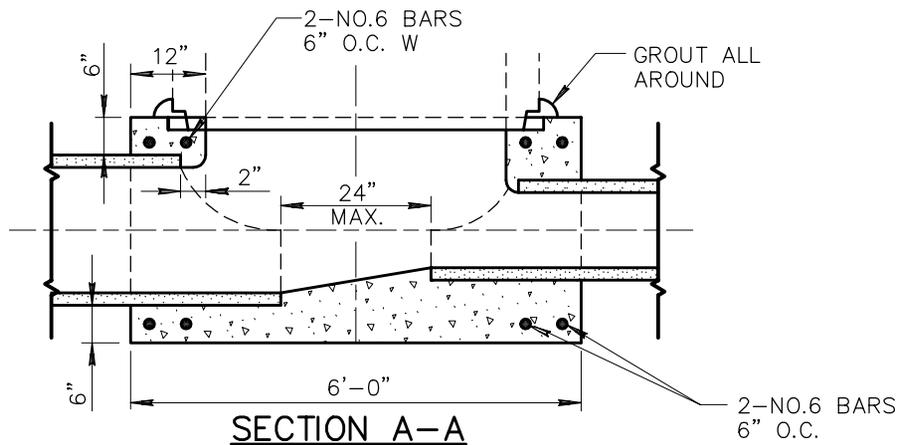
REVISED

DETAIL NO.

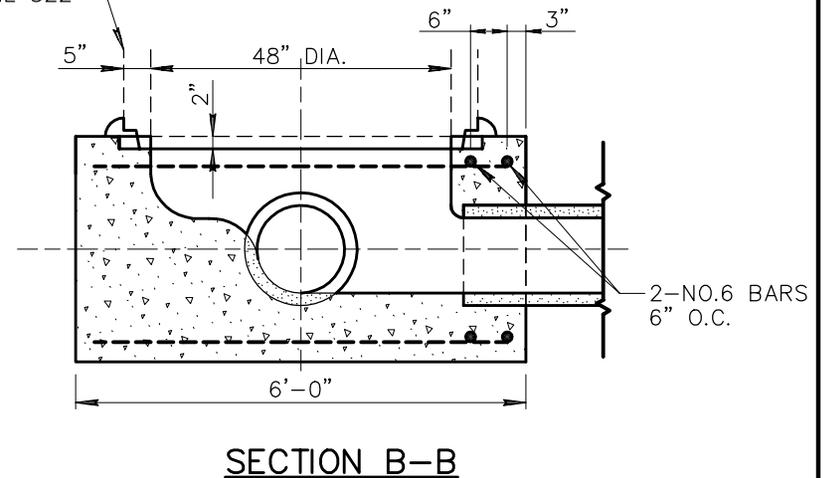
510



PLAN



MANHOLE SHAFT
PER DETAIL 522



NOTES

1. ALL CONCRETE TO BE CLASS 'A' PER SECT. 725, 505.
2. MATCH SPRING LINES OF PIPE ENTERING MANHOLE UNLESS OTHERWISE NOTED.
3. CUT PIPES TO ALLOW SETTING OF 4' DIA. CYLINDRICAL FORM FROM 6" ABOVE MAIN LINE PIPE TO SPRING LINE. CUT PIPE 2" LARGER THAN FORM TO ALLOW 2" CONCRETE OVER ENDS OF ALL CUT PIPE.
4. INVERT AND BASE OF MANHOLE TO BE POURED AND INVERT TO BE SHAPED BY HAND TO MAKE SMOOTH TRANSITION. FINISH WITH RUBBER FLOAT.
5. CENTER MANHOLE ON PIPE JOINT WHERE PIPE CHANGES SIZES, LEAVING A GAP OF 12" MINIMUM, 24" MAXIMUM.

DETAIL NO.

520



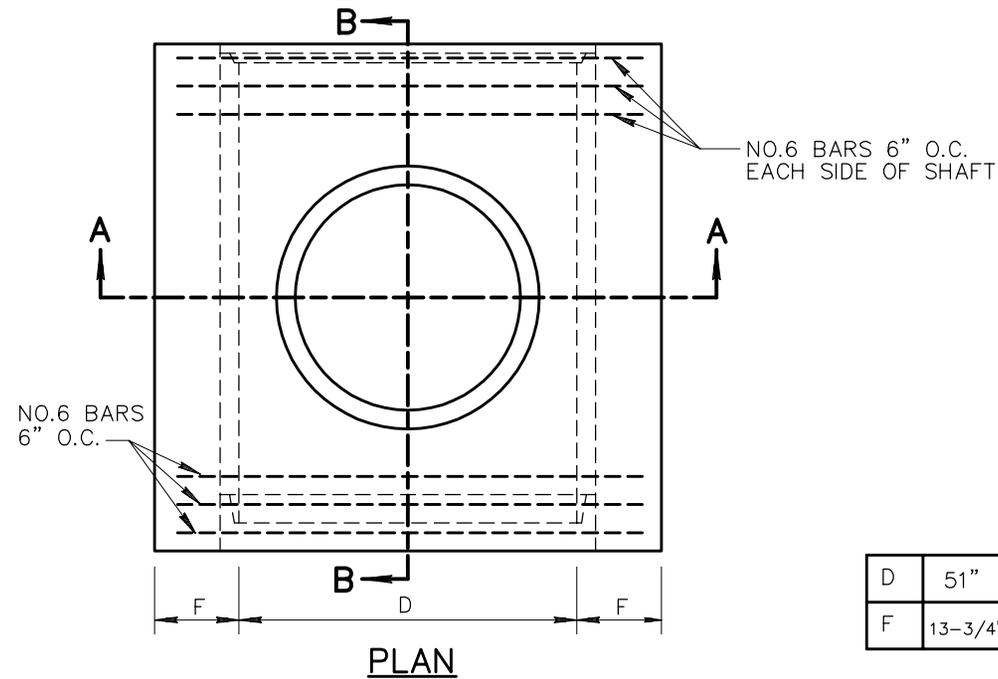
STANDARD DETAIL
ENGLISH

**STORM DRAIN MANHOLE BASE
(48" AND SMALLER)**

REVISED

DETAIL NO.

520

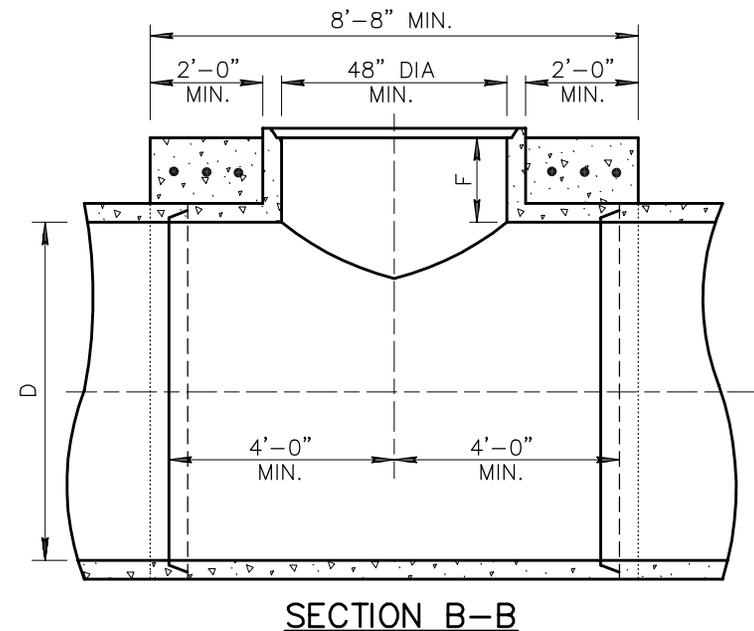
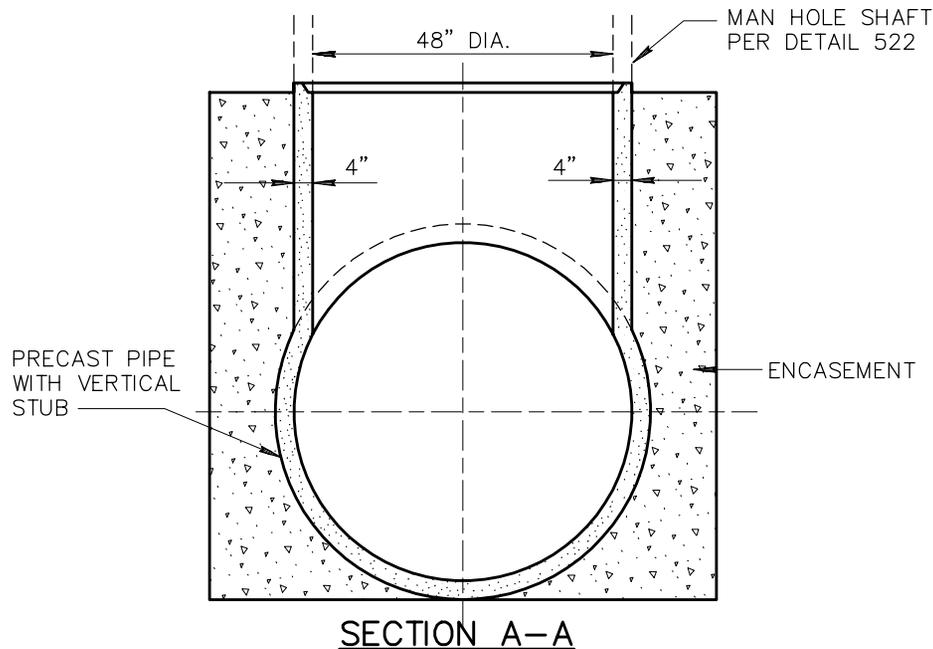


NOTES:

1. LINE PIPE AND STUB MAY BE CAST MONOLITHICALLY OR STUB MAY BE CAST ON TO LINE PIPE SECTION PRIOR TO COMPLETE CURING.
2. ALL LINE PIPE REINFORCEMENT SHALL BE TURNED UP INTO STUB.
3. THE VERTICAL STUB TO BE A.S.T.M. C-76 CLASS II WALL 'A' AND THE HORIZONTAL PIPE TO BE EQUAL TO STRENGTH OF PIPE ENTERING MANHOLE.
4. ALL REINFORCING STEEL SHALL CLEAR FACE OF CONCRETE BY 1-1/2" UNLESS SHOWN OTHERWISE.
5. CONCRETE ENCASEMENT SHALL BE CLASS 'A' PER SECT. 725 AND 505.

TABLE OF VALUES FOR 'F' & 'D'

D	51"	54"	57"	60"	63"	66"	69"	72"	78"	84"	90"	96"
F	13-3/4"	14-1/2"	15"	15-1/2"	16-1/4"	16-3/4"	17-1/2"	18"	19-1/4"	20-1/2"	21-3/4"	23"



DETAIL NO.

521



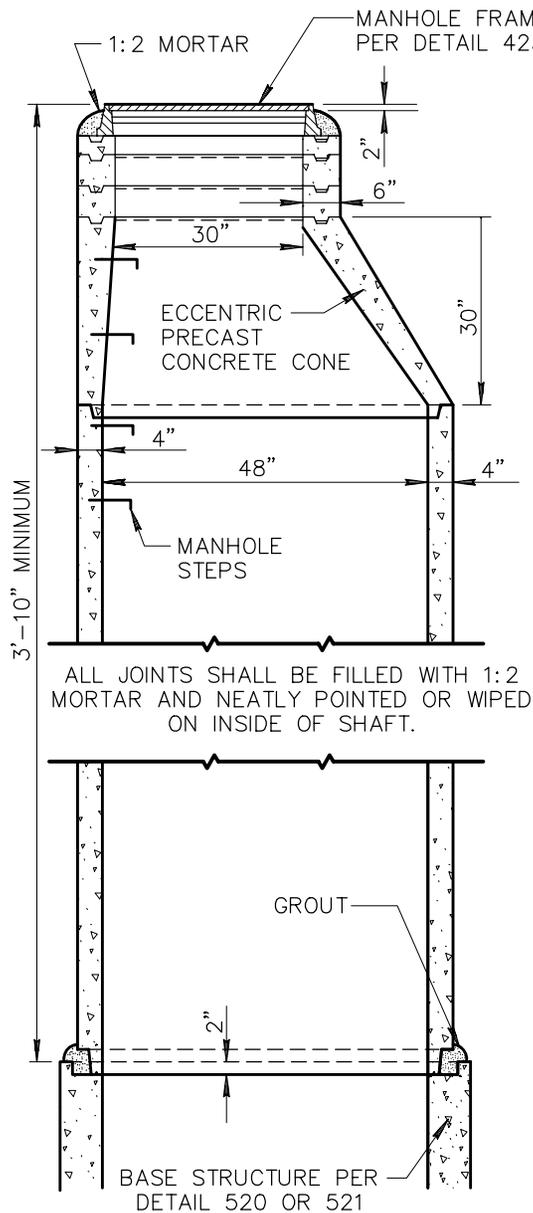
STANDARD DETAIL
ENGLISH

STORM DRAIN MANHOLE BASE
(51" OR LARGER)

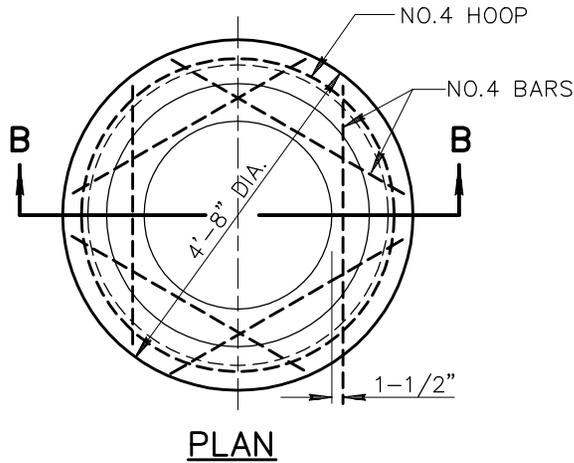
REVISED

DETAIL NO.

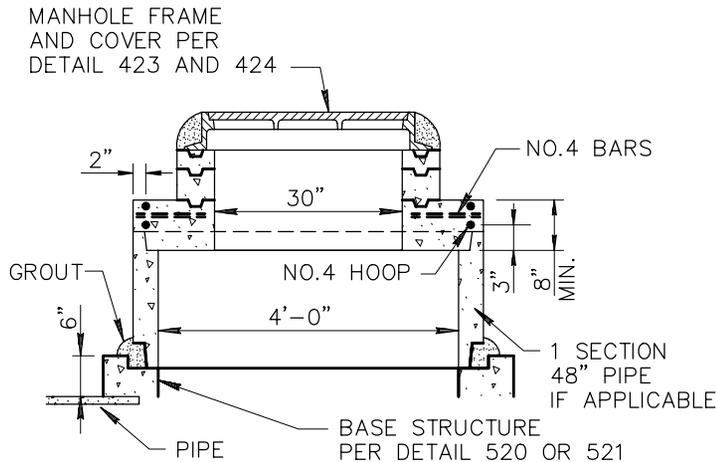
521



VERTICAL SECTION OF ECCENTRIC MANHOLE SHAFT



USE WHERE THERE IS 3'-10" OR LESS COVER OVER PIPE

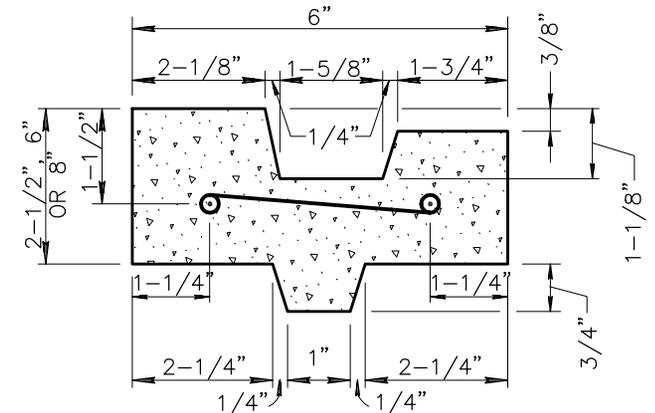


SECTION B-B

SHALLOW MANHOLE

NOTES:

1. PRECAST CONCRETE CONES AND SECTIONS TO BE A.S.T.M. C-478.
2. BRICK MAY BE USED IN LIEU OF OR IN COMBINATION WITH CONCRETE ADJUSTING RINGS.
3. PRECAST CONCRETE SECTIONS 48" DIA PIPE MAY BE FURNISHED IN STANDARD LENGTHS.
4. UNLESS OTHERWISE SHOWN ON PLANS, USE (2) 2-1/2" PRECAST CONCRETE ADJUSTING RINGS ON IMPROVED STREETS AND (4) 2-1/2" RINGS ON UNIMPROVED STREETS.
5. MANHOLE STEPS SHALL BEGIN 2'-0" BELOW FINISHED GRADE AND CONTINUE AT 12" INTERVALS TO APPROXIMATELY 2' ABOVE MANHOLE SHELF. (AS REQUIRED BY AGENCY.)
6. CONCRETE SHALL BE CLASS A PER SECTION 725 AND 505.



2-1/2" RINGS SHALL BE REINFORCED WITH TWO 1/4" ROUND STEEL HOOPS; 6" AND 8" RINGS SHALL BE REINFORCED WITH FOUR 1/4" HOOPS, TIED WITH NO. 14 A.S. & W. GAUGE WIRE 8" O.C.

REINFORCED CONCRETE ADJUSTING RING

DETAIL NO.

522



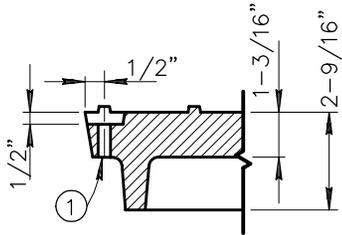
STANDARD DETAIL ENGLISH

STORM DRAIN MANHOLE SHAFT

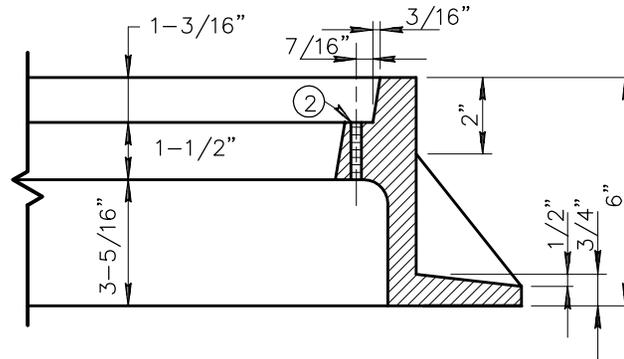
REVISED

DETAIL NO.

522



COVER SECTION



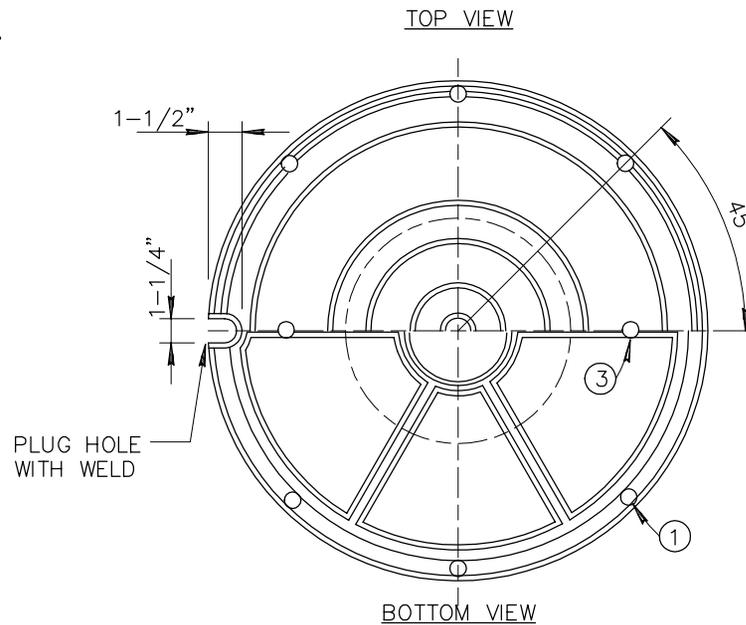
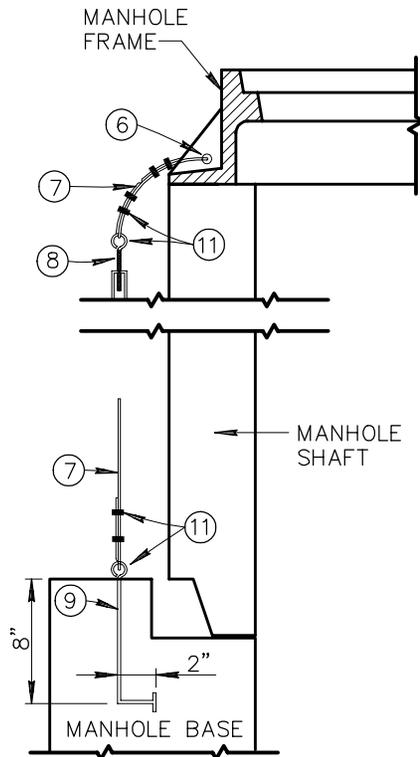
FRAME SECTION

FOR A 30" M.H. OPENING, USE THE STD. WATER TIGHT 30" M.H. FRAME & COVER, AND ANCHOR THE FRAME AS OUTLINED IN THE INSTRUCTIONS NOTED ON THIS SHEET.

FOR A 24" M.H. OPENING, MODIFY THE STD. 24" M.H. FRAME & COVER, FOLLOWING THE NOTED PROCEDURES, ONE THRU FIVE.

NOTES:

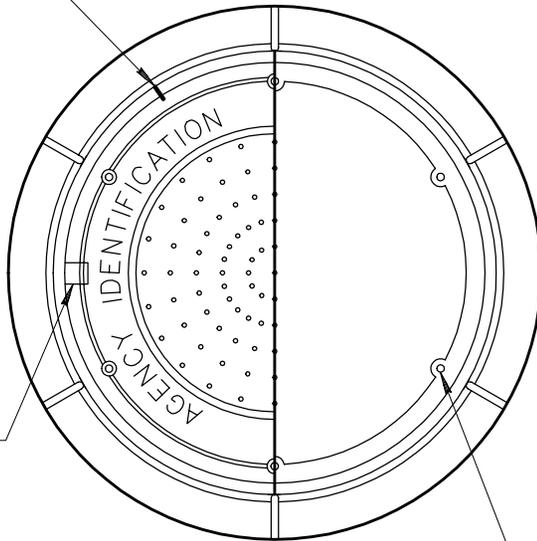
- ① DRILL (8) HOLES $17/32$ " IN COVER FOR $1/2$ " CAPSCREWS, COUNTERBORE $1/2$ " DEEP BY $1-1/8$ " DIA. TO ACCOMODATE CAPSCREW AND SOCKET WRENCH. SPACE EQUALLY.
 - ② DRILL (8) HOLES AND TAP FOR $1/2$ " - 13 THREAD NATIONAL COARSE BOLT.
 - ③ DRILL, TAP AND COUNTERBORE (2) HOLES FOR $1/2$ " CAPSCREWS TO BE USED FOR LIFTING COVER. PLUG WITH CAPSCREWS.
 - ④ COVER AND FRAME MUST BE MATCHED, DRILLED AND TAPPED IN SETS.
 - ⑤ CASTING DIMENSIONS GIVEN ABOVE ARE FROM DET. 424, 24" MANHOLE FRAME AND COVER.
- BOTH 24" AND 30" FRAMES TO BE ANCHORED AS FOLLOWS:
- ⑥ DRILL $1/2$ " HOLE IN FILLET. DO NOT USE ADJACENT FILLETS.
 - ⑦ $1/4$ " STAINLESS STEEL CABLE. SECURED WITH CABLE CLAMPS.
 - ⑧ $1/2$ "x9" HOOK AND EYE TURNBUCKLE.
 - ⑨ $1/2$ " EYE BOLT WITH 1" DIA. EYE.
 - ⑩ INSTALL THREE CABLES PER 24" COVER (FOUR CABLES FOR 30" COVERS). EYEBOLTS TO BE SET DIRECTLY BELOW FILLETS USED.
 - ⑪ TRIPLE WRAP TURNBUCKLES AND CABLE CLAMPS WITH 1" WIDE TAPE, SAFE-T-CLAD, F.O.S. 655, OR APPROVED EQUAL.



STANDARD 24" M.H. FRAME AND COVER

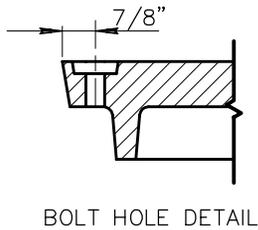
GROUND MATCH MARK
1/4" W x 1/8" D

(2) CONCEALED
PICKHOLES
180 DEG. APART

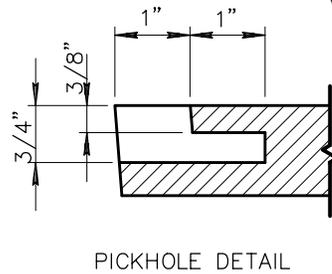


NOTES:

1. DRILL (6) HOLES IN 30" COVER (4 HOLES IN 24" COVER) 17/32" CORED RECESS FOR 1/2" CAPSCREWS. SPACE EQUALLY (304 S.S.)
2. DRILL (6) HOLES IN 30" FRAME (4 HOLES IN 24" FRAME) AND TAP FOR 1/2" - NATIONAL COARSE BOLT (HEX HEAD).
3. COVER AND FRAME MUST BE MATCH MARKED, DRILLED AND TAPPED IN SETS.
4. DIMENSIONS, LETTERING, WEIGHTS AND MATERIALS SHALL CONFORM TO DET. 424.
5. REFER TO DETAIL 523-1 FOR INSTALLATION PROCEDURES.



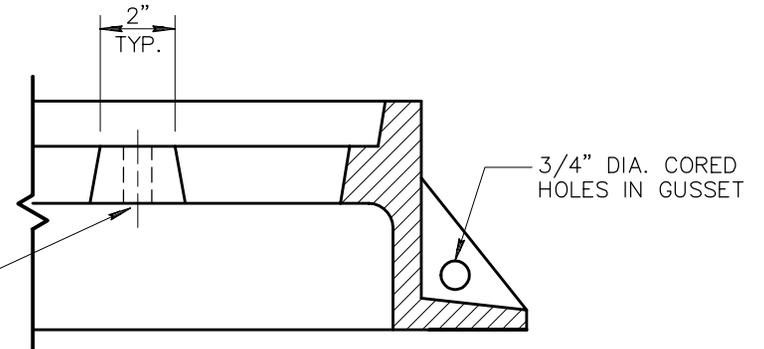
BOLT HOLE DETAIL



PICKHOLE DETAIL

COVER SECTION

TYP. BOLT PAD



FRAME SECTION

DETAIL NO.

523-2



STANDARD DETAIL
ENGLISH

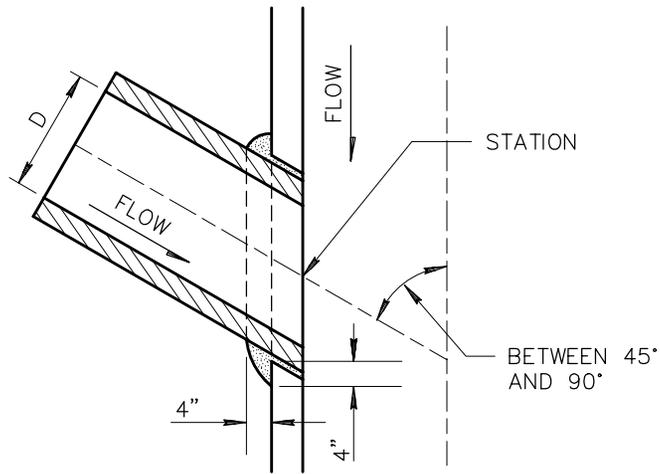
PRESSURE MANHOLE

REVISED

DETAIL NO.

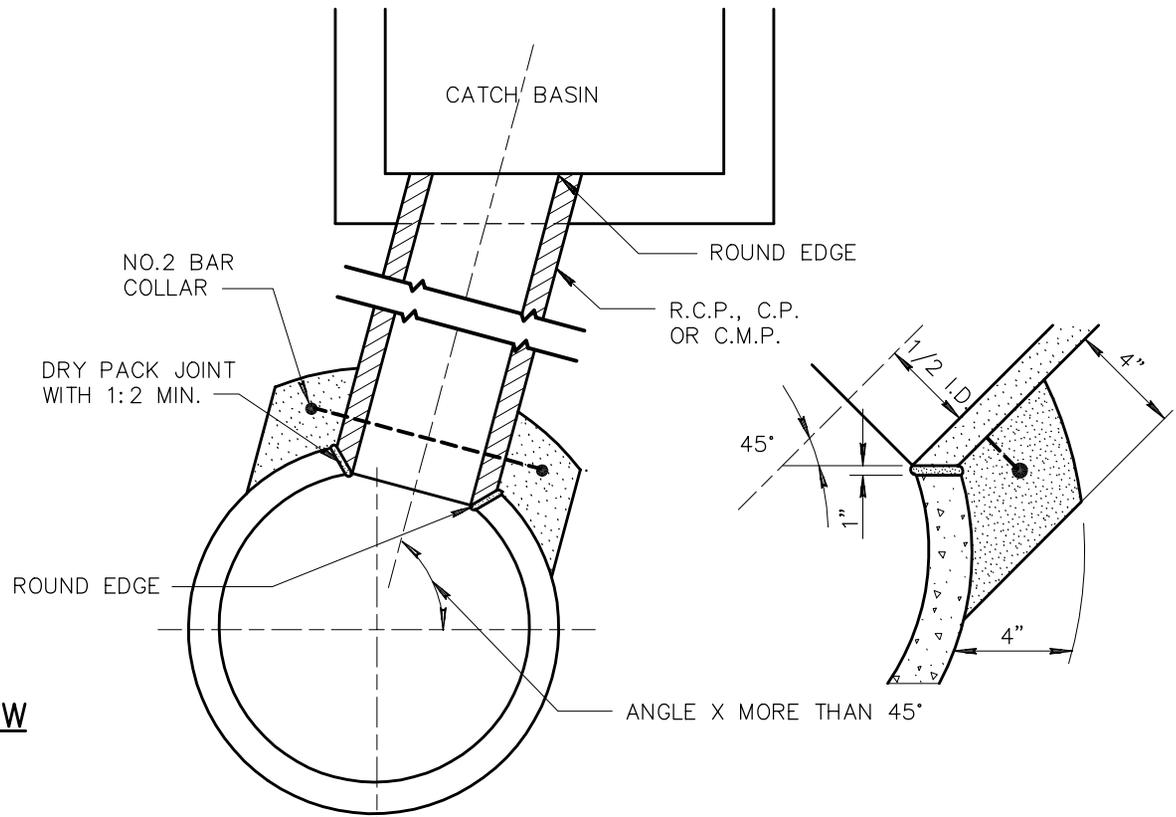
523-2

TOP VIEW



SECTION A-A

FRONT VIEW

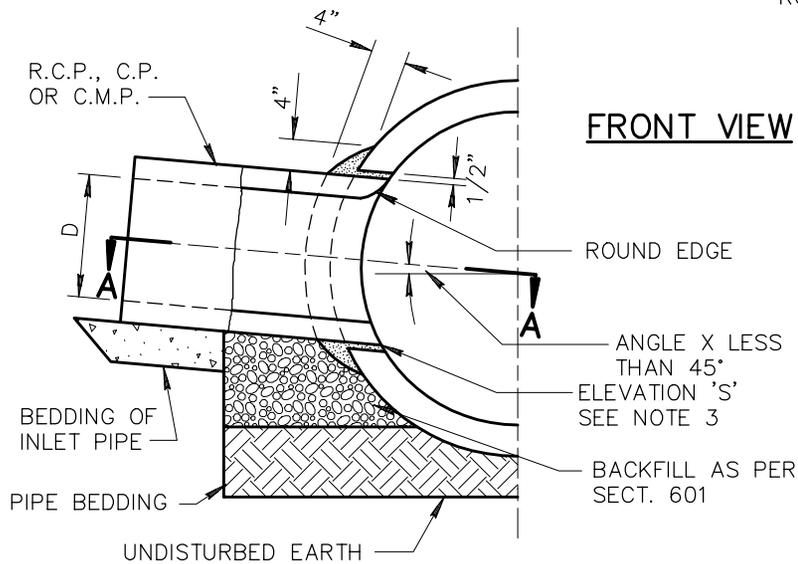


**CATCH BASIN ABOVE STORM DRAIN
TYPE 2**

NOTES:

1. D SHALL BE 24" OR LESS. FOR LARGER VALUE OF D USE MANHOLE OR JUNCTION STRUCTURE.
2. IN NO CASE SHALL THE OUTSIDE DIAMETER OF THE INLET EXCEED ONE HALF THE INSIDE DIAMETER OF THE MAIN STORM DRAIN.
3. CENTERLINE OF INLET SHALL BE ON RADIUS OF MAIN STORM DRAIN EXCEPT WHEN ELEVATION 'S' IS SHOWN ON PLANS.
4. THE MINIMUM OPENING INTO THE STORM DRAIN SHALL BE THE OUTSIDE DIAMETER OF THE CONNECTING PIPE PLUS 1".
5. IF ANGLE X FROM HORIZONTAL IS 45° OR LESS USE TYPE 1. IF ANGLE X IS 45° OR OVER USE TYPE 2.

FRONT VIEW



**SIDE INLET
TYPE 1**

DETAIL NO.

524



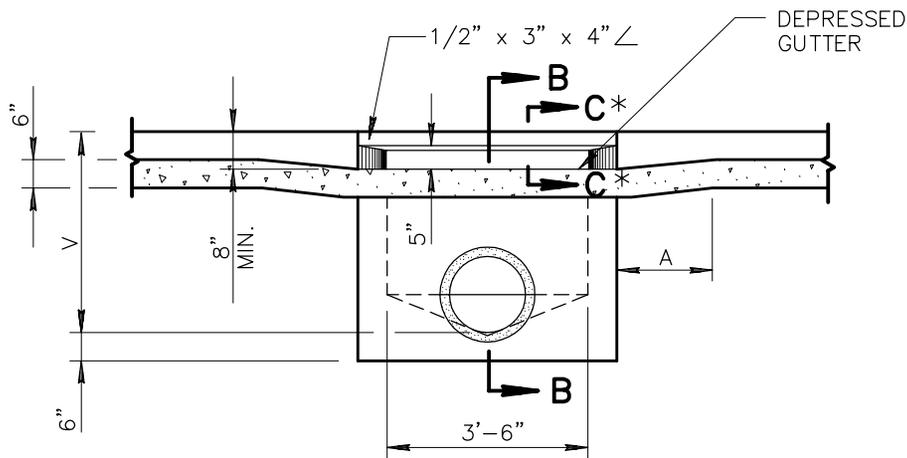
STANDARD DETAIL
ENGLISH

**STORM DRAIN LATERAL
PIPE CONNECTIONS**

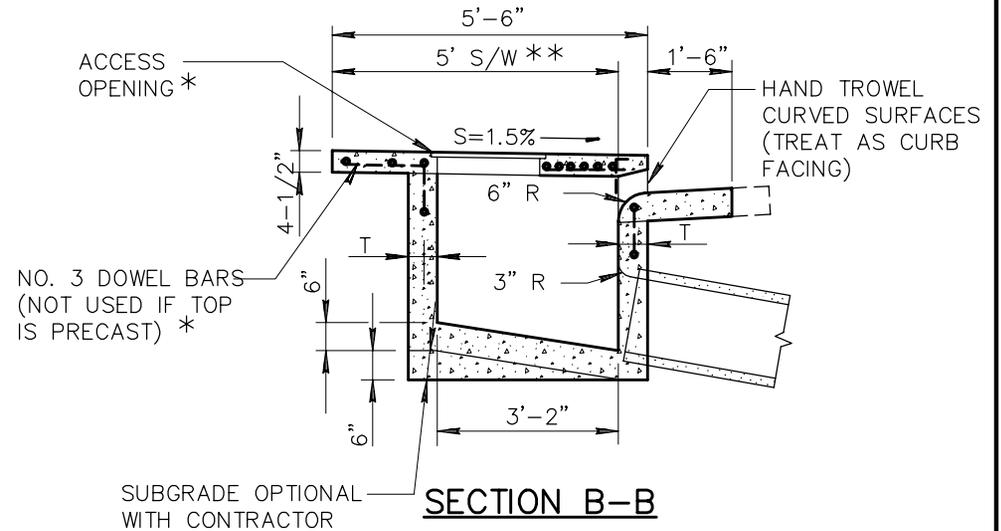
REVISED

DETAIL NO.

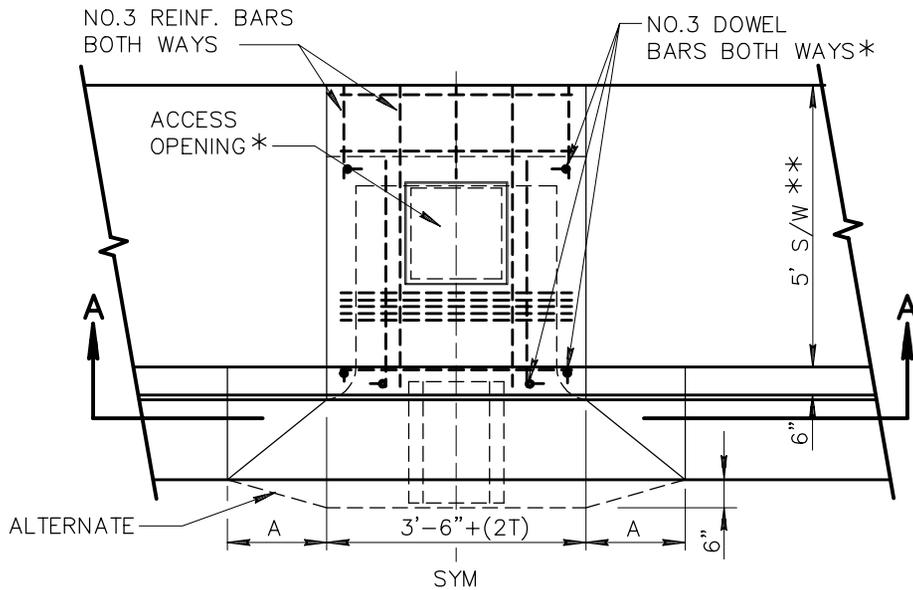
524



SECTION A-A



SECTION B-B



PLAN VIEW

NOTES:

1. THE ENTIRE CATCH BASIN COVER MAY BE POURED IN PLACE OR PRECAST.
2. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.
3. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS POURED.
4. FLOOR OF BASIN SHALL BE TROWELLED TO A HARD SMOOTH SURFACE AND SHALL SLOPE FROM ALL DIRECTIONS TO OUTLET.
5. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 D PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECT. 790.
6. CONCRETE SHALL BE CLASS A PER SECTION 725.

DIMENSIONS

T=6" IF V=4' OR LESS
 T=8" IF V IS BETWEEN 4' AND 8'
 T=10" IF V IS 8' OR MORE (IF V EXCEEDS 10' SPECIAL DESIGN IS REQUIRED)
 V=3'-6" UNLESS OTHERWISE SPECIFIED.

CURB	A
4"	3'-3"
6"	1'-9"
7"	1'-0"

* SEE DETAILS 536-1 AND 536-2 FOR DETAILS AND SECTIONS COMMON TO ALL CURB OPENING CATCH BASINS.
 ** 4' LOCATIONS WHERE 4' S/W IS REQUIRED.

DETAIL NO.

530



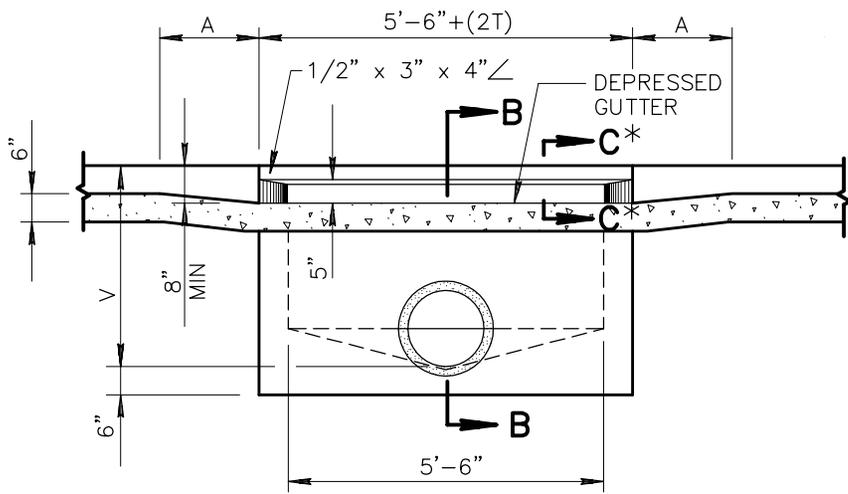
STANDARD DETAIL
 ENGLISH

**3'-6" CURB OPENING
 CATCH BASIN - TYPE 'A'**

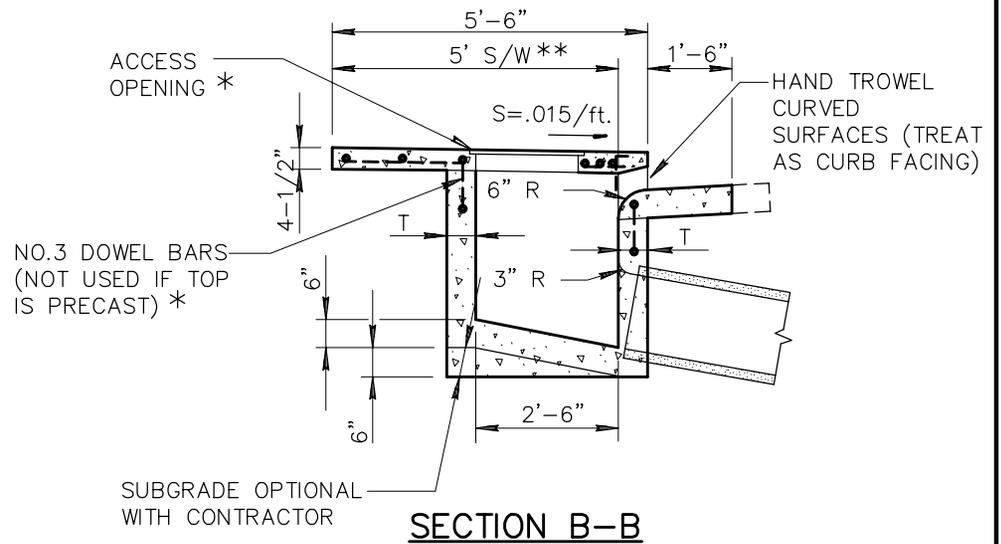
REVISED

DETAIL NO.

530



SECTION A-A



SECTION B-B

NOTES:

1. THE ENTIRE CATCH BASIN COVER MAY BE POURED IN PLACE OR PRECAST.
2. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.
3. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS POURED.
4. FLOOR OF BASIN SHALL BE TROWELLED TO A HARD SMOOTH SURFACE AND SHALL SLOPE FROM ALL DIRECTIONS TO OUTLET.
5. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 D PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECT. 790.
6. CONCRETE SHALL BE CLASS A PER SECTION 725.

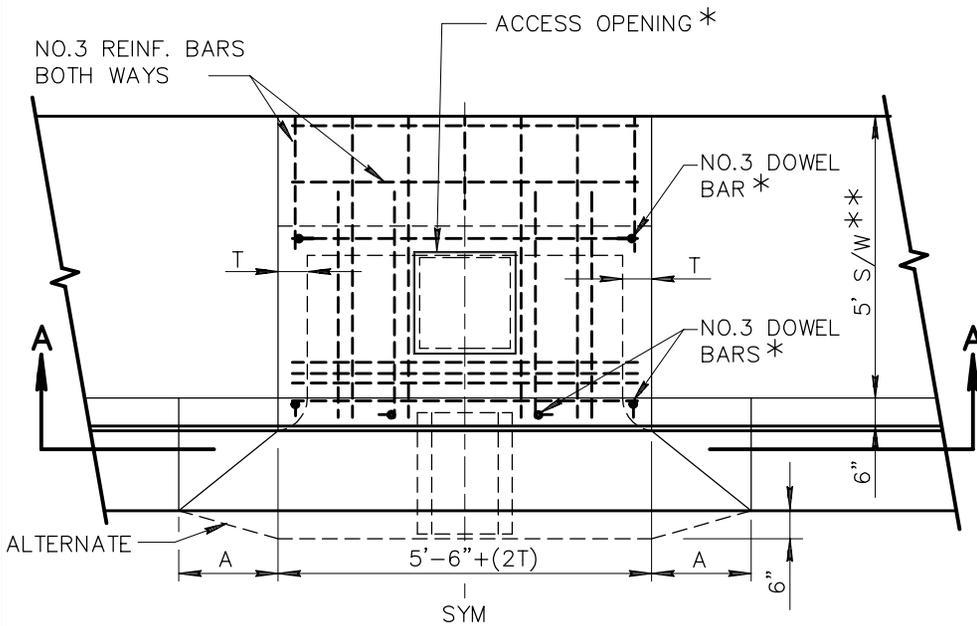
DIMENSIONS

T=6" IF V=4' OR LESS
 T=8" IF V IS BETWEEN 4' AND 8'
 T=10" IF V IS 8' OR MORE (IF V EXCEEDS 10' SPECIAL DESIGN IS REQUIRED)
 V=3'-6" UNLESS OTHERWISE SPECIFIED.

CURB	A
4"	3'-3"
6"	1'-9"
7"	1'-0"

* SEE DETAILS 536-1 AND 536-2 FOR DETAILS AND SECTIONS COMMON TO ALL CURB OPENING CATCH BASINS.

** 4' LOCATIONS WHERE 4' S/W IS REQUIRED.



PLAN VIEW

DETAIL NO.

531



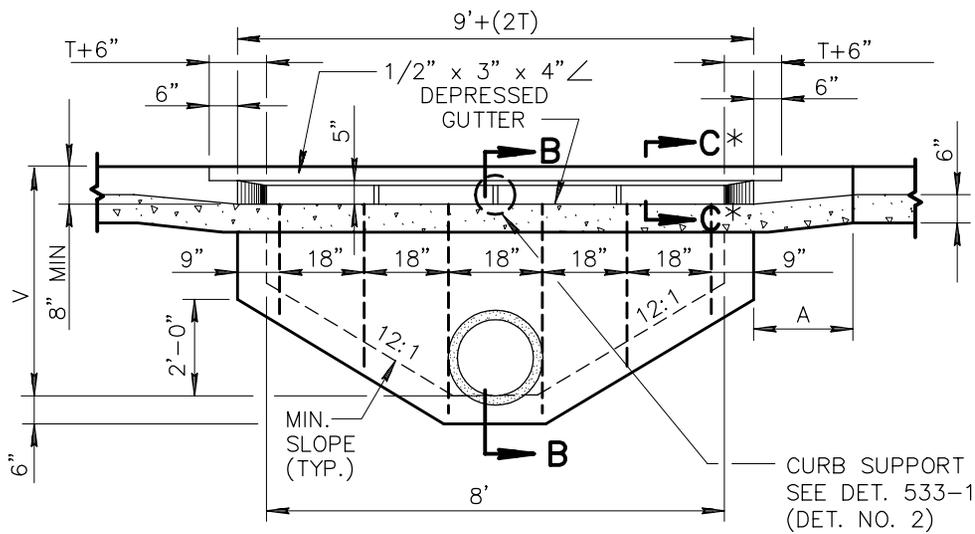
STANDARD DETAIL
 ENGLISH

**5'-6" CURB OPENING
 CATCH BASIN - TYPE 'B'**

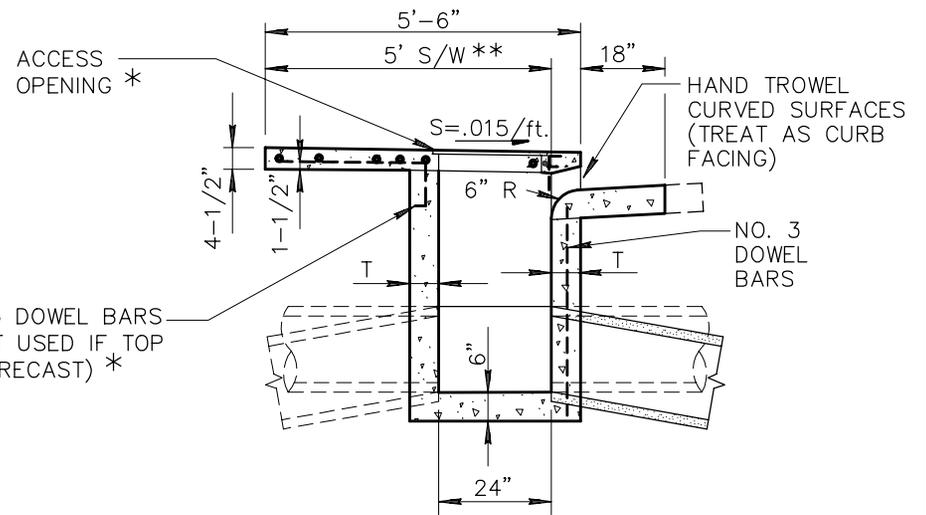
REVISED

DETAIL NO.

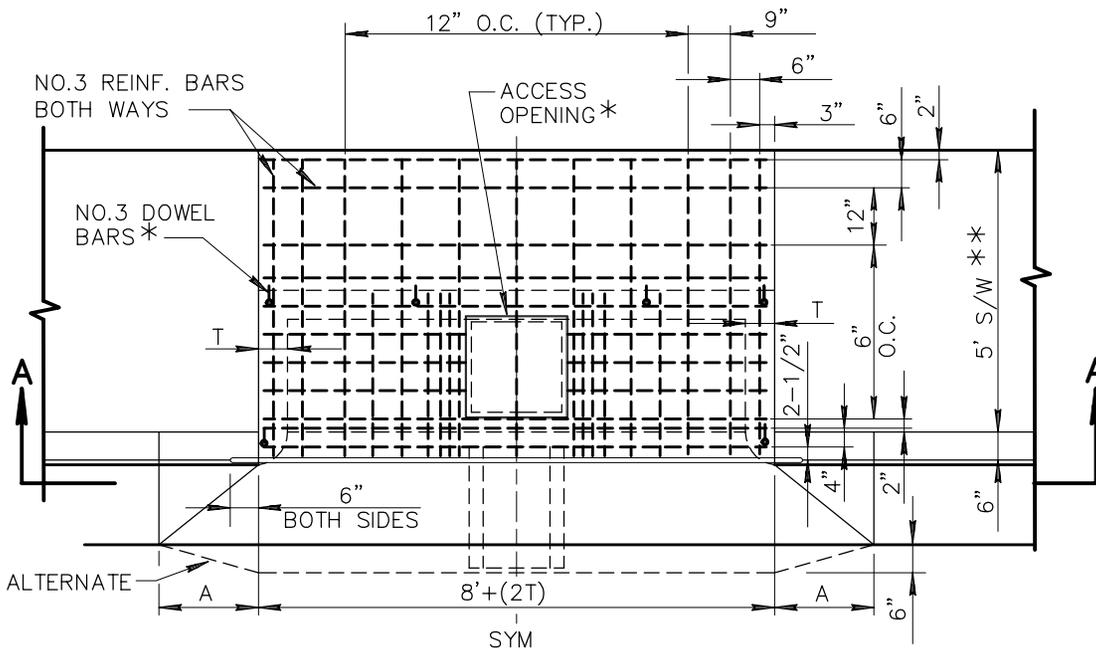
531



SECTION A-A



SECTION B-B



PLAN VIEW

NOTES:

1. THE ENTIRE CATCH BASIN COVER MAY BE POURED IN PLACE OR PRECAST.
2. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.
3. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS POURED.
4. FLOOR OF BASIN SHALL BE TROWELLED TO A HARD SMOOTH SURFACE AND SHALL SLOPE FROM ALL DIRECTIONS TO OUTLET.
5. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO.1 D PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECT. 790.
6. CONCRETE SHALL BE CLASS A PER SECTION 725.

CURB	A
4"	3'-3"
6"	1'-9"
7"	1'-0"

DIMENSIONS

T=6" IF V=4' OR LESS
 T=8" IF V IS BETWEEN 4' AND 8'
 T=10" IF V IS 8' OR MORE (IF V EXCEEDS 10' SPECIAL DESIGN IS REQUIRED)
 V=4' UNLESS OTHERWISE SPECIFIED.

* SEE DETAILS 536-1 AND 536-2 FOR DETAILS AND SECTIONS COMMON TO ALL CURB OPENING CATCH BASINS.
 ** 4' LOCATIONS WHERE 4' S/W IS REQUIRED.

DETAIL NO.
532

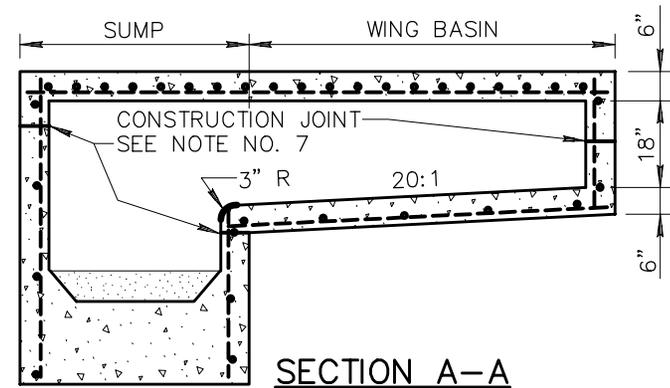
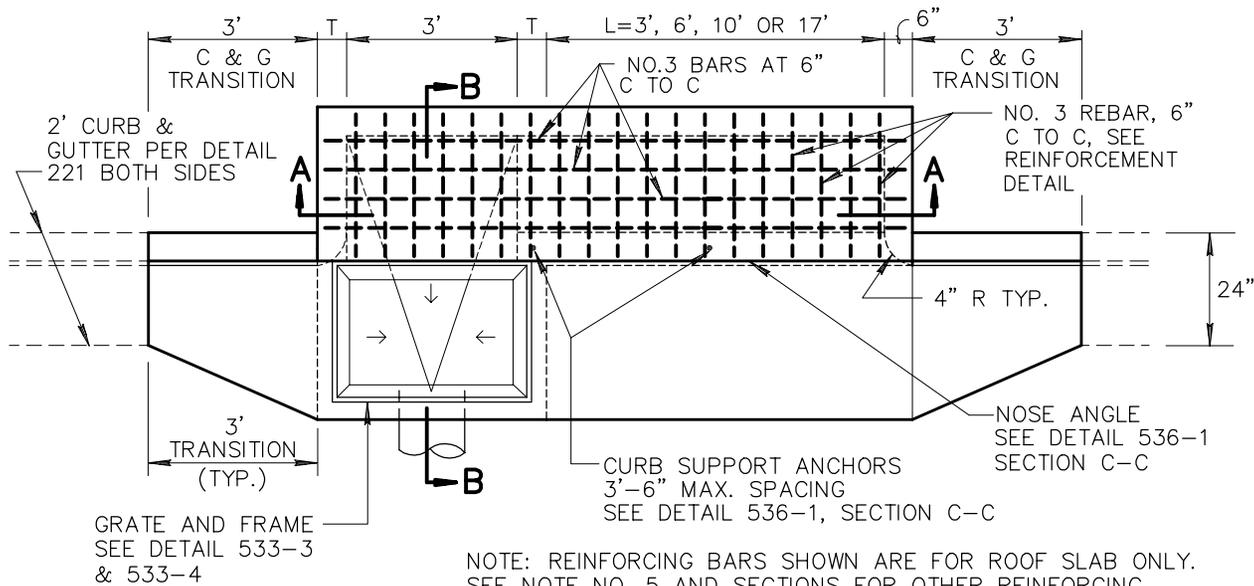


STANDARD DETAIL
ENGLISH

**8'-0" CURB OPENING
CATCH BASIN - TYPE 'C'**

REVISED

DETAIL NO.
532

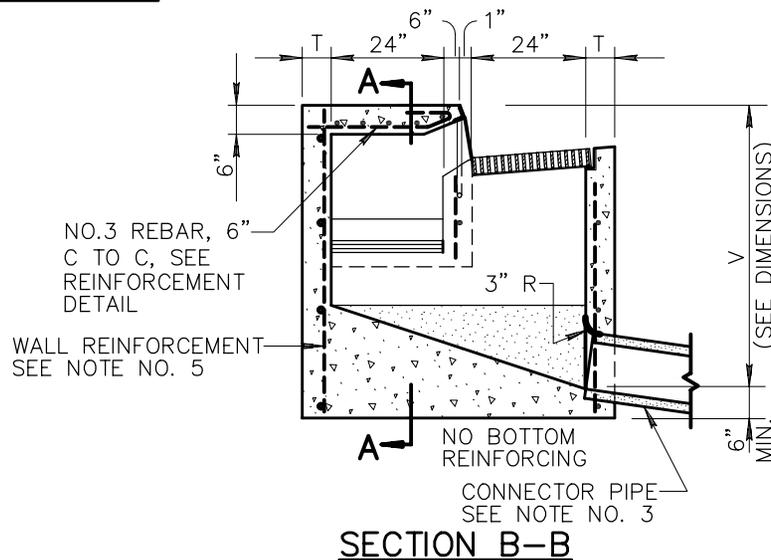


NOTE: REINFORCING BARS SHOWN ARE FOR ROOF SLAB ONLY.
SEE NOTE NO. 5 AND SECTIONS FOR OTHER REINFORCING.

NOTES:

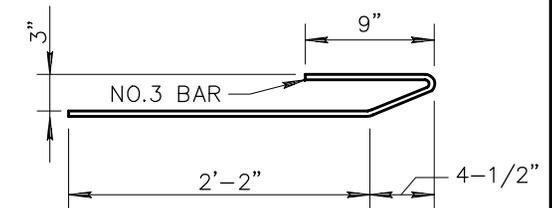
1. SINGLE C.B. (ILLUSTRATED), SUMP WITH WING BASIN UPSTREAM.
2. DOUBLE C.B. SUMP WITH SYMMETRICAL WING BASINS EACH SIDE.
3. PIPES CAN BE PLACED IN ANY WALL EXCEPT WALL ADJACENT TO A WING BASIN. PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS PLACED.
4. SUMP FLOOR SHALL HAVE A WOOD TROWEL FINISH AND A MIN. SLOPE OF 4:1 IN ALL DIRECTIONS TOWARD OUTLET PIPE.
5. ALL REFORCING BARS SHALL BE NO.4 18" C TO C BOTH WAYS AND 1-1/2" CLEAR TO INSIDE OF WALLS AND OUTSIDE WING BASIN FLOOR EXCEPT AS SHOWN. SEE SECT. 727.
6. ALL CONCRETE SHALL BE CLASS 'A', PER SECT. 725.
7. CONSTRUCTION JOINTS SHALL BE PLACED TO MEET FIELD CONDITIONS.
8. ALL EXPOSED STEEL SHALL BE GALVANIZED OR PAINTED WITH ONE SHOP COAT OF #1 PAINT AND TWO FIELD COATS OF #10 PAINT.

PLAN VIEW



DIMENSIONS

- V = 3'-3" MIN. WHEN L = 3'
- V = 3'-5" MIN. WHEN L = 6'
- V = 3'-7" MIN. WHEN L = 10'
- V = 4'-0" MIN. WHEN L = 17'
- T = 6" WHEN V IS LESS THAN 8'
- T = 8" WHEN V IS EQUAL TO OR GREATER THAN 8'
- H = CURB HEIGHT PRIOR TO THE TRANSITION



REINFORCEMENT DETAIL

DETAIL NO.
533-1

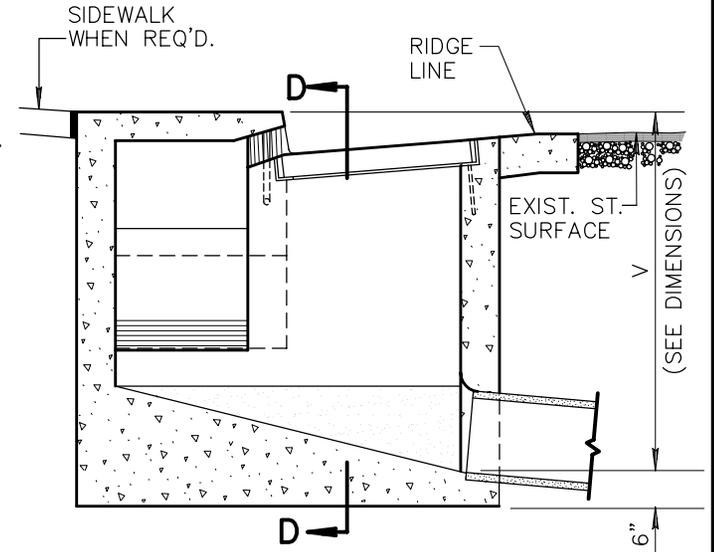
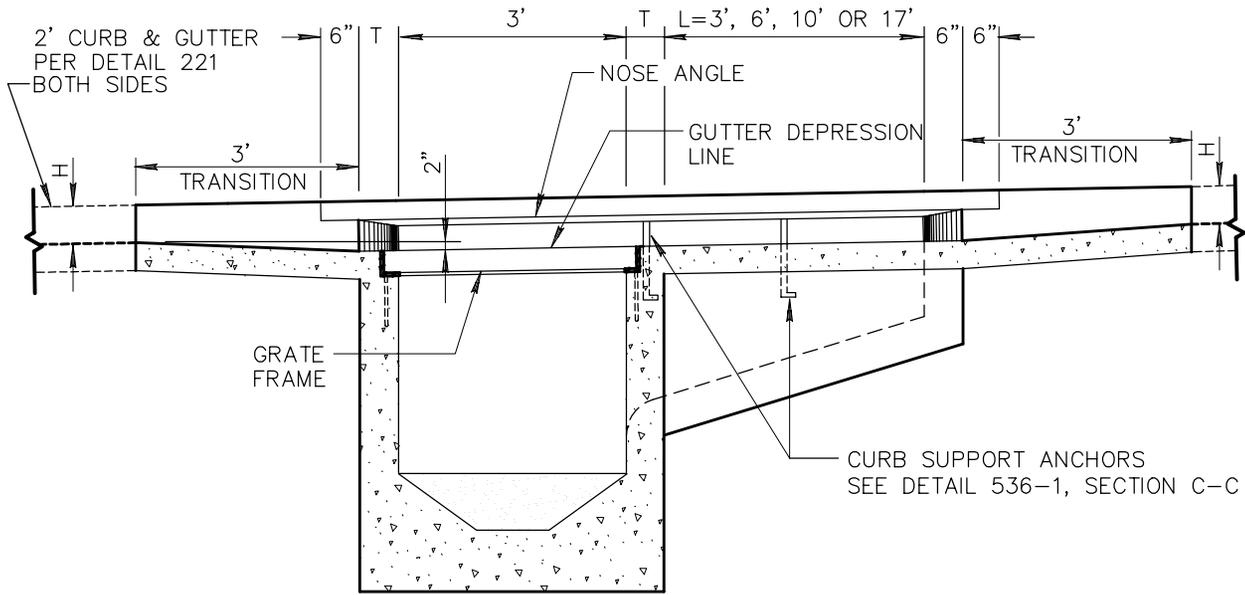


STANDARD DETAIL
ENGLISH

CATCH BASIN TYPE 'D

REVISED

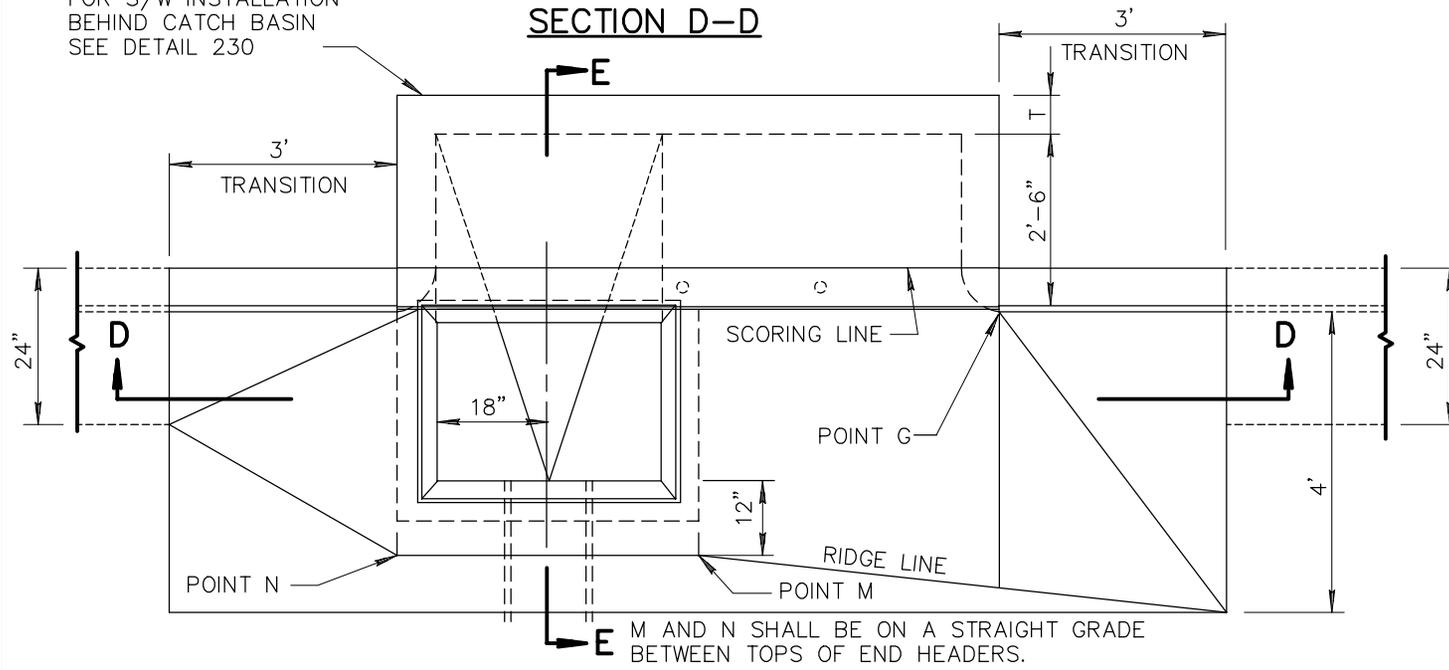
DETAIL NO.
533-1



FOR S/W INSTALLATION
BEHIND CATCH BASIN
SEE DETAIL 230

SECTION D-D

SECTION E-E



PLAN VIEW

APRON NOTES:

9. APRON IS CONSTRUCTED ONLY WHEN SPECIFIED ON PLANS.
10. CONCRETE IN APRON SHALL BE NOT LESS THAN 8" THICK.
11. CURB FACES AT CATCH BASIN OPENING AND POINT G SHALL BE THAT OF THE EXISTING CURB FACE PLUS 2" OR AS OTHERWISE SHOWN.
12. ELEVATION AT THE OUTER CORNERS OF THE LOCAL DEPRESSION SHOWN ON THE PLANS ARE FOR THE FINISHED SURFACE.
13. SEE DETAIL 533-1 FOR ADDITIONAL DIMENSIONS, REBAR PLACEMENT AND OTHER INFORMATION TO CONSTRUCT CATCH BASIN.

M AND N SHALL BE ON A STRAIGHT GRADE
BETWEEN TOPS OF END HEADERS.

DETAIL NO.
533-2

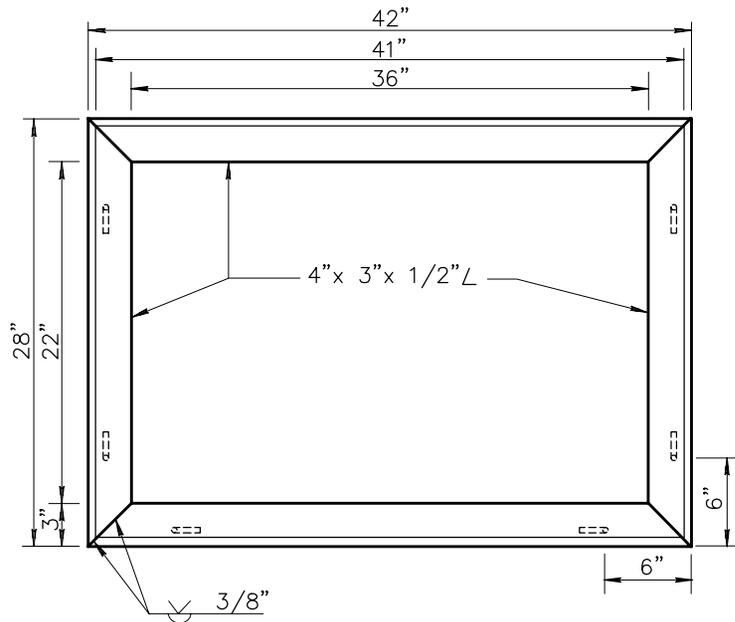


STANDARD DETAIL
ENGLISH

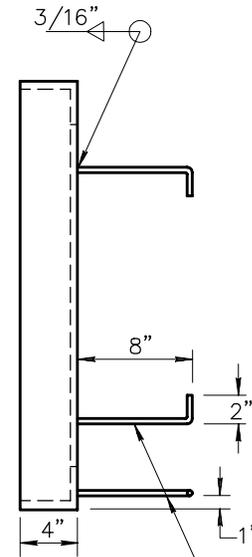
APRON FOR TYPE 'D' CATCH BASIN

REVISED

DETAIL NO.
533-2

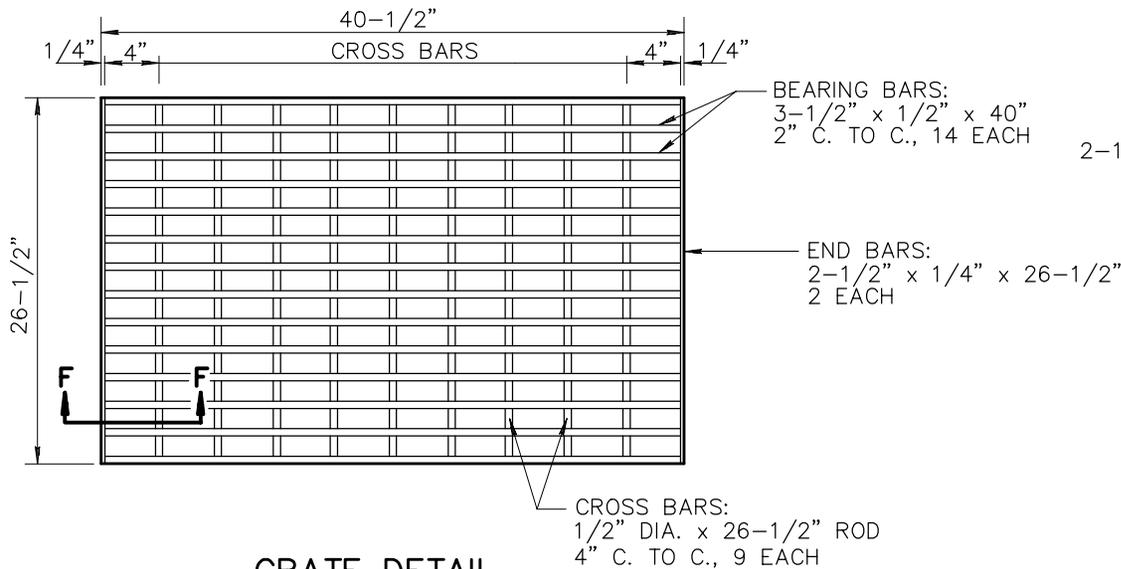


FRAME DETAIL

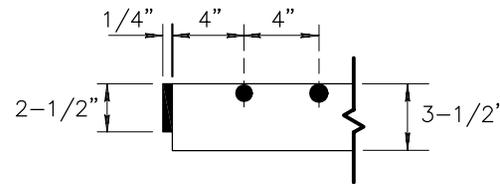


ANCHORS - TOTAL 6
SEE NOTE NO. 17

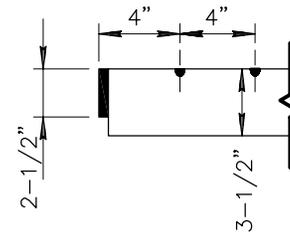
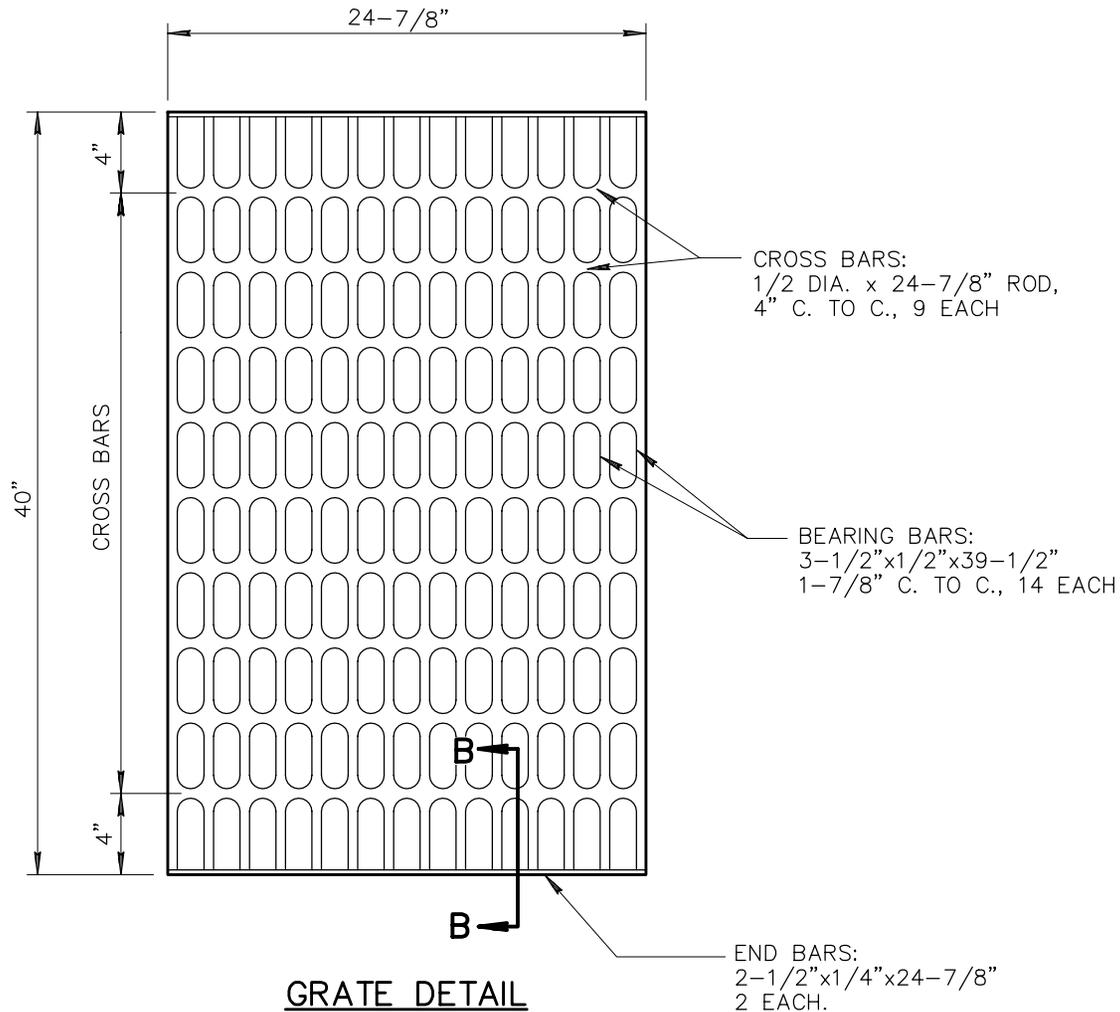
- FRAME AND GRATE NOTES**
14. FRAME AND GRATING SHALL BE TESTED FOR ACCURACY OF FIT AND SHALL BE MARKED IN SETS BEFORE DELIVERY.
 15. ALL WELDING SHALL BE IN ACCORDANCE WITH STANDARD WELDING SPECIFICATIONS.
 16. CROSS BARS AND END BARS MAY BE FILLET WELDED, RESISTANCE WELDED OR ELECTOR FORGED TO BEARING BARS.
 17. ANCHORS SHALL BE 3/8" DIA. STEEL ROD, NO. 3 REBAR, 3/8" DIA. x 8" BOLTS OR 8" NELSON STUDS.
 18. ALL PARTS SHALL BE OF STRUCTURAL GRADE STEEL.
 19. ALL EXPOSED STEEL SHALL BE GALVANIZED OR PAINTED WITH ONE COAT #1 PAINT AND TWO FIELD COATS OF #10 PAINT.



GRATE DETAIL



SECTION F-F



SECTION B-B

GRATE DETAIL

GRATE OPENING: 4.344 SQ. FT.

DETAIL NO.
533-4

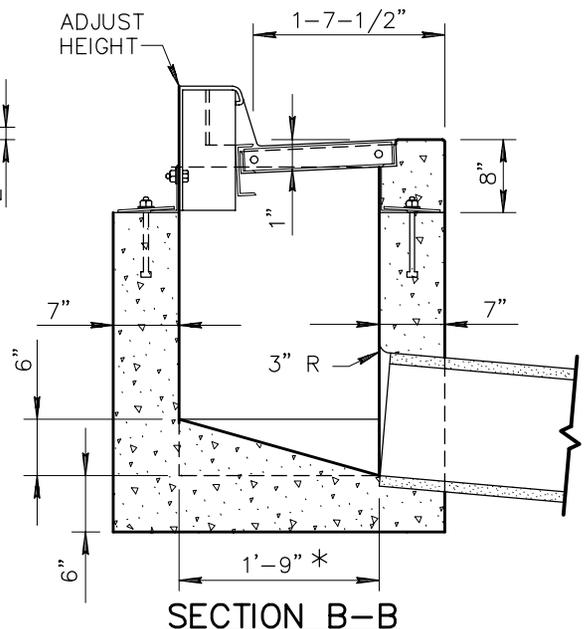
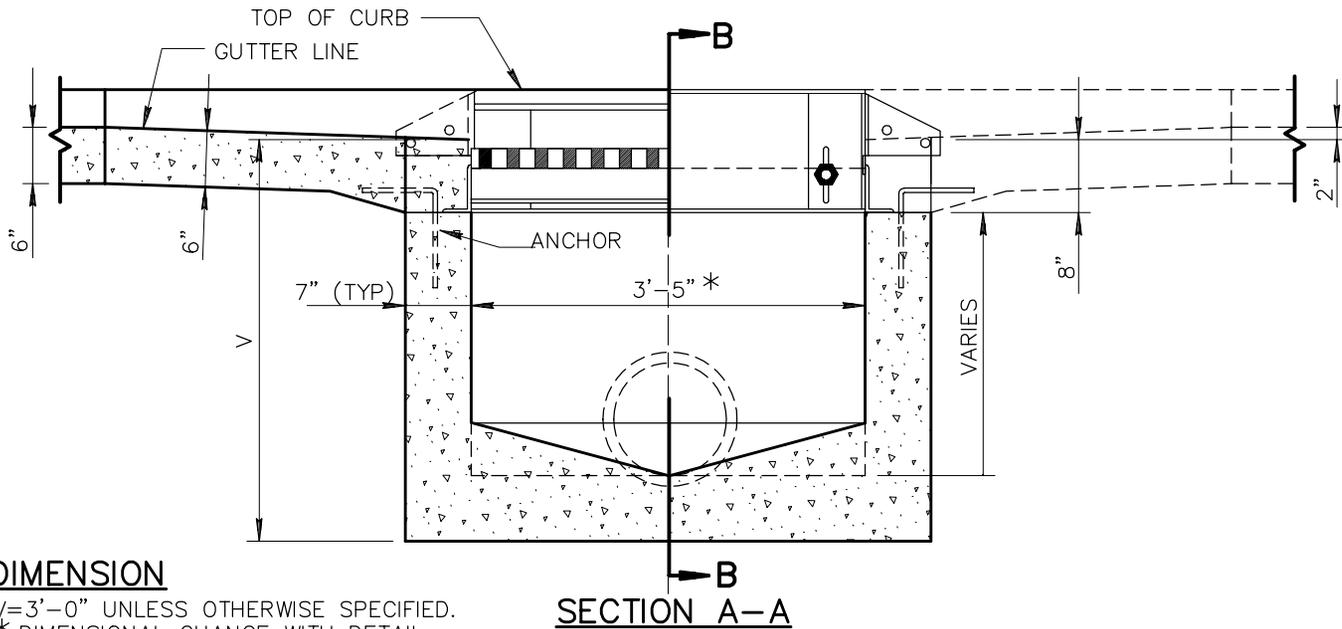


STANDARD DETAIL
ENGLISH

**7'-0" CURB OPENING CATCH BASIN
TYPE 'D' - GRATE DETAILS**

REVISED
7-13-2000

DETAIL NO.
533-4



DIMENSION

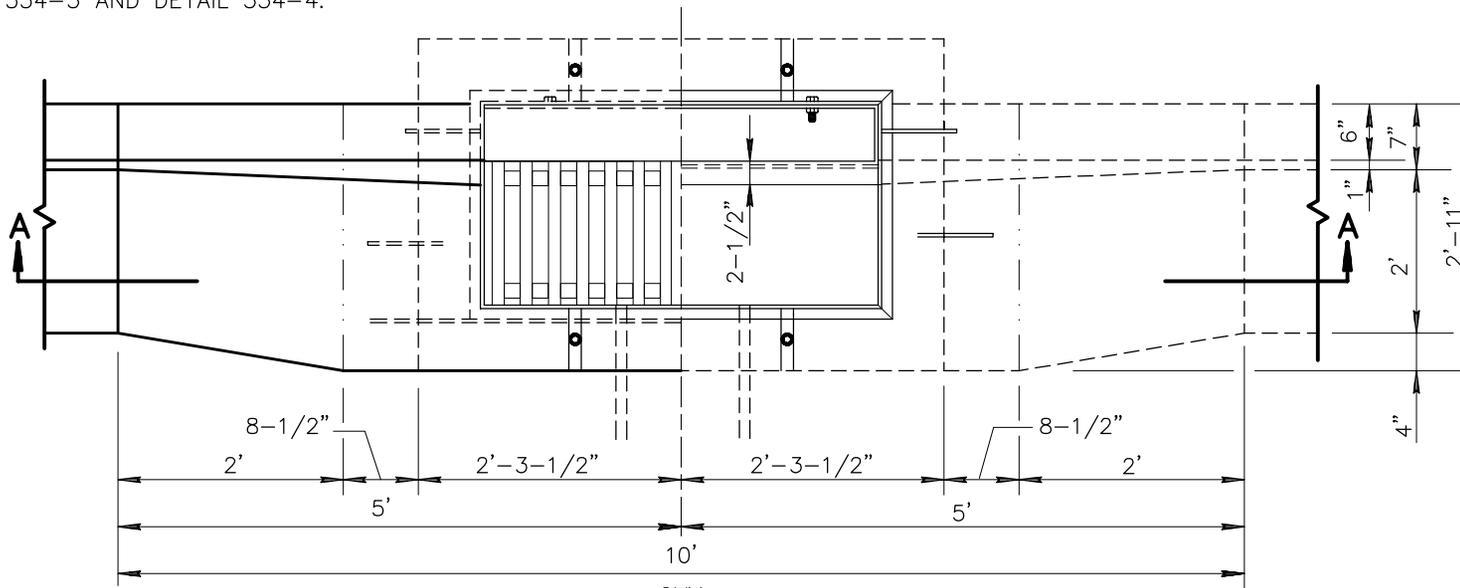
V=3'-0" UNLESS OTHERWISE SPECIFIED.
 * DIMENSIONAL CHANGE WITH DETAIL 534-3 AND DETAIL 534-4.

SECTION A-A

SECTION B-B

NOTES:

1. ADJUSTABLE CURB, FRAME AND GRATING UNITS SHALL BE STRUCTURAL STEEL OR CAST IRON
2. PIPES MAY ENTER OR LEAVE ANY WALL. BOTTOM OF BOX TO BE SLOPED TO OUTLET PIPE FROM ALL DIRECTIONS AND TROWELLED TO A HARD SMOOTH SURFACE.
3. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.
4. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS POURED.
5. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECT. 790.
6. ALL CONCRETE, CLASS 'A' AS PER SECTION 725.



HALF PLAN GUTTER & GRATE

HALF PLAN FRAME & ANCHORS

DETAIL NO.
534-1

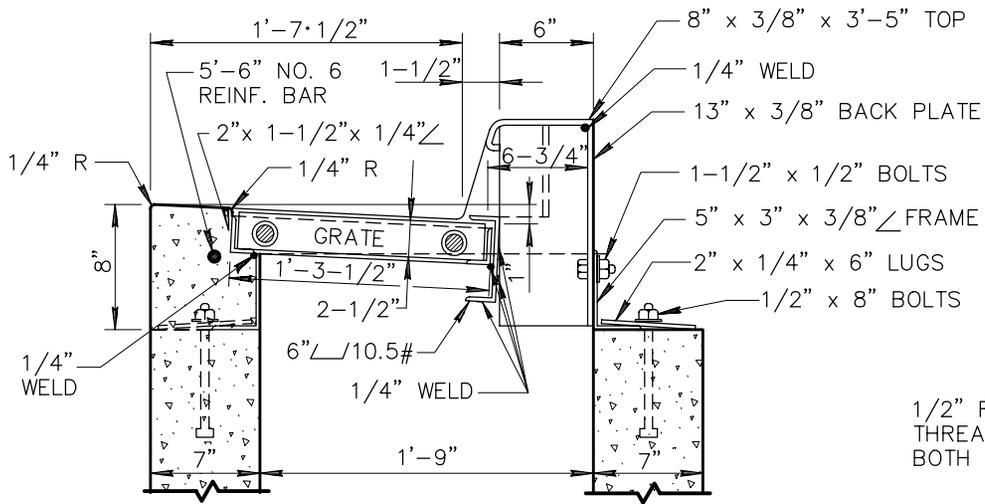


STANDARD DETAIL
 ENGLISH

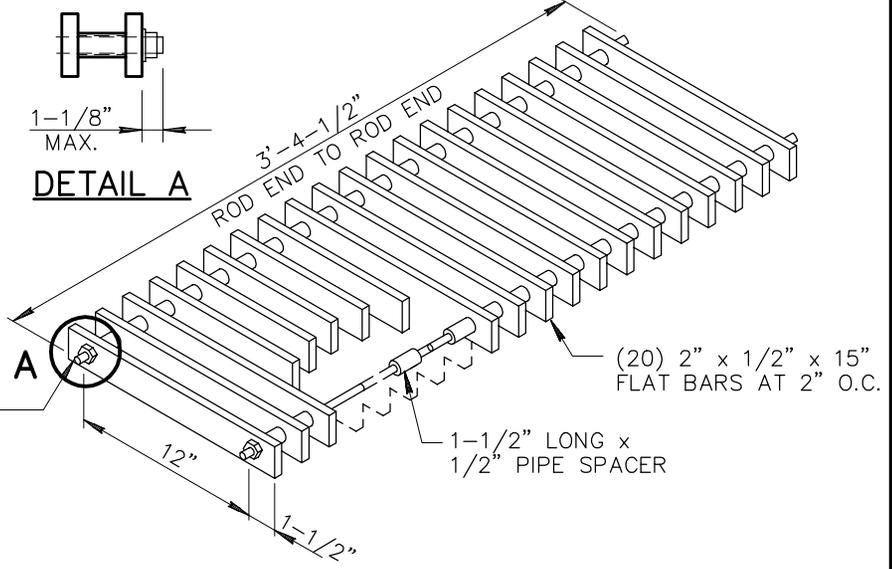
CATCH BASIN TYPE 'E'

REVISED

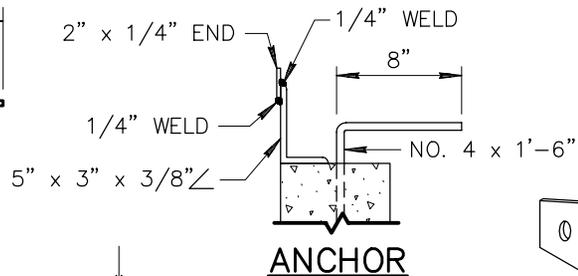
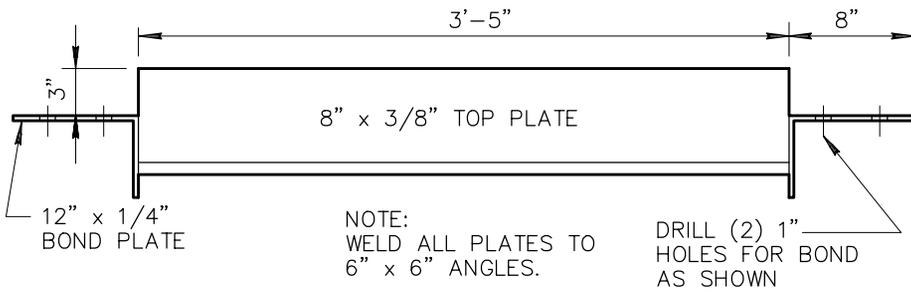
DETAIL NO.
534-1



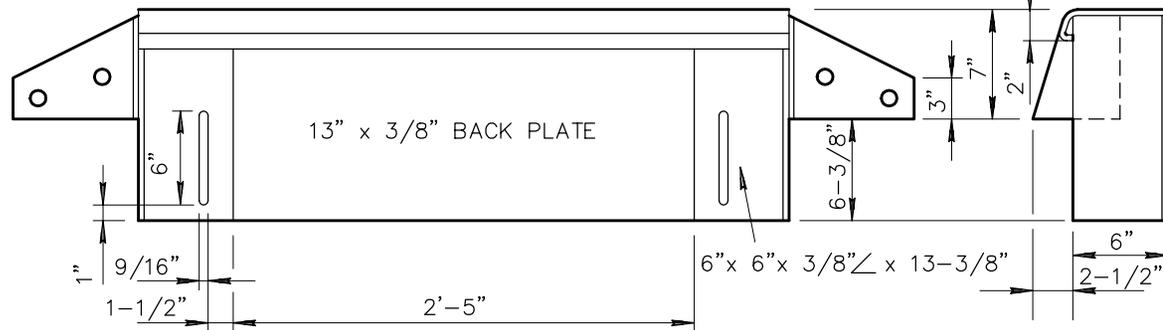
CROSS SECTION



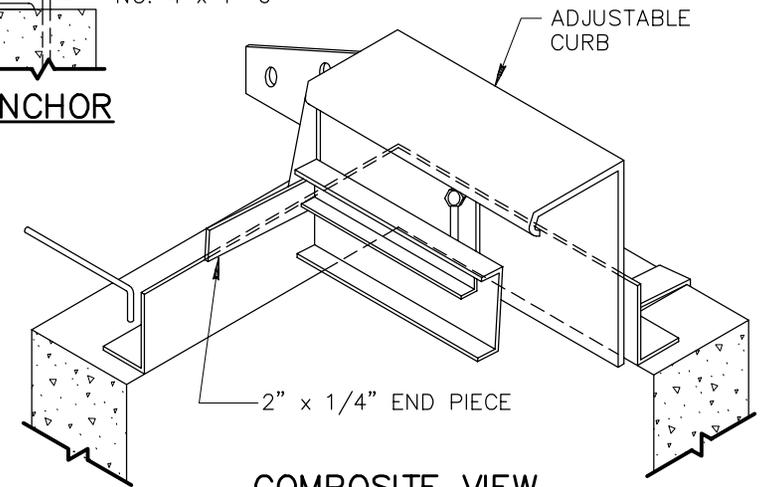
GRATE



ANCHOR



ADJUSTABLE CURB



COMPOSITE VIEW

DETAIL NO.
534-2

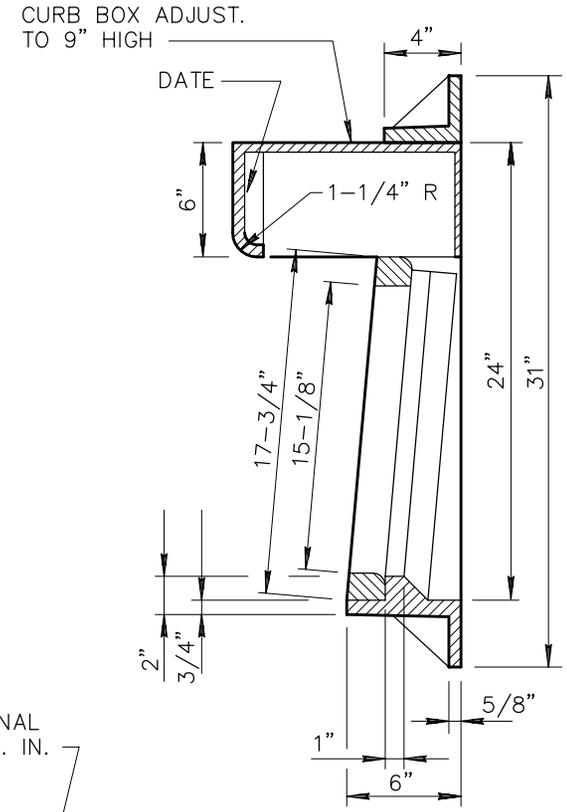
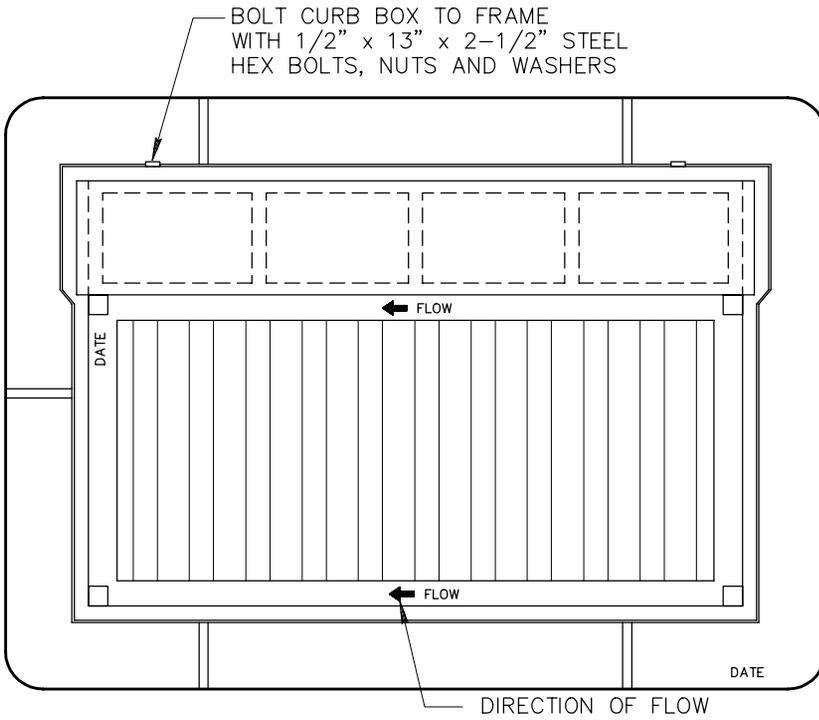


STANDARD DETAIL
ENGLISH

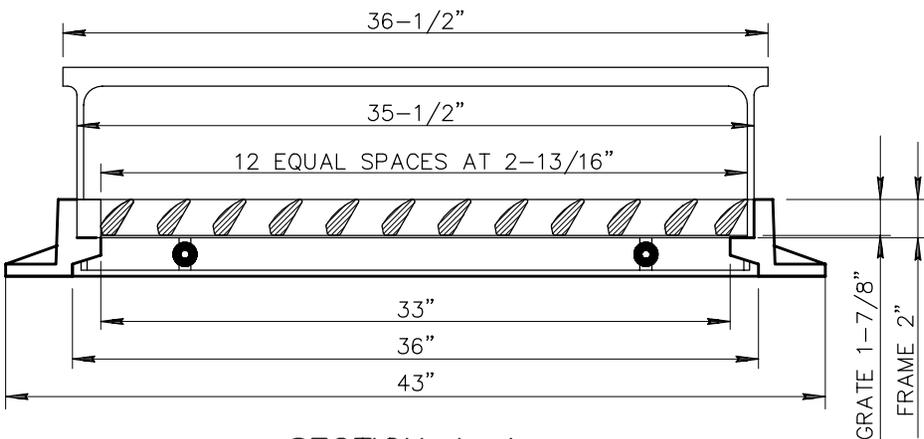
CATCH BASIN TYPE 'E' (DETAILS)

REVISED

DETAIL NO.
534-2

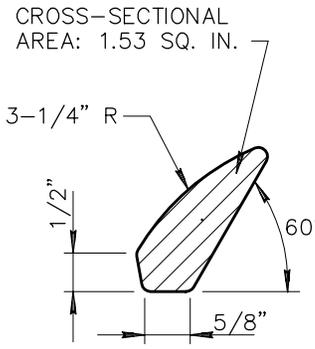


SECTION B-B



SECTION A-A

CAST IRON FRAME - GRATE - CURB BOX



VANE DETAIL

NOTE:

DIMENSIONAL CHANGE REQUIRED FROM 3'-5" WIDTH TO 3'-0" AND 1'-9" DEPTH TO 2'-0"
 MATERIAL CAST GRAY IRON ASTM A-48-83 CLASS 35B.
 FRAME WEIGHT 209 LBS; GRATE 140 LBS; CURB BOX 92 LBS.

DETAIL NO.
534-3



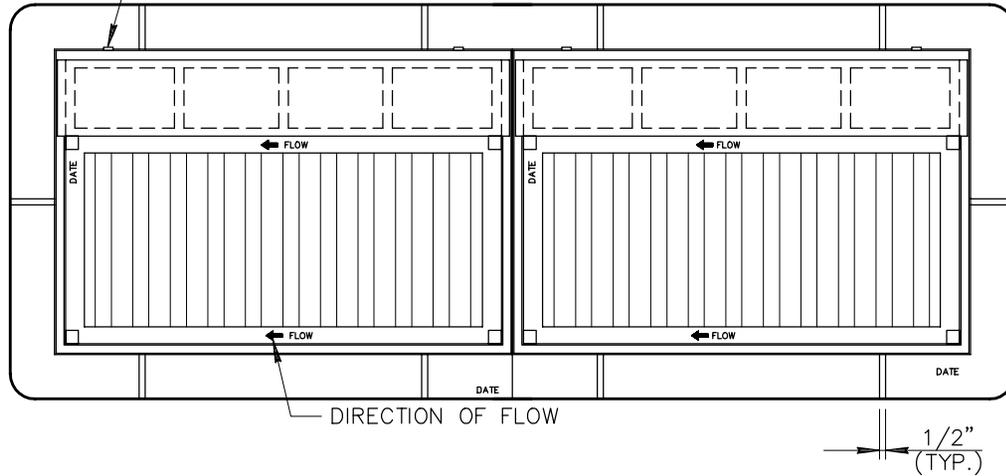
STANDARD DETAIL
ENGLISH

CATCH BASIN TYPE 'E' (DETAILS)

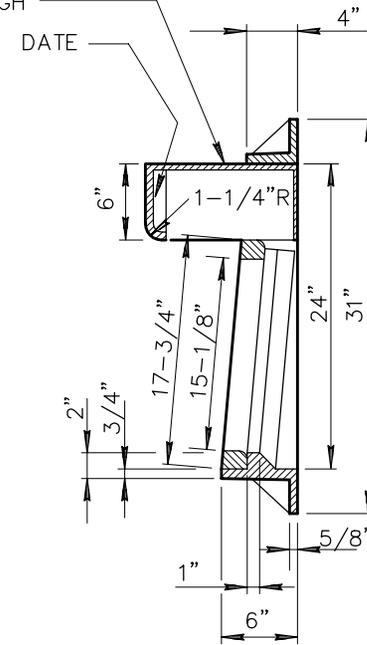
REVISED

DETAIL NO.
534-3

BOLT CURB BOX TO FRAME
WITH 1/2" x 13" x 2-1/2" STEEL HEX
HEAD BOLTS, NUTS AND WASHERS

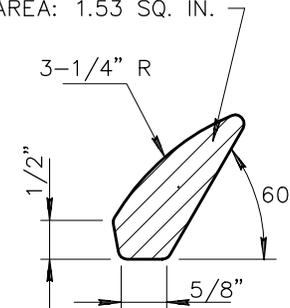


CURB BOX ADJUST.
TO 9" HIGH



SECTION B-B

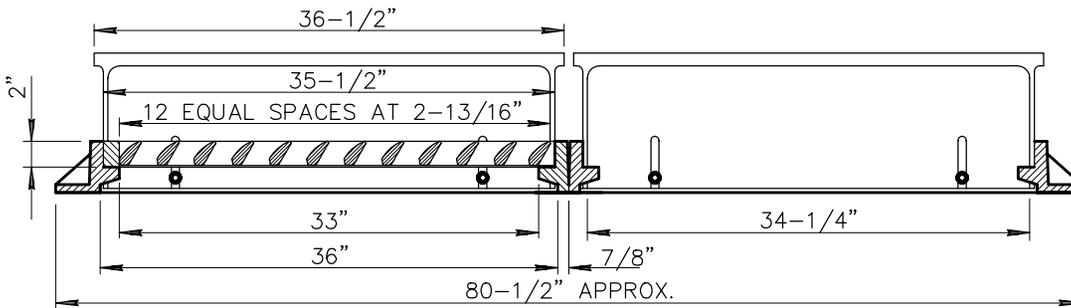
CROSS-SECTIONAL
AREA: 1.53 SQ. IN.



VANE DETAIL

NOTE:

DIMENSIONAL CHANGE REQUIRED FROM 3'-5" WIDTH TO 6'-2", AND 1'-9" DEPTH TO 2'-0" REQUIRES ONE CENTER STEEL I-BEAM 4" x 7.7 LBS. MATERIAL CAST GRAY IRON ASTM A-48-83 CLASS 35B. FRAME WEIGHT 197 LBS.; GRATE 140 LBS.; CURB BOX 92 LBS.



SECTION A-A

DOUBLE UNIT CAST IRON FRAME - GRATE - CURB BOX

DETAIL NO.
534-4

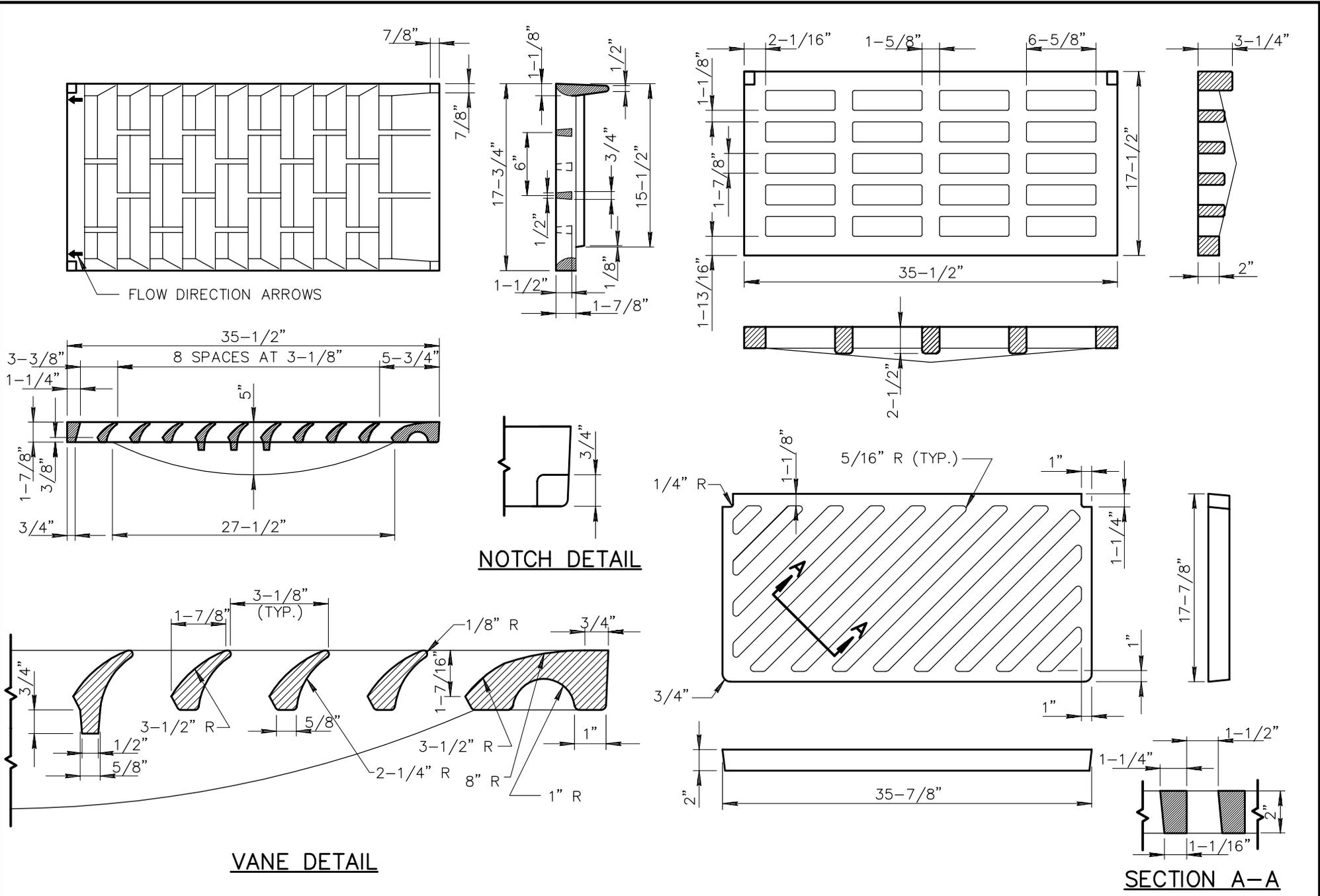


STANDARD DETAIL
ENGLISH

CATCH BASIN TYPE 'E' (DETAILS)

REVISED

DETAIL NO.
534-4



DETAIL NO.
534-5

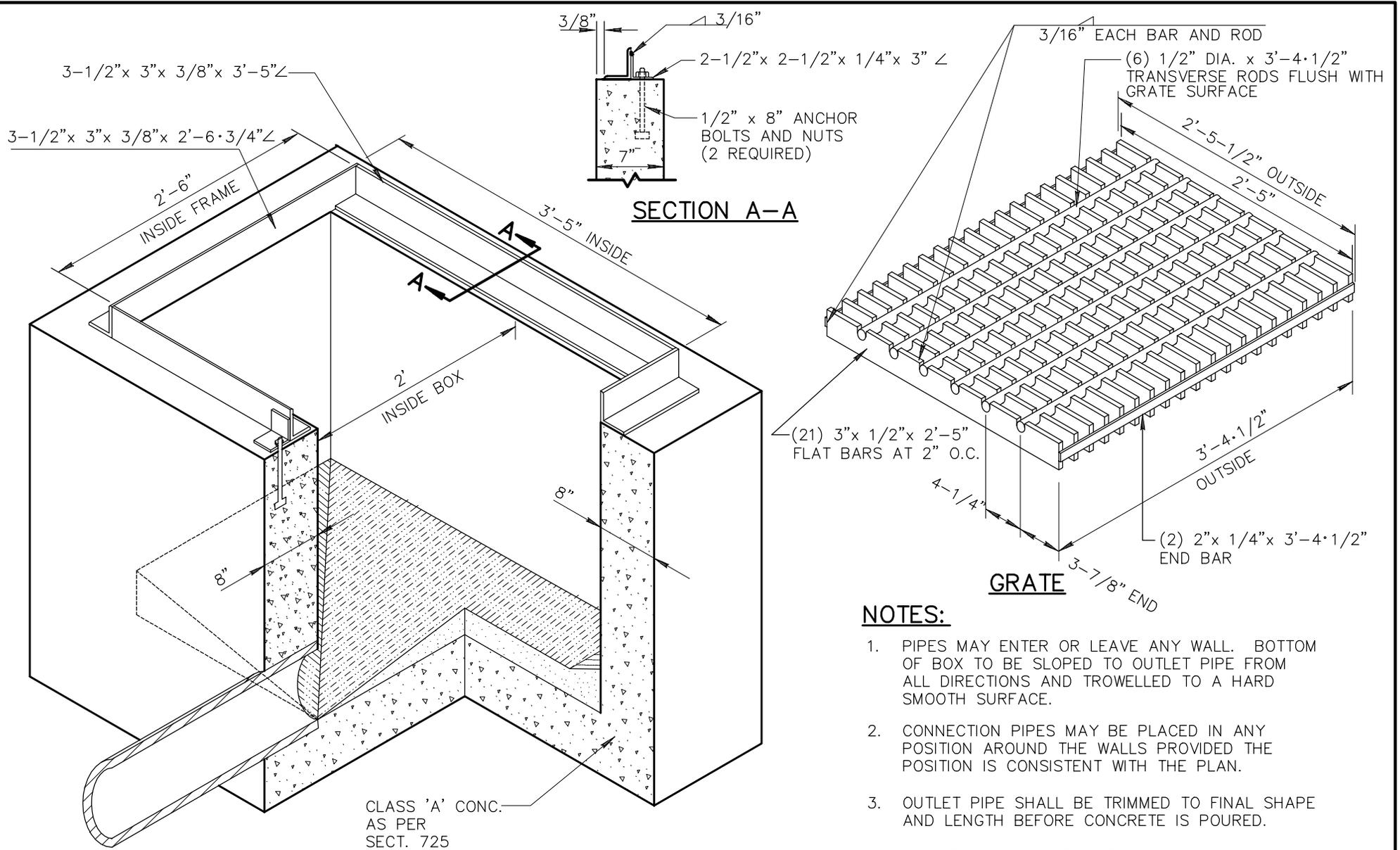


STANDARD DETAIL
ENGLISH

**ALTERNATE GRATE STYLES
SUMP LOCATION**

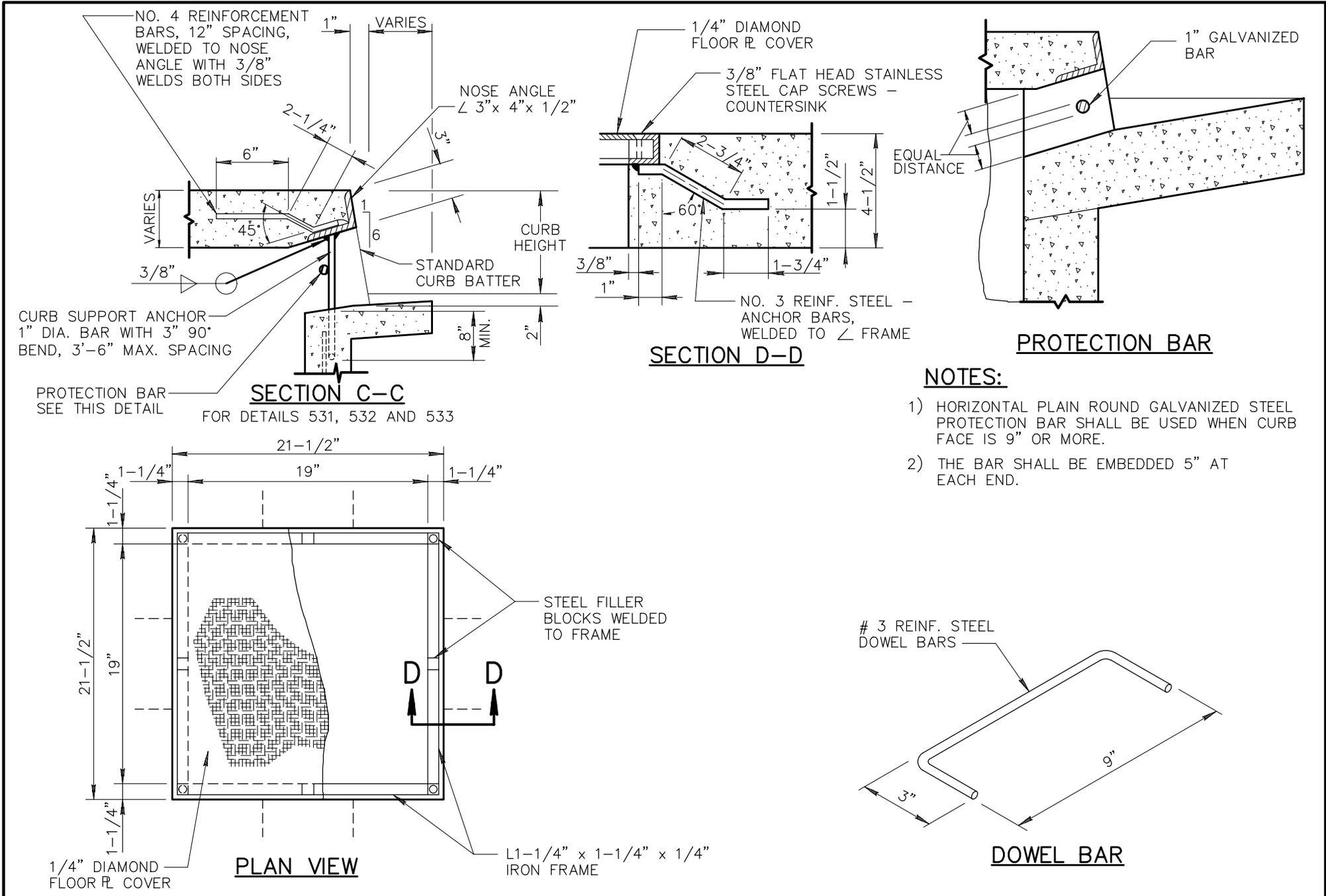
REVISED

DETAIL NO.
534-5



NOTE:
CONSTRUCT BOX AS PER CATCH BASIN TYPE 'E'
(LOWER PORTION ONLY).

- NOTES:**
1. PIPES MAY ENTER OR LEAVE ANY WALL. BOTTOM OF BOX TO BE SLOPED TO OUTLET PIPE FROM ALL DIRECTIONS AND TROWELLED TO A HARD SMOOTH SURFACE.
 2. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.
 3. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS POURED.
 4. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECT. 790.
 5. ALL WELDS ON FRAME AND SIDE BARS ON GRATE SHALL BE FULL LENGTH OF JOINT.



DETAIL NO.
536-1

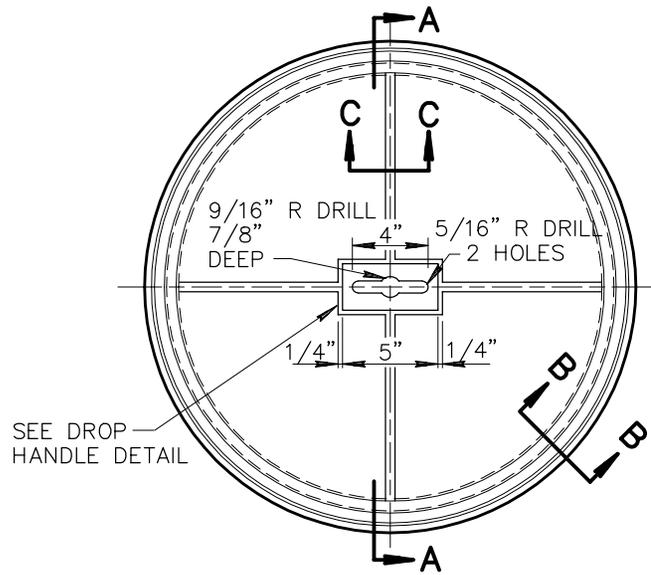


STANDARD DETAIL
ENGLISH

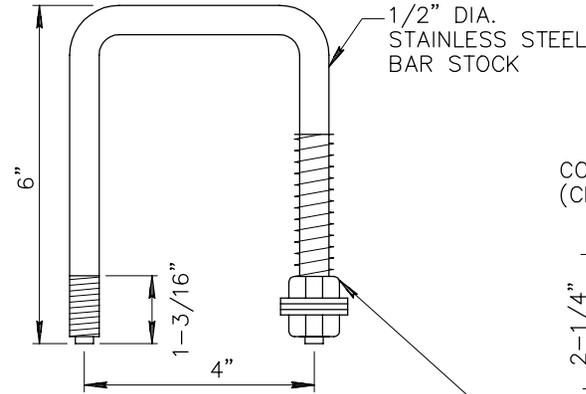
**COMMON DETAILS AND SECTIONS
FOR CURB OPENING CATCH BASINS**

REVISED

DETAIL NO.
536-1

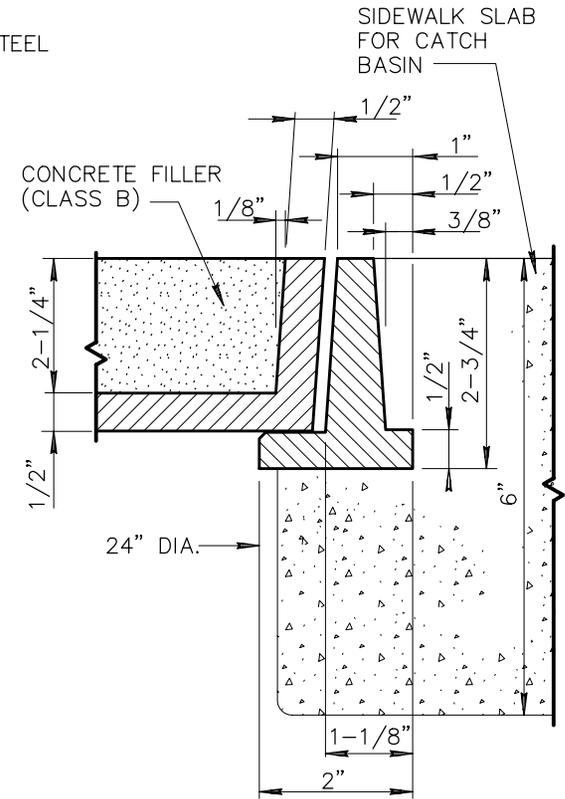


PLAN VIEW

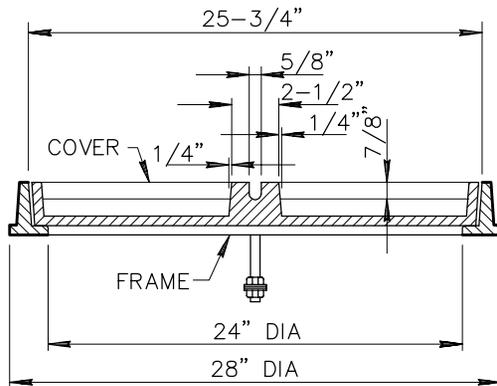


- FURNISH FOR EACH SIDE OF HANDLE
- 1 EACH 304-S.STL. SPRING
2-1/2" x 17/32" I.C. x 3/32"
 - 2 EACH 1/2" HEX NUT
 - 3 EACH 1/2" FLAT WASHER
 - 1 EACH 1/2" LOCK WASHER

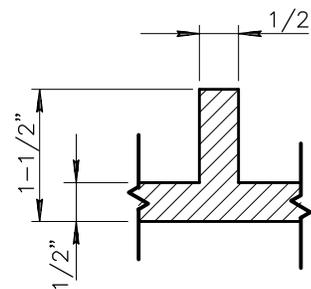
DROP HANDLE



SECTION B-B



SECTION A-A



SECTION C-C

NOTES:

1. FRAME SHALL BE NON-LOCKING.
2. FRAME AND COVER SHALL BE CAST IRON OR ASTM A-36 STRL. HORIZONTAL SURFACE OF COVER IN CONTACT WITH FRAME SHALL BE MACHINED. ASA B-46 ROUGHNESS SHALL NOT EXCEED 1/32".
3. COVER SHALL BE FILLED WITH CONCRETE AND BROOM FINISHED.
4. SMALL VARIATIONS IN DIMENSIONS OF FEATURES OF A MINOR NATURE THAT ARE PART OF THE FOUNDRY'S CASTING ARE PERMISSIBLE.

DETAIL NO.
536-2



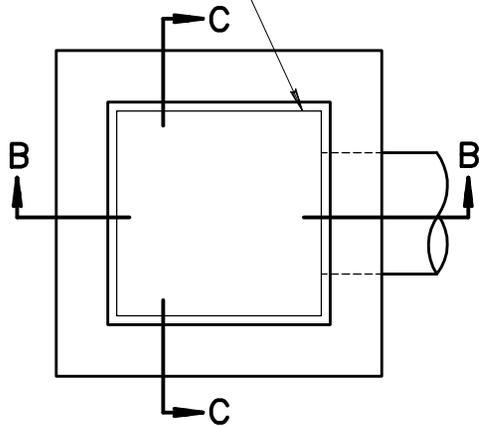
STANDARD DETAIL
ENGLISH

**ALTERNATE COVER FOR
CURB OPENING CATCH BASINS**

REVISED

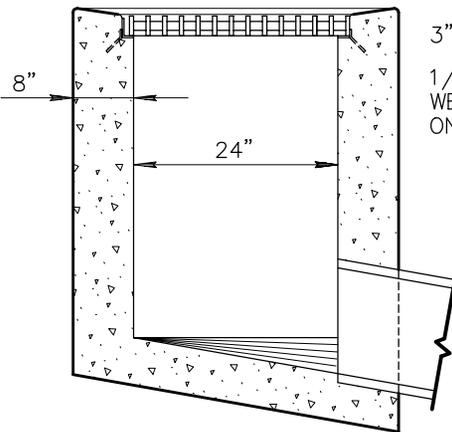
DETAIL NO.
536-2

29" x 53" I.D.
GRATE FRAME



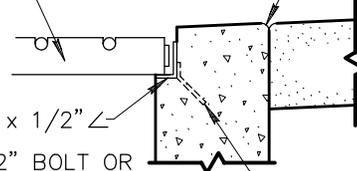
PLAN

SINGLE GRATE



SECTION B-B

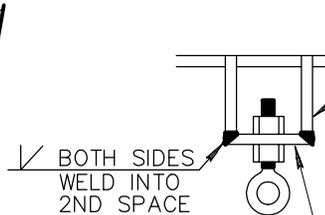
GRATE



3" x 2-1/2" x 1/2" ∠
1/2" x 3-1/2" BOLT OR
WELDED LUG, 4 EACH -
ONE ON EACH CORNER

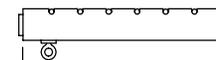
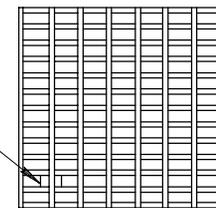
DETAIL OF ANGLE FRAME
GRATE SUPPORT

ALL CONCRETE SHALL BE
CLASS 'A' PER SECT. 725.
EXPOSED EDGES SHALL BE
FINISHED WITH A 1/2"
RADIUS.



1/2" DIA x 1" EYE BOLT
2-3/8" x 3-1/8" x 1/4"
BEVELED SIDES FOR WELDS

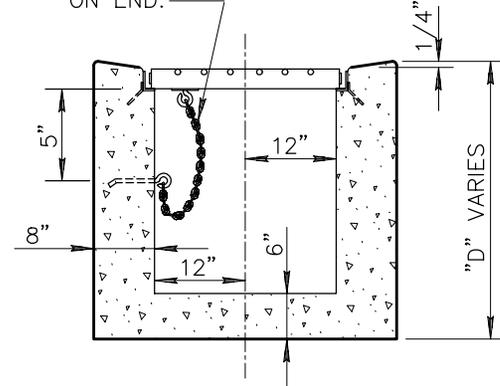
WELD INTO
SECOND
SPACE



1/4" x 1-3/4" x 24"
CHAIN

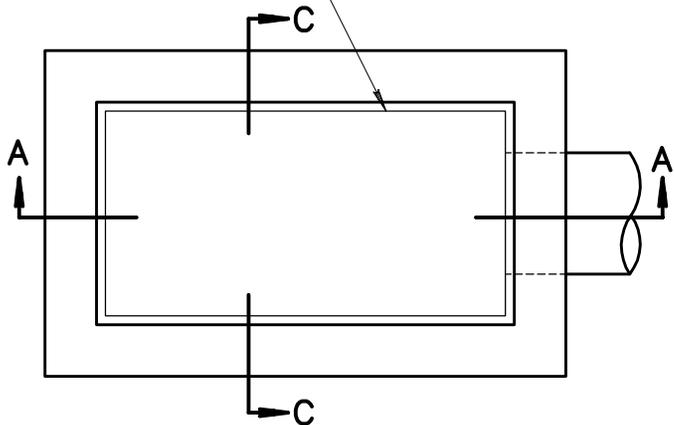
BAR GRATE
SEE DETAIL 539

1/4" x 1-3/4" x 24" CHAIN TO 1" x 6"
EYE BOLT IN WALL. BEND BOLT 1"
ON END.



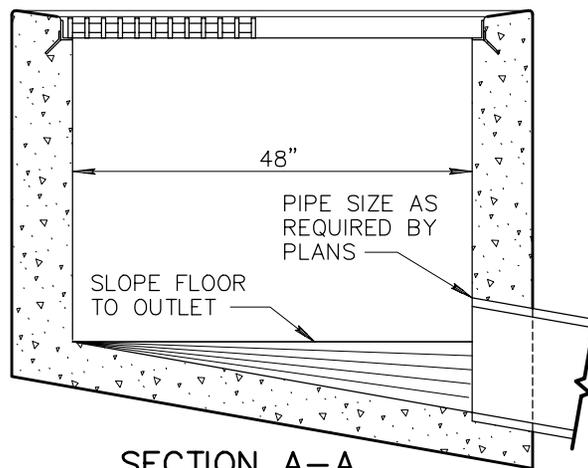
SECTION C-C

29" x 29" I.D.
GRATE FRAME



PLAN

DOUBLE GRATE



SECTION A-A

DETAIL NO.

537



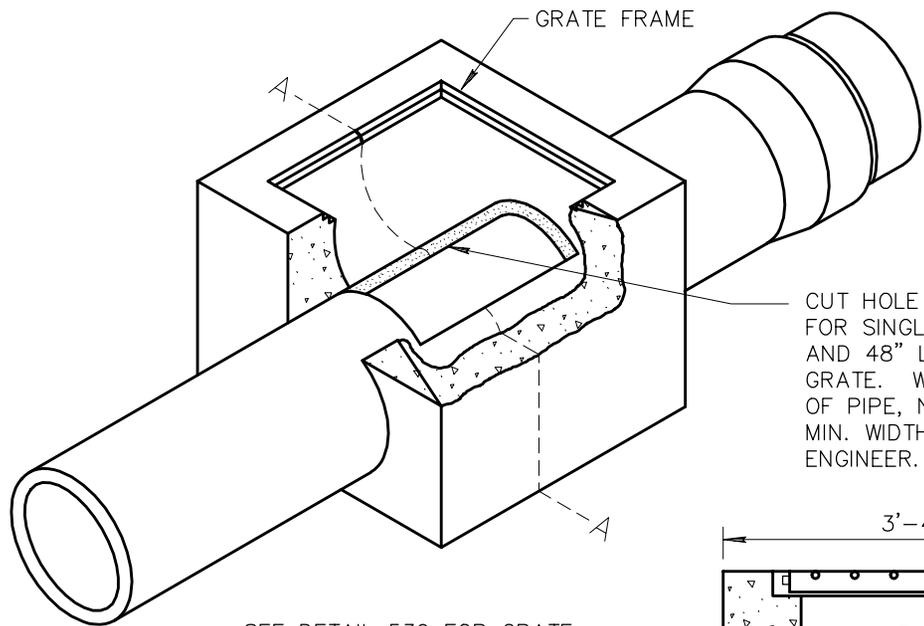
STANDARD DETAIL
ENGLISH

CATCH BASIN - TYPE 'G'

REVISED

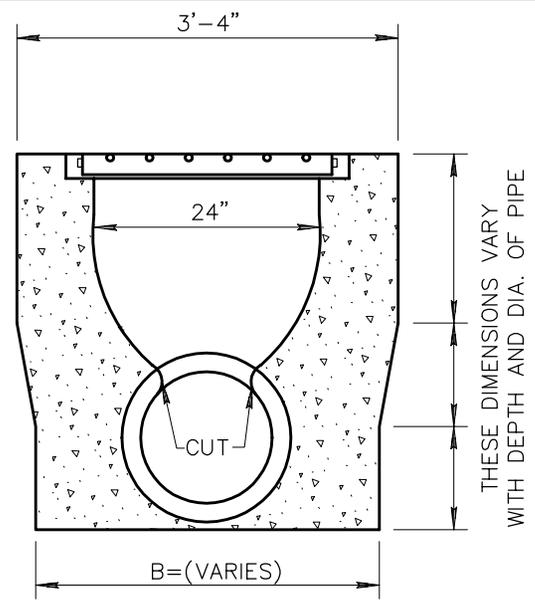
DETAIL NO.

537

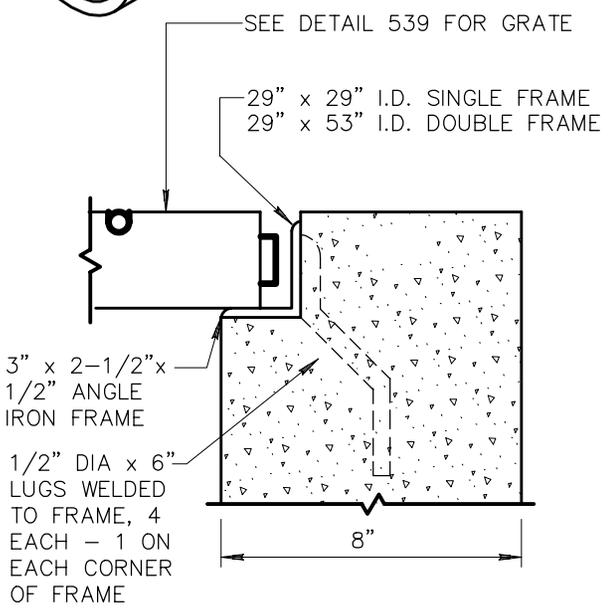


WHEN DOUBLE GRATE IS USED INCREASE THE LENGTH OF THE STRUCTURE ACCORDINGLY.

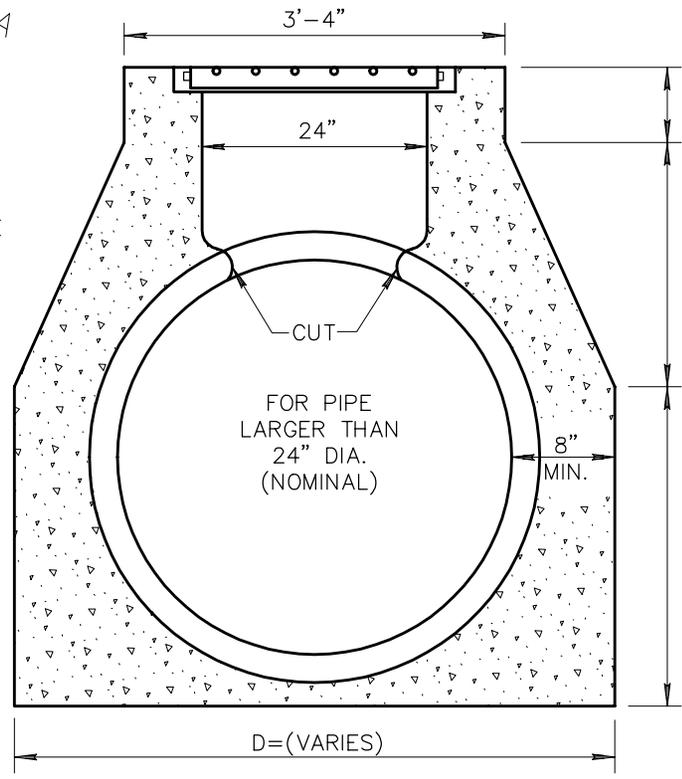
CUT HOLE IN PIPE 24" LONG FOR SINGLE GRATE STRUCTURES AND 48" LONG FOR DOUBLE GRATE. WIDTH DEPENDS ON DIA. OF PIPE, NOT TO EXCEED 22" MIN. WIDTH TO BE SET BY PROJECT ENGINEER.



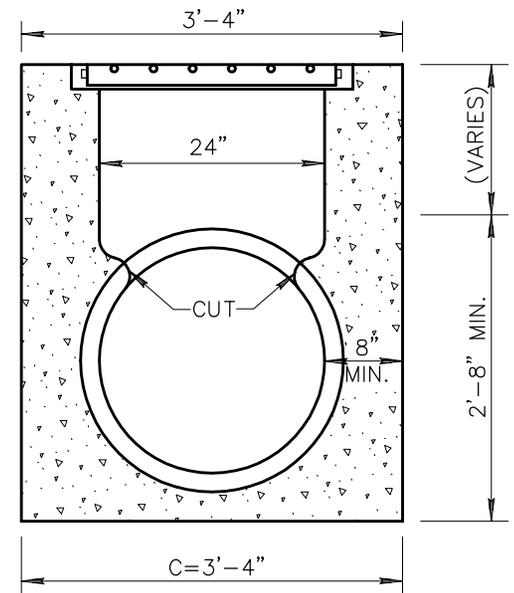
SECTION A-A



DETAIL OF ANGLE FRAME GRATE SUPPORT



SECTION A-A



SECTION A-A
24" PIPE (NOMINAL)

DETAIL NO.
538

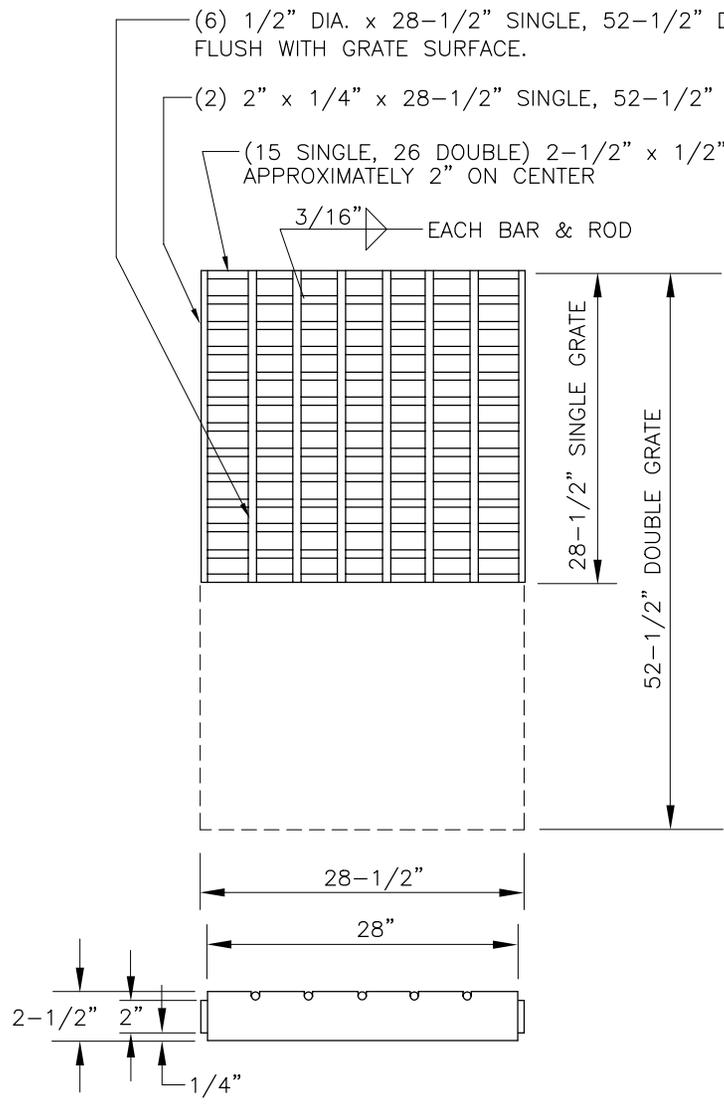


STANDARD DETAIL
ENGLISH

CATCH BASIN - TYPE 'H'

REVISIONS

DETAIL NO.
538



NOTES:

1. ALL STEEL SHALL BE IN ACCORDANCE WITH A.S.T.M. A-36.
2. WELDING SHALL BE IN ACCORDANCE WITH A.W.S. SPECIFICATIONS.
3. FRAME AND GRATE SHALL BE TESTED FOR ACCURACY OF FIT AND SHALL BE MARKED IN SETS BEFORE DELIVERY.
4. THE COMPLETED ASSEMBLY SHALL BE GIVEN ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECTION 790.
5. THE GRATE SHALL BE FABRICATED TO WITHIN 1/8" SPECIFIED DIMENSIONS.

DETAIL NO.
539

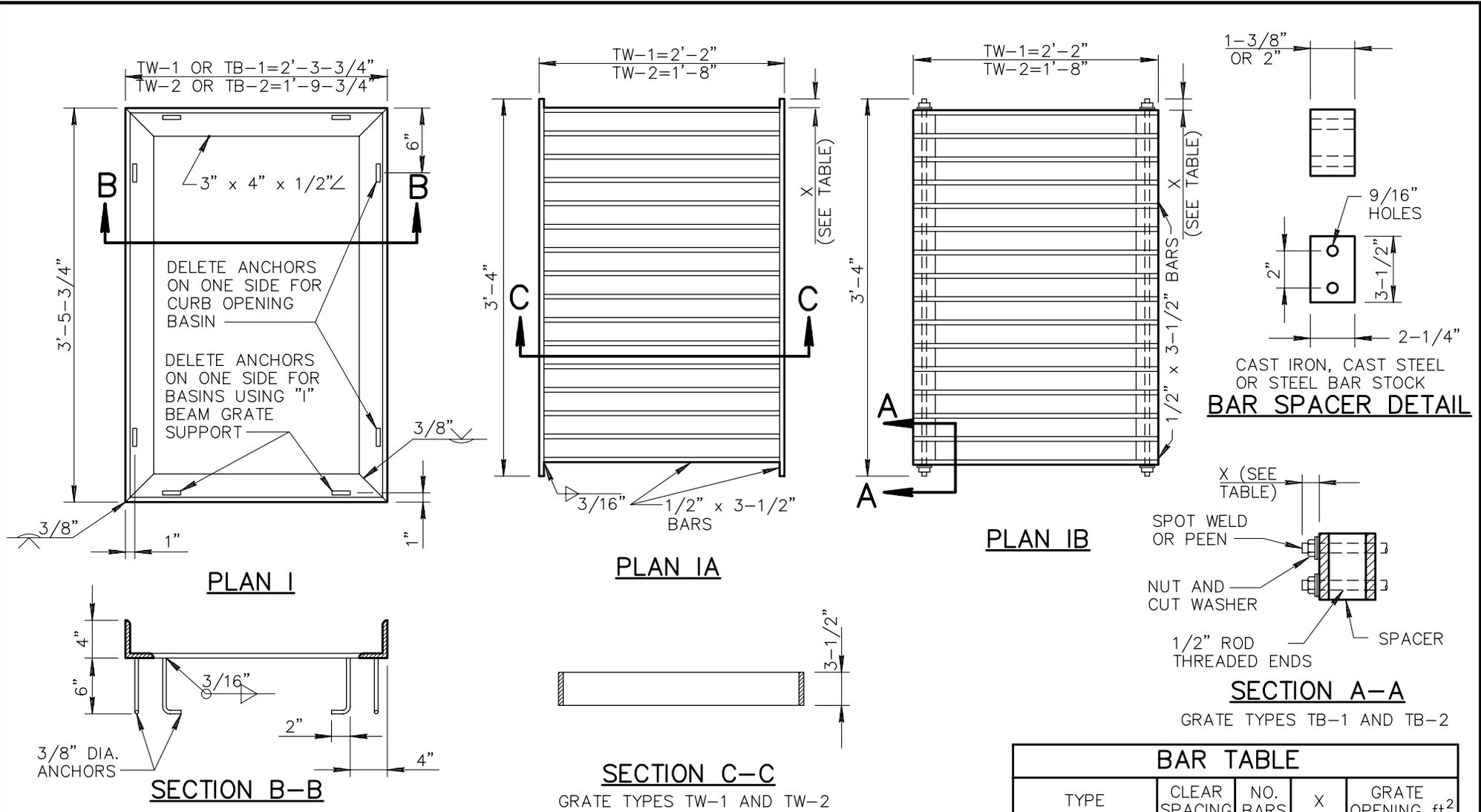


STANDARD DETAIL
ENGLISH

**GRATES FOR CATCH BASINS,
TYPE G AND H**

REVISED

DETAIL NO.
539

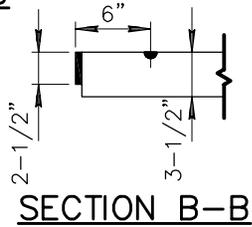
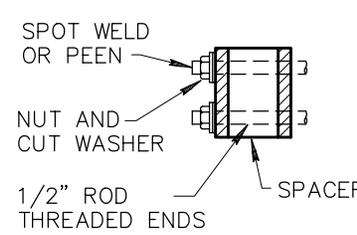
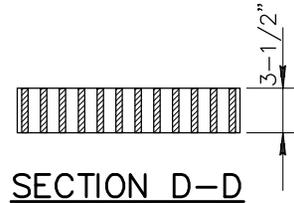
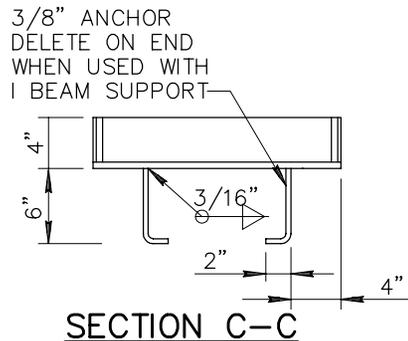
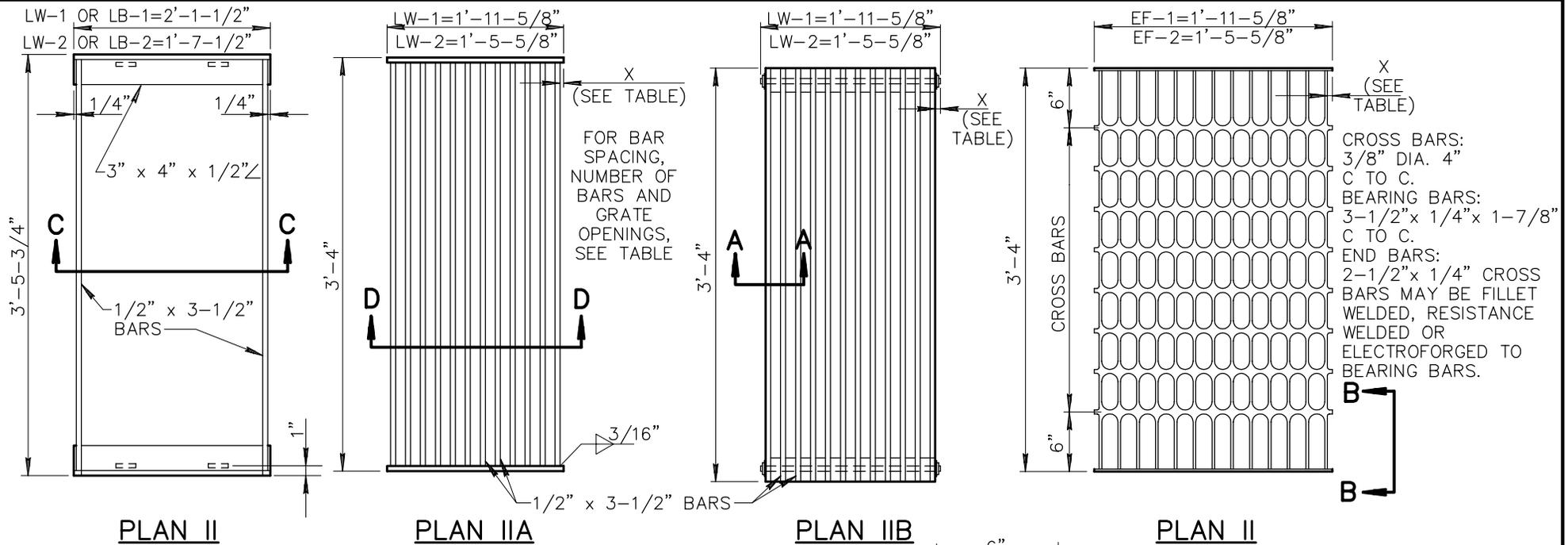


NOTES:

1. GRATING UNITS AND FRAMES SHALL BE FABRICATED FROM STRUCTURAL STEEL EXCEPT AS NOTED.
2. WELDING SHALL BE IN ACCORDANCE WITH STD. WELDING SPECS.
3. THE COMPLETED ASSEMBLY SHALL BE GIVEN TWO SHOP COATS OF NO. 1 PAINT AS PER SECT. 790.
4. FRAME AND GRATE SHALL FIT TO A MAX. ROCK OF 0.093" AT ANY POINT.
5. RESTRICT USE TO GRADES OF 3% OR LESS.

BAR TABLE				
TYPE	CLEAR SPACING	NO. BARS	X	GRATE OPENING ft ²
TW OR TB-1.0	1"	26	1"	3.21
TW OR TB-1.1	1-3/8"	21	1"	3.32
TW OR TB-1.2	2"	16	1"	4.66
TW OR TB-2.0	1"	26	1"	2.32
TW OR TB-2.1	1-3/8"	21	1"	2.41
TW OR TB-2.2	2"	16	1"	2.65

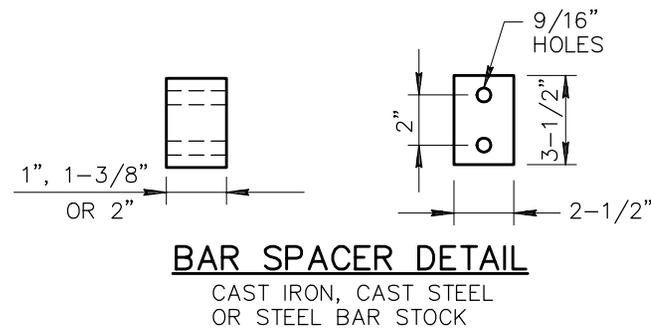
TW INDICATES TRANSVERSE WELDED
 TB INDICATES TRANSVERSE BOLTED



NOTES:

1. LW INDICATES LONGITUDINAL WELDED.
2. LB INDICATES LONGITUDINAL BOLTED.
3. EF INDICATES ELECTROFORGED.
4. GRATING UNITS AND FRAMES SHALL BE FABRICATED FROM STRUCTURAL STEEL 'A-36 EXCEPT AS NOTED.
5. ALL WELDING SHALL BE IN ACCORDANCE WITH STANDARD WELDING SPECIFICATIONS.
6. THE COMPLETED ASSEMBLY SHALL BE GIVEN ONE SHOP COAT OF NO. 1 PAINT.
7. FRAMES AND GRATES SHALL FIT TO A MAXIMUM ROCK OF 0.093" AT ANY POINT.
8. GRATE TYPE LW AND EF RESTRICTED TO SLOPES OF 3% OR LESS
9. GRATES TYPE LB USE LONGITUDINAL GRADES IN EXCESS OF 3% OR AS AN ALTERNATE TO TYPES LW OR EF ON GRADES OF 3% OR LESS.

GRATE TYPE	CLEAR BAR SPACING	NO. BARS	X	GRATE OPENING ft ²
LW OR LB-1.0	1"	16	5/16"	3.97
LW OR LB-1.1	1-3/8"	13	5/16"	4.34
LW OR LB-1.2	2"	9	1-9/16"	4.84
EF-1	1-5/8"	13	7/16"	4.66
LW OR LB-2.0	1"	12	5/16"	2.98
LW OR LB-2.1	1-3/8"	9	1-1/16"	3.35
LW OR LB-2.2	2"	7	1-1/16"	3.60
EF-2	1-5/16"	10	1/4"	3.48



DETAIL NO.
540-2



STANDARD DETAIL
ENGLISH

CATCH BASIN GRATES

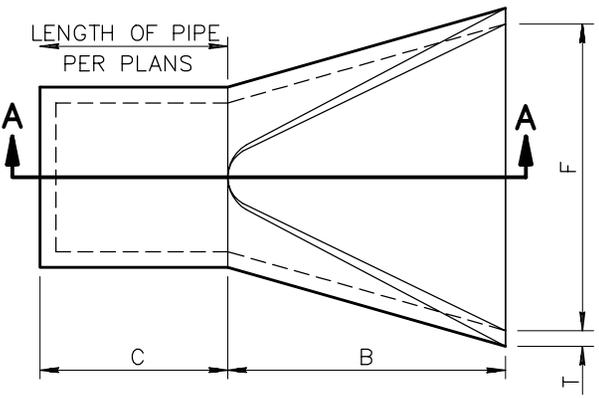
REVISED

DETAIL NO.
540-2

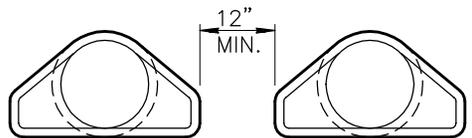
PIPE DIA.	APPROX. WEIGHT (LBS.)	DIMENSIONS – INCHES						APPROX. SLOPE
		T	A	B	C	E	F	
24"	1520	3	9-1/2	43-1/2	30	73-1/2	48	3
27"	1930	3-1/4	10-1/2	49-1/2	24	73-1/2	54	3
30"	2190	3-1/2	12	54	19-3/4	73-3/4	60	3
36"	4100	4	15	63	34-3/4	97-3/4	72	3
42"	5380	4-1/2	21	63	35	98	78	3
48"	6550	5	24	72	26	98	84	3
54"	8240	5-1/2	27	65	33-1/4	98-1/4"	90	2 1/2

NOTES

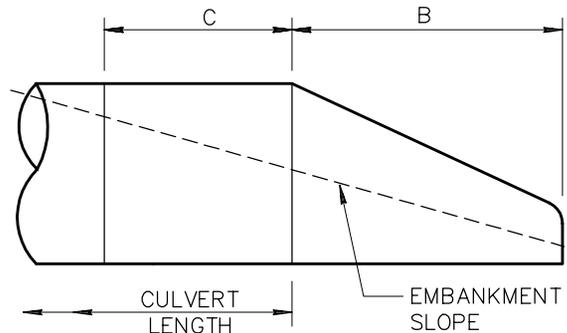
- DESIGN OF END SECTION SHALL CONFORM TO STANDARD FOR REINFORCED CONCRETE PIPE.
- END SECTION JOINT CONFORMATION SHALL MATCH THE PIPE JOINTS.
- EMBANKMENT SLOPE SHALL BE WARPED TO MATCH SLOPE OF END SECTION.
- CULVERT LENGTH IS AS SHOWN ON PLANS.



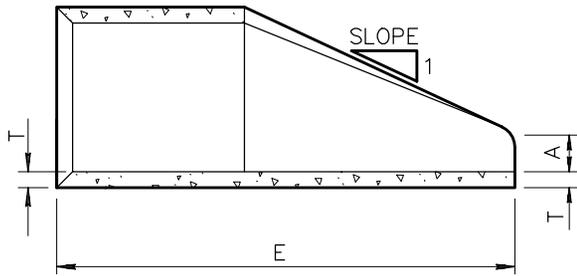
PLAN



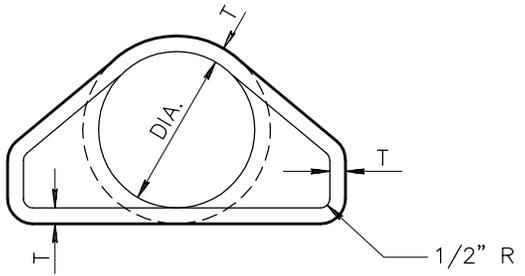
SPACING FOR MULTIPLE INSTALLATION



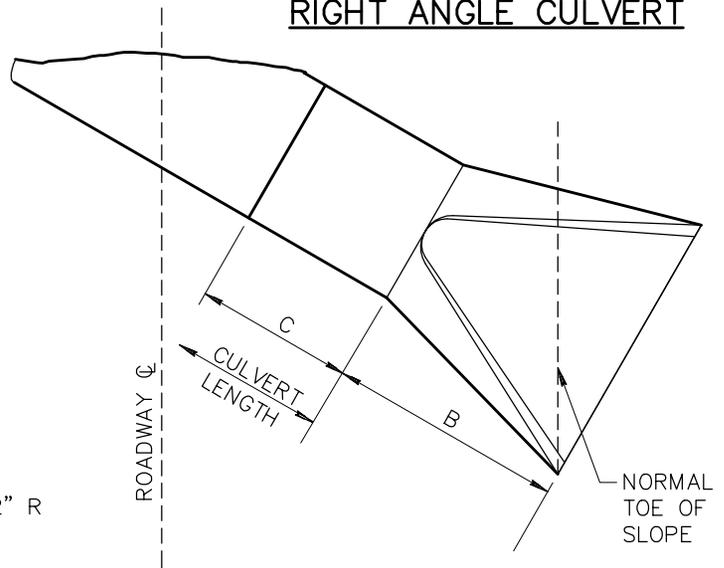
RIGHT ANGLE CULVERT



SECTION A-A



FRONT ELEVATION



SKewed CULVERT

DETAIL NO.
545

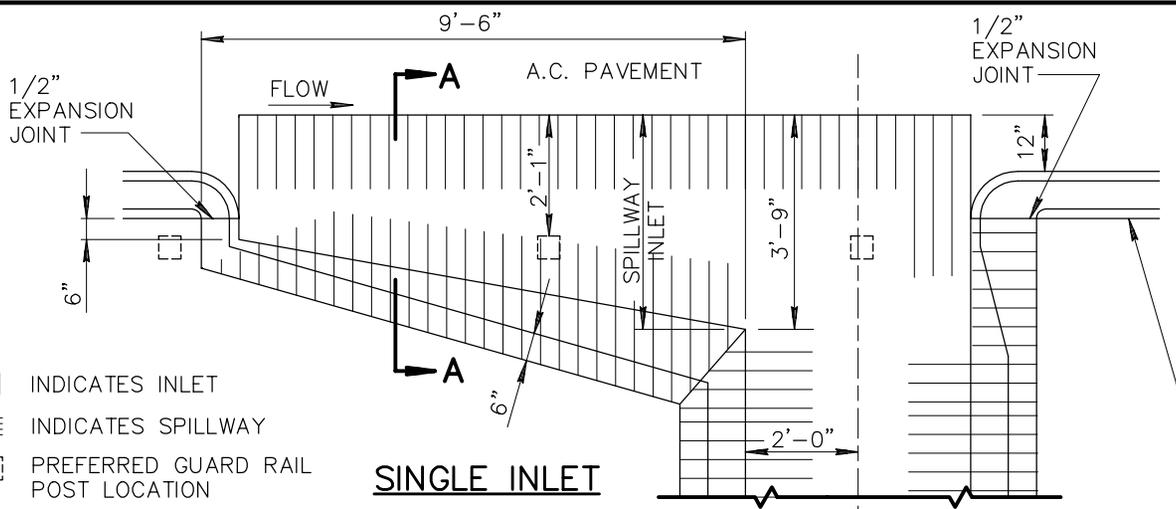


STANDARD DETAIL
ENGLISH

END SECTION—REINFORCED CONCRETE PIPE

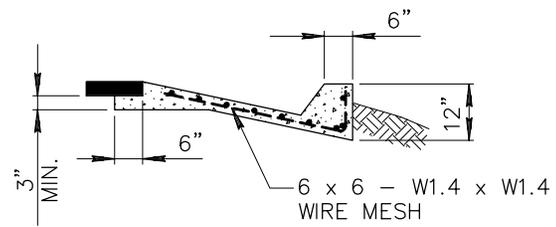
REVISED

DETAIL NO.
545

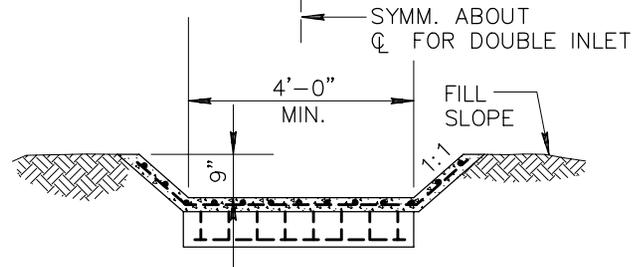


|||| INDICATES INLET
 |||| INDICATES SPILLWAY
 □ PREFERRED GUARD RAIL POST LOCATION

SINGLE INLET



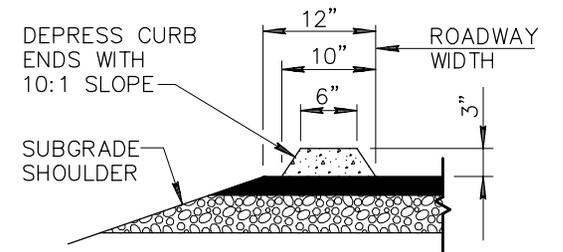
SECTION A-A



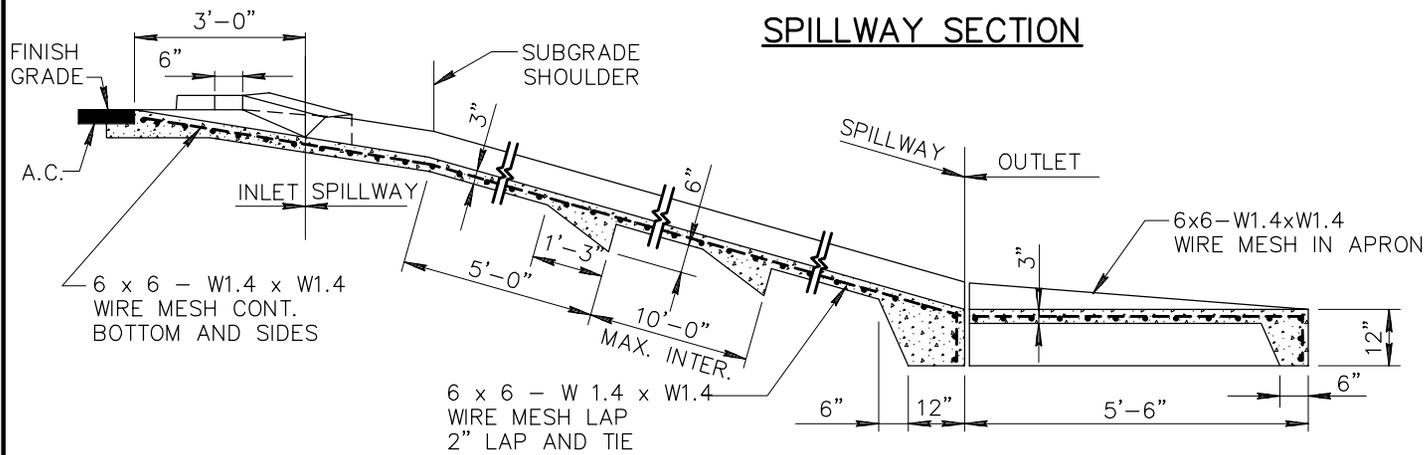
SPILLWAY SECTION

NOTES:

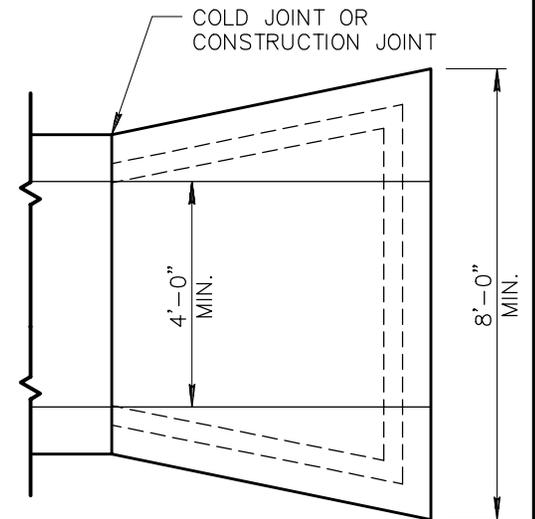
1. WHERE ROCK IS ENCOUNTERED THE OUTLET MAY BE OMITTED.
2. ALL PORTIONS OF SPILLWAY TO BE TROWEL FINISHED.
3. CONCRETE FOR THE SPILLWAY INLET, SPILLWAY AND OUTLET SHALL BE CLASS 'B' PER SECT. 725.
4. WHEN THE OUTLET IS USED, THE WIRE MESH SHALL EXTEND THROUGH THE JOINT INTO THE OUTLET IN LIEU OF BENDING INTO THE KEY.



EMBANKMENT CURB/EXTRUDED (OPTIONAL)



**SECTION ON SPILLWAY Q
DOUBLE INLET**



DETAIL NO.

550



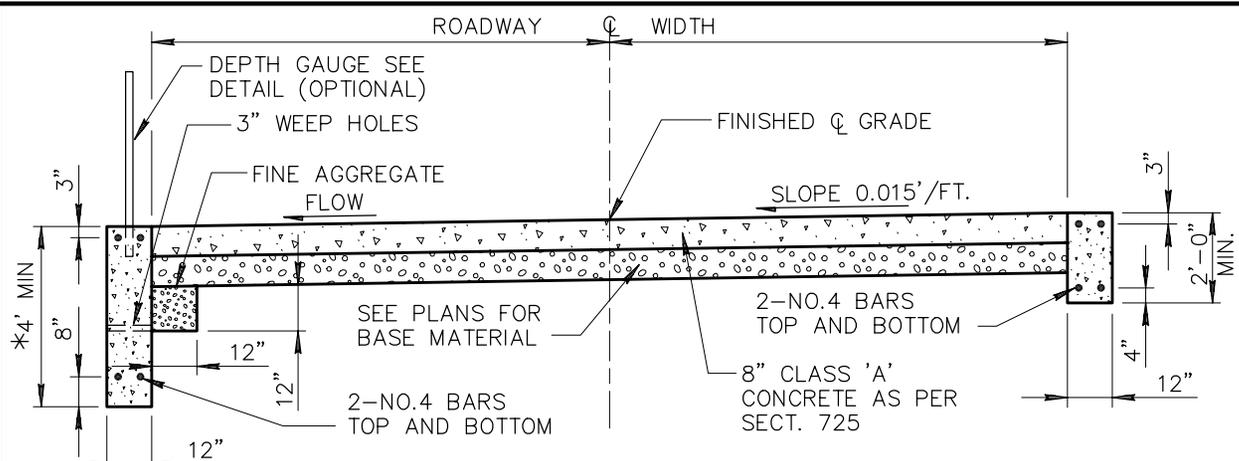
STANDARD DETAIL
ENGLISH

SPILLWAY INLET AND OUTLET

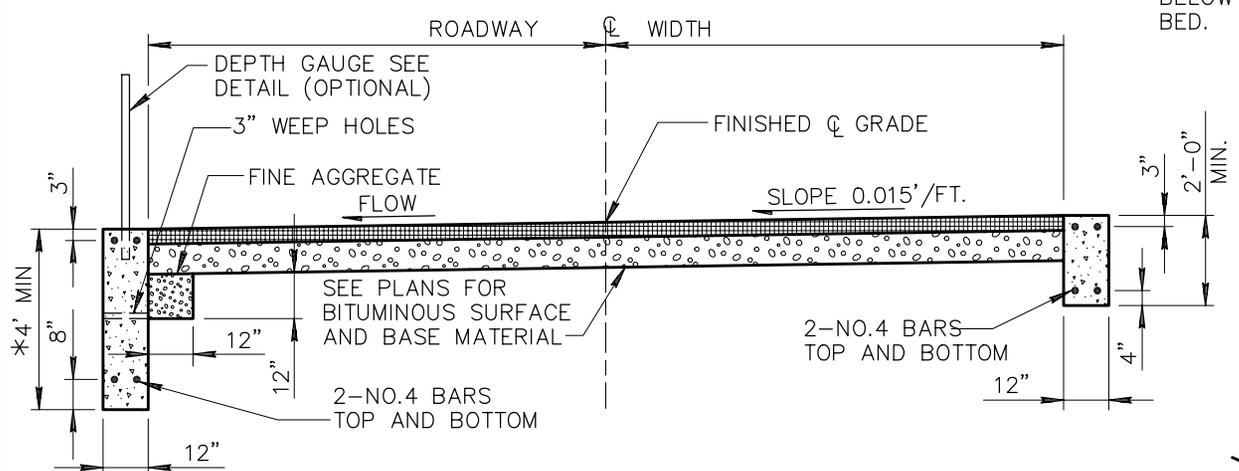
REVISED

DETAIL NO.

550



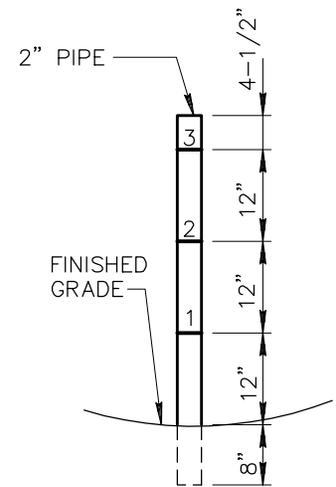
CONCRETE SURFACE FORD CONCRETE WALLS



BITUMINOUS SURFACE FORD CONCRETE WALLS

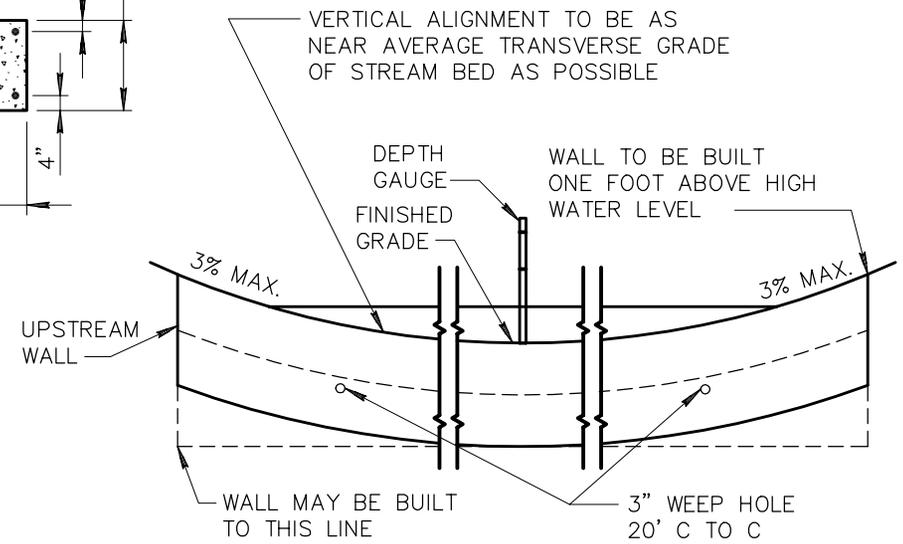
NOTES:

1. FORD WALLS SHALL BE CLASS 'A' CONCRETE PER SECT. 725
2. DEPTH GAUGE SHALL BE PAINTED 2 COATS WHITE ENAMEL. NUMERALS AND MARKERS SHALL BE 1 COAT BLACK ENAMEL.
3. NUMBERS ON DEPTH GAUGE TO BE 2" HIGH.
4. HEIGHT OF DEPTH GAUGE OPTIONAL.
5. TWO DEPTH GAUGES MAY BE USED. ONE ON EACH END OF UPSTREAM WALL. START WITH 2' INSTEAD OF 1'



DEPTH GAUGE DETAIL
(OPTION OF THE CONTRACTING AGENCY)

*MIN. DISTANCE BELOW STREAM BED.



ELEVATION LOOKING UPSTREAM

DETAIL NO.

552



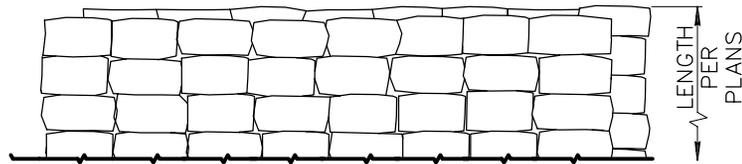
STANDARD DETAIL
ENGLISH

CONCRETE CUT-OFF WALLS

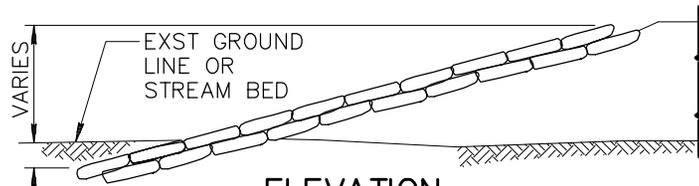
REVISED

DETAIL NO.

552

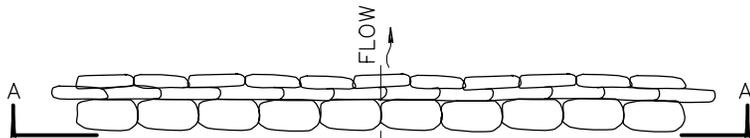


PLAN

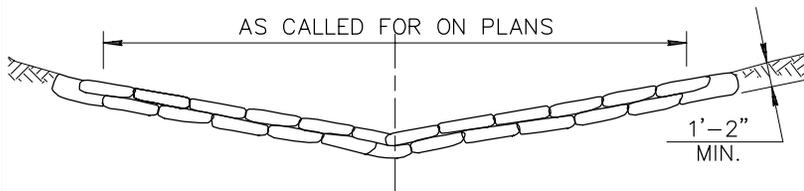


ELEVATION

TYPE 1 RIPRAP



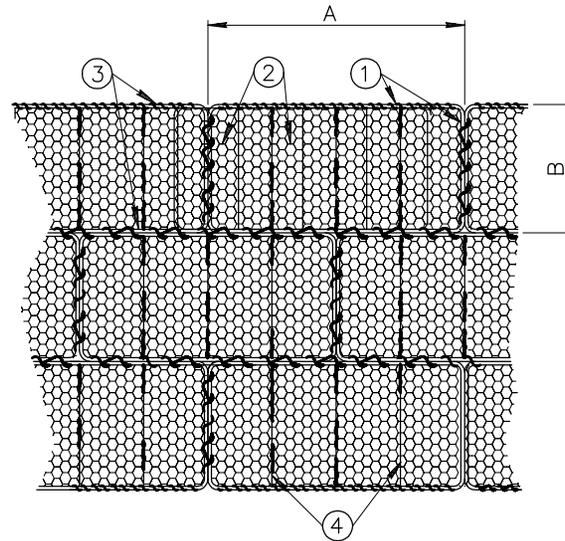
PLAN



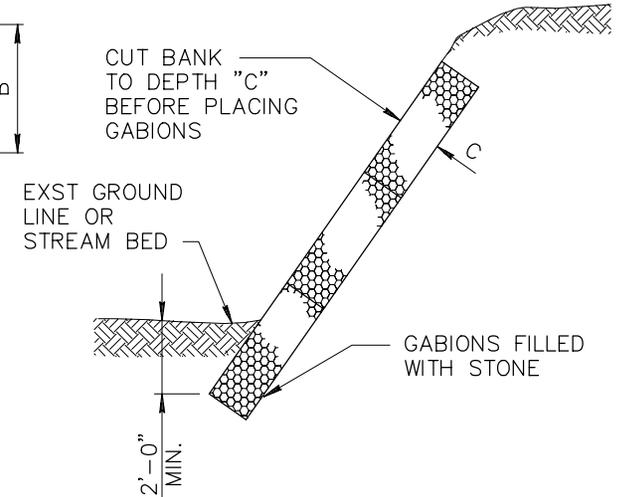
ELEVATION

TYPE 2 RIPRAP

TYPICAL GABIONS



PLAN



ELEVATION

- ① HEAVY GAUGE FRAME WIRE.
- ② HEAVY GAUGE TRIPLE-TWIST HEXAGONAL MESH (OR EQUAL) FASTENED TO FRAME WIRE.
- ③ CONTINUOUS HEAVY GAUGE WRAPPED AROUND FRAMES TO FASTEN GABIONS TO EACH OTHER.
- ④ PARTITIONS TO PREVENT SHIFTING, NORMALLY ONE PER 3' LENGTH. INSTALLED AT FACTORY.

NOMINAL SIZE COMBINATIONS				
LENGTH	WIDTH	DEPTH		
A	B	C		
6'	3'	1'	1.5'	3'
9'	3'	1'	1.5'	3'
12'	3'	1'	1.5'	3'

OTHER SIZES AVAILABLE FROM MANUFACTURER.

NOTES:

- 1. PLAIN ROCK OR GROUTED ROCK MAY BE SUBSTITUTED FOR SACKED CONCRETE.
- 2. GROUT FOR RIPRAP MAY BE PNEUMATICALLY PLACED MORTAR.

DETAIL NO.

555



STANDARD DETAIL
ENGLISH

EROSION PROTECTION / RIPRAP

REVISED

DETAIL NO.

555