

Drain Line "A"
Sta. 3+87±
End 24" RCP
Inv. = 8.00

PACIFIC OCEAN

End Riprap Armor
Sta. 4+10±

Anchor Collar
(Typ.)

Begin Riprap Armor
Sta. 3+25

Drain Line "A"
Scheme 1
Sta. 2+00 to
Sta. 4+10±

Drain Line "A"
Sta. 2+00
Type "D" SDMH
Top = 9.0±
Inv. = 4.00

Drain Line "A"
24" RCP
For Profile
See Plan Sht.
No. H2

Drainage
Easement

6102.62N
4461.70E

E.P. Gate
149°-36±

Drain Line "A"
Sta. 0+60
Type A-9P GDI #1
Top = 9.0±
Inv. = 4.70

07°-57'-32"

10.00

SMH

A.C. Pavt.

R/W

Guy Wire

CRM Headwall

Relocated as Shown

Coconut Tree
(Typical)

Wooden Fence

Drainage Easement

Hibiscus Hedge

SMH

Drain Line "B"
Sta. 1+40.37
Type A-9P GDI #2
Top = 17.3±
Inv. = 11.56
Top = 17.41
Inv. = 11.25

Sta. 4+57±

Drain Line "B"
Sta. 4+57± 5+00.27
End 24" RCP at
Exist. CRM Headwall
Top = 10.9±
Inv. = 7.50
Top = 9.50
Inv. = 7.23

Highwater
Mark

Relocated as Shown
Coconut Tree
(Typical)

Wooden Fence

155°-30'
78.60

155°-30'
160°-24'

Wooden Fence

Drainage Easement

155°-30'
91.60

CRM Wall

Relocated as Shown

155°-02'
10.00

155°-42'-30"

58.98

151°-03'
108.21

Hollow Tile Wall

Drain Line "B"
24" RCP
For Profile See
Plan Sht. No. H2

61°-01'
12.00

R/W

W12

W6

W12

W6

W12

W6

W12

W6

W12

W6

W12

W6

W12

W6

W12

W6

227°-27'
12.62

Drain Line "B"
Sta. 4+57± 4+17.35
Type "A" SDMH
Top = 12.0±
Inv. = 8.00
Top = 12.64
Inv. = 7.53

SMH
Top = 12.2±
Inv. = 5.21

335°-50'
107.72

335°-50'

Drain Line "B"
Sta. 2+62± 2+10.61
Type "A" SDMH
Top = 16.3±
Inv. = 10.34
Top = 15.16
Inv. = 8.68

334°-46'-30"

52.01

151°-03'
151°-37'

331°-03'
108.00

WV

Sign Guy Wire

6308.60N
5016.10 E

W12

W6

W12

W6

W12

W6

W12

W6

W12

W6

W12

W6

W12

W6

W12

True North
Scale: 1"=40'

GENERAL NOTES

1. The Contractor shall maintain an access to the surrounding properties at all times.
2. Location of existing utility lines are taken from past record drawings and are only approximate. Contractor shall verify and locate all utility lines and crossings prior to new construction.
3. Any existing utility lines, damaged during new construction shall be repaired or replaced by the contractor at his own expense.
4. Coordinates for Drain Line "B" referred to Puunene 2, 1950." Δ
5. Highwater mark at seashore surveyed by Maui Highway District Office Nov. 9, 1984.

DRAINAGE NOTES

1. Existing drainage system will be functional at all times during new construction. Contractor shall furnish materials, equipment, labor and tools, and incidentals necessary to accomplish maintenance of flow, the cost of which shall be incidental to the various contract items.
2. For A.C. Pavement restoration detail, see plan sht. H2.

Sta. 0+00 to Sta. 1+40 (Drain Line "B")
Construct: Type A-9P GDI #1 (For detail see plan sht. no. H2)
Install: 24" RCP, CL. III

Estimated Quantities
Structure Exc. 105 C.Y.
24" RCP, Class III 140 L.F.
Type A-9P GDI, 4.00 Feet to 4.99 Feet 1 EA.

Sta. 1+40 to Sta. 2+62 (Drain Line "B")
Construct: Type A-9P GDI #2 (For detail see plan sht. no. H3)
Install: 24" RCP, CL. III

Estimated Quantities
Structure Exc. 90 C.Y.
24" RCP, Class III 122 L.F.
Type A-9P GDI #2, 5.00 Feet to 5.99 Feet 1 EA.

Sta. 2+62 to Sta. 4+57± (Drain Line "B")
Construct: Type "A" SDMH
Install: 24" RCP, CL. III

Estimated Quantities
Structure Exc. 140 C.Y.
24" RCP, Class III 195 L.F.
Type "A" SDMH, 5.00 Feet to 5.99 Feet 1 EA.

Sta. 4+57 to 4+97± (Drain Line "B")
Construct: Type "A" SDMH
CRM Headwall (For detail see plan sht. no. H2)
Install: 24" RCP, Class III

Estimated Quantities
Structure Exc. 35 C.Y.
24" RCP, Class III 40 L.F.
Type "A" SDMH, 4.00 Feet to 4.99 Feet 1 EA.
CRM 3 C.Y.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	36A-01-84	1986	3	8

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

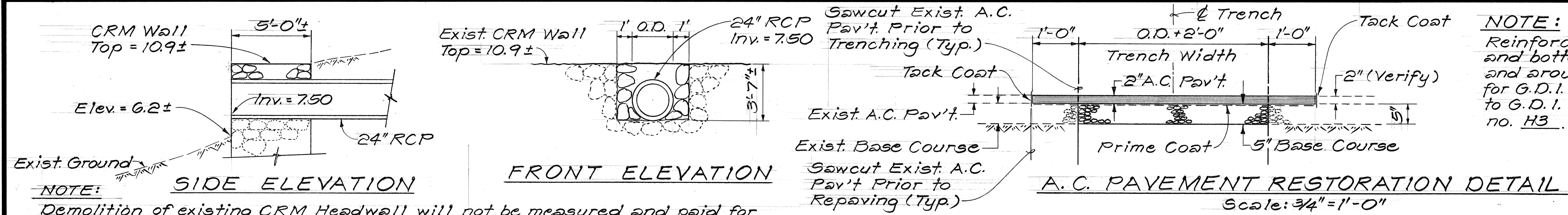
HANA HIGHWAY DRAINAGE
IMPROVEMENTS AT PAIA
PROJECT NO. 36A-01-84

SCALE: AS NOTED DATE: MAY 1986
SHEET No. H1 OF 6 SHEETS

SURVEY PLOTTED BY	DATE
DESIGNED BY	
NOTED BY	
CHECKED BY	

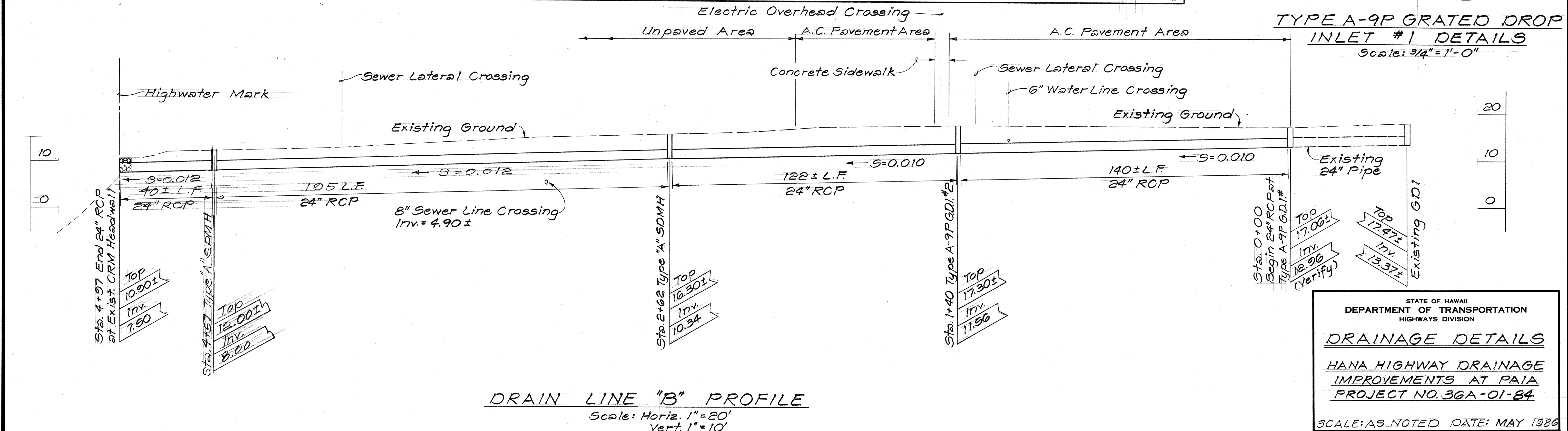
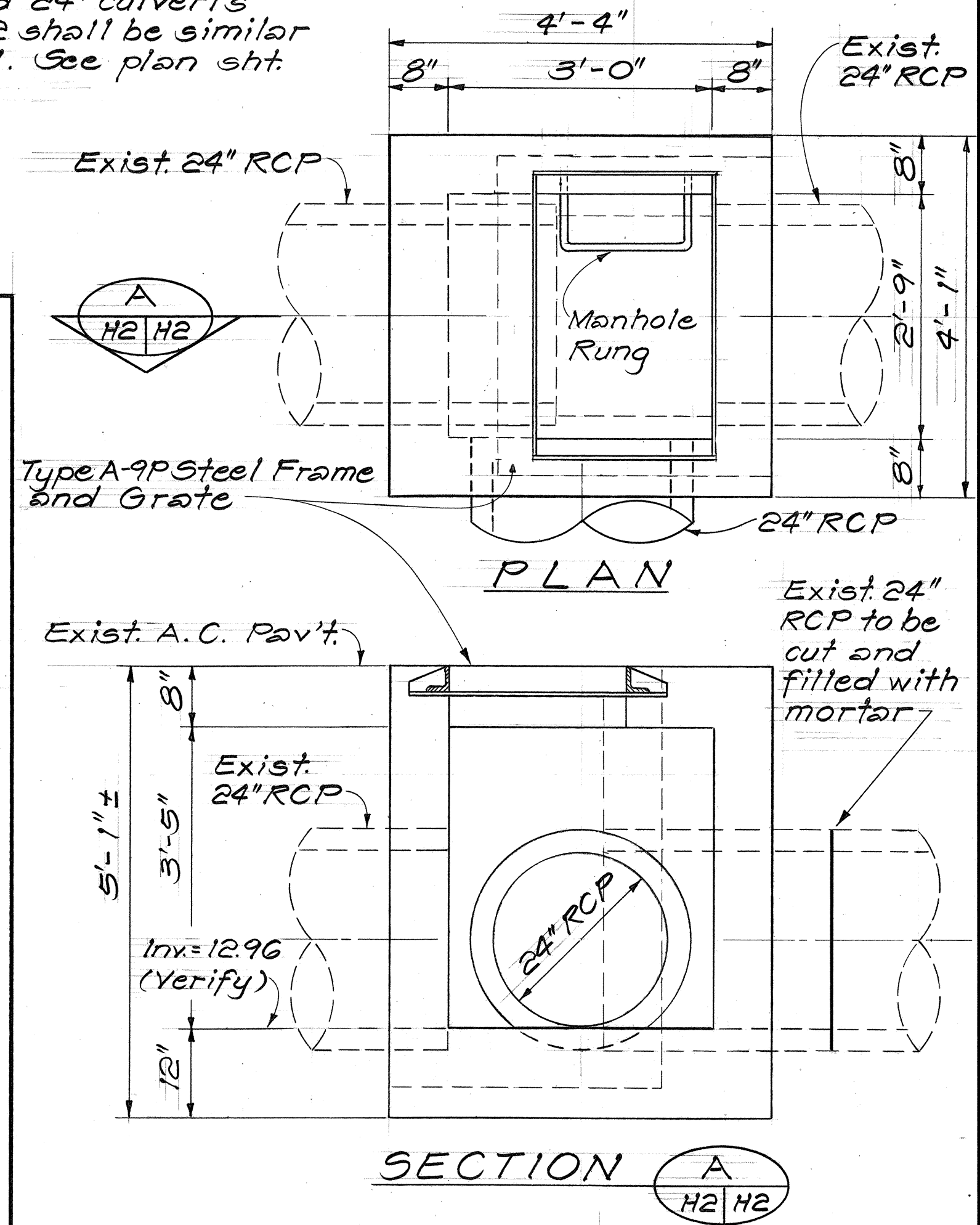
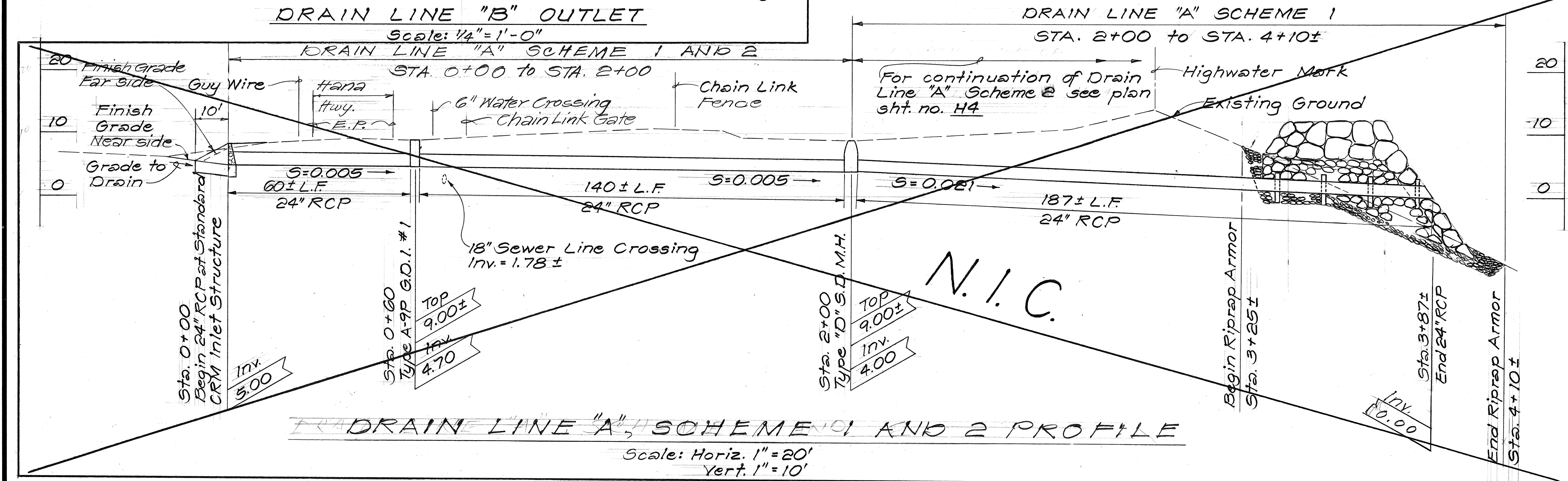
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	36A-01-84	1986	4	8



NOTE:
Reinforcing Steel at top and bottom slab, walls, and around 24\"/>

NOTE:
Demolition of existing CRM Headwall will not be measured and paid for separately but shall be considered incidental to the Cement Rubble Masonry.



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

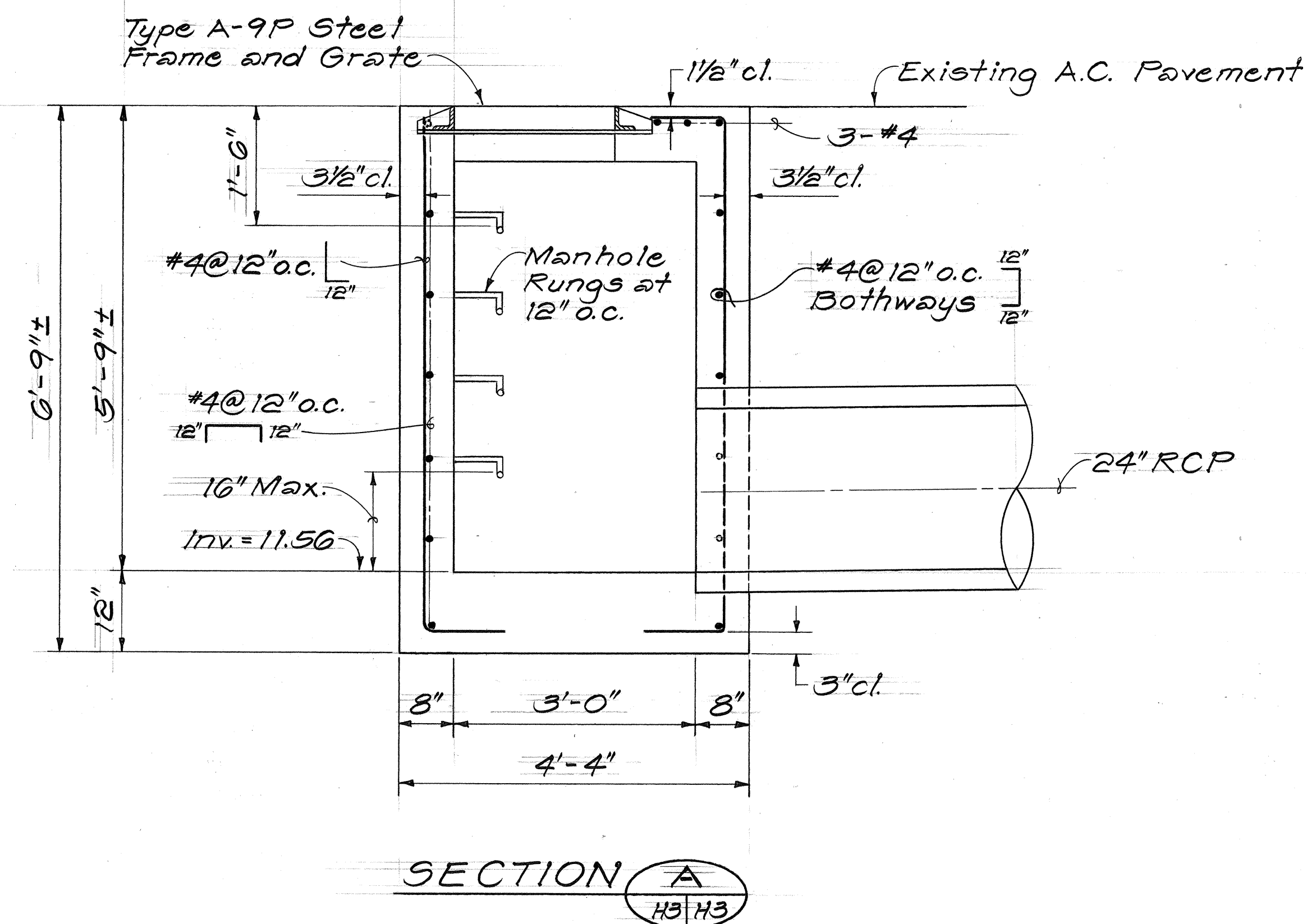
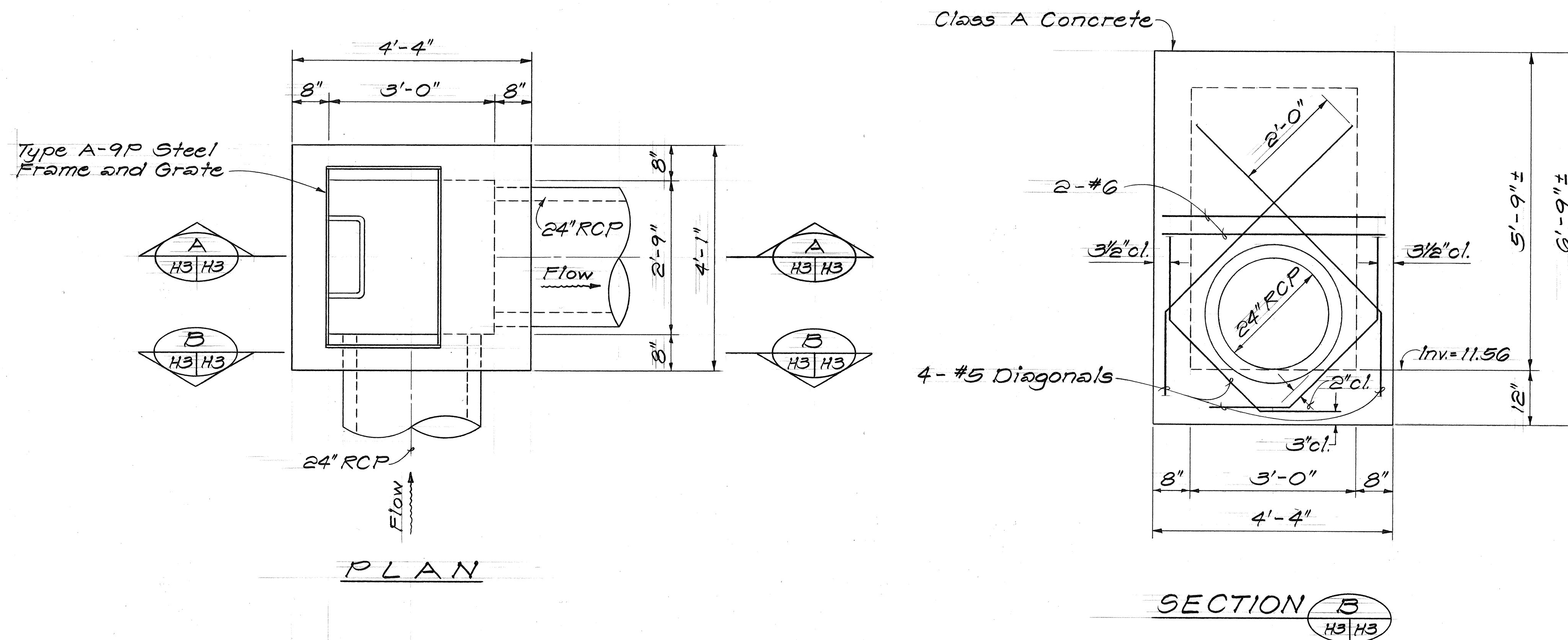
DRAINAGE DETAILS

HANA HIGHWAY DRAINAGE
IMPROVEMENTS AT PAIA
PROJECT NO. 36A-01-84

SCALE: AS NOTED DATE: MAY 1986
SHEET NO. H2 OF 6 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
NO.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	36A-01-84	1986	5	8



TYPE A-9P GRATED DROP INLET #2 DETAILS

Scale: 3/4" = 1'-0"

STATE OF HAWAII	
DEPARTMENT OF TRANSPORTATION	
HIGHWAYS DIVISION	
DRAINAGE DETAILS	
HANA HIGHWAY DRAINAGE	
IMPROVEMENTS AT PAIA	
PROJECT NO. 36A-01-84	
SCALE: AS NOTED DATE: MAY 1986	
SHEET NO. H3 OF 6 SHEETS	

ORIGINAL	SURVEY PLOTTED BY	DATE
PLAN	DRAWN BY	
NOTE BOOK	TRACED BY	
	CHECKED BY	
	NO.	

The diagram illustrates a manhole structure with the following dimensions and components:

- Top Section:** A culvert is shown at the top, with a diameter of 8".
- Manhole Rung:** A circular structure is shown inside the manhole, with a diameter of 8".
- Manhole Body:** The main body of the manhole is shown with a diameter of 8".
- Manhole Types:** The manhole is labeled with "Type A", "Type B", and "Type C".
- Dimensions:**
 - 5'-0" (Type "A")
 - 5'-6" (Type "B")
 - 6'-0" (Type "C")

Manhole Opening

4 - #5 Diagonal Bars Bottom

22" ϕ

#5 Bars at 5 1/2" o.c. Bothways Bottom

12" Typ. (Bend As Required)

18" Bend Typ.

Horizontal "B" Bars

4 Bars at 12" o.c.

Technical drawing of a manhole section showing reinforcement details, dimensions, and materials.

Reinforcement Details:

- Top Reinforcement:** 1'-8" dimension, 12" Typ. (Bend As Required), 1 1/2" cl.
- Bottom Reinforcement:** 5 Bars at 5 1/2" o.c. Bothways, 1'-6" dimension, 1 1/4" cl.
- Manhole Rungs:** at 12" o.c. (Incidental to Cl. A Concrete)
- Horizontal "B" Bars:** (See Table)
- Class A Concrete:** Main body of the manhole.
- Culvert Section:** 16" Max. dimension, 1 1/2" cl., 5 Bars at 8" o.c. Bothways, 8" dimension, 3" cl.

Dimensions:

- 4 1/8"
- 5'-0"
- 1'-6"
- 3 1/2" cl.
- 5'-0"
- 20'-0" Max.
- 5'-0"
- 5'-0"
- 16" Max.
- 8"
- 3" cl.
- 8"
- Varies
- 8"

Other Labels:

- Finish Grade
- See Detail "A" for added reinforcing around culvert
- See Detail of Culvert Sec for added reinforcing

Required)

Grade

3  at 16" o.c.

1 1/2" cl.

2" cl.

5 Bars at 8" o.c. Bothways

3" cl.

3" cl.

16"

12" Minimum

3 - # 6 Bars Top and Bottom

Culvert

Technical drawing of a culvert cross-section showing reinforcement details. The culvert is circular with a 2" cl. diameter. It is surrounded by a concrete structure with a 1:1 slope. Reinforcement includes 2 - #6 Bar, 4 - #6 [12" at 4" o.c.], 4 - #5 Diagonal Bars, and 2' - 0" Typ. (Bend As Required). Dimensions include 3 1/2" cl., 3" cl., 12", and 3" cl. The drawing also shows a 2" cl. diameter for the culvert and a 3" cl. diameter for the pipe. The outer diameter is indicated at the bottom.

"H" MAX. (FT.)	HORIZONTAL "B" BARS
0' - 0" to 5' - 0"	# 4 at 12" o.c.
5' - 1" to 10' - 0"	# 4 at 9" o.c.
10' - 1" to 15' - 0"	# 4 at 6" o.c.
15' - 1" to 20' - 0"	# 5 at 6" o.c.

NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 5 approved 12 - 17 - 69	H.C.	8/20/70
2.	Revise horizontal bar table and detail notes.	H.C.	4/21/71

APPROVED: Herbert Zeisler 8-20-80
ASSISTANT CHIEF, ENGINEERING DATE

STANDARD DETAILS

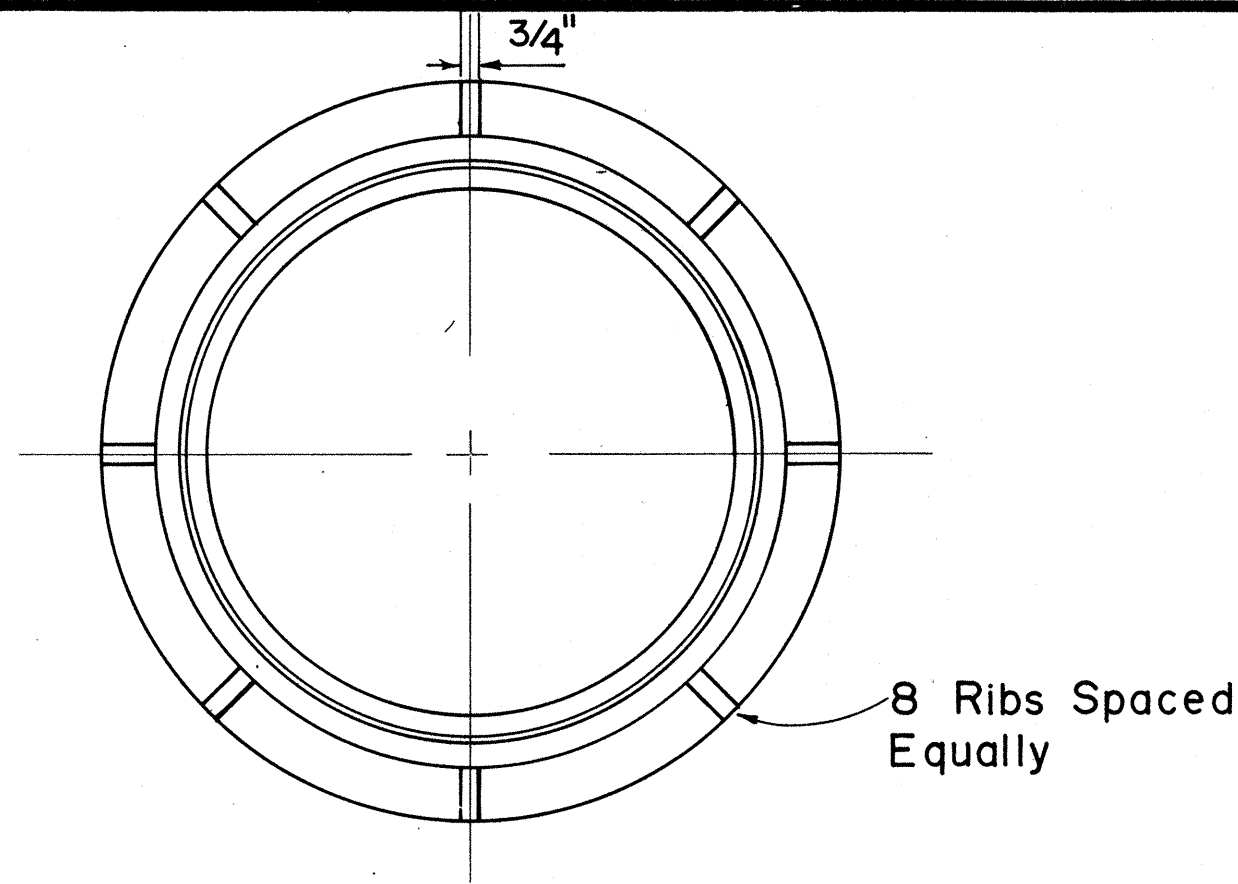
TYPE A, B, AND C

STORM DRAIN MANHOLE

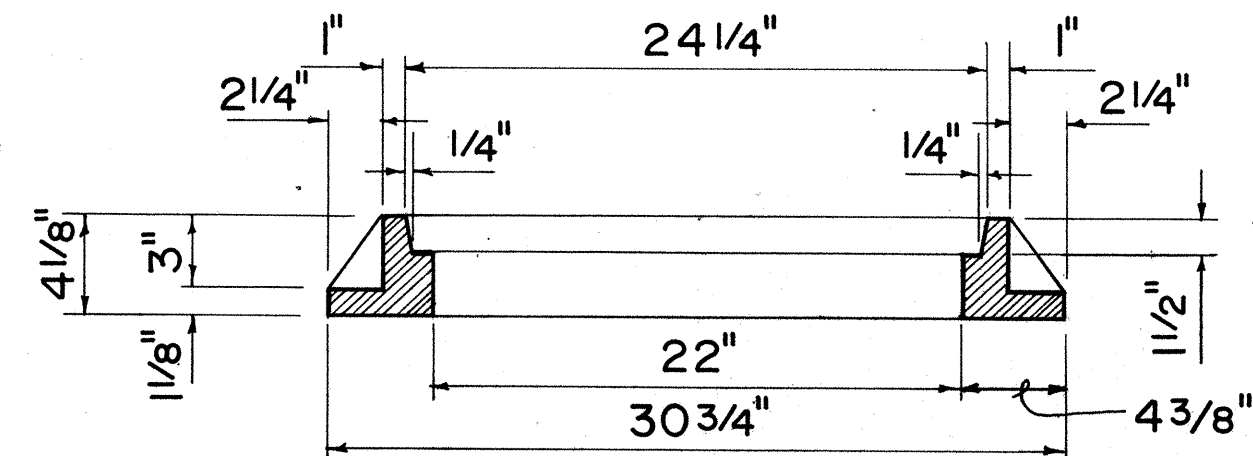
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SHEET No. 44 OF 6 SHEETS DH5

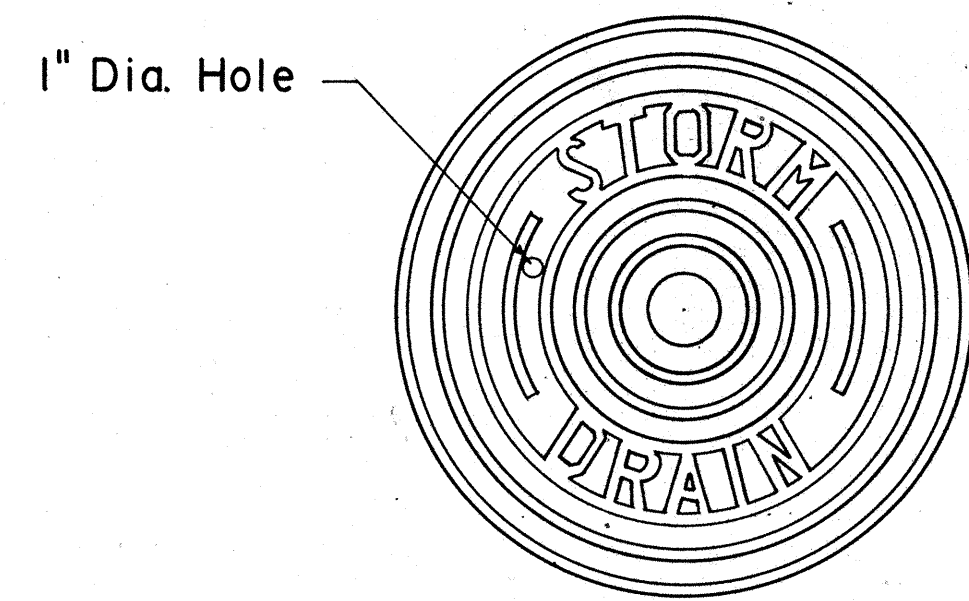
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	36A-01-84	1986	7	8



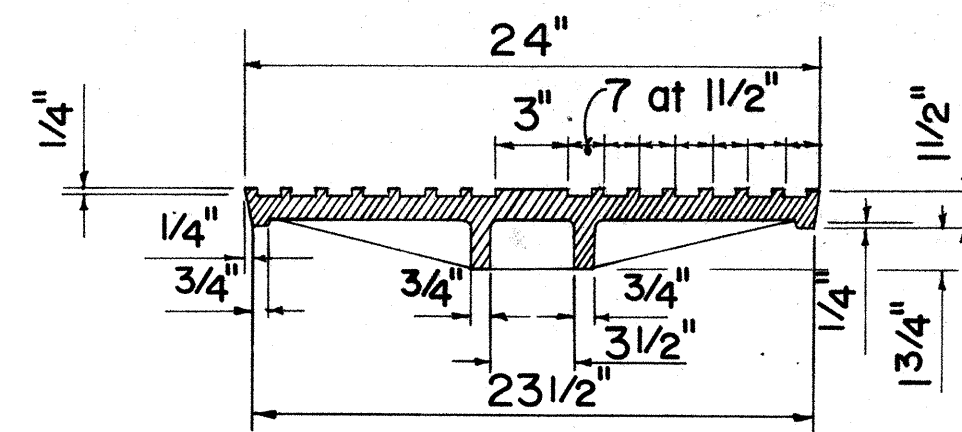
PLAN OF FRAME



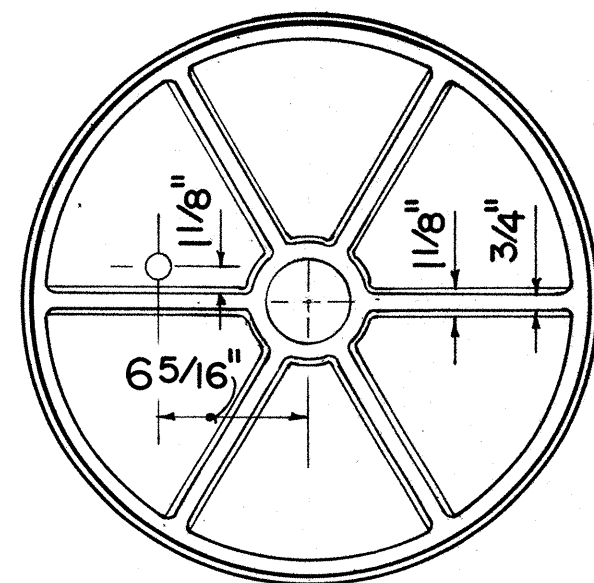
SECTION OF FRAME



TOP VIEW OF COVER

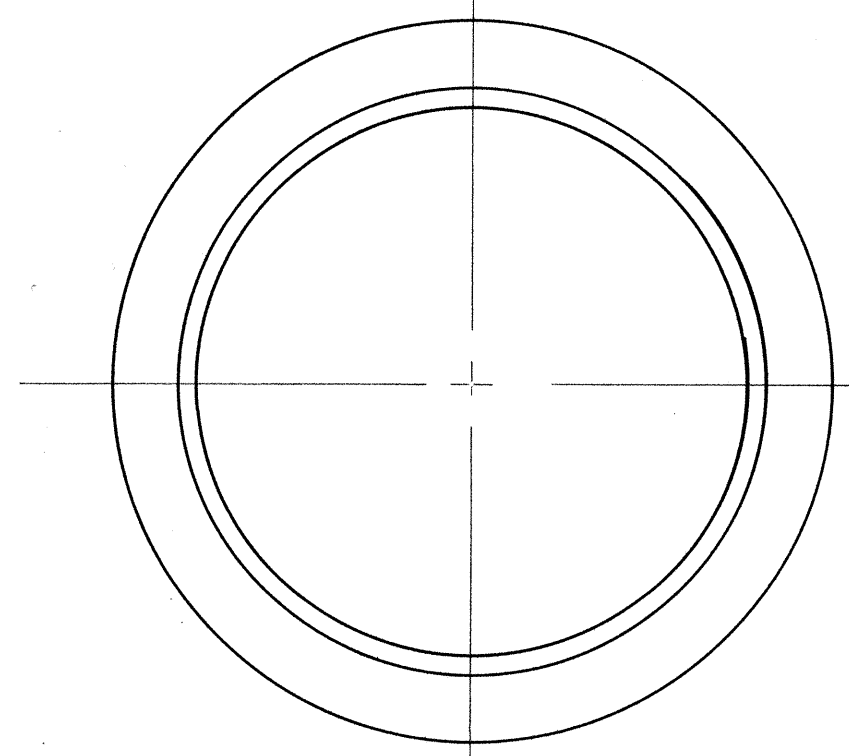


SECTION

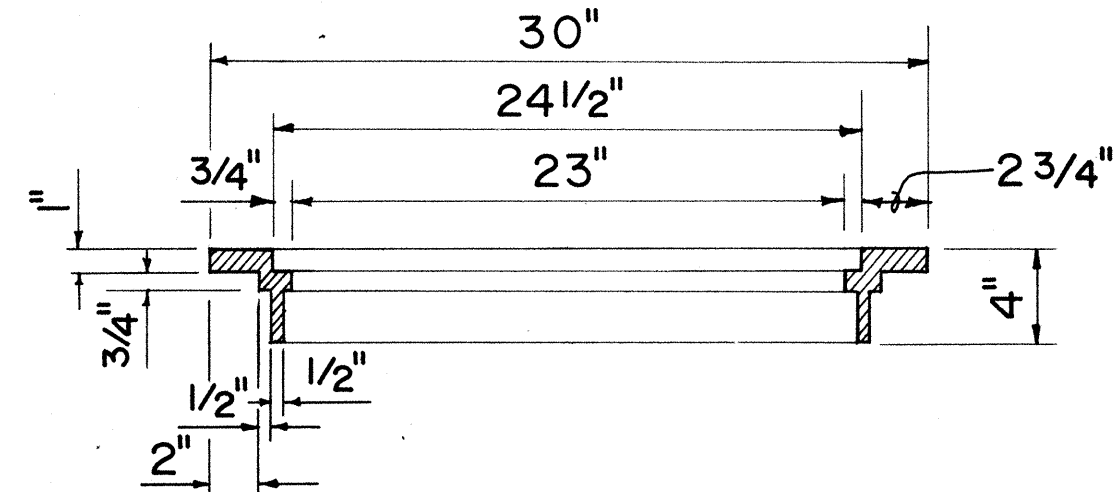


BOTTOM VIEW OF COVER

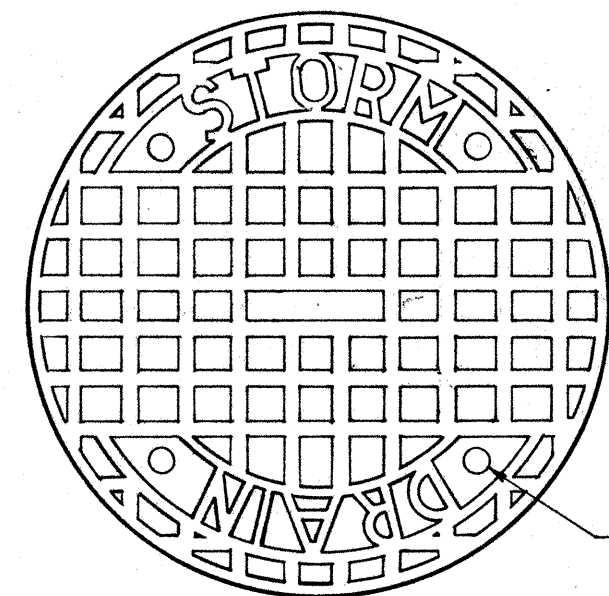
TYPE "P" CAST IRON
FRAME AND COVER



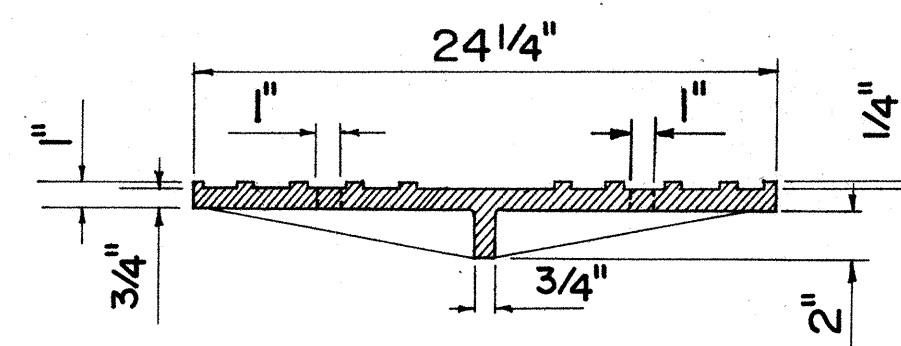
PLAN OF FRAME



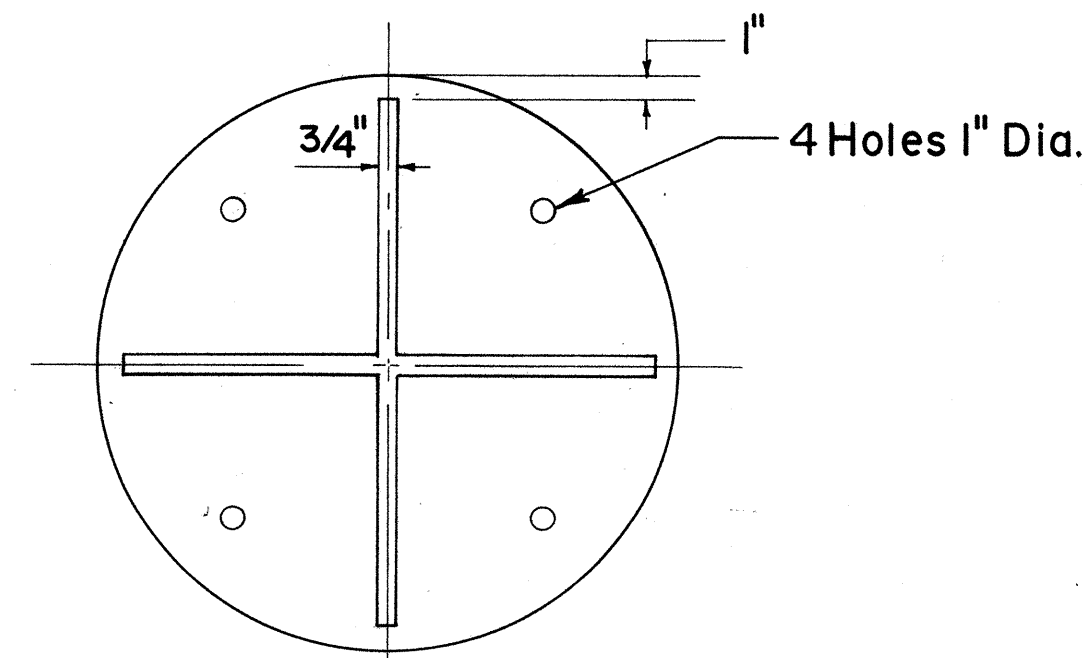
SECTION OF FRAME



TOP VIEW OF COVER

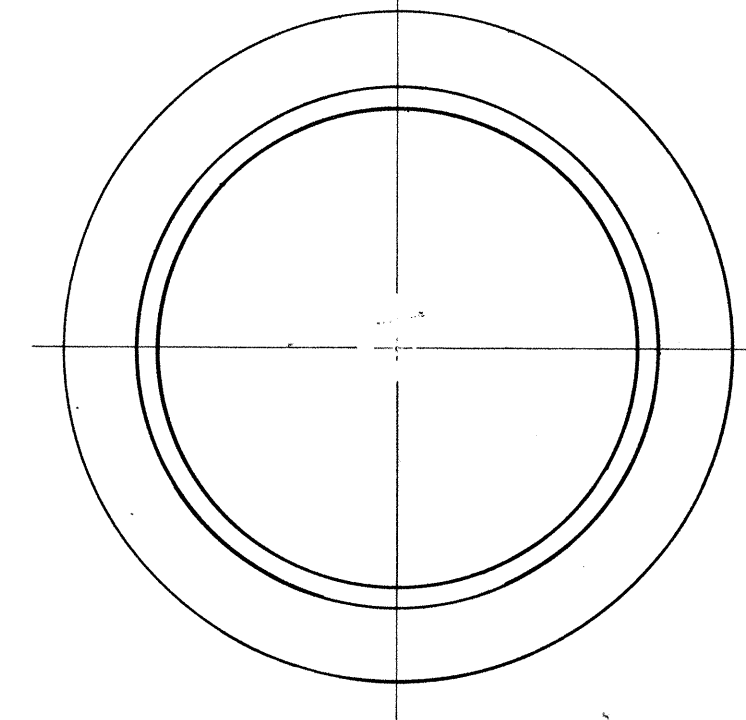


SECTION

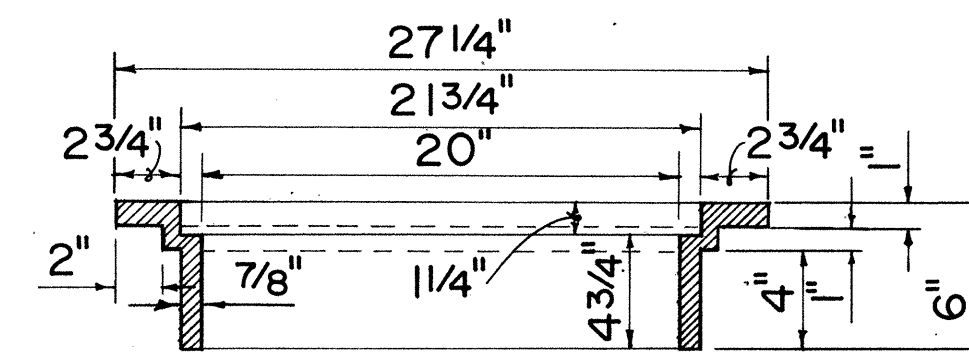


BOTTOM VIEW OF COVER

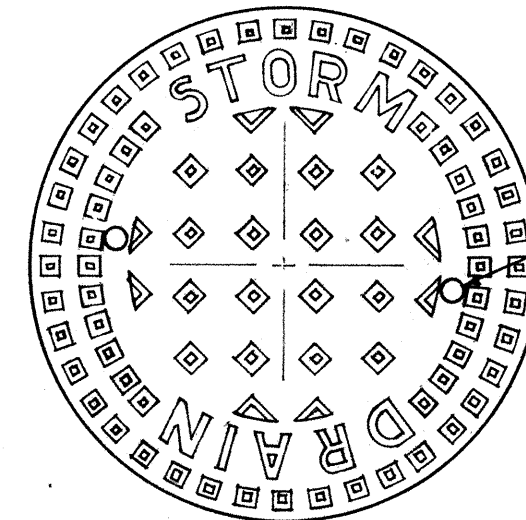
TYPE "B" CAST IRON
FRAME AND COVER



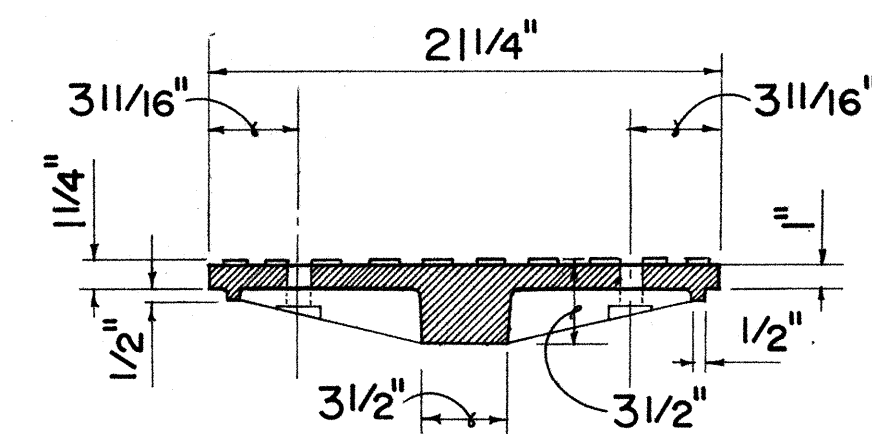
PLAN OF FRAME



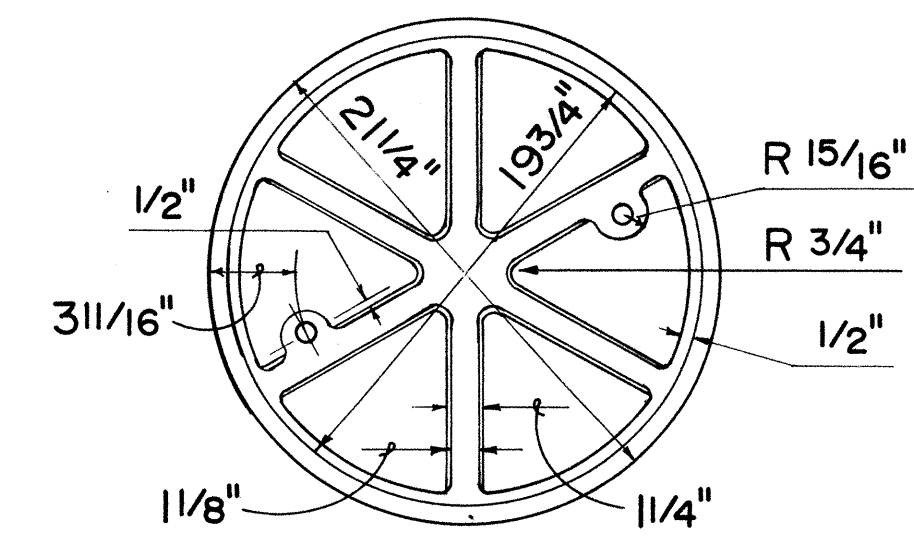
SECTION OF FRAME



TOP VIEW OF COVER

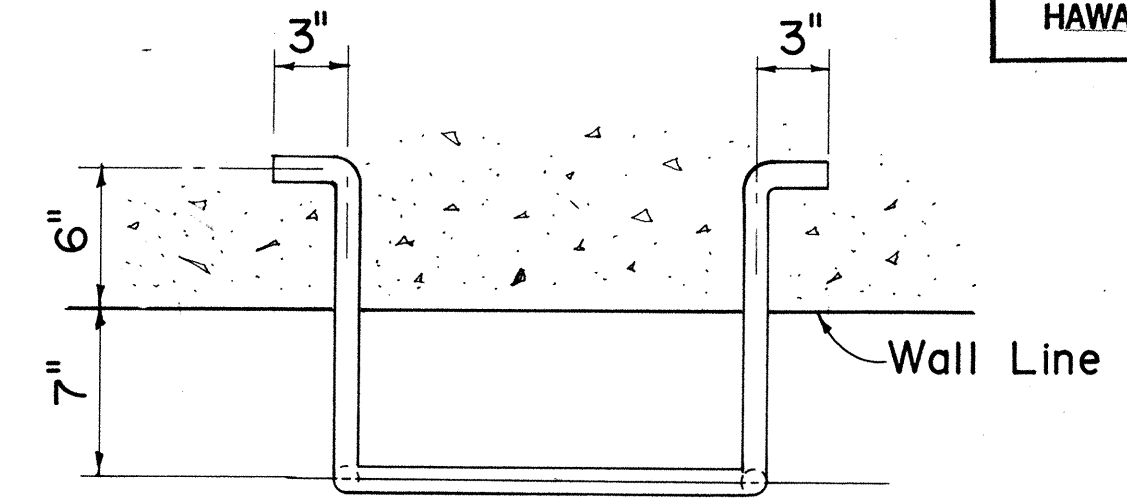


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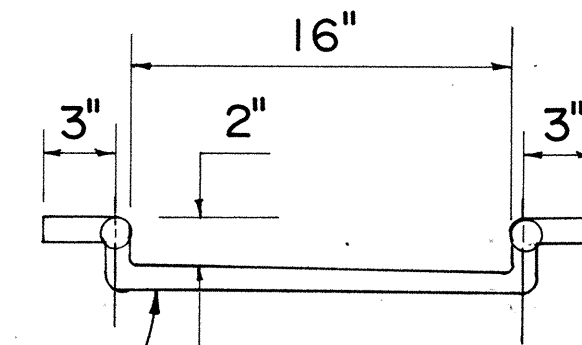


BOTTOM VIEW OF COVER

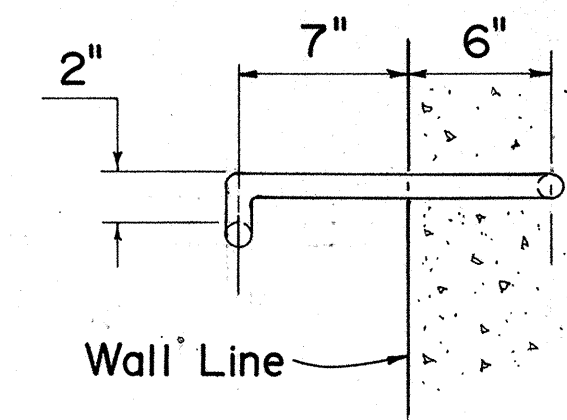
TYPE "A" CAST IRON
FRAME AND COVER



PLAN



FRONT VIEW



SIDE VIEW

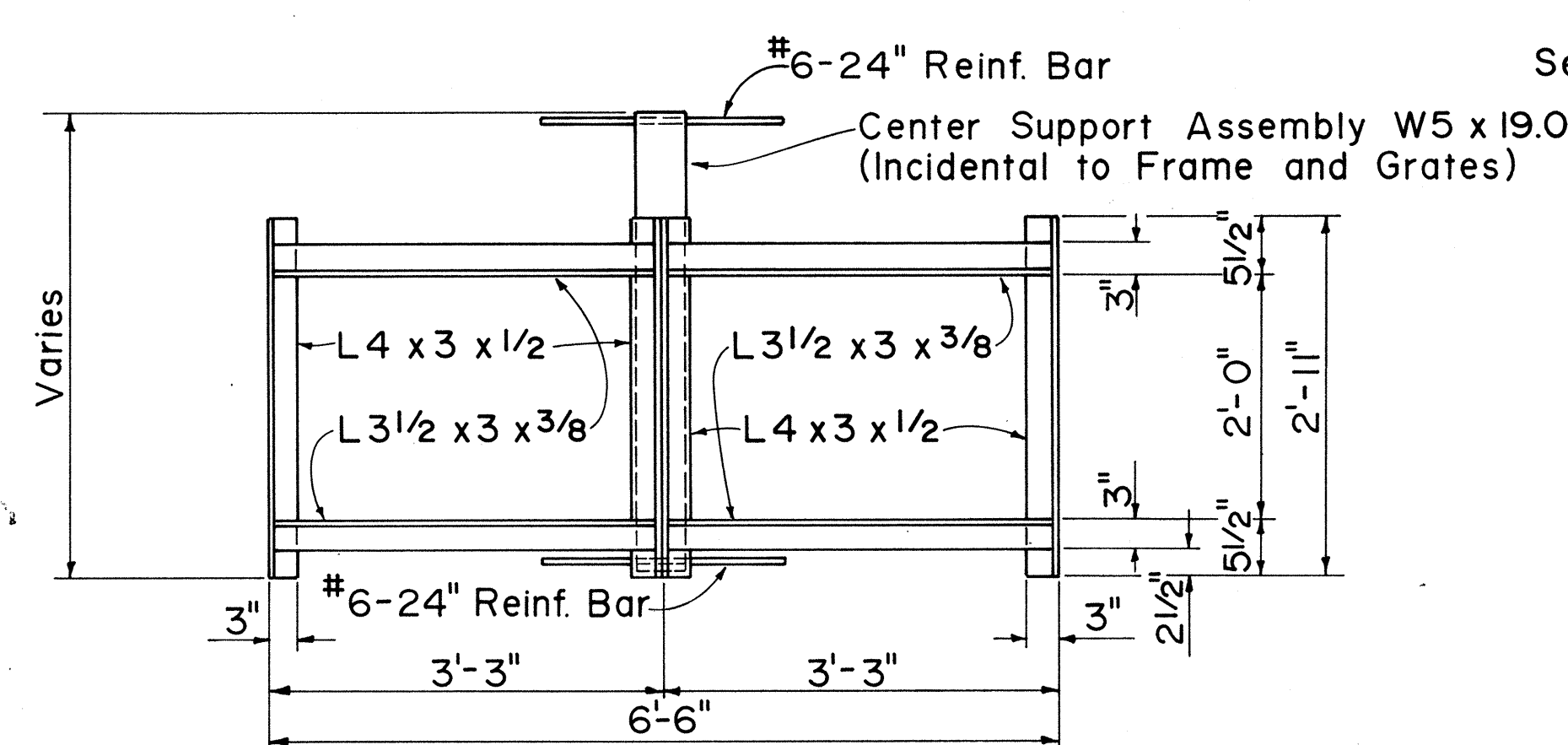
MANHOLE RUNG

APPROVAL RECOMMENDED:
 T. Takano 6-19-79
 HYDRAULIC DESIGN ENGINEER DATE
 APPROVED:
 Herbert Zaleishi 6-22-79
 ASSISTANT CHIEF, ENGINEERING DATE

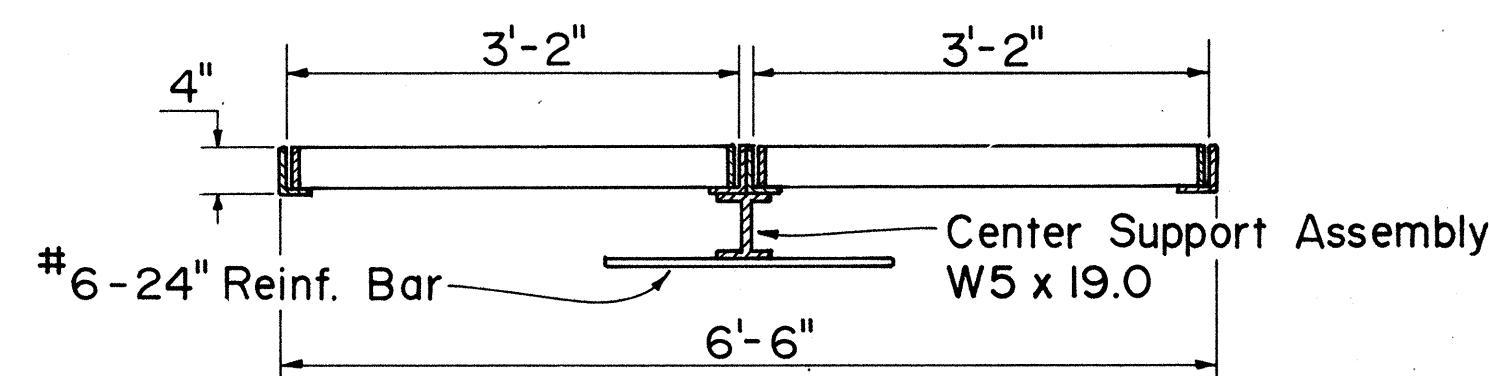
NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 6 approved 12-17-69	H.T.	6/22/79

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STANDARD DETAILS CATCH BASIN AND MANHOLE CASTINGS
Not To Scale Date: Dec. 1977
SHEET No. 45 OF 6 SHEETS DH 8

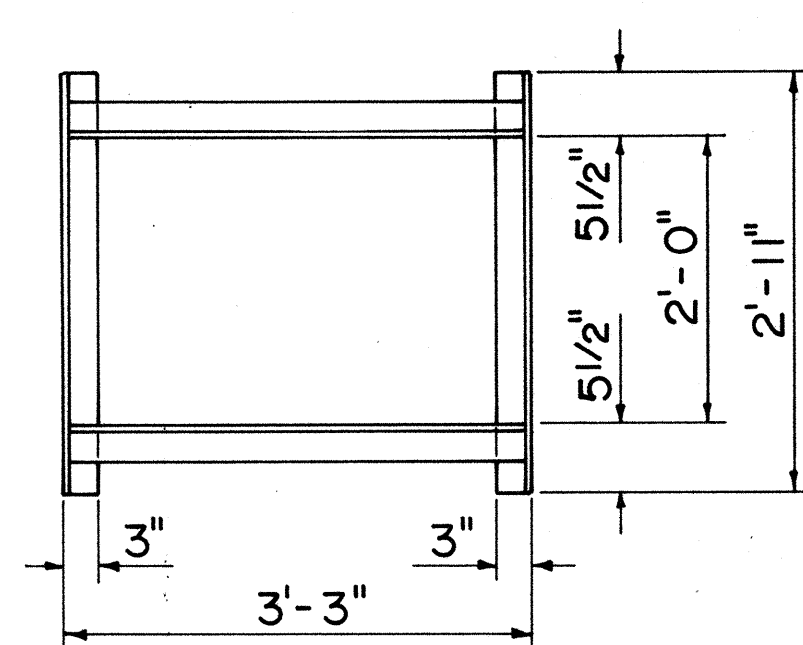
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	36A-01-84	1986	8	8



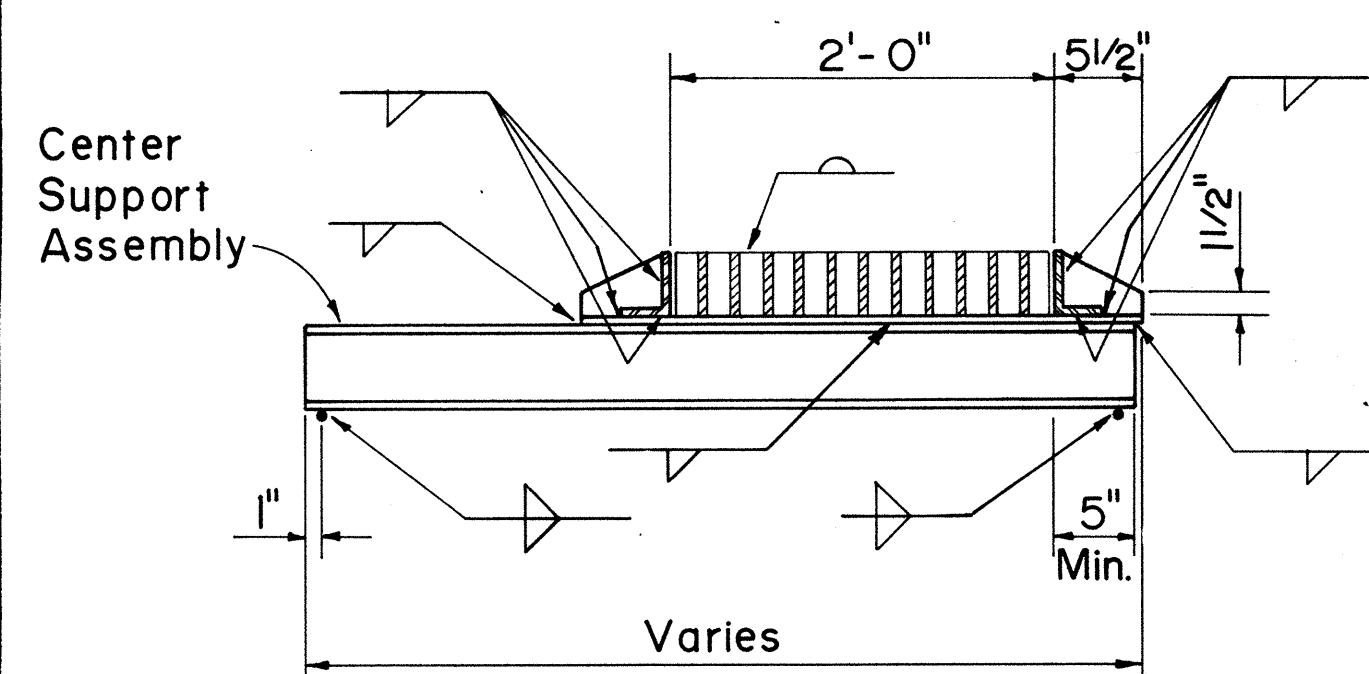
PLAN
(Two or More Grates)



LONGITUDINAL SECTION
(Thru Frame & Grate)

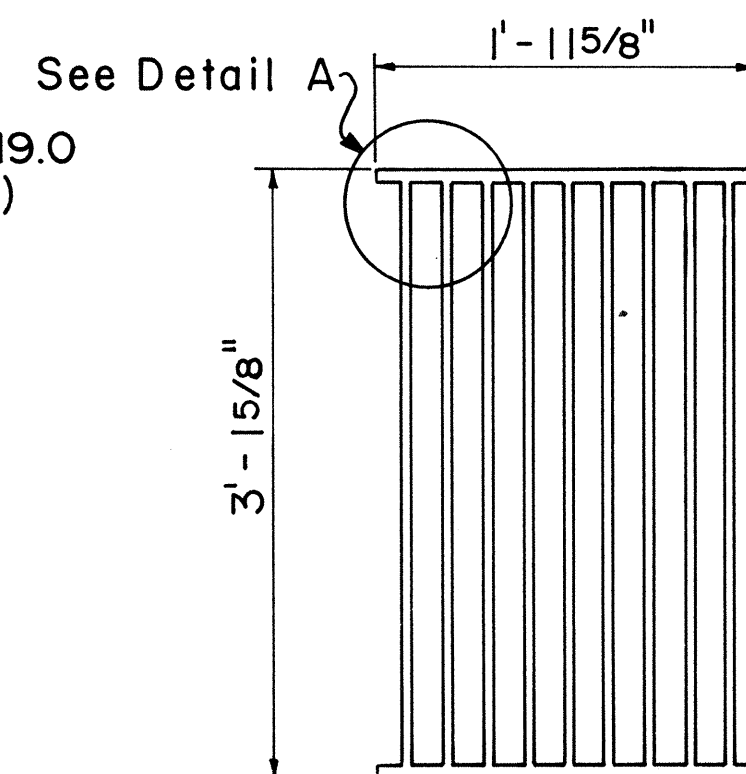


PLAN
(Single Grate)

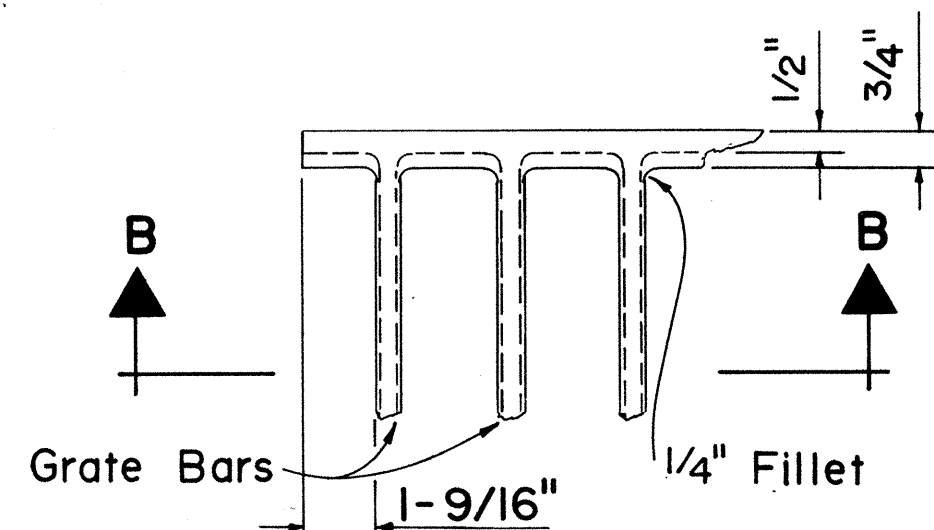


CROSS SECTION
(Thru Frame & Grate)

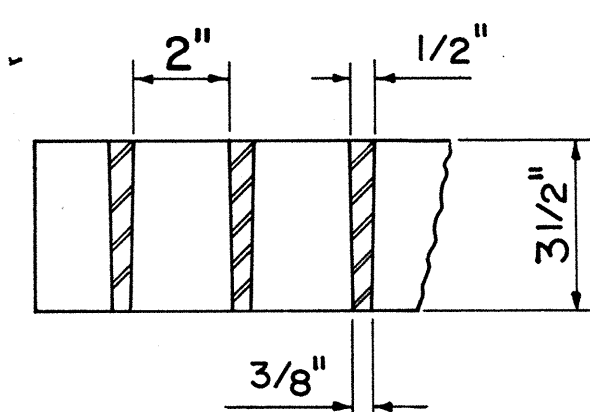
FRAME DETAILS



PLAN

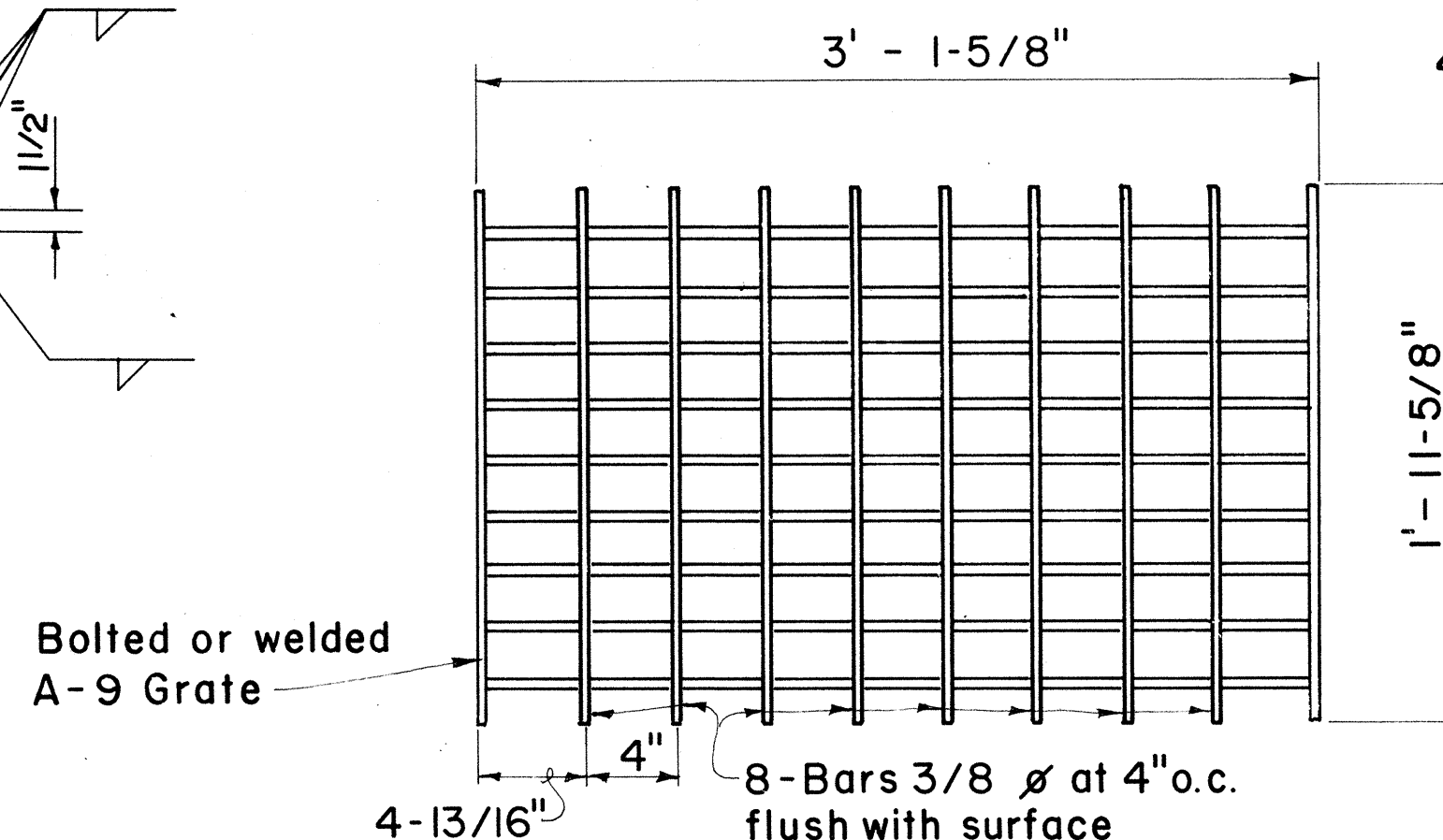


DETAIL A



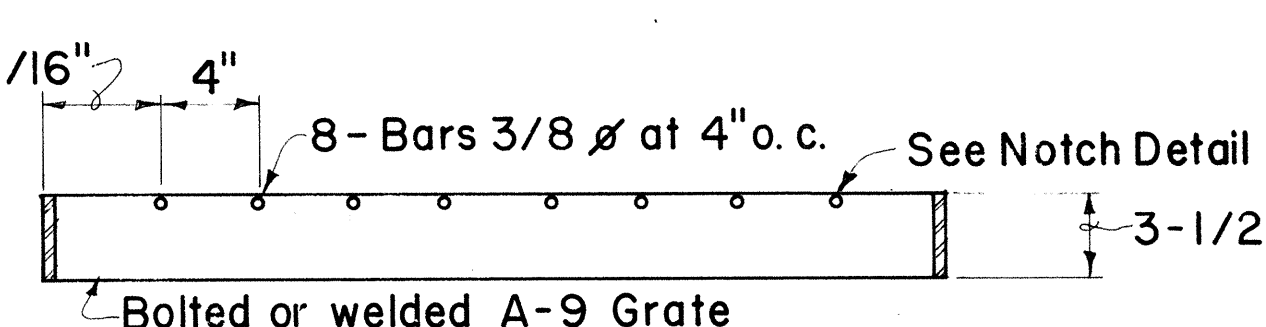
SECTION B-B

**ALTERNATIVE CAST MALLEABLE IRON
OR CAST STEEL GRATE**

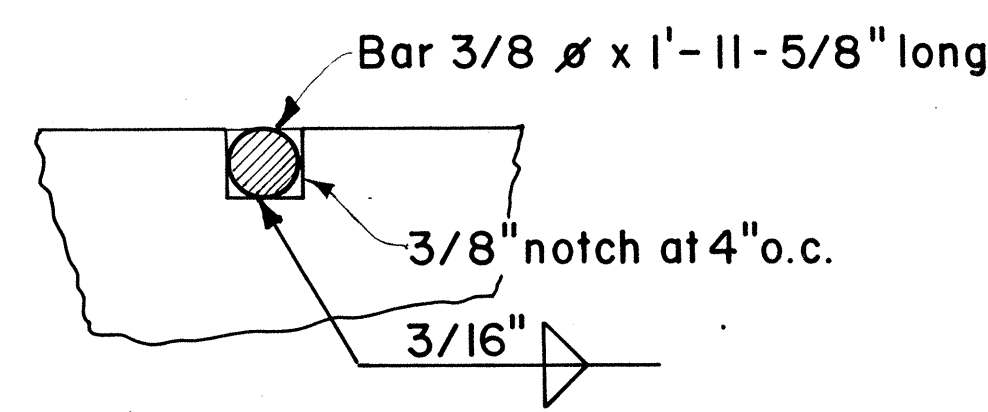


PLAN

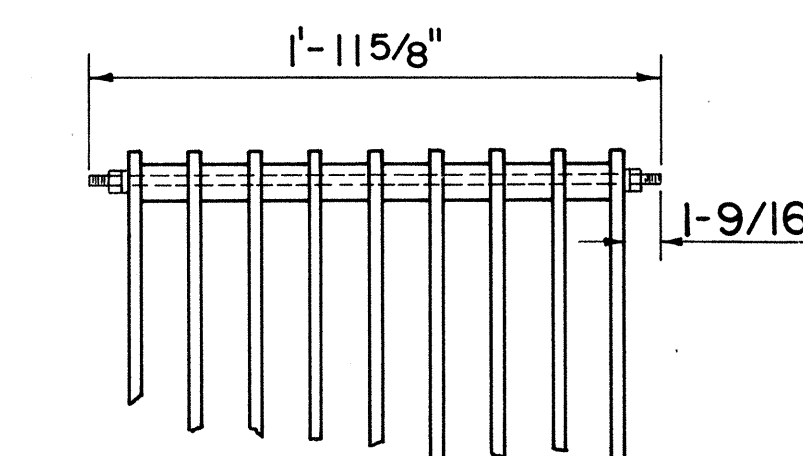
TYPE A-9P STEEL GRATE



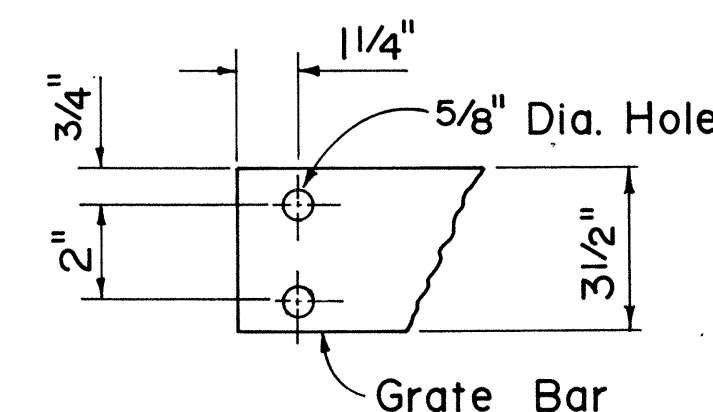
SECTION



NOTCH DETAIL

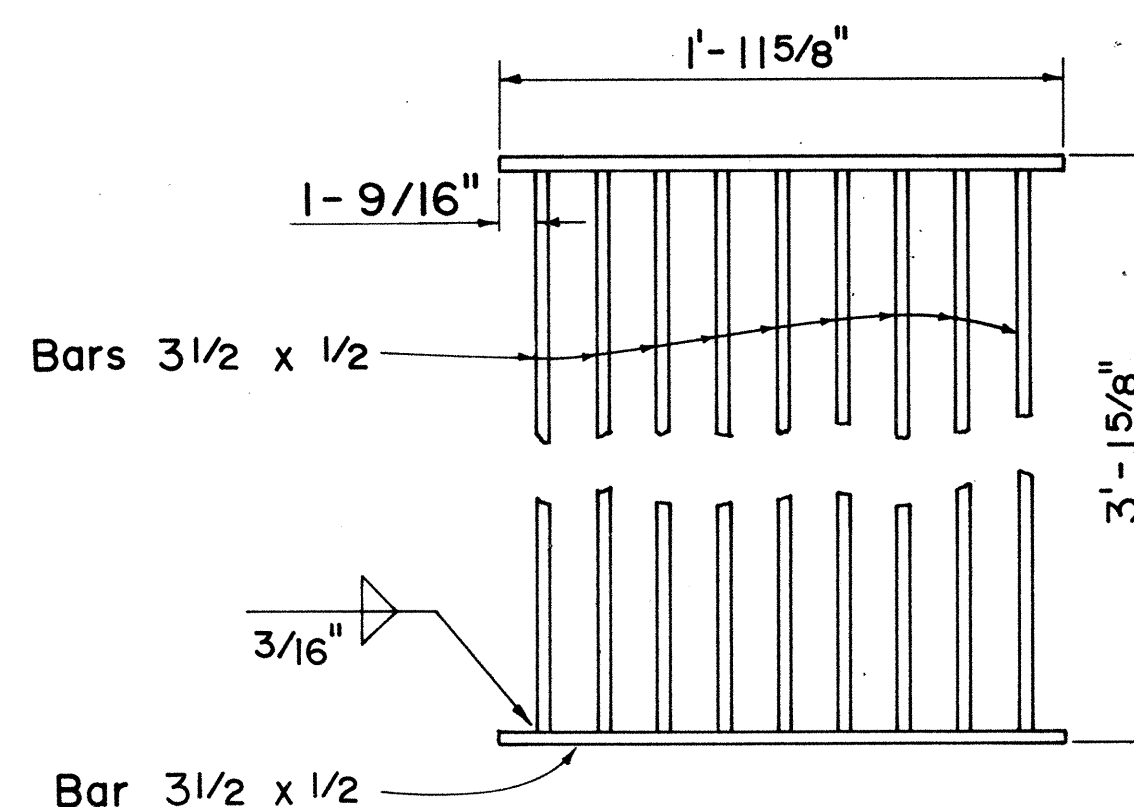


BOLTED END BLOCK



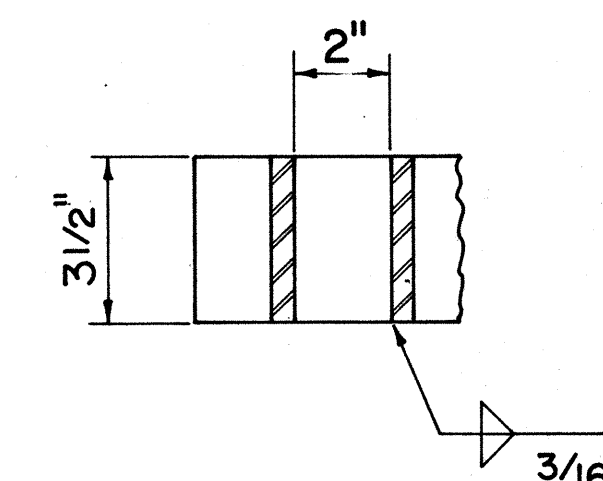
END OF BAR

ALTERNATIVE BOLTED GRATE

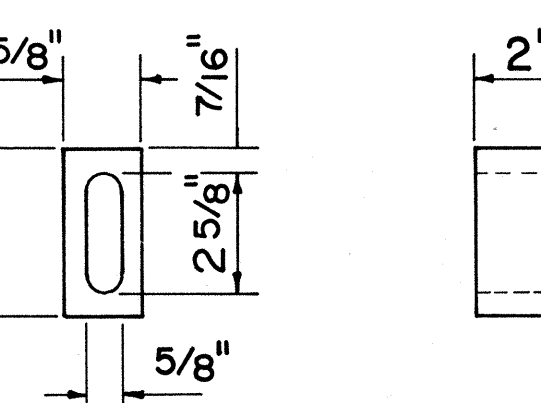


PLAN

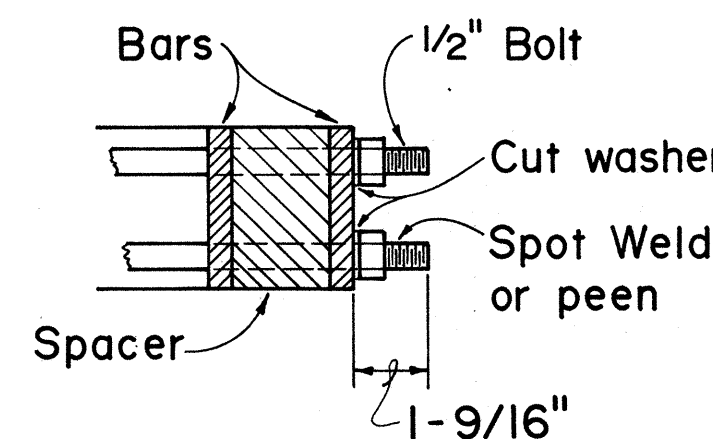
ALTERNATIVE WELDED GRATE



SECTION



BAR SPACER



BOLTING DETAIL

GENERAL NOTES

- Contractor has the option of using cast malleable iron, cast steel, welded, or bolted grate.
- All welds 3/8" unless otherwise noted.
- Type A-9 - Use in location not accessible to bicycle traffic.
- Grate shall be parallel to the direction of flow.

APPROVAL RECOMMENDED:
HYDRAULIC DESIGN ENGINEER
APPROVED:
ASSISTANT CHIEF, ENGINEERING

NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 7 approved 12-17-69	H.T.	6/20/79
2.	Revise standard nomenclature for rolled steel shapes.	H.T.	4/21/82
3.	Revised note no. 3 & no. 4 and eliminated Type A-12 Grate.	fio	7-25-84

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
TYPE A-9 AND A-9P
FRAMES AND GRATES

Not To Scale Date: Dec. 1977

SHEET NO. 46 OF 6 SHEETS DH 9