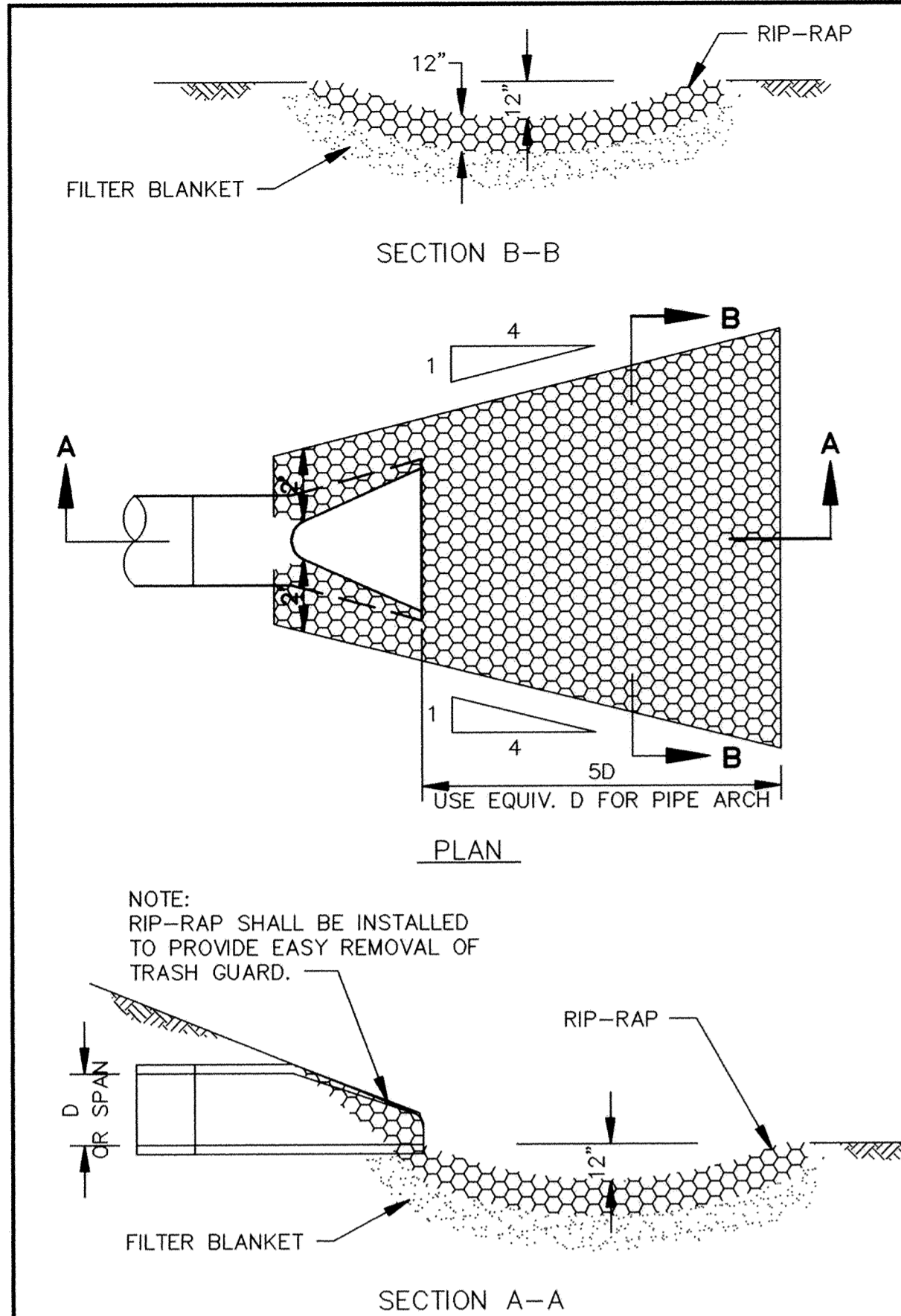
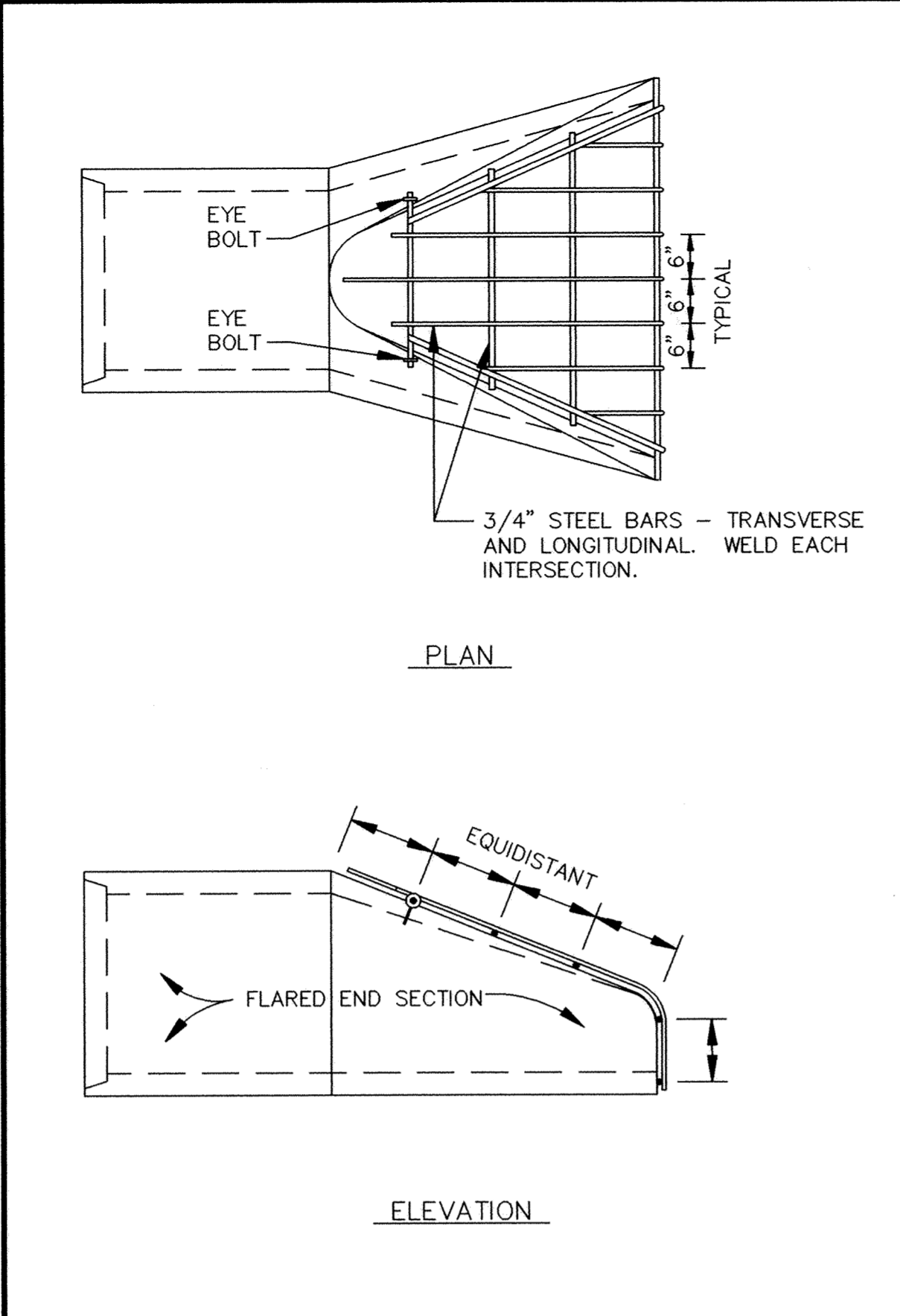


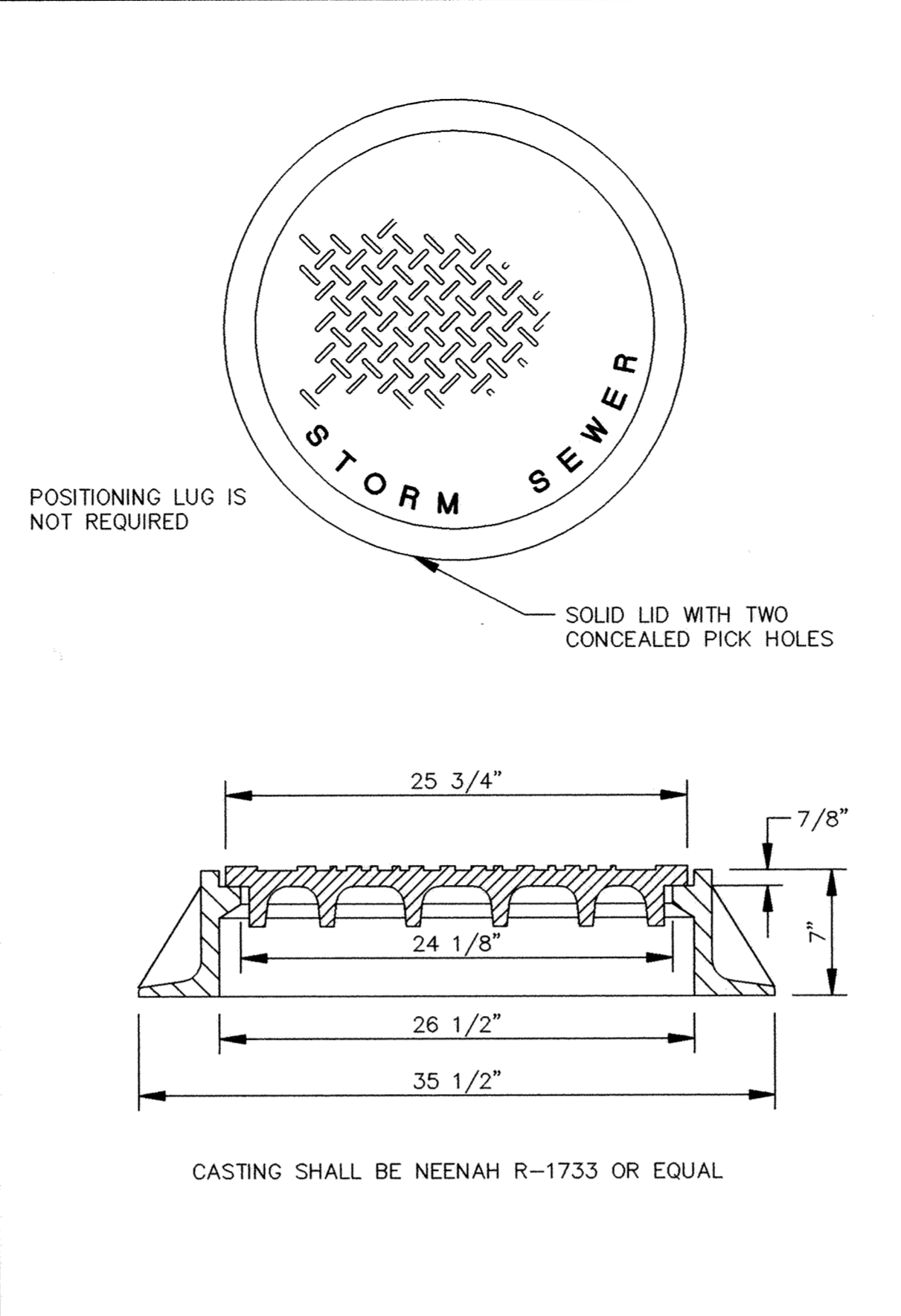
SARCO PRODUCTS • NEW HARBOR, MINNESOTA
REPRODUCED BY PART NUMBER 8822
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REPRODUCED BY PART NUMBER 8822



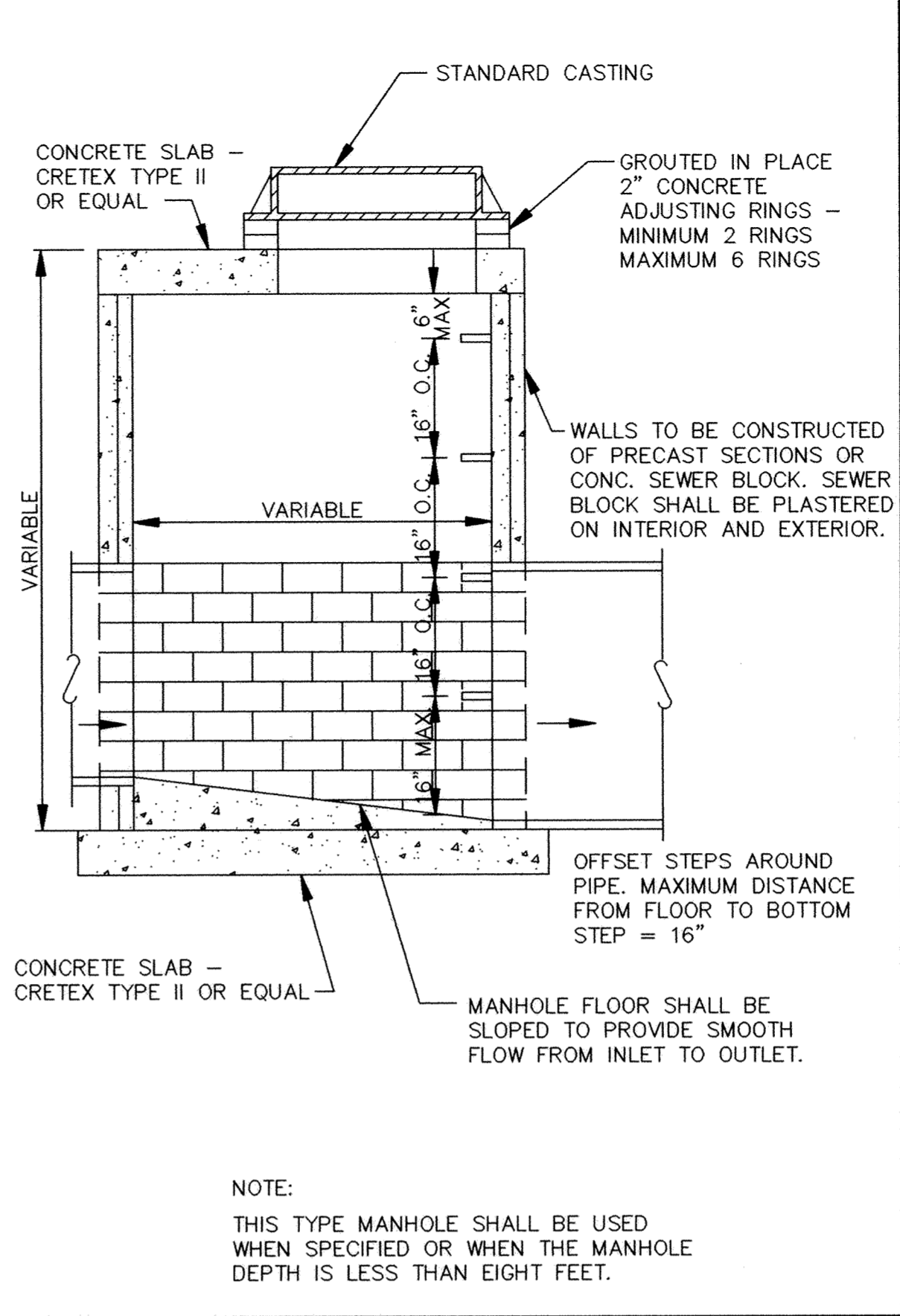
RIP-RAP INSTALLATION



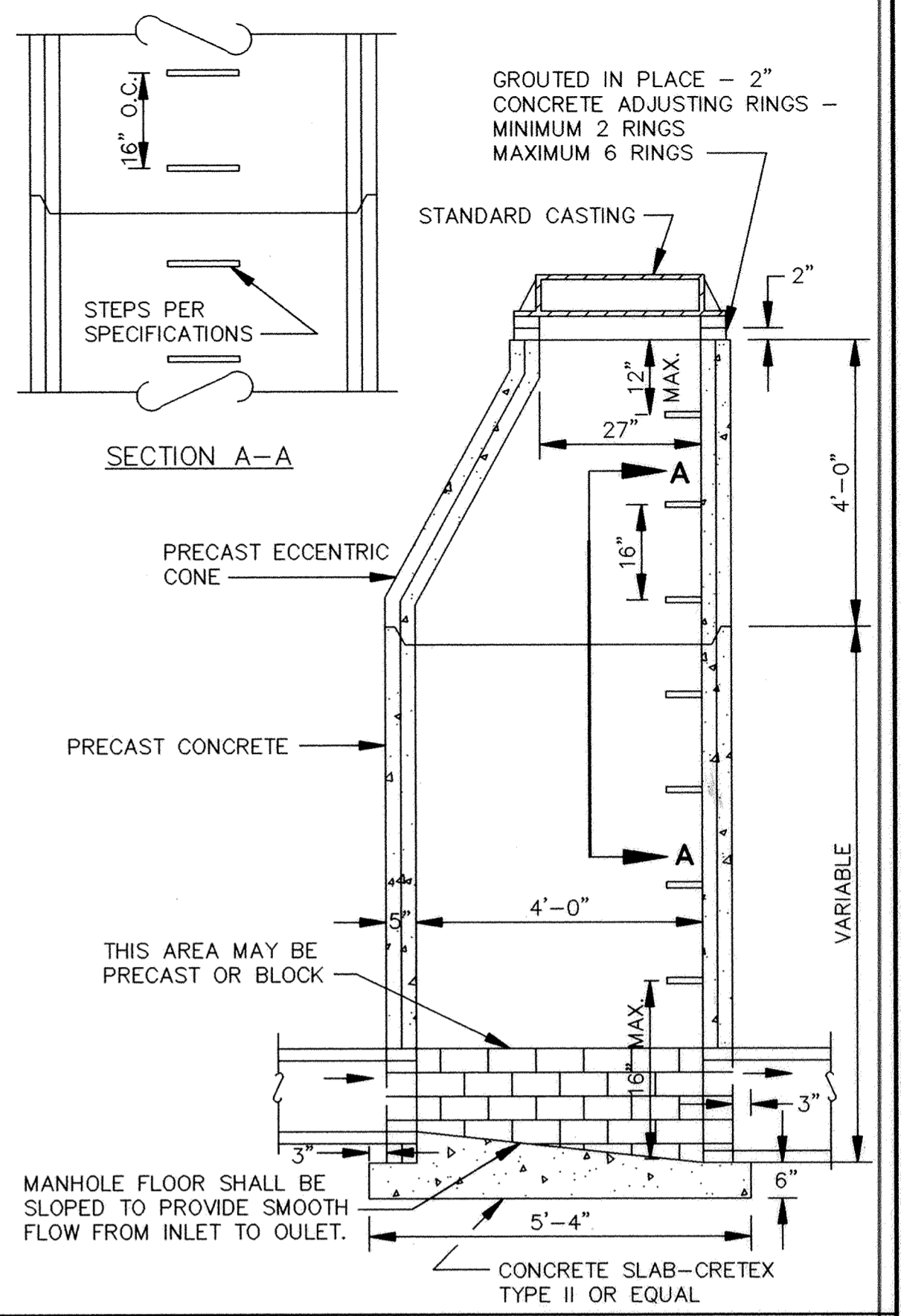
TRASH GUARD



STANDARD MANHOLE CASTING



SLAB TOP MANHOLE



STANDARD MANHOLE

PIPE SIZE	THREAD DIAMETER
12	
15	
18	5/8"
21	ROLLED THREADS (SEE NOTE 4)
24	
27	
30	
33	
36	
42	3/4"
48	CUT OR ROLLED
54	
60	
66	
72	
78	
84	
90	1"
96	CUT OR ROLLED
102	
108	
120	
132	

CANOPY TIE

U BOLT TIE

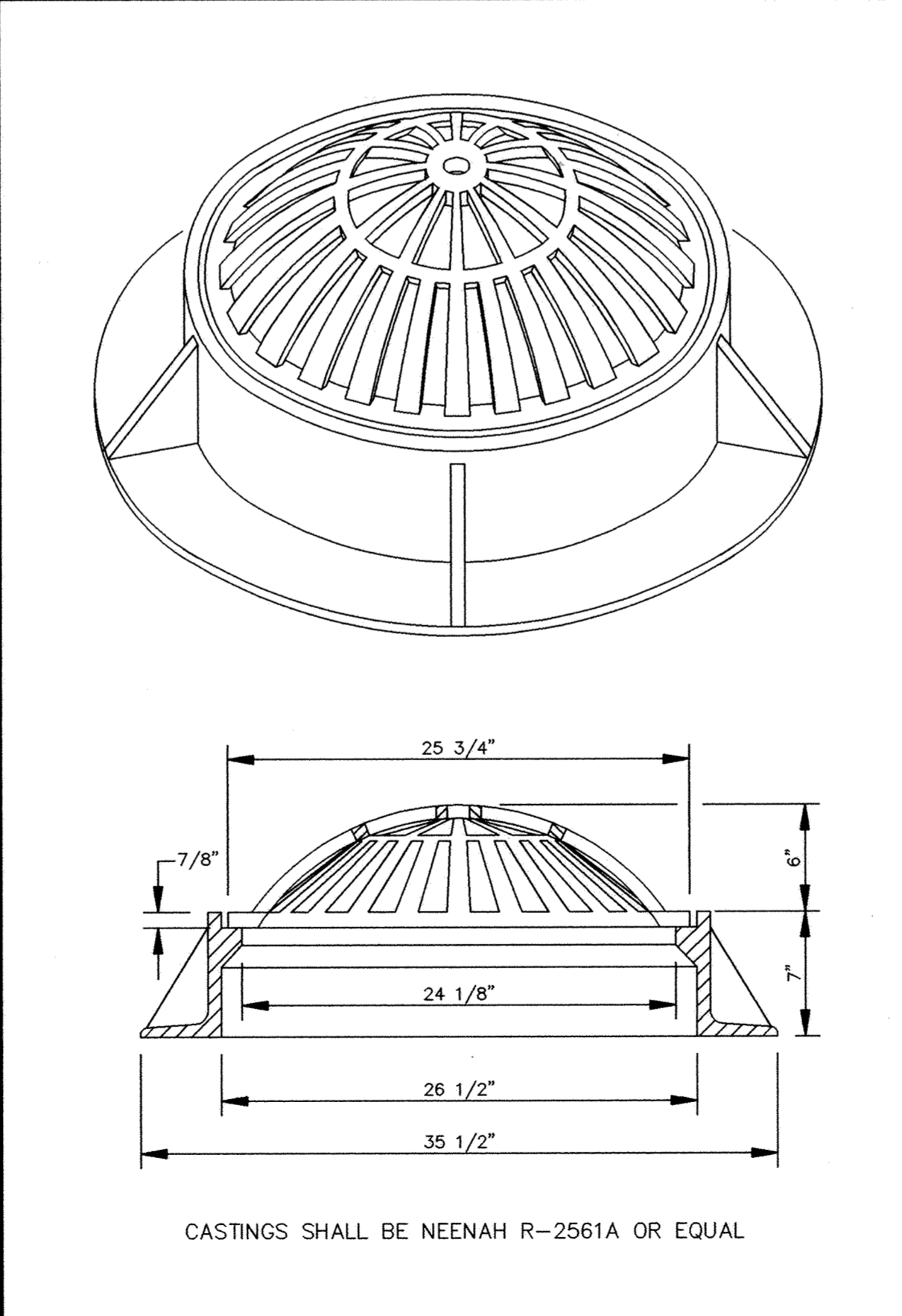
EYE BOLT TIE

NOTE:

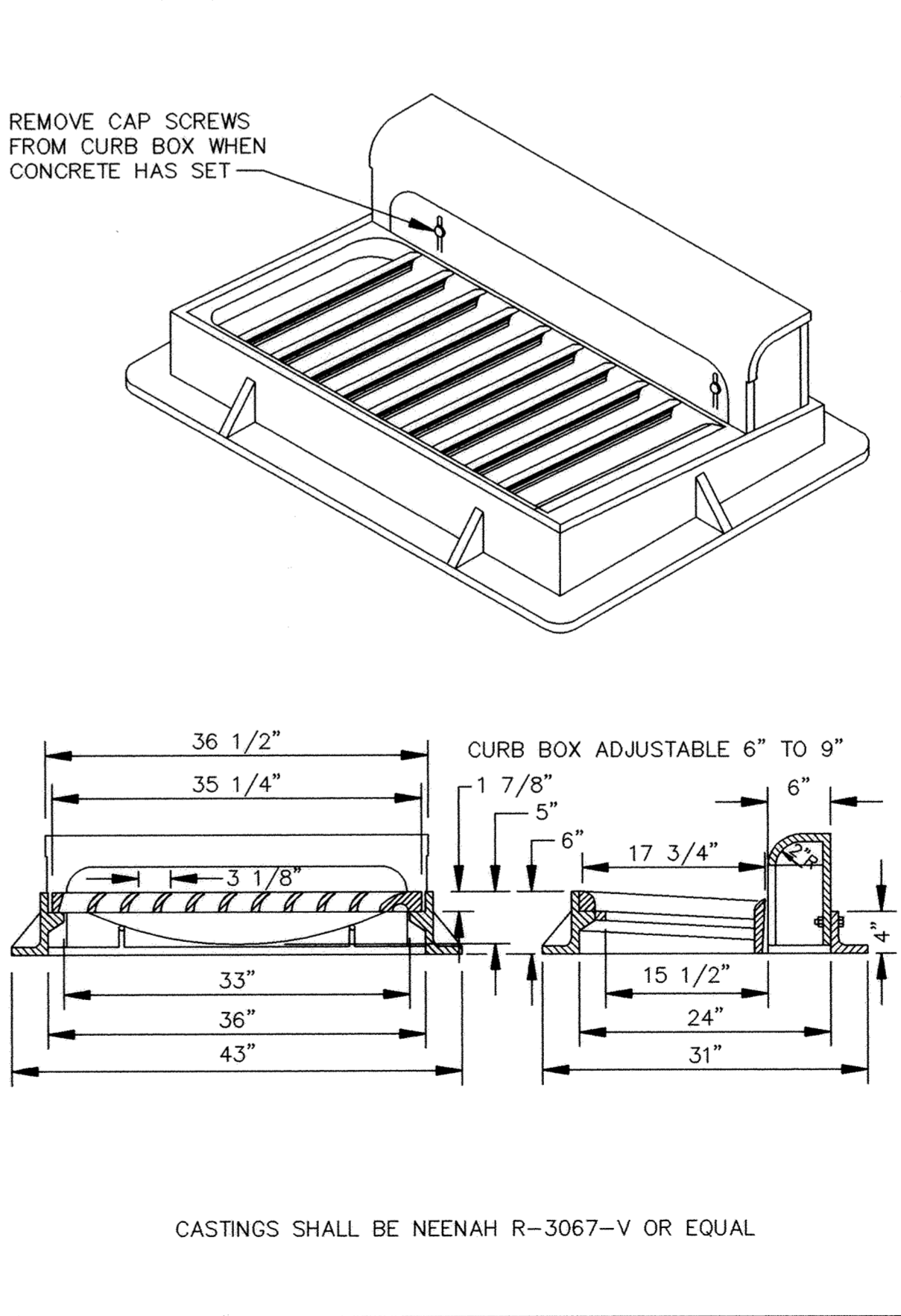
- HOLES SHALL BE CAST-IN OR DRILLED 16" FROM OUTSIDE EDGE OF JOINT.
- NUTS AND WASHERS ARE NOT REQUIRED ON INSIDE OF PIPE WITH 27" DIAMETER OR LESS.
- TIES ARE NOT REQUIRED FOR BELL PIPE 24" AND SMALLER. ON OTHER SIZES, TIE MAY BE INSERTED FROM INSIDE.
- CUT THREADS MAY BE USED IF WASHER AND NUT ARE USED.
- PIPE SIZES LISTED ARE INSIDE DIAMETER OF ROUND PIPE OR EQUIVALENT DIAMETER OF PIPE ARCH.

PLACEMENT OF HOLES

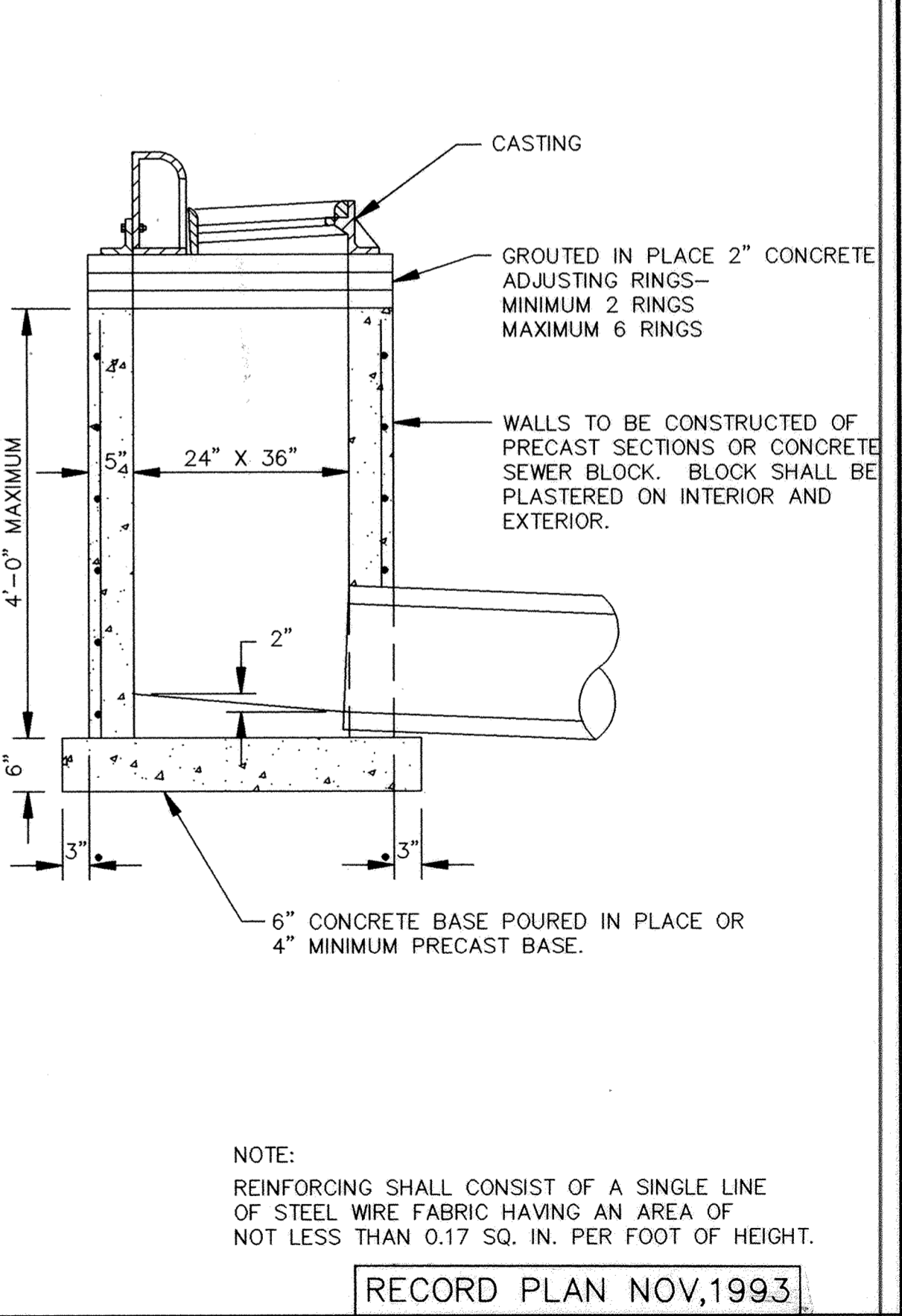
CONCRETE PIPE JOINT TIES



BEEHIVE CASTING



STANDARD INLET CASTING



SHALLOW CATCH BASIN

ER159-04

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Jerry J. Maier

DATE 4/22/93 REG. NO. 15316

CONSULTING ENGINEERS

Maier Stewart & Associates Inc.

1959 SLOAN PLACE (612) 774-6021 ST. PAUL, MINNESOTA 55117
9800 SHELARD PARKWAY (612) 546-0432 MINNEAPOLIS, MINNESOTA 55441

DATE	DESCRIPTION	DESIGNED	SJM
		CHECKED	TJM
		DRAWN	CLS
		GRAPHIC SCALE	
		0 HORIZ.	
		0 VERT.	

CITY OF ELK RIVER
HERITAGE LANDING
STORM SEWER DETAILS

DATE APRIL 1993 SHEET 28 OF 28 SHEETS PROJECT NO. 230-159