

C3813

INSTALLATION OF PRECAST CONCRETE MANHOLES

1.0 Purpose

This purpose of this standard is to detail construction and materials required for the installation of precast concrete manholes, including frames and covers.

2.0 Bill Of Materials

Note: Table lists common standard sizes, covers and frames. Refer to NSTAR Material Standard Index for less commonly needed manholes.

Item	Description	Catalog ID	Compatible Unit
1	<p>Common Manholes (Inside Dim. W x L x Ht), Material Standard Numbers Listed:</p> <p>M1201 - 4'x4'x4'ht -secondary, split fiber w/bottom</p> <p>M1202 - 4'x6'x6'ht - primary splicing (URD)</p> <p>M1203 - 6'x10'x6'ht - primary splicing</p> <p>M1204 - 6'x10'x8'ht - primary splicing</p> <p>M1205 - 6'-6"x12'-6"x7'-10" ht - HA-300</p> <p>M1208 - 4'x4'x4'ht -secondary (URD, open bottom)</p> <p>M1212 - 10'x13'x8'ht - 3-way station get-a-way</p> <p>M1214 - 8'x14'x8'ht - station get-a-way</p> <p>M1216 - 5'x5'x5'ht - primary splicing (URD)</p> <p>M1217 - 13'x13'x8' ht - 4-way station get-a-way</p>	<p>16246</p> <p>16238</p> <p>16239</p> <p>16240</p> <p>16241</p> <p>9435</p> <p>16243</p> <p>16245</p> <p>9437</p> <p>18090</p>	<p>NMH-4x4x4</p> <p>NMH-4x6x6</p> <p>NMH-6x10x6</p> <p>NMH-6x10x8</p> <p>NMH-6x13x8</p> <p>NMH-4x4x4NB</p> <p>NMH-10x13x8</p> <p>NMH-8x14x8</p> <p>NMH-5x5x5</p> <p>NMH-13x13x8</p>
2	<p>Manhole (MH) Frames and Adapters:</p> <p>Standard Cover and Frame Assembly: No. 1 MH Frame & Solid Cover (2 catalog ID items)</p> <p>M1303 – No. 1 MH Frame only (standard size)</p> <p>M1304 – No. 1-L MH Frame only (low profile)</p> <p>M1305 – No. 0 MH Frame (large round opening)</p> <p>M1306 – Reducing Adapter for No. 0 MH Frame</p> <p>M1307 – No. 00 MH Frame (square opening)</p> <p>M1308 – Square to Round Adapter for No. 00 Manhole Frame</p>	<p>1384 & 1347</p> <p>1384</p> <p>1385</p> <p>1382 & 1097</p> <p>1383 & 1098</p>	<p>NMCF-1C</p> <p>NMCF-1</p> <p>NMCF-1L</p> <p>NMCF-LR</p> <p>NMCF-SQ</p>

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Item	Description	Catalog ID	Compatible Unit
3	Manhole Covers, Material Standards: M1300 – Solid Cover – line, switch MHs M1301 – Slotted Cover – hot MHs, not in sidewalk M1302 – Venting Hole Cover – Xfmr & sidewalk	1347 1348 16296	NMCC-S NMCC-V NMCC-H
4	5/8 " X 8'L Copperweld Ground Rod	9229	See Page 4
5	Mechanical Connector, 4/0 Cu – Ground Rod	597	See Page 4
6	Mechanical Connector, 1/0 Cu – Ground Rod	9009	See Page 4
7	4/0 Mechanical Connector, 4/0 – 4/0 Cu wire	608	See Page 4
8	Manhole ID Tag Holder	366	See Page 6

3.0 General

- 3.1 The precast manhole(s) to be installed shall be NSTAR approved precast manhole(s). Refer to the Bill of Materials list of commonly used approved NSTAR precast manholes.
 - 3.2 The manhole frame and cover shall also be approved NSTAR items, refer to Bill of Materials.
 - 3.3 The location of proposed precast manholes shall be approved and located per NSTAR local engineering dept. before installation begins.
 - 3.4 All excavation, backfill and paving shall be done in accordance with this standard and all applicable local and state regulations. When conflicts exist between local/state regulations and this standard the more stringent requirement shall be adhered to unless otherwise directed by NSTAR.
 - 3.5 DIG Safe marking and notification regulations are to be understood and adhered to prior and during all construction.
 - 3.6 All NSTAR safety standards as well as all applicable OSHA and DOT worker safety requirements shall be adhered to at all in times.
 - 3.7 Test pits shall be dug at proposed location of precast manhole before installation is confirmed. Test pits shall extend 12 inches beyond the extreme length and width and depth of the proposed manhole.
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4.0 Excavation and Installation

- 4.1 The excavation shall be made to fully accommodate the proposed precast manhole, allowing for a minimum of 12 inches clear all around the outside length and width dimensions (of the manhole) and of sufficient size to safely and properly install all required shoring and bracing. The depth of the excavation shall be a minimum of 6 inches deeper than the installed underside of the manhole to allow for a minimum of 6 inches of bedding.
- 4.2 Manhole shall be installed using properly rated rigging equipment, adhering to OSHA work methods. The manhole shall be set level on firm well compacted bedding.
- 4.3 Install, operate and maintain pump or dewatering equipment as necessary to prevent water from accumulating in excavation during excavation and installation of manhole.

5.0 Backfill Material

- 5.1 Backfill material to be used for bedding shall be 6 inches (minimum) of $\frac{3}{4}$ " diameter crushed stone per Figure 1, page 7.
- 5.2 Backfill material to be used between the surrounding earth and the exterior sidewalls of the manhole and shall be "Type IE", (Controlled Density Fill, "CDF", or excavatable flowable fill).
- 5.3 Backfill material above the top of the manhole to final grade or paving if required shall conform to Massachusetts Highway Department Specification, "MHD M1 M1.03.1 Process Gravel for Subbase". Backfill shall be compacted mechanically in eight inch (8") loose layers to 95% of the maximum density per ASTM D1557 unless otherwise approved by NSTAR.

6.0 Pavement Cuts

- 6.1 All cuts in bituminous or concrete pavement shall be vertical and made with the proper tools to ensure minimum repaving. The pavement cut shall be straight and uniform.
 - 6.2 Excavated pavement and street base, if any, shall be kept at least two (2) feet back from the edge of the excavation cut and shall be piled so as not to endanger the work or restrict, hamper or inconvenience owners or tenants of property or interfere with the normal flow of traffic. All excess
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materials not suitable for backfill shall be removed from the job site and disposed of as directed by NSTAR.

7.0 Sod Removal

Sod shall be removed carefully, when possible, in regular and uniform blocks with sharp edged tools. It shall be placed in uniform piles along the excavation and kept moist until time for relaying. The Contractor shall be responsible for suitable reseeding, if necessary and shall maintain until grass has grown.

8.0 Street Restoration

All street paving of open excavations shall be restored using temporary or Interim pavement with two – 1-1/2 inch lifts of compacted hot mix asphalt binder (unless otherwise noted by NSTAR). Cold patch repairs when approved by NSTAR shall be cold patch NSTAR Cat ID 1628. Permanent street paving shall be by the governing municipality.

9.0 Grounding of Manhole

9.1 Manhole grounding shall be as detailed on Figure 2, page 8. Refer to table below for typical manhole grounding accessories and compatible unit assemblies.

9.2 Install two copperweld ground rods, one outside each corner of manhole. Connect 4/0 bare copper wire to ground rods using grounding mechanical or exothermic connector in two places. Connect 4/0 bare copper wire to 4/0 copper ground wire tails projecting from manhole with two mechanical connectors.

Table of Precast Manhole Ground Ring Accessories

Description	Quantity	Catalog ID	Compatible Unit
4'x4' or 5'x5' – small manhole ground ring includes: -5/8" x 8' Ground rod -1/0 Cu Ground wire -Ground Rod Connector to 1/0 Cu wire -Ground Wire connector 1/0-1/0 Cu wire	 2 40 2 4	 9229 100 9009 608	 UGN4x4

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Description	Quantity	Catalog ID	Compatible Unit
10'x6'– standard manhole ground ring includes: -5/8" x 8' Ground rod -4/0 Cu Ground wire -Ground Rod Connector to 4/0 Cu wire -Ground Wire connector, bronze , 4/0-4/0 Cu wire	2 55 2 4	9229 116 597 608	UGN10x6
14'x8'– large manhole ground ring includes: -5/8" x 8' Ground rod -4/0 Cu Ground wire -Ground Rod Connector to 4/0 Cu wire -Ground Wire connector 4/0-4/0 Cu wire	2 65 2 4	9229 116 597 608	UGN14x8

10.0 Manhole Frame & Cover

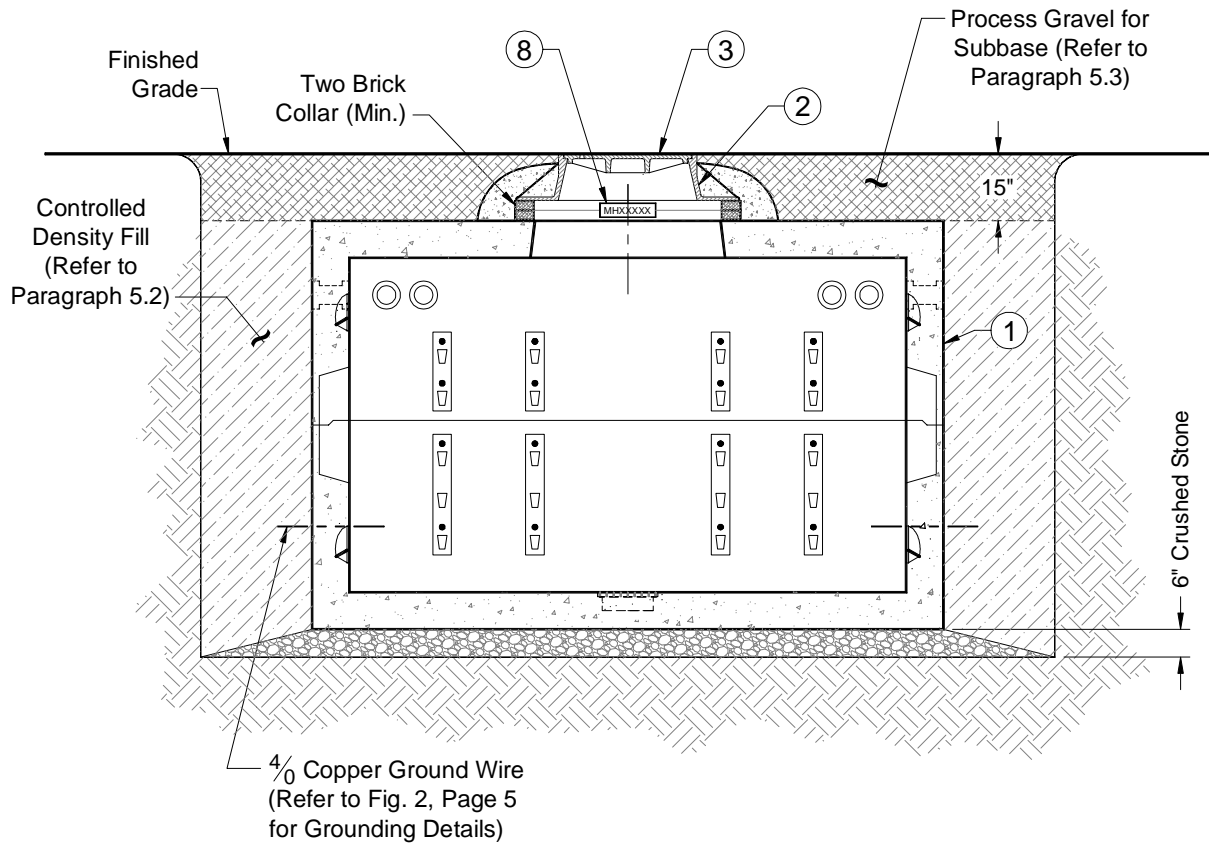
- 10.1 NSTAR approved manhole frame(s) shall be installed on a two brick collar course (unless required otherwise by NSTAR) over the opening(s) on the roof of the manhole as shown in Figure 1, page 7. Refer to NSTAR Standards in the Bill of Materials for approved frames and covers.
- 10.2 The brick collar course shall be installed directly around the manhole roof opening as shown on Fig. 1, page 7. The bricks shall consist of the best quality steam cured brick manufactured per the latest revision of ASTM Standard C55 or the latest revision of ASTM Standard C32 (if red brick is specified). The brick collar and flange of the manhole frame shall be completely covered with a concrete seal. The concrete (approved 2500 psi pea stone mix using Type 2 Portland Cement) seal shall completely encase the lower 3 inches of the frame and the brick course layers.

11.0 Miscellaneous Manhole Accessories

- 11.1 The items in the table, on page 6 (not shown on figures in this standard) are either pre-installed by precast manhole vendor or installed as required after installation.
- 11.2 All manholes shall have Manhole ID Tag fastened to the chimney. Refer to Figure 1, page 7.

Table of Miscellaneous Manhole Accessories

Description	Catalog ID	Compatible Unit
Cable Arm Stanchions: Single Position Two Position Three Position Four Position Five Position Six Position	1750 1751 1752 17534 1754 1755	USTN1 USTN2 USTN3 USTN4 USTN5 USTN6
Cable Support Arms: One Position Two Position Three Position	1140 1141 1146	USTC1 USTC2 USTC3
Duct Plugs: 4 inch diameter 5 inch diameter 6 inch diameter	1636 1637 16896	NFP4-PLUG NFP5-PLUG NFP6-PLUG
Fairleader:	1371	NA-FA
Duct Seal: Small Package Large Package	9469 1239	NAS-DX NAL-DX
Manhole ID Holder	366	N/A



TYPICAL SECTION
Showing Manhole Frame Installation

FIGURE 1

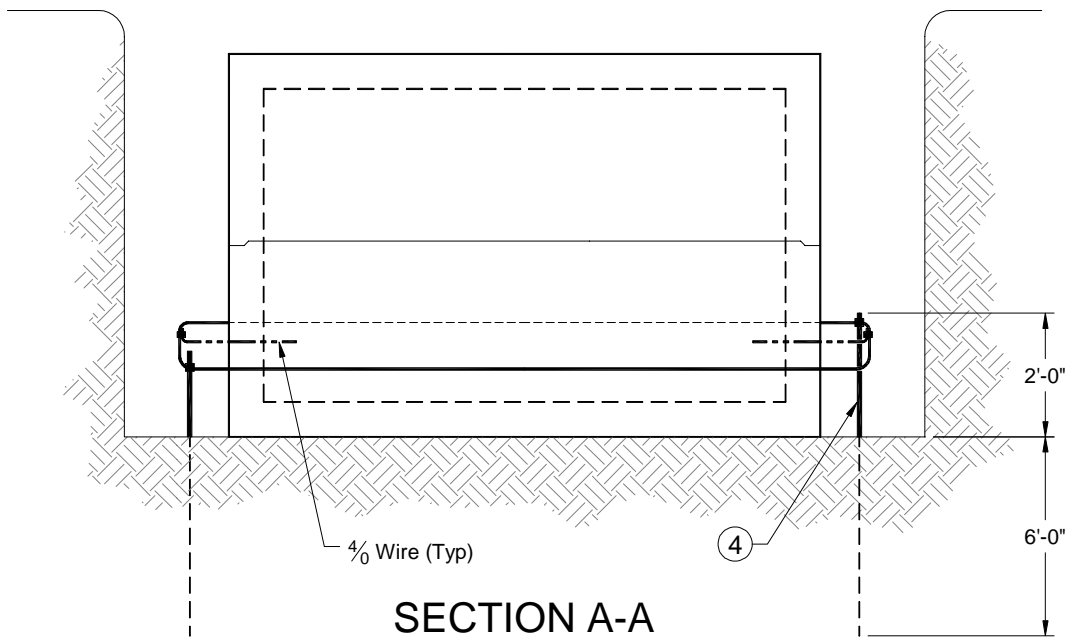
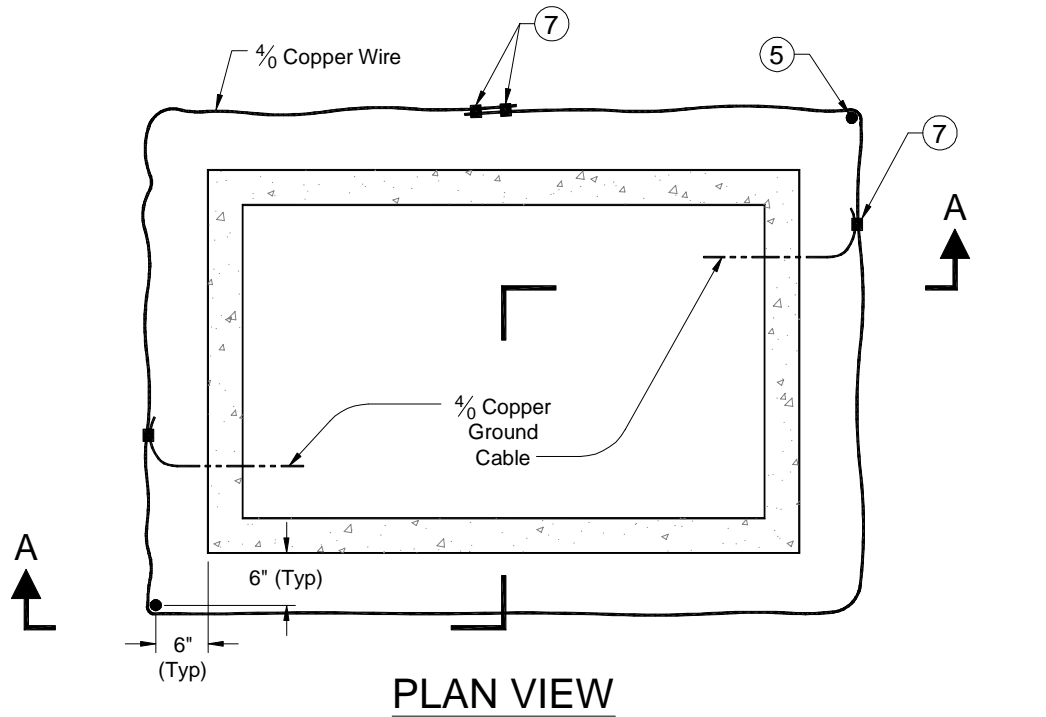


FIGURE 2
MANHOLE GROUNDING DETAILS

Note: 5'x5' and Smaller Manholes Require 1/0 Ground Wire instead of 4/0.

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12.0 References

Refer to NSTAR Material Standard Index for complete list of all NSTAR approved precast manholes, frames and covers.

Approved by: Amin Jessa
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