

ORIGINAL PLAN
DESIGNED BY
NOTED BY
CHECKED BY
DATE

SURVEY PLOTTED BY
DESIGNED BY
NOTED BY
CHECKED BY
DATE

DATE	REVISION
6/6/80	Revised description of Item No. 202.0410 and quantity for Item No. 206.2020, per Addendum No. 1.

DRAINAGE

SUMMARY

PROJECT : INTERSTATE ROUTE H-1 KAPIOLANI INTERCHANGE ON-RAMP

PROJECT NO : I - HI - I(157)24

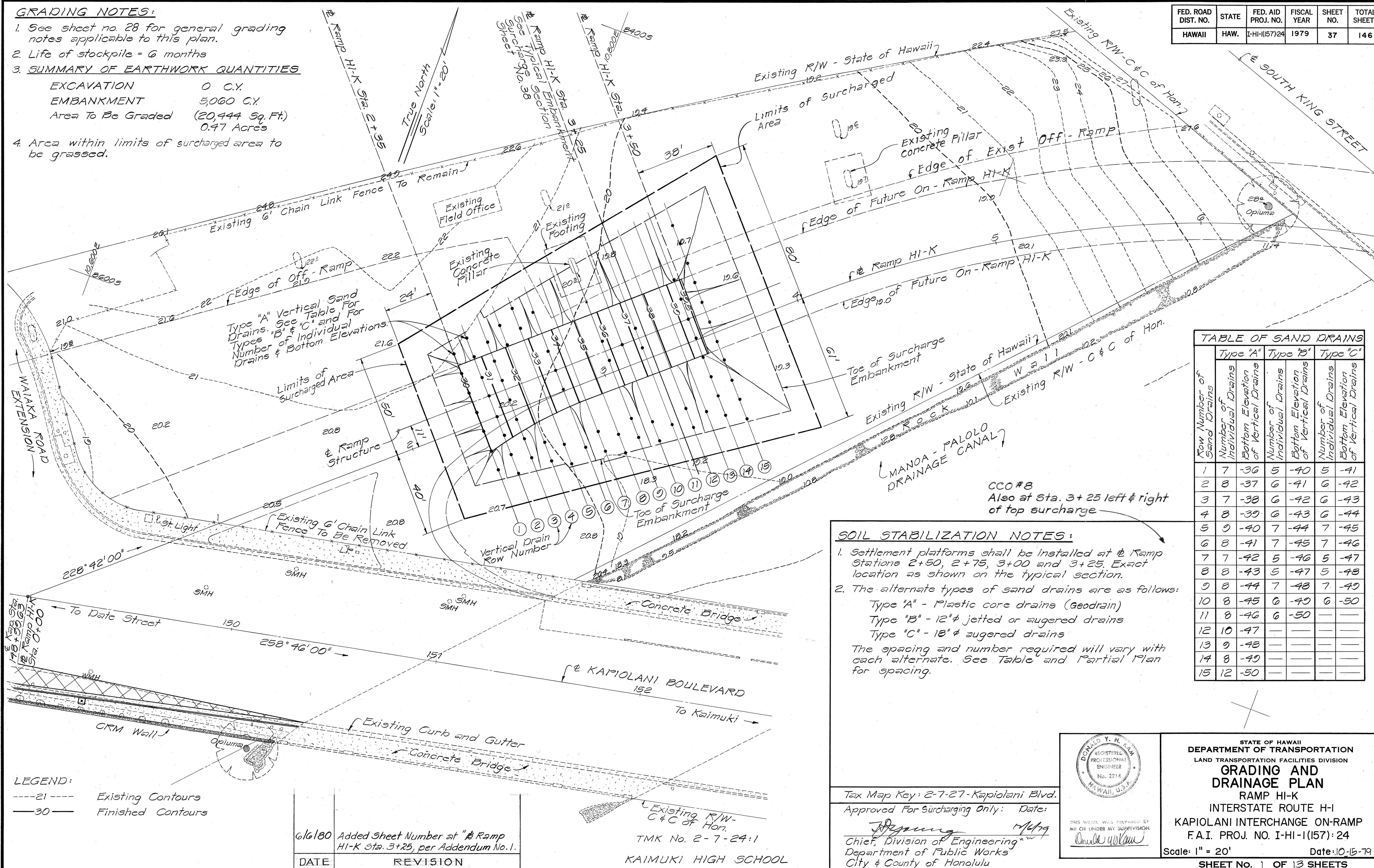
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-I(157)24	1979	36	146

LINE NUMBER	ITEM NO.		202.	206.	503.	503.	602.	603.	603.	603.	604.	604.	604.	604.	604.										
	UNIT	USED	0410	2020	0020	2020	1020	1048	6001	9000	2150	2160	2300	2330	5000										
TYPE OF STRUCTURE	STATION		EACH	C.Y.	C.Y.	C.Y.	LBS	L.F.	L.F.	L.F.	EACH	EACH	EACH	EACH	L.F.										
			Removal of Portion of Existing Concrete Drain and Sewer Manholes.	Structural Excavation For Drainage System	Class "A" Concrete For Drainage System	Class "B" Concrete For Drainage System	Reinforcing Steel For Drainage System	24-Inch Reinforced Concrete Pipe Class IV	24-Inch Corrugated Metal Pipe Sheet Thickness 0.109 Inch or 24-Inch or 24-Inch Reinf. Conc. Pipe Cl. III	8-Inch Steel Pipe	Type "A" Cast Iron Frame and Cover	Type "B" Cast Iron Frame and Cover	Type "S" Steel Frame and Grate	Type GIGI4 Steel Frame and Grate	4-Foot Diameter Prefabricated Storm Drain Riser Section										
1	Type "B" CB-1	@ Kap. Sta. 142+58.60 DL "A" Sta. 0+46.00		37	5		728	28			1														
2	Shallow SDMH Pavement	@ Kap. Sta. 142+86.30 DL "A" Sta. 0+18		15	3	4	390	18			1														
3	Existing SDMH	@ Kap. Sta. 142+93.26 DL "A" Sta. 0+00	1	2		2	40																		
4	Existing CB	DL "B" Sta. 0+00	1	97					106																
5	Type C CB-2	DL "B" Sta. 1+05.60		96	6		108	98				1													
6	D.I. (Type GIGI4)	@ Ramp Sta. 2+15 DL "B" Sta. 2+04		8	3		42							1											
7																									
8	Ramp Deck Drain	@ Ramp 10+78.25								15			1		1										
9	Ramp Deck Drain	@ Ramp 11+18.60								15			1		1										
10																									
11																									
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1. See sheet no. 28 for general grading notes applicable to this plan.
2. Life of stockpile = 6 months
3. SUMMARY OF EARTHWORK QUANTITIES

EXCAVATION	0 C.Y.
EMBANKMENT	5,060 C.Y.
Area To Be Graded	(20,444 Sq. Ft.)
	0.47 Acres
4. Area within limits of surcharged area to be grassed.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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Row Number of Sand Drains	Type "A"		Type "B"		Type "C"	
	Number of Individual Drains	Bottom Elevation of Vertical Drains	Number of Individual Drains	Bottom Elevation of Vertical Drains	Number of Individual Drains	Bottom Elevation of Vertical Drains
1	7	-36	5	-40	5	-41
2	8	-37	6	-41	6	-42
3	7	-38	6	-42	6	-43
4	8	-39	6	-43	6	-44
5	9	-40	7	-44	7	-45
6	8	-41	7	-45	7	-46
7	7	-42	5	-46	5	-47
8	8	-43	5	-47	5	-48
9	8	-44	7	-48	7	-49
10	8	-45	6	-49	6	-50
11	8	-46	6	-50	—	—
12	10	-47	—	—	—	—
13	9	-48	—	—	—	—
14	8	-49	—	—	—	—
15	12	-50	—	—	—	—

1. Settlement platforms shall be installed at @ Ramp Stations 2+50, 2+75, 3+00 and 3+25. Exact location as shown on the typical section.
2. The alternate types of sand drains are as follows:
 - Type "A" - Plastic core drains (Geodrain)
 - Type "B" - 12" ϕ jetted or augered drains
 - Type "C" - 18" ϕ augered drains

The spacing and number required will vary with each alternate. See Table and Partial Plan for spacing.



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

GRADING AND DRAINAGE PLAN

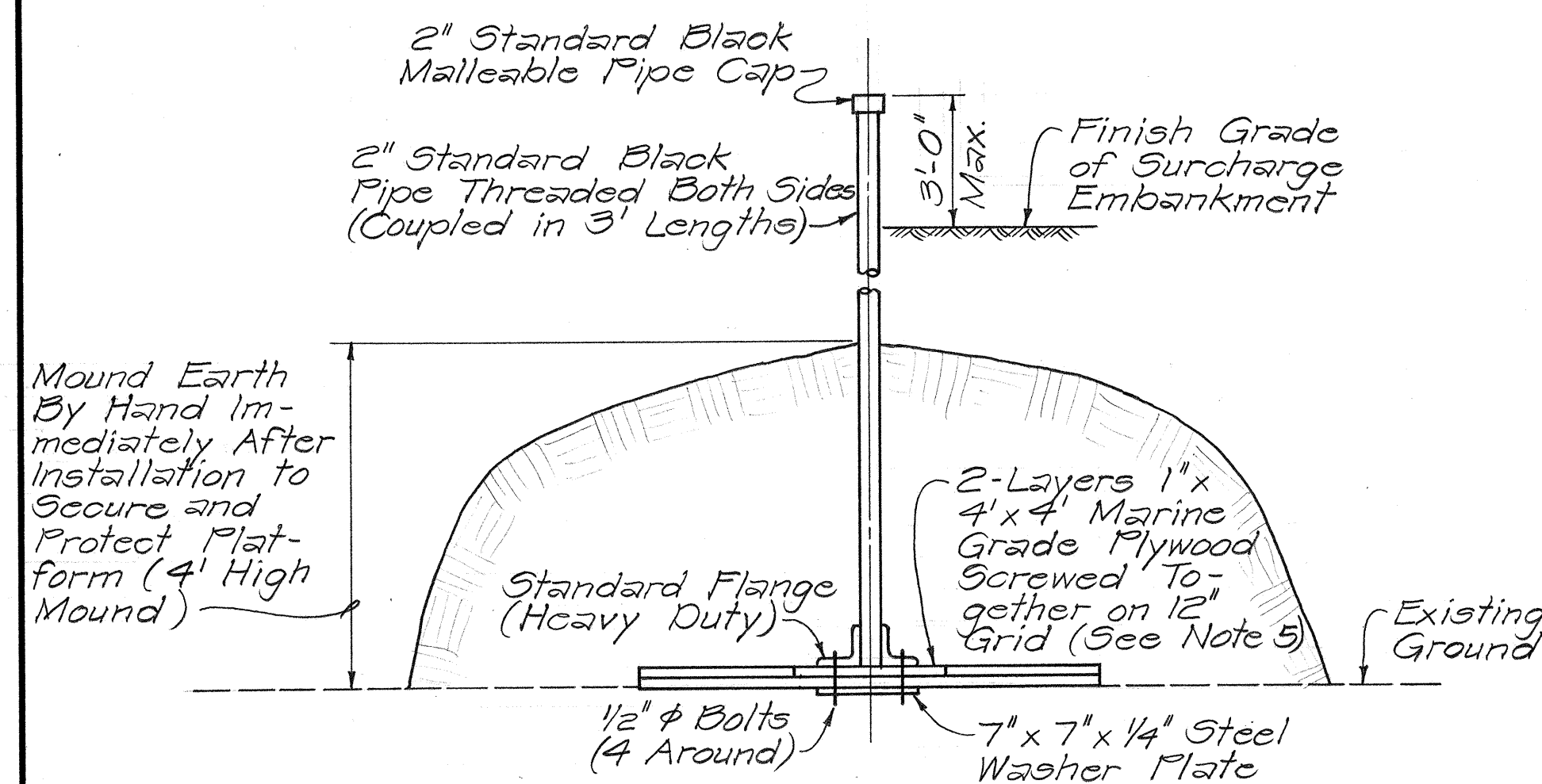
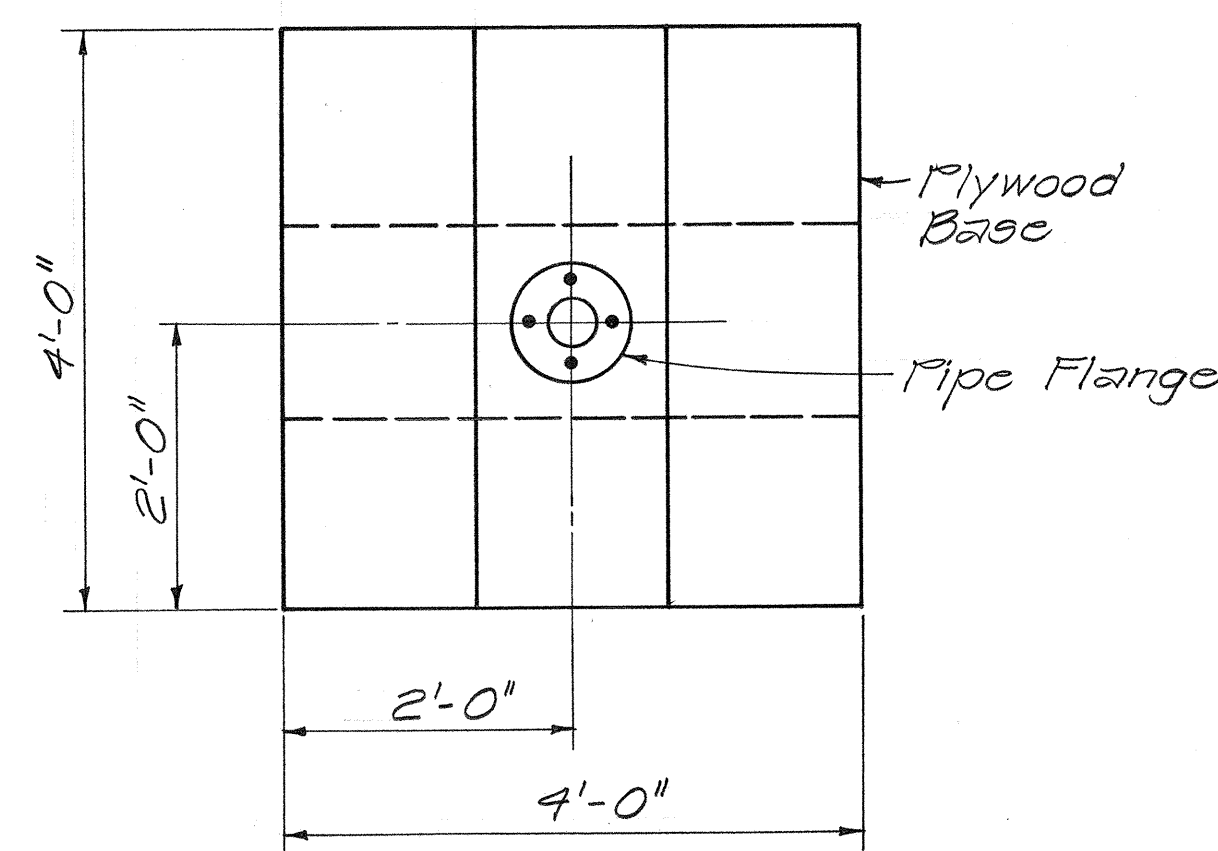
RAMP HI-K
INTERSTATE ROUTE H-I
KAPIOLANI INTERCHANGE ON-RAMP
F.A.I. PROJ. NO. I-HI-1(I57): 24

Scale: 1" = 20'

Date: 10-15-79

SHEET No. 1 OF 13 SHEETS

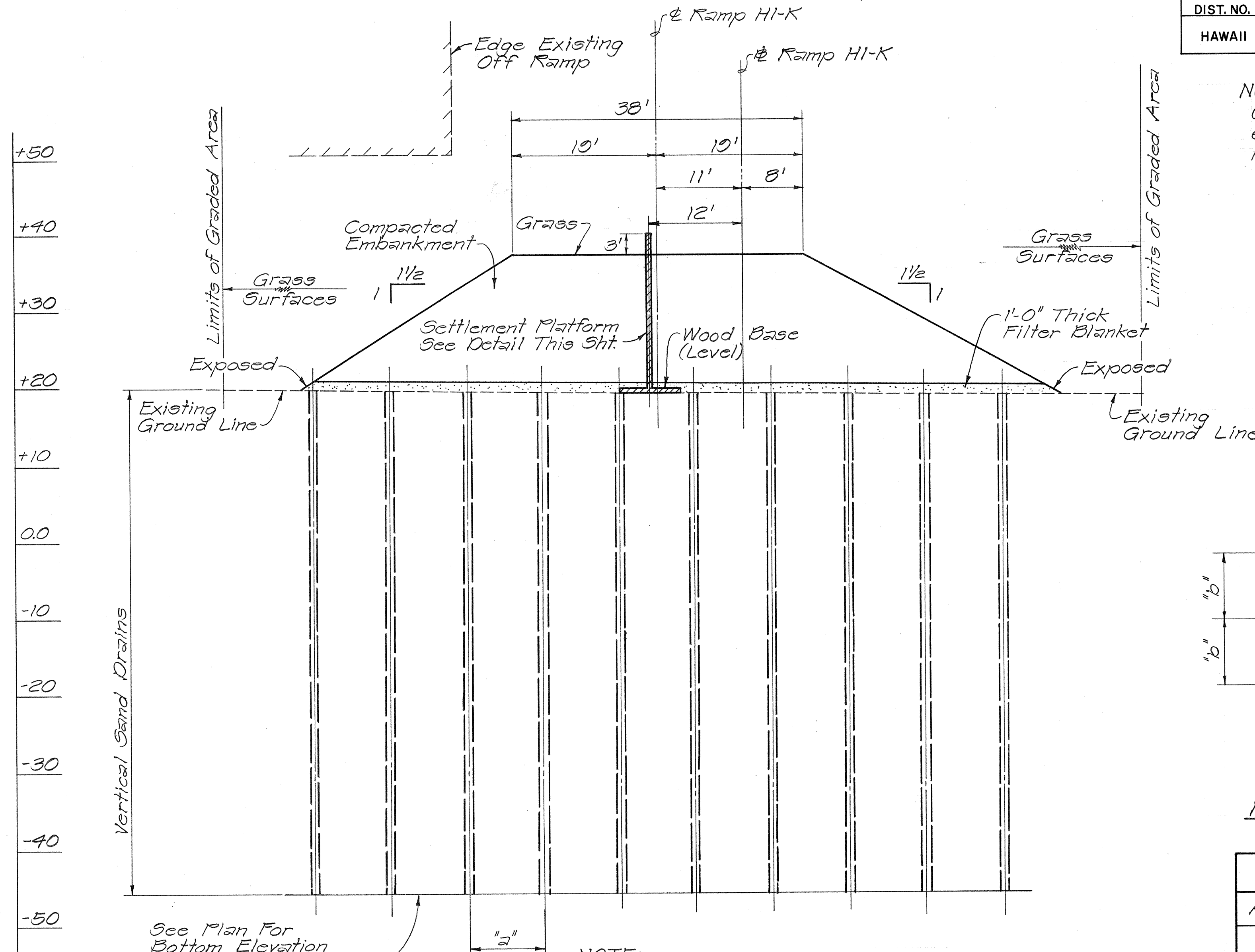
Note:
Grassed surfaces for the surcharge embankment shall be paid under Item No. 641.0100 Hydro-Mulch seeding.



SETTLEMENT PLATFORM DETAIL
Scale: 3/4" = 1'-0"

SETTLEMENT PLATFORM NOTES

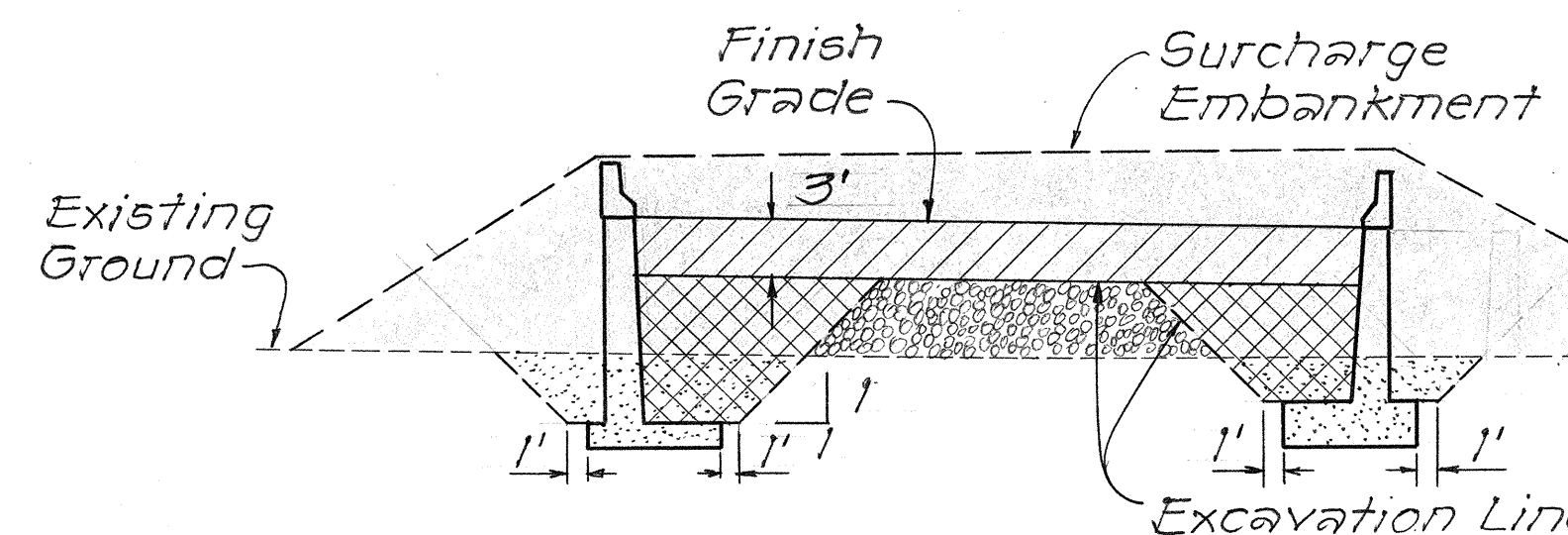
1. The Contractor shall use Wood Base Settlement Platforms.
2. Contractor to furnish material and labor to extend pipe up through fill.
3. All vertical pipes of Settlement Platforms shall be accurately and consecutively numbered in one foot intervals measured from the bottom of the Settlement Platform base. The numbering and graduations shall be marked on the vertical pipe in durable yellow paint by the Contractor immediately after each section of pipe is added.
4. Settlement Platforms shall be placed on existing ground. Ground shall be made level as necessary.
5. Sound lumber must be used for the Wood Base Platform.



TYPICAL EMBANKMENT SURCHARGE SECTION
RAMP HI-K STA. 3+25
Scale: 1" = 10'

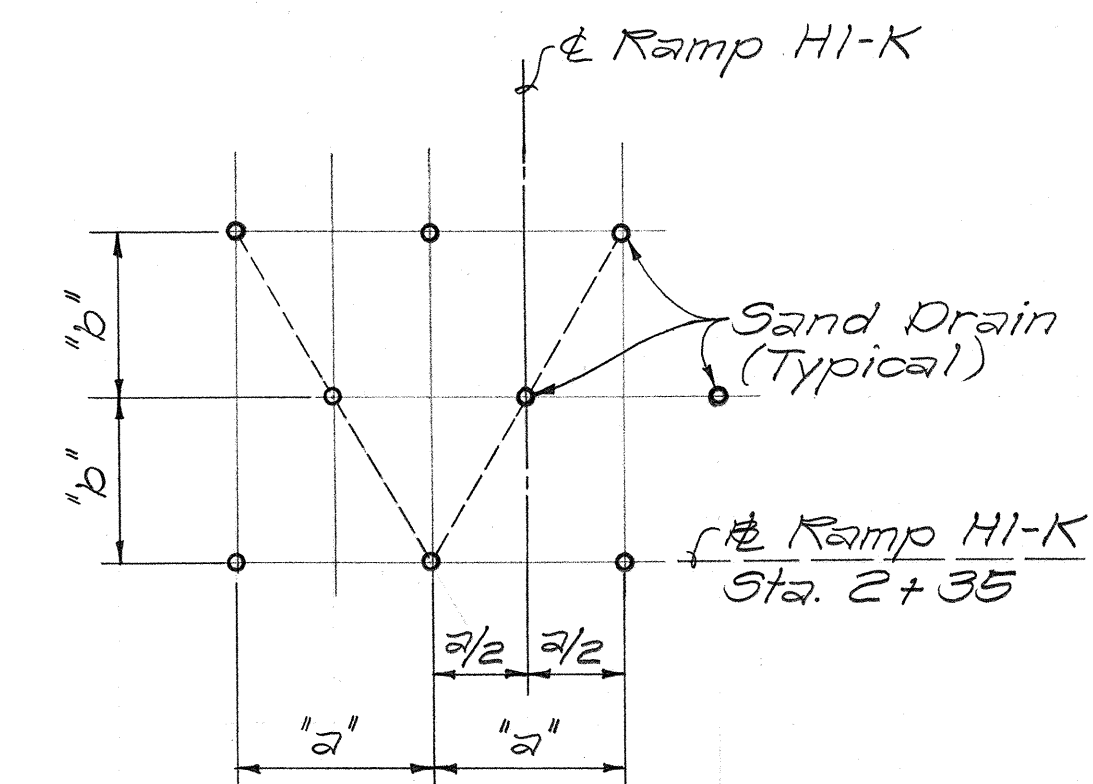
LEGEND:

- Payment for removal of surcharge embankment to be paid under Item 203.0100 Roadway Excavation.
- Replacement of excavated material paid for under Item 206.7200, Structural Backfill for Bridge Abutments, Wingwalls, and Retaining Walls.
- The subgrade within 3 feet of Finish grade to be compacted to 95%.
- Compact this material to 90% to remain in place during structural excavation for retaining walls.
- Excavation paid for under Item 206.5000 Retaining Wall Excavation.



NOTE:
The construction of the surcharge embankment shall be paid for under Item 203.0210 Imported Borrow.

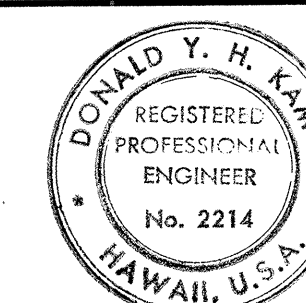
SURCHARGE EMBANKMENT-EXCAVATION & BACKFILL DETAILS
Scale: 1" = 10'



SAND DRAIN TABLE		
Alternate	"a"(ft.)	"b"(ft.)
Type "A"	10	8.66
Type "B"	14	12.12
Type "C"	15	12.99

SPACING DIAGRAM FOR SAND DRAINS
Not to Scale

Approved For Surcharging Only: Date: 12/6/79
Chief, Division of Engineering
Department of Public Works
City & County of Honolulu



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
SURCHARGE - SAND DRAINS DETAILS

INTERSTATE ROUTE H-1
KAPIOLANI INTERCHANGE ON-RAMP
F.A.I. PROJ. NO. I-HI-1(157)-24

Scale: As Noted Date: 10-15-79
SHEET NO. 2 OF 13 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(157)24	1979	39	146

± STA. 0+00 D.L. "B"
± Existing CB
Connect to Existing CB
Inv. = 14.00

Estimated Quantities
Struct. Excavation = 97 cy.
Cl. A-1 Concrete = 1 cy.
24" Pipe Culvert = 106 L.F.

± STA. 1+05.60 D.L. "B"
± CB #2 Type C
Inv. = 15.00

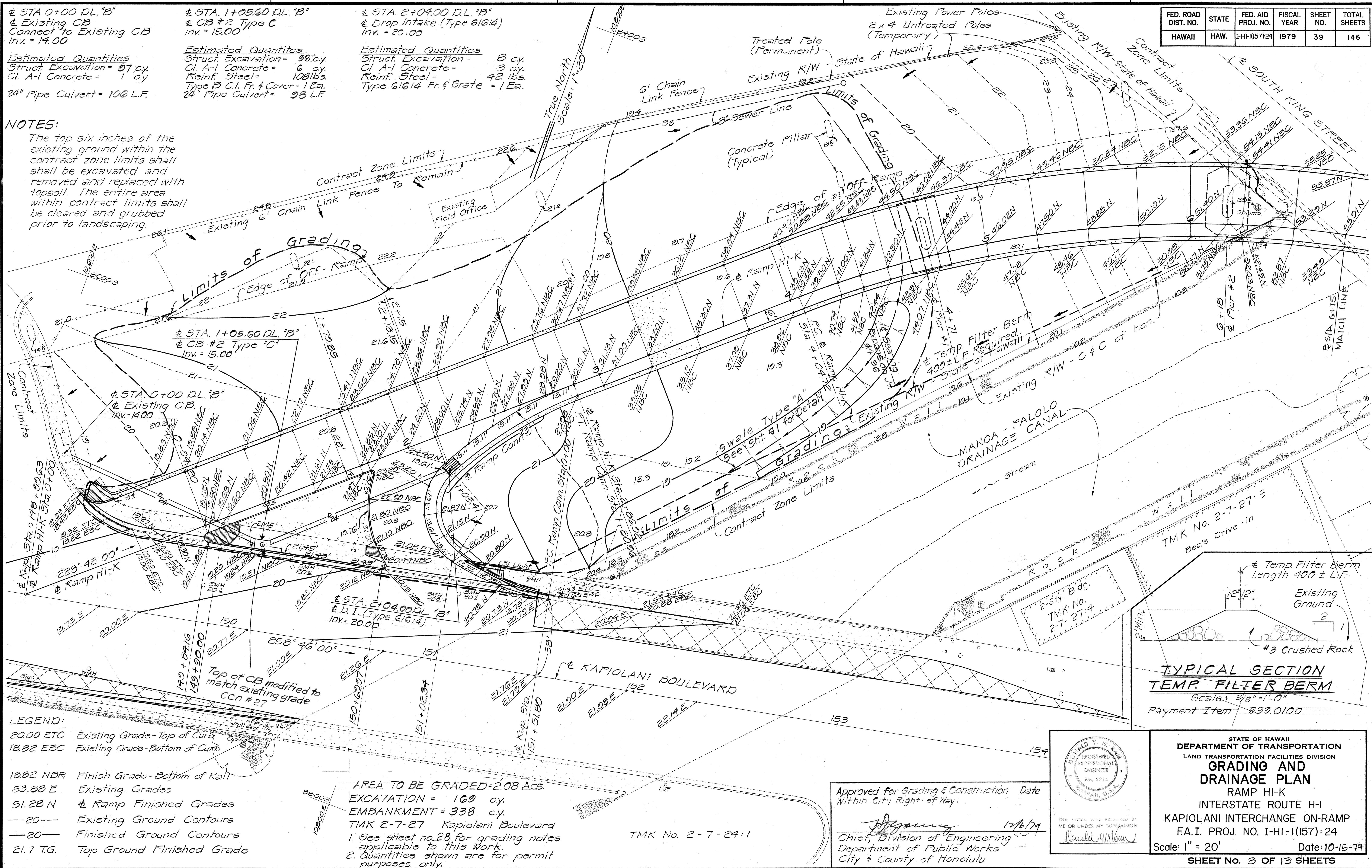
Estimated Quantities
Struct. Excavation = 96 cy.
Cl. A-1 Concrete = 6 cy.
Reinf. Steel = 108 lbs.
Type B C.I. Fr. & Cover = 1 Ea.
24" Pipe Culvert = 93 L.F.

± STA. 2+04.00 D.L. "B"
± Drop Intake (Type 61614)
Inv. = 20.00

Estimated Quantities
Struct. Excavation = 8 cy.
Cl. A-1 Concrete = 3 cy.
Reinf. Steel = 42 lbs.
Type 61614 Fr. & Grate = 1 Ea.

NOTES:

The top six inches of the existing ground within the contract zone limits shall be excavated and replaced with topsoil. The entire area within contract limits shall be cleared and grubbed prior to landscaping.



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(157)24	1979	40	146

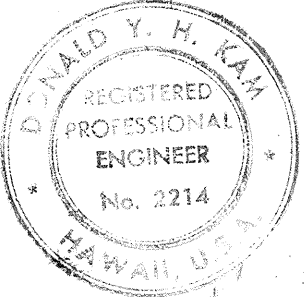
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
DRAWN BY	DESIGNED BY	
NOTE BOOK	QUANTITIES BY	
NO.	CHECKED BY	

AREA TO BE GRADED = 6,200 ±
EXCAVATION = 166 cy.
EMBANKMENT = 12 cy.
TMK 2-7-28 Lunalilo Freeway

- See sheet no.28 for grading notes applicable to this work.
- Quantities shown are for permit purposes only.

1/5/82	Revised Grades between Stas. 11+40.25 & 12+42.56.
DATE	REVISION

Approved for Grading & Construction Date 12/6/79
within City Right-of-Way Only:
Chief, Division of Engineering
Department of Public Works
City & County of Honolulu



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Donald Y. H. Kam

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

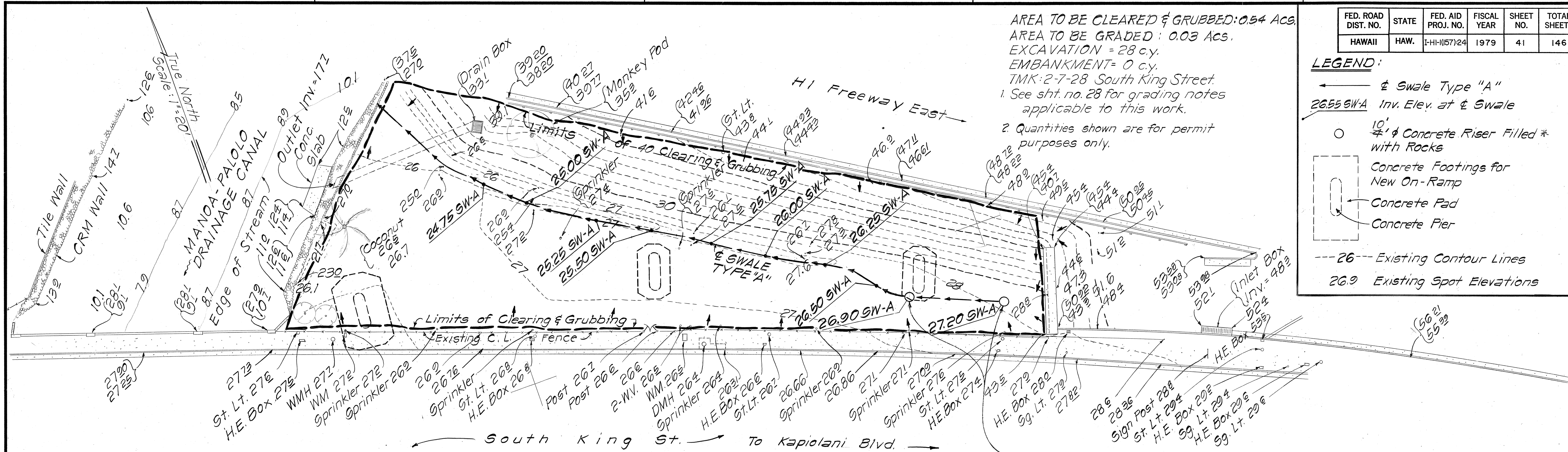
GRADING AND DRAINAGE PLAN
RAMP HI-K
INTERSTATE ROUTE HI-1
KAPIOLANI INTERCHANGE ON-RAMP
F.A.I. PROJ. NO. I-HI-1(157)24
Scale: 1" = 20' Date: 10-15-79

SHEET No. 4 OF 13 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(157)-24	1979	41	146

LEGEND:

- & Swale Type "A"
- 26.55 SW-A Inv. Elev. at & Swale
- 10' Concrete Riser Filled * with Rocks
- Concrete Footings for New On-Ramp
- Concrete Pad
- Concrete Pier
- 26 --- Existing Contour Lines
- 26.9 Existing Spot Elevations

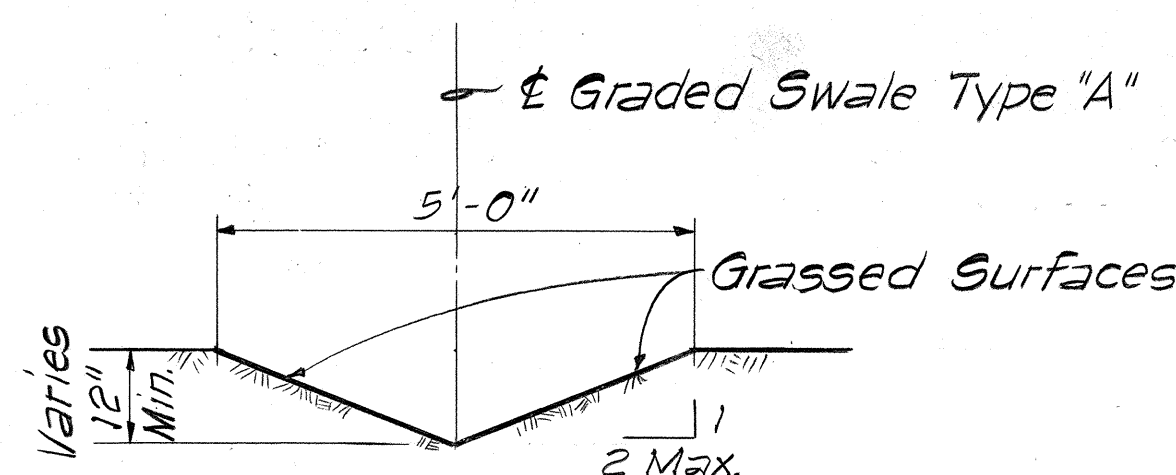


GRADING AND DRAINAGE PLAN

Scale: 1" = 20'

NOTE:

Area designated to be cleared and grubbed shall be landscaped as shown on sheet no. 122 Landscaping plan.



TYPICAL SECTION SWALE TYPE "A"

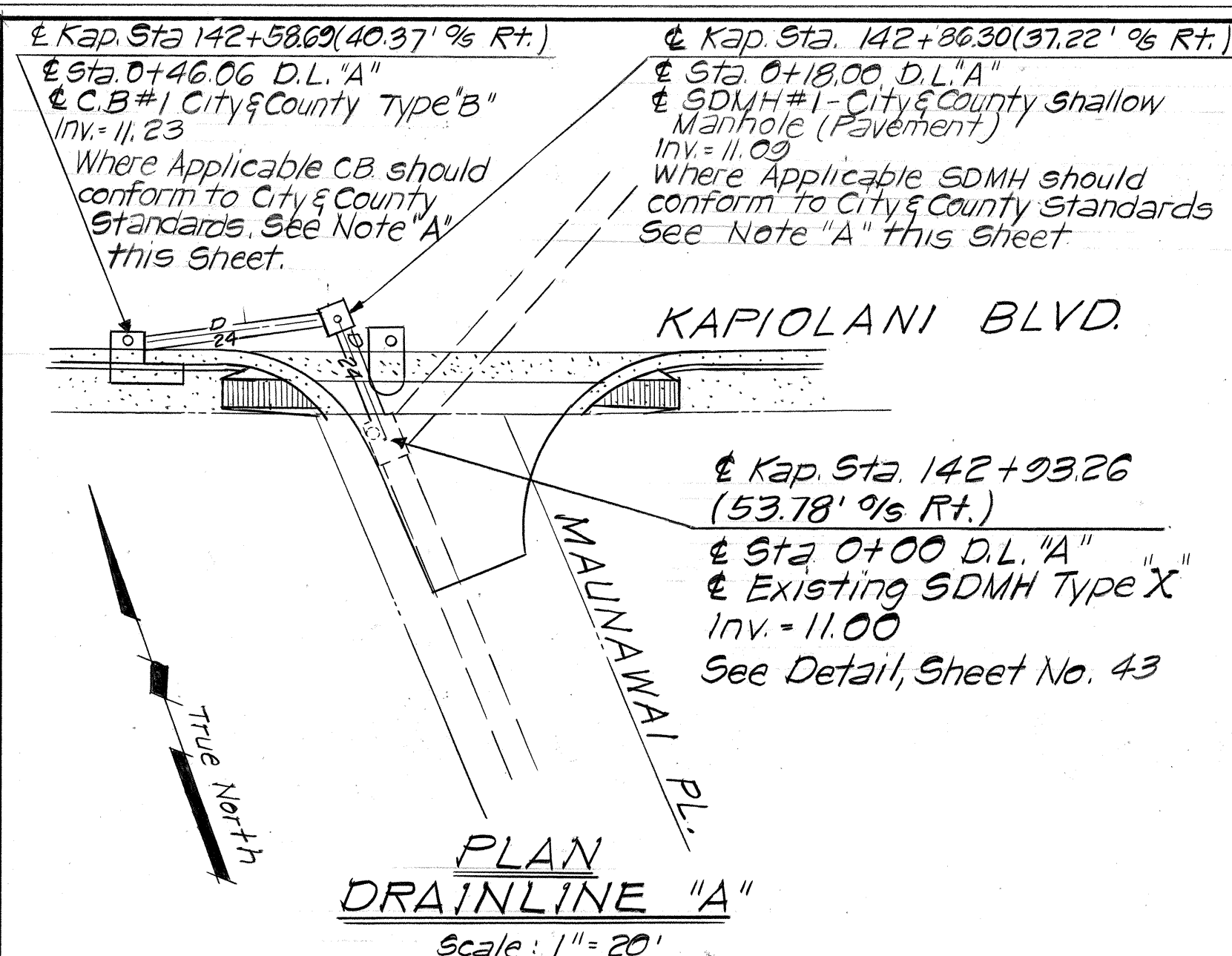
Scale: 1/2" = 1'-0"

HYDRAULIC DATA:

A = 0.53 acs.
Q = 3.0 cfs.
b = 280± feet
n = 0.035
S = 1.0% min
dn = 0.755 ft.
Vn = 2.08 ft./sec.
S = 7.0% max.

NOTE:

Construction of Swales shall be incidental to Item No. 203.0100 Roadway Excavation.



Note "A":

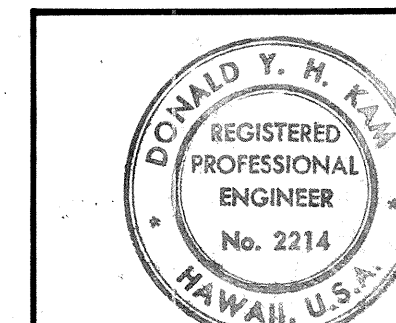
For Details, see Standard Details for Public Works Construction City and County of Honolulu, August 1976.

Sta. 0+00 D.L. "A"
Existing SDMH Type "X"
Inv. = 11.00
Estimated Quantities
Struct. Excavation = 2 C.Y.
Reinf. Steel = 40 lbs.
Cl. B Concrete = 2 C.Y.

Sta. 0+18.00 D.L. "A"
SDMH #1 - Shallow Man hole
(Pavement) (C & C Standard)
Inv. = 11.09
Estimated Quantities
Struct. Excavation = 15 C.Y.
Cl. "A" Concrete = 3 C.Y.
24" RCP Cl. IV = 18 L.F.
Reinf. Steel = 390 lbs.
Cl. "B" Concrete = 4 C.Y.
Type "A" C.I.
Frame and Cover = 1 Ea.

Sta. 0+46.06 D.L. "A"
CB #1 Type "B"
(C & C Standard)
Inv. = 11.23
Estimated Quantities
Struct. Excavation = 37 C.Y.
Cl. "A" Concrete = 5 C.Y.
Reinf. Steel = 728 lbs.
24" RCP Cl. IV = 28 L.F.
Type "A" C.I.
Frame and Cover = 1 Ea.

5/30/80	Revised Plan Drainline "A" and Added Type "A" C.I. Frame & Cover To Estimated Quantities
Date	Revision



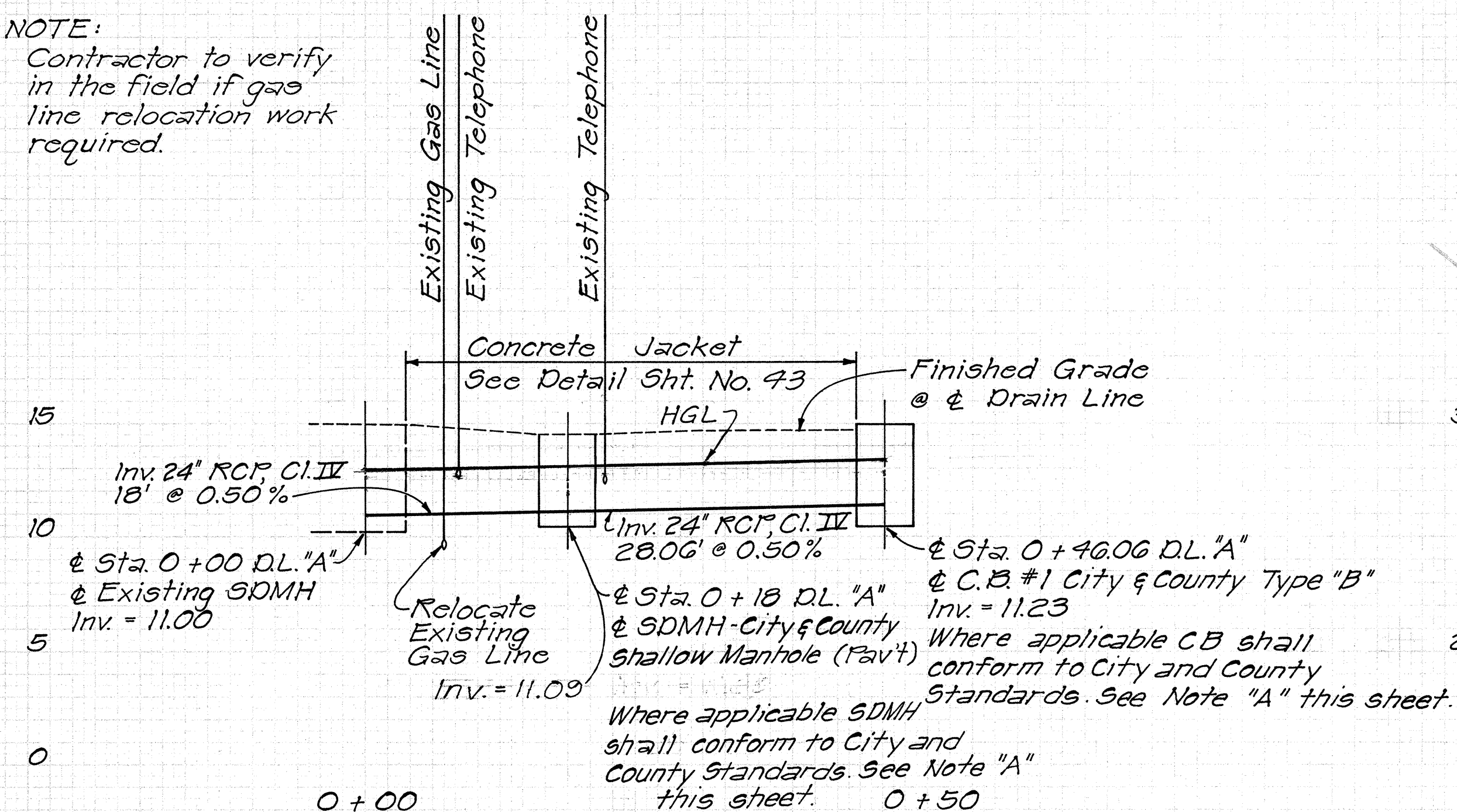
Approved For Clearing, Grubbing & Grading Only: *[Signature]* Date: 12/6/79
Chief, Division of Engineering
Department of Public Works
City & County of Honolulu

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[Signature]

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
GRADING AND DRAINAGE PLAN
RAMP HI-K
INTERSTATE ROUTE HI-1
KAPIOLANI INTERCHANGE ON-RAMP
F.A.I. PROJ. NO. I-HI-1 (157) : 24
Scale: 1" = 20' Date: 10-15-79
SHEET No. 5 OF 13 SHEETS

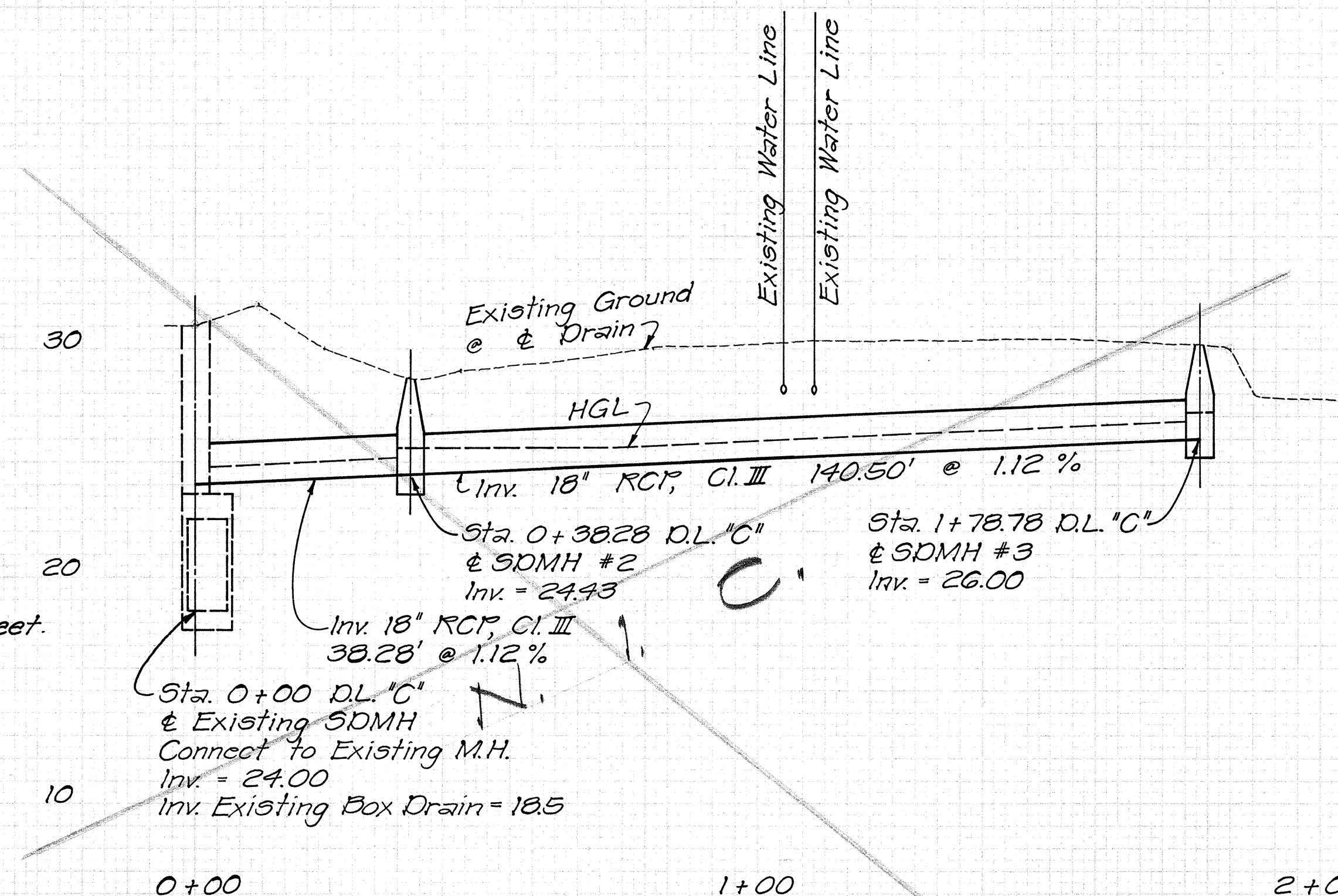
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(157)-24	1979	42	146

NOTE:
Contractor to verify in the field if gas line relocation work required.



PROFILE ~ DRAIN LINE "A"

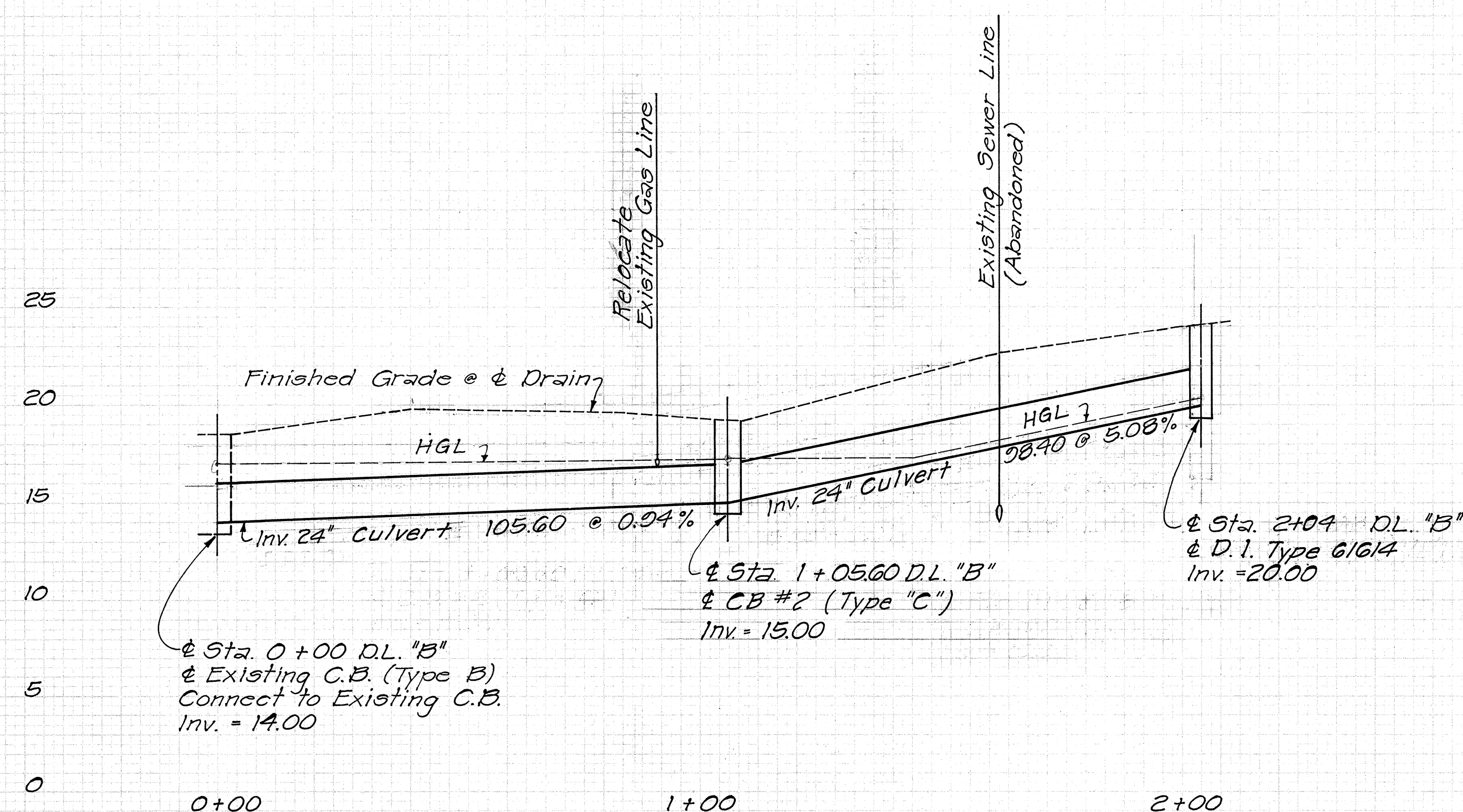
Scale: Horiz. 1" = 10'
Vert. 1" = 5'



PROFILE ~ DRAIN LINE "C"

Scale: Horiz. 1" = 20'
Vert. 1" = 5'

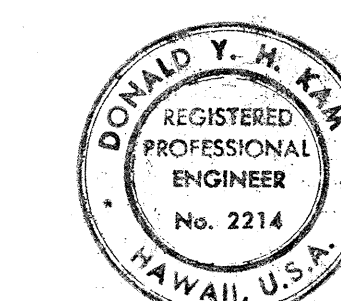
Note "A"
For Details see Standard Details for Public Works Construction, City and County of Honolulu, August 1976.



PROFILE ~ DRAIN LINE "B"

Scale: Horiz. 1" = 20'
Vert. 1" = 5'

Approved for Grading & Construction Date within City Right-of-Way Only:
[Signature] 12/6/79
Chief, Div. of Engineering
Dept. of Public Works
City & County of Honolulu
Approved: *[Signature]* Date: 4/4/79
Gasco, Inc.



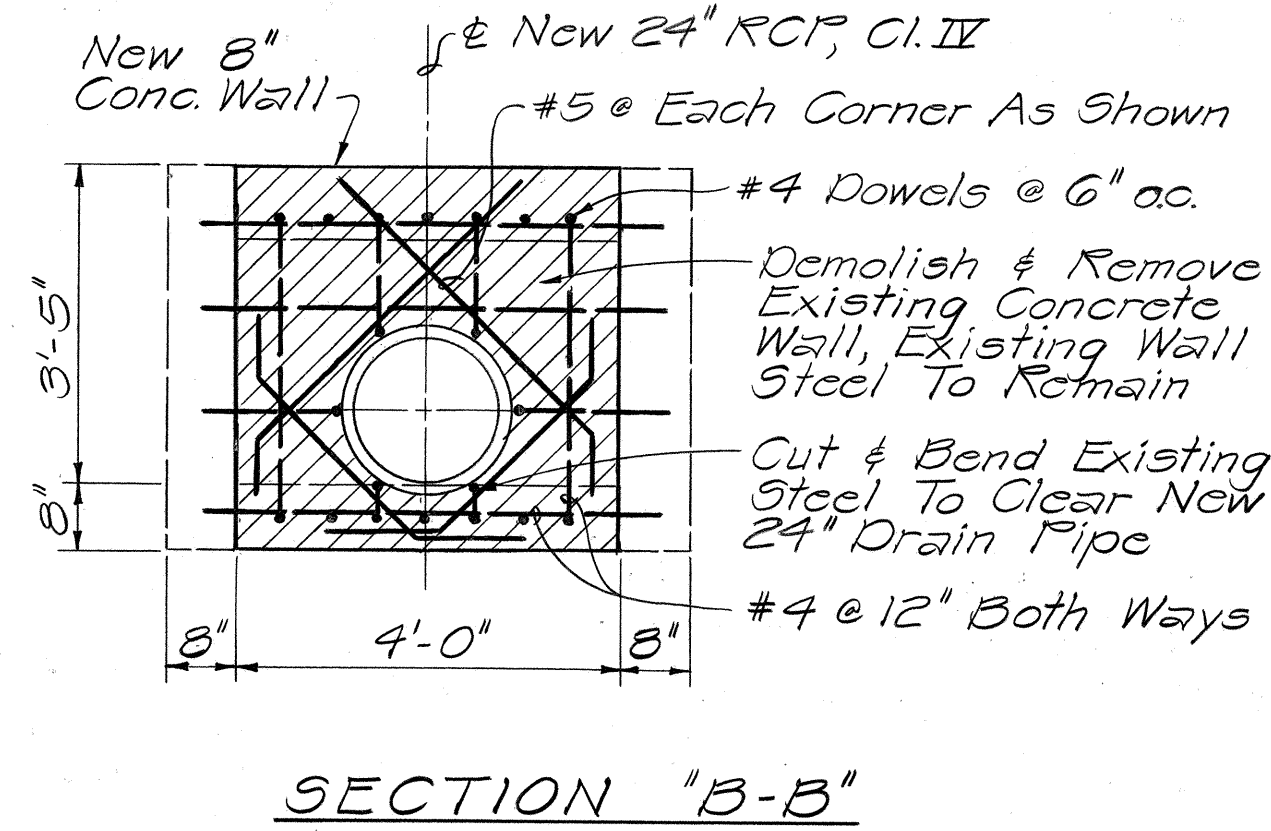
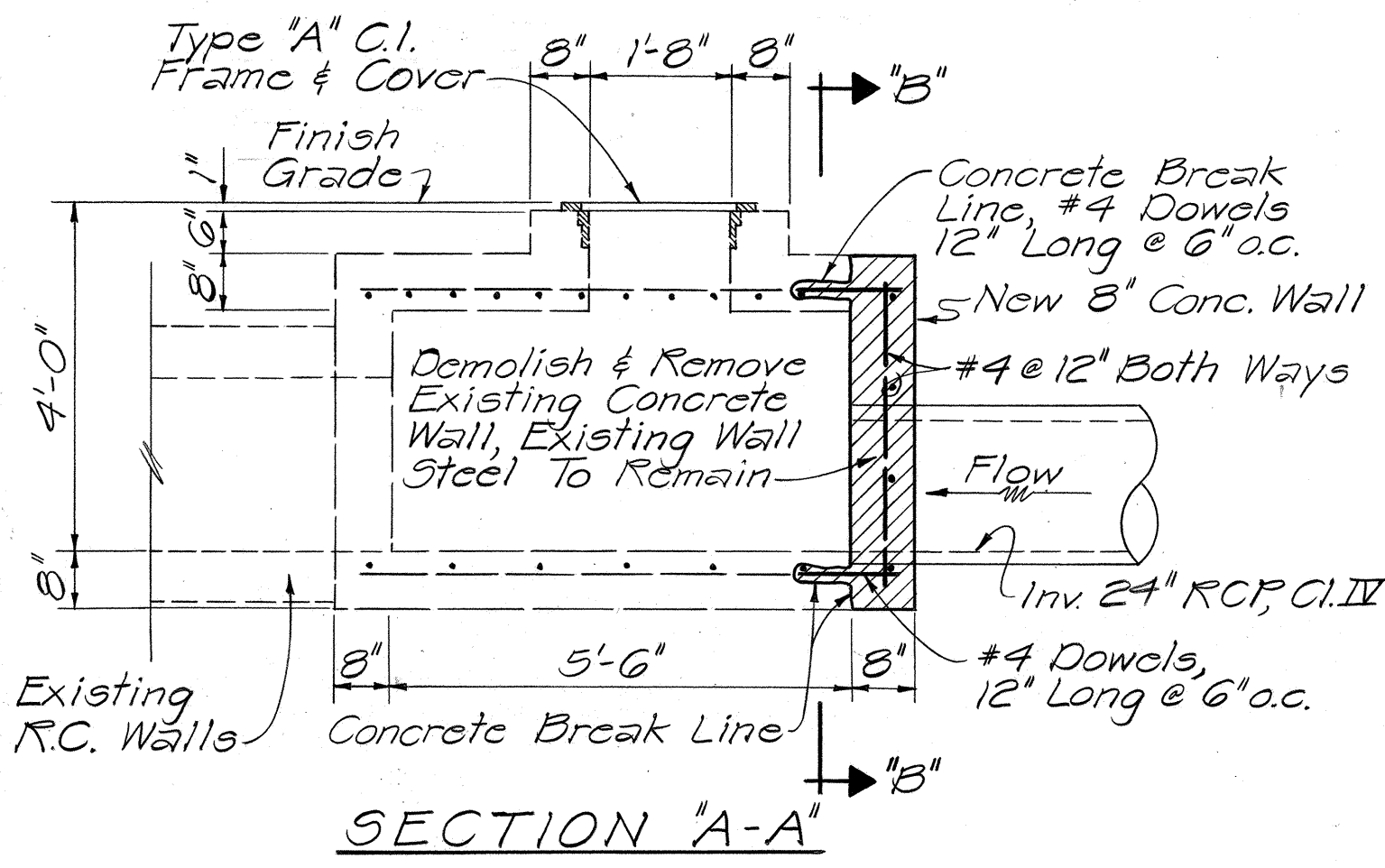
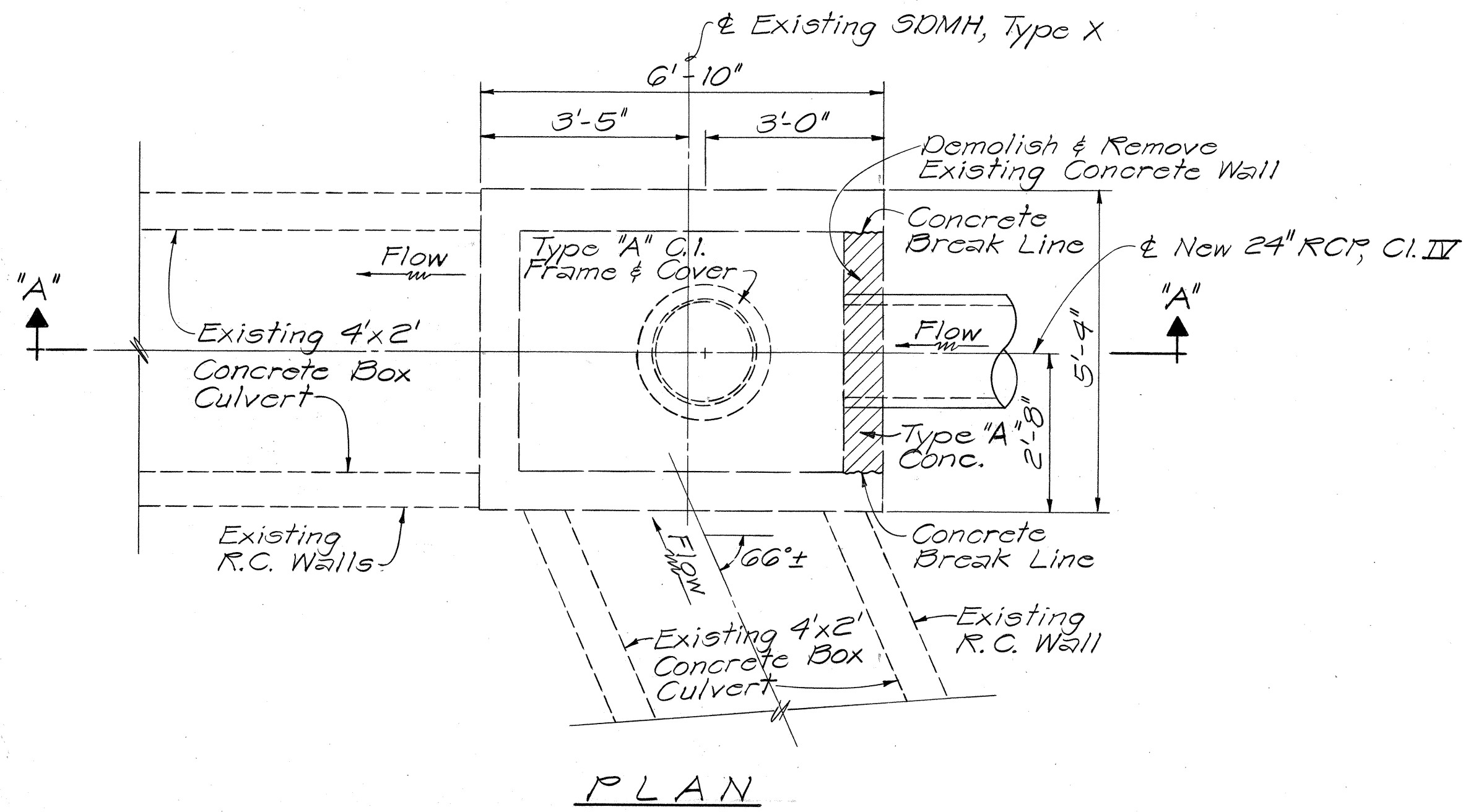
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DATE	REVISION
6/6/80	Added Invert to DRAIN LINE "A" at Sta. 0+13, per Addendum No. 1.
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION LAND TRANSPORTATION FACILITIES DIVISION DRAIN PROFILES KAPIOLANI BOULEVARD - RAMP HI-K INTERSTATE ROUTE HI-1 KAPIOLANI INTERCHANGE ON-RAMP F.A.I. PROJ. NO. I-HI-1(157)-24 Scale: As Shown Date: 10-15-79	

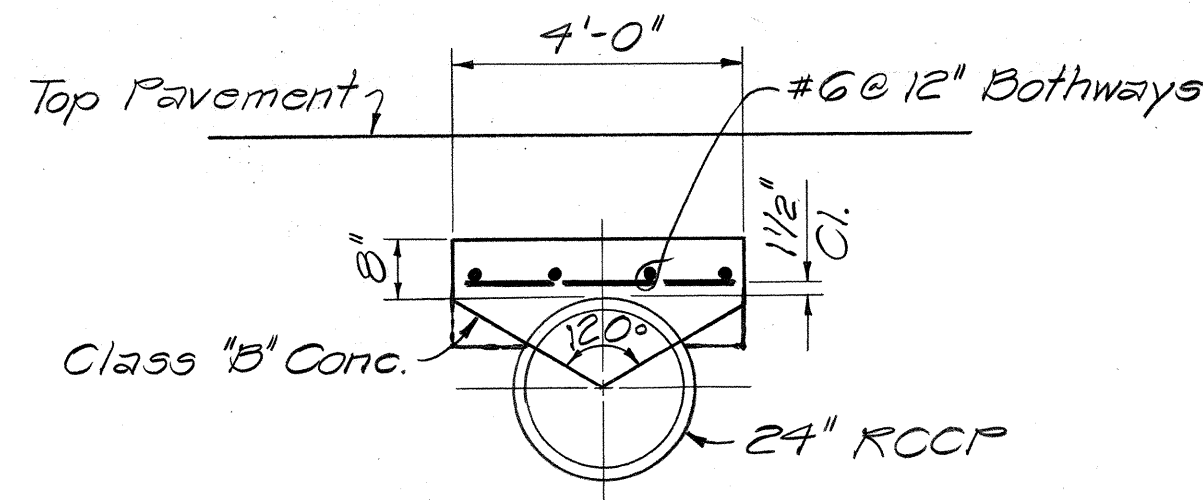
SHEET NO. 6 OF 13 SHEETS

42R

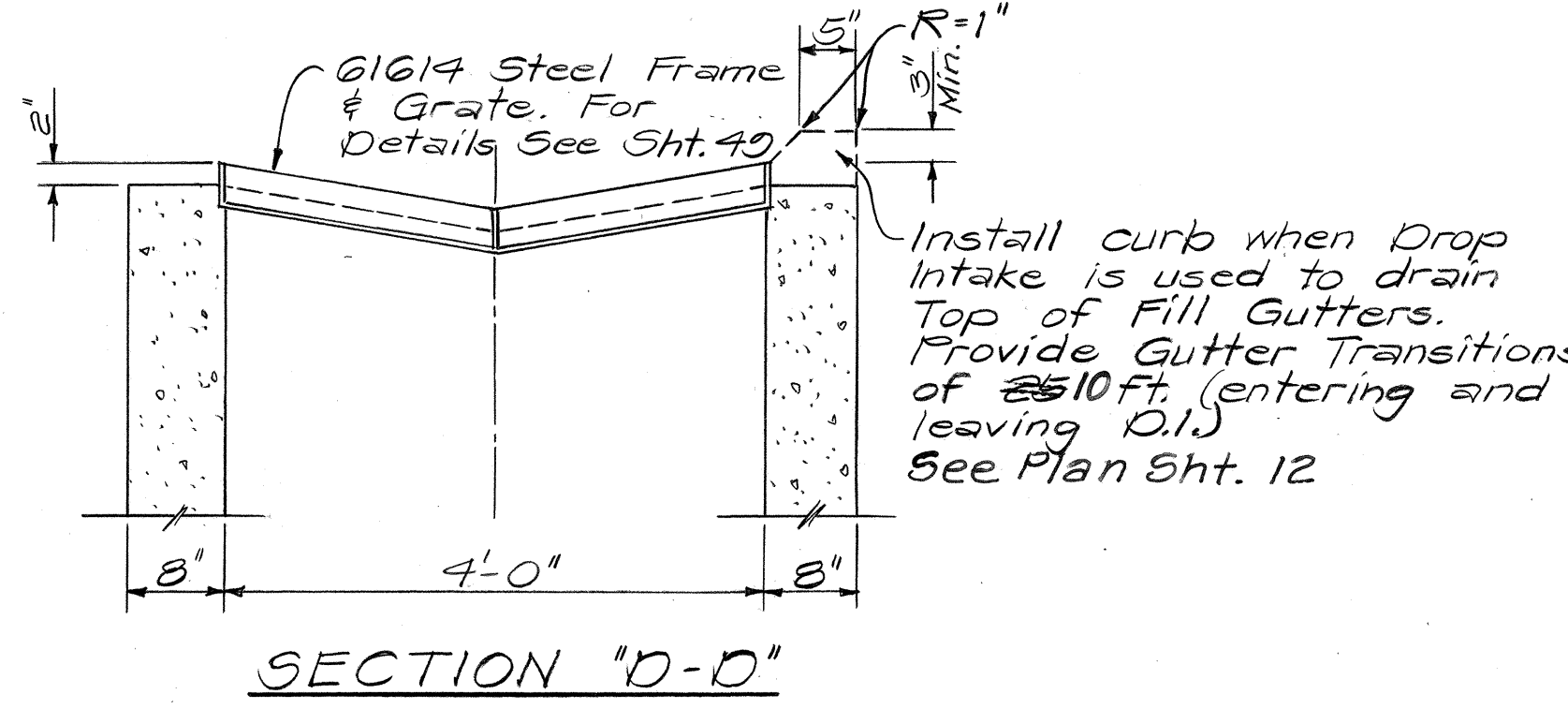
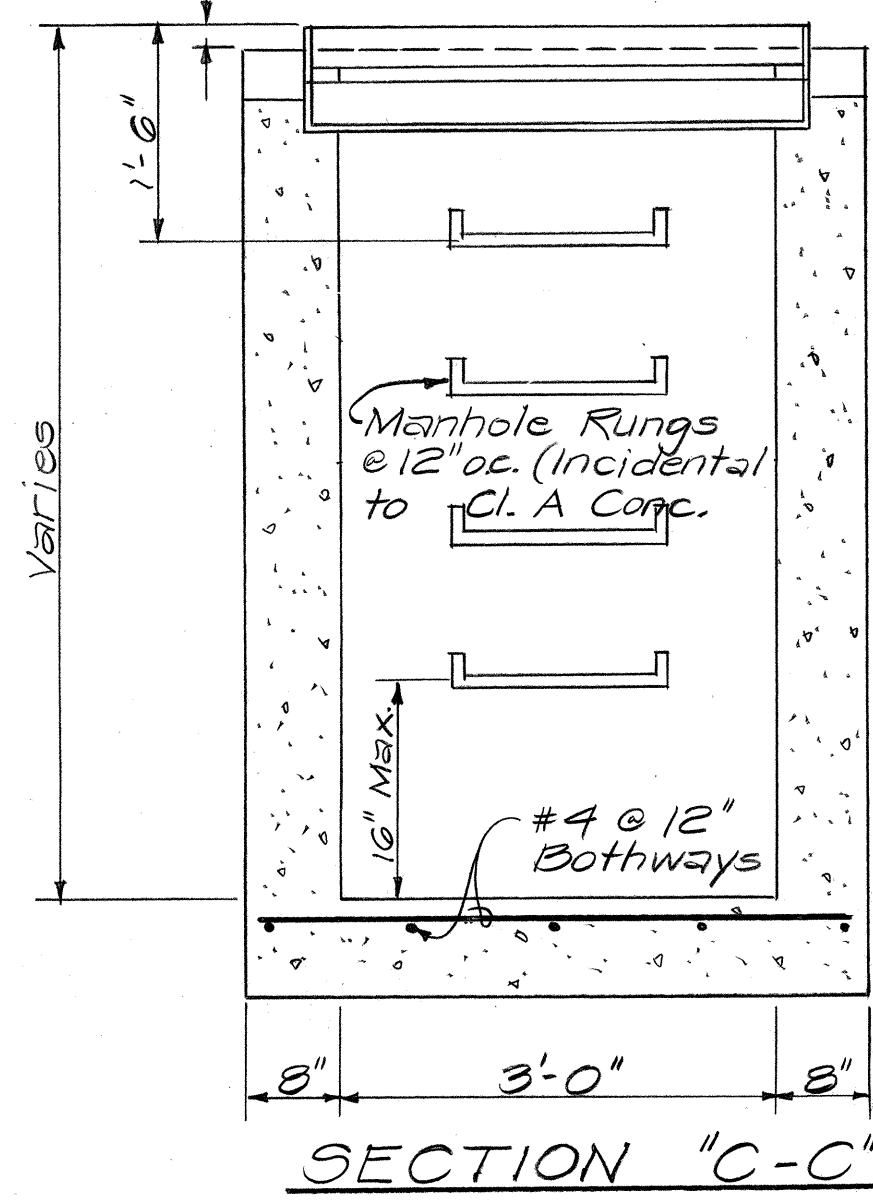
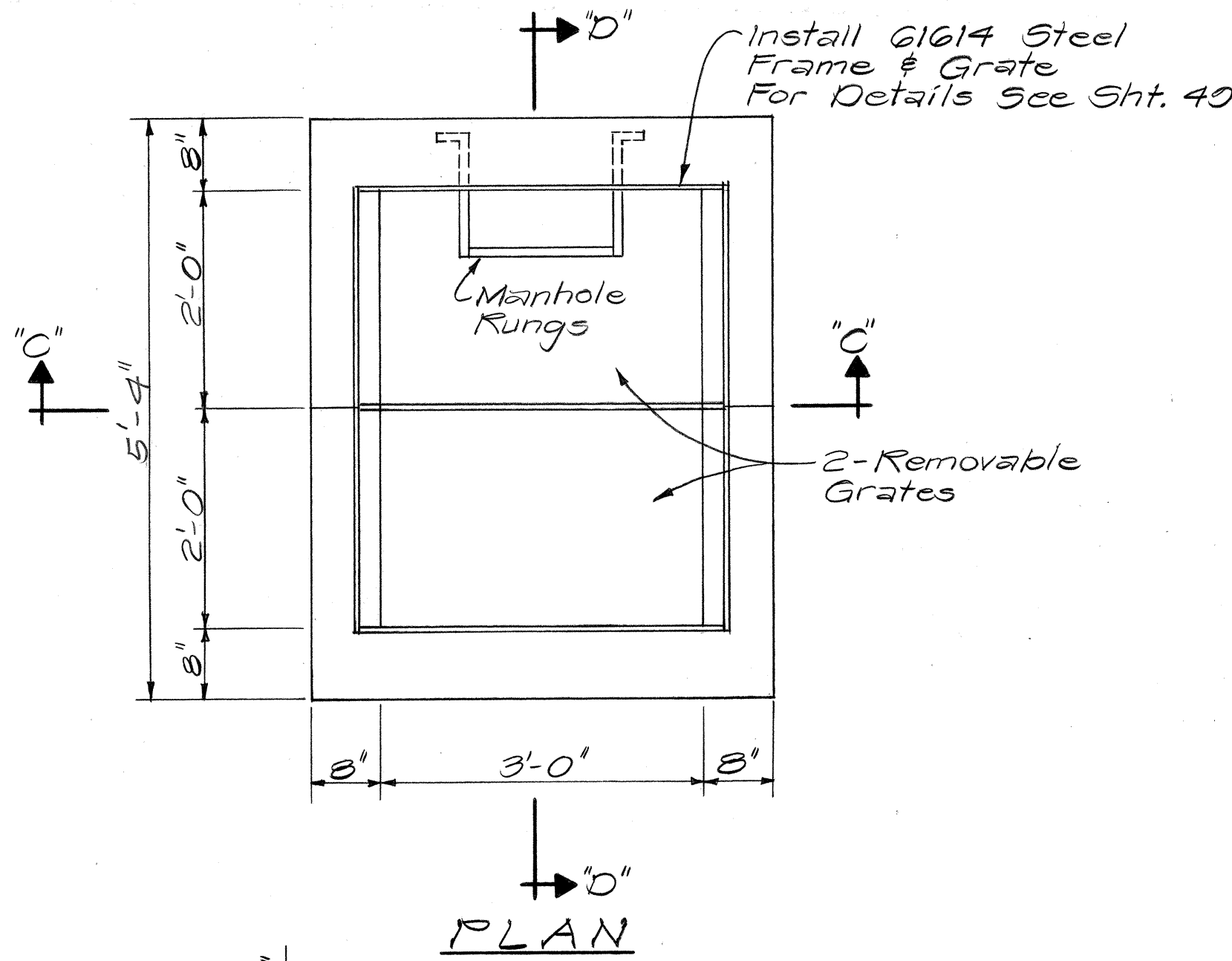
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(157)24	1979	43	146



RECONSTRUCTION ~ DRAIN MANHOLE - DRAINLINE "A"
Not To Scale



JACKET FOR 24" RCP
REINF. CONC. JACKET FOR
RCP DRAINLINE "A"
Not To Scale

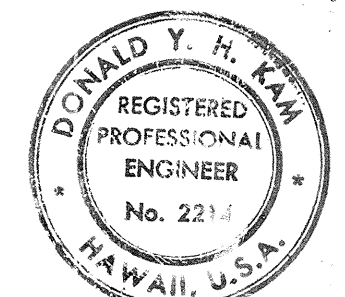


DETAILS OF 61614 DROP INTAKE
Scale: 3/4" = 1'-0"

5/30/80	Added Type "A" Concrete To Plan of Reconstructed Drain Manhole - Drainline "A" Detail & Added Detail of 61614 Intake
Date	Revision

Approved for Grading & Construction Date
within City Right-of-Way Only:

Chief, Div. of Engineering
Dept. of Public Works
City & County of Honolulu

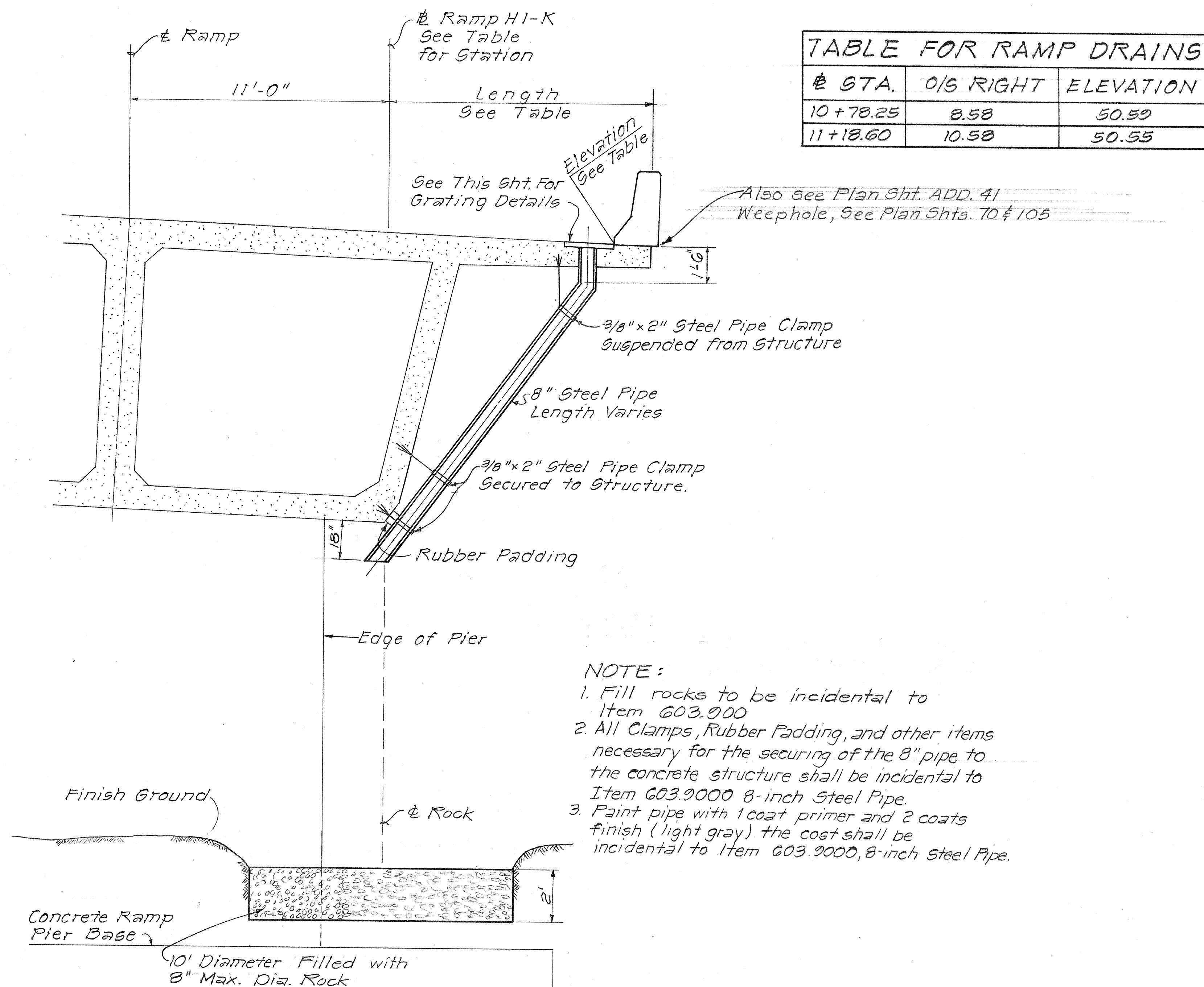


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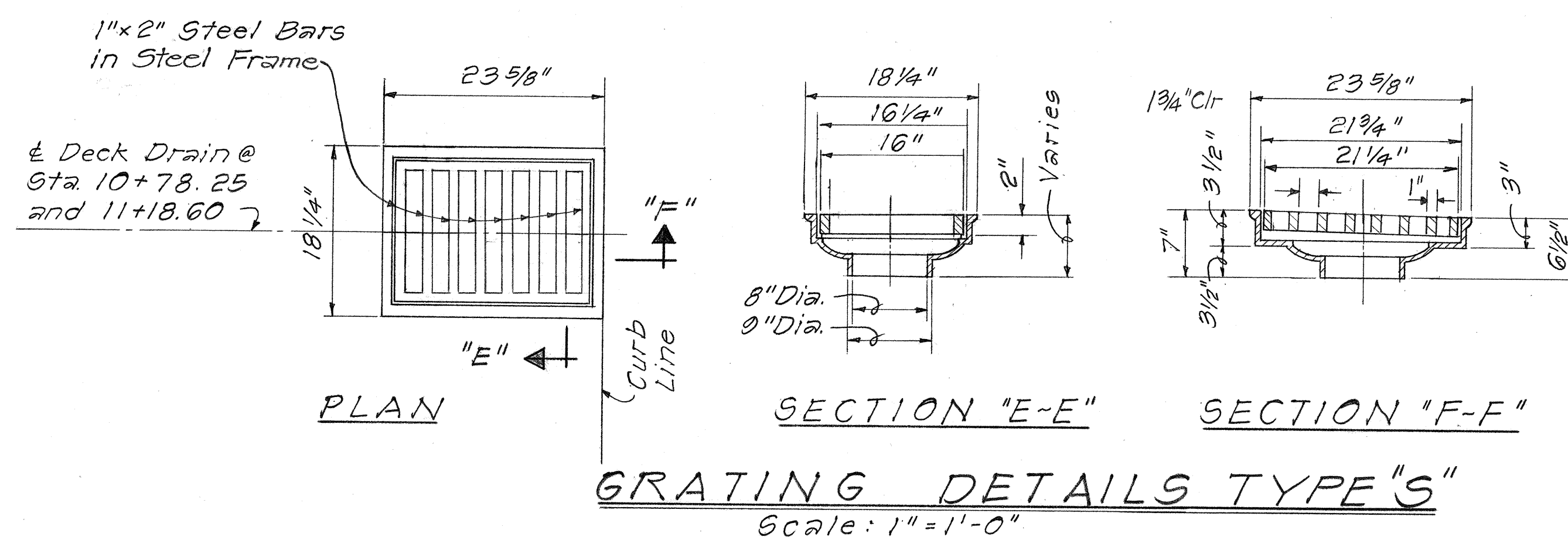
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
KAPIOLANI BOULEVARD

INTERSTATE ROUTE H-1
KAPIOLANI INTERCHANGE ON-RAMP
F.A.I. PROJ. NO. I-HI-1(157) 24
Scale: As Shown Date: 10-15-79
SHEET NO. 7 OF 13 SHEETS

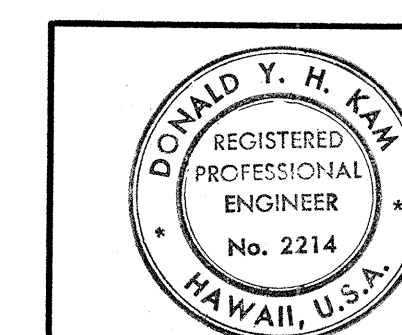
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HI-1(157)-24	1979	44	146



TYPICAL SECTION-RAMP DRAINS
Scale: 3/8"=1'-0"



5/30/80 Revised Fill Rocks on Ramp Drain Detail
Date Revision



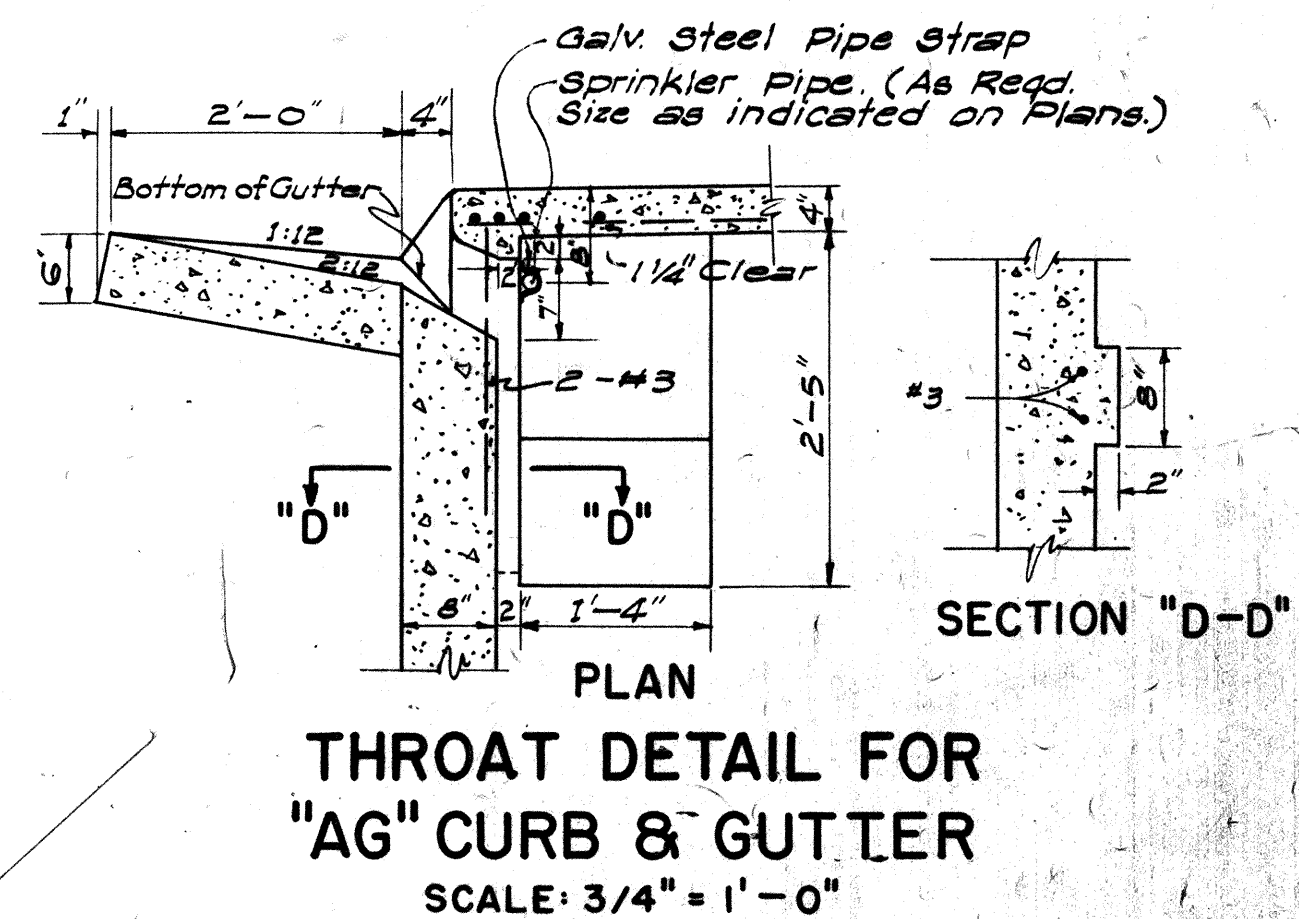
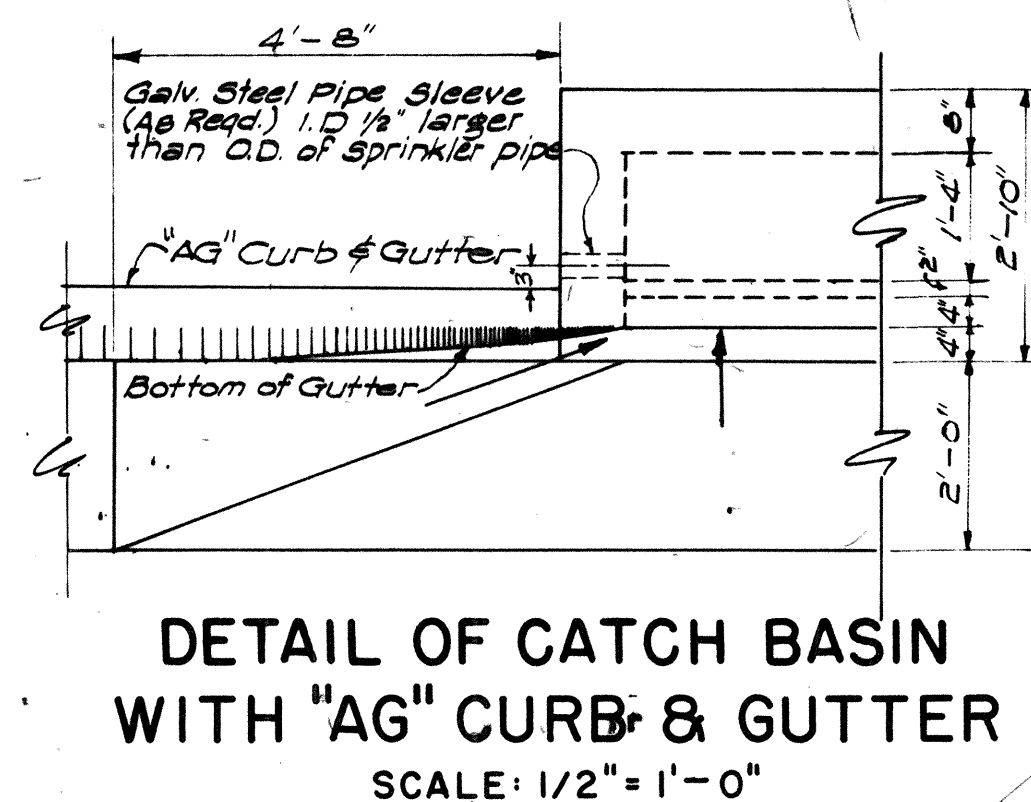
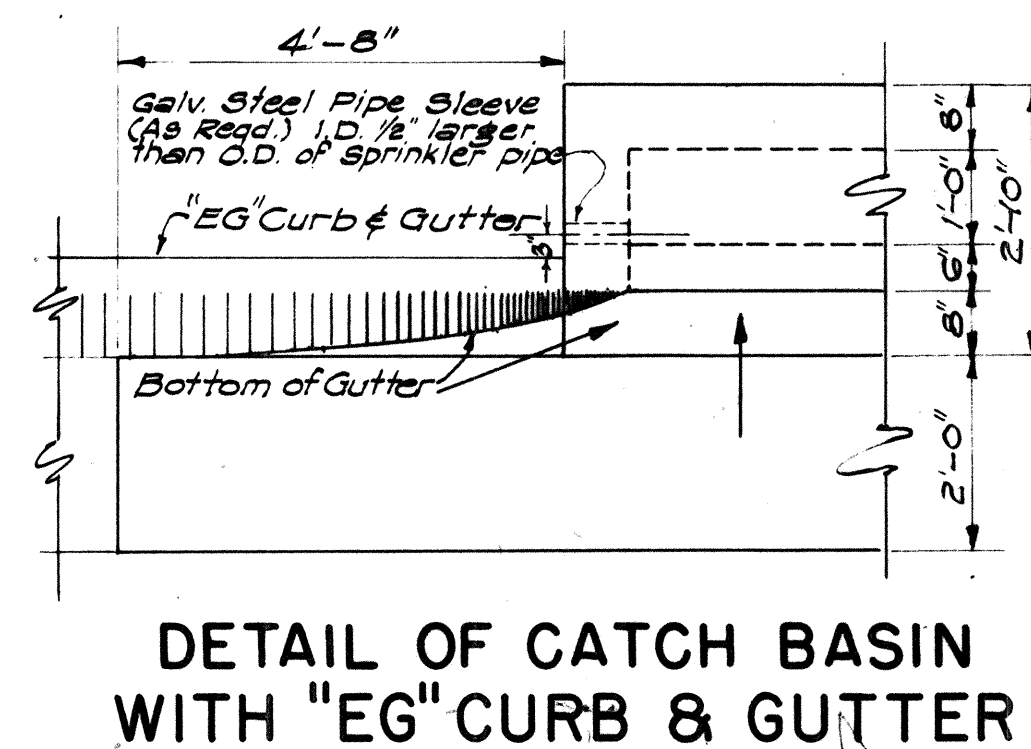
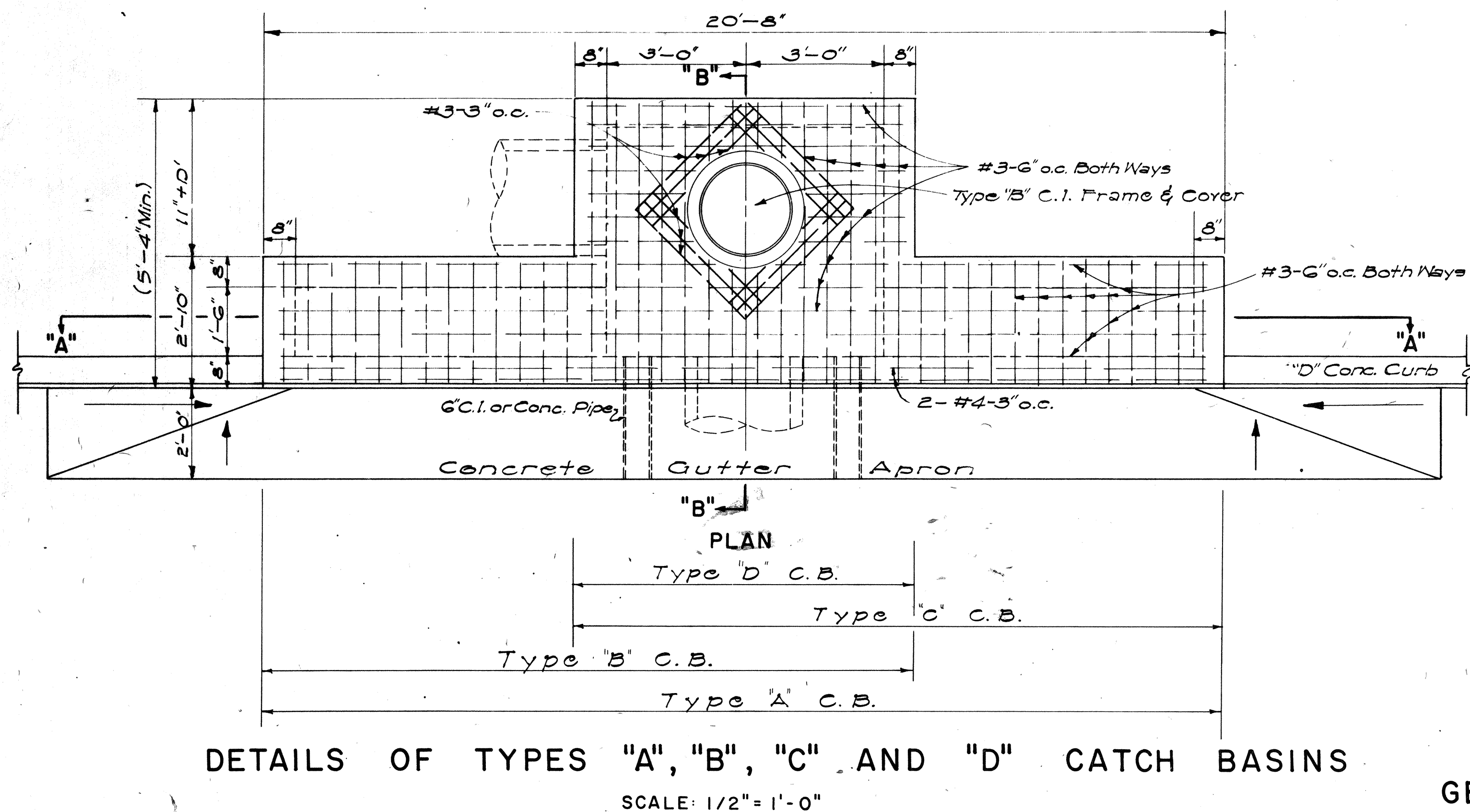
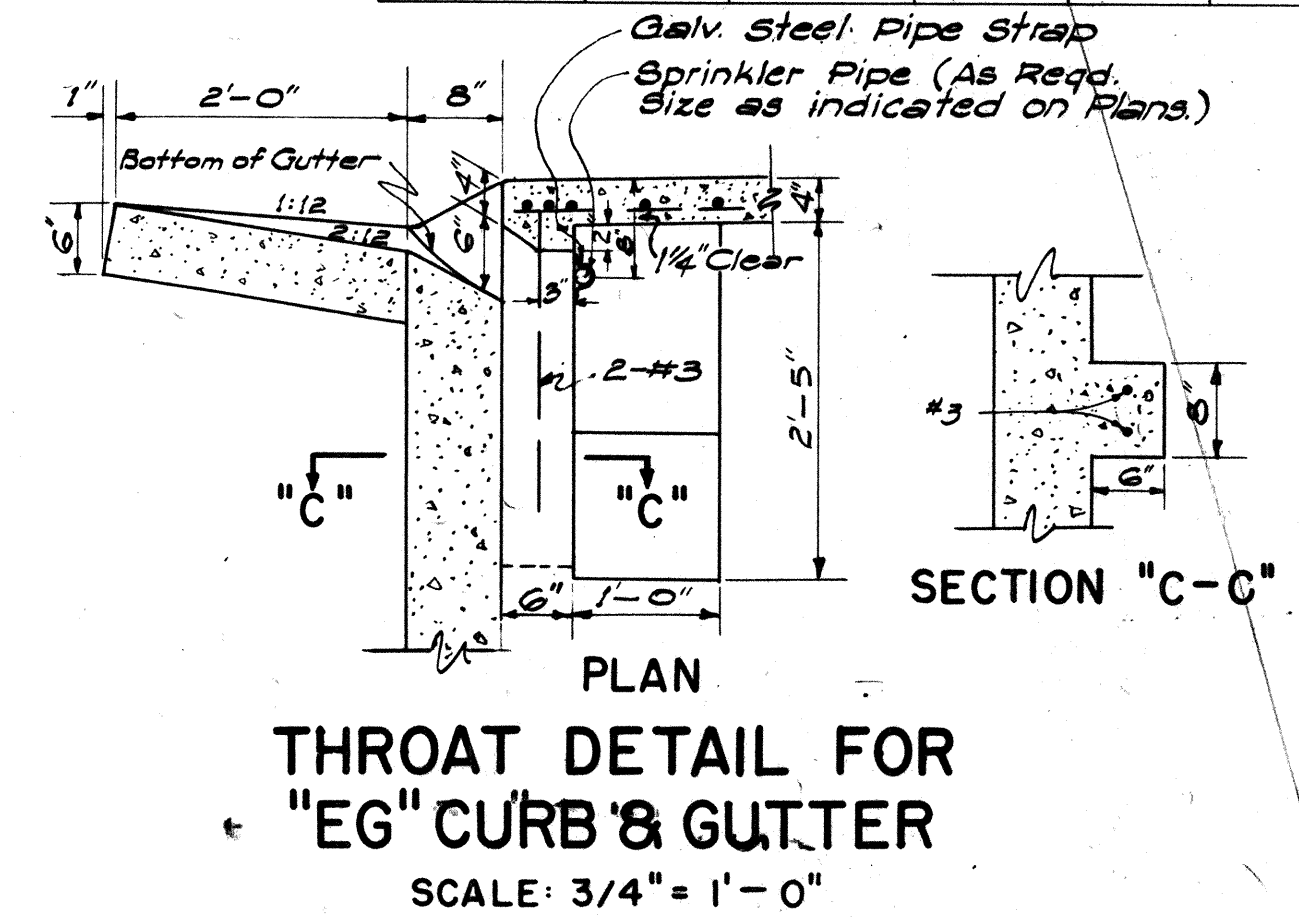
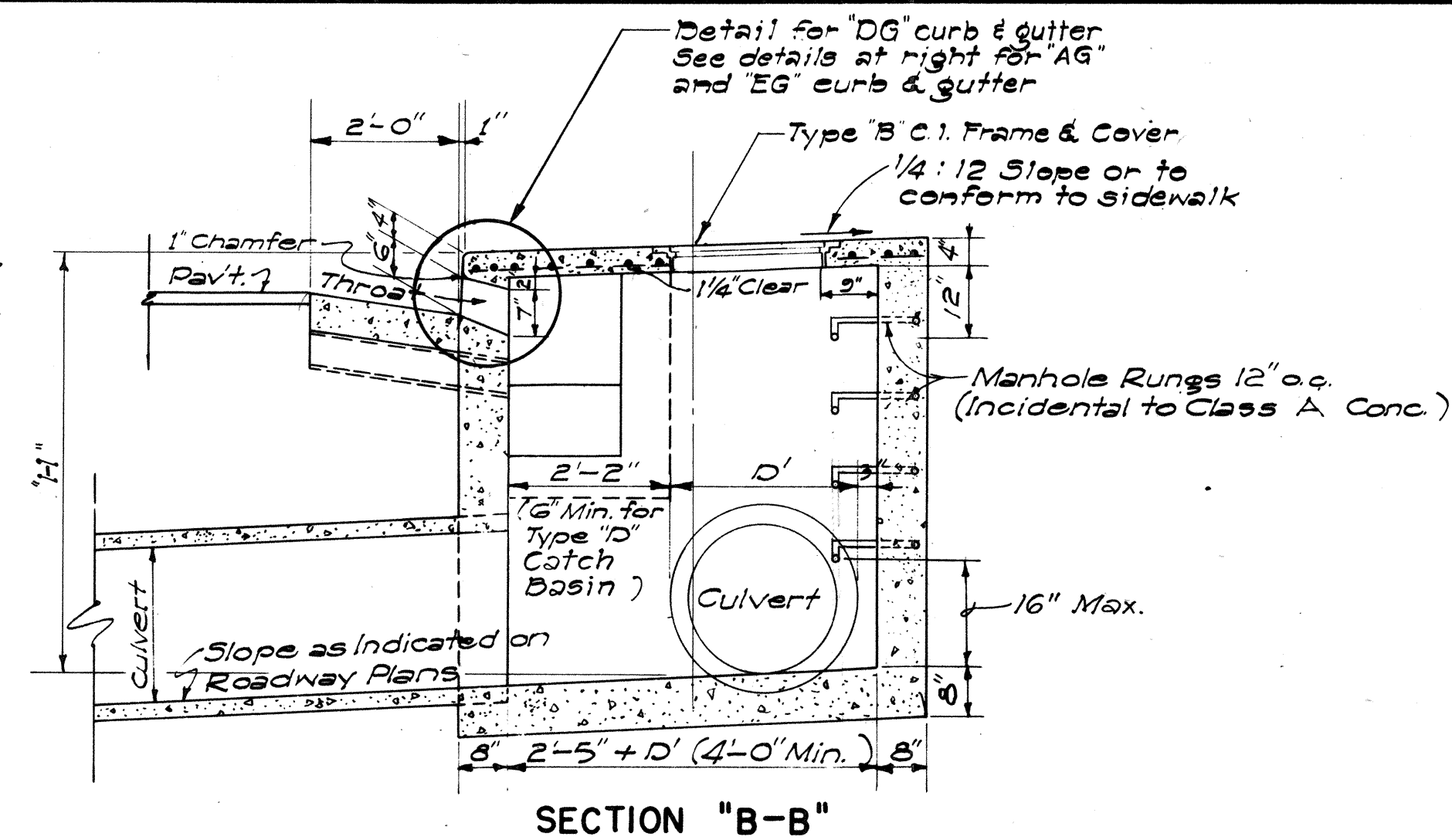
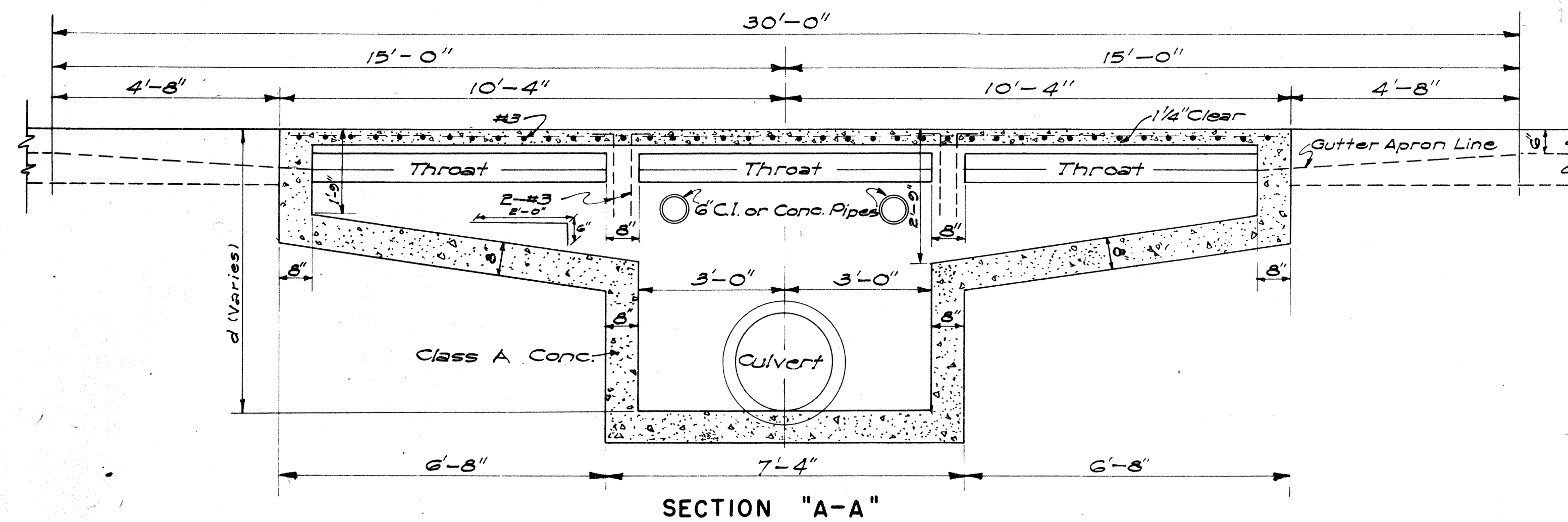
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Donald Y. H. Kam

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
KAPIOLANI ON-RAMP HI-K
INTERSTATE ROUTE H-1
KAPIOLANI INTERCHANGE ON-RAMP
F.A.I. PROJ. NO. I-HI-1(157)-24
Scale: As Shown Date: 10-15-79
SHEET NO. 8 OF 13 SHEETS

CO ADD.44

2/17/59

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-11(57)24	1979	45	146



GENERAL NOTES

- Quantities based on $d = 5.75'$ and $D = 30'$.
- Quantities do not include concrete for Gutter Apron.
- The Contractor shall install two 6" Cast Iron or Concrete Pipes as incidental to Class A Concrete for Construction Drainage. The Engineer shall determine the exact location in the field.
- Culvert shall leave C.B. from any position and any direction indicated by plans or ordered by the Engineer. Culvert may both enter and leave C.B. so that C.B. will also act as Manhole.
- The Contractor shall install Galvanized Steel Pipe Sleeves and Straps as incidental to Sprinkler System.
- The type of curb and/or gutter (Type 1, 2, 3, etc.) shall conform to the type specified on the roadway plans.
- Manhole Rungs (12" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (16 inches from the bottom) is required if "H" is 4 feet 6 inches or less. Type "B" Cast Iron Frame and Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.

ESTIMATED QUANTITIES

Type	Class A Conc. Struct. Exc.	Reinf. Steel	Gutter Length
"A"	7.5 cy.	24.7 cy.	145 lb.
"B"	6.0 cy.	21.5 cy.	108 lb.
"C"	6.0 cy.	21.5 cy.	108 lb.
"D"	4.9 cy.	16.5 cy.	77 lb.

APPROVAL RECOMMENDED:

HYDRAULIC DESIGN ENGINEER

12-17-69
DATE

APPROVED:

ASSISTANT CHIEF, ENGINEERING

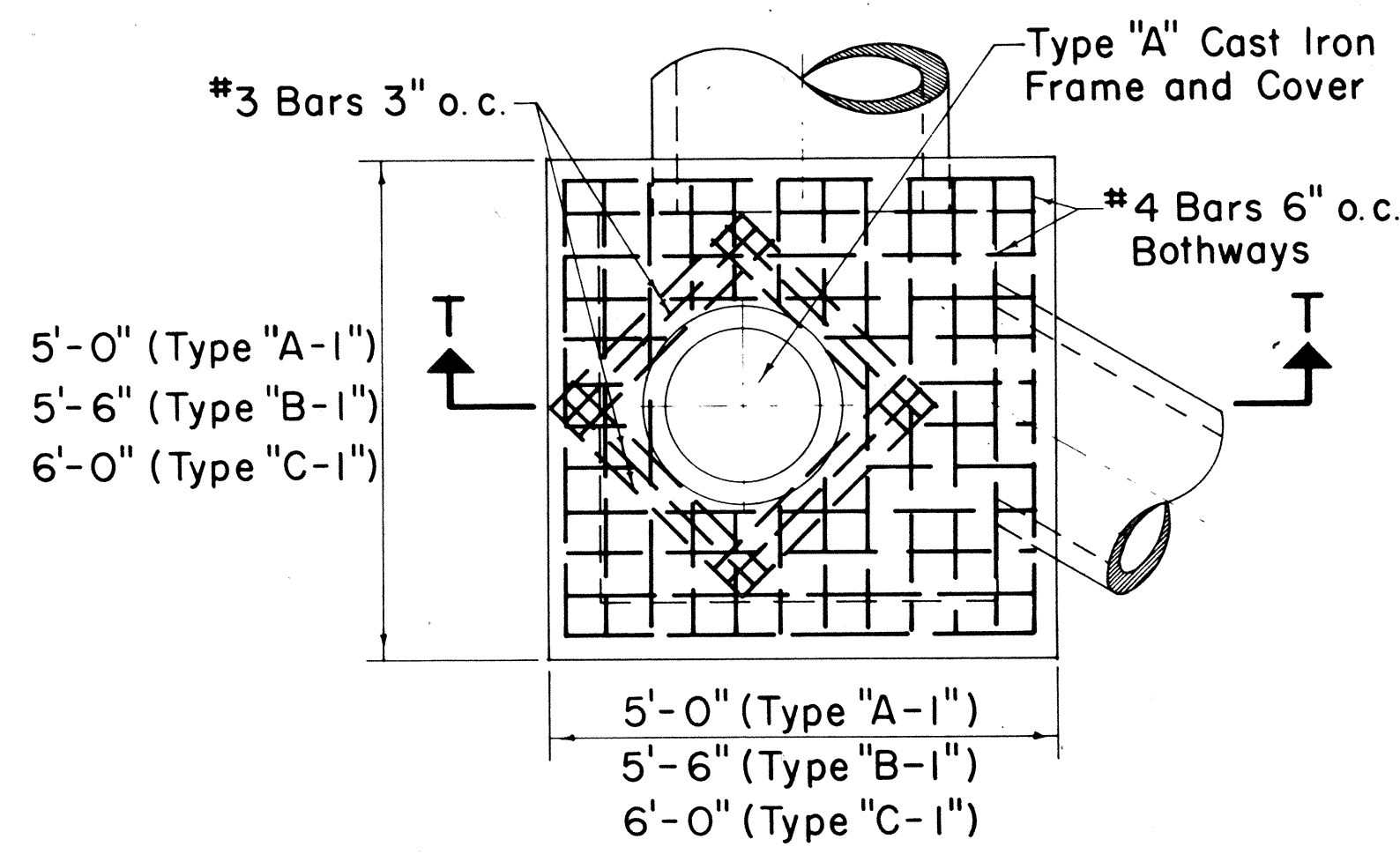
12-17-69
DATE

NO.	REVISION	APPROVED BY	DATE
1	Spacing on Manhole Rungs to conform to OSHA.	H.T.	1-21-75

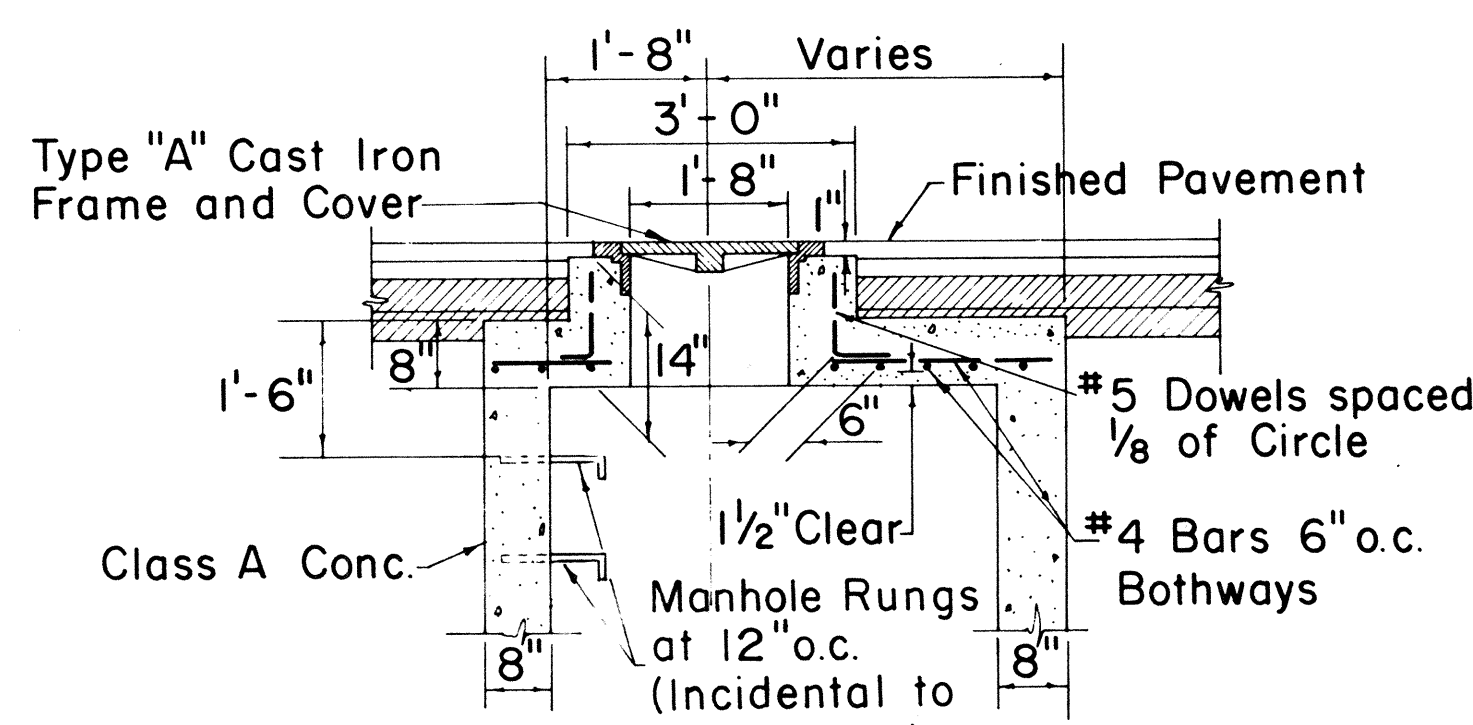
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
CATCH BASINS

Scale: As Noted Date: July, 1969
SHEET NO. 0 OF 13 SHEETS DH 1

FED. ROAD DIST. NO.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-(157)24	1979	46	146



PLAN



SECTION T-T

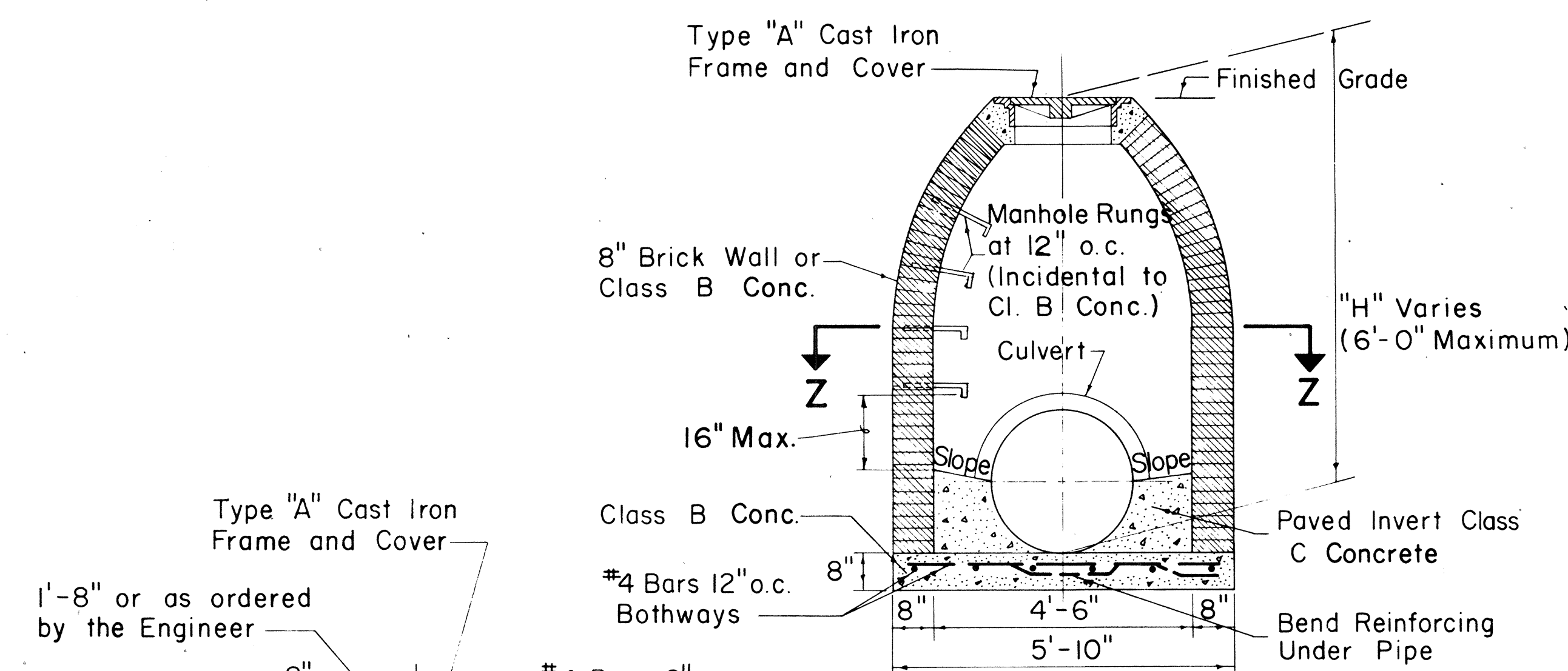
TYPE "A-1", "B-1", & "C-1"
STORM DRAIN MANHOLE
TOP DETAIL UNDER PAVEMENT

Scale: 1/2" = 1'-0"

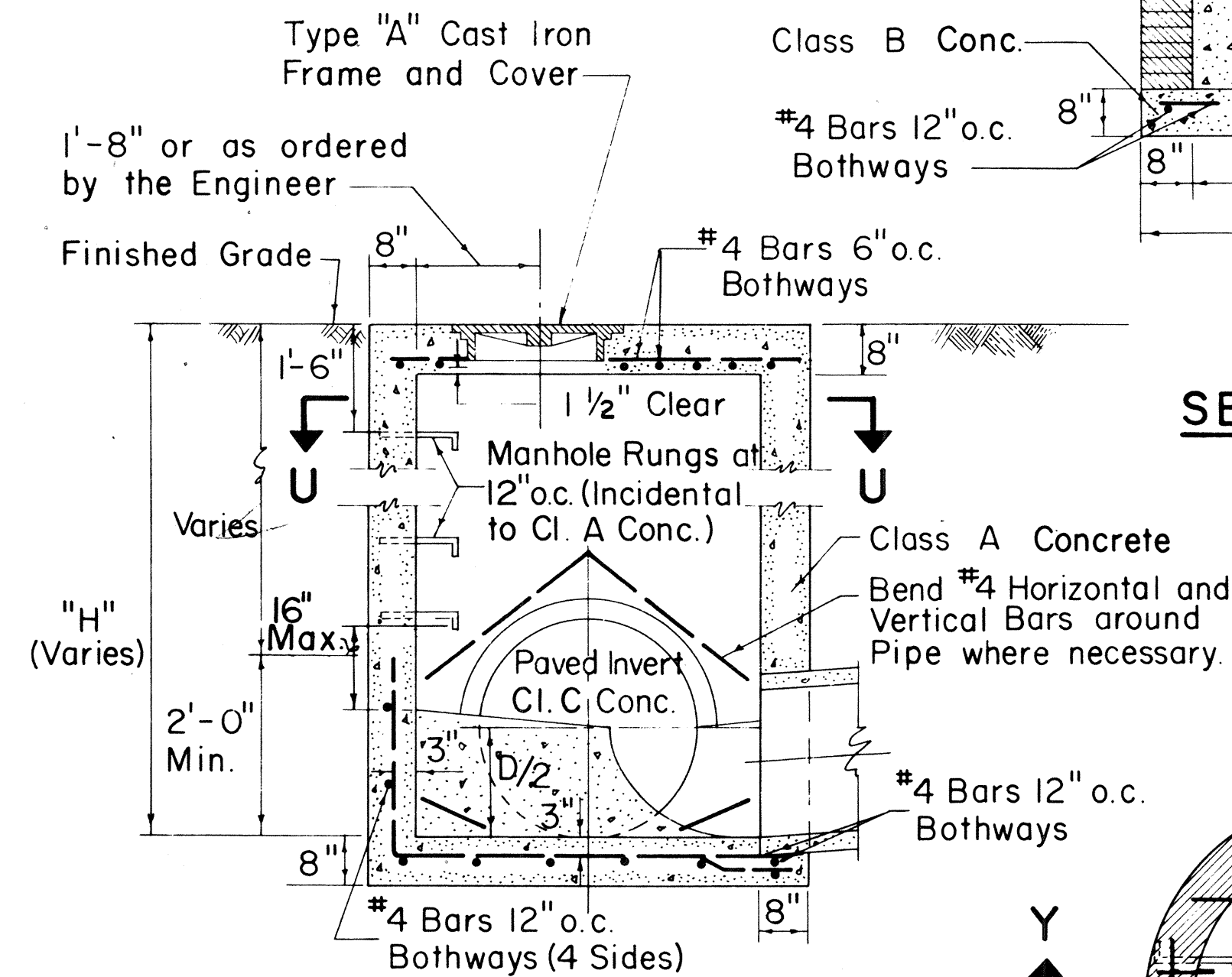
Note:
Bottom detail similar to
Type "A", "B", & "C".

GENERAL NOTES

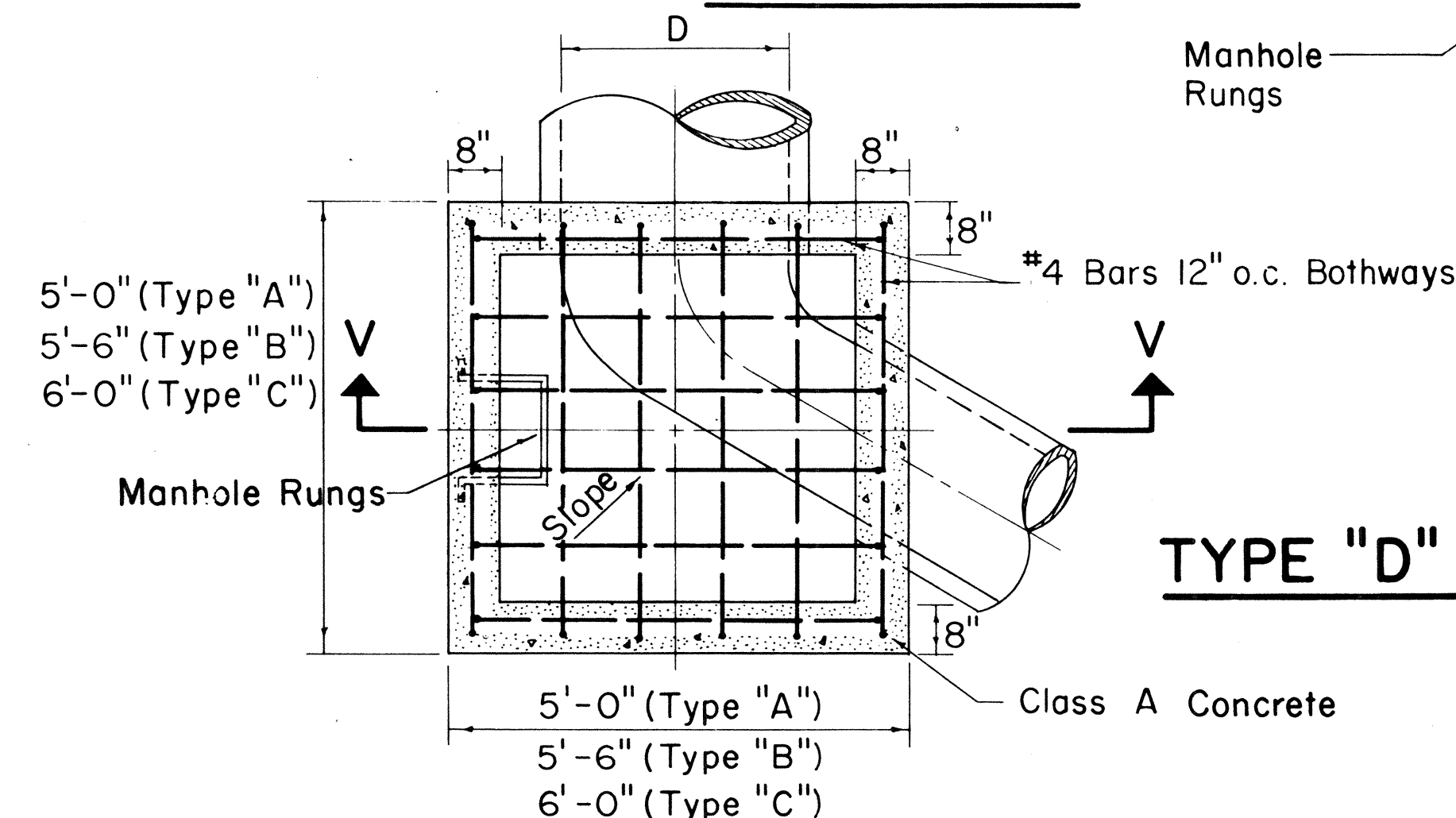
1. Culvert shall enter and leave S.D.M.H. from any position and in the direction indicated by the plans or ordered by the Engineer.
2. Manhole Rungs (12" o.c.) are required when "H" is greater than 4'-6". Only one rung (16" from the bottom) is required if "H" is 4'-6" or less. Type "A" C.I. Frame and Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.



SECTION Y-Y



SECTION V-V



SECTION U-U

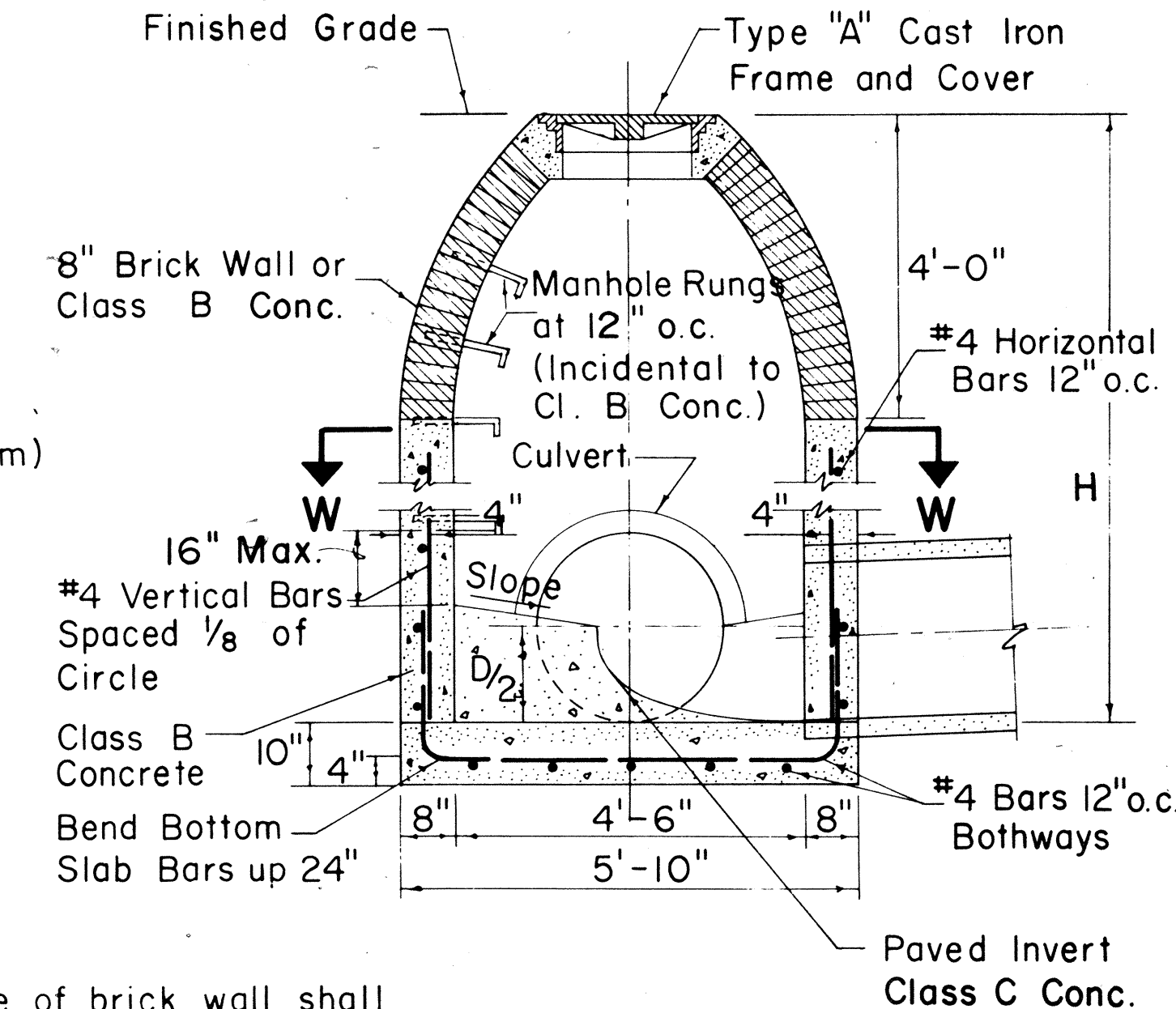
TYPE "A", "B", & "C"

S.D.M.H.

Scale: 1/2" = 1'-0"

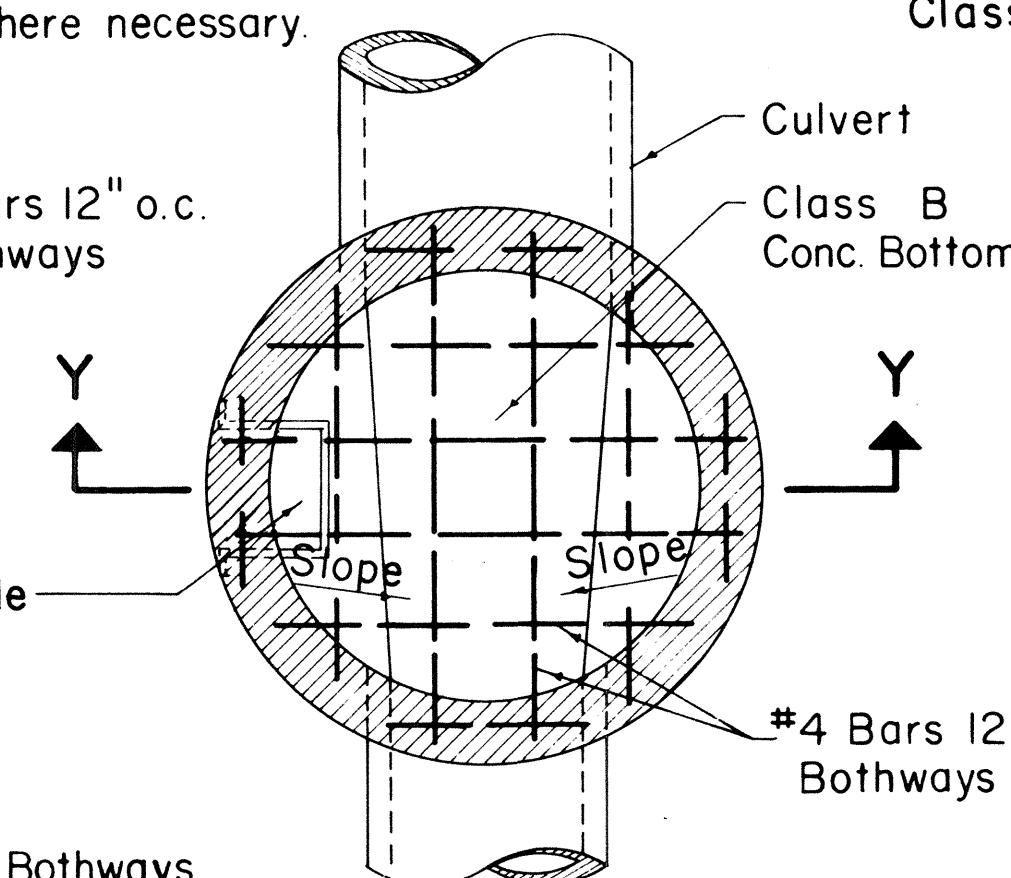
APPROVAL RECOMMENDED:
[Signature]
HYDRAULIC DESIGN ENGINEER 12-17-69 DATE

APPROVED:
[Signature]
ASST. CHIEF, ENGINEERING 12-17-69 DATE



SECTION X-X

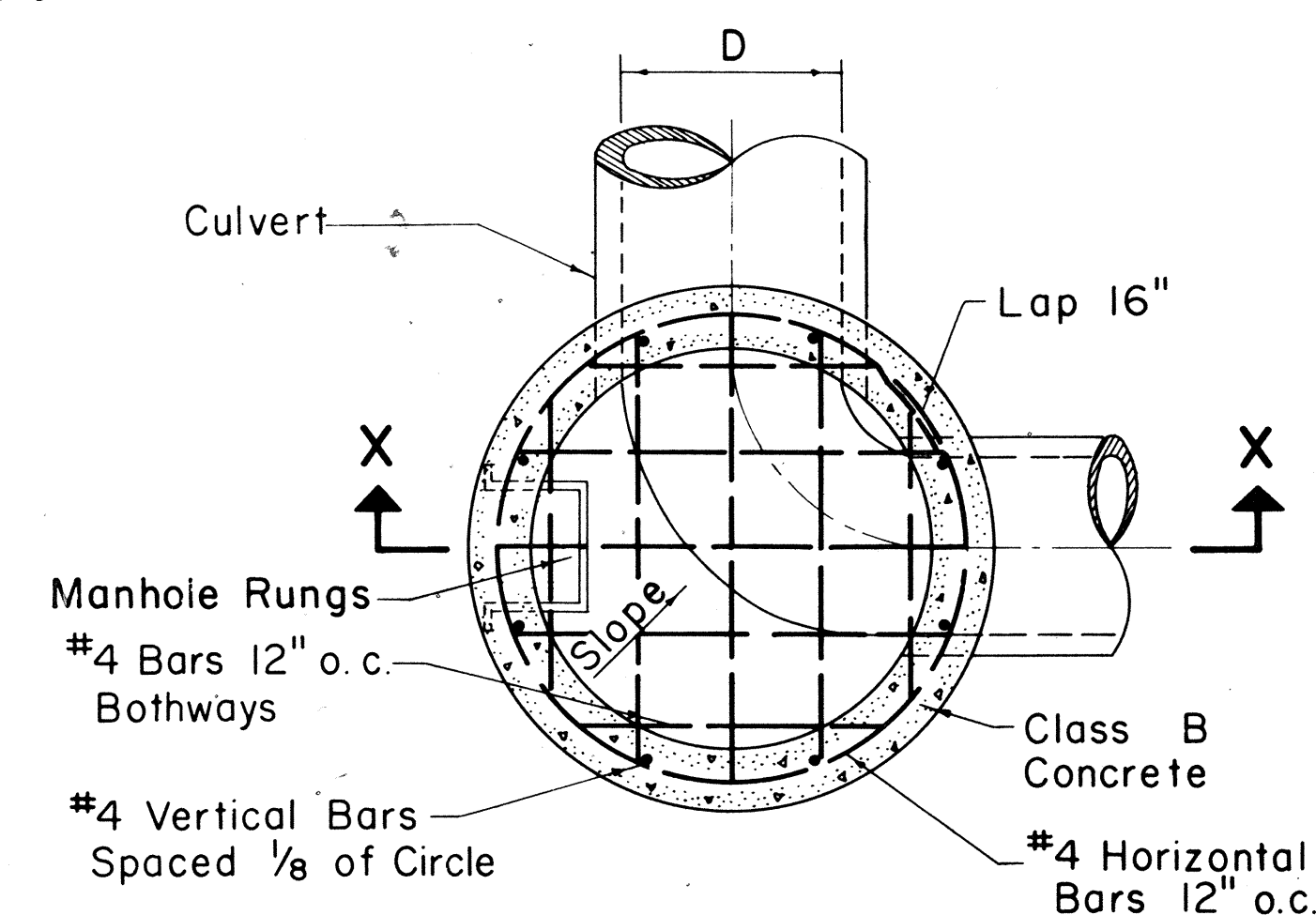
- NOTE:
1. Exterior surface of brick wall shall be plastered with 1" thickness of 1:2 Cement Mortar.
 2. Number, size and direction of culvert at manhole to be as shown on plans.
 3. Paved invert not required at drop manholes.
 4. All Class C Concrete to be incidental to Class B Concrete.



SECTION Z-Z

TYPE "D" STORM DRAIN MANHOLE

Scale: 1/2" = 1'-0"



SECTION W-W

TYPE "E" STORM DRAIN MANHOLE

Scale: 1/2" = 1'-0"

NO.	REVISION	APPROVED BY	DATE
1	Spacing on Manhole Rungs to conform to OSHA.	HT.	1-24-75

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
STORM DRAIN MANHOLES

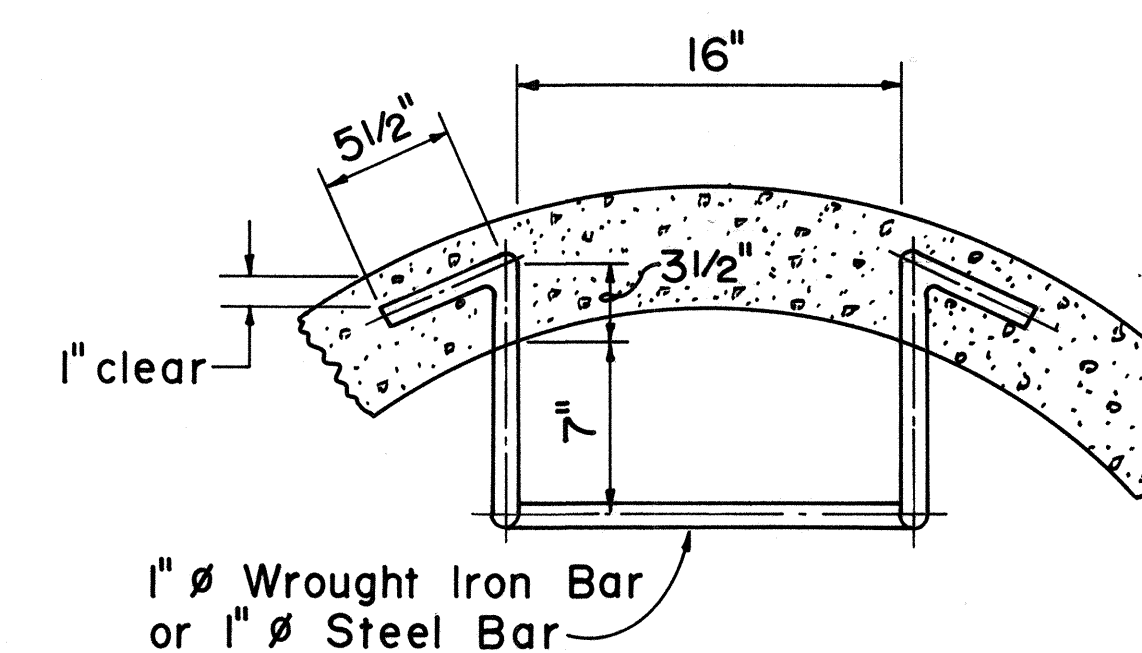
Scales: As Noted Date: July, 1969

SHEET NO. 10 OF 13 SHEETS DH 5

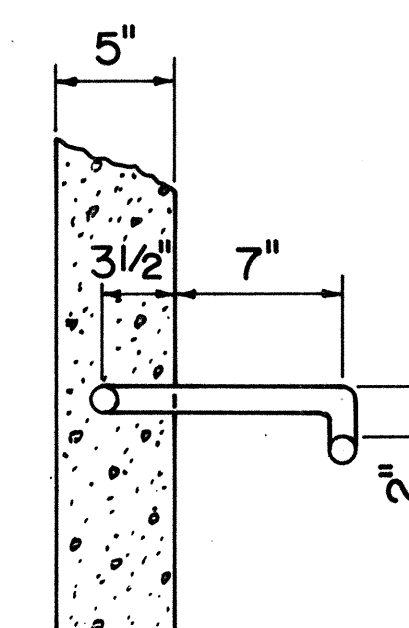
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H-11-1057-24	1979	47	146

GENERAL NOTES

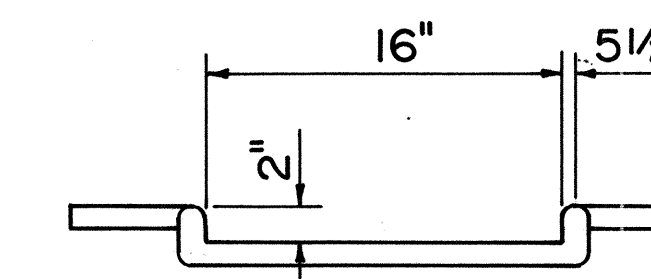
1. Select appropriate combination of risers and grade rings for required height.
2. All joints to be grouted as set.
3. Manufacturers may submit to the Engineer for approval, prior to manufacturing, designs other than those shown on this sheet.



PLAN

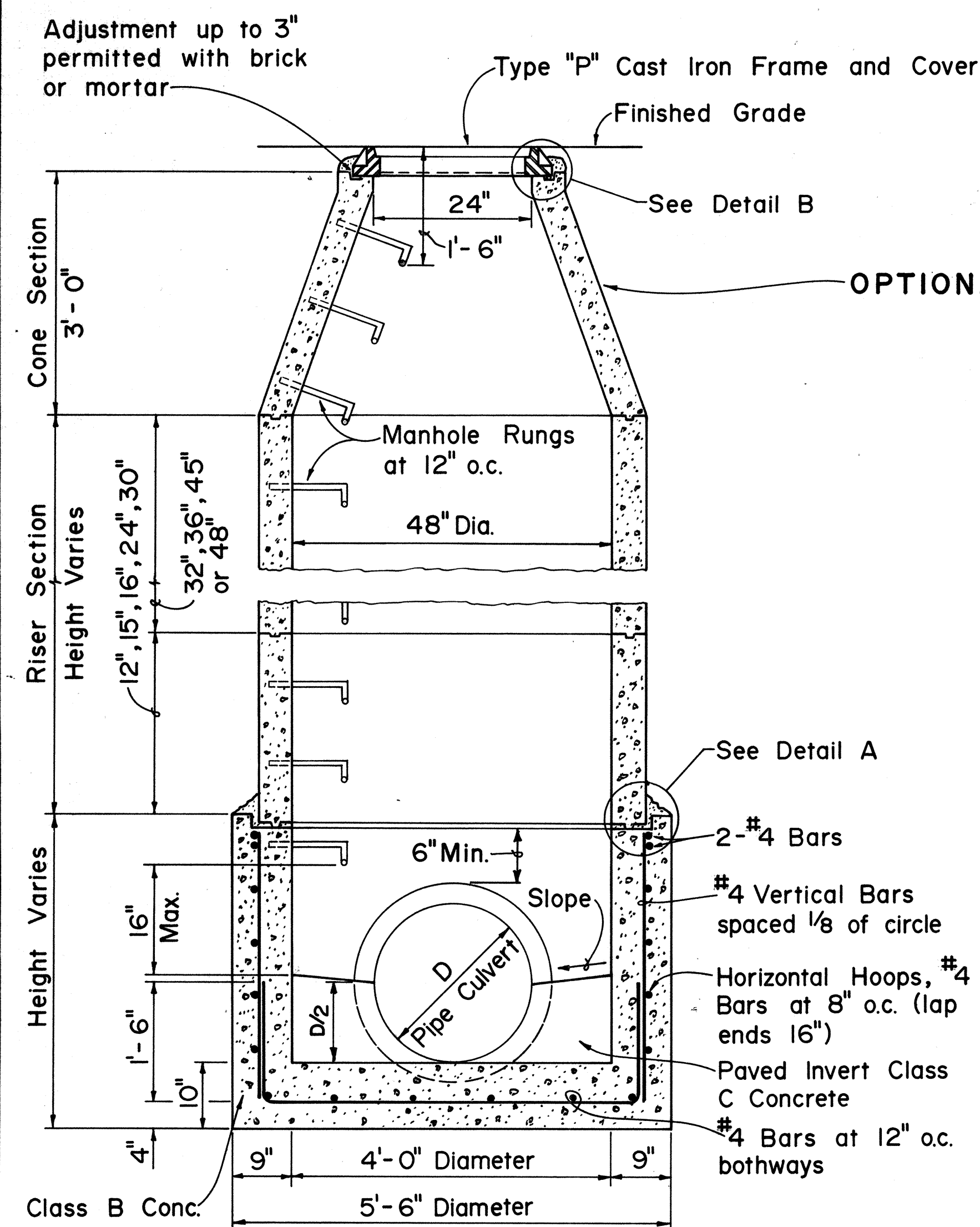


SIDE VIEW

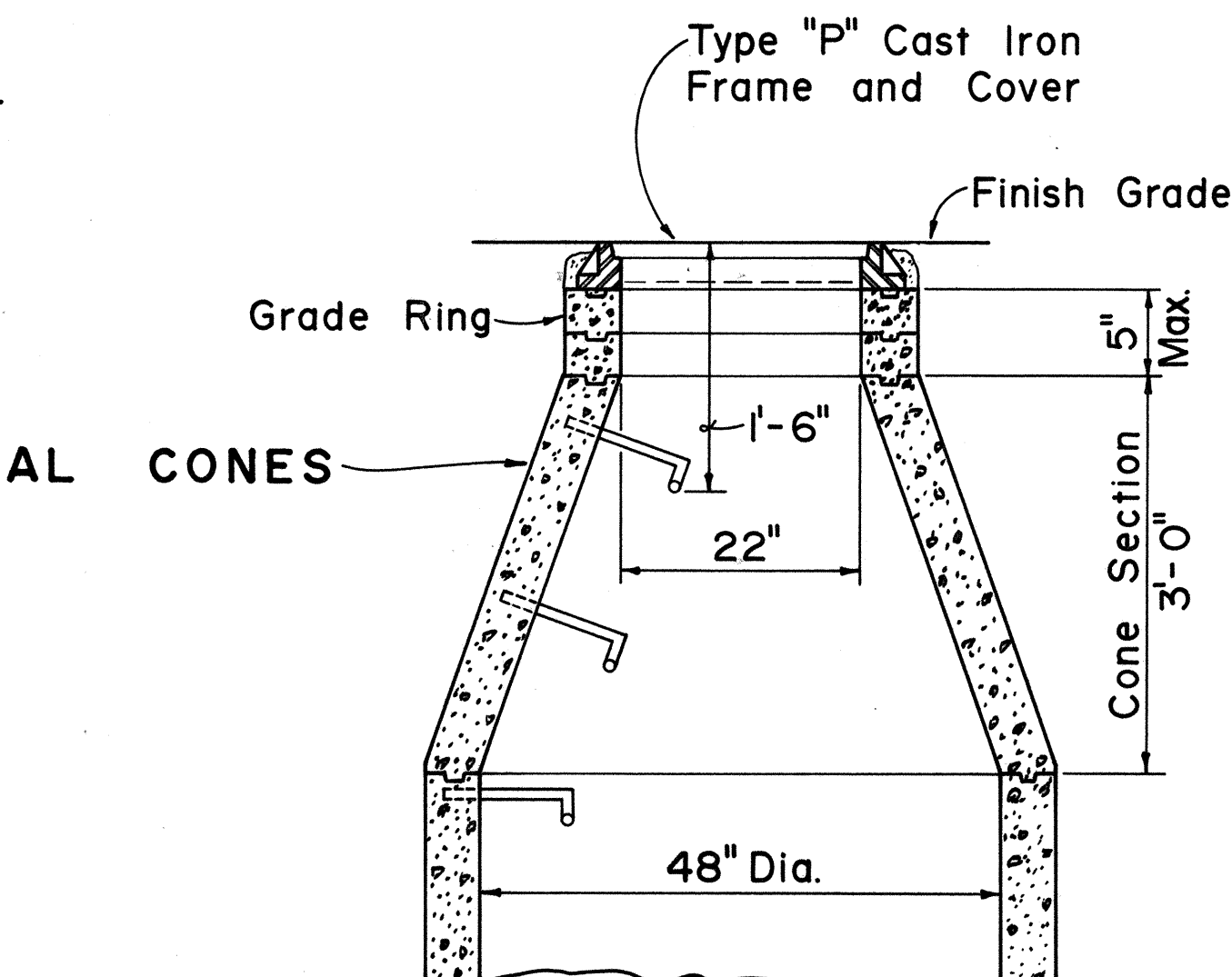


FRONT VIEW

MANHOLE RUNGS

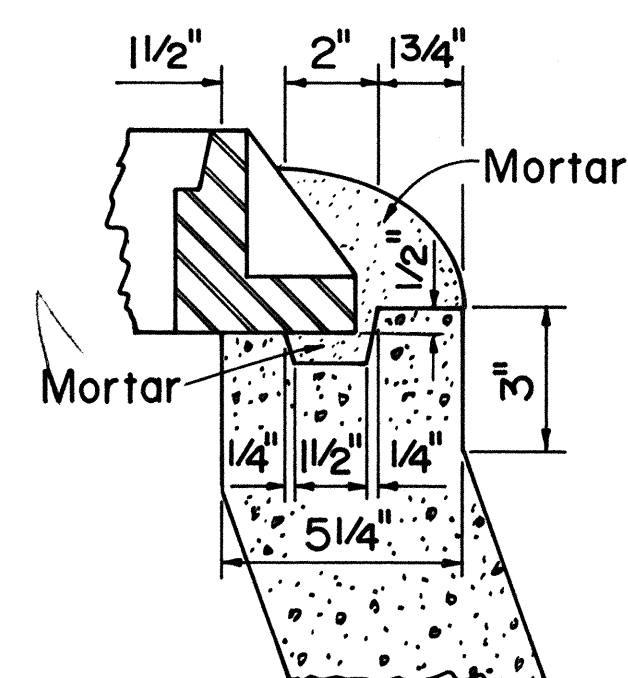


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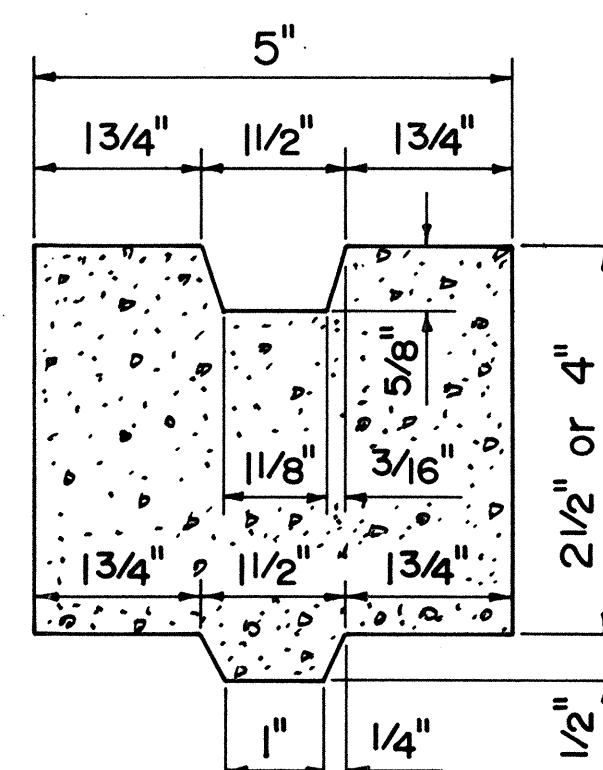


DETAIL B

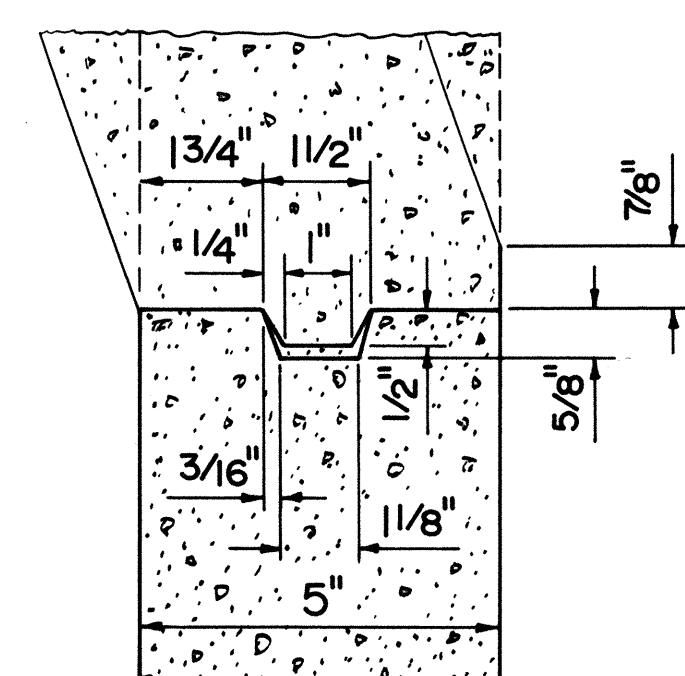
DETAIL A



GRADE RING DETAIL



PRECAST CONCRETE MANHOLE



DETAIL FOR RISER JOINTS

APPROVAL RECOMMENDED:

P. Nakano 6-19-79
HYDRAULIC DESIGN ENGINEER DATE

APPROVED:

Robert Nakano 6-22-79
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 5A approved 2-25-71	H.T.	6/22/79

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

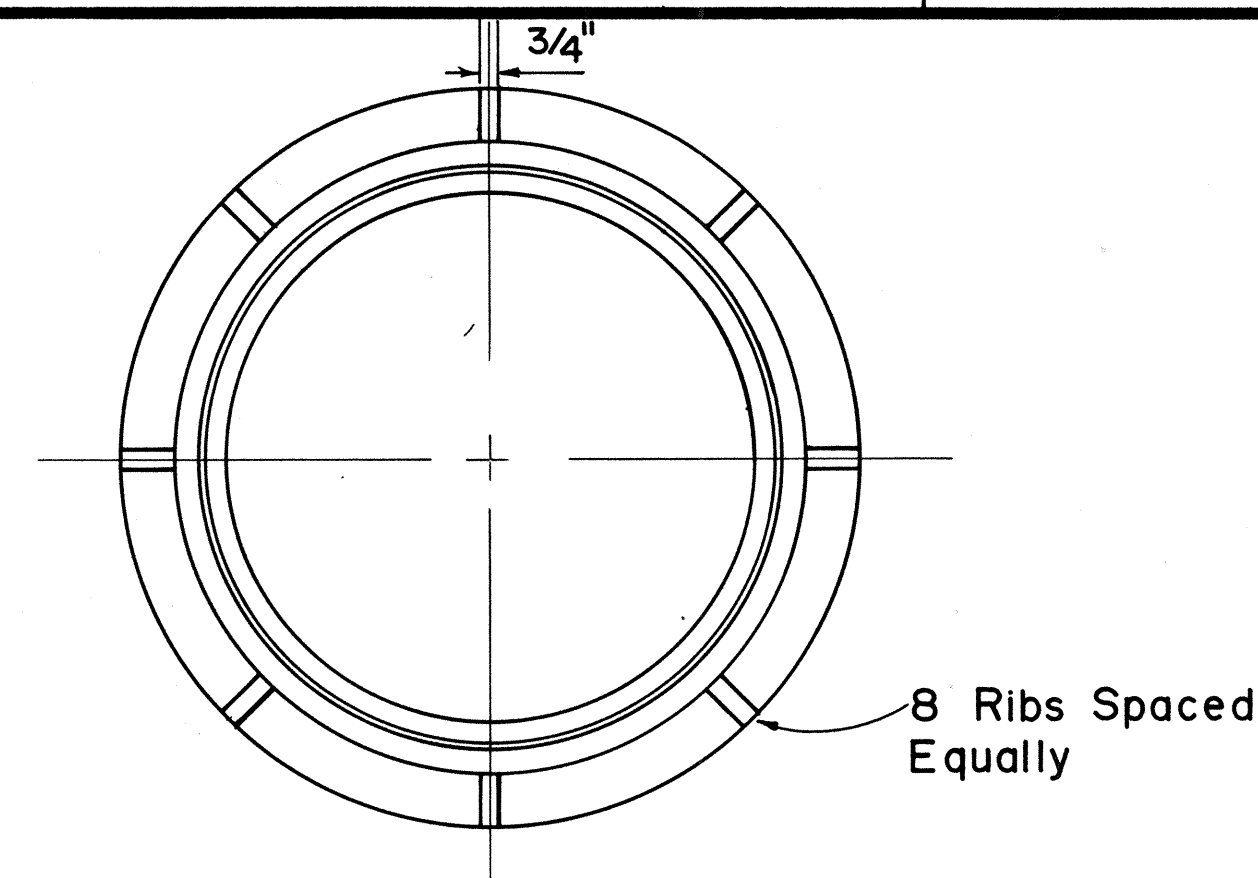
STANDARD DETAILS
PRECAST CONCRETE
MANHOLES

Not To Scale Date: Dec. 1977

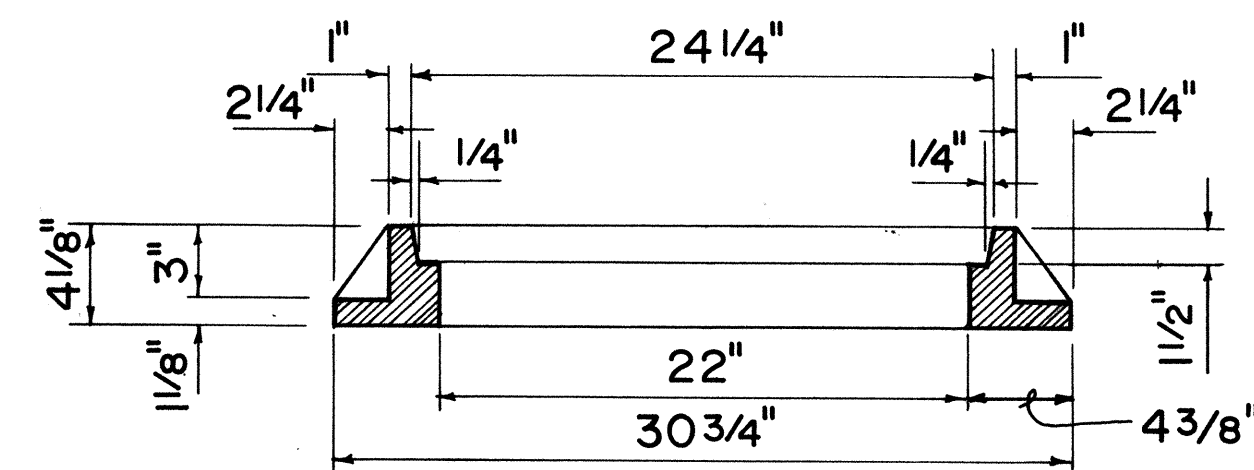
SHEET No. 11 OF 13 SHEETS DH 5A

ORIGINAL PLAN	DATE
DESIGNED BY	
NOTED BY	
CHECKED BY	
NO.	

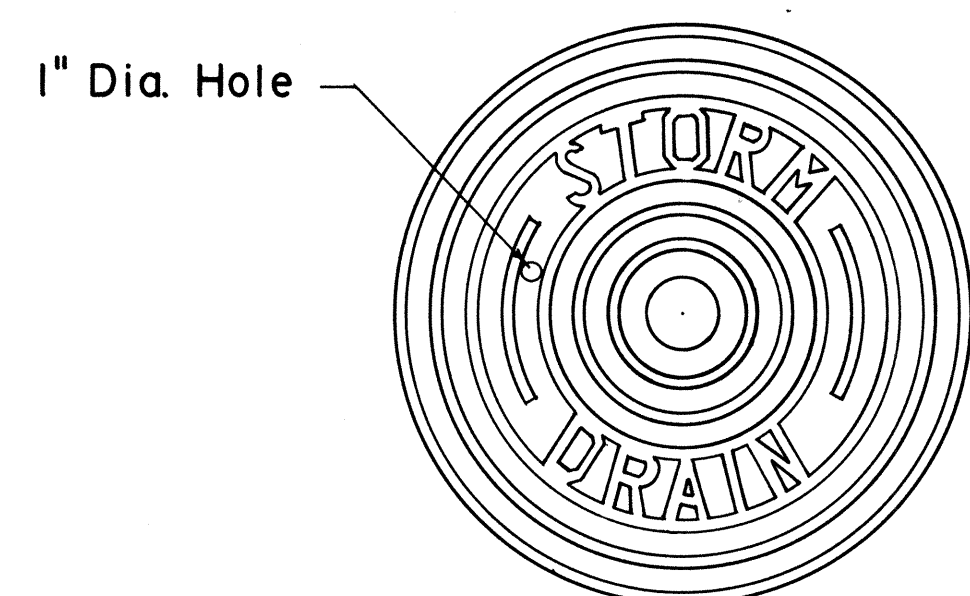
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-HI-1(157)-24	1979	48	146



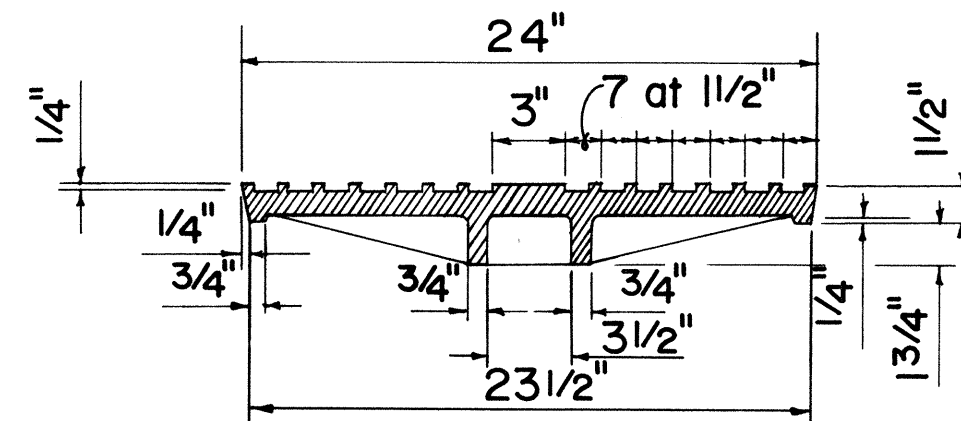
PLAN OF FRAME



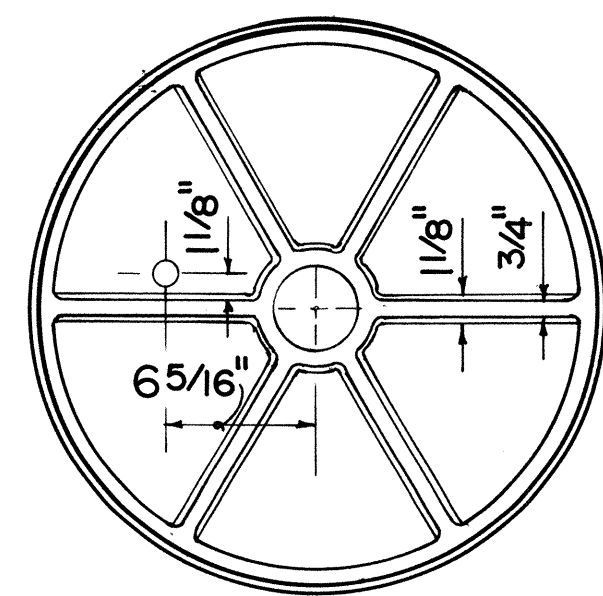
SECTION OF FRAME



TOP VIEW OF COVER

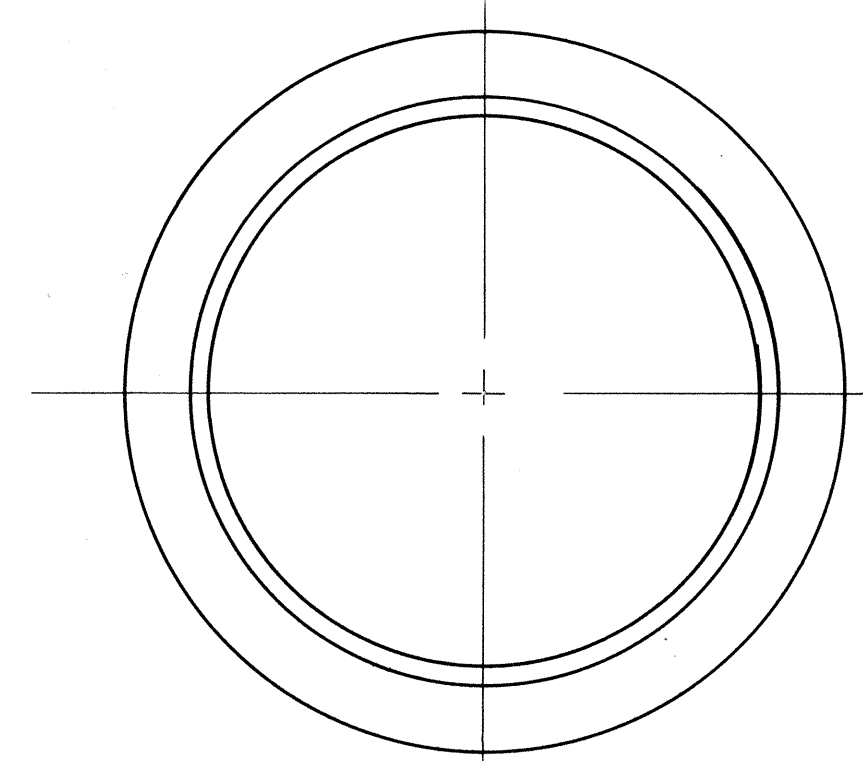


SECTION

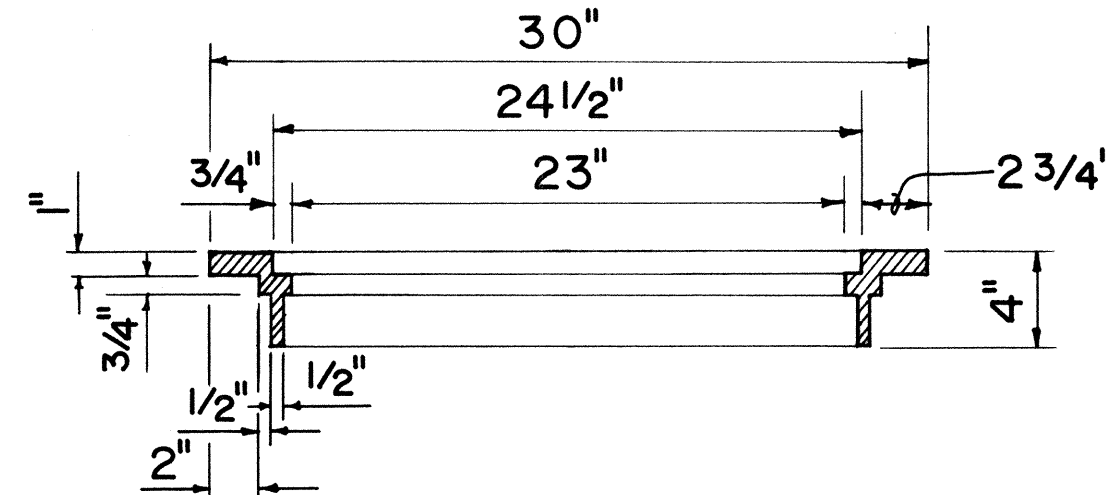


BOTTOM VIEW OF COVER

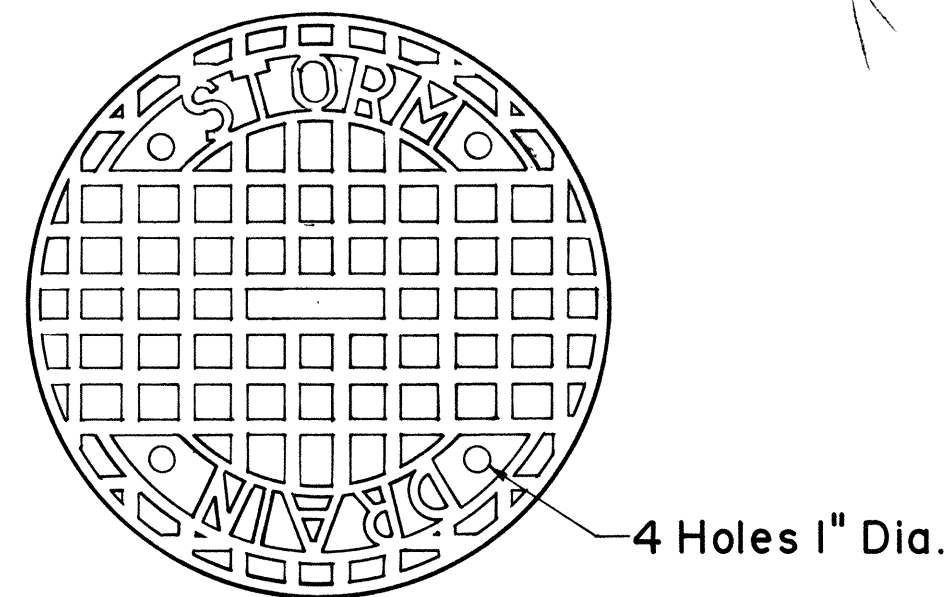
TYPE "P" CAST IRON
FRAME AND COVER



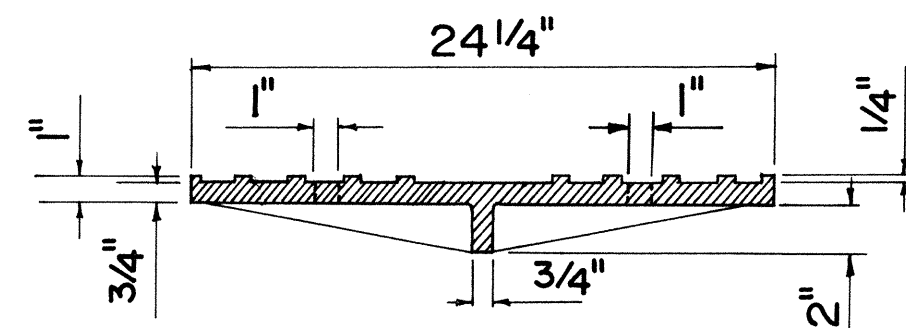
PLAN OF FRAME



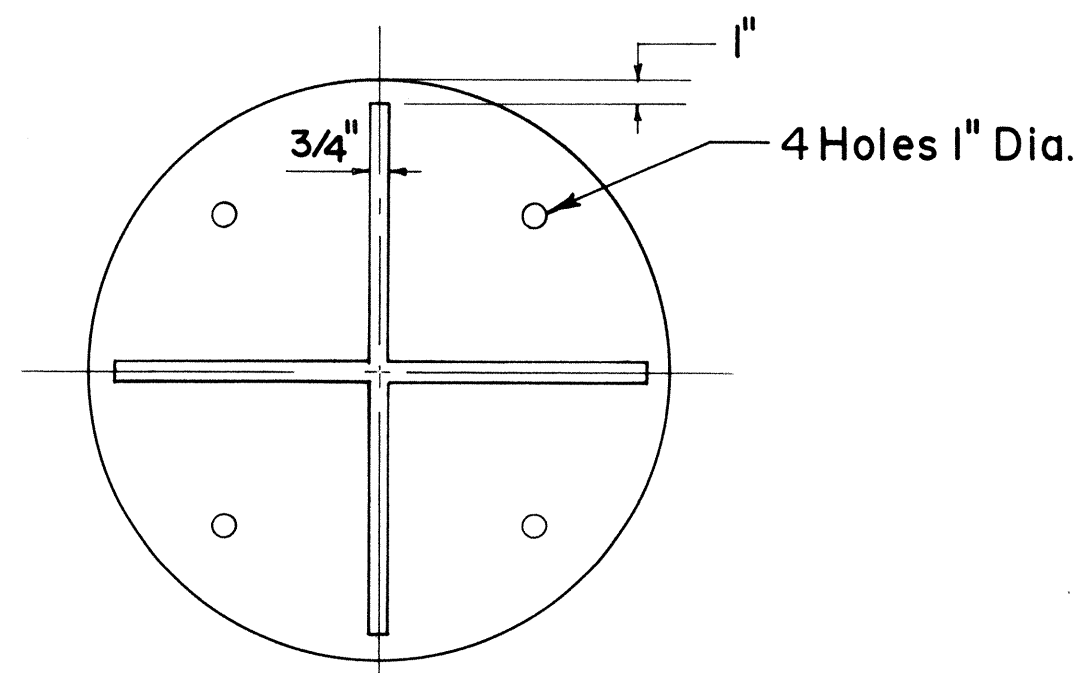
SECTION OF FRAME



TOP VIEW OF COVER

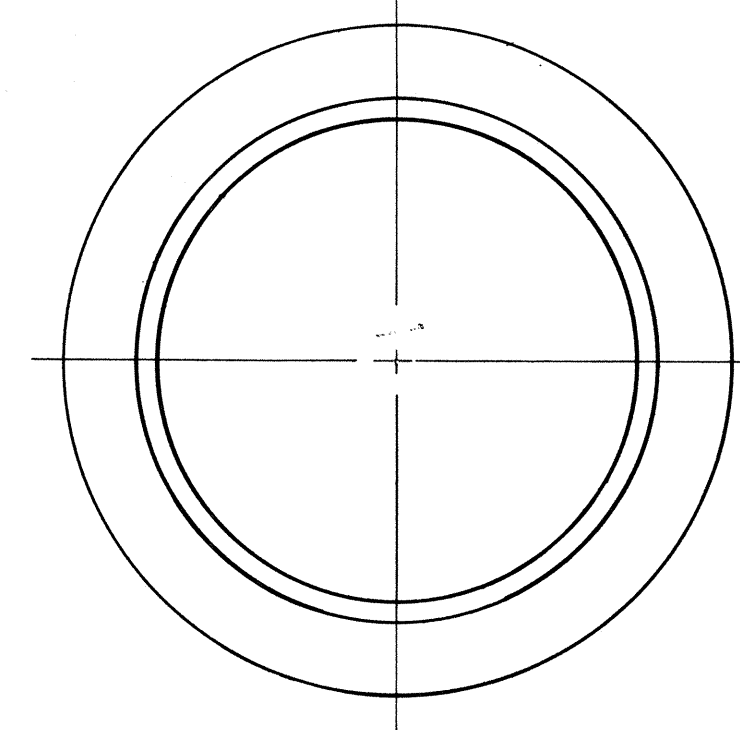


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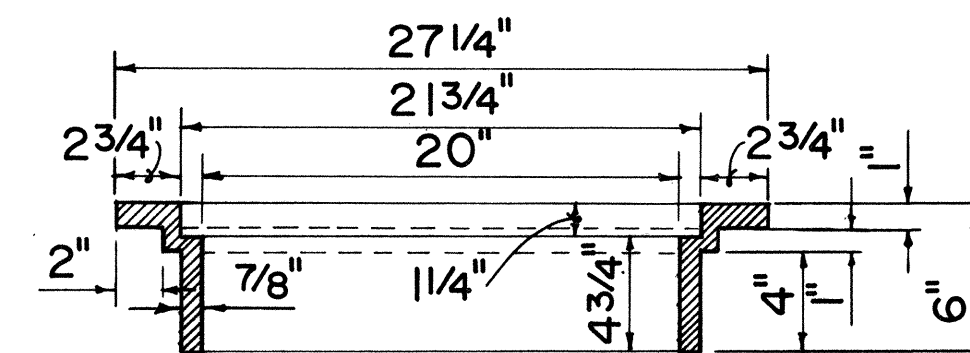


BOTTOM VIEW OF COVER

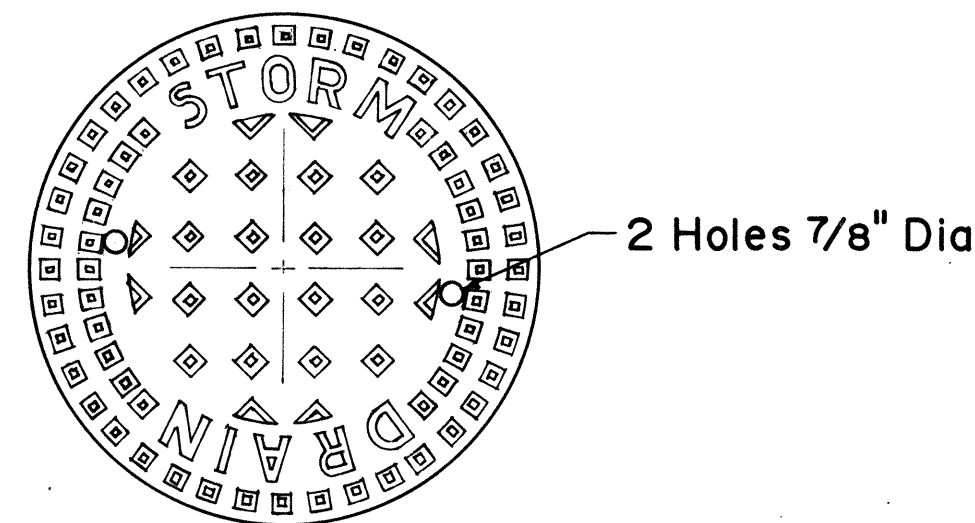
TYPE "B" CAST IRON
FRAME AND COVER



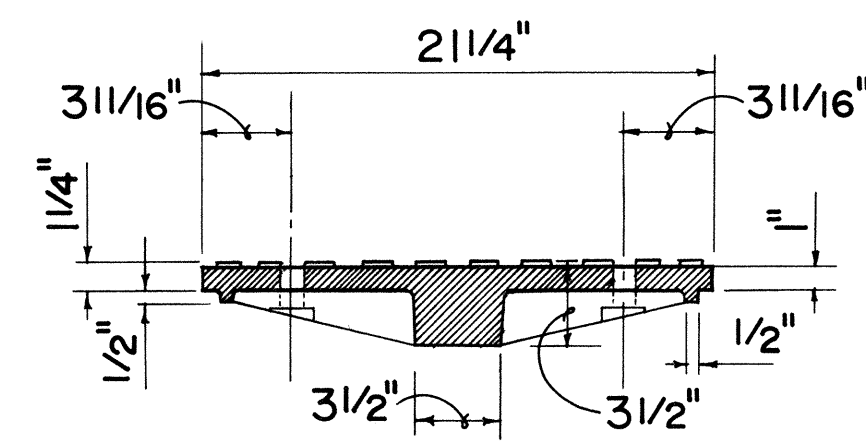
PLAN OF FRAME



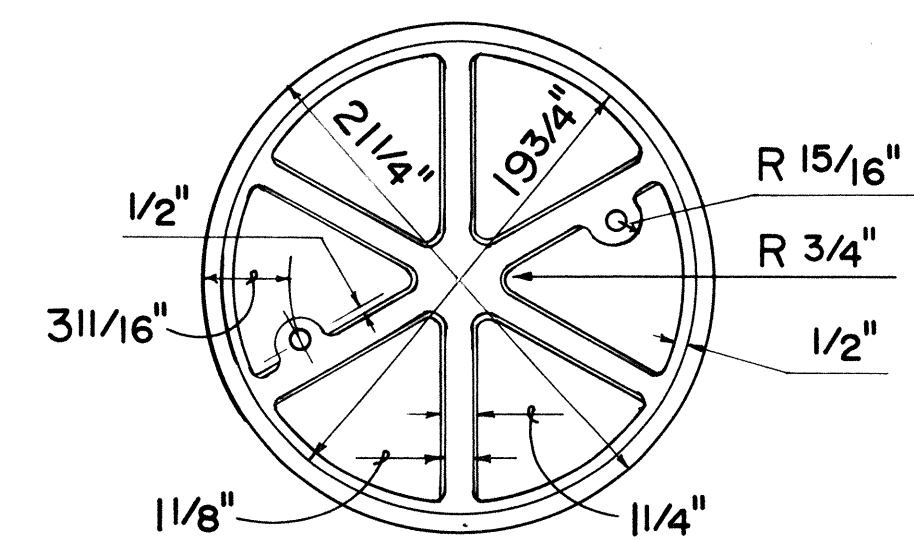
SECTION OF FRAME



TOP VIEW OF COVER

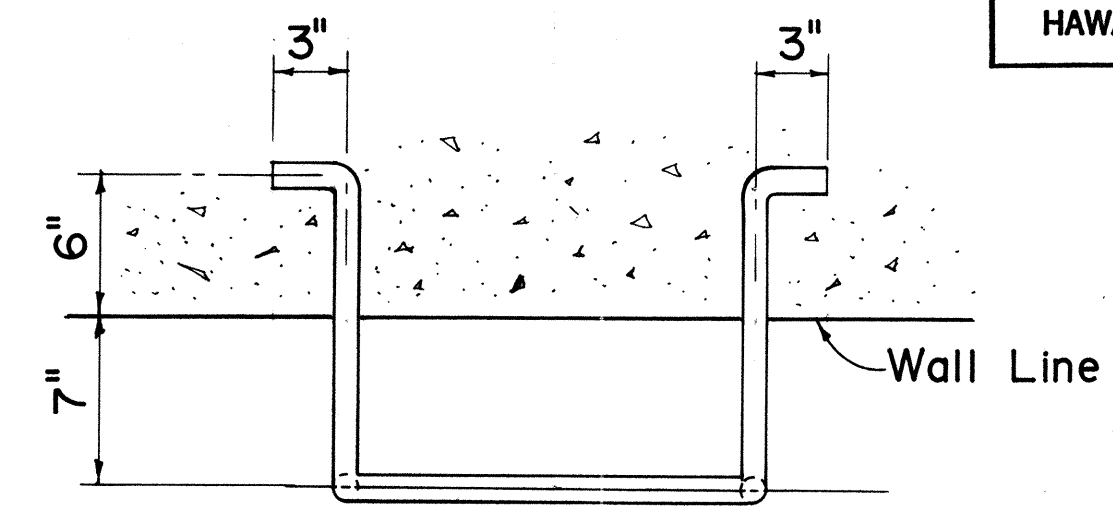


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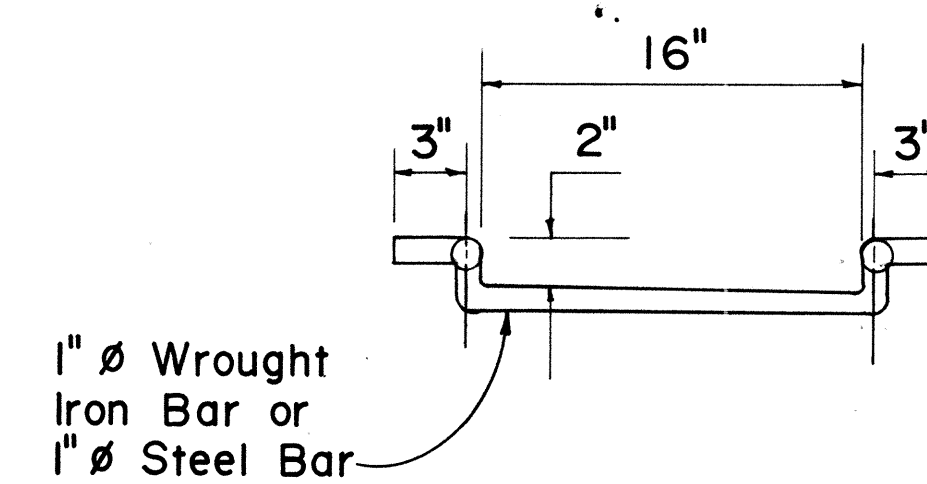


BOTTOM VIEW OF COVER

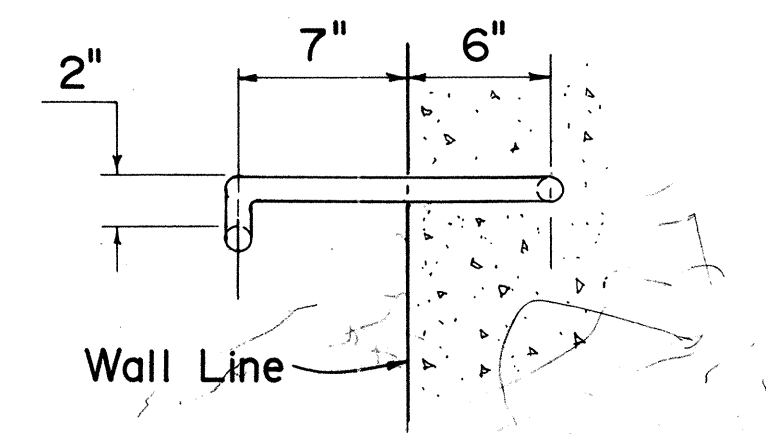
TYPE "A" CAST IRON
FRAME AND COVER



PLAN



FRONT VIEW



SIDE VIEW

MANHOLE RUNG

APPROVAL: RECOMMENDED:
Takano 6-19-79
 HYDRAULIC DESIGN ENGINEER DATE
 APPROVED:
Harbor Zakeishi 6-22-79
 ASSISTANT CHIEF, ENGINEERING DATE

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

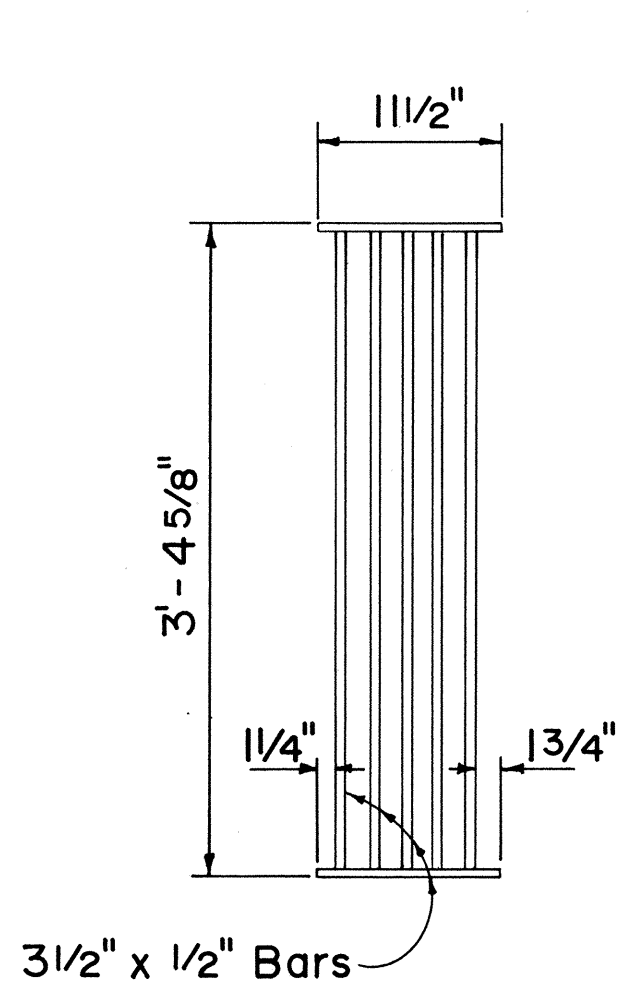
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STANDARD DETAILS CATCH BASIN AND MANHOLE CASTINGS
Not To Scale Date: Dec. 1977
SHEET NO. 12 OF 13 SHEETS DH 6

ORIGINAL PLAN	DATE
DESIGNED BY	
TRACED BY	
NOTED BY	
CHECKED BY	
NO.	

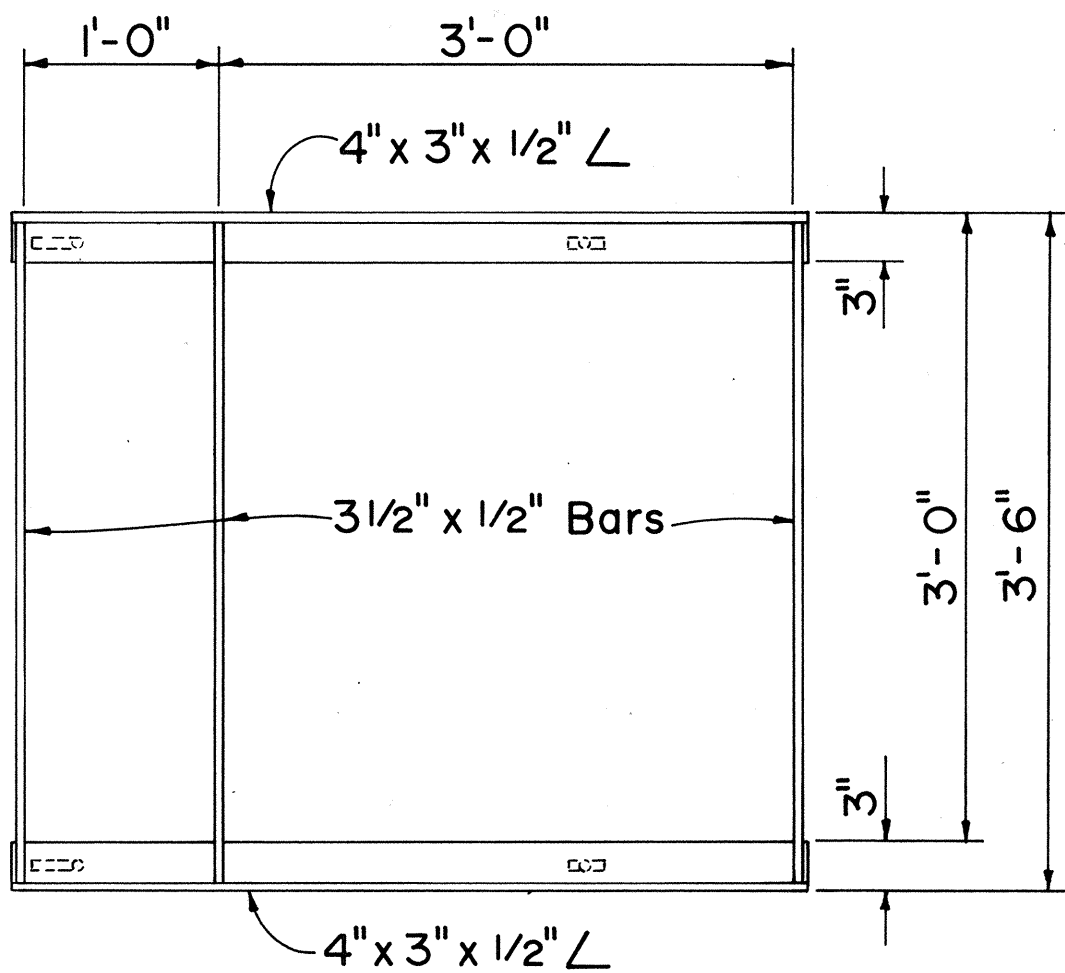
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-11-1(157)24	1979	49	146

GENERAL NOTE

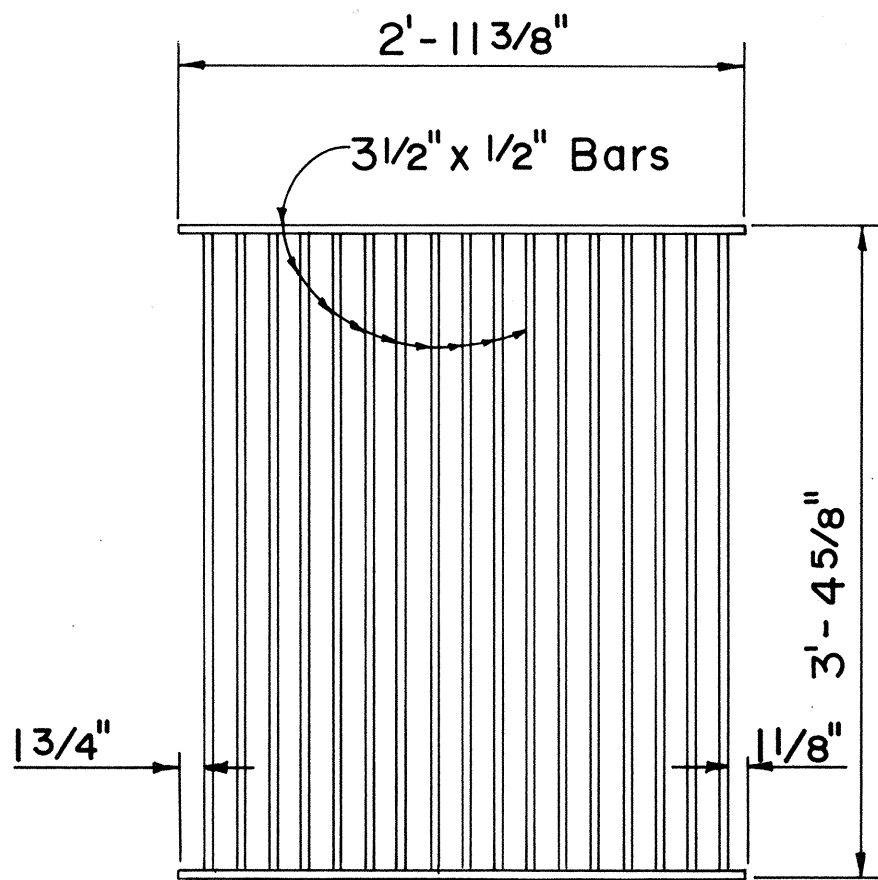
1. All welds 3/8" unless otherwise noted.



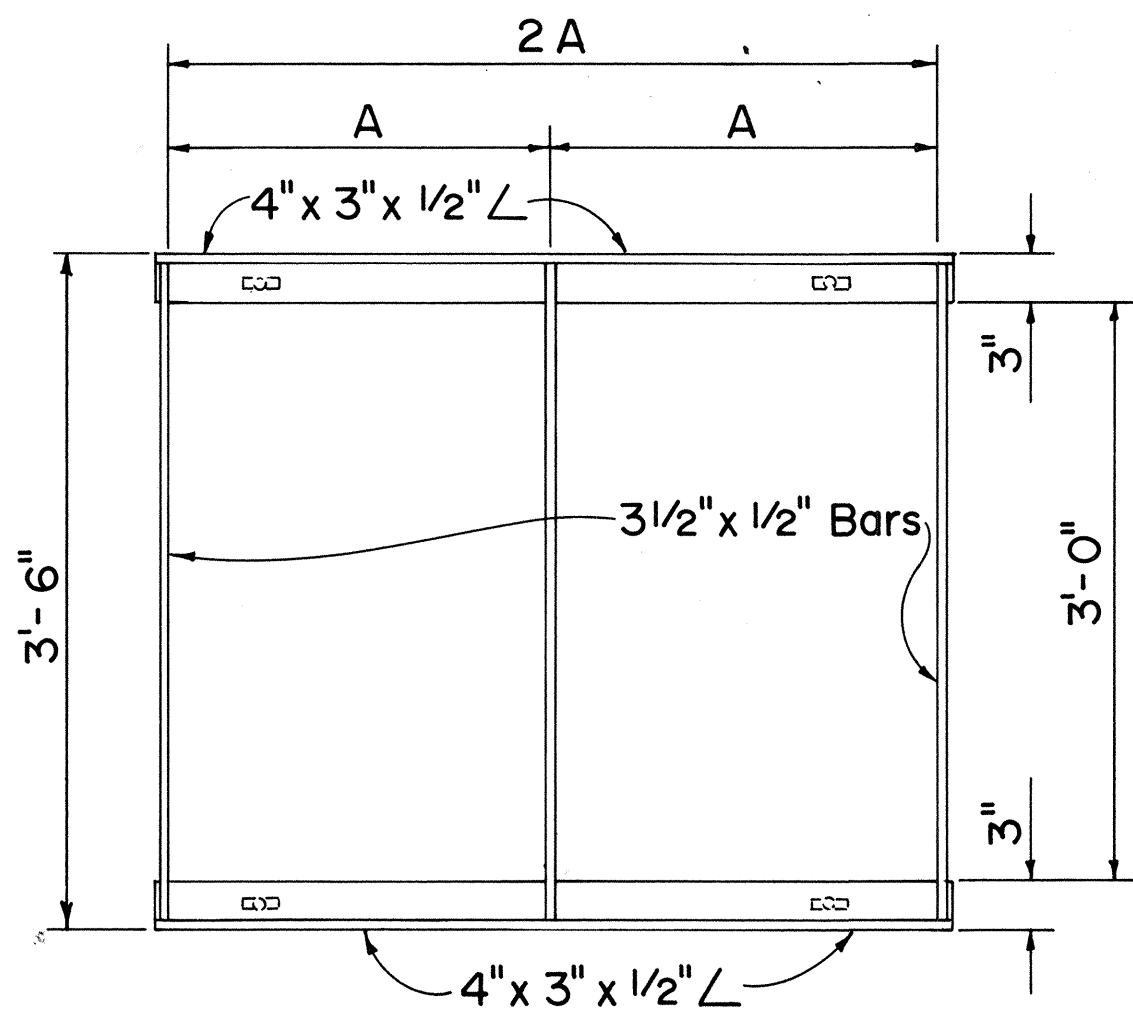
PLAN



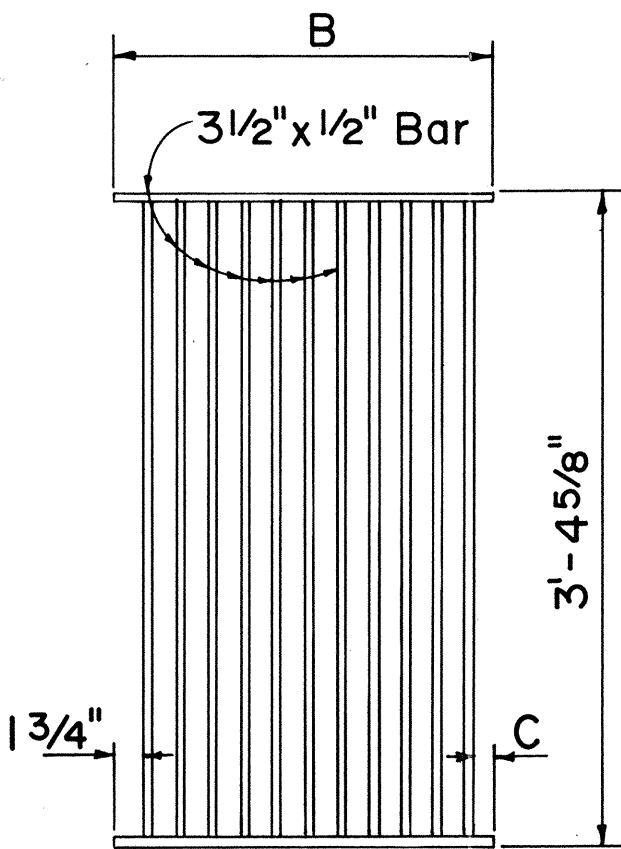
PLAN



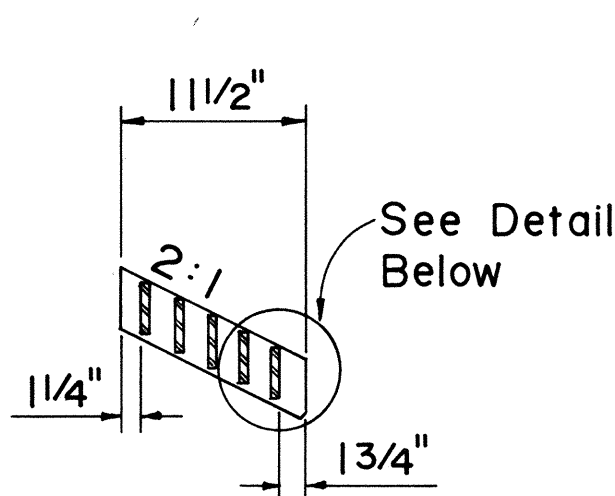
PLAN



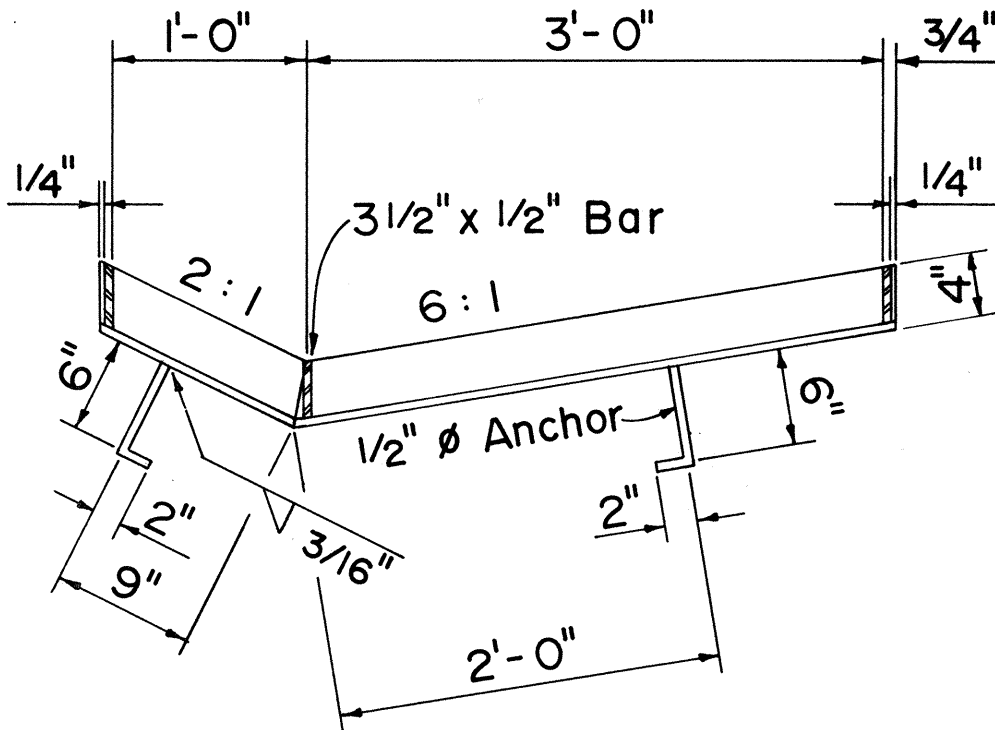
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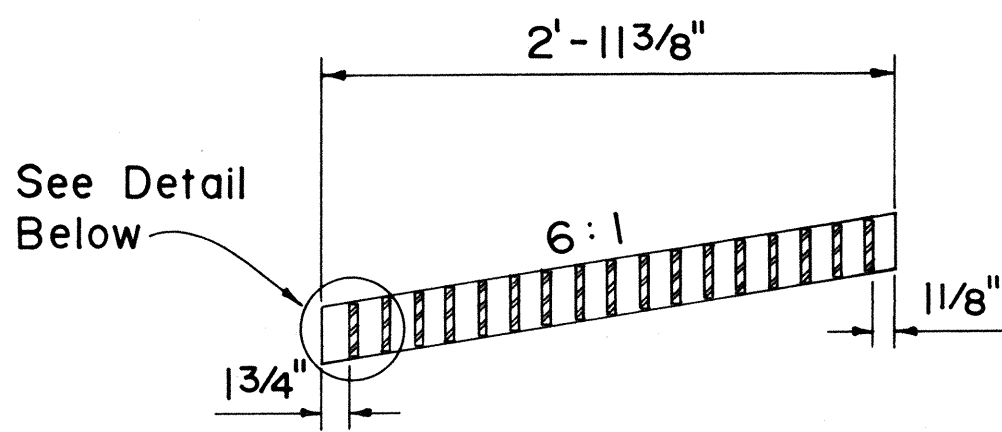
PLAN



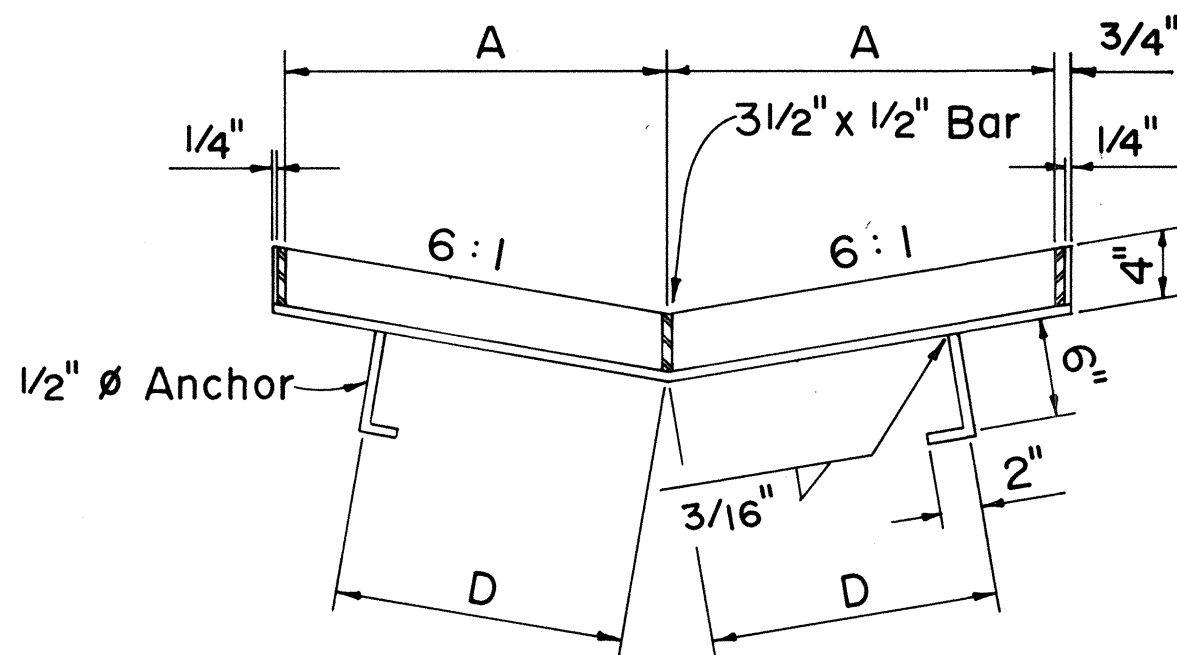
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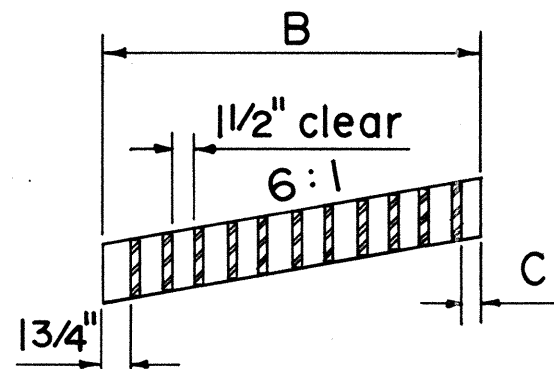
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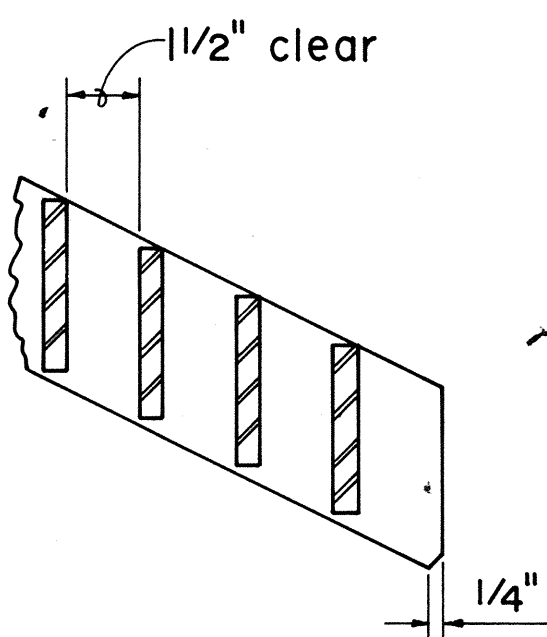
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SECTION

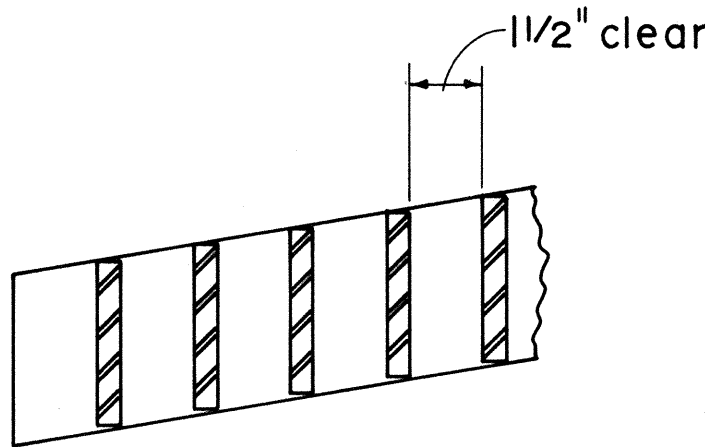


SECTION



GRATE

FRAME



GRATE

61614 OR 61616 STEEL FRAME AND GRATE

DIMENSIONS					
TYPE	NO. BARS	A	B	C	D
61614	11	2'-0"	1'-11 1/2"	1 1/4"	1'-6"
61616	17	3'-0"	2'-11 3/8"	1 1/8"	2'-0"

APPROVAL RECOMMENDED:
T. Takano
 HYDRAULIC DESIGN ENGINEER 6-19-79
 DATE

APPROVED:
Herbert Zakeishi
 ASSISTANT CHIEF, ENGINEERING 6-22-79
 DATE

NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 8 & DH 9 approved 12-17-69	H.T.	6-22-79

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

STANDARD DETAILS

61214, 61614 & 61616
 STEEL FRAMES AND GRATES

Not To Scale Date: Dec. 1977

SHEET NO. 13 OF 13 SHEETS DH 8