

**UNIFORM STANDARD  
DETAILS**

**for**

**PUBLIC WORKS  
CONSTRUCTION**

**SPONSORED and DISTRIBUTED  
by the**



2012 EDITION

**ARIZONA**

(Drawings updated for 2012)

**100 SERIES: GENERAL INFORMATION**

Detail	Revised	Title
101	2011	GENERAL INFORMATION
110-1	2011	PLAN SYMBOLS (SYMBOLS)
110-2	2011	PLAN SYMBOLS (LINE TYPES)
112	1998	DIMENSIONING FOR ROAD IMPROVEMENT PLANS
120-1	2001	SURVEY MARKER
120-2	2007	SURVEY MARKER - FOR UNINCORPORATED AREAS OF THE COUNTY
122	2011	PAVEMENT MARKER FOR FIRE HYDRANTS
130	2003	BARRICADES
131	1998	STREET SIGN BASE
140	2009	BOLLARD
141	2009	HAZARD MARKER
145	2011	SAFETY RAIL
150	1998	PRECAST SAFETY CURB
160	2003	6' CHAIN LINK FENCE AND GATE

**200 SERIES: STREET INFORMATION**

Detail	Revised	Title
200-1	2010	BACKFILL, PAVEMENT AND SURFACE REPLACEMENT
200-2	2010	BACKFILL, PAVEMENT AND SURFACE REPLACEMENT
201	2008	PAVEMENT SECTION AT TERMINATION
202	1998	ALLEY DETAILS (PAVED AND UNPAVED)
203	1998	SCUPPERS
204	1998	EQUIPMENT CROSSING
205	2006	PAVED TURNOUTS
206-1	2007	CONCRETE SCUPPER
206-2	2007	CONCRETE SCUPPER
206-3	2007	CONCRETE SCUPPER (ISOMETRIC VIEW)
210	2012 *	RESIDENTIAL SPEED HUMP
211	1998	STANDARD TRENCH PLATING DETAIL
212	2012 *	UTILITY POTHOLE REPAIR
220-1	2007	CURB AND GUTTER TYPES A, B, C AND D
220-2	2007	CURB AND GUTTER TYPES E AND E
221	2011	CURB AND GUTTER TRANSITION TYPE A TO TYPE C, INTEGRAL ROLL CURB, GUTTER AND SIDEWALK
222	2008	SINGLE CURB - TYPES A, B AND TERMINATION
223	1998	MEDIAN NOSE TRANSITION
224	1998	JOINT FOR DRAINAGE INLETS AND MANHOLE COVERS
225	2005	CONCRETE PAVERS
230	2011	SIDEWALKS
234	2012 *	CURB MODIFICATION AT DETECTABLE WARNING
235-1	2012 *	CURB RAMPS (TYPE A)
235-2	2012 *	CURB RAMPS (TYPE B)
235-3	2012 *	CURB RAMPS (TYPE C)
235-4	2011	CURB RAMPS (TYPE D)

**200 SERIES: STREET INFORMATION (CONTINUED)**

Detail	Revised	Title
235-5	2011	CURB RAMPS (TYPE E)
240	2010	VALLEY GUTTER
250-1	2009	DRIVEWAY ENTRANCES WITH DETACHED SIDEWALK
250-2	2009	DRIVEWAY ENTRANCES WITH SIDEWALK ATTACHED TO CURB
251	2003	RETURN TYPE DRIVEWAYS
252	2005	BUS BAYS
262	2012 *	WING TYPE ALLEY ENTRANCE (WITH COMBINED CURB AND GUTTER)
263	2002	WING TYPE ALLEY ENTRANCE (WITH ROLL TYPE CURB AND GUTTER)
270	2001	FRAME AND COVER (AND GRADE ADJUSTMENTS)

**300 SERIES: WATER INFORMATION**

Detail	Revised	Title
301	1998	BLOCKING FOR WATER GATE AND BUTTERFLY VALVES
302-1	1998	JOINT RESTRAINT WITH TIE RODS (DRAWING)
302-2	1998	JOINT RESTRAINT WITH TIE RODS (NOTES)
303-1	1998	JOINT RESTRAINT FOR DUCTILE IRON AND POLYETHYLENE WRAPPED DUCTILE IRON WATER PIPES (DRAWING)
303-2	1998	JOINT RESTRAINT FOR DUCTILE IRON AND POLYETHYLENE WRAPPED DUCTILE IRON WATER PIPES (TABLES)
310	1998	CAST IRON WATER METER BOX COVER NO. 1
311	1998	CAST IRON WATER METER BOX COVER NO. 2
312	1998	CAST IRON WATER METER BOX COVER NO. 3
313	1998	CAST IRON WATER METER BOX COVER NO. 4
314	1998	CAST IRON WATER METER BOX COVER NO. 5
320	1998	CONCRETE WATER METER BOXES
321	1998	STANDARD WATER METER VAULT
340	2002	INSTALLING TAPPING SLEEVES AND VALVES
342	1998	CONCRETE PRESSURE PIPE TAPPING SLEEVE
345-1	1998	3", 4", 6" WATER METER
345-2	1998	4", 6" WATER METER WITH ON-SITE HYDRANTS
346	1998	FIRE LINE DETECTOR CHECK VAULT
360	2008	FIRE HYDRANT INSTALLATION
362	1999	LOCATIONS FOR NEW FIRE HYDRANTS
370	1998	VERTICAL REALIGNMENT OF WATER MAINS
380	1998	THRUST BLOCKS FOR WATER LINES
381	1998	ANCHOR BLOCKS FOR VERTICAL BENDS
389	2001	CURB STOP WITH VALVE BOX AND COVER
390	1998	CURB STOP WITH FLUSHING PIPE
391-1	2001	VALVE BOX INSTALLATION AND GRADE ADJUSTMENT
391-2	2001	VALVE BOX INSTALLATION AND GRADE ADJUSTMENT
392	2001	DEBRIS CAP INSTALLATION

\* NEWLY REVISED.

DETAIL NO.

**100-1**STANDARD DETAIL  
ENGLISH**INDEX (PAGE 1 OF 2)**

REVISED

01-01-2012

DETAIL NO.

**100-1**

**400 SERIES: SEWER INFORMATION**

Detail	Revised	Title
403-1	1998	PIPE SUPPORT ACROSS TRENCHES
403-2	1998	PIPE SUPPORT ACROSS TRENCHES
403-3	1998	ALTERNATIVE TO PIPE SUPPORT
404-1	2006	WATER AND SANITARY SEWER SEPARATION/PROTECTION
404-2	2006	WATER AND SANITARY SEWER SEPARATION/PROTECTION
404-2	2006	WATER AND SANITARY SEWER SEPARATION/PROTECTION
405	1998	BROKEN SEWER LINE REPLACEMENT
420-1	2004	PRE-CAST CONCRETE SEWER MANHOLE
420-2	2001	PRE-CAST CONCRETE SEWER MANHOLE
421	2012 *	OFFSET MANHOLE 8" TO 30" PIPE
422	2012 *	BRICK SEWER MANHOLE AND COVER FRAME ADJUSTMENT
423-1	2012 *	24" CAST IRON MANHOLE FRAME AND COVER
423-2	2012 *	30" CAST IRON MANHOLE FRAME AND COVER
424-1	2012 *	24" CAST IRON WATERTIGHT MANHOLE FRAME AND COVER
424-2	2012 *	30" CAST IRON WATERTIGHT MANHOLE FRAME AND COVER
425	1998	24" ALUMINUM MANHOLE FRAME AND COVER
426	2007	DROP SEWER CONNECTIONS
427	1998	STUB OUT AND PLUGS
428	1998	MANHOLE STEPS
429	1998	INDUSTRIAL WASTE CONTROL VAULT WITH MANHOLE
440-1	2007	TYPE 'A' SEWER BUILDING CONNECTION - ELECTRONIC BALL MARKERS (STANDARD)
440-2	2007	TYPE 'B' SEWER BUILDING CONNECTION - TWO-WAY CLEANOUT AND METER BOX AT R/W
440-3	2007	TYPE 'C' SEWER BUILDING CONNECTION - ONE-WAY CLEANOUT AND METER BOX
440-4	2006	SEWER SERVICE CURB CROSSING STAMP DETAIL
441	2001	SEWER CLEANOUT

**500 SERIES: IRRIGATION AND STORM DRAIN INFORMATION**

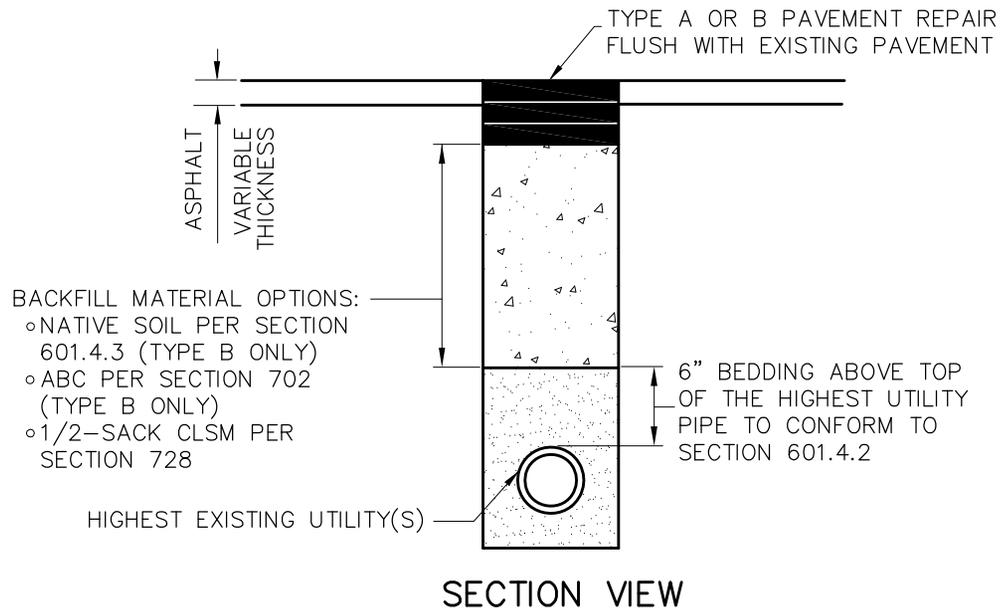
Detail	Revised	Title
501-1	2012 *	HEADWALL
501-2	2012 *	HEADWALL
501-3	1998	HEADWALL 42" TO 84" PIPE
501-4	1998	HEADWALL IRRIGATION 18" TO 60" PIPE
501-5	1998	HEADWALL DROP INLET
502-1	1998	TRASH RACK
502-2	2004	TRASH RACK
503	1998	IRRIGATION STANDPIPE
504	1998	CONCRETE BLOCK JUNCTION BOX
505	1998	CONCRETE PIPE COLLAR
506	1998	IRRIGATION VALVE INSTALLATION
507	1998	ENCASED CONCRETE PIPE (FOR SHALLOW INSTALLATION)
510	1998	CORRUGATED METAL PIPE AND INSTALLATION

**500 SERIES: IRRIGATION AND STORM DRAIN INFORMATION (CONTINUED)**

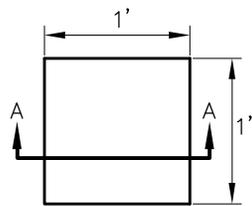
Detail	Revised	Title
520	1998	STORM DRAIN MANHOLE BASE (48" AND SMALLER)
521	1998	STORM DRAIN MANHOLE BASE (51" OR LARGER)
522	1998	STORM DRAIN MANHOLE SHAFT
523-1	1998	PRESSURE MANHOLE
523-2	1998	PRESSURE MANHOLE
524	1998	STORM DRAIN LATERAL PIPE CONNECTIONS
530	1998	3'-6" CURB OPENING CATCH BASIN - TYPE 'A'
531	1998	5'-6" CURB OPENING CATCH BASIN - TYPE 'B'
532	1998	8'-0" CURB OPENING CATCH BASIN - TYPE 'C'
533-1	1998	CATCH BASIN TYPE 'D'
533-2	1999	APRON FOR TYPE 'D' CATCH BASIN
533-3	2007	FRAME AND GRATE FOR TYPE 'D' CATCH BASIN
533-4	2007	7'-0" CURB OPENING CATCH BASIN TYPE 'D' - GRATE DETAILS
534-1	1998	CATCH BASIN TYPE 'E'
534-2	1998	CATCH BASIN TYPE 'E' (DETAILS)
534-3	1998	CATCH BASIN TYPE 'E' (DETAILS)
534-4	1998	CATCH BASIN TYPE 'E' (DETAILS)
534-5	1998	ALTERNATE GRATE STYLES, SUMP LOCATION
535	2009	CATCH BASIN TYPE 'F' (FOR USE WITHOUT CURB)
536-1	1999	COMMON DETAILS AND SECTIONS FOR CURB OPENING CATCH BASINS
536-2	1998	ALTERNATIVE COVER FOR CURB OPENING CATCH BASINS
537	2002	CATCH BASIN TYPE 'G'
539	1998	GRATES FOR CATCH BASINS, TYPE G AND H
540-1	1998	CATCH BASIN GRATES
540-2	1998	CATCH BASIN GRATES
541	2005	CATCH BASIN SUBGRADE DRAIN
545	1998	END SECTION - REINFORCED CONCRETE PIPE
550	1998	SPILLWAY INLET AND OUTLET
552	2009	CONCRETE CUT-OFF WALLS
555	2010	EROSION PROTECTION/GABIONS

\* NEWLY REVISED.





**TYPE A PAVEMENT REPAIR**

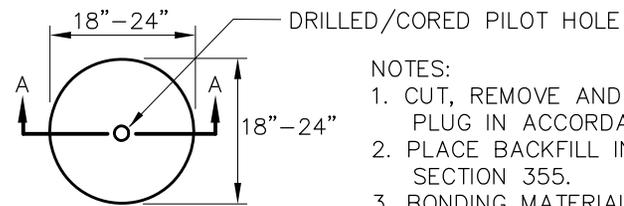


**PLAN VIEW**

NOTES:

1. DIMENSIONS ARE NOMINAL.
2. EDGES SHALL BE CUT TO A NEAT VERTICAL FACE.
3. PLACE CLSM BACKFILL IN ACCORDANCE WITH SECTION 604.
4. PLACE AGENCY-APPROVED ASPHALT CONCRETE IN MAXIMUM 2" LIFTS.

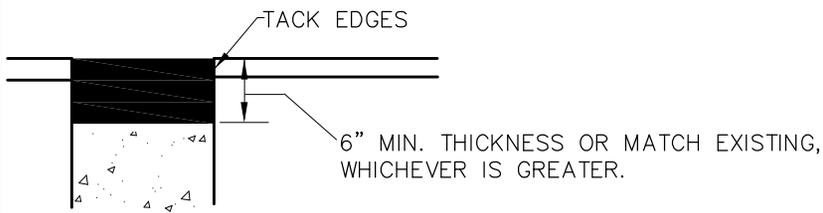
**TYPE B PAVEMENT REPAIR**



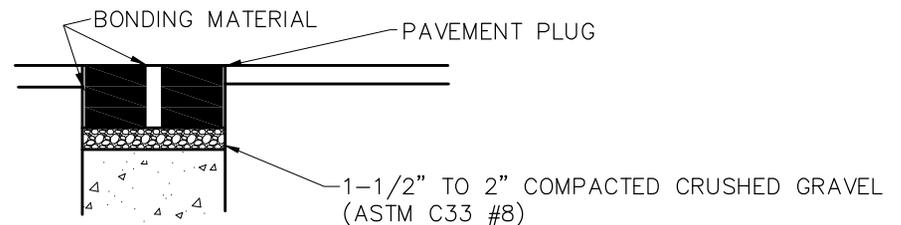
**PLAN VIEW**

NOTES:

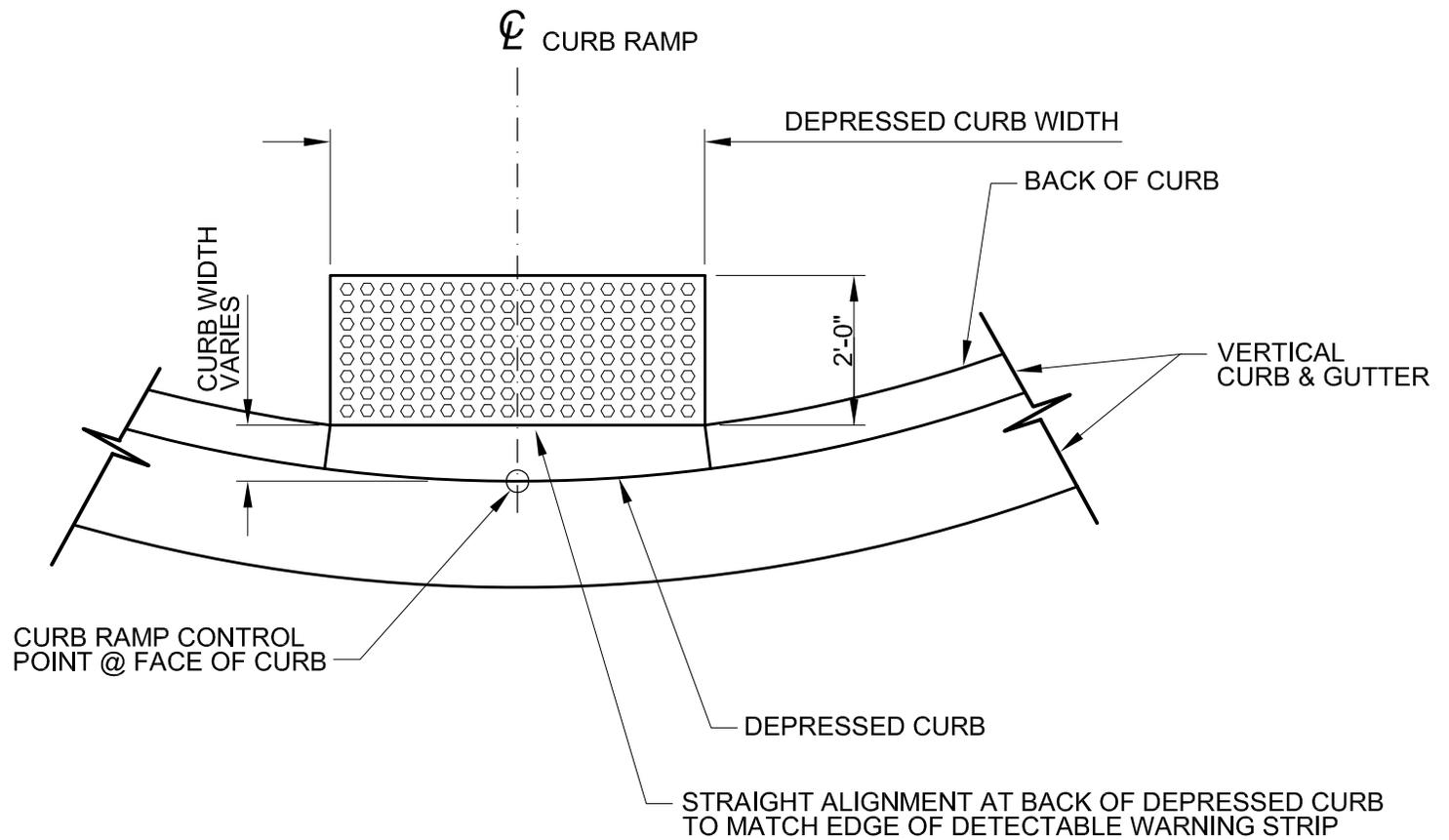
1. CUT, REMOVE AND REPLACE PAVEMENT. PLUG IN ACCORDANCE WITH SECTION 355.
2. PLACE BACKFILL IN ACCORDANCE WITH SECTION 355.
3. BONDING MATERIAL SHALL BE AS SPECIFIED IN SECTION 708.



**SECTION A-A**



**SECTION A-A**



PLAN VIEW

DETAIL NO.

**234**



MARICOPA  
ASSOCIATION of  
GOVERNMENTS

STANDARD DETAIL  
ENGLISH

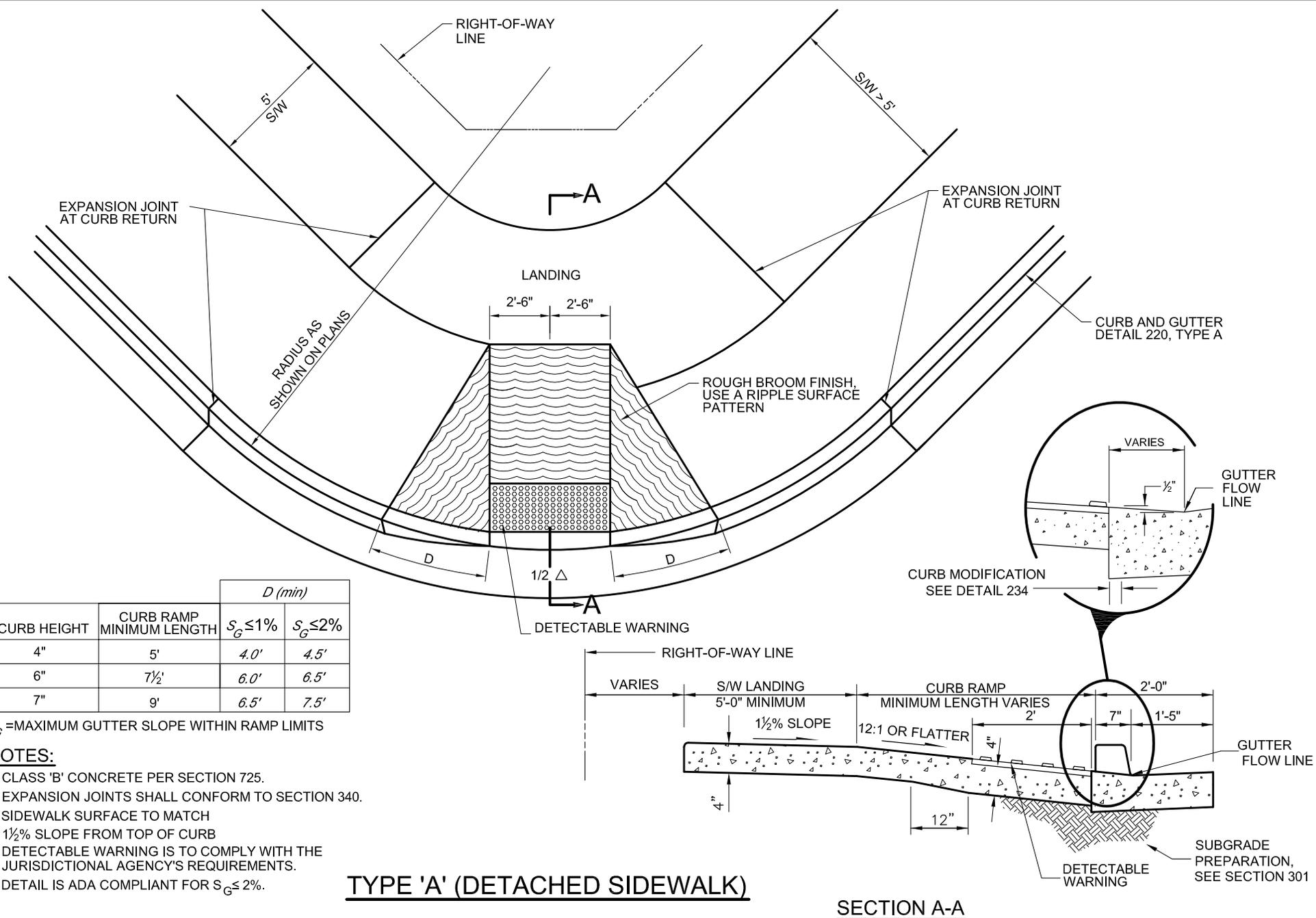
**CURB MODIFICATION  
AT DETECTABLE WARNING**

REVISED

01-01-2012

DETAIL NO.

**234**



CURB HEIGHT	CURB RAMP MINIMUM LENGTH	<i>D (min)</i>	
		$S_G \leq 1\%$	$S_G \leq 2\%$
4"	5'	4.0'	4.5'
6"	7½'	6.0'	6.5'
7"	9'	6.5'	7.5'

$S_G$  = MAXIMUM GUTTER SLOPE WITHIN RAMP LIMITS

**NOTES:**

1. CLASS 'B' CONCRETE PER SECTION 725.
2. EXPANSION JOINTS SHALL CONFORM TO SECTION 340.
3. SIDEWALK SURFACE TO MATCH  
1½% SLOPE FROM TOP OF CURB
4. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.
5. DETAIL IS ADA COMPLIANT FOR  $S_G \leq 2\%$ .

**TYPE 'A' (DETACHED SIDEWALK)**

**SECTION A-A**

DETAIL NO.

235-1

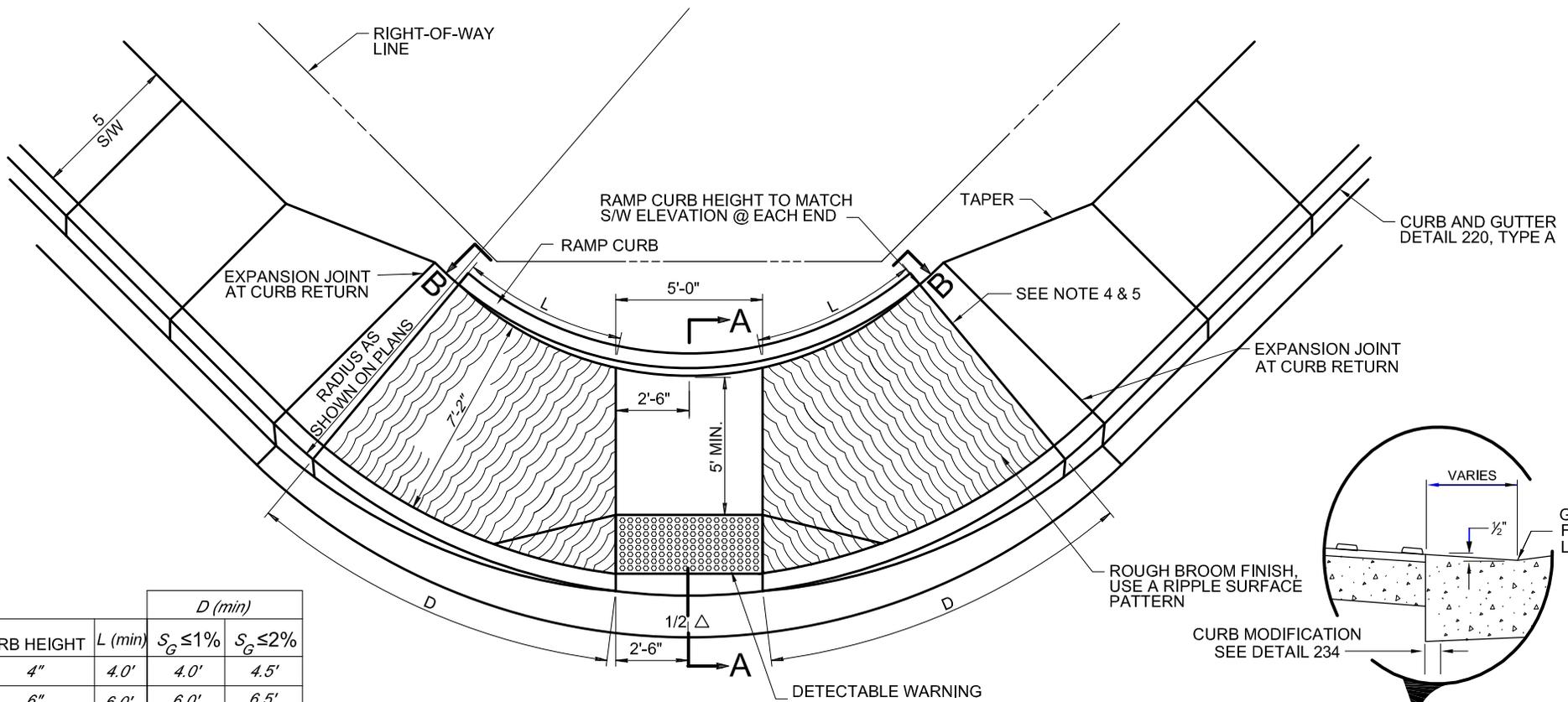


STANDARD DETAIL  
ENGLISH

CURB RAMPS

REVISED  
01-01-2012

DETAIL NO.  
235-1

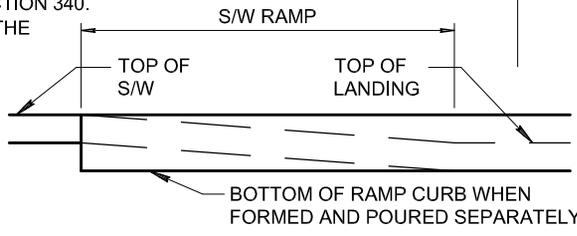


CURB HEIGHT	L (min)	D (min)	
		$S_G \leq 1\%$	$S_G \leq 2\%$
4"	4.0'	4.0'	4.5'
6"	6.0'	6.0'	6.5'
7"	7.0'	6.5'	7.5'

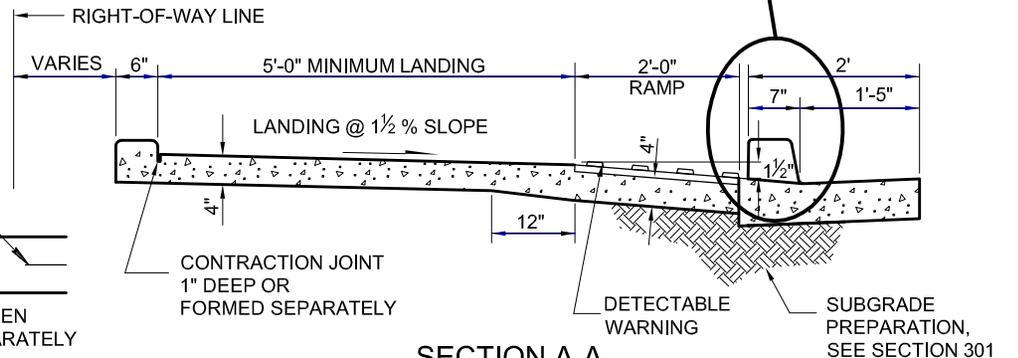
$S_G$  = MAXIMUM GUTTER SLOPE WITHIN RAMP LIMITS

**NOTES:**

1. CLASS 'B' CONCRETE PER SECTION 725.
2. EXPANSION JOINTS SHALL CONFORM TO SECTION 340.
3. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.
4. INCREASE 'L' OR 'D' AS NEEDED TO HAVE THE TOP OF RAMP FORM A RADIAL LINE.
5. WHEN TOP OF RAMP IS LESS THAN 4' FROM CURB RETURN, EXTEND RAMP TO THE CURB RETURN.
6. DETAIL IS ADA COMPLIANT FOR  $S_G \leq 2\%$ .



**SECTION B-B**

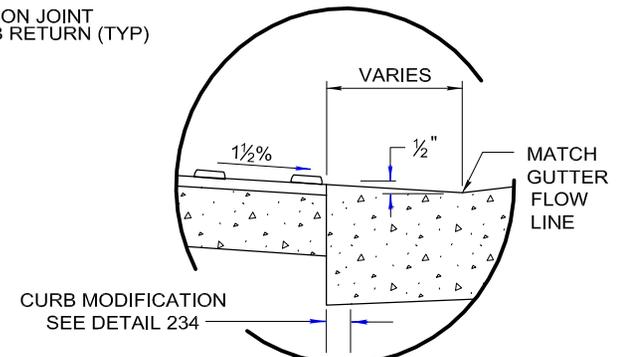
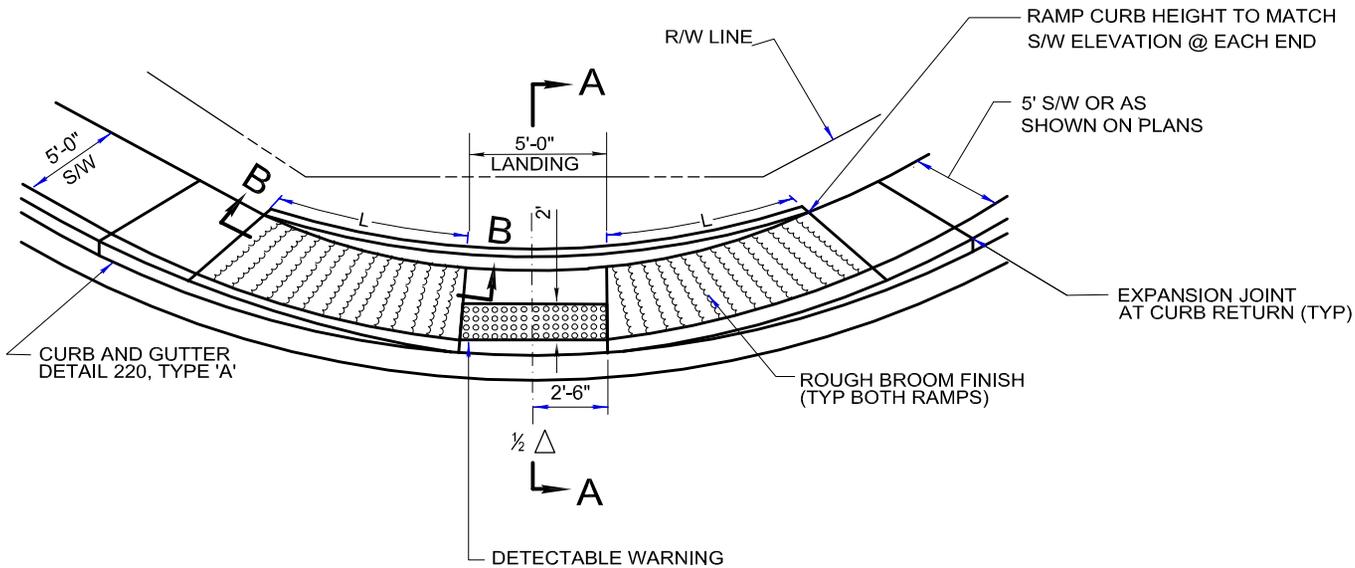


**TYPE 'B'**

**SECTION A-A**

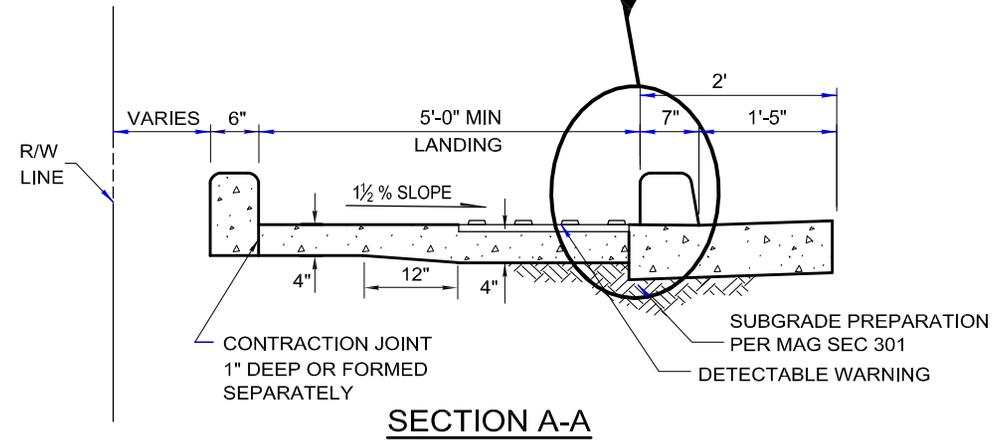
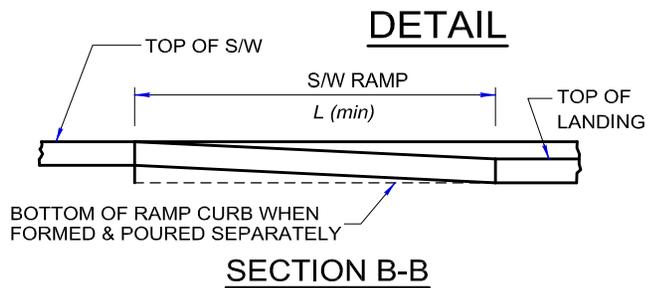
**NOTES:**

1. CLASS 'B' CONCRETE CONSTRUCTION PER SECTION 725.
2. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENT.
3. RAMP LONGITUDINAL SLOPE SHALL BE 12:1 OR FLATTER.
4. RAMP CROSS SLOPE SHALL BE 1½%.
5. DETAIL IS ADA COMPLIANT FOR CURB RADII ≥ 20' AND GUTTER SLOPE ≤ 2.0%.



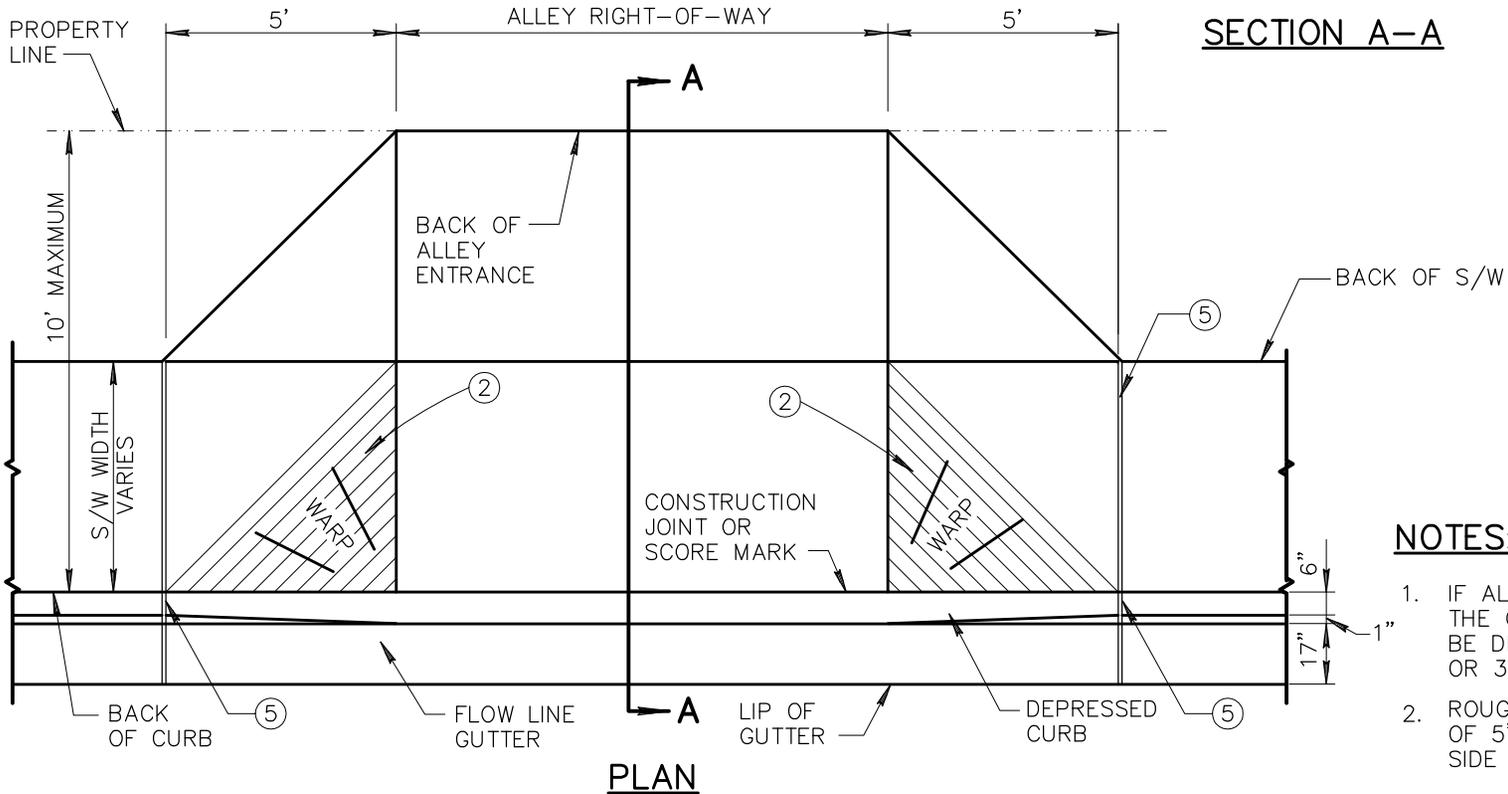
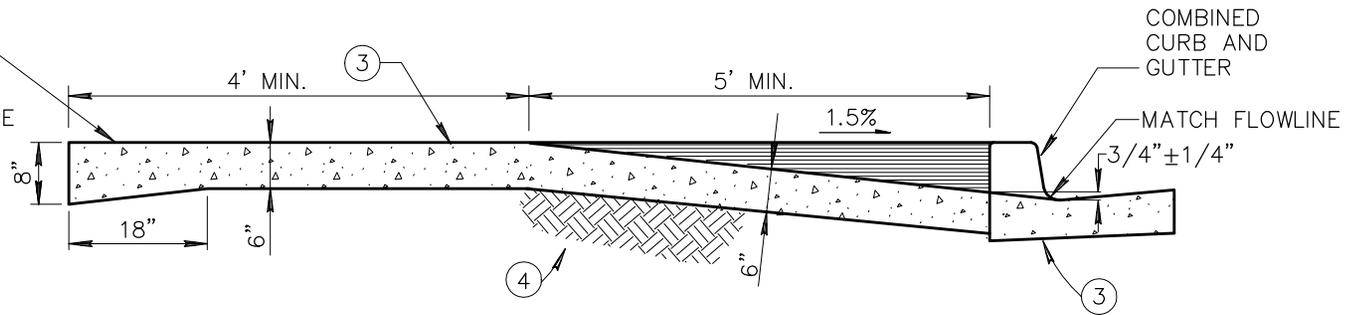
CURB HEIGHT	L (min)	
	$S_G \leq 1\%$	$S_G \leq 2\%$
4"	5.0'	6.0'
6"	7.0'	8.5'

$S_G$  = MAXIMUM GUTTER SLOPE WITHIN RAMP LIMITS



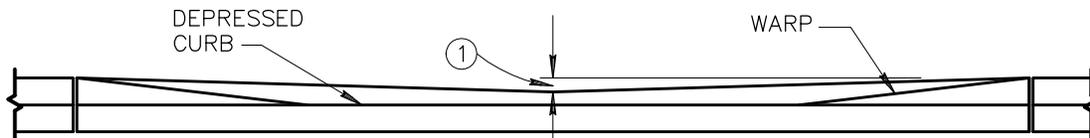
**TYPE 'C'**

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



**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. ROUGH BROOM FINISH FULL WIDTH OF 5' WARP SECTION, EACH SIDE OF ALLEY ENTRANCE.
3. CLASS 'B' CONCRETE CONSTRUCTION PER SECT. 725.
4. SUBGRADE PREPARATION, PER SECT. 301.
5. EXPANSION JOINTS SHALL CONFORM TO SECTION 340.



**ELEVATION**

DETAIL NO.

**262**



STANDARD DETAIL  
ENGLISH

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

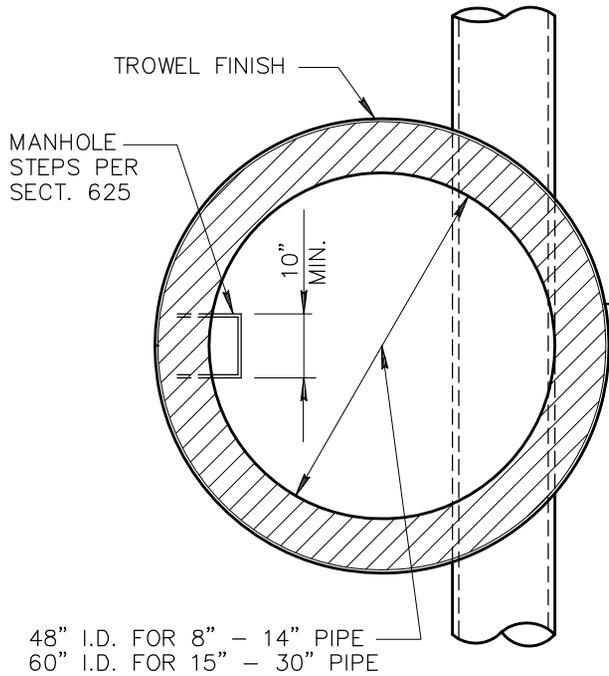
REVISED

01-01-2012

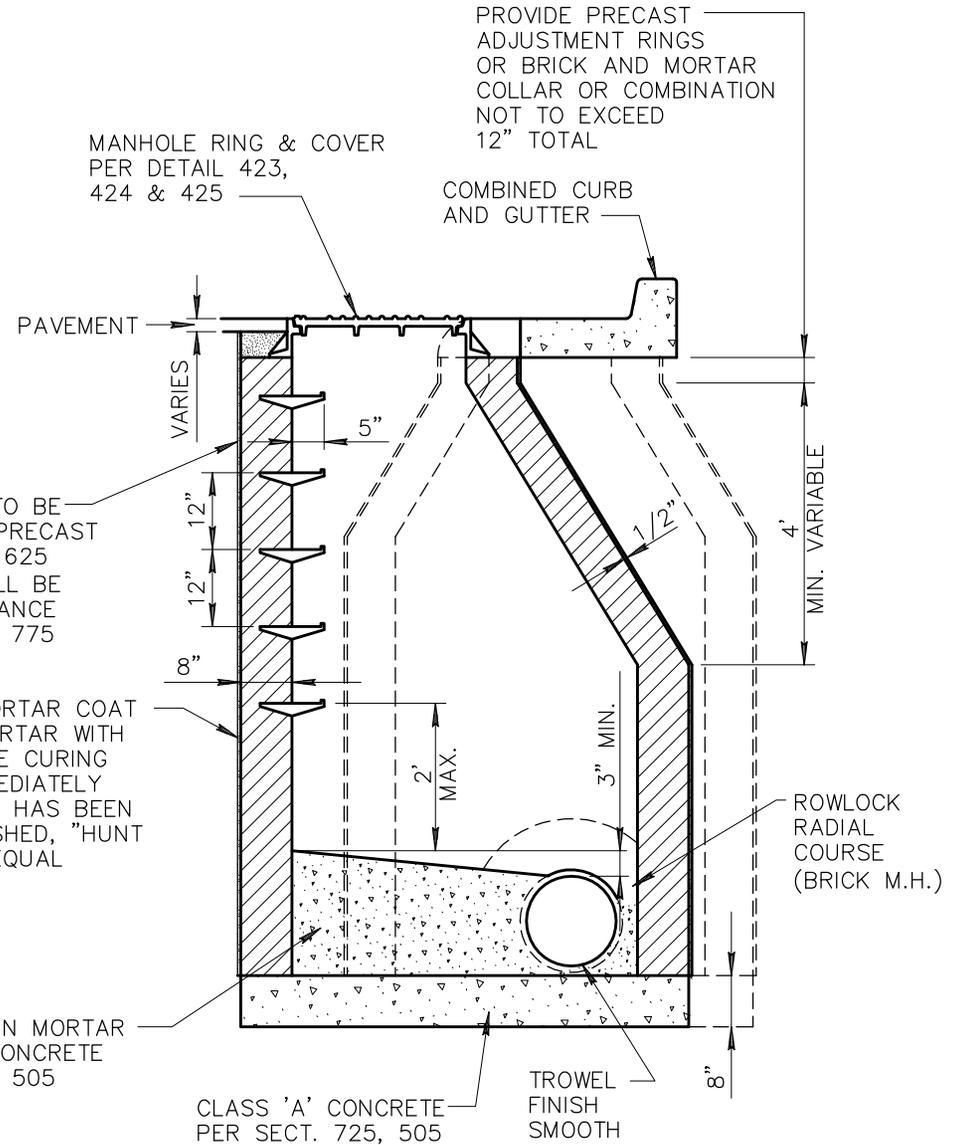
DETAIL NO.

**262**

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 MORTAR COAT  
OUTSIDE OF MORTAR 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

MIN. VARIABLE  
4'

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

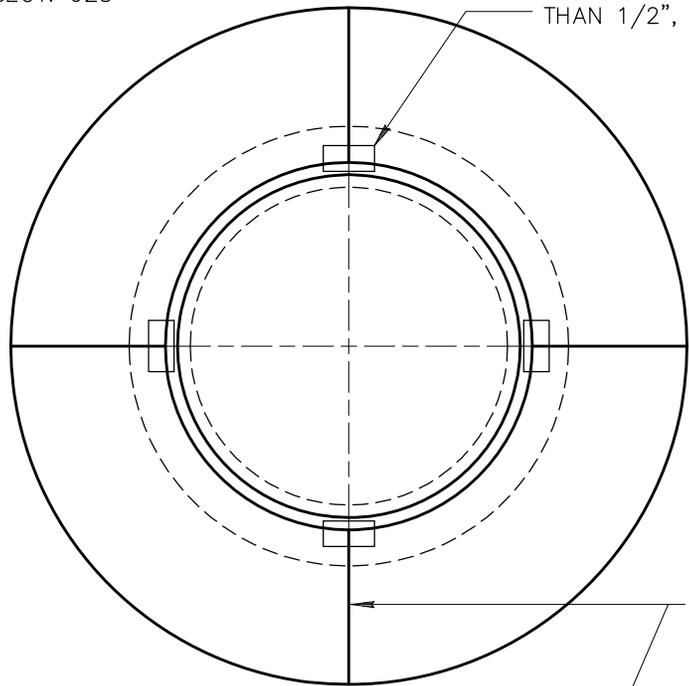
01-01-2012

DETAIL NO.

421

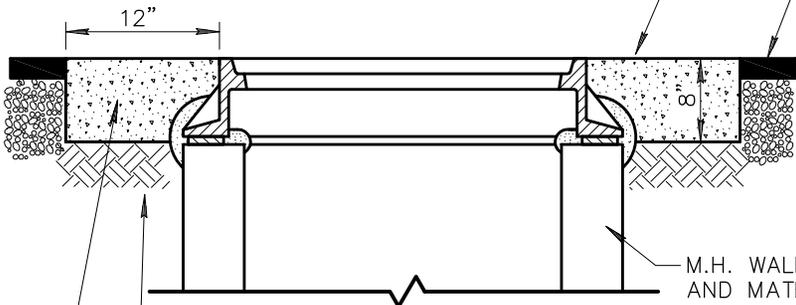
M.H. FRAME AND COVER PER SECT. 625

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



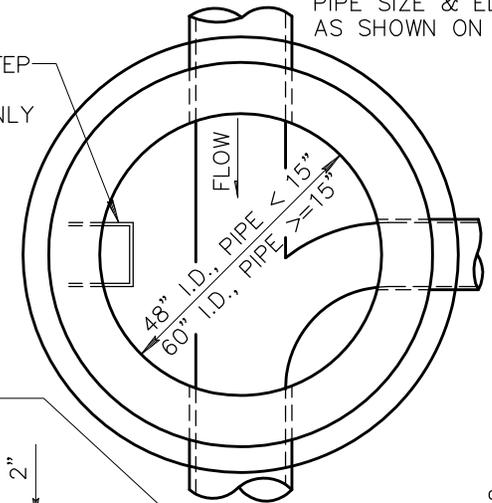
SUBGRADE PREPARATION TO CONFORM TO SECT. 301 OR 601

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

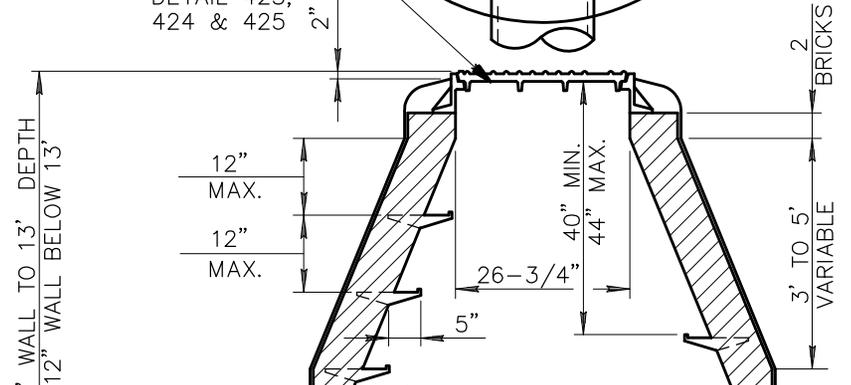
M.H. WALL THICKNESS AND MATERIAL VARIES

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

PIPE SIZE & ELEVATION AS SHOWN ON PLANS



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



1:3 CEMENT MORTAR COAT OUTSIDE WITH MEMBRANE TYPE CURING COMPOUND AFTER MORTAR 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

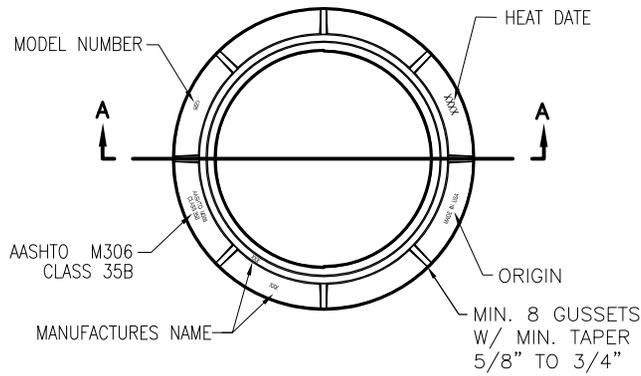
REVISED

01-01-2012

DETAIL NO.

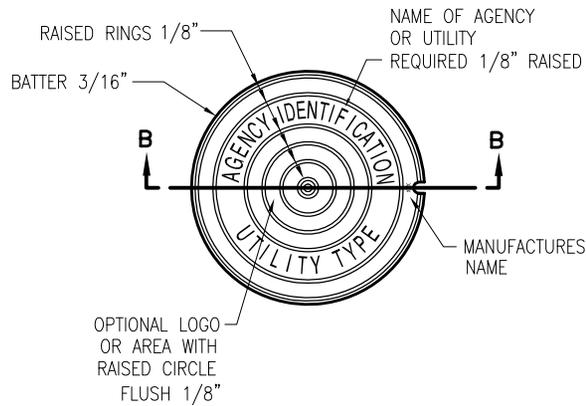
422

**FRAME TOP VIEW**

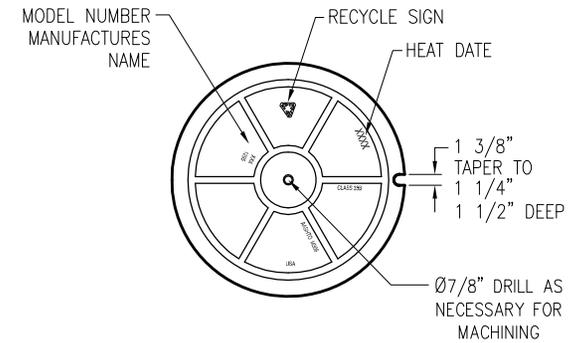


FRAME WT. (CL. 35) - 180 LBS

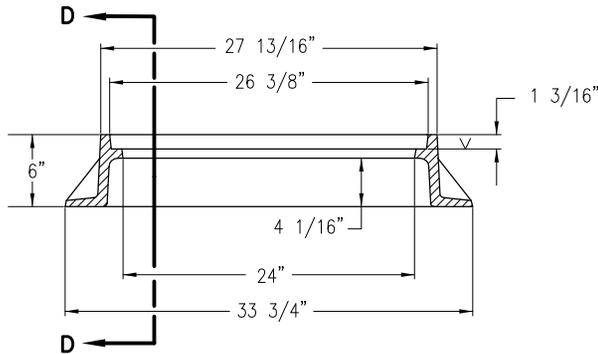
**COVER TOP VIEW**



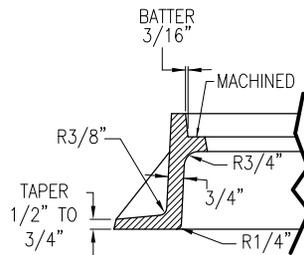
**COVER BOTTOM VIEW**



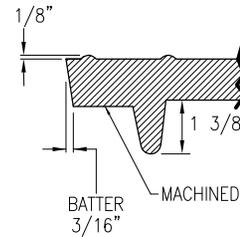
COVER WT. (CL. 35) - 188 LBS



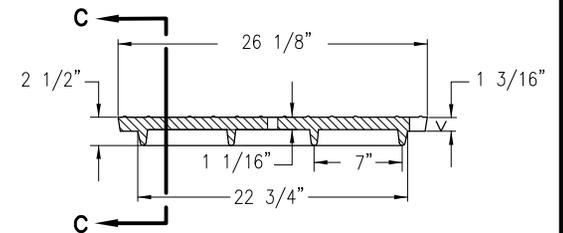
SECTION A



SECTION D



SECTION C



SECTION B

**NOTE:**

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" IN HEIGHT AND RAISED FLUSH W/ TOP OF RINGS. TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL. WEIGHT OF CASTINGS SHALL BE NO MORE THAN 2% MORE OR LESS THAN THE APPROXIMATE WEIGHT SPECIFIED. CASTINGS SHALL CONFORM TO ASTM A-48, CLASS 35 AND AASHTO M306. THE BEARING SURFACES OF THE FRAMES AND COVERS SHALL BE MACHINED AND THE COVERS SHALL SEAT FIRMLY WITHOUT ROCKING. ALL DIMENSIONS SHALL HAVE A 1/16" TOLERANCE.

DETAIL NO.  
**423-1**



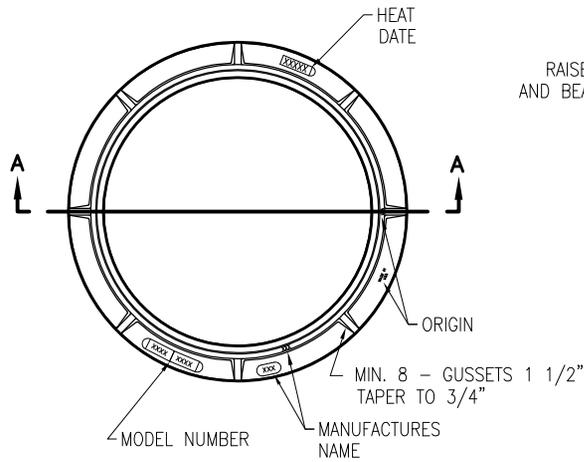
STANDARD DETAIL  
ENGLISH

**24" CAST IRON  
MANHOLE FRAME AND COVER**

REVISED  
01-01-2012

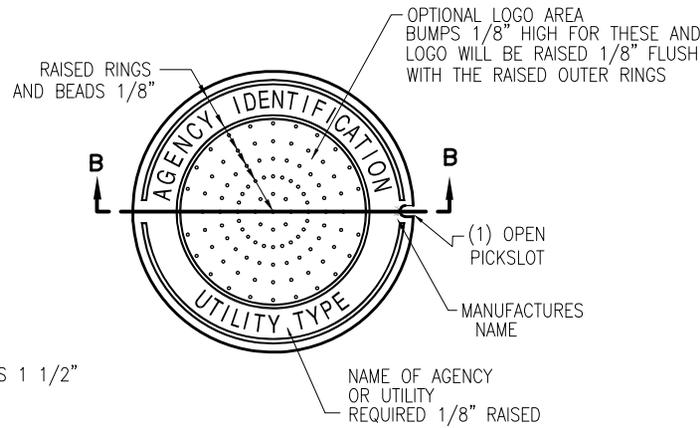
DETAIL NO.  
**423-1**

**FRAME TOP VIEW**

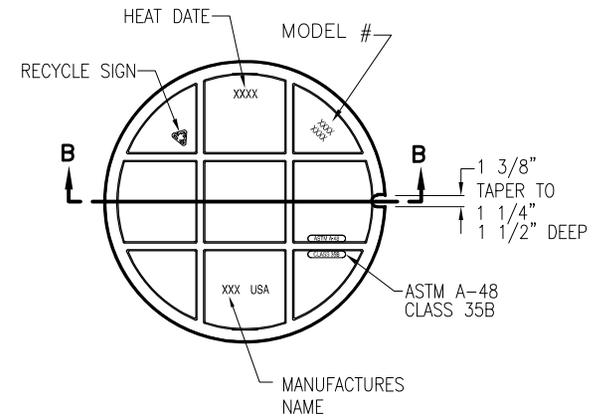


FRAME WT. (CL. 35) - 227 LBS

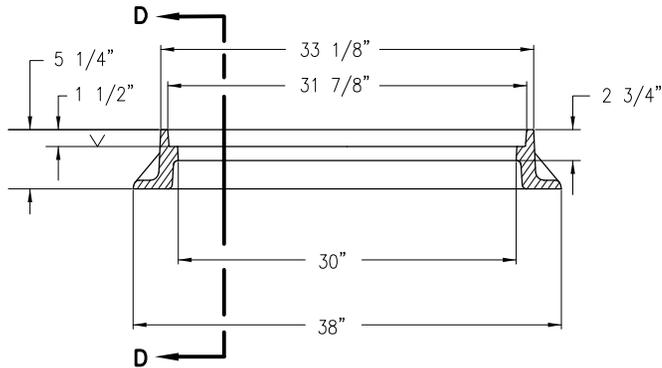
**COVER TOP VIEW**



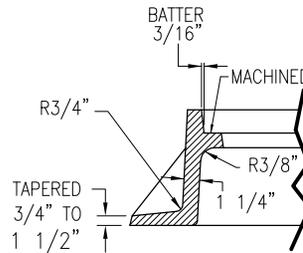
**COVER BOTTOM VIEW**



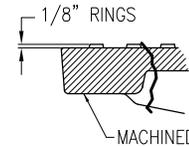
COVER WT. (CL. 35) - 210 LBS



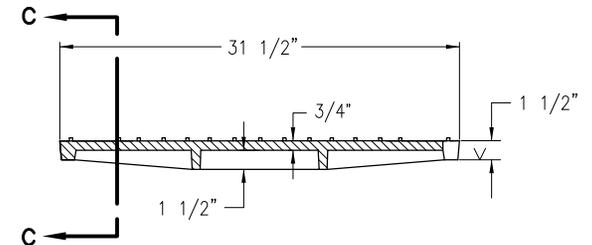
**SECTION A**



**SECTION D**



**SECTION C**



**SECTION B**

**NOTE:**

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" IN HEIGHT AND RAISED FLUSH W/ TOP OF COVER. TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL. WEIGHT OF CASTINGS SHALL BE NO MORE THAN 2% MORE OR LESS THAN THE APPROXIMATE WEIGHT SPECIFIED. CASTINGS SHALL CONFORM TO ASTM A-48, CLASS 35 AND AASHTO M306. THE BEARING SURFACES OF THE FRAMES AND COVERS SHALL BE MACHINED AND THE COVERS SHALL SEAT FIRMLY WITHOUT ROCKING. ALL DIMENSIONS SHALL HAVE A 1/16" TOLERANCE.

DETAIL NO.  
**423-2**



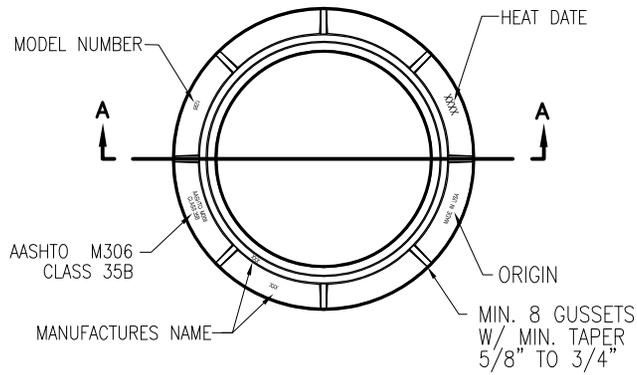
STANDARD DETAIL  
ENGLISH

**30" CAST IRON  
MANHOLE FRAME AND COVER**

REVISED  
01-01-2012

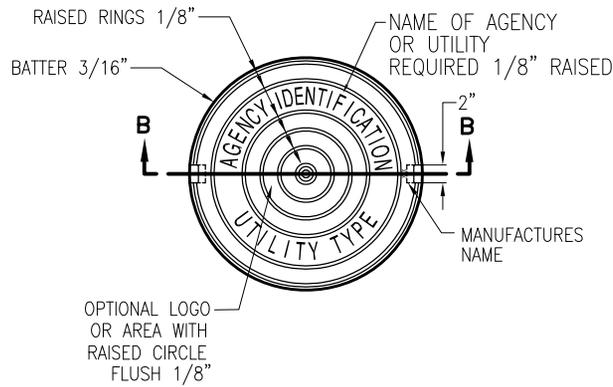
DETAIL NO.  
**423-2**

**FRAME TOP VIEW**

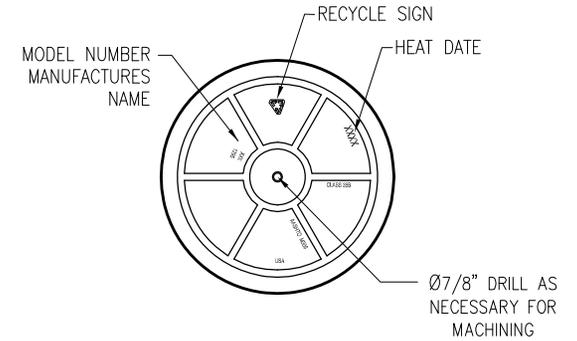


FRAME WT. (CL. 35) – 180 LBS

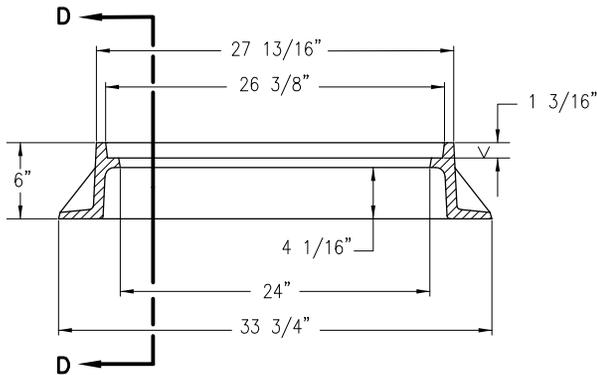
**COVER TOP VIEW**



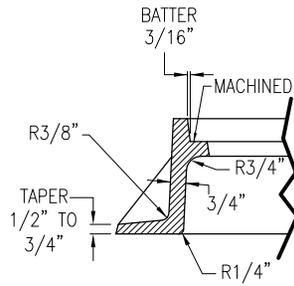
**COVER BOTTOM VIEW**



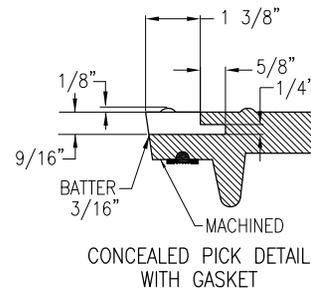
COVER WT. (CL. 35) – 188 LBS



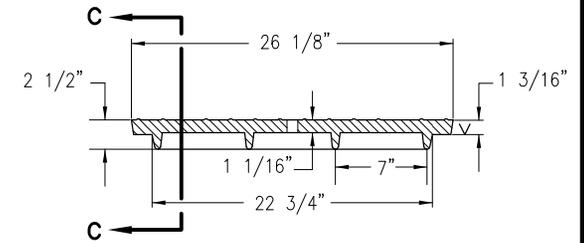
**SECTION A**



**SECTION D**



**SECTION C**



**SECTION B**

**NOTE:**

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" IN HEIGHT AND RAISED FLUSH W/ TOP OF COVER. TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL. WEIGHT OF CASTINGS SHALL BE NO MORE THAN 2% MORE OR LESS THAN THE APPROXIMATE WEIGHT SPECIFIED. CASTINGS SHALL CONFORM TO ASTM A-48, CLASS 35 AND AASHTO M306. THE BEARING SURFACES OF THE FRAMES AND COVERS SHALL BE MACHINED AND THE COVERS SHALL SEAT FIRMLY WITHOUT ROCKING. ALL DIMENSIONS SHALL HAVE A 1/16" TOLERANCE.

DETAIL NO.  
**424-1**



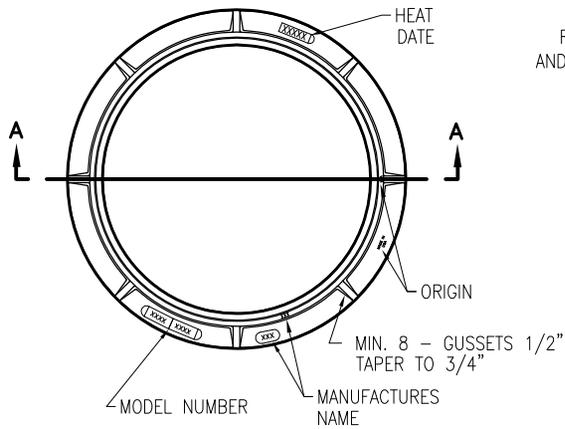
STANDARD DETAIL  
ENGLISH

**24" CAST IRON WATERTIGHT  
MANHOLE FRAME AND COVER**

REVISED  
01-01-2012

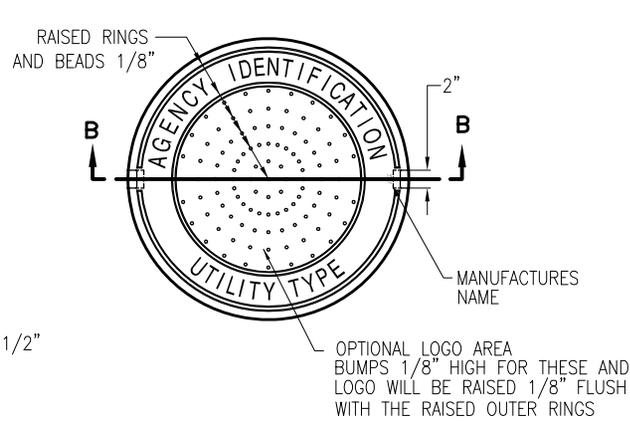
DETAIL NO.  
**424-1**

**FRAME TOP VIEW**

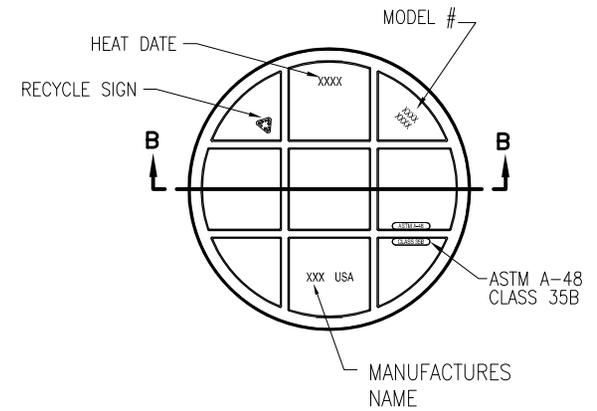


FRAME WT. (CL. 35) - 227 LBS

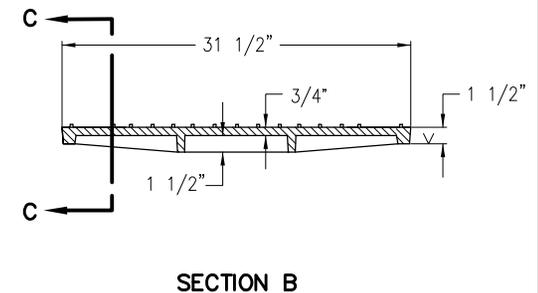
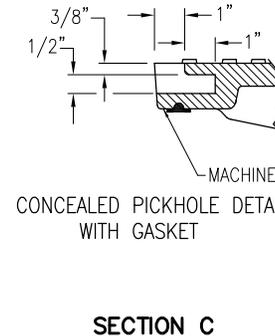
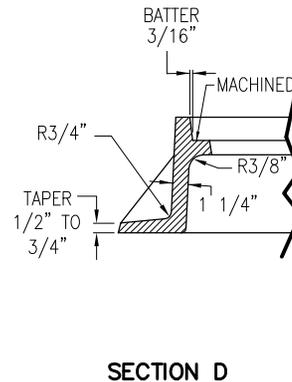
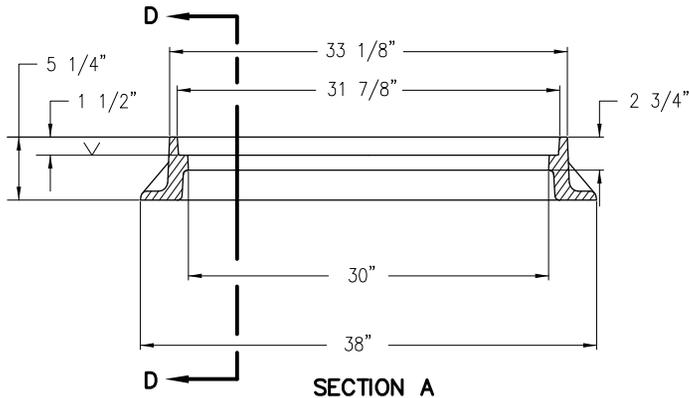
**COVER TOP VIEW**



**COVER BOTTOM VIEW**



COVER WT. (CL. 35) - 210 LBS



**NOTE:**

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" IN HEIGHT AND RAISED FLUSH W/ TOP OF COVER. TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL. WEIGHT OF CASTINGS SHALL BE NO MORE THAN 2% MORE OR LESS THAN THE APPROXIMATE WEIGHT SPECIFIED. CASTINGS SHALL CONFORM TO ASTM A-48, CLASS 35 AND AASHTO M306. THE BEARING SURFACES OF THE FRAMES AND COVERS SHALL BE MACHINED AND THE COVERS SHALL SEAT FIRMLY WITHOUT ROCKING. ALL DIMENSIONS SHALL HAVE A 1/16" TOLERANCE.

DETAIL NO.  
**424-2**

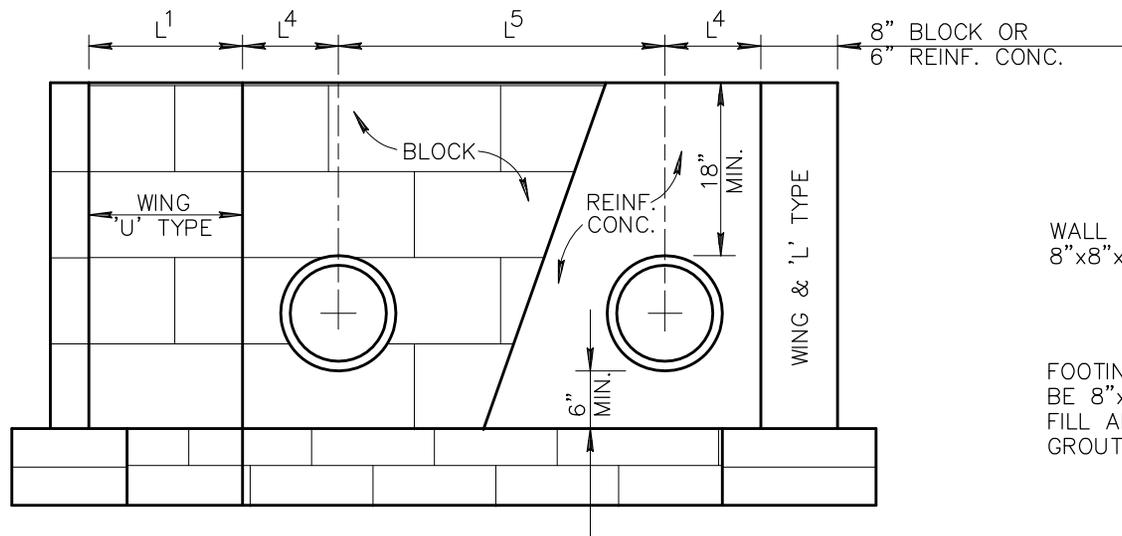


STANDARD DETAIL  
ENGLISH

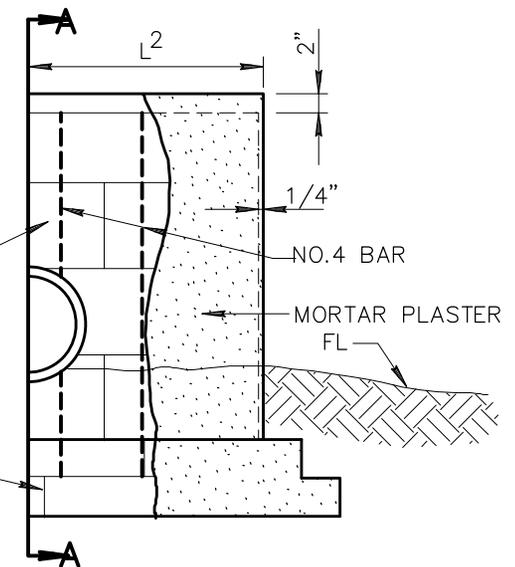
**30" CAST IRON WATERTIGHT  
MANHOLE FRAME AND COVER**

REVISED  
01-01-2012

DETAIL NO.  
**424-2**



**DOUBLE PIPE HEADWALL**



**ELEVATION**

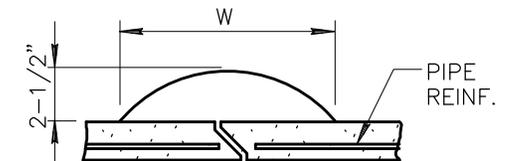
CONCRETE MASONRY UNITS (BLOCK) HEADWALLS JOINED WITH CEMENT MORTAR PLASTERED BOTH SIDES OF WALL FULL HEIGHT AND SHALL BE CURED PER SECT. 726.

**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.

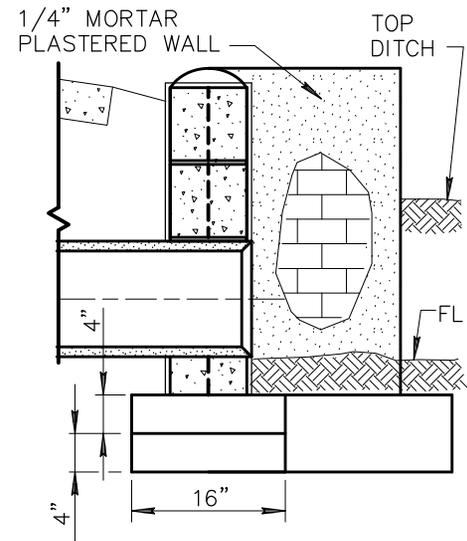
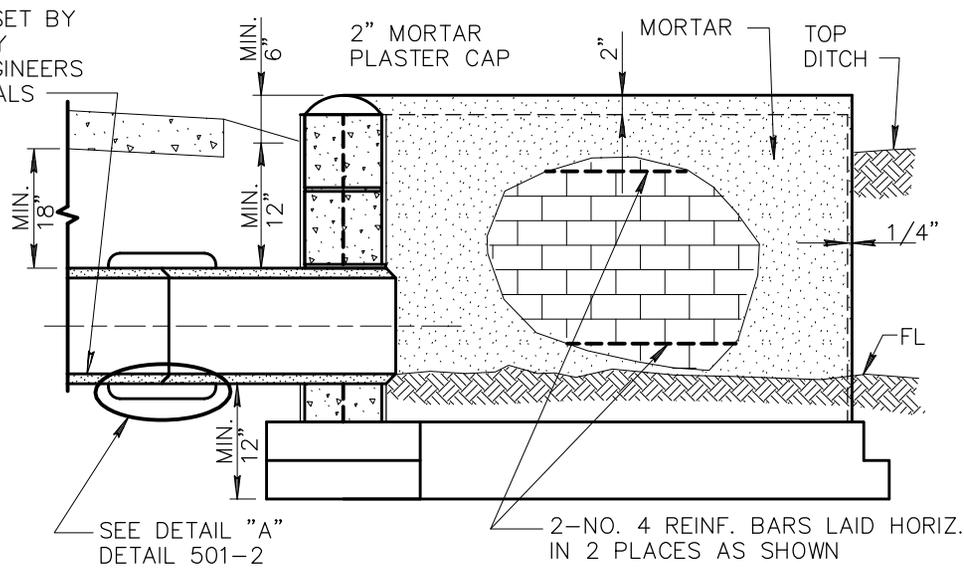
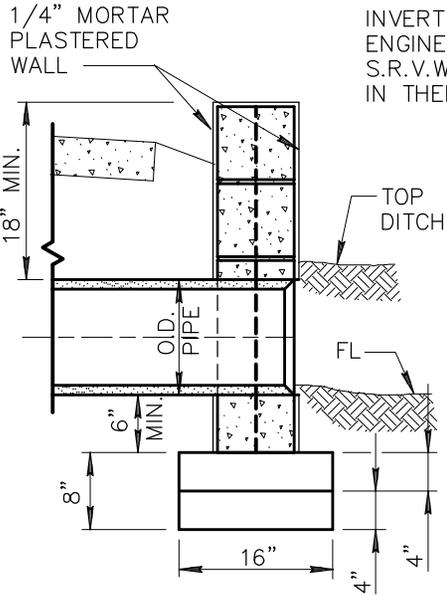
HEADWALL DIMENSIONS					
*NOMINAL PIPE SIZE	L <sup>1</sup>	L <sup>2</sup>	L <sup>3</sup>	L <sup>4</sup>	L <sup>5</sup>
12"	1'-4"	2'-0"	3'-8"	0'-10"	2'-10"
15"	2'-0"	2'-8"	4'-0"	1'-0"	3'-0"
18"	2'-0"	3'-8"	4'-8"	1'-2"	3'-4"
21"	2'-8"	4'-0"	5'-4"	1'-3"	3'-8"
24"	2'-8"	4'-0"	5'-4"	1'-6"	3'-11"
30"	2'-8"	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.

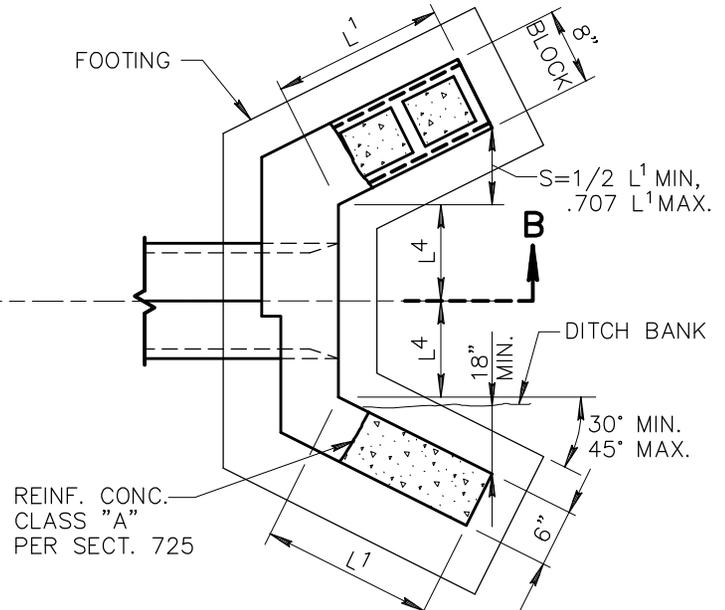
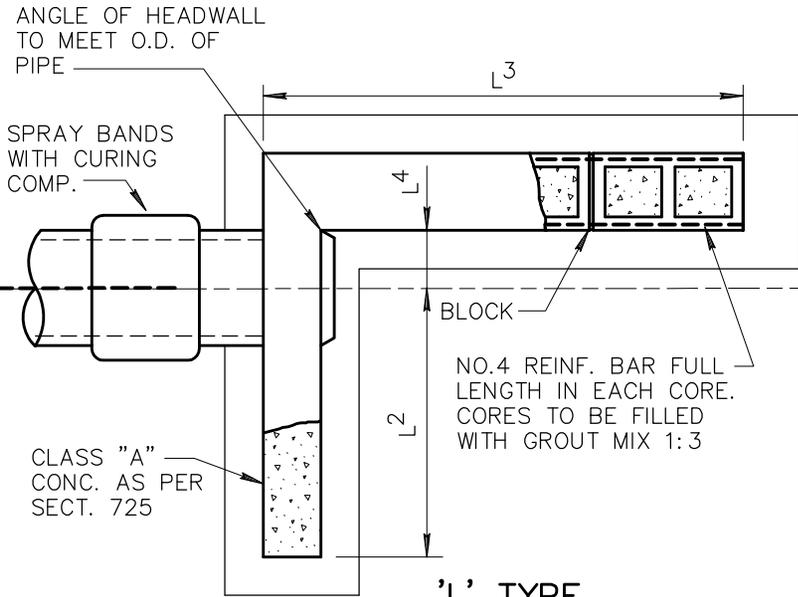
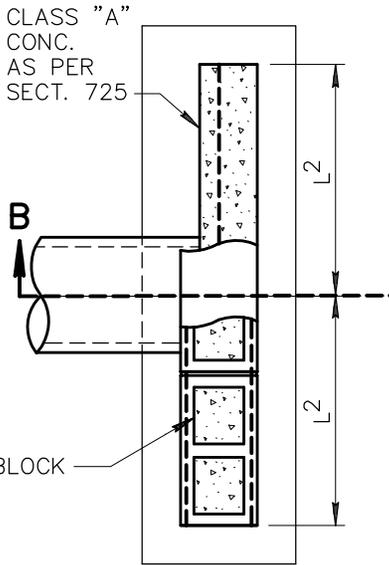


PIPE SIZE	W
12" - 21" INCL.	11"
24" - 42" INCL.	13"

**DETAIL "A"**



**SECTION B-B**



**STRAIGHT TYPE**

**'L' TYPE PLAN**

**'U' TYPE**

DETAIL NO.

**501-1**



STANDARD DETAIL  
ENGLISH

**HEADWALL**

REVISED

01-01-2012

DETAIL NO.

**501-1**