SECTION 744

CASE 18-14

REVISED 08-19-18

PRECAST POLYMER CONCRETE MANHOLE

744.1 GENERAL:

This specification covers requirements for precast polymer concrete manhole structures. All precast manhole manufacturers shall be ISO (International Organization for Standardization 9001-2015 (or most current) certified and shall provide all ISO 9001-2015 (or most current) certifications upon request. The manufacturer shall provide the Engineer in the submittal package at least 5 references showing manufacturer has been actively producing polymer concrete (including entity and job name, contact person and telephone number). Loading criteria for the precast polymer concrete manholes shall meet or exceed the AASHTO H20 loading requirements. All precast manhole bases shall be monolithically cast to ensure water tightness and have a certified structural design and the manhole shall be cast in a fashion to achieve water tightness. This shall include a monolithic cast manhole base with a multi section cast manhole sections, cones and flat lids which also shall have a certified structural design sealed and stamped by an Arizona P.E. polymer concrete risers, flat lids, and cones can be utilized on top of a concrete cast-in place base that are poured in the field.

744.2 MATERIALS:

744.2.1 Polymer Concrete Materials: Concrete materials shall conform to the requirements of ASTM 6783 for polymer concrete mix design. All aggregates and sand shall be non-reactive and resistant to sewer gases. California Greenbook of Standards and Specifications section 211-2, “Pickle Jar Test”, shall be provided in the submittal package of Polymer Concrete Mix. All materials shall be test above 12,000 psi in compression strength according to ASTM C579 Method B and above 1,500psi in Modulus of Rupture according to ASTM C78. This shall be certified by the manufacturer and provided in the submittal pacakge..

744.2.2Precast Sections: Precast sections polymer concrete manhole sections, monolithic base sections and related components referencing to ASTM C 478. ASTM C 478 material and manufacturing is allowed compositional and dimensional differences required by a polymer concrete product this includes reinforcement type excluding steel and wall thickness design as required by manufacturer and loading requirements with AASHTO M199. The design shall be in accordance with using traffic load A-16 (HS20-44) or greater. Polymer manholes will be designed based upon live and dead load criteria in ASTM C 857 and ACI 350-05, Unit soil weight of 120 pcf located above portions of manhole, including base slab projections, Internal liquid pressure based on unit weight of 63 pcf, and dead load of manhole sections fully supported by polymer concrete manhole base. This shall be certified by the manufacturer

744.2.3 Joints and Connections: Details of proposed joints and connections shall be submitted to the engineer for approval and shall conform to ASTM C990 as applicable. Water tightness and vacuum testing as applicable. Joints shall be sealed with a butyl mastic type product as approved by engineer.

744.3MANHOLE PENETRATIONS:

The location of penetrations connections shall be determined by the plans and specifications. Manhole penetrations connection may be formed or cut out. Cut outs of the precast base shall be done using a mechanical hole saw.

A flexible pipe to manhole connector shall be used whenever a pipe connects into a precast 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 manner 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 from materials that conform to the physical and chemical requirements in ASTM C923 or C425 as applicable. 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 type 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 C1244.

Designs are to be submitted and approved by governing engineer and certified by the manufacturer.

744.4 REINFORCING:

Fiberglass reinforcement shall be required in flat lids, and manhole bases, risers, and cones as required by the manufacturer in accordance to designs sealed by an Arizona P.E. All reinforcement shall be fiberglass bar type reinforcement per ACI 440. Fiberglass rebar shall conform to ASTM D7205/D7205M.

744.5 LIFTING POINTS:

Lifting points shall be designed and evaluated by a registered professional engineer. There shall be a minimum of two lifting points on every precast 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.

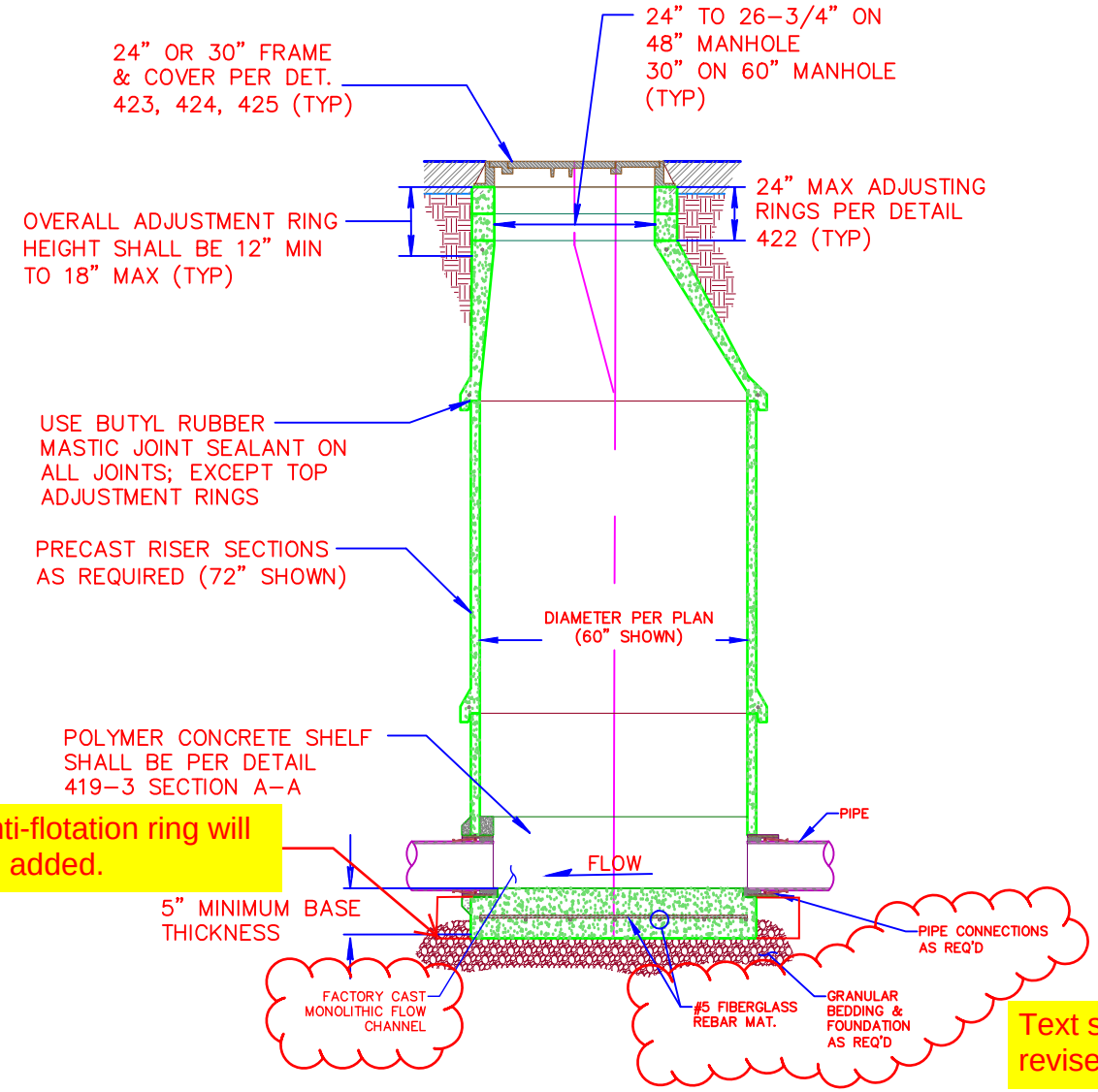
744.6 IMPERFECTIONS:

Any imperfections which in the opinion of the engineer may adversely affect the performance of the precast section shall be cause for rejection. The manufacturer is to specify acceptable repair procedures and imperfections that may be acceptable during the manufacturing process.

– End of Section –

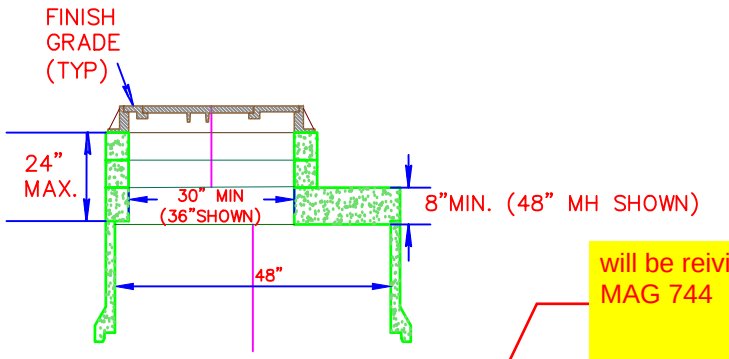
TYPE 'A' TOP

(POLYMER CONCRETE ECCENTRIC CONICAL TOP MANHOLE)



Anti-flotation ring will be added.

(POLYMER CONCRETE FLAT TOP M.H.)



will be reivised to MAG 744

NOTES:

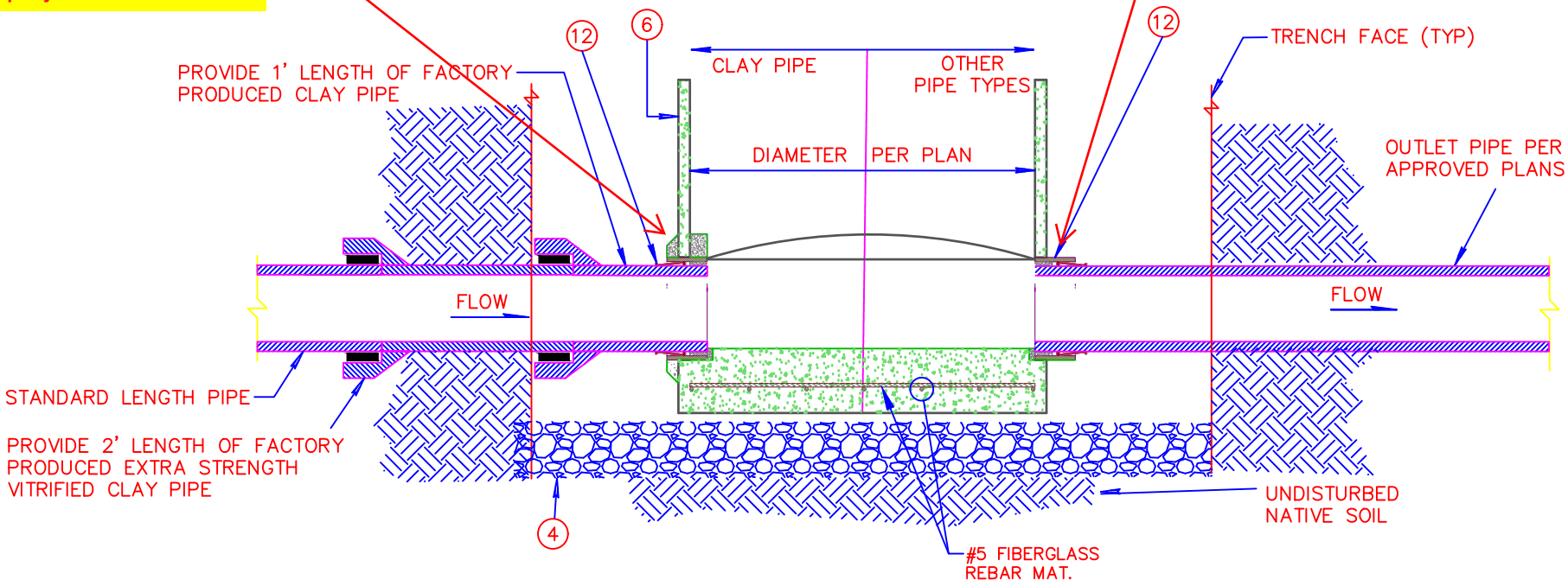
1. PRECAST FRP REINFORCED POLYMER CONCRETE MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH MAG XXX-X EXCEPT AS MODIFIED HEREIN.
2. SEE MAG DETAIL 422 FOR FINAL ADJUSTMENT TO GRADE.
3. ALL MANHOLES SHALL REQUIRE ENGINEER (STRUCTURAL) CALCS.
4. THE MANHOLE ACCESS POINT SHALL BE ORIENTED IN SUCH A WAY THAT THE OPENING IS DIRECTLY ABOVE THE LOWEST INVERT, OR AS OTHERWISE DIRECTED BY THE PLANS OR ENG.
5. FOR PRECAST BASE SEE DETAIL 419-2.
6. FLAT TOPS SHALL ONLY BE USED WITH APPROVAL FROM THE ENGINEER AND ON MANHOLES 84" AND ABOVE.

Text size will be revised.

DETAIL NO.			REVISED	DETAIL NO.
419-1	MARICOPA ASSOCIATION of GOVERNMENTS — STANDARD DETAIL ENGLISH	POLYMER CONCRETE S.S. MANHOLE	05-11-2018	419-1

A note will be added for a cast in place bell type joint.

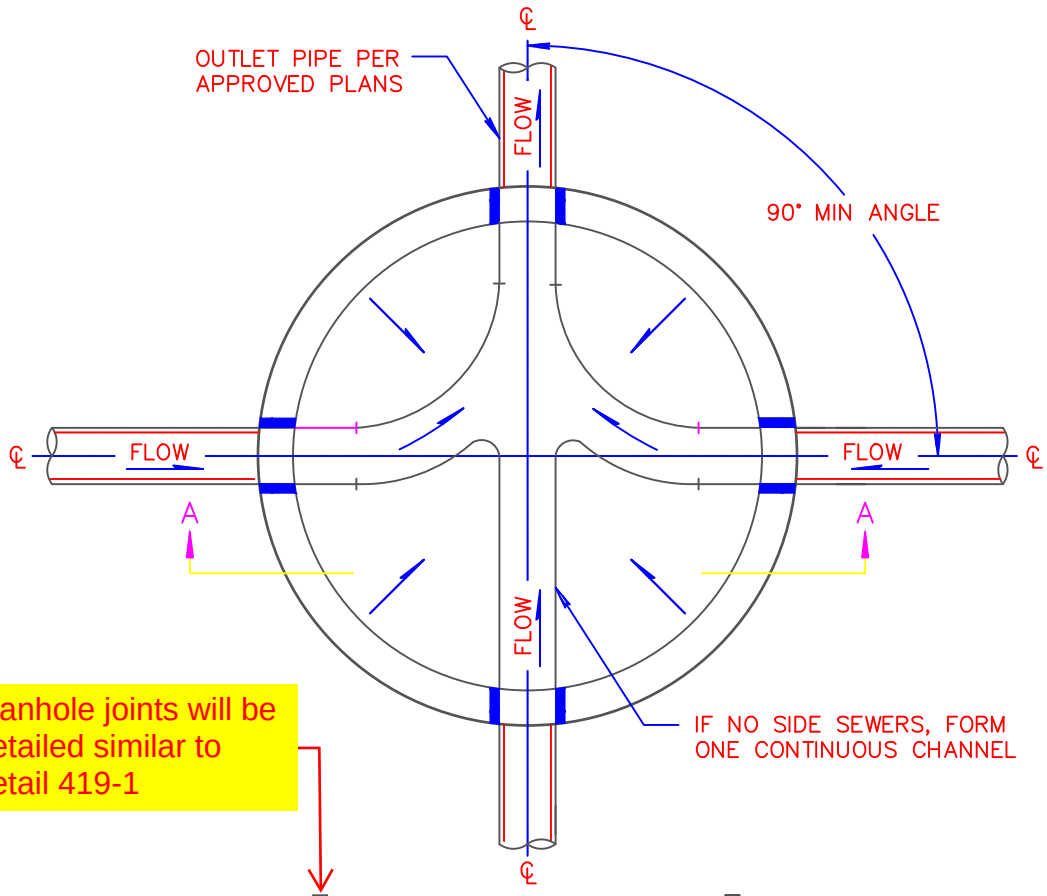
A note will be added for a rubber boot type joint.

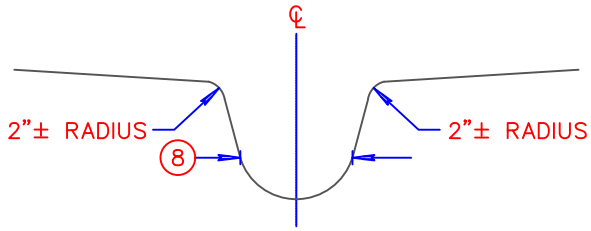


NOTES:

1. PRECAST, MANUFACTURER SHALL BE AN ISO 9001–2018 CERTIFIED PLANT. ENTIRE PRECAST BASE SHALL BE MANUFACTURED AT THE PLANT SOLELY PRODUCING POLYMER CONCRETE STRUCTURES..
2. MINIMUM 12.000 PSI POLYMER CONCRETE SHALL BE USED FOR PRECAST MANHOLES.
3. JOINTS FOR BARREL SECTION SHALL BE POSITIVE CONNECTION TYPE.
4. ALL PRECAST MANHOLE BASES SHALL BE PLACED ON 8" MINIMUM OF ABC PER SECTION 702 COMPACTED TO 100% MAXIMUM DENSITY.
5. ALL MODIFICATIONS SHALL BE APPROVED BY THE ENGINEER.
6. MINIMUM WALL THICKNESS SHALL BE MINIMUM 2".
7. REINFORCEMENT SHALL BE CERTIFIED BY AN ARIZONA REGISTERED PROFESSIONAL ENGINEER, AS REQUIRED BY MANUFACTURER
8. CHANNEL TRANSITION SHALL BE CONSTANT FROM INLET TO OUTLET OF MANHOLE TO FACILITATE SMOOTH TRANSITIONS AND ACCOMMODATE CORRESPONDING MANDREL.
9. THERE SHALL BE NO HARD CONNECTIONS (GROUTED) INTO THE MANHOLE BASE UNLESS APPROVED BY THE ENGINEER.
10. ALL SEWER SERVICE CONNECTIONS SHALL HAVE THE SAME CONNECTION TYPES IN THE PRECAST MANHOLE BASE.
11. BALLASC SLAB AS REQUIRED BY ENGINEER
12. 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.			REVISED	DETAIL NO.
419–2	MARICOPA ASSOCIATION of GOVERNMENTS STANDARD DETAIL ENGLISH	PRECAST POLYMER CONCRETE MH BASE	05/14/2018	419–2

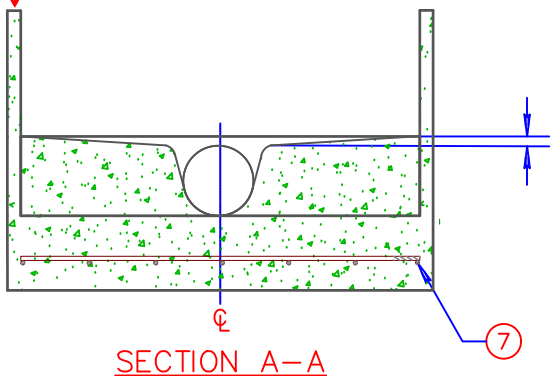




CHANNEL TRANSITION SHALL BE CONSISTENT FROM INLET TO OUTLET OF MANHOLE TO FACILITATE SMOOTH TRANSITIONS AND ACCOMMODATE CORRESPONDING MANDREL.

TYPICAL CHANNEL

Manhole joints will be detailed similar to detail 419-1



SECTION A–A

SEE DETAIL 419–2 FOR NOTES

DETAIL NO.			REVISED	DETAIL NO.
419-3	MARICOPA ASSOCIATION of GOVERNMENTS — STANDARD DETAIL ENGLISH	POLYMER CONCRETE MANHOLE BASE	05/14/2018	419-3