



CITY OF BUCKEYE
Engineering Department

Case Number: 13-21

Date: 07-25-13

To: MAG Specifications and Details Committee

From: Craig Sharp

RE: Section 742 Pre Cast Manhole Bases

Purpose: Creating a new section and details for pre-cast manhole bases and modifying the existing cast in place manhole detail No. 420-1, 420-2, 421 and 422.

Revisions:

Creating a new section and details for pre-cast manhole bases and modifying existing details.

Updated 04-02-14

SECTION 742

PRE CAST MANHOLE BASES

742.1 GENERAL:

This specification covers the requirements of pre cast manhole bases for gravity sanitary sewer. When noted on the plans or in the special provisions pre cast manhole bases shall be constructed according to this specification. All pre cast manhole base manufacturers shall be NPCA (National Pre Cast Association) certified and shall provide all certifications upon request. Loading criteria for the pre cast base shall meet or exceed the AASHTO 1120 loading requirements. All pre cast manhole bases and risers shall be monolithically cast to ensure water tightness and have a certified structural design. An anti-float ring shall be cast with the base and riser during manufacturing.

742.2 MATERIALS:

742.2.1 Cementitious Materials: Cementitious materials shall conform to Section 725.2 and shall have a minimum compressive strength after 28 days of 4000 PSI.

742.2.2 Pre Cast Sections: Pre Cast sections shall conform to ASTM C478, AASHTO M199

742.2.3 Joints and Connections: Joints and connections shall conform to ASTM C425, C990 and C923.

742.3 CASTING TYPES:

All pre cast manhole bases shall be cast using either a dry cast or a wet cast system. Each manufacturer shall be proficient in their manner of casting and shall monitor and test the materials being used in the casting. The test results shall be available upon request by the contracting agency.

742.3.1 Wet Castings: Wet casting shall consist of pouring thoroughly mixed cementitious materials in its plastic form into a pre determined mold the size and shape required per the drawings or special provisions. Concrete shall be placed in forms and vibrated in such a manner to make a dense uniform product conforming to the plans and specifications.

742.3.2 Dry Castings: Dry casting shall consist of casting the base utilizing mechanized equipment with a zero (0) slump concrete between the core and jacket. Curing shall be by a kiln or a combination of tarps and moisture curing.

742.4 CUT OUT/KNOCK OUT:

Cut out of the precast base shall be done using a mechanical whole saw. The location of the whole shall be determined by the plans and specifications. After the core is removed from the casting the manufacturer shall coat all reinforcing with a corrosion inhibiting epoxy suitable for end use application. The thickness of the epoxy shall be per the manufacturer recommendation suitable for the end use application. Knock outs shall be formed in the location noted on the plans or specifications.

742.5 REINFORCING

Reinforcing for the base shall meet the following specifications:

- Wire ASTM A82 or A496
- Wire fabric A185 or A497

Design of the reinforcing shall be in accordance with ACI 318 and ASTM C890

742.6 GASKETS

A flexible pipe to manhole connector shall be used whenever a pipe penetrates into a pre cast concrete manhole or structure. The design of the connector shall provide a flexible, watertight seal between the pipe and the concrete. The connector shall assure that a seal is made between the structure wall and the pipe by:

- casting the connector integrally with the structure wall during the manufacturing process in a manor that will not pull out during pipe coupling.
- compressing the connector against the inside circumference of the structure by means of wedge or toggle style connection, expansion ring or other means approved by the engineer.

The connector shall be made of from materials that conform to the physical and chemical requirements outlined in the ASTM C923, and

The connector shall be sized specifically for the type of pipe being used and shall be installed in accordance with the recommendations of the manufacturer.

The connection hardware shall be constructed of a 316 stainless steel meeting ASTM A480. The hardware shall ensure a water tight connection between the concrete and the pipe material and shall provide an adequate seal enough to withstand the negative air pressure test per ASTM C-1244.

742.7 LIFTING DEVICES

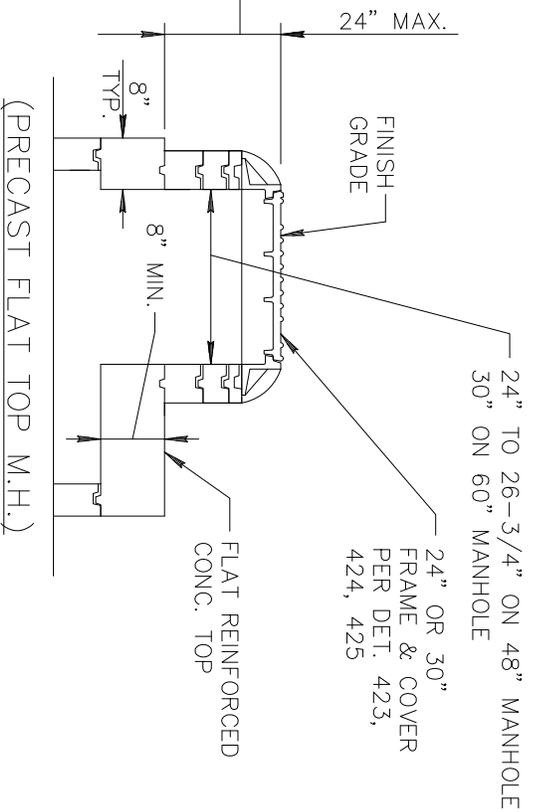
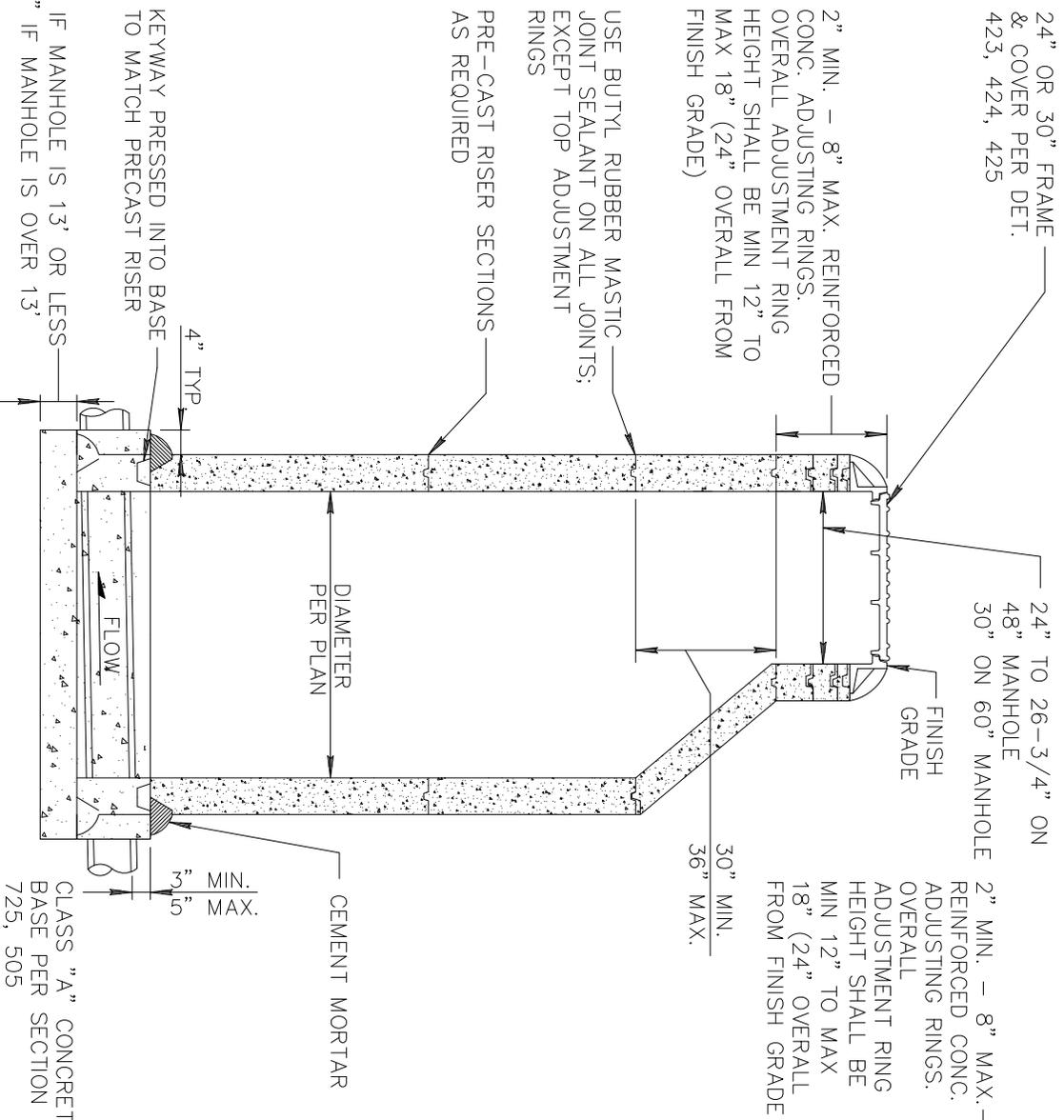
Lifting devices shall be designed and evaluated by a registered professional engineer and have a minimum safety factor of 4. There shall be a minimum of 2 lifting points on every pre cast manhole base. After base installation, the lifting holes shall be thoroughly packed with a pre-packaged non-shrink grout. Bent reinforcing steel bars shall not be used as lifting devices. Through lifting holes will not be allowed.

742.8 IMPERFECTIONS

742.8.1 Imperfections: Any imperfections which in the opinion of the engineer may adversely affect the performance of the pre cast base shall be cause for rejection.

-End of Section -

TYPE 'A' TOP
(PRE-CAST ECCENTRIC CONICAL TOP MANHOLE)



NOTES:

1. PRE-CAST, 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.
8. FOR PRE-CAST BASE SEE DETAIL 420-2.

DETAIL NO.
420-1

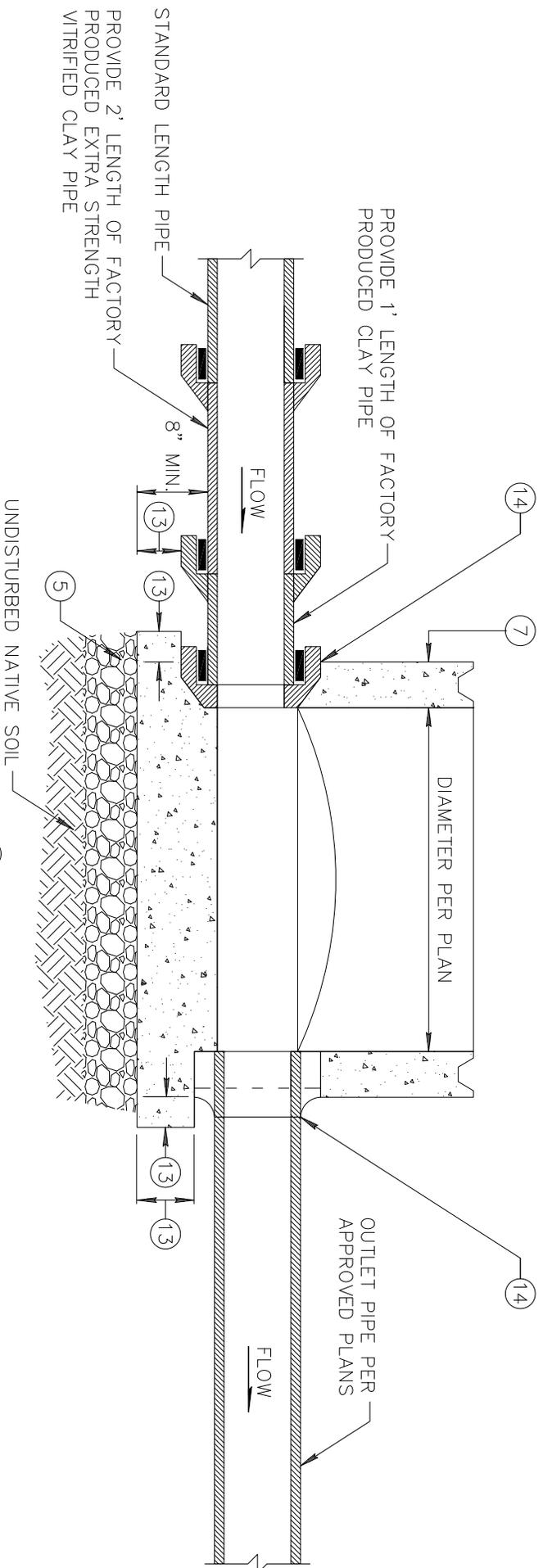


STANDARD DETAIL
ENGLISH

PRE CAST CONCRETE SEWER MANHOLE

REVISED
01-01-2015

DETAIL NO.
420-1



NOTES:

- ① PRE-CAST, MANUFACTURER SHALL BE AN NPCA CERTIFIED PLANT. ENTIRE PRE-CAST 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 OR LAP JOINT. ALL LIFTING HOLES SHALL BE SEALED WITH GROUT.
- ⑤ ALL PRECAST MANHOLE BASES SHALL BE PLACED ON 10" MINIMUM OF #57 ROCK PER ASTM D448 WITH AT LEAST ONE FRACTURED FACE PER TEST METHOD ARIZ 212 OR 8" MINIMUM MAG ABC COMPACTED TO 100% RELATIVE DENSITY.
- ⑥ ALL MODIFICATIONS SHALL BE APPROVED BY THE ENGINEER.
- ⑦ MINIMUM WALL THICKNESS SHALL BE 5".
- ⑧ REINFORCEMENT SHALL BE DESIGNED BY AN ARIZONA REGISTERED PROFESSIONAL ENGINEER.
- ⑨ CHANNEL TRANSITION SHALL BE CONSTANT FROM INLET TO OUTLET OF MANHOLE.
- 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 PRE-CAST MANHOLE BASE.
- ⑫ ALL CORE HOLES INTO THIS STRUCTURAL PRE-CAST BASE SHALL BE COATED WITH APPROVED COATING MATERIAL.
- ⑬ THE MINIMUM ANTI-FLOAT RING SHALL BE 6" WIDE ON 48" BASES, 7" WIDE ON 60" BASES, AND 8" WIDE ON 72" BASES. ANTI-FLOAT RING SHALL BE A MINIMUM OF 5" THICK.
- ⑭ ALL PIPE CONNECTIONS SHALL BE ELASTOMERIC GASKET/BOOT PER ASTM C425 AND ASTM F477. ADDITIONALLY, A POLYURETHANE JOINT MAY BE USED ON EXTRA STRENGTH VITRIFIED CLAY PIPE.

DETAIL NO.

420-2



STANDARD DETAIL
ENGLISH

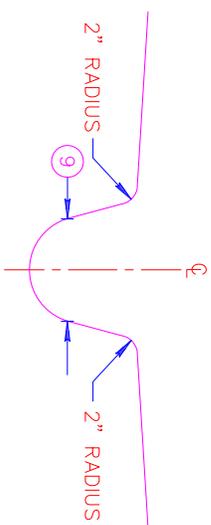
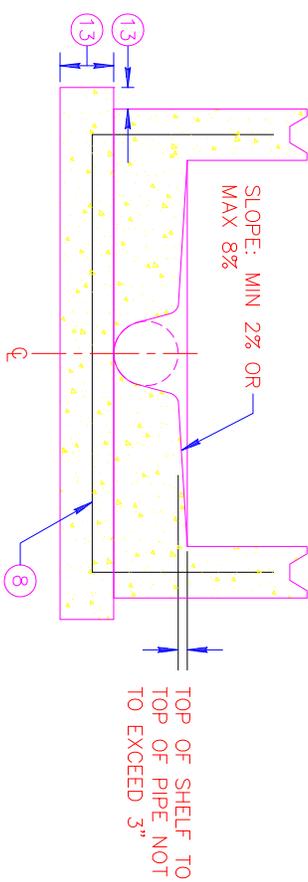
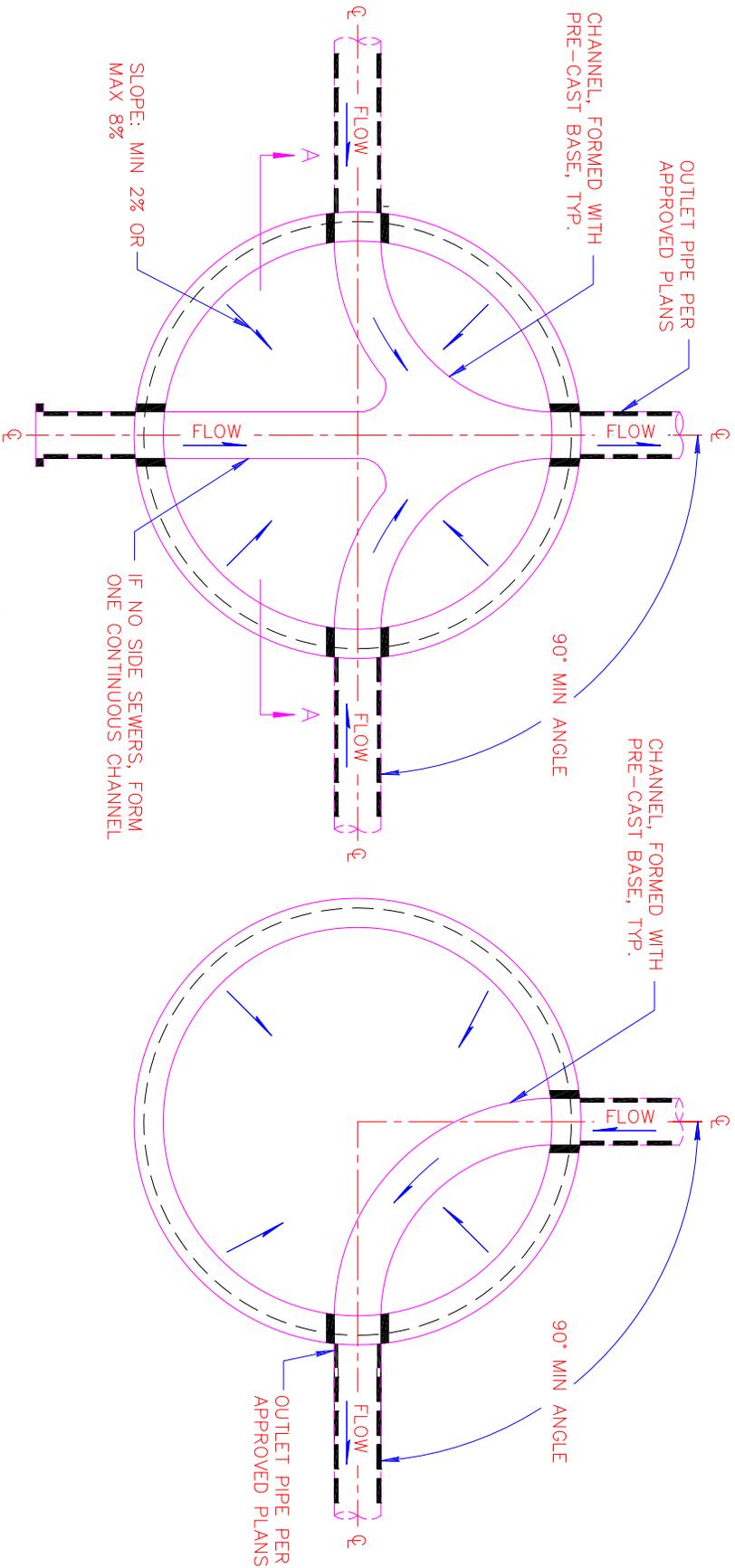
PRE-CAST CONCRETE MANHOLE BASE

REVISED

01-01-2015

DETAIL NO.

420-2



SECTION A-A

TYPICAL CHANNEL

SEE DETAIL 420-2 FOR NOTES

DETAIL NO.
420-3

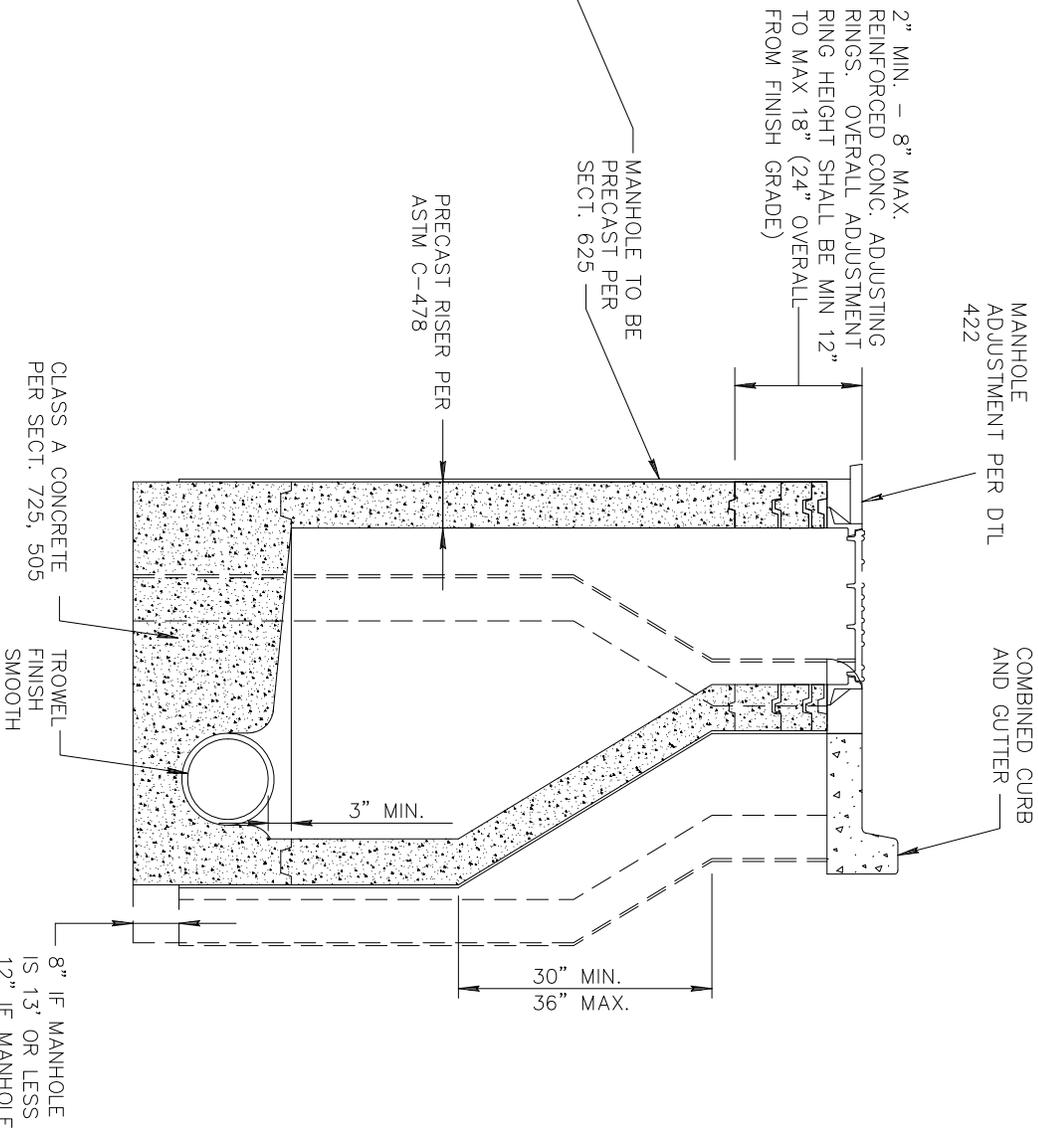
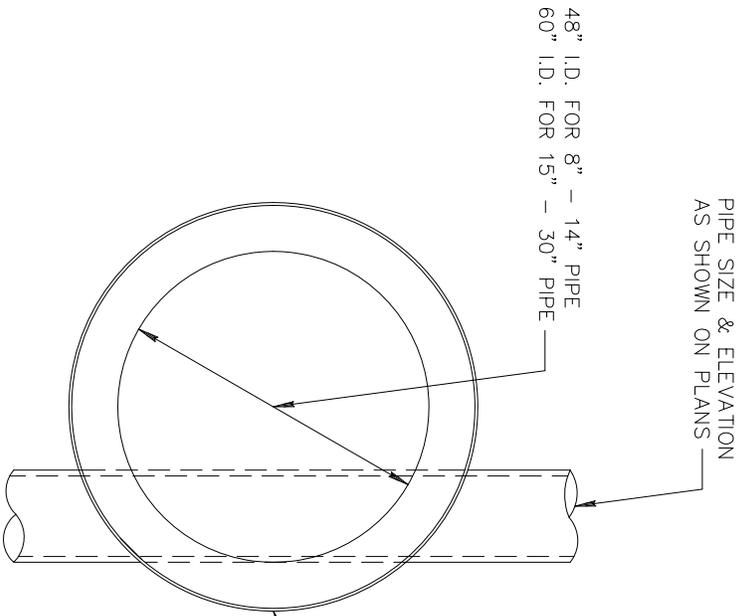


STANDARD DETAIL
ENGLISH

PRE-CAST CONCRETE MANHOLE BASE

REVISED
01-01-2015

DETAIL NO.
420-3



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

DETAIL NO.
421

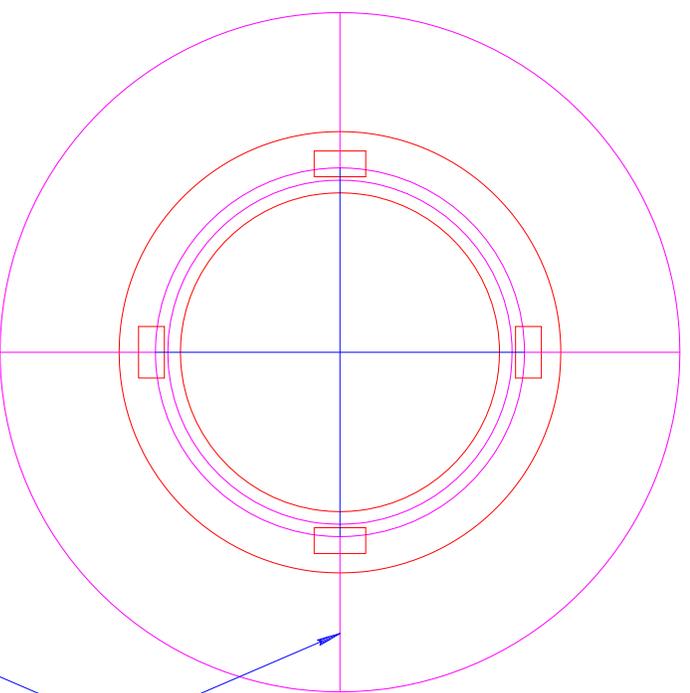


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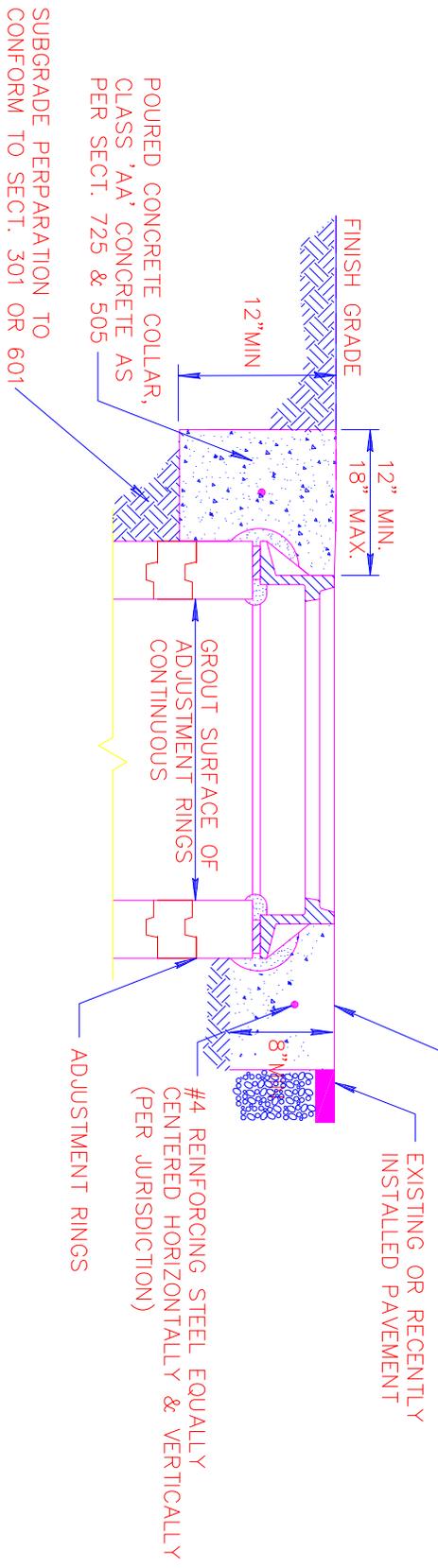
OFFSET MANHOLE 8" TO 30" PIPE

REVISED
01-01-2015

DETAIL NO.
421



- NOTES:
1. CONTRACTORS SHALL ADJUST ALL MANHOLE RINGS AND COVERS, INCLUDING MANHOLES OUTSIDE OF THE PAVEMENT.



DETAIL NO. 422



MANHOLE FRAME AND COVER ADJUSTMENT

REVISED 01-01-2015

DETAIL NO. 422