

**UNIFORM STANDARD  
DETAILS**

**for**

**PUBLIC WORKS  
CONSTRUCTION**

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2015 EDITION

 ARIZONA



**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	2015 *	SURVEY MARKER
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	2013	6' CHAIN LINK FENCE AND GATE

**200 SERIES: STREET INFORMATION**

Detail	Revised	Title
200-1	2015 *	BACKFILL, PAVEMENT AND SURFACE REPLACEMENT
200-2	2015 *	BACKFILL, PAVEMENT AND SURFACE REPLACEMENT
201	2014	ASPHALT PAVEMENT EDGE DETAILS
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	2015 *	UTILITY POTHOLE REPAIR
220-1	2007	CURB AND GUTTER TYPES A, B, C AND D
220-2	2007	CURB AND GUTTER TYPES E AND F
221	2014	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	2014	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)
235-5	2011	CURB RAMPS (TYPE E)

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

Detail	Revised	Title
240	2010	VALLEY GUTTER
250-1	2014	DRIVEWAY ENTRANCES WITH DETACHED SIDEWALK
250-2	2013	DRIVEWAY ENTRANCES WITH SIDEWALK ATTACHED TO CURB
251	2003	RETURN TYPE DRIVEWAYS
252	2005	BUS BAYS
260	2013	ALLEY ENTRANCE (WITH VERTICAL CURB AND GUTTER)
262	2012	WING TYPE ALLEY ENTRANCE (WITH COMBINED CURB AND GUTTER)
263	2002	WING TYPE ALLEY ENTRANCE (WITH ROLL TYPE CURB AND GUTTER)
270	2014	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
360-1	2013	DRY BARREL FIRE HYDRANT INSTALLATION
360-2	2013	WET BARREL FIRE HYDRANT INSTALLATION
360-3	2013	FIRE HYDRANT INSTALLATION DETAILS
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	2015 *	VALVE BOX INSTALLATION AND GRADE ADJUSTMENT
391-2	2015 *	VALVE BOX INSTALLATION AND GRADE ADJUSTMENT
392	2015 *	DEBRIS CAP INSTALLATION

\* NEWLY REVISED.

DETAIL NO.

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

REVISED

01-01-2015

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
404-3	2006	WATER AND SANITARY SEWER SEPARATION/PROTECTION
405	1998	BROKEN SEWER LINE REPLACEMENT
420-1	2015 *	CONCRETE SANITARY SEWER MANHOLE
420-2	2015 *	PRE-CAST CONCRETE MANHOLE BASE
420-3	2015 *	CONCRETE MANHOLE BASE
421	2015 *	OFFSET MANHOLE 8" TO 30" PIPE
422	2015 *	MANHOLE FRAME AND COVER 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
429	2015 *	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

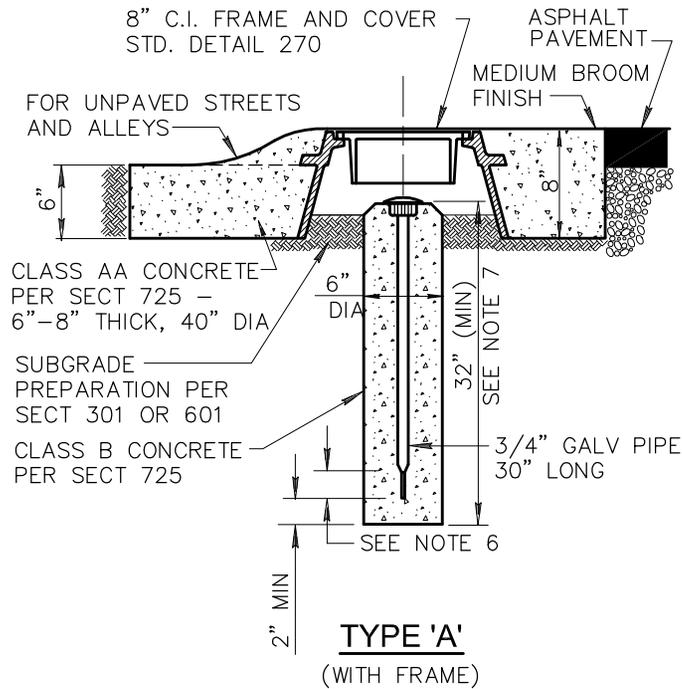
**500 SERIES: IRRIGATION AND STORM DRAIN INFORMATION**

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	2014	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

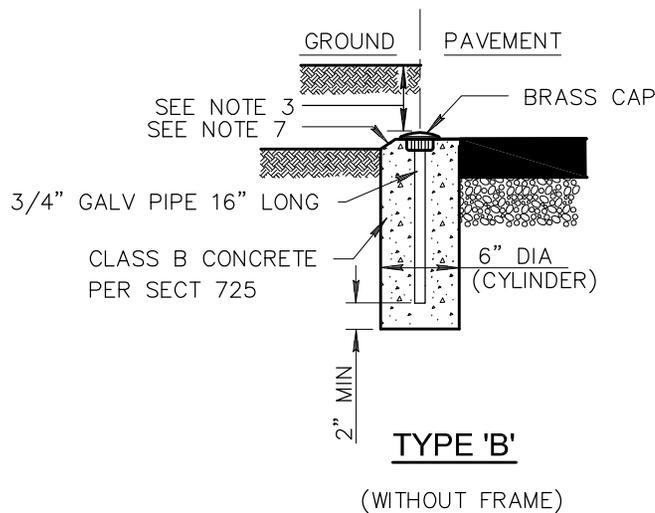
**500 SERIES: IRRIGATION AND STORM DRAIN INFORMATION (CONTINUED)**

Detail	Revised	Title
520	1998	STORM DRAIN MANHOLE BASE (48" AND SMALLER)
521	1998	STORM DRAIN MANHOLE BASE (51" OR LARGER)
522	2015 *	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'
538	1998	CATCH BASIN TYPE 'H'
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	2015 *	CONCRETE CUT-OFF WALLS
555	2010	EROSION PROTECTION/GABIONS

\* NEWLY REVISED.



**TYPE 'A'**  
(WITH FRAME)

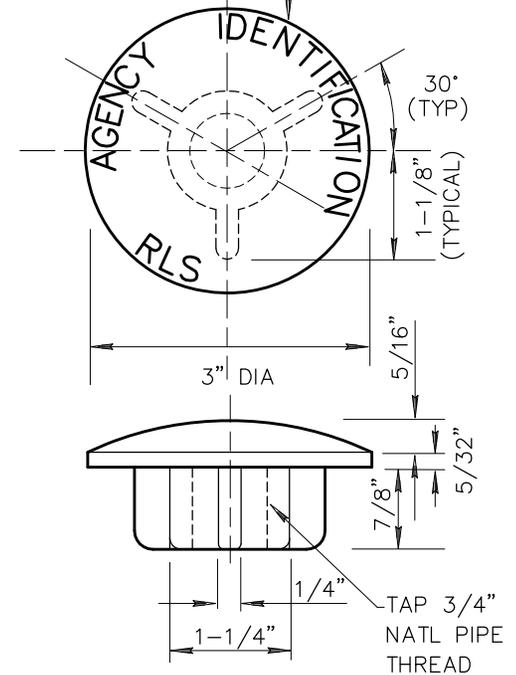


**TYPE 'B'**  
(WITHOUT FRAME)

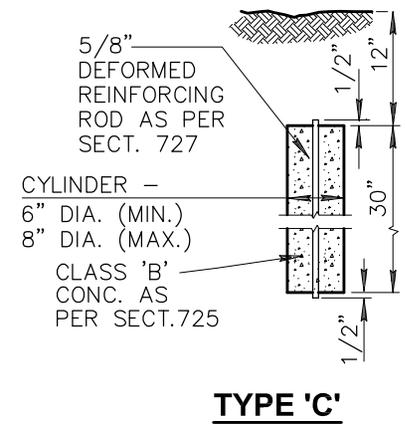
**NOTES:**

1. TYPE 'A' TO BE USED AT INTERSECTIONS OF MAJOR STREETS & COLLECTOR STREETS, SECTION CORNERS, SECTION 1/4 CORNERS, CENTER OF SECTIONS, AND AT OTHER POINTS AS SHOWN ON PLANS.
2. TYPE 'B' TO BE USED (EXCEPT WHERE TYPE 'A' IS SPECIFIED) AT INTERSECTION OF STREET CENTERLINES, PC'S, PT'S AND PI'S OF CURVES, SECTION 1/16 CORNERS, SUBDIVISION CORNERS, CHANGE IN ALIGNMENT OF SUBDIVISION BOUNDARIES, AND AT OTHER POINTS AS SHOWN ON PLANS.
3. FOR UNPAVED STREETS AND ALLEYS SET TOP OF MARKER SIX INCHES BELOW FINISHED GRADE.
4. CAP TO BE CONSTRUCTED OF RED BRASS OR BRONZE.
5. LETTERS TO BE APPROX. 1/32" WIDE & 1/32" DEEP.
6. FLATTENING THE BOTTOM 2" OF THE GALVANIZED PIPE IS OPTIONAL.
7. TOP OF CONCRETE POST IS CHAMFERED 3/4" EXCEPT WHEN SET FLUSH WITH PAVEMENT.
8. THE CAP SHALL SHOW THE POINT SURVEYED BY A PUNCH MARK OR SCRIBED CROSS AND THE CAP SHALL BE STAMPED WITH THE YEAR AND THE REGISTERED LAND SURVEYOR'S (RLS) REGISTRATION NUMBER.
9. WHEN APPLICABLE, THE CAP SHALL BE STAMPED WITH THE APPROPRIATE PUBLIC LAND MARKING PER CURRENT MANUAL OF INSTRUCTIONS FOR THE SURVEY OF PUBLIC LANDS OF THE UNITED STATES, PREPARED BY THE BUREAU OF LAND MANAGEMENT.
10. SUBMIT TO THE ENGINEER A COPY OF THE RECORDED CORNER RECORD OR RESULTS OF SURVEY TO DOCUMENT COMPLIANCE WITH THE ARIZONA BOARD OF TECHNICAL REGISTRATION REQUIREMENTS.

1/16" BORDER FROM EDGE OF CAP TO TOP OF 1/4" LETTERING.



**CAP DETAIL**



**TYPE 'C'**

DETAIL NO.

120



STANDARD DETAIL  
ENGLISH

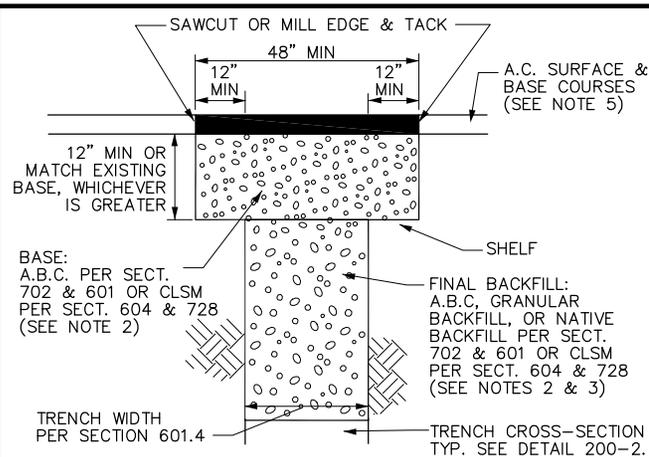
SURVEY MARKER

REVISED

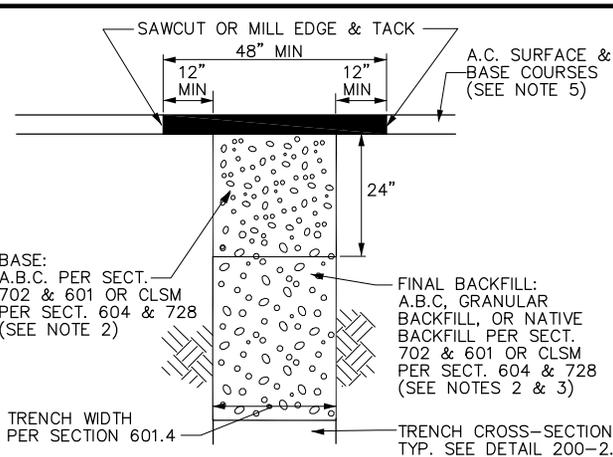
01-01-2015

DETAIL NO.

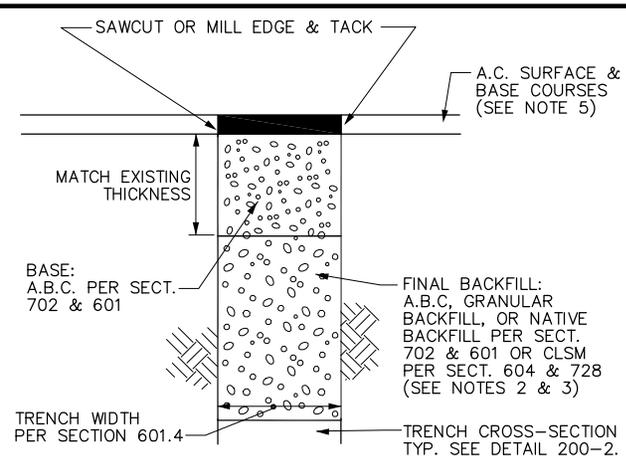
120



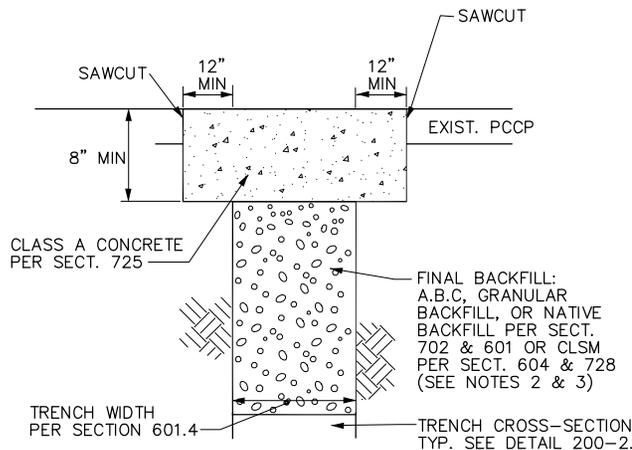
**"T TOP" TRENCH REPAIR**



**TYPE "A" TRENCH REPAIR**

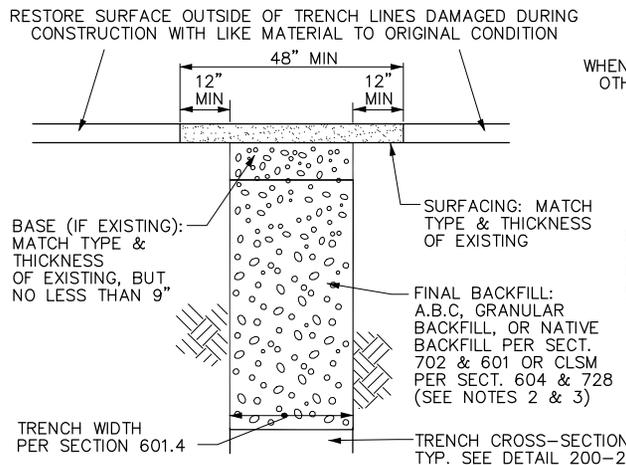


**TYPE "B" TRENCH REPAIR**



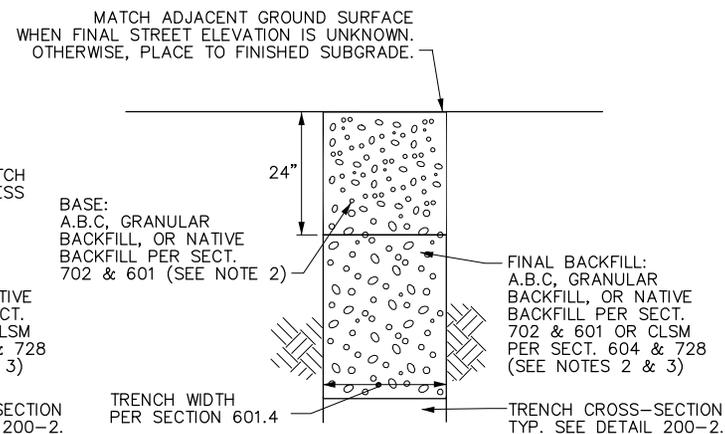
**TYPE "C" TRENCH REPAIR**

(TRENCH IN PORTLAND CEMENT CONCRETE PAVEMENT)



**TYPE "D" TRENCH REPAIR**

(TRENCH NOT UNDER CONCRETE OR ASPHALT PAVEMENT)



**TYPE "E" TRENCH REPAIR**

(TRENCH IN FUTURE ROADWAY PRISM OR ALLEY)

**NOTES:**

1. PAVEMENT MATCHING AND SURFACE REPLACEMENT SHALL BE IN ACCORDANCE WITH SECTION 336.
2. TYPE OF BACKFILL AND BASE (IF APPLICABLE) SHALL BE AS NOTED HEREIN UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS. IF NOT SPECIFIED, CLSM SHALL BE 1/2-SACK PER SECTIONS 604 AND 728.
3. TRENCHES LESS THAN 24" WIDE SHALL BE BACKFILLED FROM TOP OF INITIAL BACKFILL TO BOTTOM OF SURFACING MATERIALS WITH 1/2-SACK CLSM PER SECTIONS 604 AND 728.
4. BASE, FINAL BACKFILL, AND PIPE EMBEDMENT ZONE COMPACTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 601.
5. ASPHALT CONCRETE SURFACE AND BASE COURSES SHALL COMPLY WITH SECTION 336.2.4.1 UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS.
6. USE TYPE "A" FOR LONGITUDINAL TRENCH REPAIR AND USE "T-TOP" FOR TRANSVERSE TRENCH REPAIR (SEE DETAIL 200-2) UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS. TYPE "B" TRENCH REPAIR MAY BE USED FOR TRANSVERSE TRENCH REPAIR IF SPECIFIED BY THE AGENCY.
7. PROVIDE MINIMUM 12" WIDE SHELF AS SHOWN IN "T-TOP" TRENCH REPAIR AT ENDS OF TYPE "A" TRENCH REPAIR EXCEPT WHERE EDGE ABUTS EXISTING CONCRETE.
8. USE "T-TOP" PAVEMENT REPLACEMENT WHERE A TRENCH IS NOT PARALLEL TO A STREET OR GOES THROUGH AN INTERSECTION.
9. SEE DETAIL 200-2 FOR REMNANT PAVEMENT REMOVAL REQUIREMENTS.
10. EXPOSED COPPER OR POLYETHYLENE WATER PIPE UP TO 2" IN DIAMETER IN TRENCHES TO BE BACKFILLED WITH CLSM SHALL BE WRAPPED WITH MINIMUM 3/4" THICK PREFORMED PIPE-COVERING FOAM INSULATION BEFORE PLACING CLSM.

DETAIL NO.  
200-1



STANDARD DETAIL  
ENGLISH

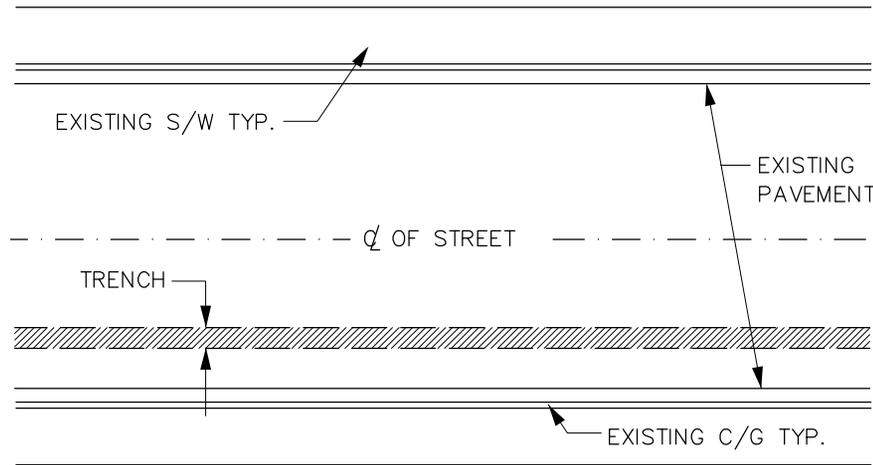
BACKFILL, PAVEMENT  
AND SURFACE REPLACEMENT

PROPOSED  
01-01-2015

DETAIL NO.  
200-1

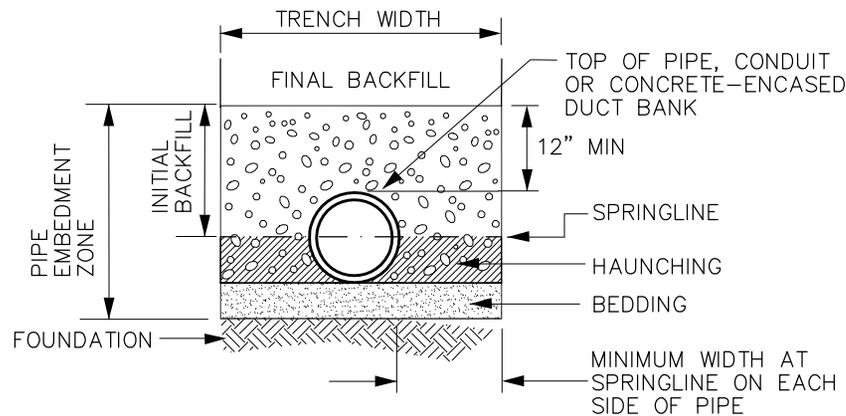
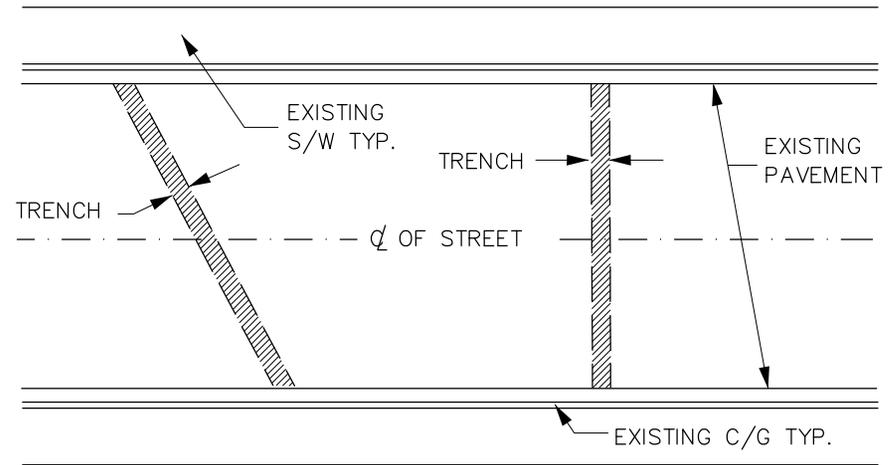
## LONGITUDINAL TRENCH

(TRENCH IN PAVEMENT PARALLEL TO TRAFFIC)

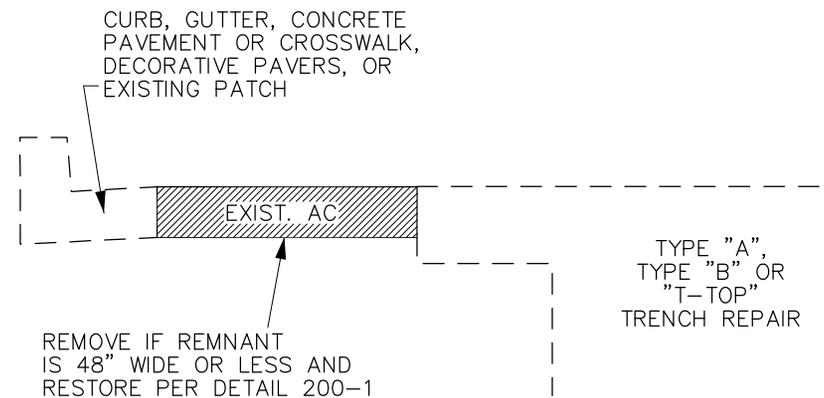


## TRANSVERSE TRENCH

(TRENCH IN PAVEMENT NOT PARALLEL TO TRAFFIC)



### TRENCH CROSS-SECTION DETAIL



### REMNANT PAVEMENT REMOVAL

### NOTES:

1. SEE SECTION 601 FOR TRENCH EXCAVATION, BACKFILLING AND COMPACTION REQUIREMENTS.
2. SEE MAG DETAIL 200-1 FOR DETAILED TRENCH REPAIR REQUIREMENTS FOR TRENCH TYPES NOTED HEREIN.
3. SEE MAG DETAIL 211 FOR REQUIREMENTS REGARDING THE USE OF PLATING TRANSVERSE TRENCHES. USE OF STEEL PLATES SHALL NOT EXCEED 72 HOURS AFTER COMPLETION OF BACKFILL AND PRIOR TO FINAL PATCHING.

DETAIL NO.

200-2



STANDARD DETAIL  
ENGLISH

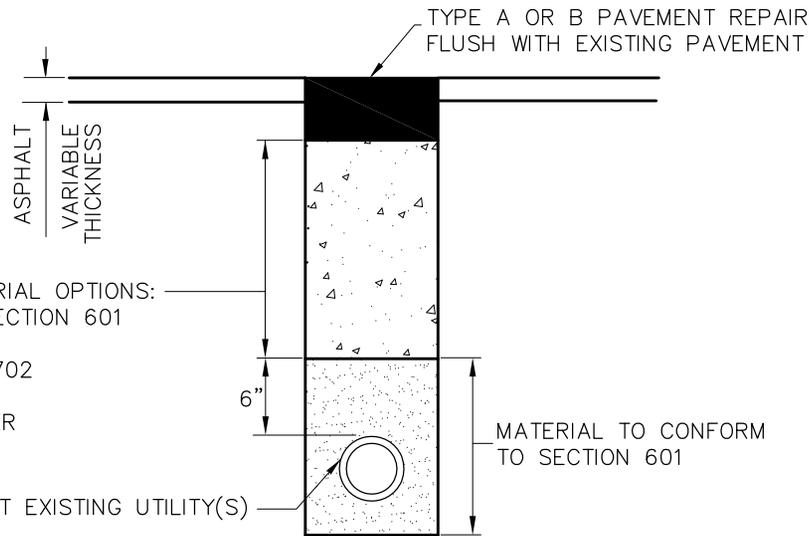
BACKFILL, PAVEMENT AND  
SURFACE REPLACEMENT

PROPOSED

01-01-2015

DETAIL NO.

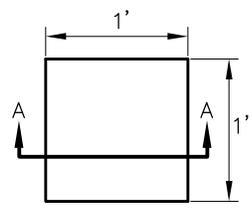
200-2



- FINAL BACKFILL MATERIAL OPTIONS:
- NATIVE SOIL PER SECTION 601 (TYPE B ONLY)
  - ABC PER SECTION 702 (TYPE B ONLY)
  - 1/2-SACK CLSM PER SECTION 728

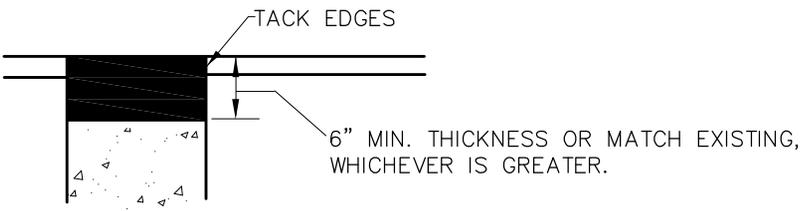
**SECTION VIEW**

**TYPE A PAVEMENT REPAIR**



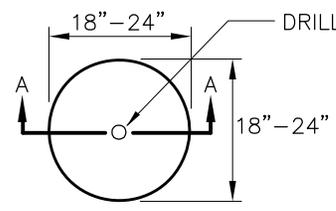
- NOTES:
1. DIMENSIONS ARE NOMINAL.
  2. EDGES SHALL BE CUT TO A NEAT VERTICAL FACE.
  3. PLACE CLSM BACKFILL IN ACCORDANCE WITH SECTION 604.
  4. PLACE AGENCY-APPROVED ASPHALT CONCRETE IN MAXIMUM 2" LIFTS.

**PLAN VIEW**



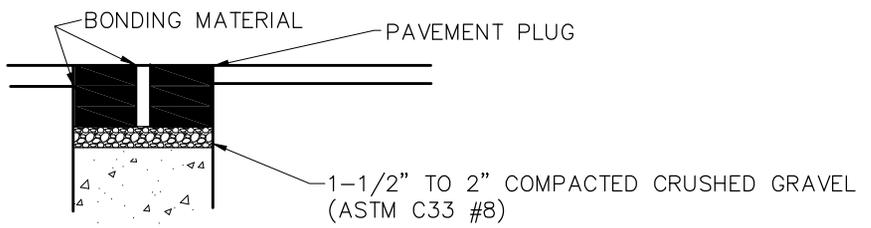
**SECTION A-A**

**TYPE B PAVEMENT REPAIR**

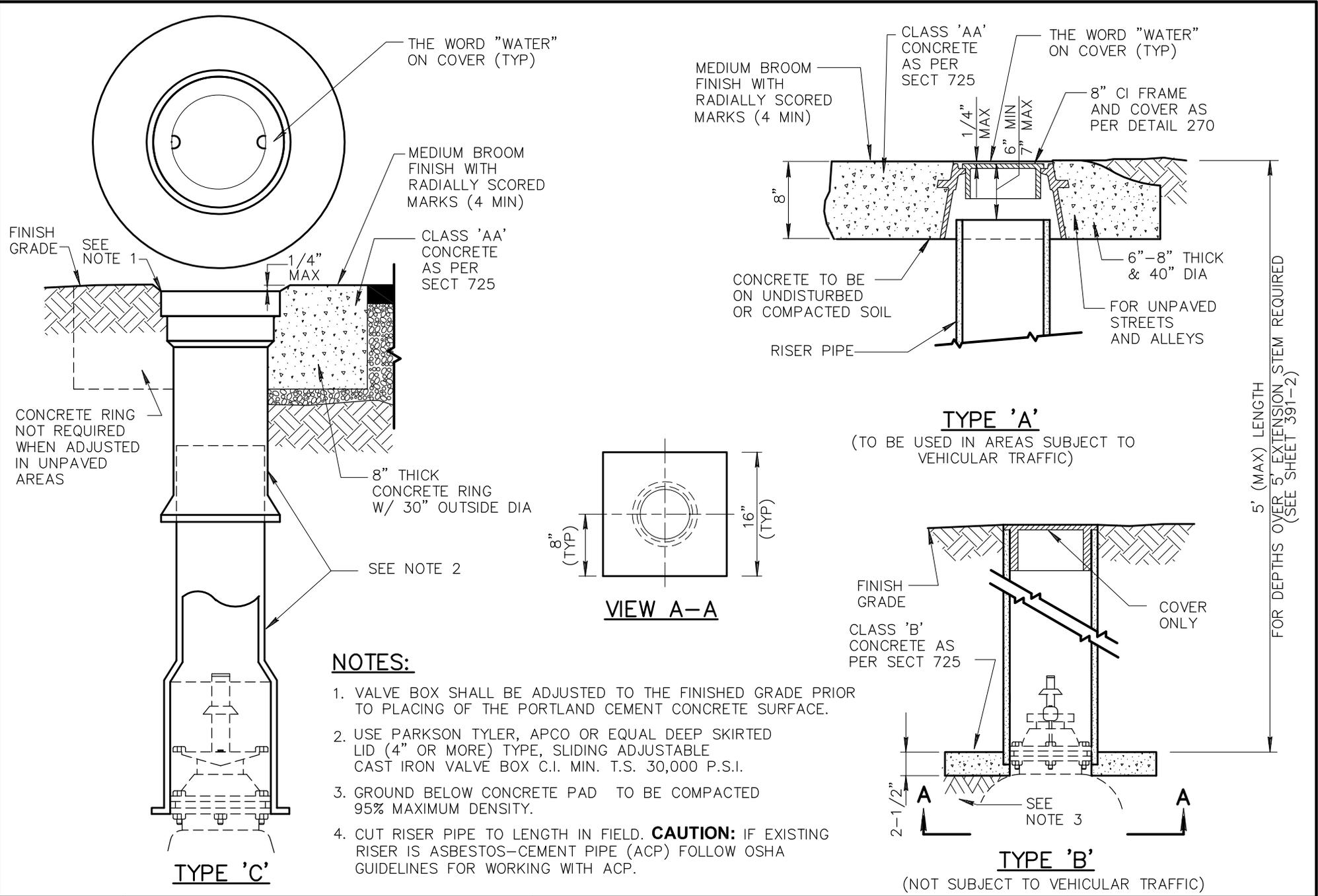


- NOTES:
1. CUT, REMOVE AND REPLACE PAVEMENT. PLUG IN ACCORDANCE WITH SECTION 355.
  2. PLACE BACKFILL IN ACCORDANCE WITH SECTION 355.
  3. BONDING MATERIAL SHALL BE AS SPECIFIED IN SECTION 708.

**PLAN VIEW**



**SECTION A-A**



DETAIL NO.

391-1



STANDARD DETAIL  
ENGLISH

VALVE BOX INSTALLATION  
AND GRADE ADJUSTMENT

REVISED

01-01-2015

DETAIL NO.

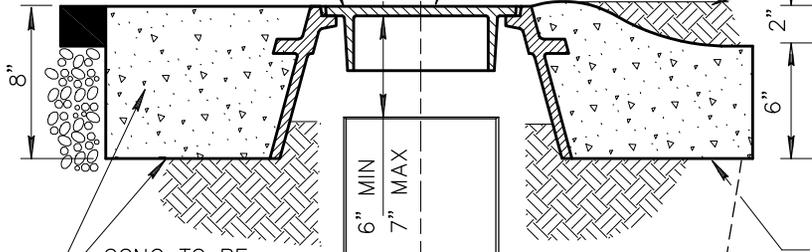
391-1

THE WORD 'WATER'  
ON COVER (TYP)

CENTER LINE OF VALVE BOX TO BE  
PLUMB OVER Q<sub>L</sub> OF OPERATING NUT

8" CI FRAME  
AND COVER AS PER  
DETAIL 270

GROUND



CONC TO BE  
ON UNDISTURBED  
OR COMPACTED  
SOIL

CLASS 'AA' CONC  
AS PER SECT 725  
RADIALLY SCORE  
JOINTS. MEDIUM  
BROOM FINISH

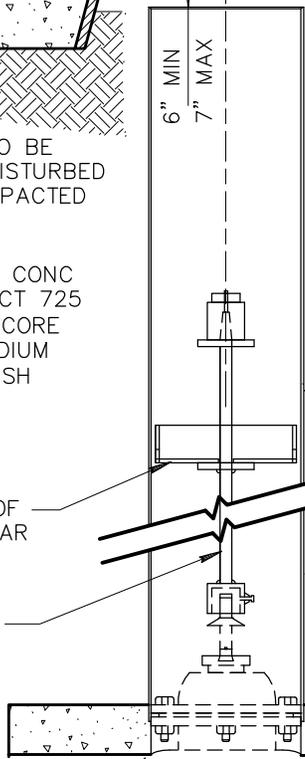
POURED CONC.  
COLLAR 6"-8" THICK AND  
40" SQUARE OR ROUND  
VALVE BOX CENTERED

COMPACTED BACKFILL  
IN LAYERS SO AS  
NOT TO DISTURB THE  
RISER PIPE, DENSITY  
PER TABLE 601-2  
IN SPEC SECT 601

RISER 8" C-900 PVC  
PER AWWA C900 OR  
APPROVED EQUAL  
SEE NOTE 2

SEE DETAIL OF  
DISC & COLLAR  
RIGHT

SEE NOTE 1



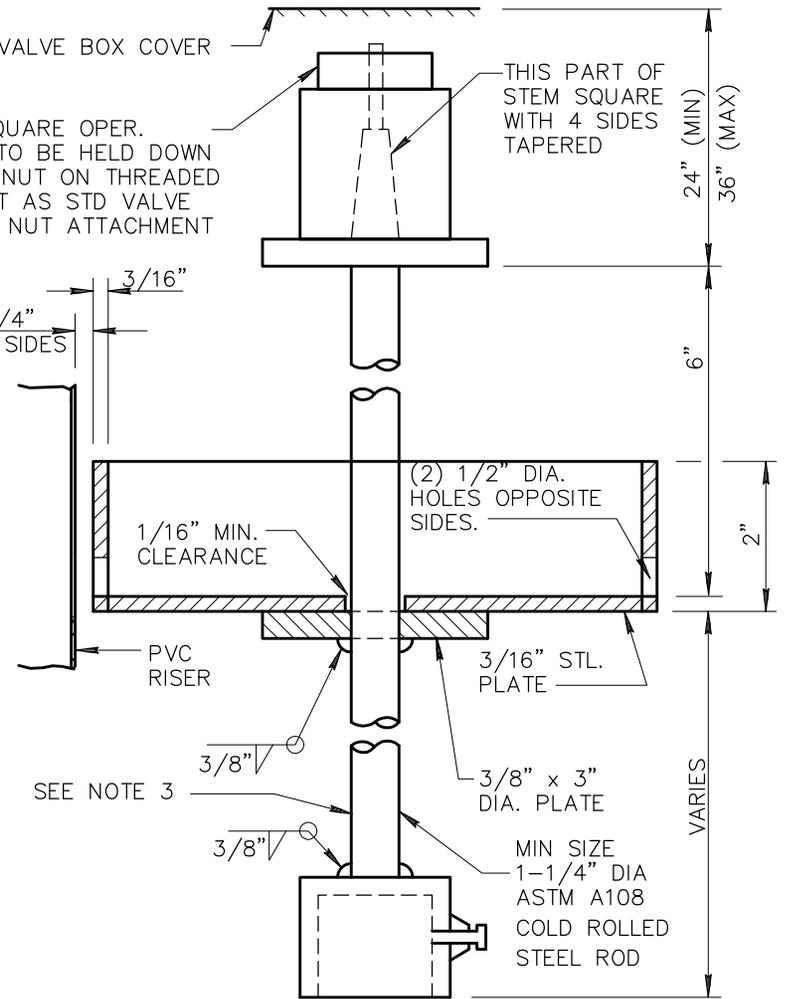
SEE NOTE 3  
SHEET 1

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

3/16"  
1/4"  
ALL SIDES



3/8"

3/8"

MIN SIZE  
1-1/4" DIA  
ASTM A108  
COLD ROLLED  
STEEL ROD

VARIES

**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 SECTIONS OF PIPE ARE USED TO MAKE THE VALVE BOX RISER, THEY SHALL BE COUPLED OR BONDED TO FORM DEBRIS-TIGHT JOINTS.
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**

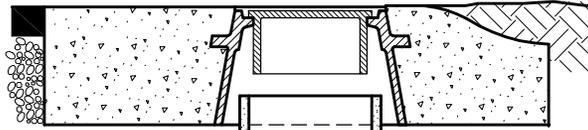


STANDARD DETAIL  
ENGLISH

**VALVE BOX INSTALLATION  
AND GRADE ADJUSTMENT**

REVISED  
01-01-2015

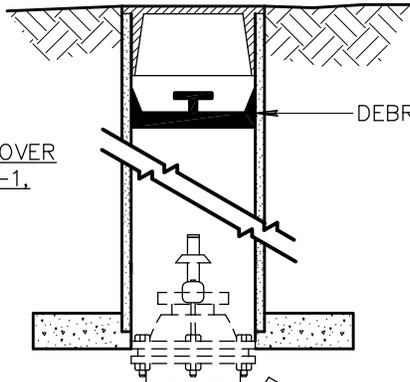
DETAIL NO.  
**391-2**



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

DEBRIS CAP

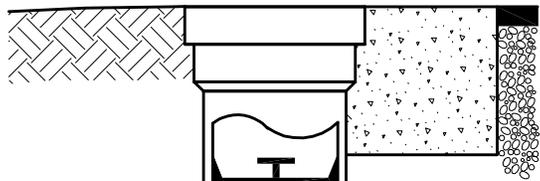
TYPE 'A'



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

DEBRIS CAP

TYPE 'B'



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

DEBRIS CAP

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.
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 CAP SHALL BE INSTALLED IN ALL VALVE HOUSINGS AS REQUIRED BY THE CONTRACT DOCUMENTS OR BY THE AGENCY'S POLICIES.

### TYPE 'A' TOP

(PRECAST ECCENTRIC CONICAL TOP MANHOLE)

24" OR 30" FRAME  
& COVER PER DET.  
423, 424, 425 (TYP)

24" TO 26-3/4" ON  
48" MANHOLE  
30" ON 60" MANHOLE  
(TYP)

OVERALL ADJUSTMENT RING  
HEIGHT SHALL BE 12" MIN  
TO 18" MAX (TYP)

24" MAX ADJUSTING  
RINGS PER DETAIL  
422 (TYP)

30" MIN.  
36" MAX.

USE BUTYL RUBBER  
MASTIC JOINT SEALANT ON  
ALL JOINTS; EXCEPT TOP  
ADJUSTMENT RINGS

PRECAST RISER SECTIONS  
AS REQUIRED

CONCRETE SHELF SHALL BE  
PER DETAIL 420-3 SECTION  
A-A

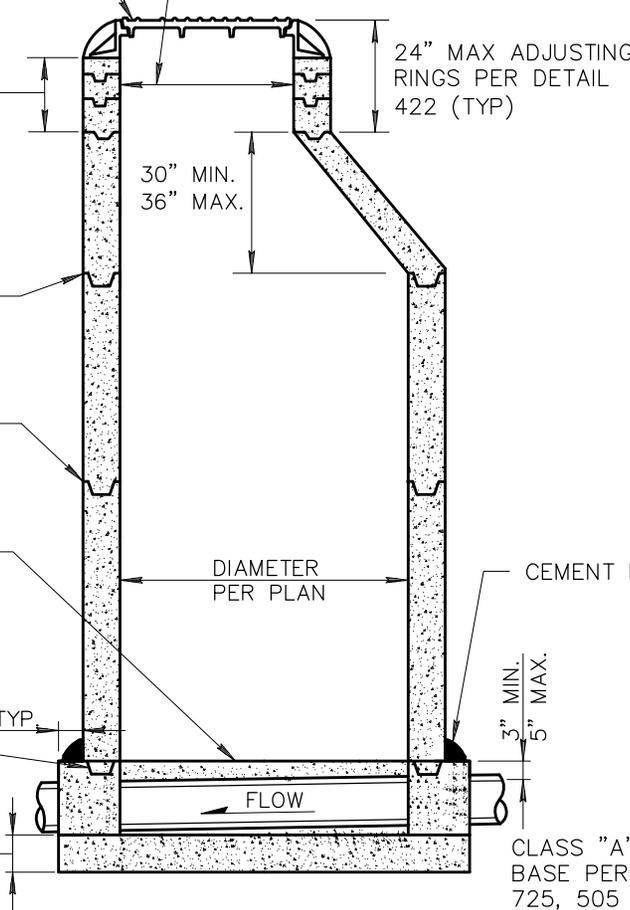
DIAMETER  
PER PLAN

CEMENT MORTAR

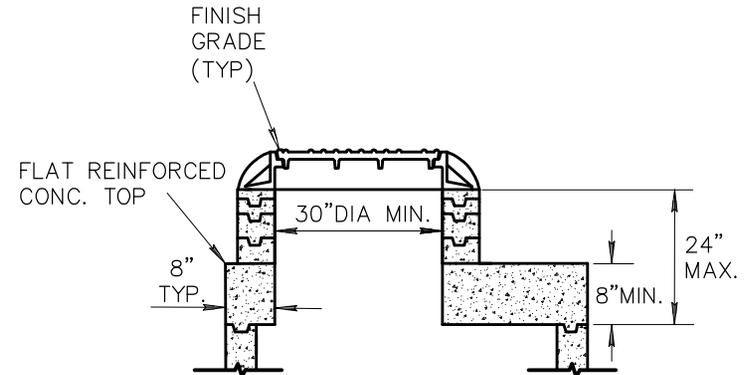
4" TYP  
KEYWAY PRESSED INTO BASE  
TO MATCH PRECAST RISER

8" IF MANHOLE IS 13' OR LESS  
12" IF MANHOLE IS OVER 13'

CLASS "A" CONCRETE  
BASE PER SECTION  
725, 505



### (PRECAST FLAT TOP M.H.)



#### NOTES:

1. PRECAST STEEL REINFORCED MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C 478 EXCEPT AS MODIFIED HEREIN.
2. CAST-IN-PLACE MANHOLE BASE TO BE CONSTRUCTED IN ONE PLACEMENT.
3. CAST-IN-PLACE MANHOLE BASE SHELF AND CHANNEL TO RECEIVE SMOOTH TROWEL FINISH.
4. MANHOLE COATINGS PER AGENCY.
5. SEE MAG DETAIL 422 FOR FINAL ADJUSTMENT TO GRADE.
6. ANY MANHOLE OVER 20' SHALL REQUIRE ENGINEER (STRUCTURAL) CALCS.
7. THE MANHOLE ACCESS POINT SHALL BE ORIENTED IN SUCH A WAY THAT THE OPENING IS DIRECTLY ABOVE THE LOWEST INVERT, OR AS OTHERWISE DIRECTED BY THE PLANS OR ENG.
8. FOR PRECAST BASE SEE DETAIL 420-2.
9. FLAT TOPS SHALL ONLY BE USED WITH APPROVAL FROM THE ENGINEER.

DETAIL NO.  
420-1

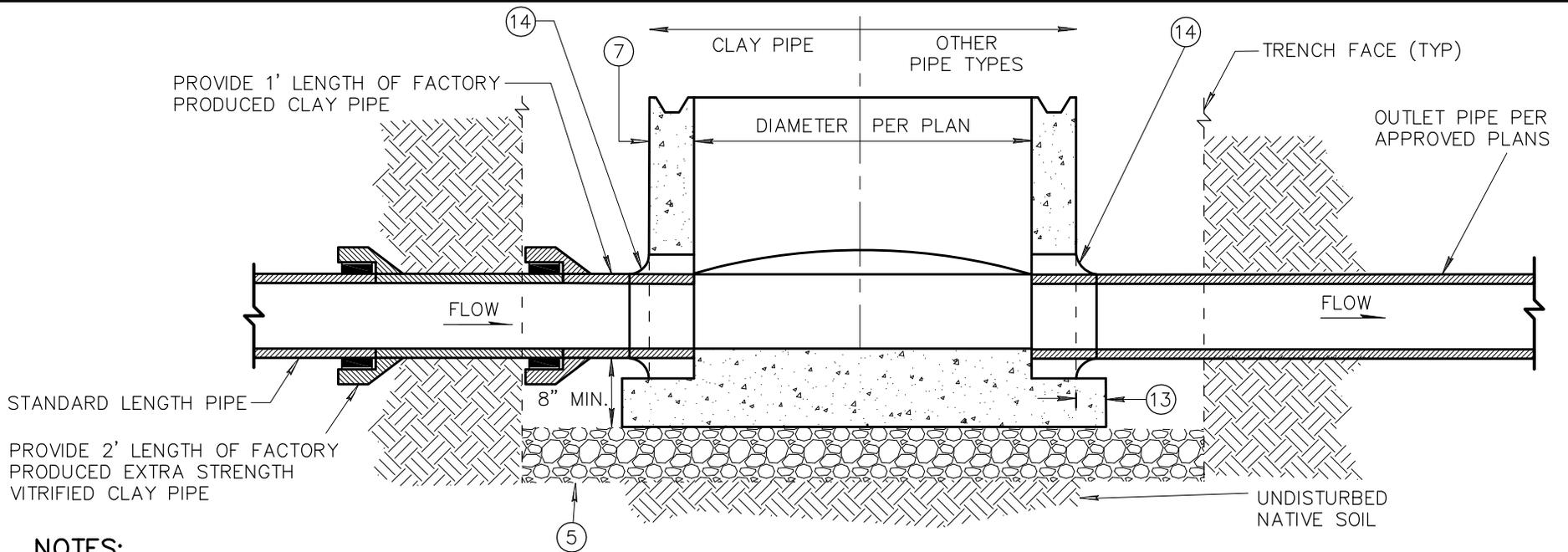


STANDARD DETAIL  
ENGLISH

CONCRETE SANITARY SEWER MANHOLE

REVISED  
01-01-2015

DETAIL NO.  
420-1



**NOTES:**

- ① PRECAST, MANUFACTURER SHALL BE AN NATIONAL PRECAST CONCRETE ASSOCIATION (NPCA) CERTIFIED PLANT. ENTIRE PRECAST BASE SHALL BE MANUFACTURED AT THE PLANT PER ASTM C478.
- ② MAG "AA" 4000 PSI CONCRETE SHALL BE USED FOR PRECAST MANHOLE BASES.
- ③ SPRING LINE OF CAST-IN-PLACE BELL SHALL STOP AT INSIDE FACE OF MANHOLE.
- ④ JOINTS FOR BARREL SECTION SHALL BE TONGUE AND GROOVE TYPE. ALL LIFTING HOLES SHALL BE SEALED WITH GROUT.
- ⑤ ALL PRECAST MANHOLE BASES SHALL BE PLACED ON 8" MINIMUM OF ABC PER SECTION 702 COMPACTED TO 100% MAXIMUM DENSITY.
- ⑥ ALL MODIFICATIONS SHALL BE APPROVED BY THE ENGINEER.
- ⑦ MINIMUM WALL THICKNESS SHALL BE PER ASTM C478 (MIN 5").
- ⑧ REINFORCEMENT SHALL BE DESIGNED BY AN ARIZONA REGISTERED PROFESSIONAL ENGINEER.
- ⑨ CHANNEL TRANSITION SHALL BE CONSTANT FROM INLET TO OUTLET OF MANHOLE TO FACILITATE SMOOTH TRANSITIONS AND ACCOMMODATE CORRESPONDING MANDREL.
- ⑩ THERE SHALL BE NO HARD CONNECTIONS (GROUTED) INTO THE MANHOLE BASE UNLESS APPROVED BY THE ENGINEER.
- ⑪ ALL SEWER SERVICE CONNECTIONS SHALL HAVE THE SAME CONNECTION TYPES IN THE PRECAST MANHOLE BASE.
- ⑫ ALL CORE HOLES INTO THIS STRUCTURAL PRECAST BASE SHALL BE COATED WITH AN APPROVED COATING MATERIAL.
- ⑬ THE MANHOLE BOTTOM SHALL EXTEND OUTSIDE THE MANHOLE WALL A MINIMUM 6" WIDE ON 48" BASES, 7" WIDE ON 60" BASES, AND 8" WIDE ON 72" BASES. EXTENDED BOTTOM SHALL BE A MINIMUM OF 5" THICK.
- ⑭ ALL PIPE CONNECTIONS SHALL BE IN COMPLIANCE WITH ASTM F477 OR ASTM C425. AN EXTRA STRENGTH VCP BELL WITH A POLYURETHANE JOINT THAT MEETS ASTM C425 MAY BE USED WITH VCP.

DETAIL NO.  
**420-2**

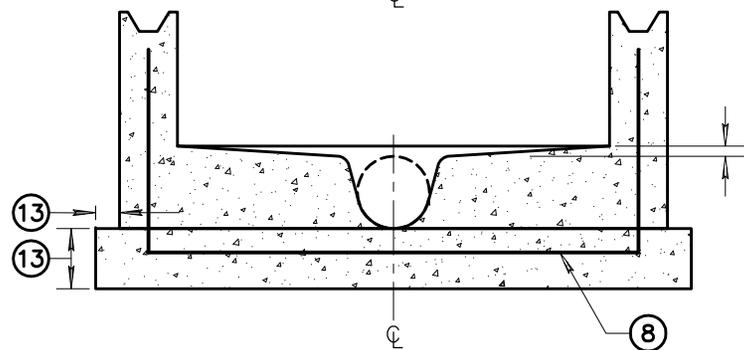
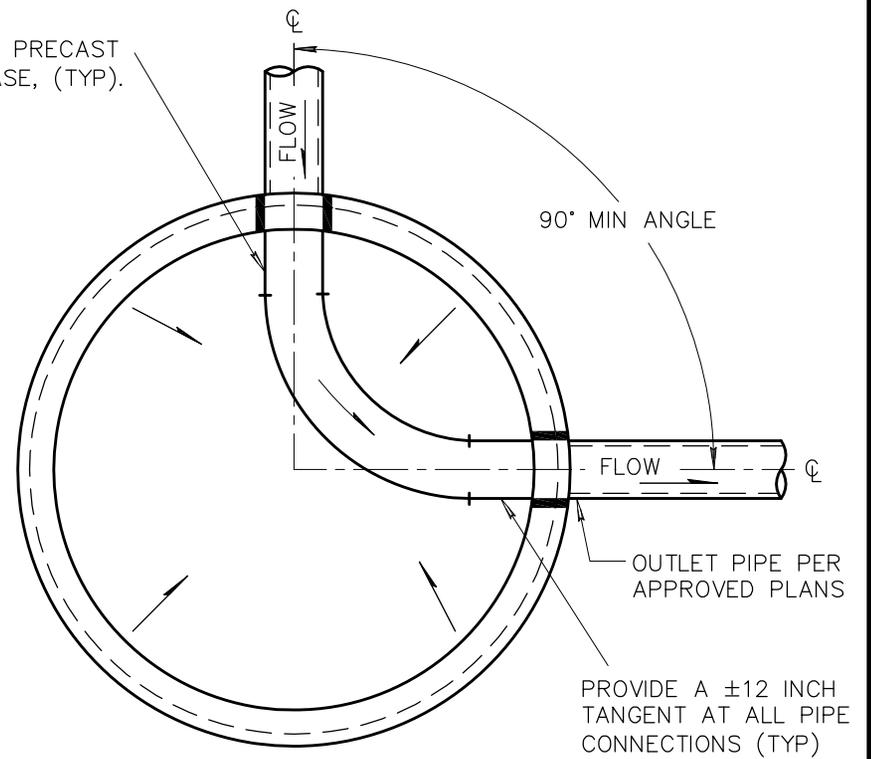
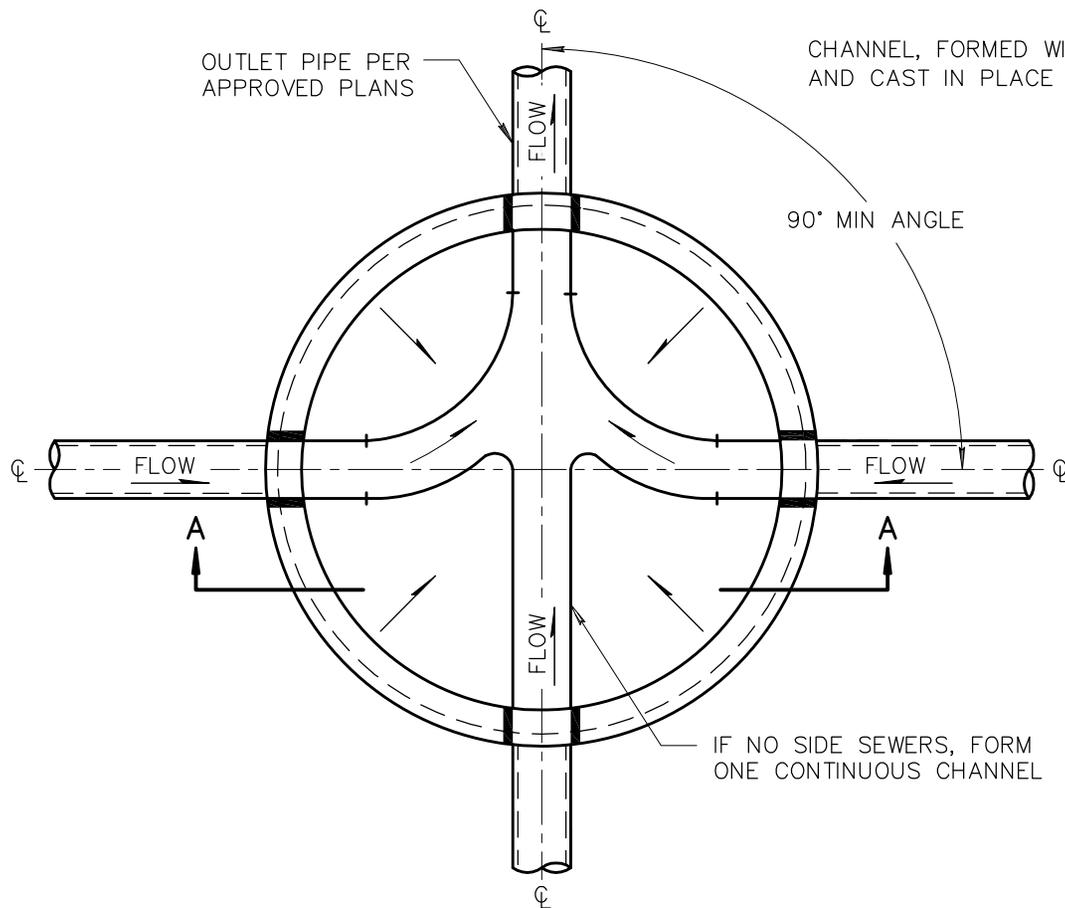


STANDARD DETAIL  
ENGLISH

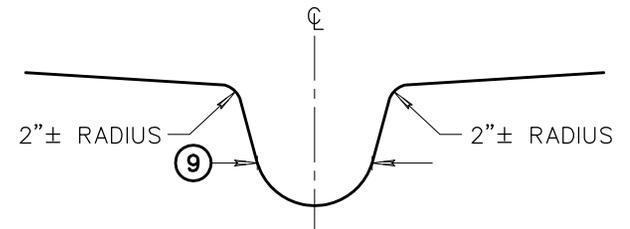
**PRECAST CONCRETE MANHOLE BASE**

REVISED  
01-01-2015

DETAIL NO.  
**420-2**



SECTION A-A



CHANNEL TRANSITION SHALL BE CONSISTENT FROM INLET TO OUTLET OF MANHOLE TO FACILITATE SMOOTH TRANSITIONS AND ACCOMMODATE CORRESPONDING MANDREL.

TYPICAL CHANNEL

SEE DETAIL 420-2 FOR NOTES

DETAIL NO.  
420-3



STANDARD DETAIL  
ENGLISH

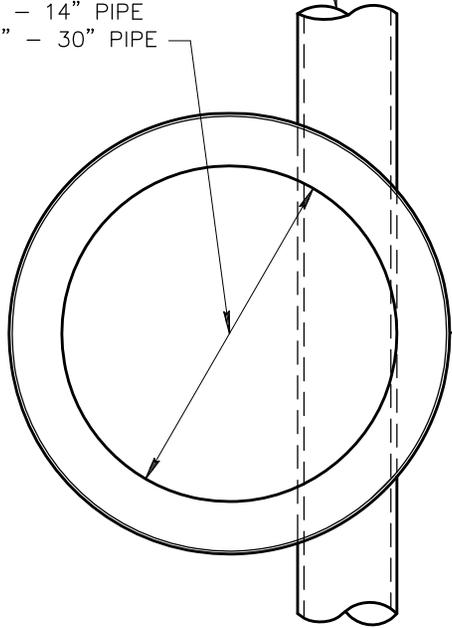
CONCRETE MANHOLE BASE

REVISED  
01-01-2015

DETAIL NO.  
420-3

PIPE SIZE & ELEVATION  
AS SHOWN ON PLANS

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



MANHOLE ADJUSTMENT  
PER DETAIL 422

COMBINED CURB  
AND GUTTER

SEE DETAIL  
420-1 FOR  
ADJUSTMENT  
REQUIREMENTS

MANHOLE TO BE  
PRECAST PER  
SECT. 625

PRECAST RISER PER  
ASTM C-478

4"  
TYP

2% MIN NOT TO  
EXCEED 3"

CEMENT  
MORTAR  
(TYP)

30" MIN.  
36" MAX.

CLASS A CONCRETE  
PER SECT. 725, 505

TROWEL  
FINISH  
SMOOTH

8" IF MANHOLE  
IS 13' OR LESS  
12" IF MANHOLE  
IS OVER 13'

DETAIL NO.

421



STANDARD DETAIL  
ENGLISH

OFFSET MANHOLE 8" TO 30" PIPE

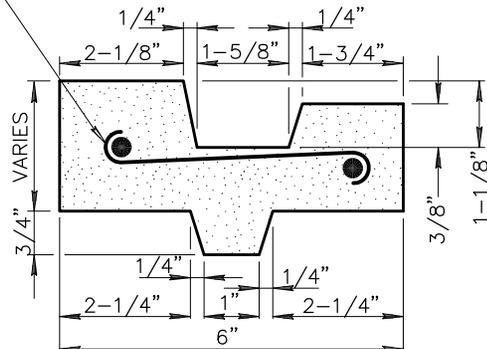
REVISED

01-01-2015

DETAIL NO.

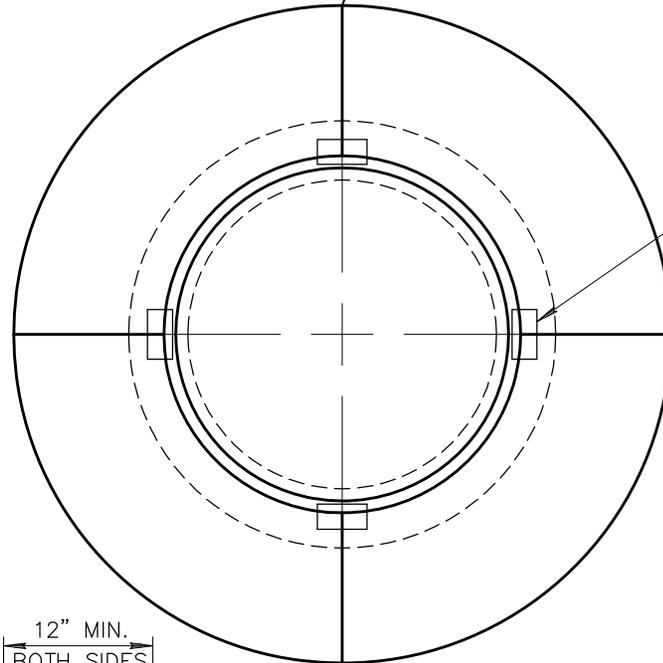
421

(2) NO.2 HOOPS FOR 4" RING TIED WITH NO. 4 A.S.& W. GAUGE WIRE. 6" & 8" RING REQUIRE (4) NO. 2 HOOPS.



**ADJUSTING RING DETAIL**

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



**NOTES:**

1. CONTRACTORS SHALL ADJUST ALL MANHOLE RINGS AND COVERS, INCLUDING MANHOLES OUTSIDE OF THE PAVEMENT.
2. ADJUSTMENT SHALL BE CONSTRUCTED PER MAG SECTION 345.
3. MANHOLE COATINGS PER AGENCY
4. GROUT SHALL BE USED BETWEEN FRAME AND ADJUSTING RING TO ACHIEVE WATER TIGHTNESS.

SPACER TYPE	REQUIRED THICKNESS
BRICK	GREATER THAN 2"
4"X2" STEEL SPACER	1/2" TO 2"
GROUT	LESS THAN 1/2"

OUT OF PAVEMENT—FINISH GRADE

CONCRETE COLLAR, CLASS 'AA' CONCRETE PER SECT. 725 & 505

SUBGRADE PREPARATION TO CONFORM TO SECT. 301 OR 601

12" MIN. BOTH SIDES

EXISTING OR RECENTLY INSTALLED PAVEMENT

#4 REINFORCING STEEL HOOP EQUALLY CENTERED HORIZONTALLY & VERTICALLY (IF REQUIRED BY AGENCY)

GROUT INTERIOR SURFACE OF ADJUSTMENT RINGS CONTINUOUS

ADJUSTING RINGS

DETAIL NO.

422



STANDARD DETAIL  
ENGLISH

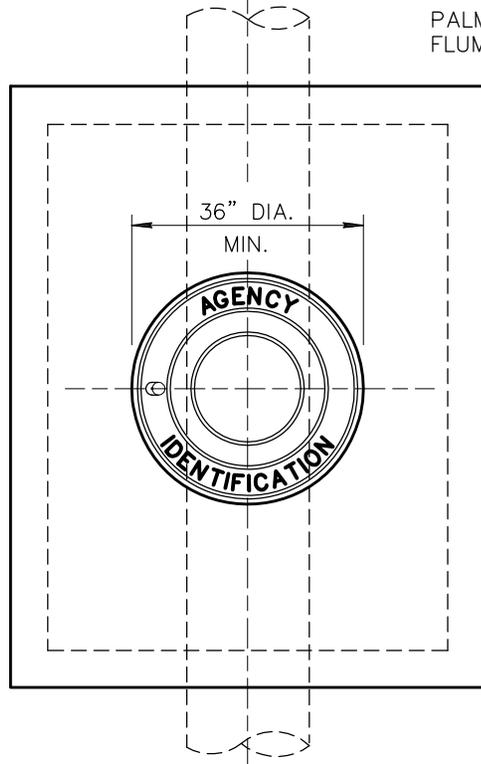
**MANHOLE FRAME  
AND COVER ADJUSTMENT**

REVISED  
01-01-2015

DETAIL NO.

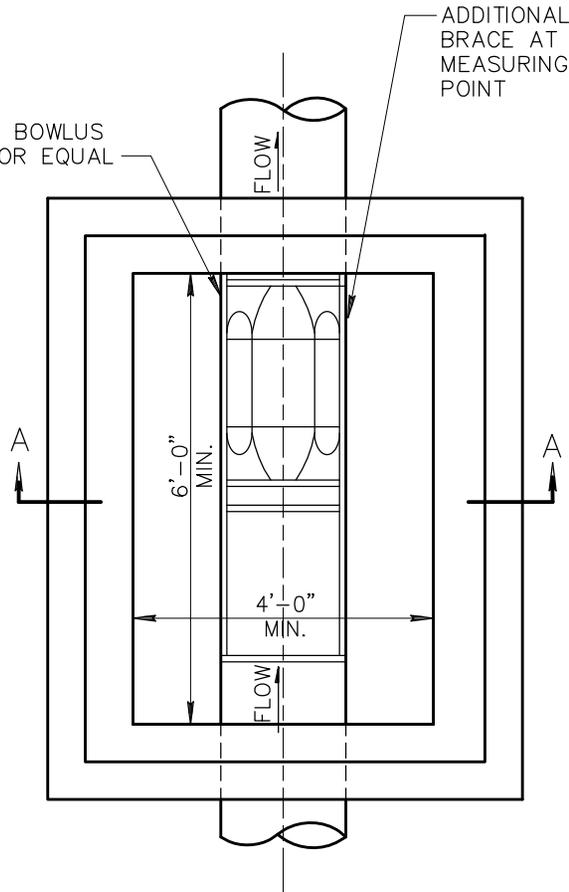
422

MANHOLE FRAME AND COVER PER DETAIL NO. 423



**MANHOLE & COVER SLAB**

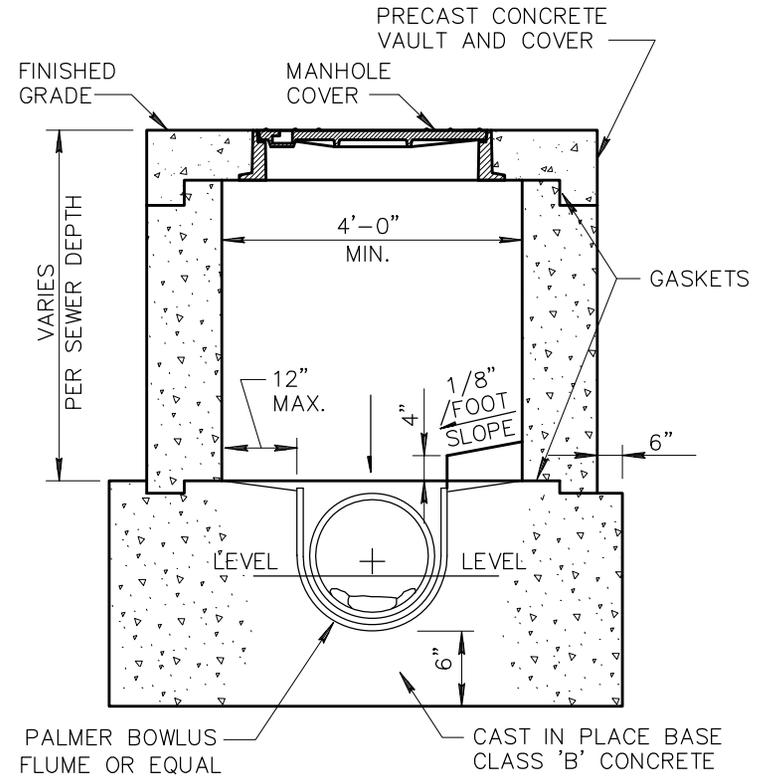
PALMER BOWLUS FLUME OR EQUAL



**PLAN VIEW**

NOTE: WITH COVER REMOVED.

ADDITIONAL BRACE AT MEASURING POINT



**SECTION A-A**

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

**NOTES:**

1. 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.
2. 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.
3. THE PALMER BOWLUS FLUME SHALL BE INSTALLED PER THE MANUFACTURERS RECOMMENDATIONS.
4. 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.
5. 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

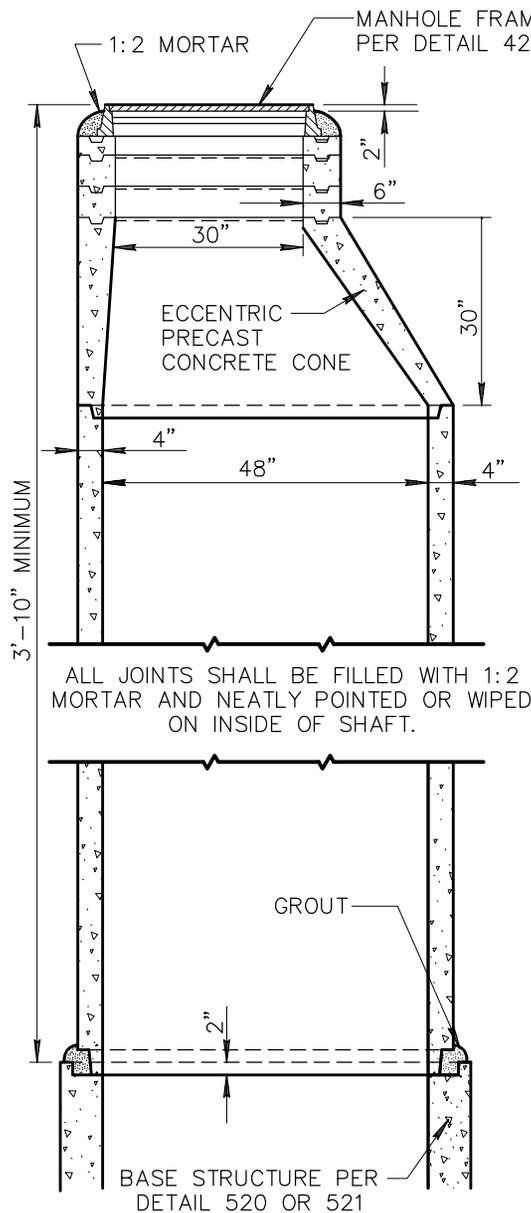
**INDUSTRIAL WASTE CONTROL  
VAULT WITH MANHOLE**

REVISED

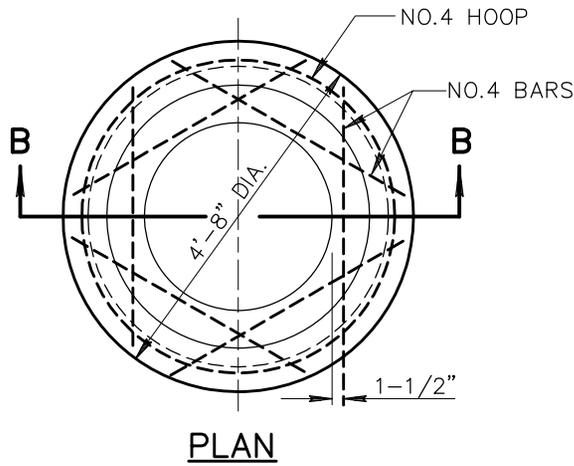
01-01-2015

DETAIL NO.

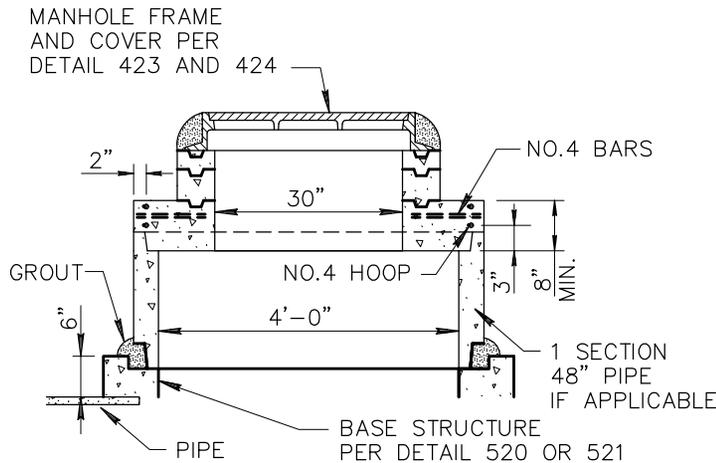
**429**



**VERTICAL SECTION OF  
ECCENTRIC MANHOLE SHAFT**



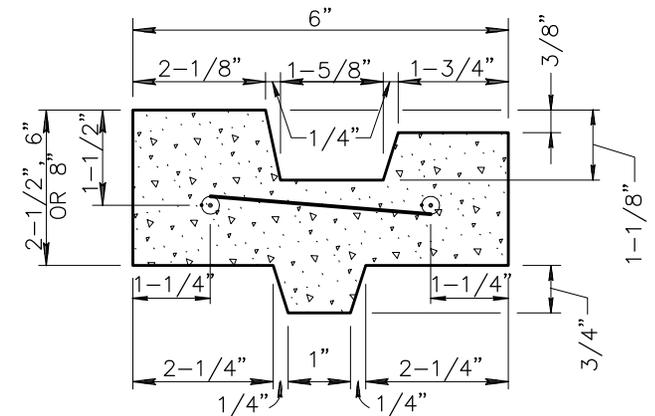
**PLAN**  
USE WHERE THERE IS 3'-10"  
OR LESS COVER OVER PIPE



**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. 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

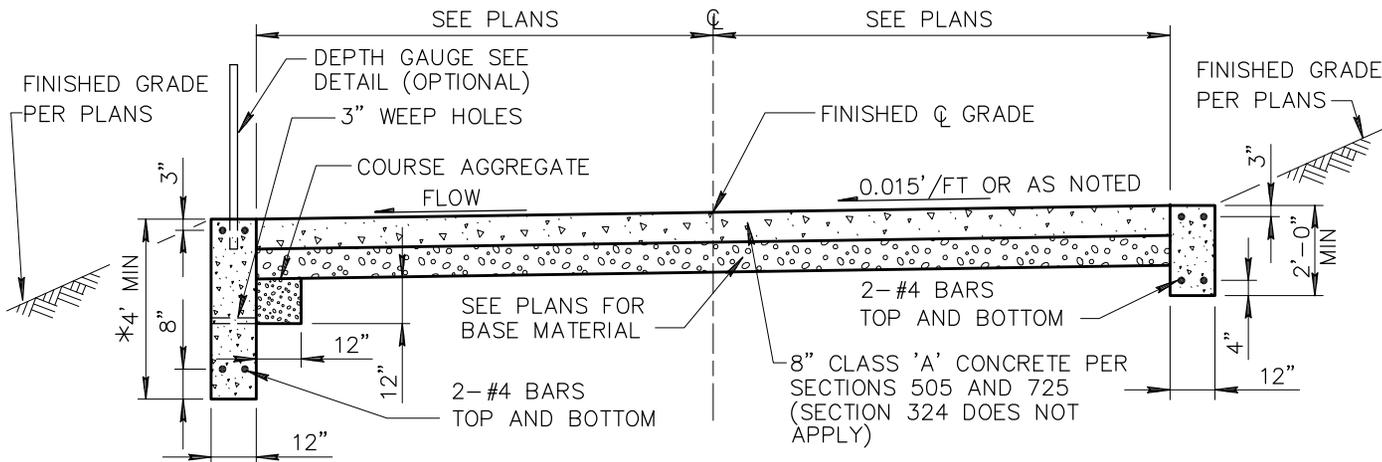
**STORM DRAIN MANHOLE SHAFT**

REVISED

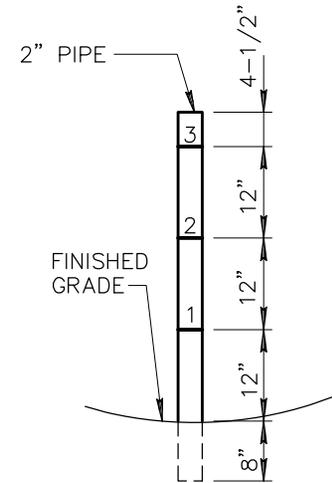
01-01-2015

DETAIL NO.

**522**



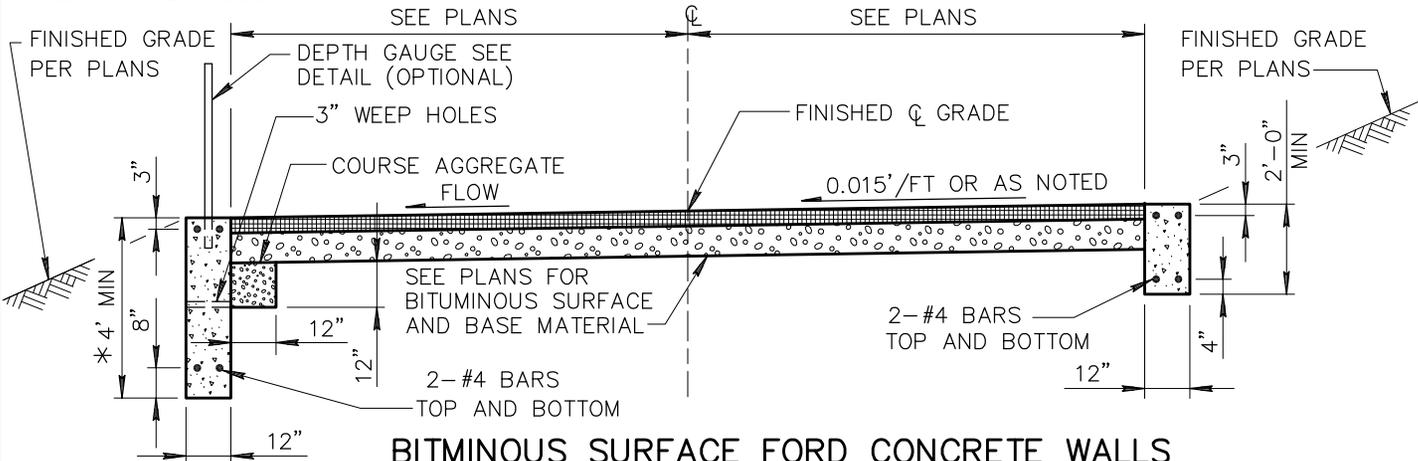
**CONCRETE SURFACE FORD CONCRETE WALLS**



**DEPTH GAUGE DETAIL**

(OPTION OF THE CONTRACTING AGENCY)

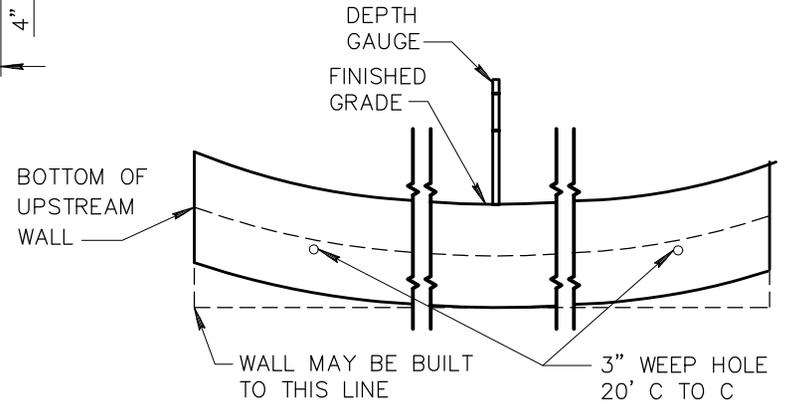
\*MIN. DISTANCE BELOW STREAM BED



**BITMINOUS 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 PER PLANS.
5. REINFORCING BARS SHALL BE SET 3" CLEAR FROM SIDES OF CUT-OFF WALLS.
6. COURSE AGGREGATE AT WEEP HOLES SHALL BE ASTM C33 SIZE 57, ENCLOSED IN FILTER FABRIC (SECTION 796, CLASS B), AND EXTENDED Laterally A MINIMUM OF SIX-INCHES (6") ON EACH SIDE OF THE WEEP HOLE.



**ELEVATION LOOKING UPSTREAM**

DETAIL NO.

552



STANDARD DETAIL  
ENGLISH

FORD CROSSING AND CUT-OFF WALLS

REVISED

01-01-2015

DETAIL NO.

552