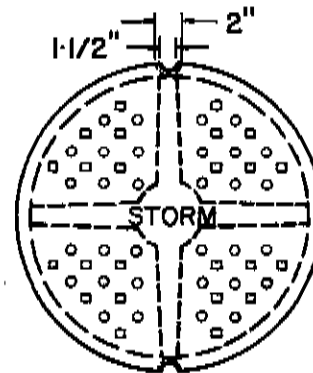
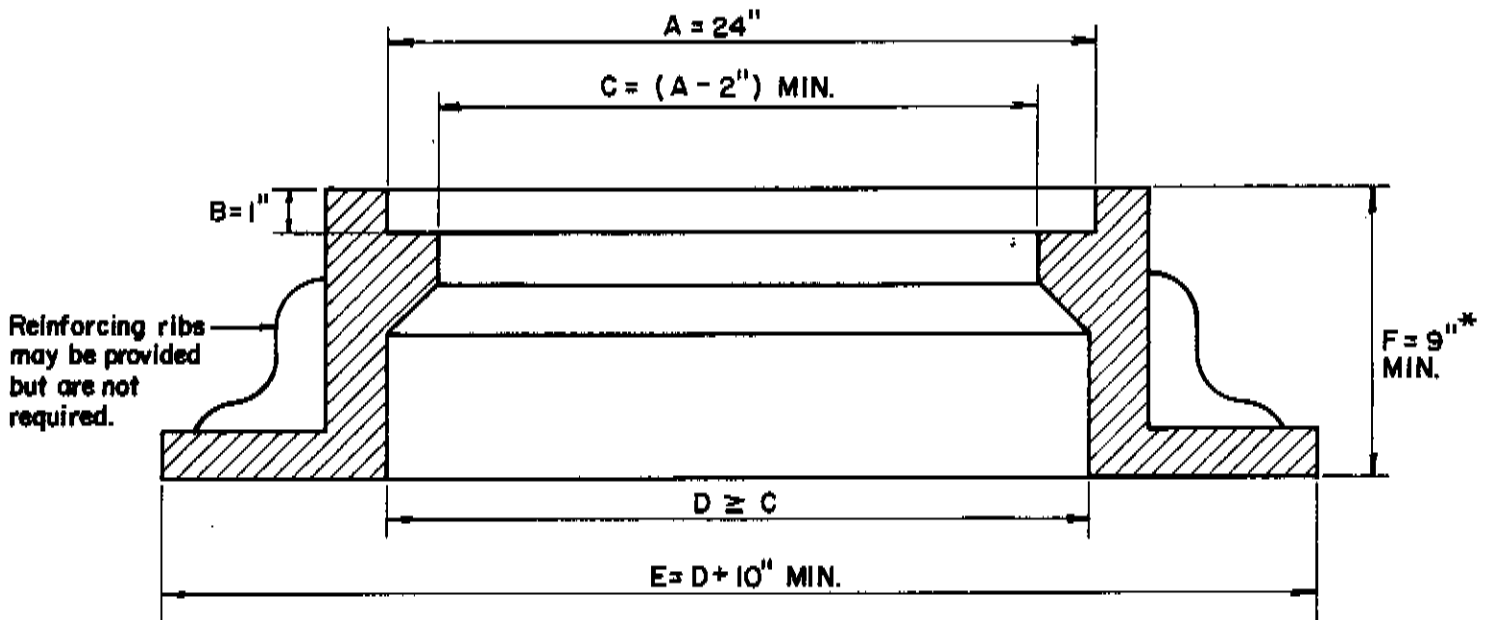


# **MANHOLE DETAILS**



**NOTES**

MANHOLE CASTINGS SHALL BE HEAVY DUTY, SUITABLE FOR H-20 HIGHWAY TRAFFIC LOADINGS.

MANHOLE FRAMES AND COVERS SHALL HAVE MACHINED BEARING SURFACES.

THE WORD "STORM" SHALL BE CAST AS A PART OF THE LID FOR EACH STORM MANHOLE AND THE WORD "SANITARY" SHALL BE CAST AS A PART OF THE LID FOR EACH SANITARY MANHOLE.

MANHOLE CASTINGS SHALL BE DIPPED TWICE IN BLACK ASPHALT PAINT.

BOLTED, LOCKING, SELF SEALING OR LIDS WITH HOLES IF REQUIRED WILL BE DESCRIBED IN THE SPECIFICATIONS AND DETAILED ON THE PLANS.

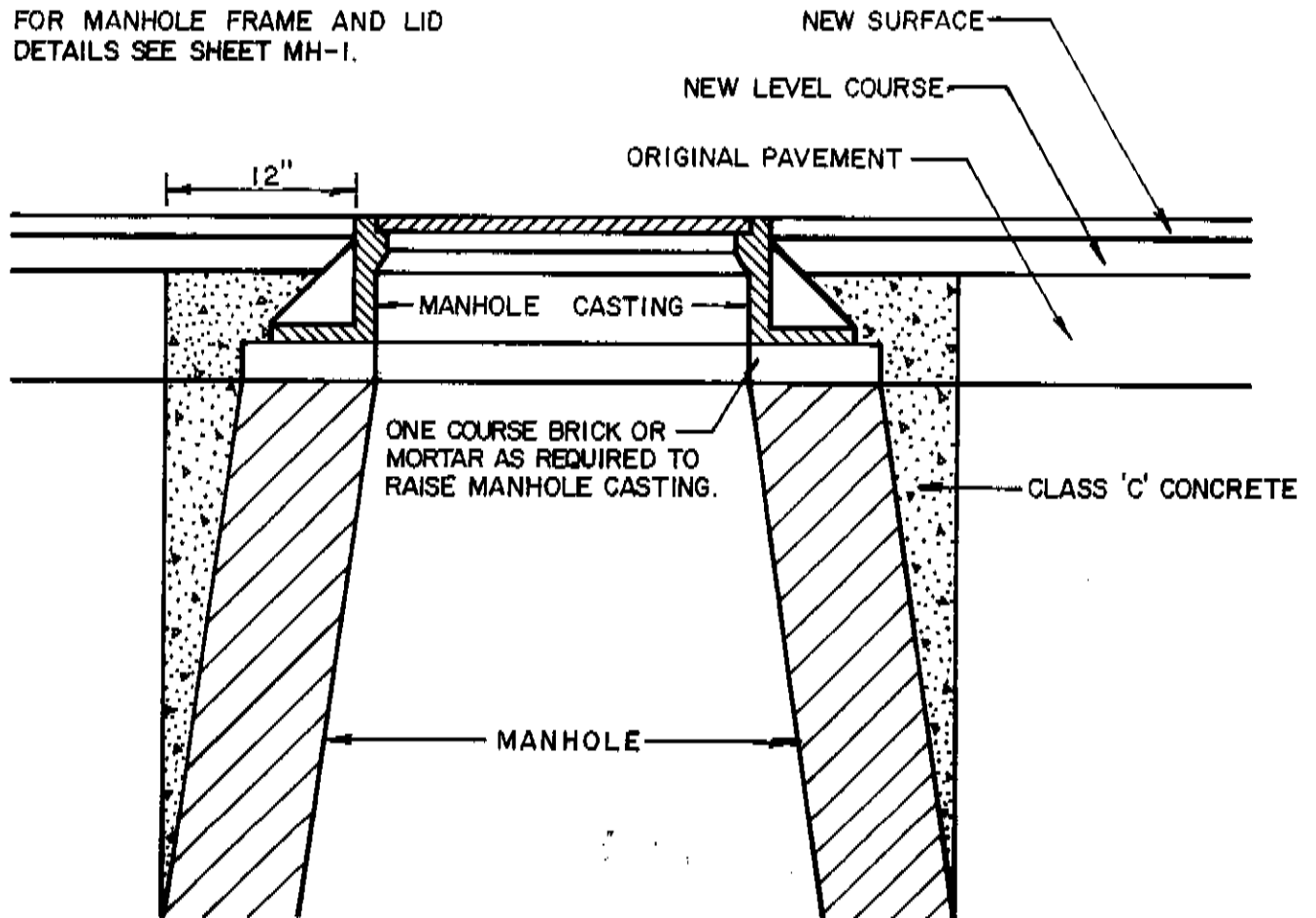
**APPROVED CASTINGS**

- A. OHIO FOUNDRY INC. (FORMERLY THE EAST AKRON CASTING CO.)
  - 1. FRAME NO. 100; LID NO. 102.
  - 2. FRAME NO. 470; LID NO. 471.
- B. NEENAH FOUNDRY COMPANY
  - 1. R-1040 WITH TYPE "A" LID.
  - 2. R-1050 WITH TYPE "A" LID.
  - 3. R-1669A WITH TYPE "A" LID.
- C. EAST JORDAN IRON WORKS, INC.
  - 1. NO. 1058      4. NO. 2015
  - 2. NO. 1260      5. NO. 2020
  - 3. NO. 1450 → 1" HOLES ONLY

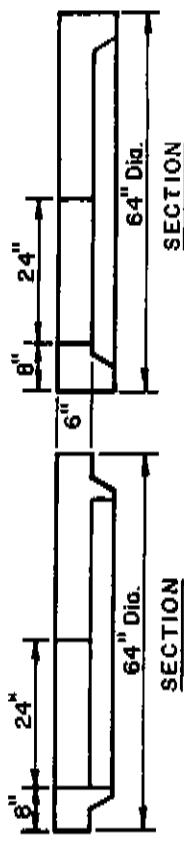
<b>CITY OF KENT, OHIO</b> DEPARTMENT OF PUBLIC SERVICE ENGINEERING DIVISION			
<b>CONSTRUCTION STANDARDS</b>			
<b>MANHOLE FRAME &amp; COVER DETAILS</b>			
DATE	3/6/89	BY	CLW
NO.	MH-1	CITY ENGINEER	

\*"F" MAY BE REDUCED TO 7" FOR CASTINGS NOT IN PAVEMENT.

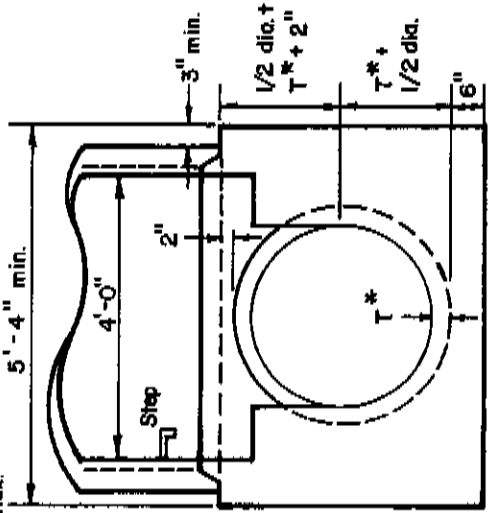
FOR MANHOLE FRAME AND LID  
DETAILS SEE SHEET MH-1.



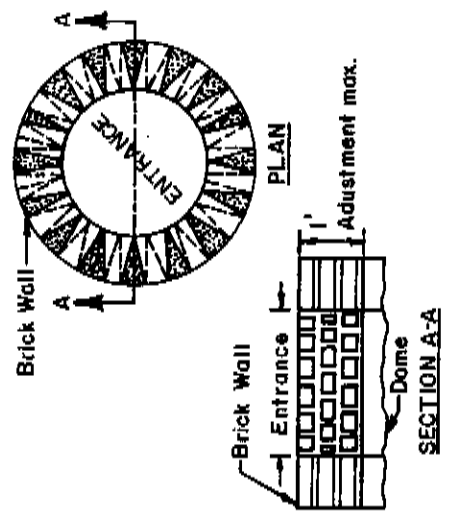
CITY OF KENT, OHIO			
DEPARTMENT OF PUBLIC SERVICE			
ENGINEERING DIVISION			
CONSTRUCTION STANDARDS			
DETAIL FOR RAISING OF MANHOLE COVER			
FOR PAVING OR RESURFACING PROJECTS			
DATE	12-86	BY	CLW
		NO.	MH-2
CITY ENGINEER <i>W. R. Pambolan</i>			



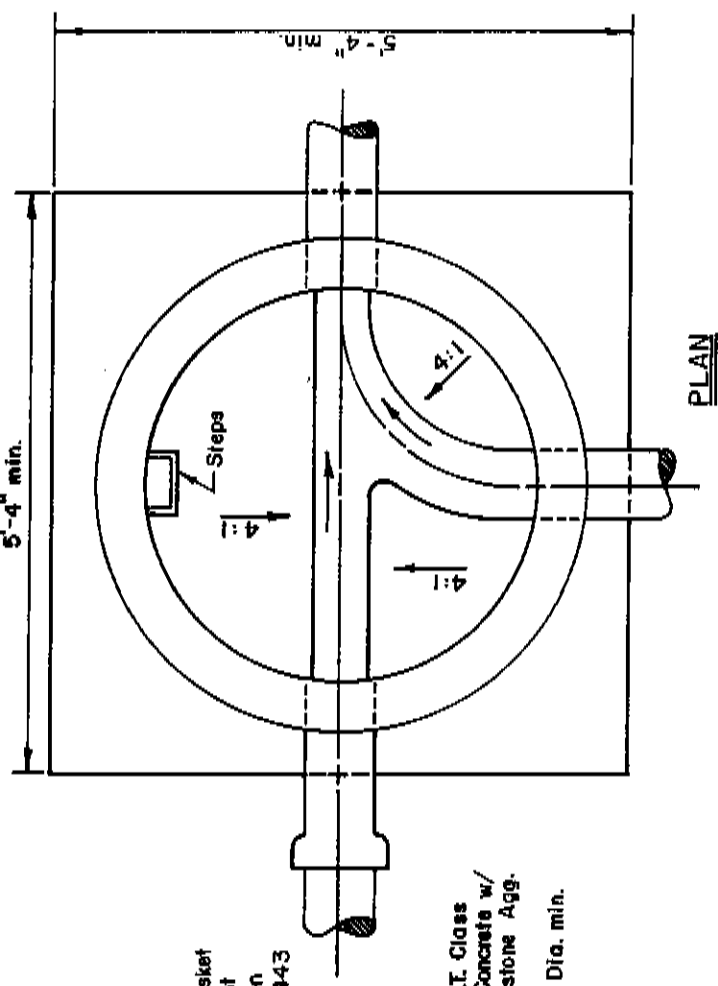
**DOMES ALTERNATES**



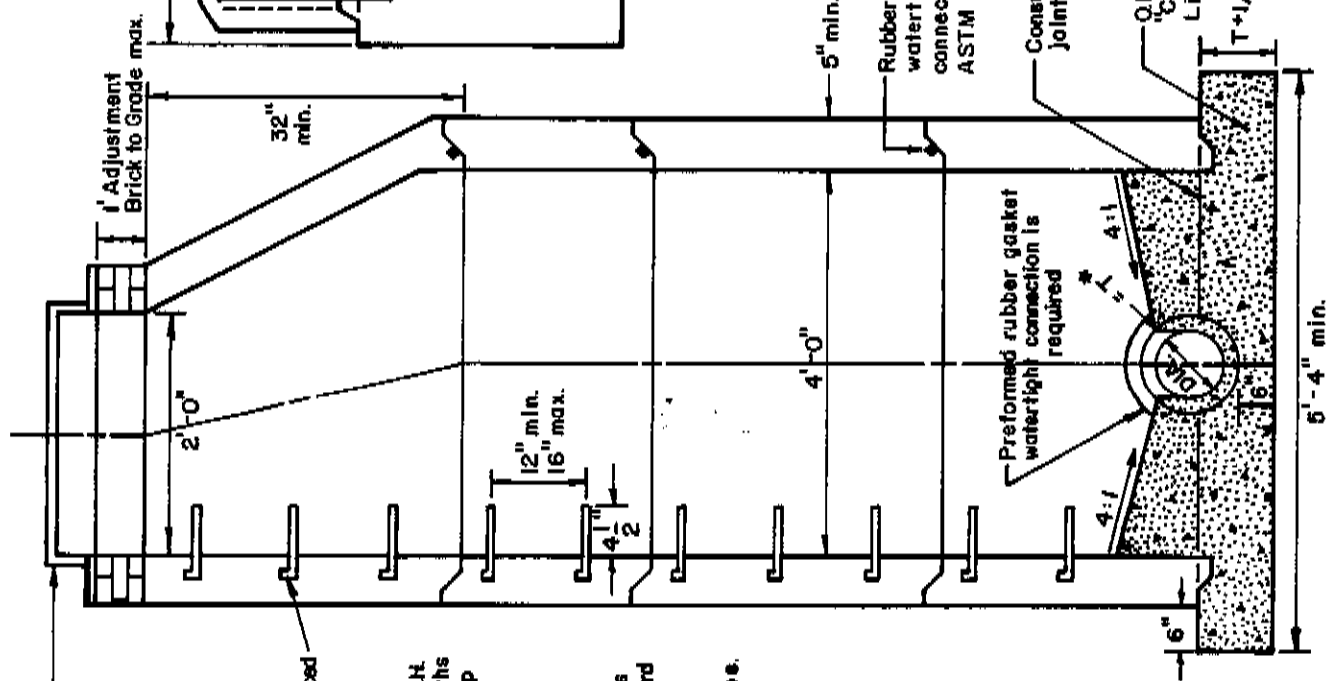
**BASE ALTERNATE**



**ADJUSTING TO GRADE**



**PLAN**



**ELEVATION**

M.H. Frame No. 100, Cover No. 102, as Manufactured by East Akron Casting Co. or Neenah R-1669A Frame and vented lid or Approved Equal.

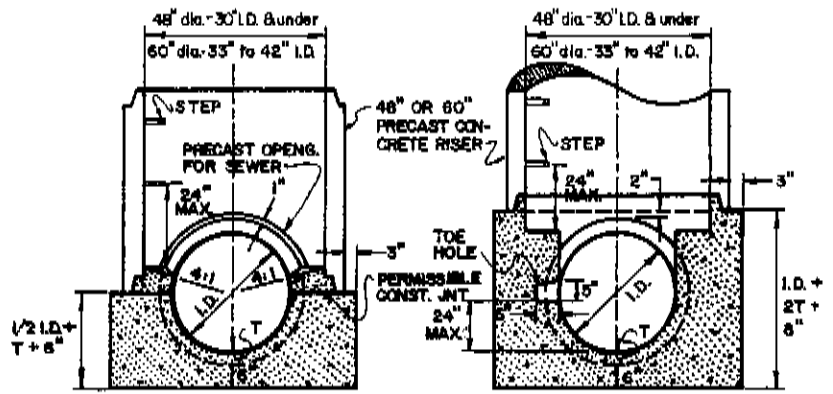
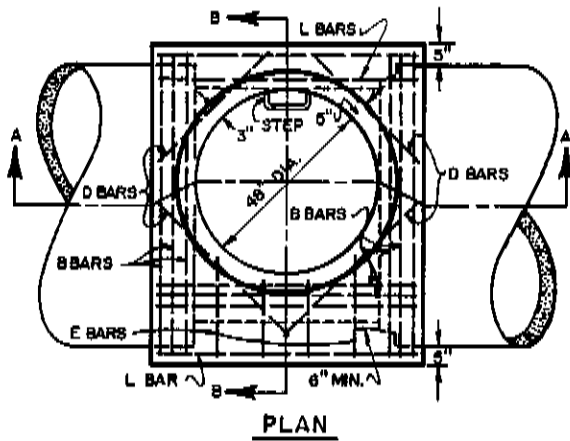
O.O.T. 711.31 Reinforced Propylene Plastic Steps 12" width minimum

Pre-cast Reinf. Conc. MH per O.O.T. 604. Lengths to be in multiples of step spacing.

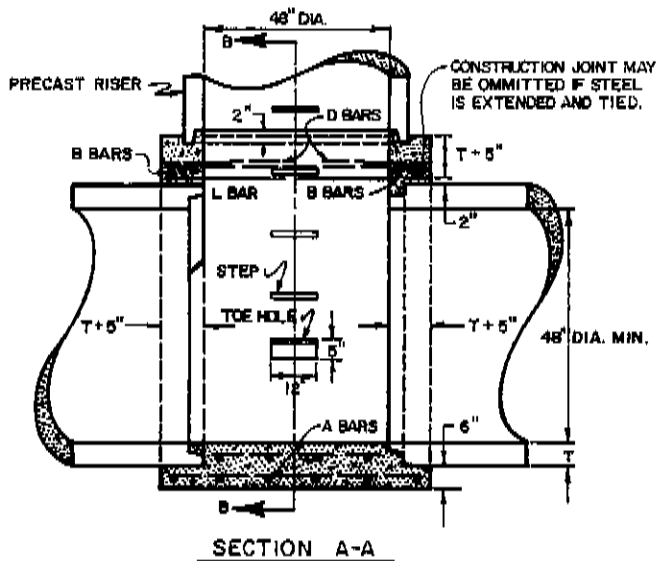
See sheet MH-1 for frame and lid details. See sheets MH-11 & MH-12 for standard storm manhole notes.

\* Thickness of conc. pipe.

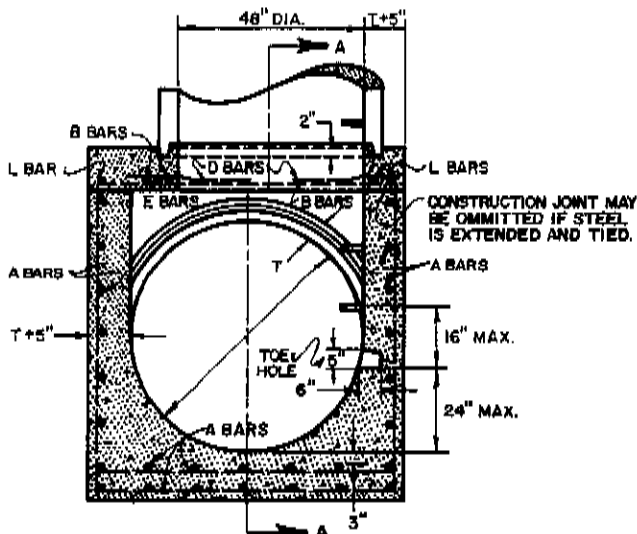
<b>CITY OF KENT, OHIO</b>			
DEPARTMENT OF PUBLIC SERVICE ENGINEERING DIVISION			
<b>CONSTRUCTION STANDARDS</b>			
STANDARD No. 1 STORM MANHOLE FOR SEWERS 36" & UNDER			
DATE	3/5/89	BY	CLW
			NO. MH-3
CITY ENGINEER		<i>[Signature]</i>	



MANHOLE BASES ON SEWERS 42" AND UNDER



SECTION A-A



SECTION B-B

MANHOLE BASE ON SEWERS 48" AND OVER

T = THICKNESS OF INTERCEPTING SEWER PIPE.

REINFORCING STEEL LIST

BAR	SPACING	BAR SIZES FOR SEWERS		
		48"-60"	66"-78"	84"-96"
A	12" c/c BOTH WAYS	5/8" $\phi$	3/4" $\phi$	7/8" $\phi$
B	3" c/c BOTH WAYS	5/8" $\phi$	3/4" $\phi$	7/8" $\phi$
L	AS SHOWN	5/8" $\phi$	3/4" $\phi$	7/8" $\phi$
D	AS SHOWN	5/8" $\phi$	5/8" $\phi$	5/8" $\phi$
E	12" c/c	5/8" $\phi$	5/8" $\phi$	5/8" $\phi$

FOR STANDARD STORM MANHOLE NOTES SEE SHEETS MH-11 & MH-12. FOR MANHOLE FRAME & LID DETAILS SEE SHEET MH-1.

NUMBER 5 MANHOLE SHALL CONSIST OF A BASE OR BOTTOM AS DETAILED HEREON AND OTHER MANHOLE COMPONENTS AS DETAILED OR SPECIFIED ON O.D.O.T. MH-3. IN LIEU OF THE TONGUE AND GROOVE JUNCTION BETWEEN THE RISER AND THE BASE, THE BASE MAY HAVE A FLAT SURFACE AND THE RISER MAY HAVE A SQUARE END SET IN A BED OF MORTAR ON THE BASE.

OPENINGS FOR THE 42" AND UNDER INLET AND OUTLET SEWER PIPES SHALL BE PREFABRICATED IN THE RISER SECTION UNLESS THE MANHOLE BASE IS BUILT TO AN ELEVATION 2" ABOVE THE TOP OF THE INLET & OUTLET PIPES.

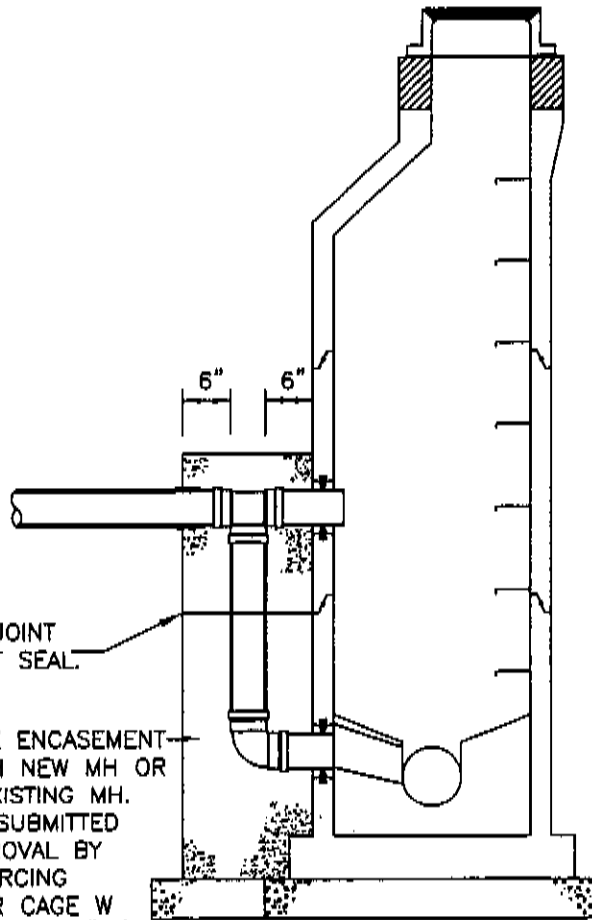
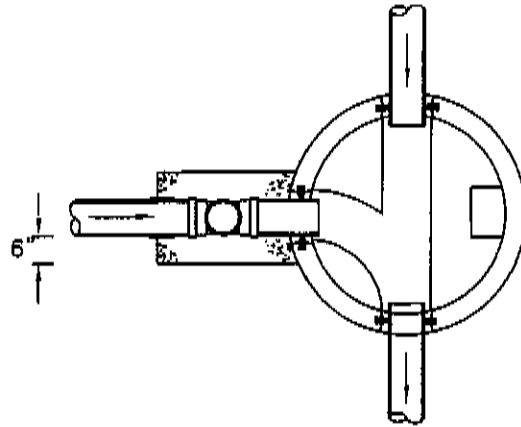
CONCRETE FOR THE BASES MAY BE CLASS C OR MEET THE REQUIREMENTS OF O.D.O.T. 706.13. THE BASES MAY BE PRECAST OR CAST IN PLACE. IF PRECAST, THE BASE ON SEWERS 42" AND UNDER SHALL HAVE SUFFICIENT STEEL REINFORCEMENT TO PERMIT SHIPPING AND PLACEMENT WITHOUT DAMAGE TO THE BASE. THE BASE ON SEWERS 48" AND OVER SHALL BE REINFORCED AS SHOWN.

CITY OF KENT, OHIO  
DEPARTMENT OF PUBLIC SERVICE  
ENGINEERING DIVISION

CONSTRUCTION STANDARDS

STANDARD No. 5 MANHOLE

DATE 3/6/89 BY CLW NO. MH-4  
CITY ENGINEER *[Signature]*



PERMISSIBLE CONST. JOINT  
WITH C443 WATERTIGHT SEAL.

REINFORCED CONCRETE ENCASUREMENT  
FORMED INTEGRAL WITH NEW MH OR  
STRUCTURAL TIE TO EXISTING MH.  
TIE TO MH SHALL BE SUBMITTED  
FOR REVIEW AND APPROVAL BY  
THE ENGINEER. REINFORCING  
SHALL BE No 4 REBAR CAGE W  
No 4 REBAR STIRRUPS AT 12" c/c  
AND 4-No 4 VERT REBAR.

SEE MH-6 FOR STANDARD MANHOLE DETAILS

CITY OF KENT, OHIO  
DEPARTMENT OF PUBLIC SERVICE  
ENGINEERING DIVISION

CONSTRUCTION DETAILS

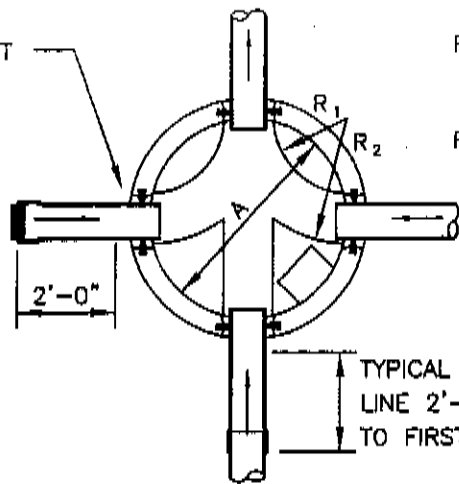
STANDARD SANITARY MH DROP

DATE 09/16/93 BY INT NO. MH-5

CITY ENGINEER

PRECAST M.H. OPENING  
W/ FLEXIBLE WATERTIGHT  
CONNECTION (TYP.)

STANDARD STUB @  
0.50% MIN. OR AS  
SHOWN ON DWG.



$$R_1 = \frac{A - \text{PIPE } \phi}{2}$$

$$R_2 = \frac{A + \text{PIPE } \phi}{2}$$

TYPICAL EACH  
LINE 2'-0" LENGTH  
TO FIRST JOINT (RIDGID PIPE)

M.H. FRAME & COVER (SEE NOTE 6)  
ON SHEET MH-7

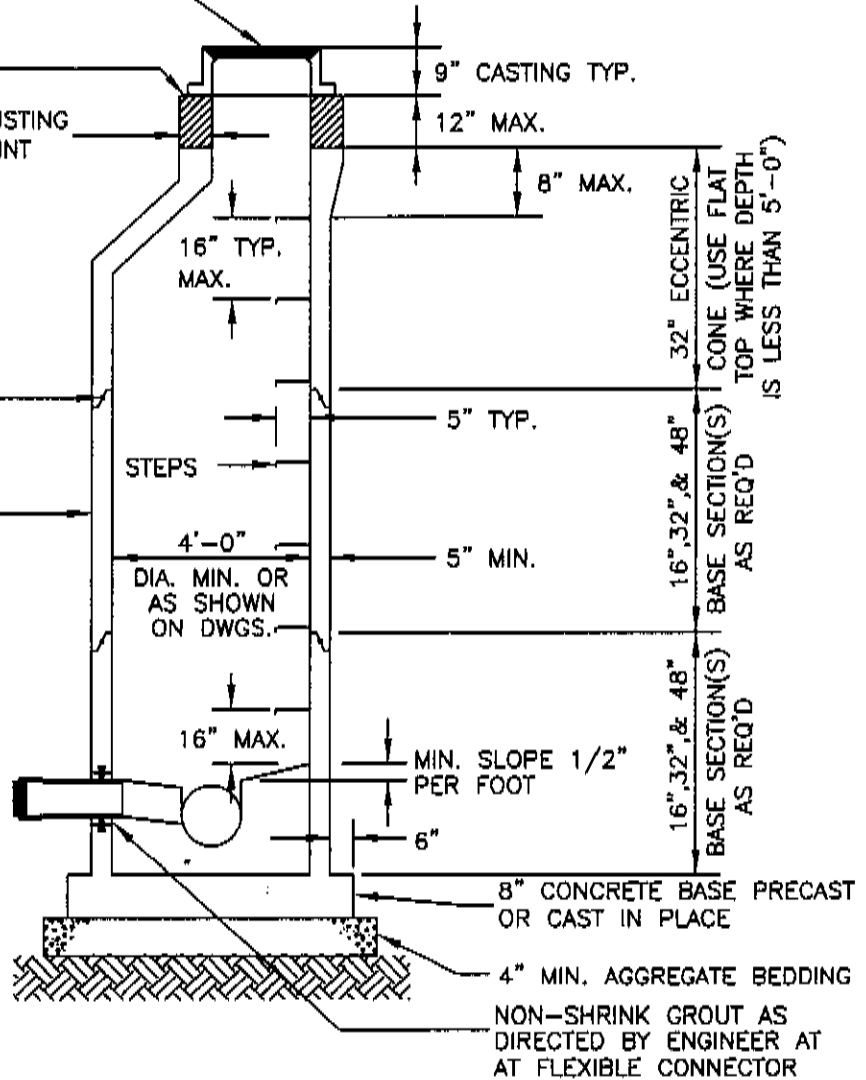
FULL MORTAR BED

8" CONC. DOUGHNUT FOR ADJUSTING  
CASTING WITH FULL MORTAR JOINT

JOINT PER ASTM C-443  
WITH JOINT SEALANT

PRECAST CONCRETE MH PER  
ASTM C-478

REMOVABLE WATERTIGHT  
PLUG



CITY OF KENT, OHIO		
DEPARTMENT OF PUBLIC SERVICE		
ENGINEERING DIVISION		
CONSTRUCTION DETAILS		
STANDARD SANITARY MANHOLE		
DATE	BY	NO.
09/16/93	INT	MH-6
CITY ENGINEER		<i>Eugene K. [Signature]</i>

M:\Drawings\Stnddwgs\stdmin.dwg

STANDARD NOTES

1. MANHOLES SHALL BE WATERTIGHT. NO VISIBLE INFILTRATION OR INFLOW SHALL BE ALLOWED.
2. ALL NEW MANHOLES SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 WITH O-RING JOINTS CONFORMING TO ASTM C-443. ALL JOINTS SHALL BE SEALED WITH TWO (2) COATS (ONE EACH JOINING END) OF BITUMINOUS JOINT FILLER MATERIAL CONFORMING TO ODOT ITEM 706.10 IN ADDITION TO THE O-RING GASKET.
3. CHANNEL INVERTS SHALL BE SMOOTH, FORMED TO DIRECT FLOW, AND PROVIDE A MINIMUM FULL 1/2 PIPE CROSS SECTION OR AS OTHERWISE SHOWN. BENCHES SHALL HAVE A MINIMUM 1/2 INCH PER FOOT SLOPE. ALL CONCRETE SHALL BE CLASS "C" (4,000 PSI AT 28 DAYS, ODOT ITEM 511). PIPES OVER EIGHT INCH (8") IN DIAMETER SHALL HAVE THE TOP OF THE CHANNEL MATCH THE CROWN OF THE PIPE.
4. NO BRICK SHALL BE ALLOWED IN NEW MANHOLE CONSTRUCTION UNLESS APPROVED BY THE ENGINEER. FIRED SEWER BRICK IS APPROVED FOR REPAIRS TO EXISTING BRICK MANHOLES.
5. ALL NEW MANHOLES SHALL BE PROVIDED WITH A FLEXIBLE NROPRENE OR OTHER APPROVED ENTRY GASKET. ANY SUCH GASKET SHALL BE INTEGRAL WITH THE MANHOLE WALL. A PIPE JOINT SHALL BE PROVIDED AT A POINT TWO FEET (2') +/- SIX INCHES (6") PAST THE MANHOLE FOUNDATION BASE.
6. THE MANHOLE CASTING FRAME AND LID SHALL AS SHOWN ON THE STANDARD MANHOLE FRAME AND LID DETAIL. WHEN SHOWN ON THE DRAWINGS LIDS SHALL BE BOLTED DOWN WITH A MINIMUM FOUR 5/16 INCH COUNTERSUNK S.S. MACHINE BOLTS. VENTED LIDS WITH MAXIMUM 3/4 INCH HOLES SHALL ONLY BE PROVIDED WHERE SPECIFICALLY SHOWN ON THE DRAWING.
7. MANHOLE CASTINGS SHALL BE ADJUSTED TO GRADE USING A MAXIMUM OF TWELVE INCHES (12") OF CONCRETE DOUGHNUTS (MINIMUM EIGHT INCH [8"] THICKNESS AND DEPTH AS REQUIRED. ALL JOINTS AND CASTINGS SHALL HAVE A FULL MORTOR BED MIXTURE OF TWO [2] PARTS SAND, ONE [1] PART PORTLAND CEMENT, MAXIMUM ONE PERCENT [1%] CALCIUM, NO LIME AND MOISTURE CURED FOR FORTY-EIGHT [48] HOURS).
8. UNLESS SEPARATE PAY ITEMS ARE PROVIDED, ALL PROTECTION AND SUPPORT OF EXISTING UTILITIES AND STRUCTURES AND PROTECTION AND/OR RESTORATION OF ALL SURFACES INCLUDING PAVEMENT, DRIVES, CURBS, SIDEWALKS, GRASS, AND ANY OTHER SURFACES SHALL BE INCLUDED IN THE UNIT PRICES BID FOR ALL SEWER

CITY OF KENT, OHIO			
DEPARTMENT OF PUBLIC SERVICE			
ENGINEERING DIVISION			
CONSTRUCTION STANDARDS			
STANDARD SANITARY MANHOLE NOTES			
DATE	3/6/89	BY	GLW
		NO.	MH-7
CITY ENGINEER	<i>Bob Brubaker</i>		



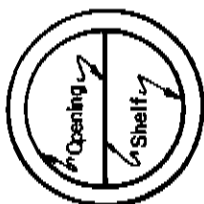
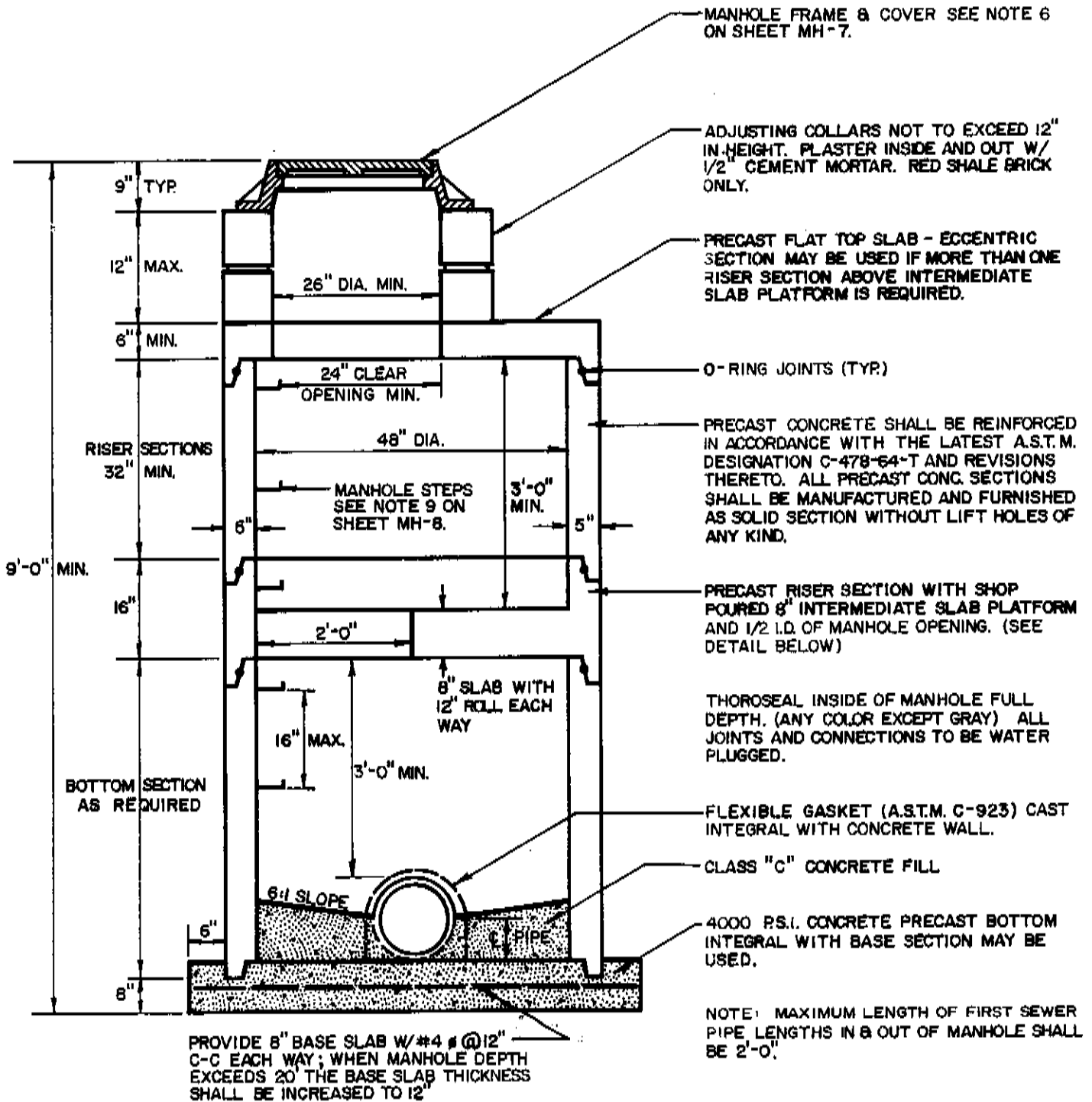
STANDARD NOTES CONT.

ITEMS. RESTORATION SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS, SECTIONS PROVIDED ON THE DRAWINGS OR THE STANDARD CONSTRUCTION DRAWING, IN ACCORDANCE WITH ANY ROAD PERMITS, OR, IF NOT SHOWN OR SPECIFIED, SHALL BE REPLACED IN KIND WITH THE EXISTING ITEM THICKNESS AND MATERIAL REMOVED. INCLUDED ARE ALL EQUIPMENT, LABOR, AND MATERIALS NECESSARY FOR EXCAVATION, STONE FOUNDATION, BEDDING BACKFILL, GRANULAR BACKFILL, SHEETING, SHORING, BRACING, DEWATERING, COMPACTION OF ANY AND ALL MATERIALS, TOPSOILING, SEEDING, AGGREGATE, AND OTHER BASE MATERIALS, PAVEMENTS, SEALING OR JOINTS, CURBS, SIDEWALKS, AND RESTORATION OF ALL STRUCTURES AND SURFACES DISTURBED.

9. MANHOLE STEPS SHALL BE ODOT 711.31 REINFORCED PROPYLENE PLASTIC WITH A 12" MINIMUM WIDTH OF TREAD.
10. WHEN MANHOLE DEPTH EXCEEDS TWENTY FEET (20') THE BASE SLAB THICKNESS SHALL BE INCREASED TO TWELVE INCHES (12").
11. MAXIMUM LENGTH OF FIRST SEWER PIPE LENGTHS IN AND OUT OF MANHOLE SHALL BE TWO FEET (2'-0").

SMENOTE - 1/27/89 - 3/6/89

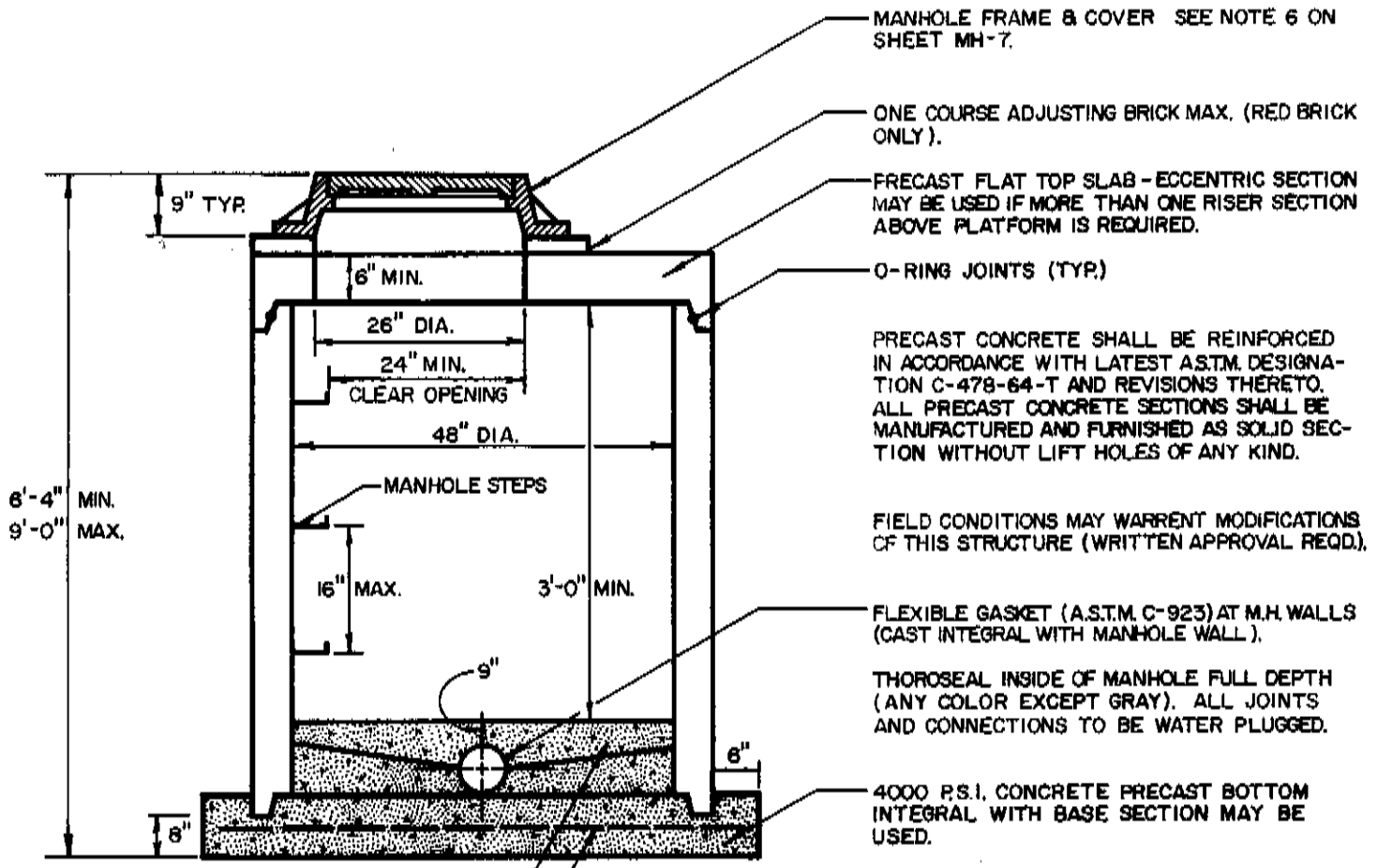
CITY OF KENT, OHIO			
DEPARTMENT OF PUBLIC SERVICE			
ENGINEERING DIVISION			
CONSTRUCTION STANDARDS			
STANDARD SANITARY MANHOLE NOTES CONT.			
DATE	3/6/89	BY	CLW
CITY ENGINEER	<i>B. D. Bunker</i>		
		NO.	MH-8



PLAN VIEW

PRECAST RISER SECTION

<b>CITY OF KENT, OHIO</b> DEPARTMENT OF PUBLIC SERVICE ENGINEERING DIVISION			
<b>CONSTRUCTION STANDARDS</b>			
SAMPLING AND METERING MANHOLE DETAIL (DEEP MANHOLE - GREATER THAN 9'-0")			
DATE	1/27/89	BY	CLW
		NO.	MH-9
CITY ENGINEER		<i>William S. ...</i>	



MANHOLE FRAME & COVER SEE NOTE 6 ON SHEET MH-7.

ONE COURSE ADJUSTING BRICK MAX. (RED BRICK ONLY).

PRECAST FLAT TOP SLAB - ECCENTRIC SECTION MAY BE USED IF MORE THAN ONE RISER SECTION ABOVE PLATFORM IS REQUIRED.

O-RING JOINTS (TYP.)

PRECAST CONCRETE SHALL BE REINFORCED IN ACCORDANCE WITH LATEST A.S.T.M. DESIGNATION C-478-64-T AND REVISIONS THERETO. ALL PRECAST CONCRETE SECTIONS SHALL BE MANUFACTURED AND FURNISHED AS SOLID SECTION WITHOUT LIFT HOLES OF ANY KIND.

FIELD CONDITIONS MAY WARRANT MODIFICATIONS OF THIS STRUCTURE (WRITTEN APPROVAL REQD.).

FLEXIBLE GASKET (A.S.T.M. C-923) AT M.H. WALLS (CAST INTEGRAL WITH MANHOLE WALL).

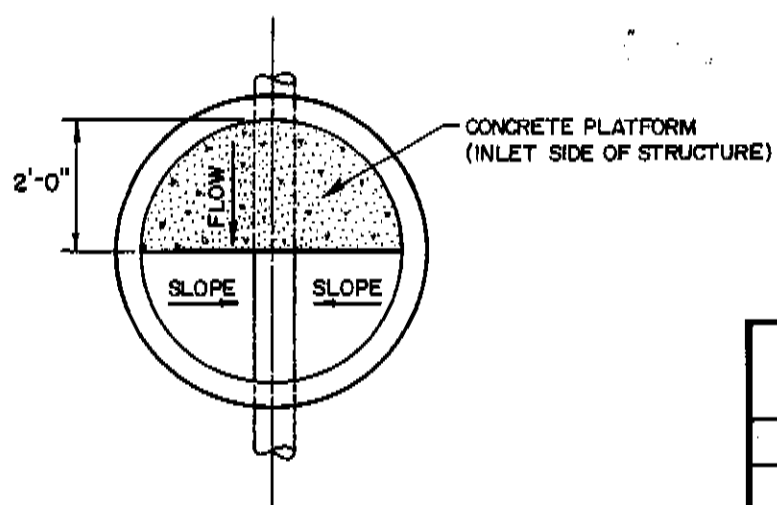
THOROSEAL INSIDE OF MANHOLE FULL DEPTH (ANY COLOR EXCEPT GRAY). ALL JOINTS AND CONNECTIONS TO BE WATER PLUGGED.

4000 P.S.I. CONCRETE PRECAST BOTTOM INTEGRAL WITH BASE SECTION MAY BE USED.

CONCRETE PLATFORM 4000 P.S.I. (SEE DETAIL BELOW)

PROVIDE 9" BASE WITH #4 @ 12" C-C EACH WAY

NOTE: MAXIMUM LENGTH OF FIRST SEWER PIPE LENGTHS IN & OUT OF MANHOLE SHALL BE 2'-0"



CONCRETE PLATFORM DETAIL

<b>CITY OF KENT, OHIO</b>			
DEPARTMENT OF PUBLIC SERVICE ENGINEERING DIVISION			
<b>CONSTRUCTION STANDARDS</b>			
SAMPLING AND METERING MANHOLE DETAIL (SHALLOW MANHOLE - 9'-0" OR LESS)			
DATE	1/27/89	BY	CLW NO. MH-10
CITY ENGINEER	<i>A. L. Sumbaker</i>		

STANDARD NOTES

1. MANHOLES SHALL BE WATERTIGHT. NO VISIBLE INFILTRATION OR INFLOW SHALL BE ALLOWED.
2. ALL NEW MANHOLES SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 WITH O-RING JOINTS CONFORMING TO ASTM C-443. ALL JOINTS SHALL BE SEALED WITH TWO (2) COATS (ONE EACH JOINING END) OF BITUMINOUS JOINT FILLER MATERIAL CONFORMING TO ODOT ITEM 706.10 IN ADDITION TO THE O-RING GASKET.
3. CHANNEL INVERTS SHALL BE SMOOTH, FORMED TO DIRECT FLOW, AND PROVIDE A MINIMUM FULL 1/2 PIPE CROSS SECTION OR AS OTHERWISE SHOWN. BENCHES SHALL HAVE A MINIMUM 1/2 INCH PER FOOT SLOPE. ALL CONCRETE SHALL BE CLASS "C" (4,000 PSI AT 28 DAYS, ODOT ITEM 511).
4. NO BRICK SHALL BE ALLOWED IN NEW MANHOLE CONSTRUCTION UNLESS APPROVED BY THE ENGINEER. FIRED SEWER BRICK IS APPROVED FOR REPAIRS TO EXISTING BRICK MANHOLES.
5. ALL NEW MANHOLES HAVING 15 INCH OR LESS INSIDE DIAMETER CONDUITS SHALL BE PROVIDED WITH A FLEXIBLE NEOPRENE OR OTHER APPROVED ENTRY GASKET. ANY SUCH GASKET SHALL BE INTEGRAL WITH THE MANHOLE WALL. FOR MANHOLES HAVING GREATER THAN 15 INCH INSIDE DIAMETER CONDUITS, AN APPROVED WATERTIGHT NON-SHRINK GROUT SEAL SHALL BE PROVIDED.
6. THE MANHOLE CASTING FRAME AND LID SHALL AS SHOWN ON THE STANDARD MANHOLE FRAME AND LID DETAIL. WHEN SHOWN ON THE DRAWINGS LIDS SHALL BE BOLTED DOWN WITH A MINIMUM FOUR 5/16 INCH COUNTERSUNK S.S. MACHINE BOLTS. VENTED LIDS WITH MAXIMUM 3/4 INCH HOLES SHALL BE PROVIDED FOR ALL STORM SEWER MANHOLES UNLESS SPECIFICALLY SHOWN OTHERWISE.
7. MANHOLE CASTINGS SHALL BE ADJUSTED TO GRADE USING A MAXIMUM OF TWELVE INCHES (12") OF CONCRETE DOUGHNUTS (MINIMUM EIGHT INCH [8"] THICKNESS AND DEPTH AS REQUIRED. ALL JOINTS AND CASTINGS SHALL HAVE A FULL MORTAR BED MIXTURE OF TWO [2] PARTS SAND, ONE [1] PART PORTLAND CEMENT, MAXIMUM ONE PERCENT [1%] CALCIUM, NO LIME AND MOISTURE CURED FOR FORTY-EIGHT [48] HOURS).
8. UNLESS SEPARATE PAY ITEMS ARE PROVIDED, ALL PROTECTION AND SUPPORT OF EXISTING UTILITIES AND STRUCTURES AND PROTECTION AND/OR RESTORATION OF ALL SURFACES INCLUDING PAVEMENT, DRIVES, CURBS, SIDEWALKS, GRASS, AND ANY OTHER SURFACES SHALL BE INCLUDED IN THE UNIT PRICES BID FOR ALL SEWER

<b>CITY OF KENT, OHIO</b> DEPARTMENT OF PUBLIC SERVICE ENGINEERING DIVISION			
<b>CONSTRUCTION STANDARDS</b>			
STANDARD STORM MANHOLE NOTES			
DATE	3/6/89	BY	CLW
CITY ENGINEER	<i>[Signature]</i>		
		NO.	MH-11

STANDARD NOTES CONT.

ITEMS. RESTORATION SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS, SECTIONS PROVIDED ON THE DRAWINGS OR THE STANDARD CONSTRUCTION DRAWING, IN ACCORDANCE WITH ANY ROAD PERMITS, OR, IF NOT SHOWN OR SPECIFIED, SHALL BE REPLACED IN KIND WITH THE EXISTING ITEM THICKNESS AND MATERIAL REMOVED. INCLUDED ARE ALL EQUIPMENT, LABOR, AND MATERIALS NECESSARY FOR EXCAVATION, STONE FOUNDATION, BEDDING BACKFILL, GRANULAR BACKFILL, SHEETING, SHORING, BRACING, DEWATERING, COMPACTION OF ANY AND ALL MATERIALS, TOPSOILING, SEEDING, AGGREGATE, AND OTHER BASE MATERIALS, PAVEMENTS, SEALING OR JOINTS, CURBS, SIDEWALKS, AND RESTORATION OF ALL STRUCTURES AND SURFACES DISTURBED.

9. MANHOLE STEPS SHALL BE ODOT 711.31 REINFORCED PROPYLENE PLASTIC WITH A 12" MINIMUM WIDTH OF TREAD.
10. WHEN MANHOLE DEPTH EXCEEDS TWENTY FEET (20') THE BASE SLAB THICKNESS SHALL BE INCREASED TO TWELVE INCHES (12").

STMNOTE - 1/27/89 - 3/6/89

CITY OF KENT, OHIO			
DEPARTMENT OF PUBLIC SERVICE			
ENGINEERING DIVISION			
CONSTRUCTION STANDARDS			
STANDARD STORM MANHOLE NOTES CONT.			
DATE	3/6/89	BY	DLW
CITY ENGINEER	<i>B.A. Brubaker</i>		
		NO.	MH-12