

METROPOLITAN UTILITIES DISTRICT
 OMAHA, NEBRASKA

SPECIFICATIONS FOR PRECAST CONCRETE MANHOLES

Section 1 - General

- * 1.1 These specifications govern precast concrete manhole sections for use as underground vaults. Manhole sections shall comply with these specifications, latest version of ASTM C478, and attached drawing 416235.
- 1.2 Manholes may be installed in traveled right-of-way and shall withstand H-20 live loading.
- 1.3 The manufacturer shall submit, with the Proposal, three (3) sets of detailed drawings showing dimensions, type of reinforcing, type of steps, maximum load design and the other materials used in the construction of the manhole sections.

Section 2 - Material

- 2.1 Concrete shall have a minimum 4000 psi compressive strength at 28 days.
- 2.2 Reinforcing mesh shall conform to latest version of ASTM A-185.

Section 3 – Manhole Sections

- 3.1 Wall thickness shall be as shown in Drawing 416235.
- 3.2 Precast manholes shall have internal diameters of 30", 48", 54", 60" or 72", as specified in the bid documents or construction drawings.
- 3.3 Section height will be specified at the time of purchase/Invitation. Height of cone and flat top sections shall comply with Drawing 416235
- 3.4 Bottom sections shall have a base flange cast with the section.
- 3.5 Special bottom sections shall have a full bottom with a 4" minimum thickness and a capped 6" x 12" long steel pipe sump, cast in the center of the bottom.
- 3.6 Section joints shall be as shown in Drawing 416235.
- 3.7 Bottom sections shall be provided with a straight through pipe pass as specified in the Invitation to Bid/construction drawings. Pipe pass designation and dimensions are as follows:

<u>OPENING</u>	<u>Height (A)</u>	<u>Width (B)</u>
No. 1	1' – 0"	1' – 2"
No. 2	1' – 6"	1' – 8"
No. 3	2' – 1"	2' – 3"
No. 4	2' – 8"	2' – 10"
No. 5	3' – 3"	3' – 5"

3.8 Wall sleeves shall be standard weight steel pipe per the specified schedule. Sleeves shall be grouted and sealed until watertight.

STEEL WALL SLEEVE SIZE

<u>Schedule</u>	<u>Pipe Size</u>	<u>Wall Thickness</u>
1	4"	0.237"
2	6"	0.280"
3	10"	0.365"
4	12"	0.375"

Section 4 – Steps

4.1 All 48", 54", 60" and 72" sections shall be furnished with steps spaced at 16" centers and located as shown on Drawing 416235.

4.2 Steps shall be polypropylene (per ASTM D4101) injection molded around a ½" ASTM A615 Grade 60 steel reinforcing bar. Steps shall meet all requirements of ASTM C478.

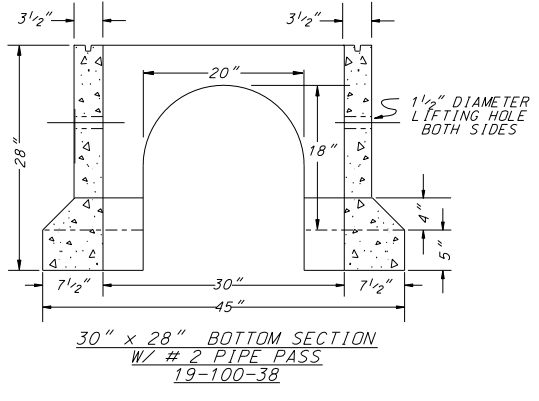
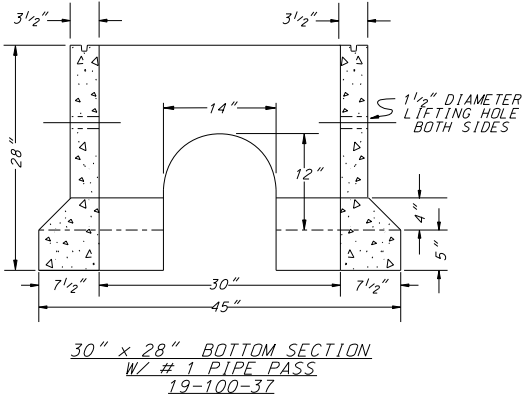
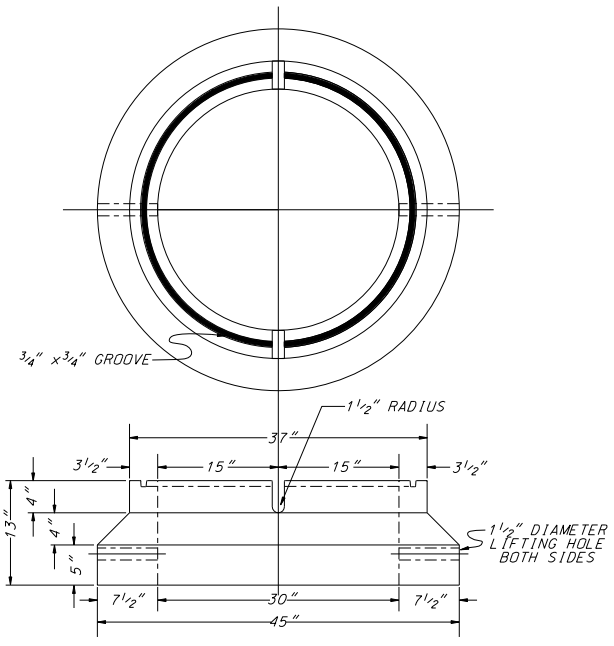
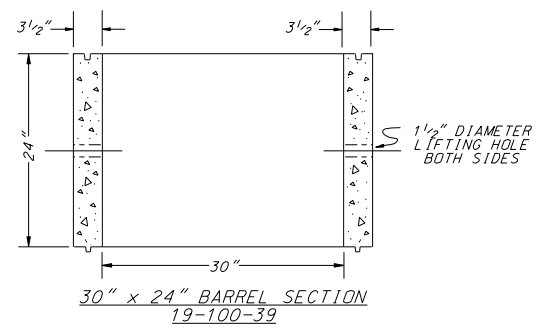
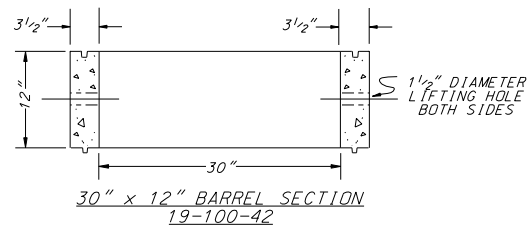
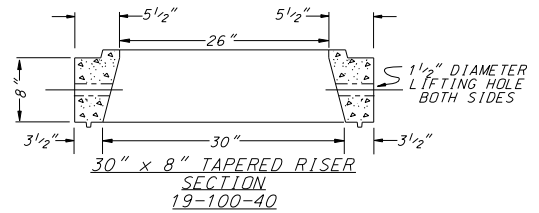
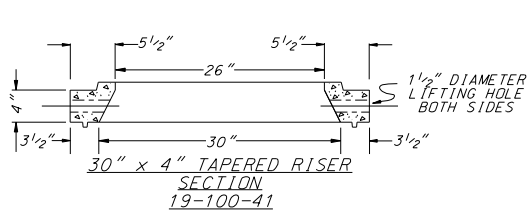
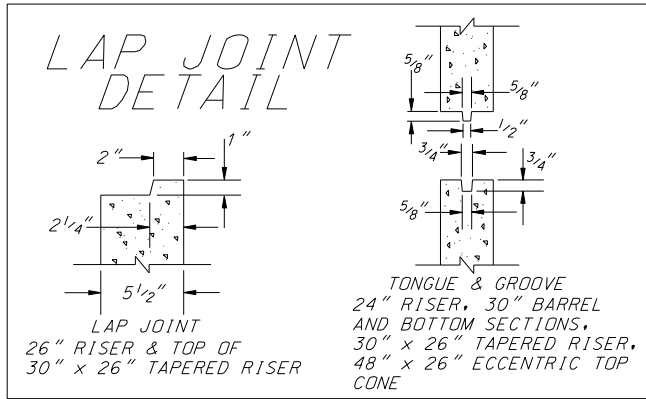
Section 5 - Handling

5.1 All sections, except flat tops, shall have a minimum of two 1½" diameter lifting holes cast in the walls. The lifting holes shall be directly opposite one another and centered vertically on the section. Sections with pipe passes, sections with wall sleeves and special barrel sections for butterfly valves shall have lifting holes located 90° from the cut out as shown on Drawing 416235.

All special bottom sections for butterfly valves and 60" and 72" barrel sections, except special barrel sections for butterfly valves, shall have three 1 ½" diameter lifting holes cast in the walls. The first lifting hole shall be 60° from the steps. The two other lifting holes shall be located to provide a 120° separation between lifting holes. The lifting holes shall be centered vertically on the section.

5.2 Flat top sections shall have 3 - 3/8" diameter (minimum) lifting cables cast in the tops. The lifting cables shall be spaced approximately 120° apart and in from the outside edge of the flat top section at least 1'- 0". The lifting cables shall be placed in a pattern as to create a nearly level position while top is being lifted and not interfere with the flange of the cast iron manhole frame. The layout of the lifting cables shall comply with Drawing 416235.

30" DIAMETER VAULTS

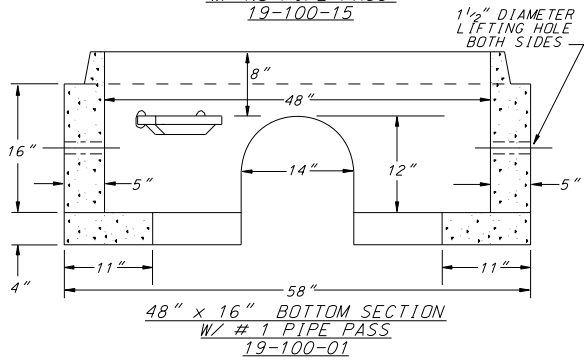
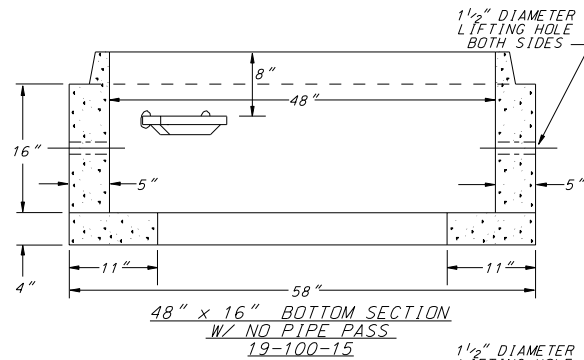
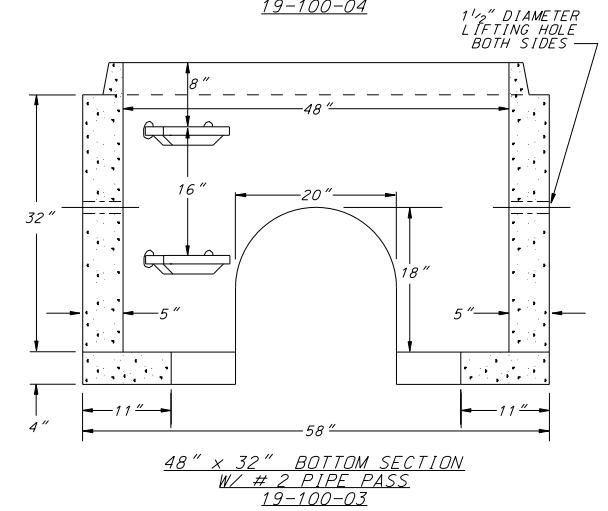
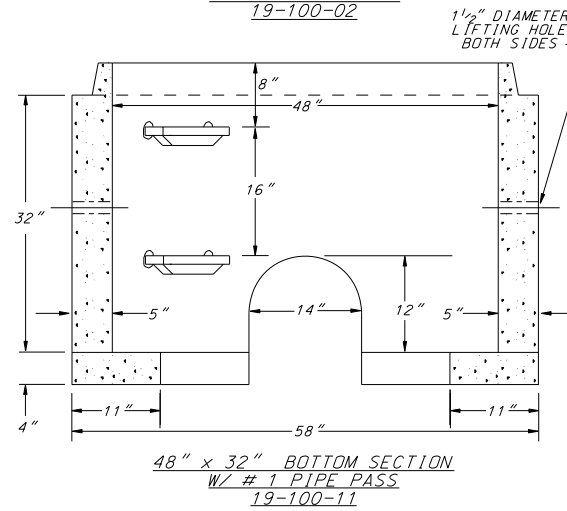
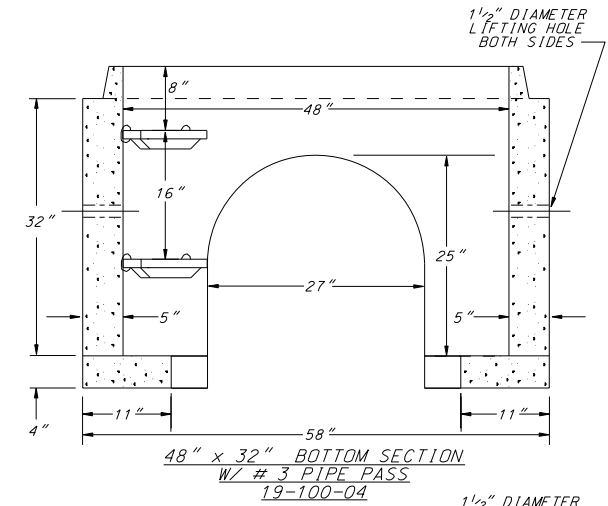
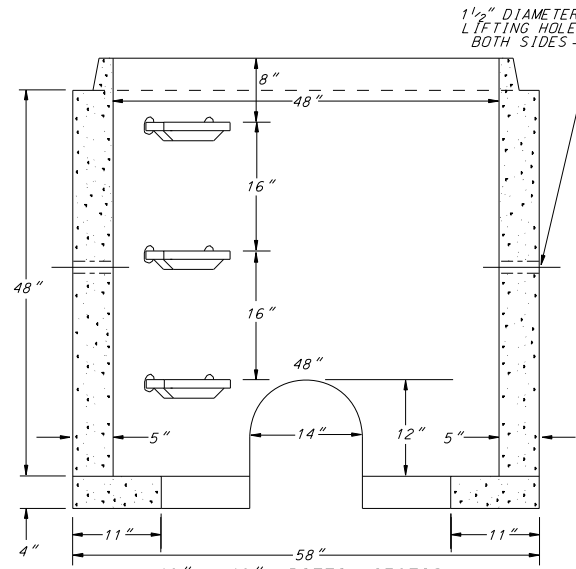
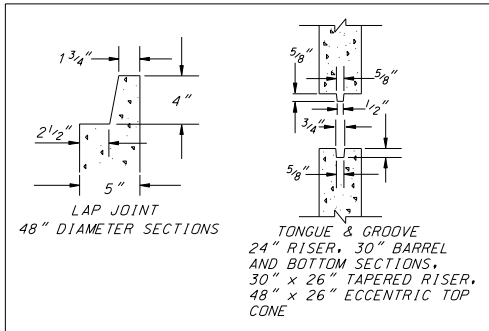


PIPE PASS for 30" MANHOLE			
OPENING NO.	HEIGHT	WIDTH	SIZE PIPE PASS REQ'D. FOR
NO. 1	12	14	4", 6" & 8" MAINS
NO. 2	18	20	10" & 12" "

METROPOLITAN UTILITY DISTRICT OMAHA, NEBRASKA		SCALE: NONE	
		DRAWN BY: W.R.T.	
30", 48", 54", 60" AND 72" PRECAST MANHOLE SECTIONS		DATE: 3-2001	
		ENG'R. CHK. BY:	
		REVISED DATE: 10-2009	
DRAWING 416235		PAGE 1 OF 11	REV. CHK. BY: MKM

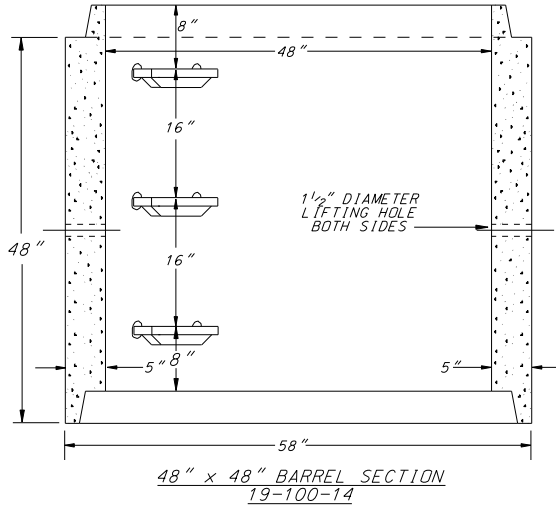
48" DIAMETER VAULTS

NOTE: ON ALL 48", 54", 60" AND 72" VAULT SECTIONS WITH PIPE PASSES, THE STEPS SHALL BE AT A 60° ANGLE FROM THE RUN OF THE PIPE PASSES.

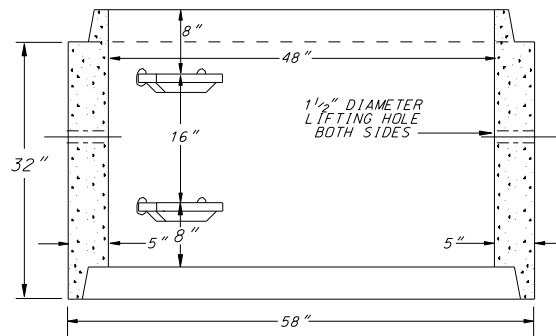


PIPE PASS for 48" MANHOLES			SIZE PIPE PASS REQ'D. FOR 4", 5" & 6" MAINS
OPENING NO.	HEIGHT	WIDTH	
NO. 1	12	14	10" & 12" "
NO. 2	18	20	14", 16", & 18" "
NO. 3	25	27	14", 16", & 18" "

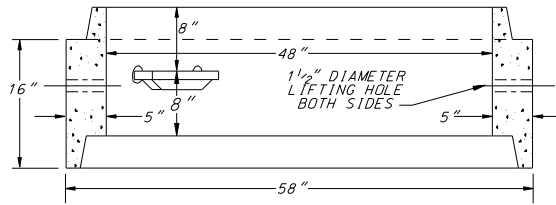
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30", 48", 54", 60" AND 72" PRECAST MANHOLE SECTIONS		DRAWN BY: W.R.T.
DRAWING 416235		DATE: 3-2001
PAGE 2 OF 11	ENG'R. CHK. BY:	
REVISED DATE: 10-2009		REV. CHK. BY: MKM



48" x 48" BARREL SECTION
19-100-14

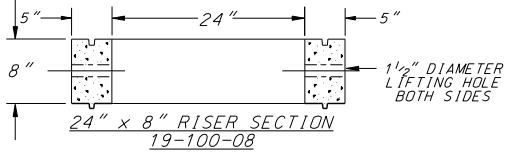


48" x 32" BARREL SECTION
19-100-06

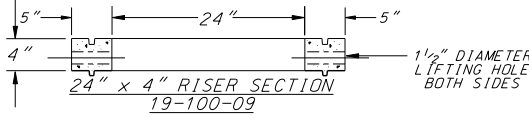


48" x 16" BARREL SECTION
19-100-05

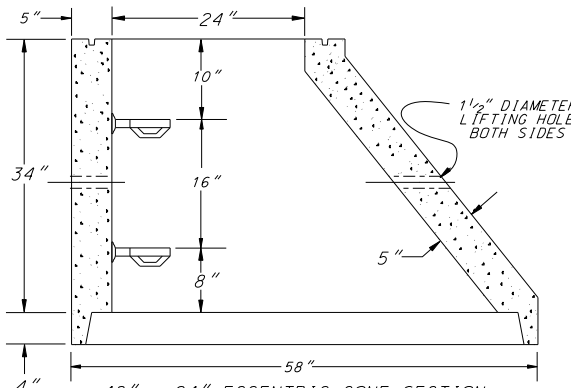
NOTE: ON ALL 48", 54", 60" AND 72" VAULT SECTIONS WITH PIPE PASSES, THE STEPS SHALL BE AT A 60° ANGLE FROM THE RUN OF THE PIPE PASSES.



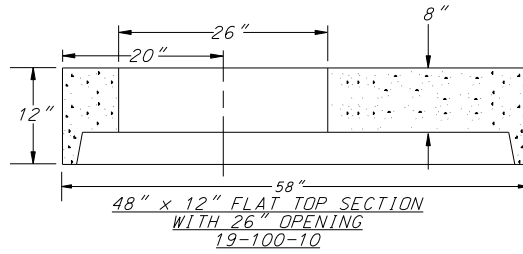
24" x 8" RISER SECTION
19-100-08



24" x 4" RISER SECTION
19-100-09

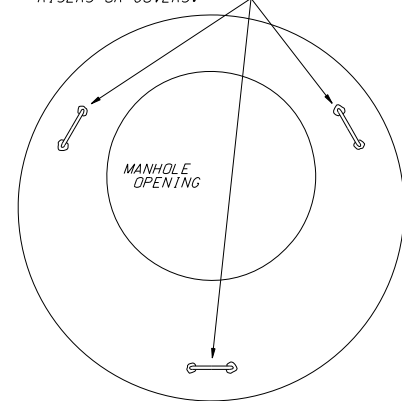


48" x 24" ECCENTRIC CONE SECTION
19-100-07

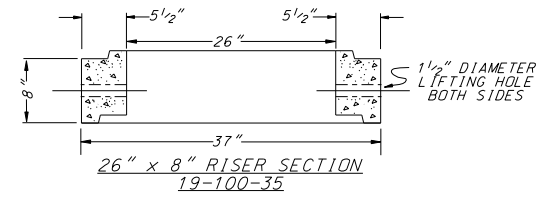


48" x 12" FLAT TOP SECTION
WITH 26" OPENING
19-100-10

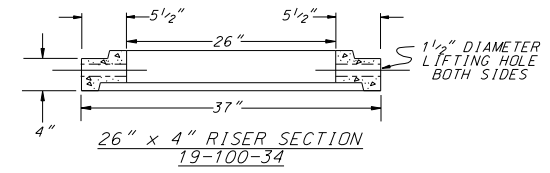
INSTALL 3 LIFTING CABLES ON ALL 48", 54", 60" AND 72" CONCRETE FLAT TOPS. THE LIFTING CABLES SHALL BE 3/8" MIN. AND SPACED AS EVENLY AROUND AS POSSIBLE. THEY SHALL NOT BE WITHIN 6" OF THE MANHOLE OPENING SO AS NOT TO INTERFERE WITH PLACEMENT OF MANHOLE RISERS OR COVERS.



TOP VIEW OF FLAT TOP SECTION



26" x 8" RISER SECTION
19-100-35

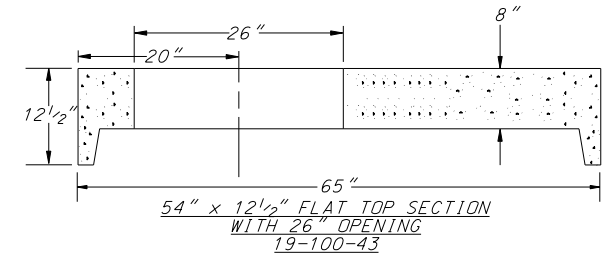
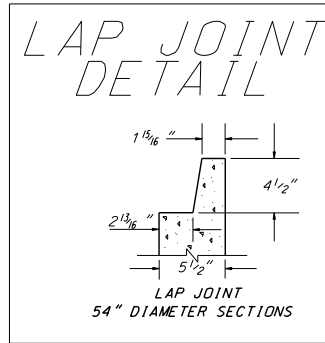


26" x 4" RISER SECTION
19-100-34

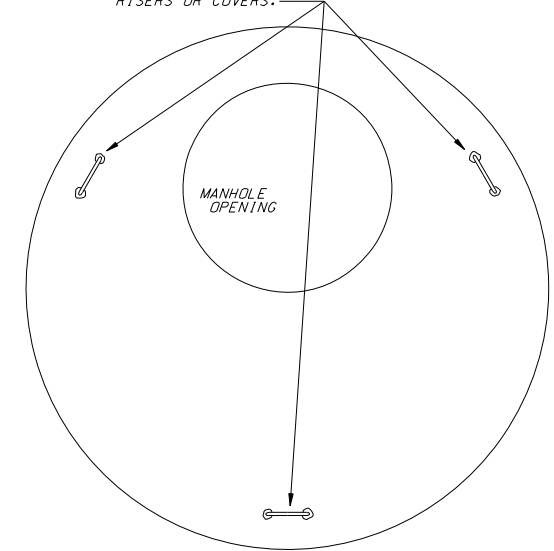
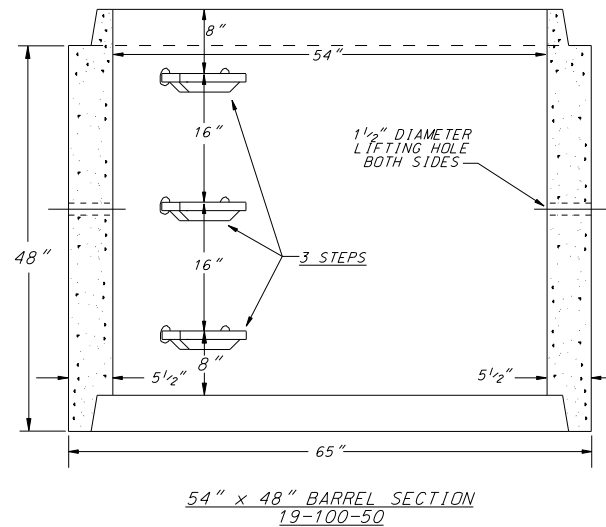
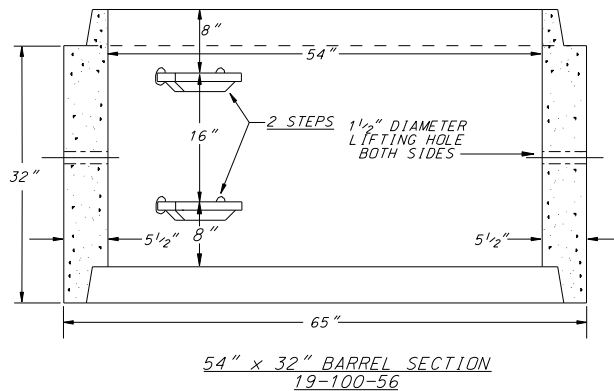
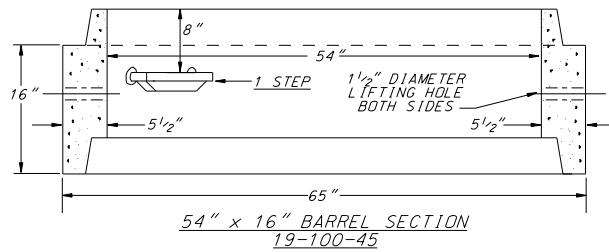
METROPOLITAN UTILITY DISTRICT OMAHA, NEBRASKA		SCALE: NONE	
30", 48", 54", 60" AND 72" PRECAST MANHOLE SECTIONS		DRAWN BY: W.R.T.	
DRAWING 416235		DATE: 3-2001	
		ENG'R. CHK. BY:	
		REVISED DATE: 10-2009	
		REV. CHK. BY: MKM	

*54" DIAMETER VAULTS

NOTE: ON ALL 48", 54", 60" AND 72" VAULT SECTIONS WITH PIPE PASSES, THE STEPS SHALL BE AT A 60° ANGLE FROM THE RUN OF THE PIPE PASSES.



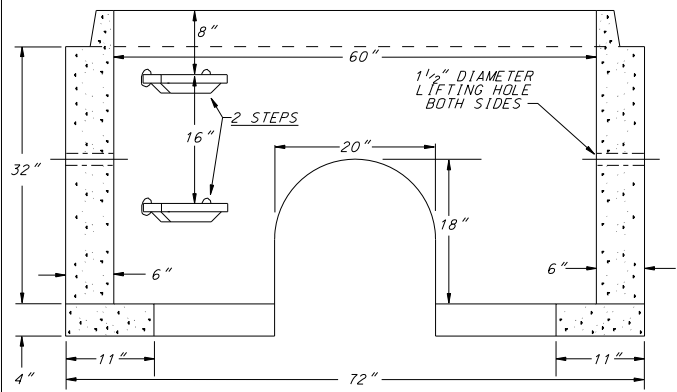
INSTALL 3 LIFTING CABLES ON ALL 48", 54", 60" AND 72" CONCRETE FLAT TOPS. THE LIFTING CABLES SHALL BE 3/8" MIN. AND SPACED AS EVENLY AROUND AS POSSIBLE. THEY SHALL NOT BE WITHIN 6" OF THE MANHOLE OPENING SO AS NOT TO INTERFERE WITH PLACEMENT OF MANHOLE RISERS OR COVERS.



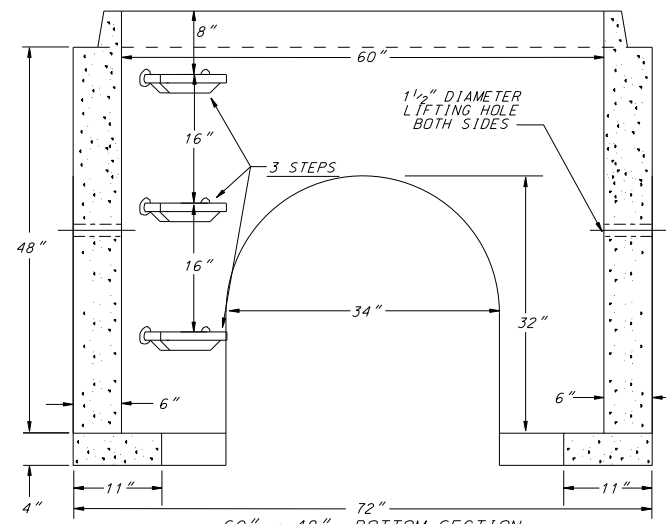
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30", 48", 54", 60" AND 72" PRECAST MANHOLE SECTIONS		DRAWN BY: W.R.T.
DRAWING 416235		DATE: 3-2001
PAGE 4 OF 11		ENG'R. CHK. BY:
		REVISED DATE: 10-2009
		REV. CHK. BY: MKM

NOTE: ON ALL 48", 54", 60" AND 72" VAULT SECTIONS WITH PIPE PASSES, THE STEPS SHALL BE AT A 60° ANGLE FROM THE RUN OF THE PIPE PASSES.

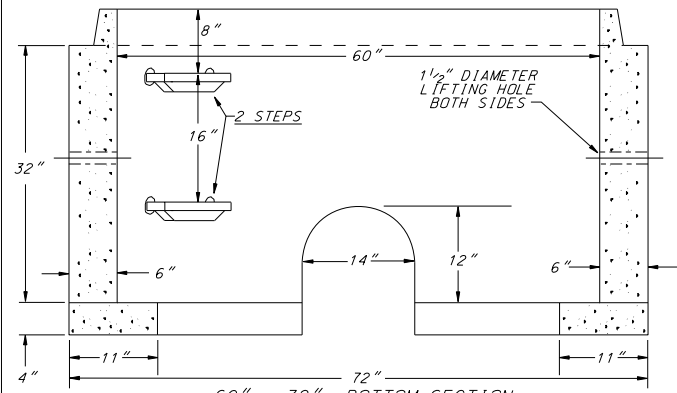
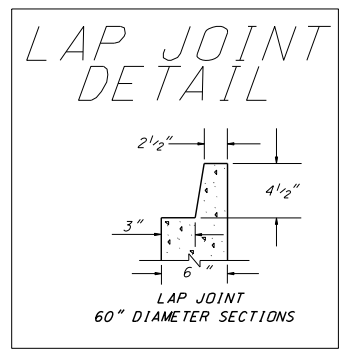
*60" DIAMETER VAULTS



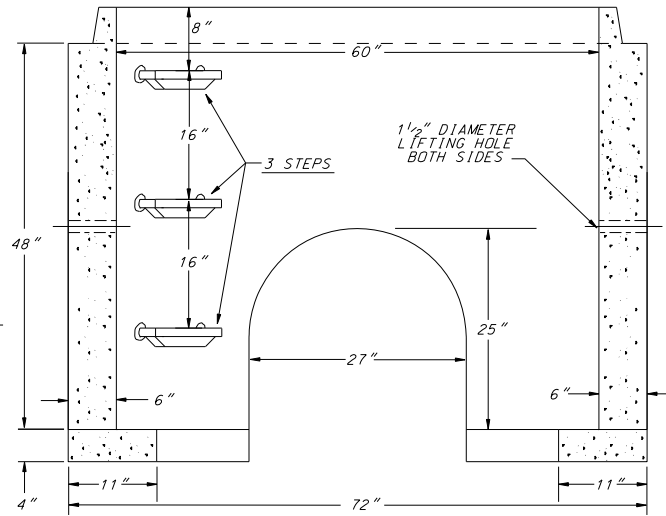
60" x 32" BOTTOM SECTION
W/ # 2 PIPE PASS
19-101-02



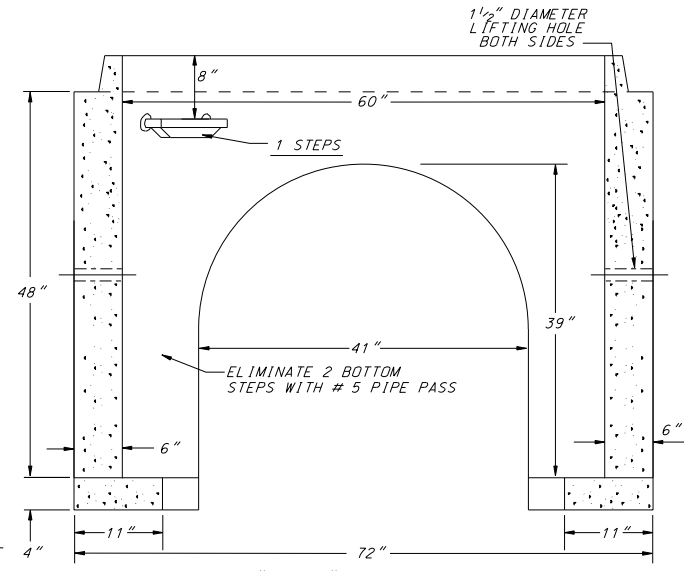
60" x 48" BOTTOM SECTION
W/ # 4 PIPE PASS
19-101-04



60" x 32" BOTTOM SECTION
W/ # 1 PIPE PASS
19-101-01



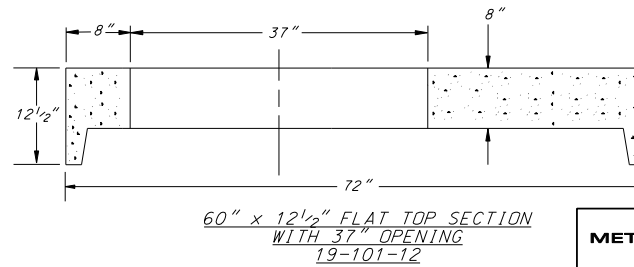
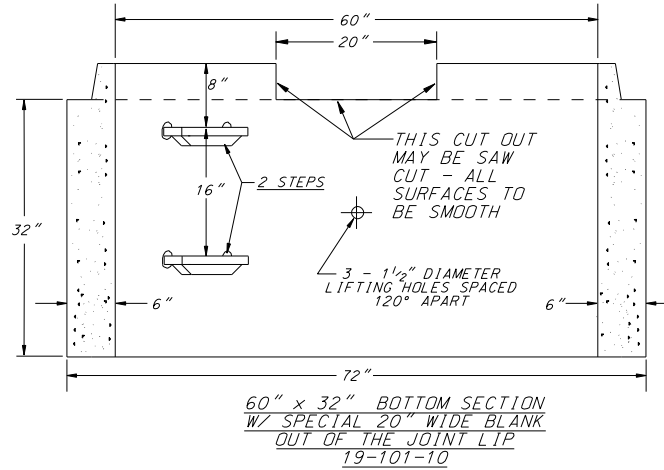
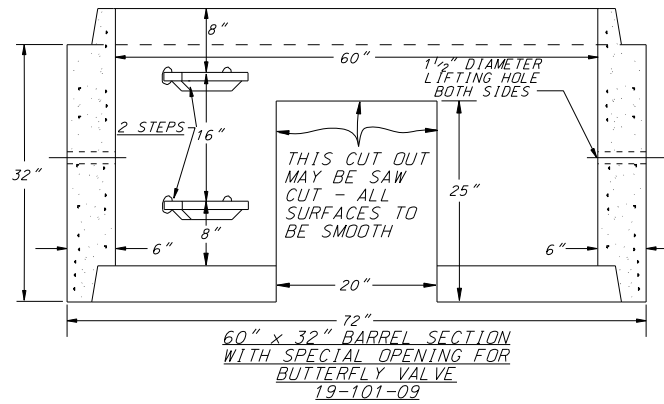
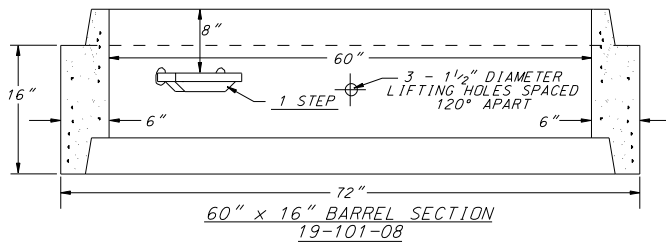
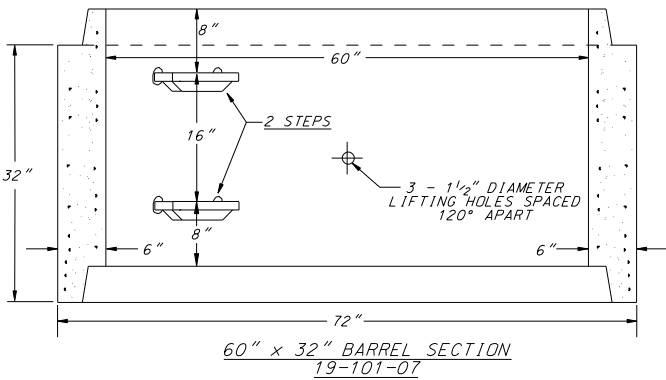
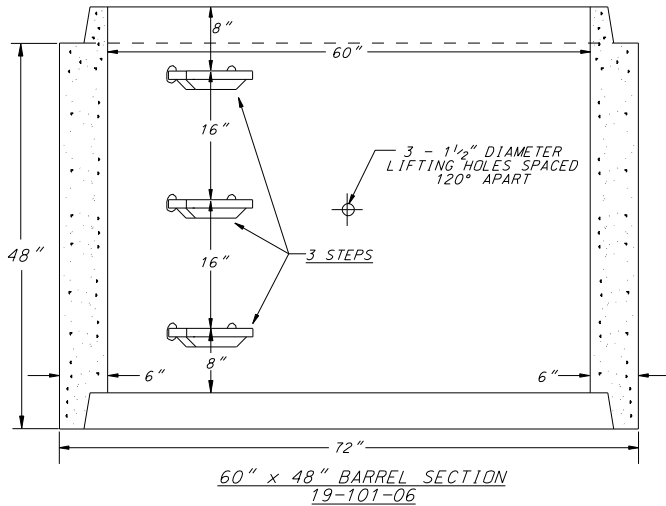
60" x 48" BOTTOM SECTION
W/ # 3 PIPE PASS
19-101-03



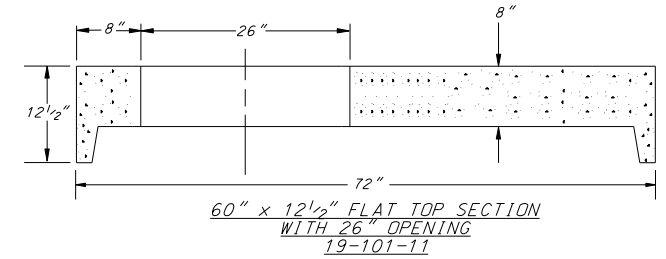
60" x 48" BOTTOM SECTION
W/ # 5 PIPE PASS
19-101-05

PIPE PASS for 60" MANHOLES			SIZE PIPE PASS REQ'D. FOR
OPENING NO.	HEIGHT	WIDTH	
NO. 1	12	14	4" 6" & 8" MAINS
NO. 2	18	20	10" & 12" "
NO. 3	25	27	14", 16", & 18" "
NO. 4	32	34	20" & 24" "
NO. 5	39	41	30" "

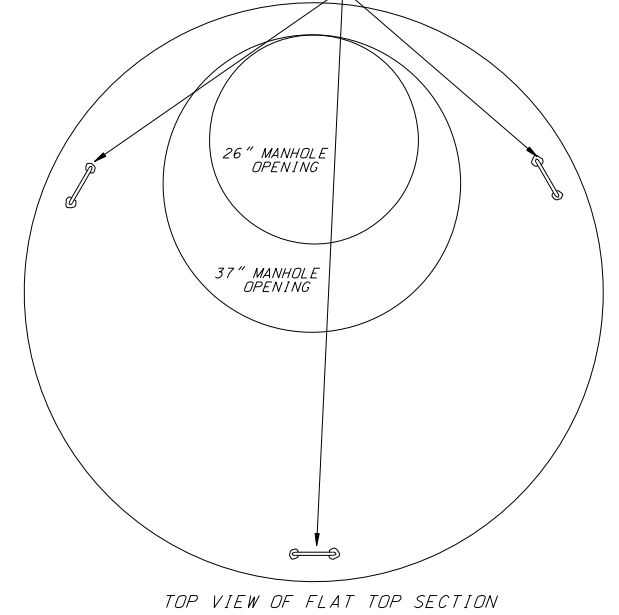
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30", 48", 54", 60" AND 72" PRECAST MANHOLE SECTIONS		DRAWN BY: JAZ
DRAWING 416235		DATE: 10-2005
PAGE 5 OF 11	ENG'R. CHK. BY:	REVISED DATE: 10-2009
	REV. CHK. BY: MKM	



NOTE: ON ALL 48", 54", 60" AND 72" VAULT SECTIONS WITH PIPE PASSES, THE STEPS SHALL BE AT A 60° ANGLE FROM THE RUN OF THE PIPE PASSES.

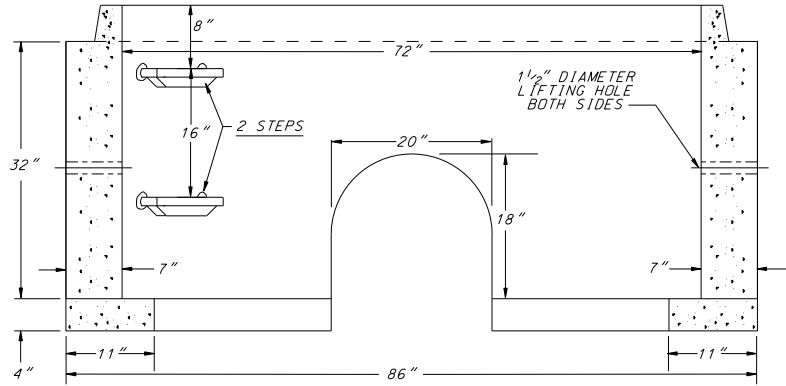


INSTALL 3 LIFTING CABLES ON ALL 48", 54", 60" AND 72" CONCRETE FLAT TOPS. THE LIFTING CABLES SHALL BE 3/8" MIN. AND SPACED AS EVENLY AROUND AS POSSIBLE. THEY SHALL NOT BE WITHIN 6" OF THE MANHOLE OPENING SO AS NOT TO INTERFERE WITH PLACEMENT OF MANHOLE RISERS OR COVERS.

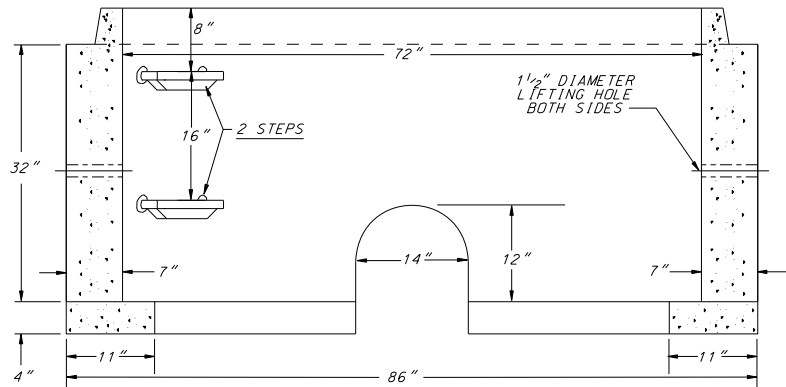


METROPOLITAN UTILITY DISTRICT OMAHA, NEBRASKA		SCALE: NONE
30", 48", 54", 60" AND 72" PRECAST MANHOLE SECTIONS		DRAWN BY: JAZ
DRAWING 416235		DATE: 10-2005
PAGE 6 OF 11		ENG'R. CHK. BY:
		REVISED DATE: 10-2009
		REV. CHK. BY: MKM

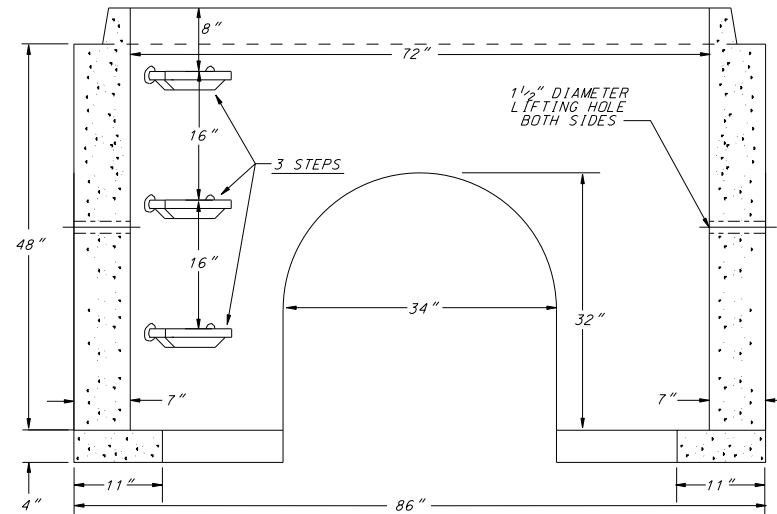
NOTE: ON ALL 48", 54", 60" AND 72" VAULT SECTIONS WITH PIPE PASSES, THE STEPS SHALL BE AT A 60° ANGLE FROM THE RUN OF THE PIPE PASSES.



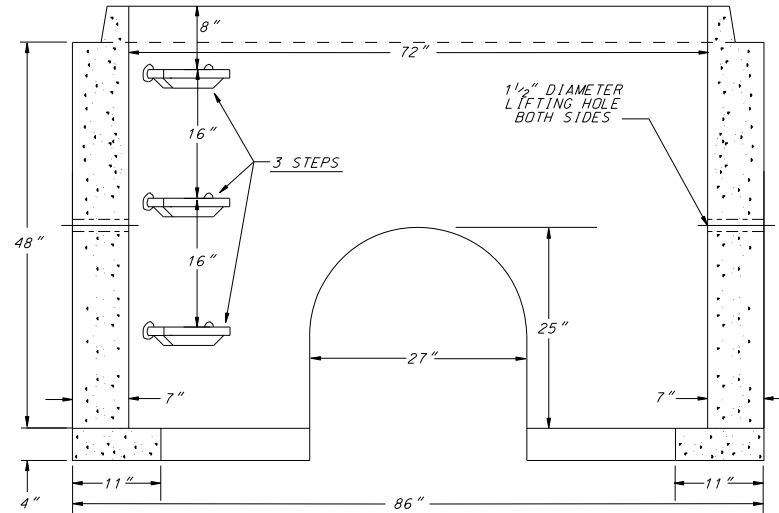
72" x 32" BOTTOM SECTION
W/ # 2 PIPE PASS
19-100-78



72" x 32" BOTTOM SECTION
W/ # 1 PIPE PASS
19-100-77



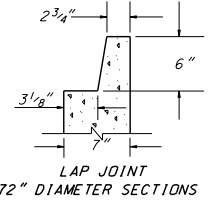
72" x 48" 86" BOTTOM SECTION
W/ # 4 PIPE PASS
19-100-79



72" x 48" BOTTOM SECTION
W/ # 3 PIPE PASS
19-100-75

*72" DIAMETER VAULTS

LAP JOINT DETAIL



PIPE PASS for 72" MANHOLES			SIZE PIPE PASS REQ'D. FOR
OPENING NO.	HEIGHT	WIDTH	
NO. 1	12	14	4", 6" & 8" MAINS
NO. 2	18	20	10" & 12" "
NO. 3	25	27	14", 16" & 18" "
NO. 4	32	34	20" & 24" "
NO. 5	39	41	30" "

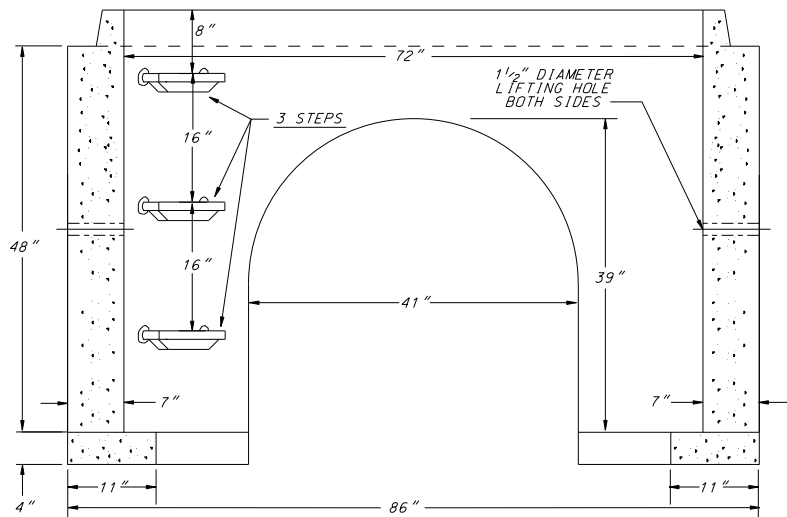
METROPOLITAN UTILITY DISTRICT
OMAHA, NEBRASKA

30", 48", 54", 60" AND
72" PRECAST
MANHOLE SECTIONS

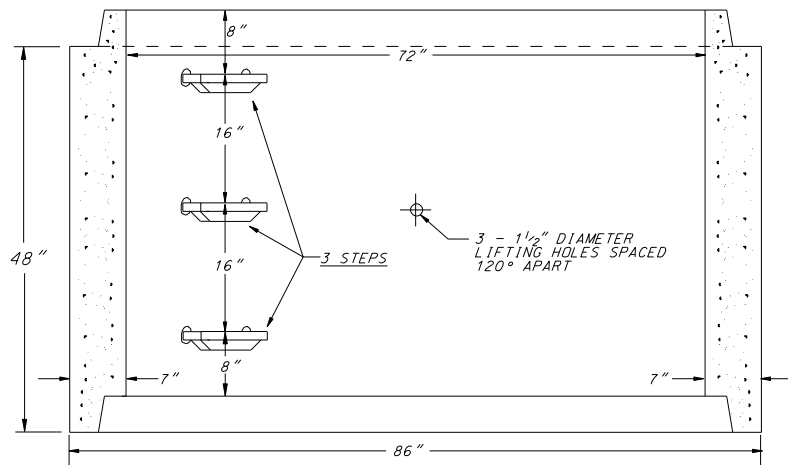
DRAWING 416235

PAGE
7 OF 11

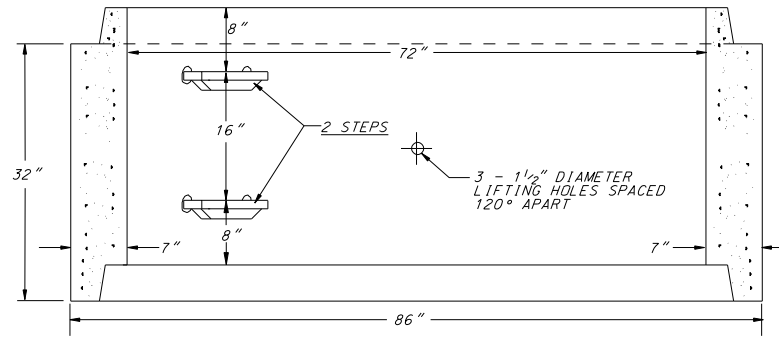
SCALE: NONE
DRAWN BY: JAZ
DATE: 10-2005
ENG'R. CHK. BY:
REVISED DATE: 10-2009
REV. CHK. BY: MKM



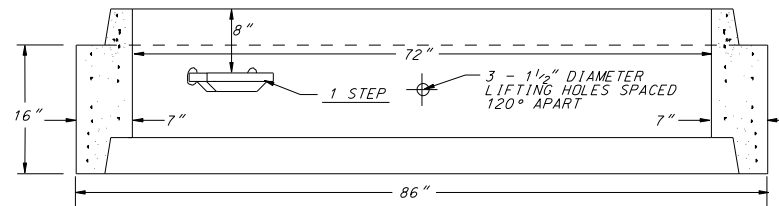
72" x 48" BOTTOM SECTION
W/ # 5 PIPE PASS
19-101-80



72" x 48" BARREL SECTION
19-100-76



72" x 32" BARREL SECTION
19-100-71

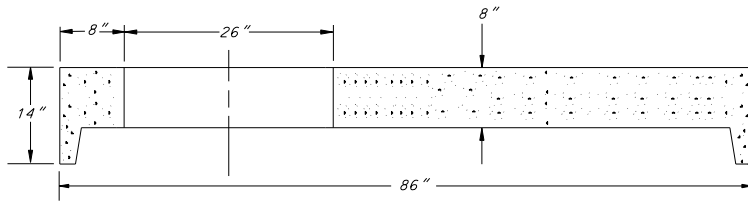


72" x 16" BARREL SECTION
19-100-72

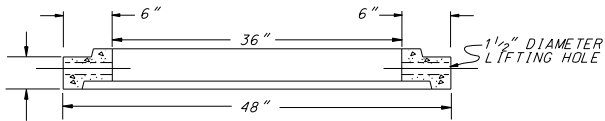
NOTE: ON ALL 48", 54", 60" AND 72" VAULT SECTIONS WITH PIPE PASSES, THE STEPS SHALL BE AT A 60° ANGLE FROM THE RUN OF THE PIPE PASSES.

PIPE PASS for 72" MANHOLES			SIZE PIPE PASS
OPENING NO.	HEIGHT	WIDTH	REQ'D. FOR
NO. 1	12	14	4", 6" & 8" MAINS
NO. 2	18	20	10" & 12" "
NO. 3	25	27	14", 16", & 18" "
NO. 4	32	34	20" & 24" "
NO. 5	39	41	30" "

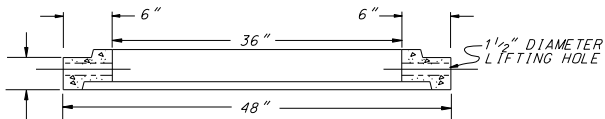
METROPOLITAN UTILITY DISTRICT OMAHA, NEBRASKA		SCALE: NONE
		DRAWN BY: JAZ
		DATE: 10-2005
30", 48", 54", 60" AND 72" PRECAST MANHOLE SECTIONS		PAGE 8 OF 11
DRAWING 416235		ENG'R. CHK. BY:
		REVISED DATE: 10-2009
		REV. CHK. BY: MKM



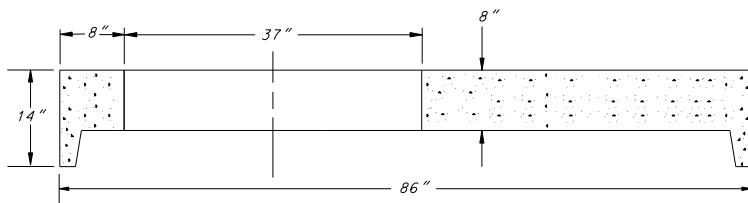
72" x 14" FLAT TOP SECTION
WITH 26" OPENING
19-100-73



36" x 4" RISER SECTION
19-100-33



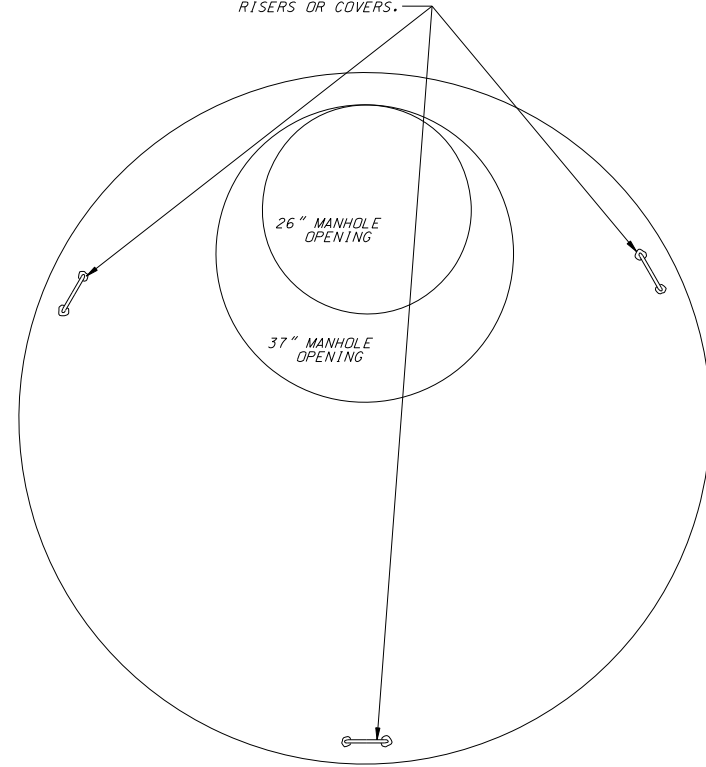
* 36" x 6" RISER SECTION
19-100-32



72" x 14" FLAT TOP SECTION
WITH 37" OPENING
19-101-81

NOTE: ON ALL 48", 54", 60" AND 72" VAULT SECTIONS WITH PIPE PASSES, THE STEPS SHALL BE AT A 60° ANGLE FROM THE RUN OF THE PIPE PASSES.

INSTALL 3 LIFTING CABLES ON ALL 48", 54", 60" AND 72" CONCRETE FLAT TOPS. THE LIFTING CABLES SHALL BE 3/8" MIN. AND SPACED AS EVENLY AROUND AS POSSIBLE. THEY SHALL NOT BE WITHIN 6" OF THE MANHOLE OPENING SO AS NOT TO INTERFERE WITH PLACEMENT OF MANHOLE RISERS OR COVERS.



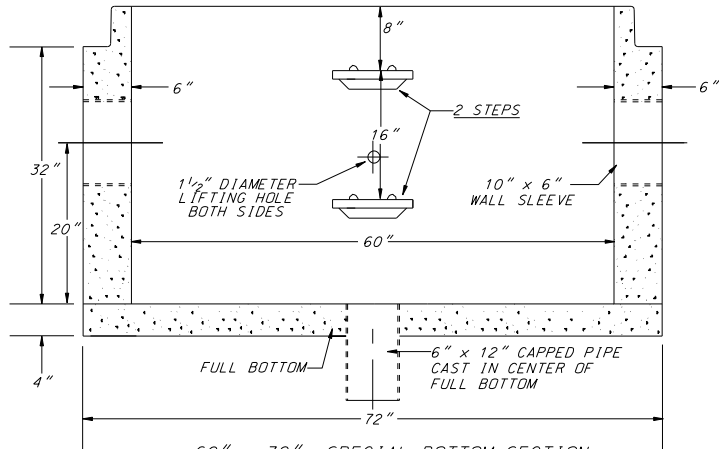
TOP VIEW OF FLAT TOP SECTION

* DENOTES CHANGE

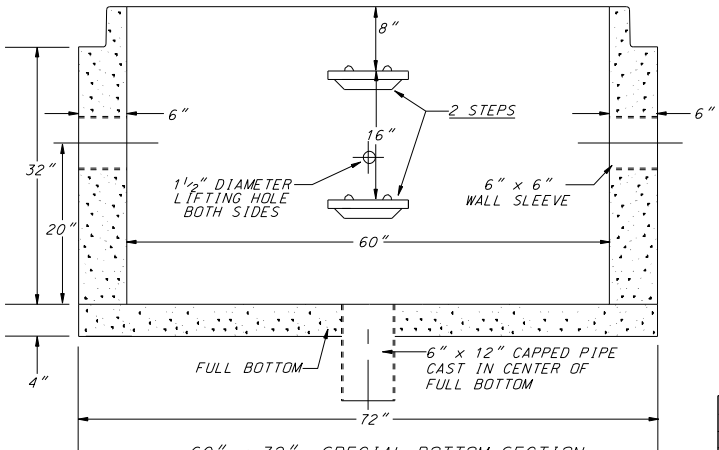
METROPOLITAN UTILITY DISTRICT OMAHA, NEBRASKA		SCALE: NONE
30", 48", 54", 60" AND 72" PRECAST MANHOLE SECTIONS		DRAWN BY: JAZMKM
DRAWING 416235		DATE: 10-2005/10-2009
PAGE 9 OF 11	ENG'R. CHK. BY:	
		REVISED DATE: 10-2009
		REV. CHK. BY: MKM

*60" REGULATOR VAULTS

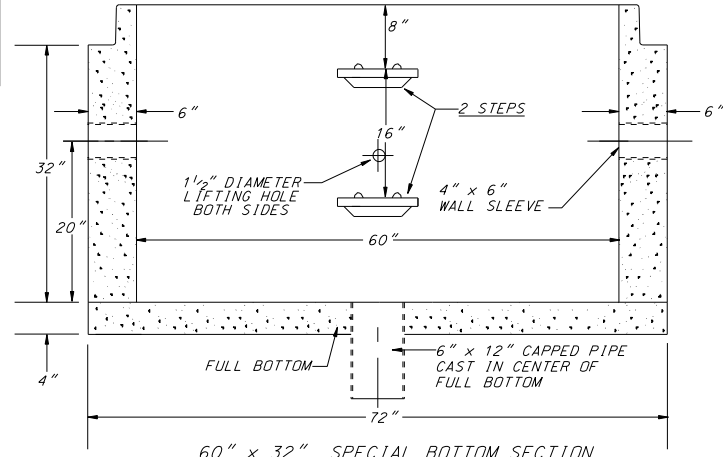
NOTE: ON ALL REGULATOR VAULT SECTIONS WITH WALL SLEEVES, THE STEPS SHOULD BE AT A 90° ANGLE FROM THE RUN OF THE PIPE SLEEVES.



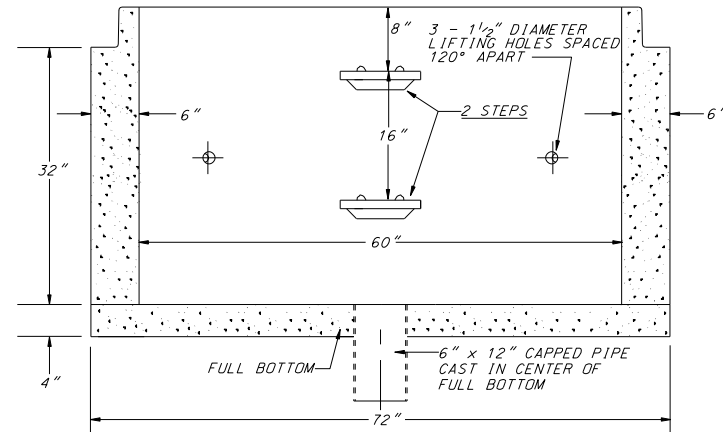
60" x 32" SPECIAL BOTTOM SECTION
FOR REG. VAULT W/ # 3 WALL
SLEEVES (10" x 6")
19-101-23



60" x 32" SPECIAL BOTTOM SECTION
FOR REG. VAULT W/ # 2 WALL
SLEEVES (6" x 6")
19-101-22



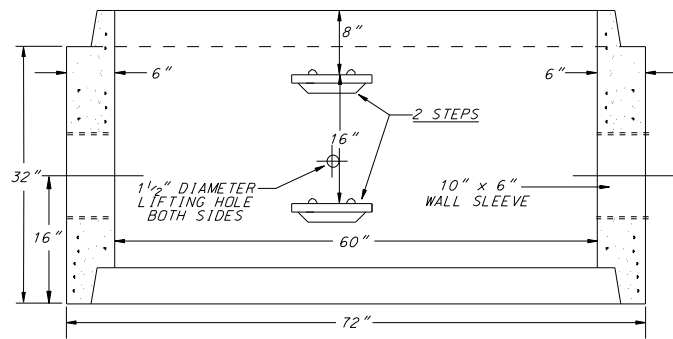
60" x 32" SPECIAL BOTTOM SECTION
FOR REG. VAULT W/ # 1 WALL
SLEEVES (4" x 6")
19-101-21



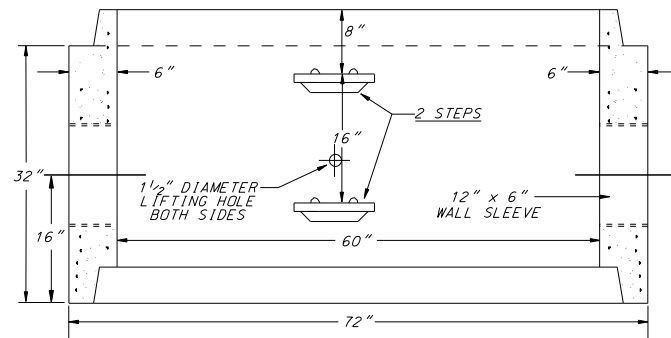
60" x 32" BOTTOM SECTION
WITHOUT WALL SLEEVES
19-101-20

WALL SLEEVE FOR 60" REGULATOR VAULTS		
SCHEDULE NO.	OUTLET INCHES	INLET INCHES
NO. 1	4"	4"
NO. 2	6"	6"
NO. 3	10"	10"
NO. 4	12"	12"

METROPOLITAN UTILITY DISTRICT OMAHA, NEBRASKA		SCALE: NONE
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60" x 32" SPECIAL BARREL SECTION
FOR REG. VAULT W/ #3 WALL
SLEEVES (10" x 6")
19-101-13



60" x 32" SPECIAL BARREL SECTION
FOR REG. VAULT W/ #4 WALL
SLEEVES (12" x 6")
19-101-14

NOTE: ON ALL REGULATOR
VAULT SECTIONS WITH WALL
SLEEVES, THE STEPS SHOULD
BE AT A 90° ANGLE FROM THE
RUN OF THE PIPE SLEEVES.

WALL SLEEVE FOR 60" REGULATOR VAULTS		
SCHEDULE NO.	OUTLET INCHES	INLET INCHES
NO. 1	4"	4"
NO. 2	6"	6"
NO. 3	10"	10"
NO. 4	12"	12"

METROPOLITAN UTILITY DISTRICT OMAHA, NEBRASKA		SCALE: NONE
30", 48", 54", 60" AND 72" PRECAST MANHOLE SECTIONS		DRAWN BY: JAZ
DRAWING 416235		DATE: 10-2005
PAGE 11 OF 11		ENG'R. CHK. BY:
		REVISED DATE: 10-2009
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