

GENERAL NOTES

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	49	197

DRAINAGE NOTES:

- Existing drainage system will be functional at all times during construction. Contractor is to furnish materials, equipment, labor, tools and incidentals necessary to accomplish maintenance of flow, the cost of which shall be incidental to the various contract items.
- Demolishing and removing a portion or the entire existing structure shall not be paid for separately, but shall be considered incidental to the various contract items.
- Culverts within the catch basins, grated drop intakes and storm drain manholes shall be cut flush with the inside face of the wall. Above work shall be considered incidental to the various contract items.
- Location of C.I. Frame and Cover for drain manholes or catch basins shall be determined by the Engineer in the field.
- Contractor shall verify the locations of all culverts in the field. Any culvert damaged during construction shall be repaired or replaced by the Contractor at his expense.
- Only non-pneumatic type of drill as approved by the Engineer will be permitted for drilling holes in concrete. Where indicated on plans, the approximate diameter of drilled holes for installation of dowels shall be 1 1/2 inches, after installing dowels, the voids shall be filled with epoxy grout as directed by the Engineer. Above work shall be considered incidental to the various contract items.
- Concrete for grated drop intakes, drain manholes and catch basins shall be Class "A".
- Premolded joint filler filler and composition roofing paper shall be considered incidental to Class "A" Concrete.
- Quantities for concrete gutter aprons shall be considered as part of structure.
- Existing cast iron frame and covers shall be cleaned and painted before installation. Above work shall be considered incidental to the various contract items.
- Salvaged C.I. Frame and Covers shall be cleaned, painted and returned to 727 Kakoi St, Honolulu, Hawaii 96819.

SPRINKLER NOTES:

- Abandon sprinkler systems affected by the roadway construction and as noted on the plans shall be removed. Removal shall be incidental to Roadway Excavation.
- Excavation for cut and plug work shall not be paid for but shall be considered incidental to the various contract items.

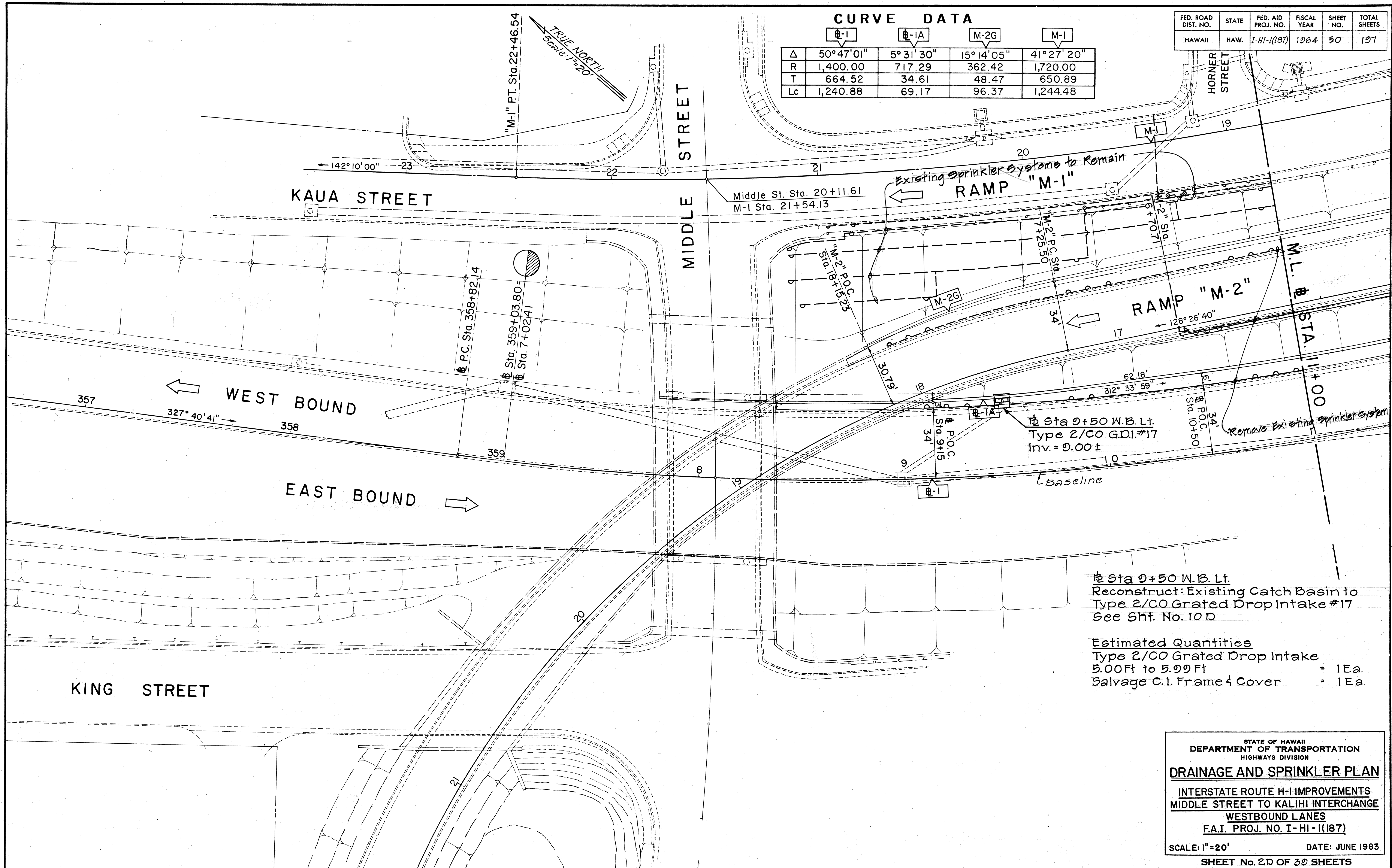
GAS FACILITIES NOTES:

- The Gasco, Inc. gas pipe lines in the project area are plastic coated and cathodically protected. The Contractor shall be extremely care ful when working near these gas pipe lines.
- Prior written clearance must be obtained from Gasco, Inc. at least five (5) working days before starting excavation near these gas lines. Since gas line locations on field maps are approximate, the Contractor, after obtaining a written clearance, shall call Gasco, Inc., a minimum of 48 hours before starting excavation to arrange for field location of existing gas lines. The telephone number is 547-3575 during business hours, and 526-0066 after hours. The Contractor shall excavate and backfill around gas pipe lines in the presence of a Gasco, Inc. representative. All backfill within six inches of gas pipe line shall be select cushion material approved by Gasco, Inc.
- For relocation of any gas pipe line, the Contractor shall notify Gasco, Inc. five (5) working days before starting work. The Contractor shall provide the necessary excavation and backfill, arrange for traffic permits and restore sidewalk pavement or other facilities. Any relocation of gas facilities shall be done by Gasco, Inc.
- The Contractor shall notify Gasco, Inc. immediately after any damage has been caused to existing gas pipelines, their coatings or their cathodic protection devices. Repair work on this damage shall be done by Gasco, Inc. with payment for this work to be borne by the Contractor.
- Minimum vertical or horizontal clearance between gas pipe lines and other pipelines, conduits, or ductlines shall be 12 inches. Adequate support and protection for gas pipe lines exposed in the trench shall be provided. Such support and protection shall be approved by Gasco, Inc.
- The Contractor shall work in an expeditious manner in order to keep uncovered gas pipe lines exposed for as short a period of time as possible.

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

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
DRAINAGE NOTES
INTERSTATE ROUTE H-1 IMPROVEMENTS MIDDLE STREET TO KALIHI INTERCHANGE WESTBOUND LANES F.A.I. PROJ. NO. I-HI-1(187)
DATE: JUNE 1983
SHEET NO. 1 OF 39 SHEETS

DATE _____
 DESIGNED BY _____
 DRAWN BY _____
 CHECKED BY _____
 ORIGINAL _____
 NOTE BOOK _____
 No. _____



CURVE DATA				
	B-1	B-1A	M-2G	M-1
Δ	50°47'01"	5°31'30"	15°14'05"	41°27'20"
R	1,400.00	717.29	362.42	1,720.00
T	664.52	34.61	48.47	650.89
Lc	1,240.88	69.17	96.37	1,244.48

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	50	197

Sta 9+50 W.B. Lt.
 Reconstruct Existing Catch Basin to
 Type 2/CO Grated Drop Intake #17
 See Sht. No. 100

Estimated Quantities
 Type 2/CO Grated Drop Intake
 5.00 Ft to 5.99 Ft = 1 Ea.
 Salvage C.I. Frame & Cover = 1 Ea.

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
DRAINAGE AND SPRINKLER PLAN
 INTERSTATE ROUTE H-1 IMPROVEMENTS
 MIDDLE STREET TO KALIHI INTERCHANGE
 WESTBOUND LANES
 F.A.I. PROJ. NO. I-HI-1(187)
 SCALE: 1"=20'
 DATE: JUNE 1983
 SHEET No. 20 OF 30 SHEETS

CURVE DATA

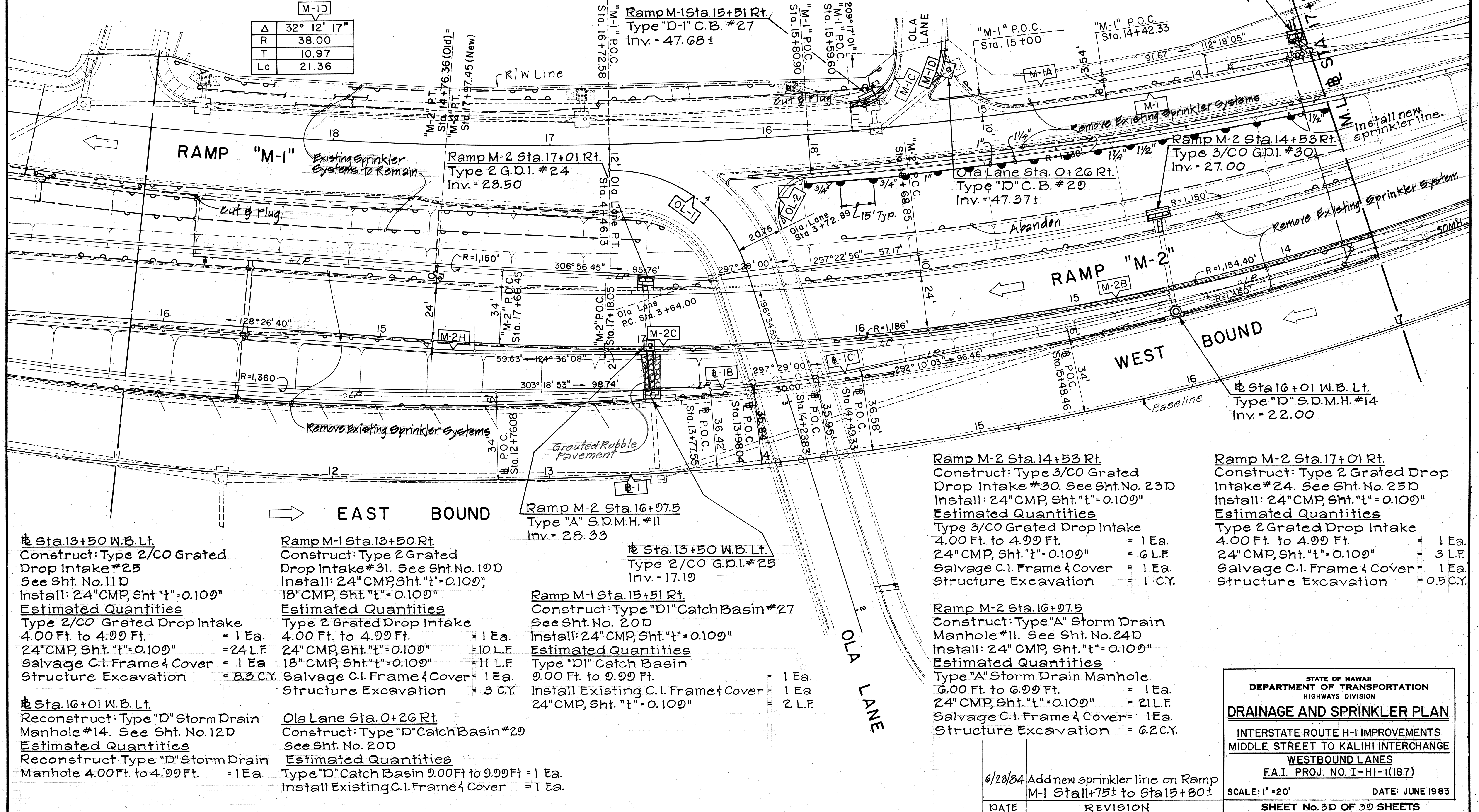
	Δ-IB	Δ-IC	M-1A	M-1C
Δ	5° 49' 53"	5° 18' 57"	4° 59' 48"	82° 58' 49"
R	196.34	215.41	657.55	25.00
T	10.00	10.00	28.69	22.11
Lc	19.98	19.99	57.34	36.21

	Δ-1	M-1	M-2B	M-2C
Δ	50° 47' 01"	41° 27' 20"	20° 29' 15"	11° 03' 45"
R	1,400.00	1,720.00	1,152.40	1,184.00
T	664.52	650.89	208.26	114.66
Lc	1,240.88	1,244.48	412.07	228.60

	OL-1	OL-2	M-2H
Δ	73° 31' 38"	111° 22' 30"	3° 50' 32"
R	64.00	18.00	298.14
T	47.82	26.37	10.00
Lc	82.13	34.99	19.99

	M-1D
Δ	32° 12' 17"
R	38.00
T	10.97
Lc	21.36

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	C051	197



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

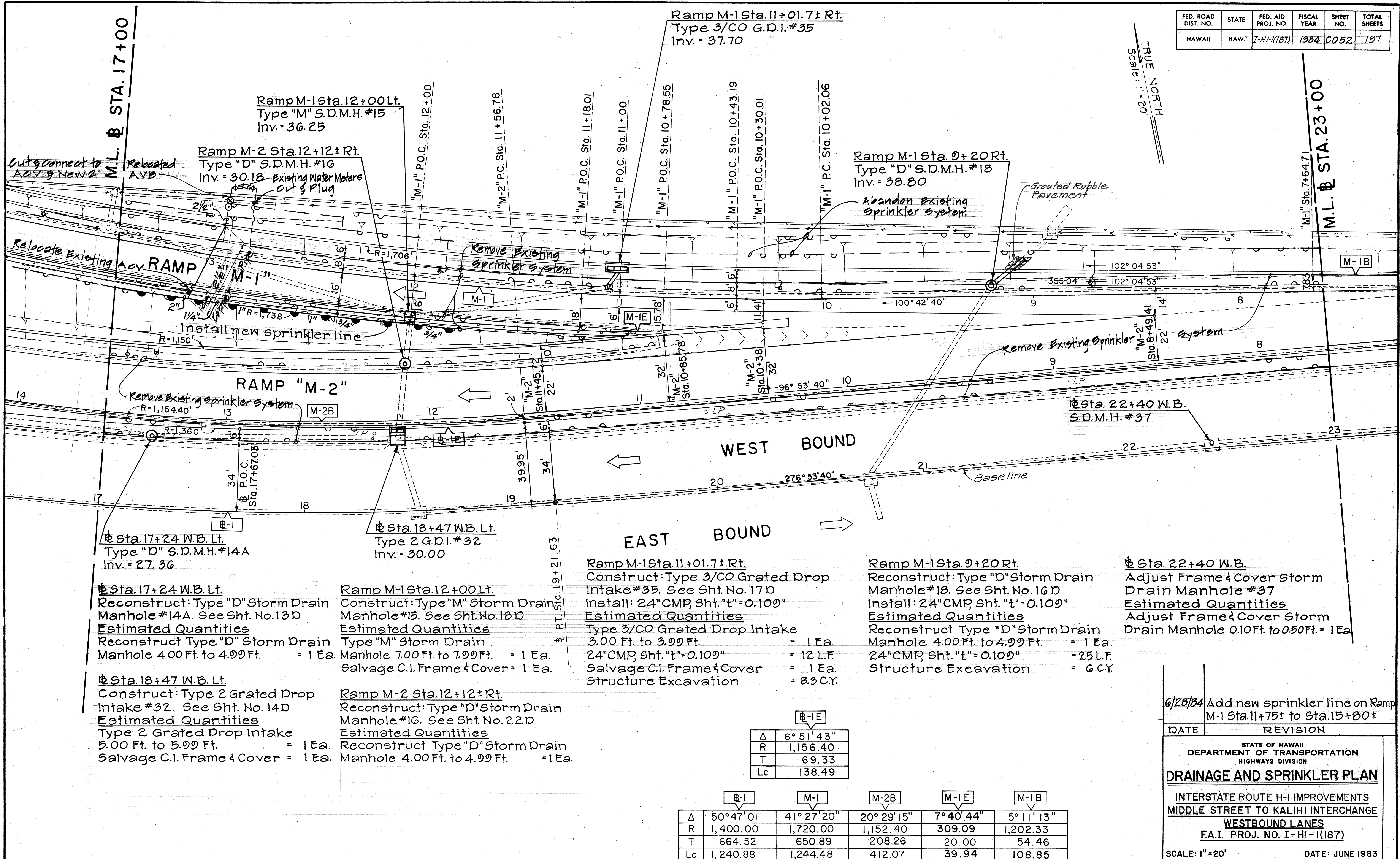
DRAINAGE AND SPRINKLER PLAN

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 1" = 20' DATE: JUNE 1983

SHEET No. 31D OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	C052	197



	$\Phi - IE$
Δ	$6^{\circ} 51' 43''$
R	1,156.40
T	69.33
Lc	138.49

	B-I	M-I	M-2B	M-1E	M-1B
Δ	50°47'01"	41°27'20"	20°29'15"	7°40'44"	5°11'13"
R	1,400.00	1,720.00	1,152.40	309.09	1,202.33
T	664.52	650.89	208.26	20.00	54.46
Lc	1,240.88	1,244.48	412.07	39.94	108.85

6/28/84 Add new sprinkler line on Ramp
M-1 Sta. 11+75± to Sta. 15+80±

DATE	REVISION
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE AND SPRINKLER PLAN

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-11(187)

SCALE: 1" = 20' DATE: JUNE 1983

SHEET No. 40 OF 39 SHEETS

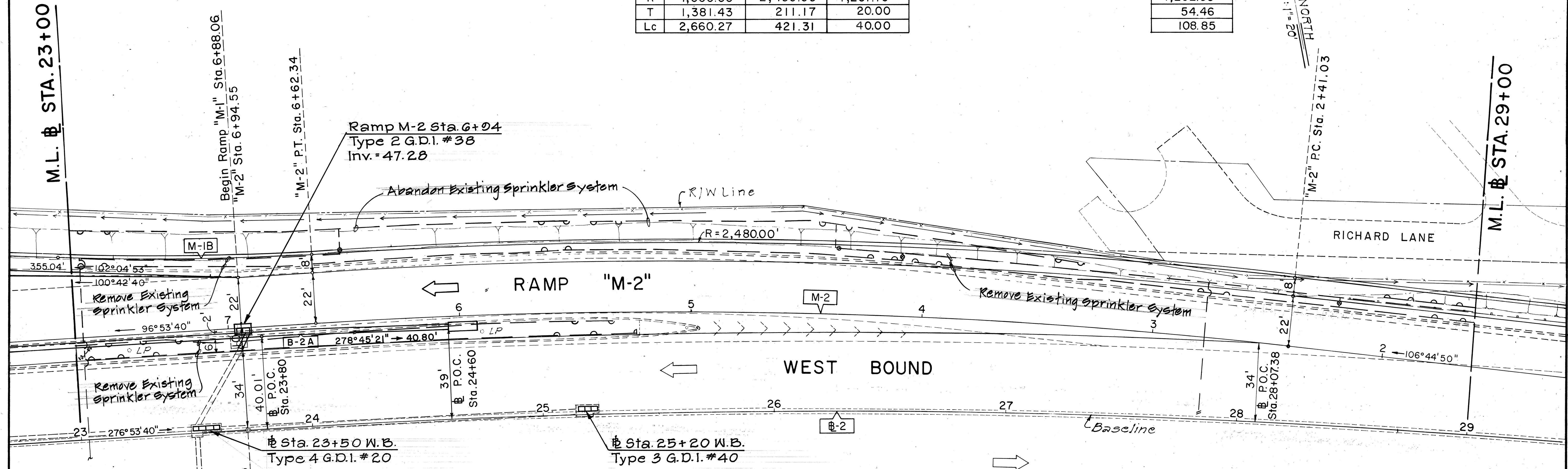
C.O.52

CURVE DATA

	B-2	M-2	B-2A
Δ	38° 06' 20"	9° 51' 10"	1° 51' 41"
R	4,000.00	2,450.00	1,231.19
T	1,381.43	211.17	20.00
Lc	2,660.27	421.31	40.00

	M-1B
Δ	5° 11' 13"
R	1,202.33
T	54.46
Lc	108.85

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(107)	1984	53	197



Sta. 23+50 W.B.
Adjust Frame & Grates Type 4 Grated
Drop Intake #20. See Sht. No. 29D
Estimated Quantities
Adjust Frame & Grates 0.10 Ft. to 0.50 Ft. = 4 Ea.

Sta. 25+20 W.B.
Adjust Frame & Grates Type 3 Grated
Drop Intake #40. See Sht. No. 29D
Estimated Quantities
Adjust Frame & Grates 0.10 Ft. to 0.50 Ft. = 3 Ea.

Ramp M-2 Sta. 6+04
Construct: Type 2 Grated
Drop Intake #38. See Sht. No. 21D
Install: 24" CMP, Sht. "t" = 0.109"
Estimated Quantities
Type 2 Grated Drop Intake
5.00 Ft. to 5.09 Ft. = 1 Ea.
24" CMP, Sht. "t" = 0.109" = 9 L.F.
Salvage C.I. Frame & Cover = 1 Ea.
Structure Excavation = 8.2 C.Y.

ORIGINAL PLAN	DATE
DESIGNED BY	
TRACED BY	
NOTE BOOK	
QUANTITIES BY	
CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE AND SPRINKLER PLAN

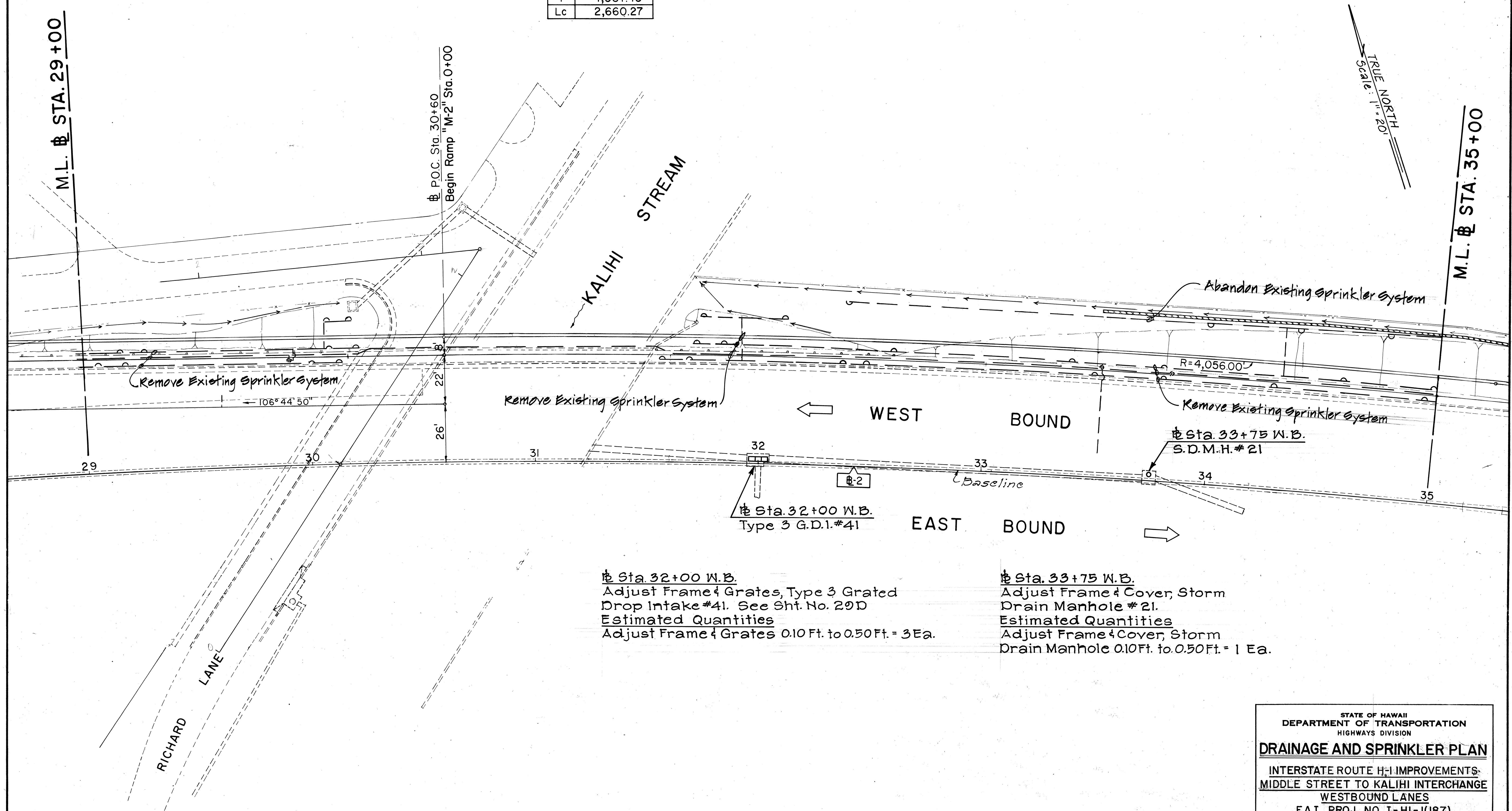
INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 1"=20' DATE: JUNE 1983
SHEET No. 53 OF 39 SHEETS

CURVE DATA

Δ	38° 06' 20"
R	4,000.00
T	1,381.43
Lc	2,660.27

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	54	191



Sta. 32+00 W.B.
Adjust Frame & Grates, Type 3 Grated
Drop Intake #41. See Sht. No. 20D
Estimated Quantities
Adjust Frame & Grates 0.10 Ft. to 0.50 Ft. = 3 Ea.

Sta. 33+75 W.B.
Adjust Frame & Cover, Storm
Drain Manhole #21.
Estimated Quantities
Adjust Frame & Cover, Storm
Drain Manhole 0.10 Ft. to 0.50 Ft. = 1 Ea.

STATE OF HAWAII
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HIGHWAYS DIVISION

DRAINAGE AND SPRINKLER PLAN

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 1" = 20' DATE: JUNE 1983
SHEET No. 60 OF 30 SHEETS

Sta 35+50 W.B. to Sta 41+00 W.B. Lt. (Ramp K-1 Sta. 2+20)

Install: Underdrain. For details See Sht. No. 30D

Estimated Quantities

Structural Exc. = 260 C.Y.
Filter Fabric = 220 S.Y.
Filter Material for Underdrains = 116 C.Y.
12-Inch Perforated Underdrain Pipe = 600 L.F.
12-Inch Non-Perforated Underdrain Pipe = 144 L.F.
Cleanout = 5 Ea.
Connection to G.D.I. = 2 Ea.

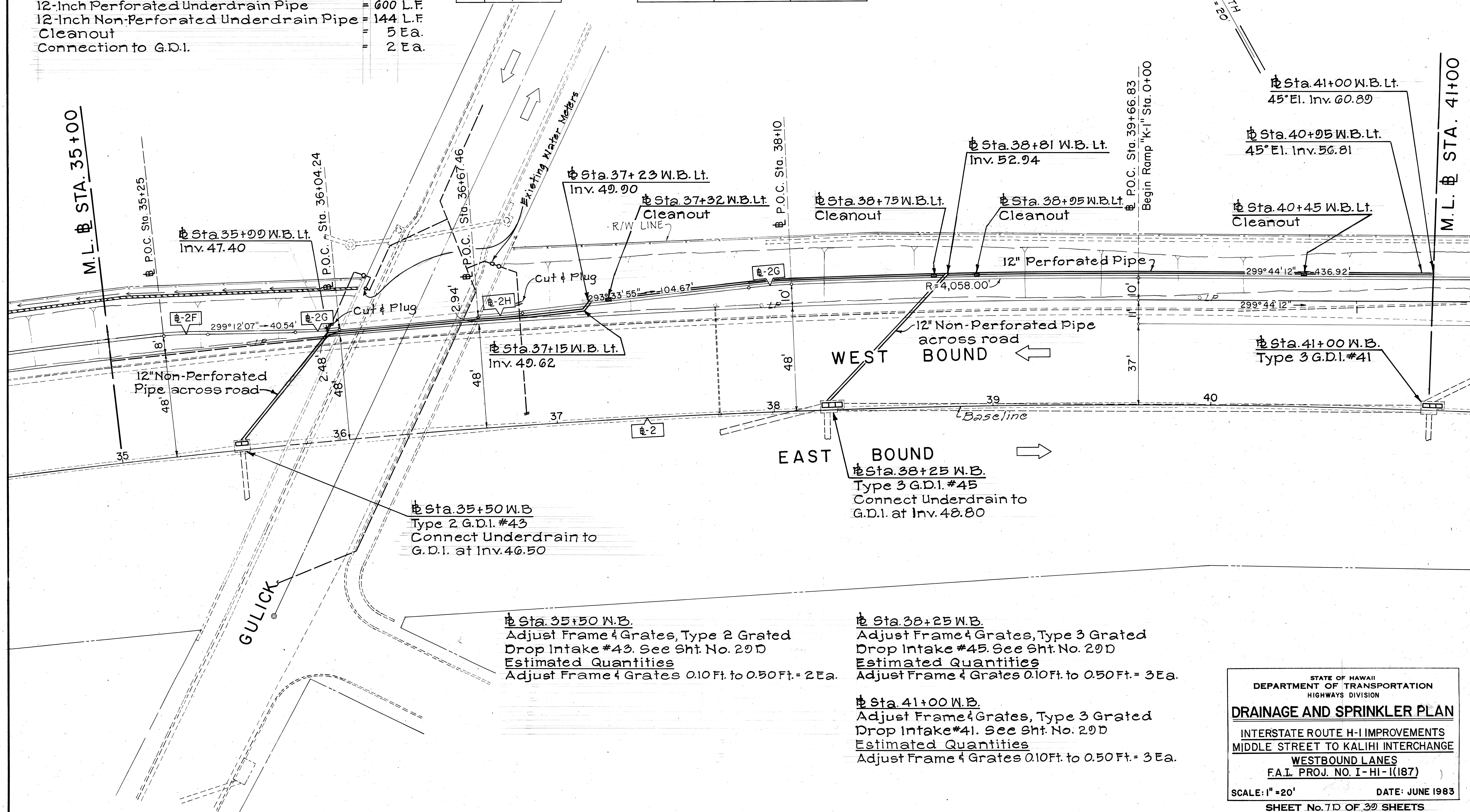
Δ	38°06'20"
R	4,000.00
T	1,381.43
Lc	2,660.27

CURVE DATA

Δ-2F	Δ-2G	Δ-2H
5°47'26"	4°36'57"	1°52'59"
197.73	248.13	608.49
10.00	10.00	10.00
19.98	19.99	20.00

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	55	197

TRUE NORTH
Scale: 1" = 20'



DATE	_____
DESIGNED BY	_____
CHECKED BY	_____
NO.	_____

Sta. 35+50 W.B.
Adjust Frame & Grates, Type 2 Grated
Drop Intake #43. See Sht. No. 29D
Estimated Quantities
Adjust Frame & Grates 0.10 Ft. to 0.50 Ft. = 2 Ea.

Sta. 38+25 W.B.
Adjust Frame & Grates, Type 3 Grated
Drop Intake #45. See Sht. No. 29D
Estimated Quantities
Adjust Frame & Grates 0.10 Ft. to 0.50 Ft. = 3 Ea.

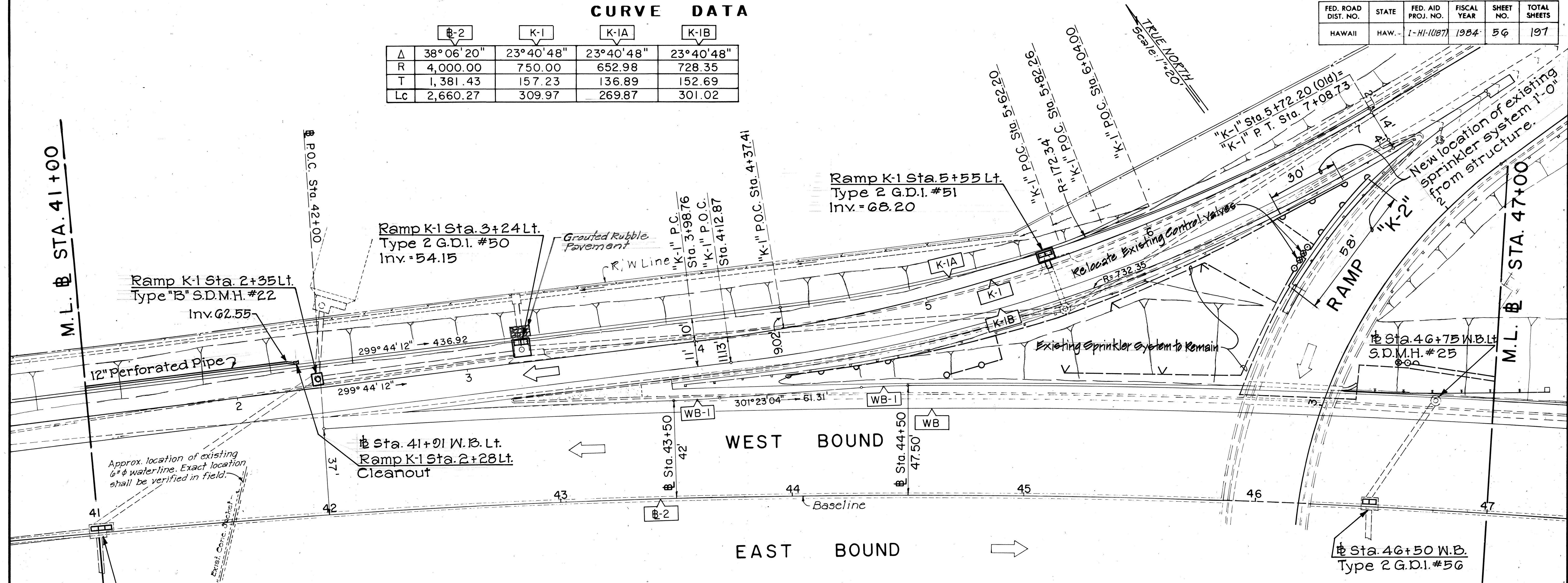
Sta. 41+00 W.B.
Adjust Frame & Grates, Type 3 Grated
Drop Intake #41. See Sht. No. 29D
Estimated Quantities
Adjust Frame & Grates 0.10 Ft. to 0.50 Ft. = 3 Ea.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
DRAINAGE AND SPRINKLER PLAN
INTERSTATE ROUTE H-1 IMPROVEMENTS MIDDLE STREET TO KALIHI INTERCHANGE WESTBOUND LANES F.A.I. PROJ. NO. I-HI-1(187)
SCALE: 1" = 20' DATE: JUNE 1983
SHEET No. 7D OF 39 SHEETS

CURVE DATA

	B-2	K-1	K-1A	K-1B
Δ	38°06'20"	23°40'48"	23°40'48"	23°40'48"
R	4,000.00	750.00	652.98	728.35
T	1,381.43	157.23	136.89	152.69
Lc	2,660.27	309.97	269.87	301.02

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-11(187)	1984	56	197



Structure #41 see Notes on sheet No. 71D

Ramp K-1 Sta. 2+35 Lt.
Reconstruct: Type "B" Storm Drain Manhole #22. See Sht. No. 15D
Estimated Quantities
Reconstruct Type "B" Storm Drain Manhole 1.00 Ft. to 1.99 Ft. = 1 Ea.

Ramp K-1 Sta. 3+24 Lt.
Construct: Type 2 Grated Drop Intake #50. See Sht. No. 26D
Estimated Quantities
Type 2 Grated Drop Intake 8.00 Ft. to 8.99 Ft. = 1 Ea.
Salvage C.I. Frame & Cover = 1 Ea.

Ramp K-1 Sta. 5+55 Lt.
Construct: Type 2 Grated Drop Intake #51. See Sht. No. 27D
Install: 24" CMP, Sht. "t" = 0.109"
Estimated Quantities
Type 2 Grated Drop Intake 3.00 Ft. to 3.99 Ft. = 1 Ea.
24" CMP, Sht. "t" = 0.109" = 3 L.F.
Salvage C.I. Frame & Cover = 1 Ea.

Sta. 46+50 W.B.
Adjust Frame & Grates, Type 2 Grated Drop Intake #56. See Sht. No. 29D
Estimated Quantities
Adjust Frame & Grate 0.10 Ft. to 0.50 Ft. = 2 Ea.

Sta. 46+75 W.B. Lt.
Adjust Frame & Cover, Storm Drain Manhole #25.
Estimated Quantities
Adjust Frame & Cover, Storm Drain Manhole 0.10 Ft. to 0.50 Ft. = 1 Ea.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE AND SPRINKLER PLAN

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 1" = 20' DATE: JUNE 1983
SHEET No. 80 OF 30 SHEETS

CURVE DATA

	#2	WB
Δ	38° 06' 20"	11° 55' 25"
R	4,000.00	4,268.78
T	1,381.43	445.78
Lc	2,660.27	888.36

Sta. 48+50 W.B.
Adjust Frame & Grates, Type 4 Grated
Drop Intake #57. See Sht. No. 29D
Estimated Quantities
Adjust Frame & Grates 0.10Ft. to 0.50Ft. = 4 Ea.

Sta. 49+50 W.B. Lt.
Reconstruct Type "D" Storm Drain
Manhole #31. See Sht. No. 15D
Estimated Quantities
Reconstruct Type "D" Storm Drain
Manhole 4.00Ft. to 4.99Ft. = 1 Ea.

Sta. 50+80 W.B.
Adjust Frame & Grates, Type 2 Grated
Drop Intake #64. See Sht. No. 29D
Estimated Quantities
Adjust Frame & Grates 0.10Ft. to 0.50Ft. = 2 Ea.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	57	191

TRUE NORTH
Scale: 1" = 20'

KALIHI STREET

Sta. 50+80.31

P.T. Sta. 50+32.42

P.O.C. Sta. 49+00

M.L. Sta. 47+00

Existing Sprinkler System to Remain

Sta. 48+50 W.B.
Type 4 G.D.I. #57

WB
Sta. 49+50 W.B. Lt.
Type "D" S.D.M.H. #31

Sta. 50+80 W.B.
Type 2 G.D.I. #64

RAMP "K-5"

WEST BOUND

EAST BOUND

RAMP "K-2"

RAMP "K-6"

RAMP "K-4"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

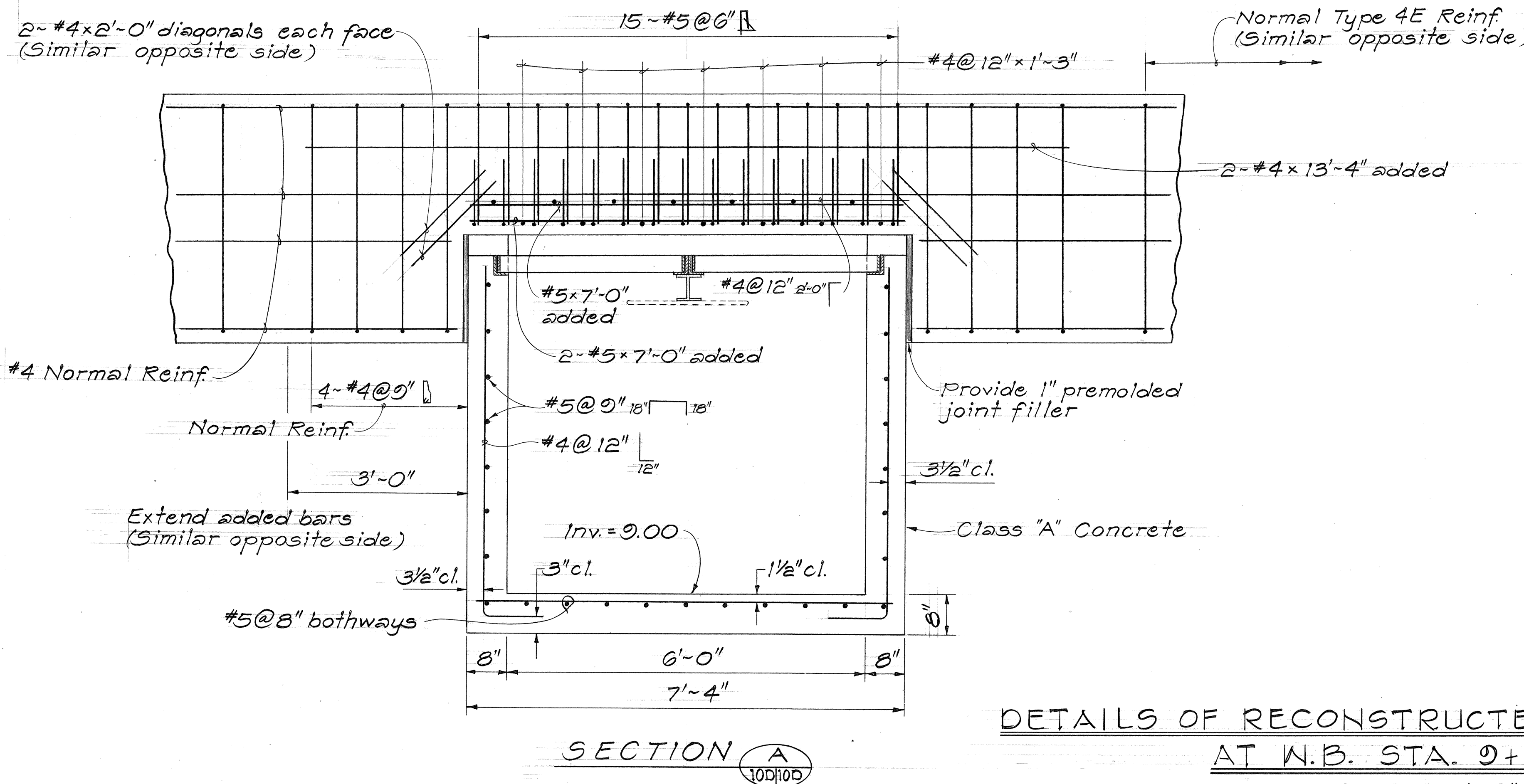
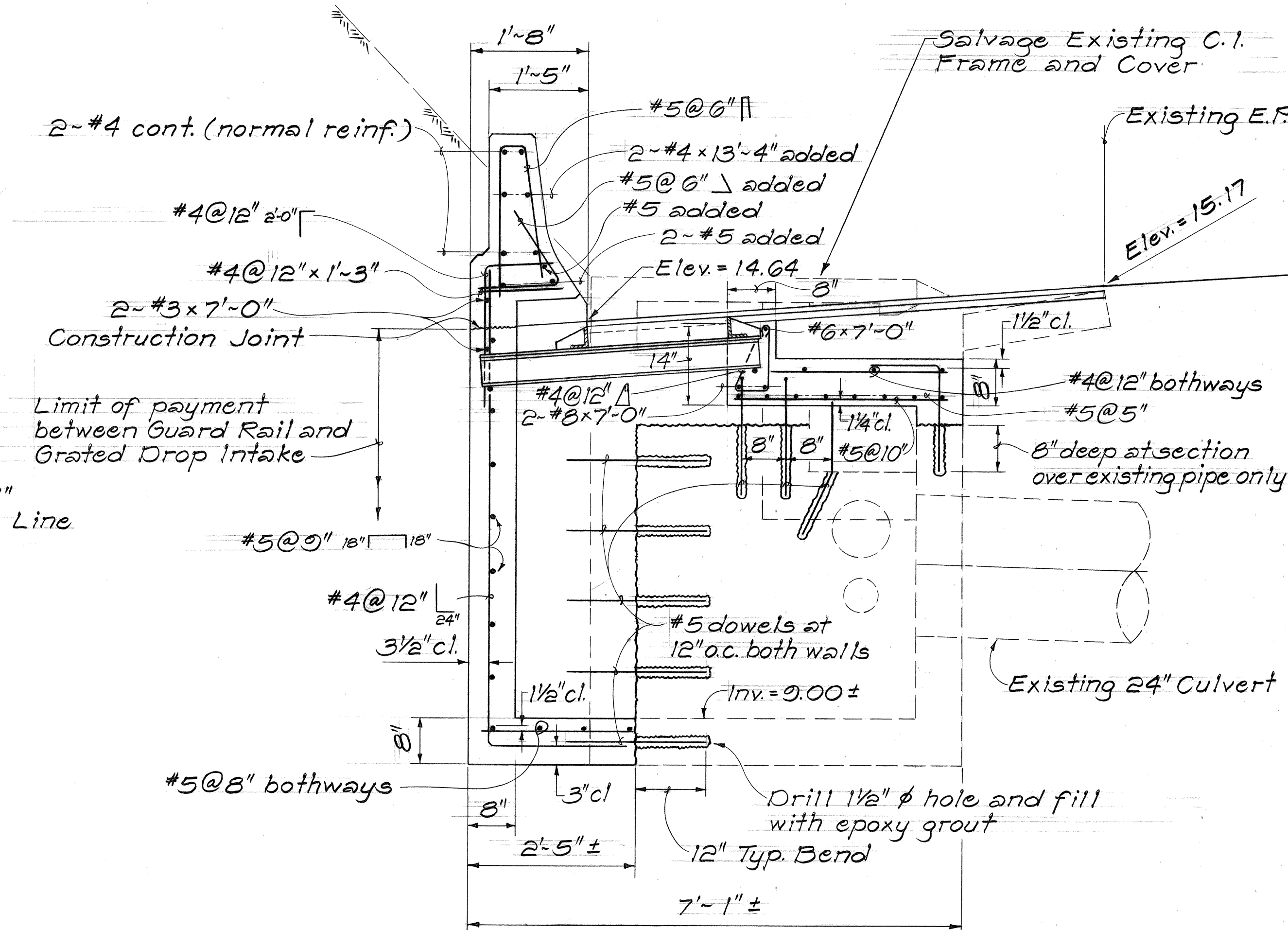
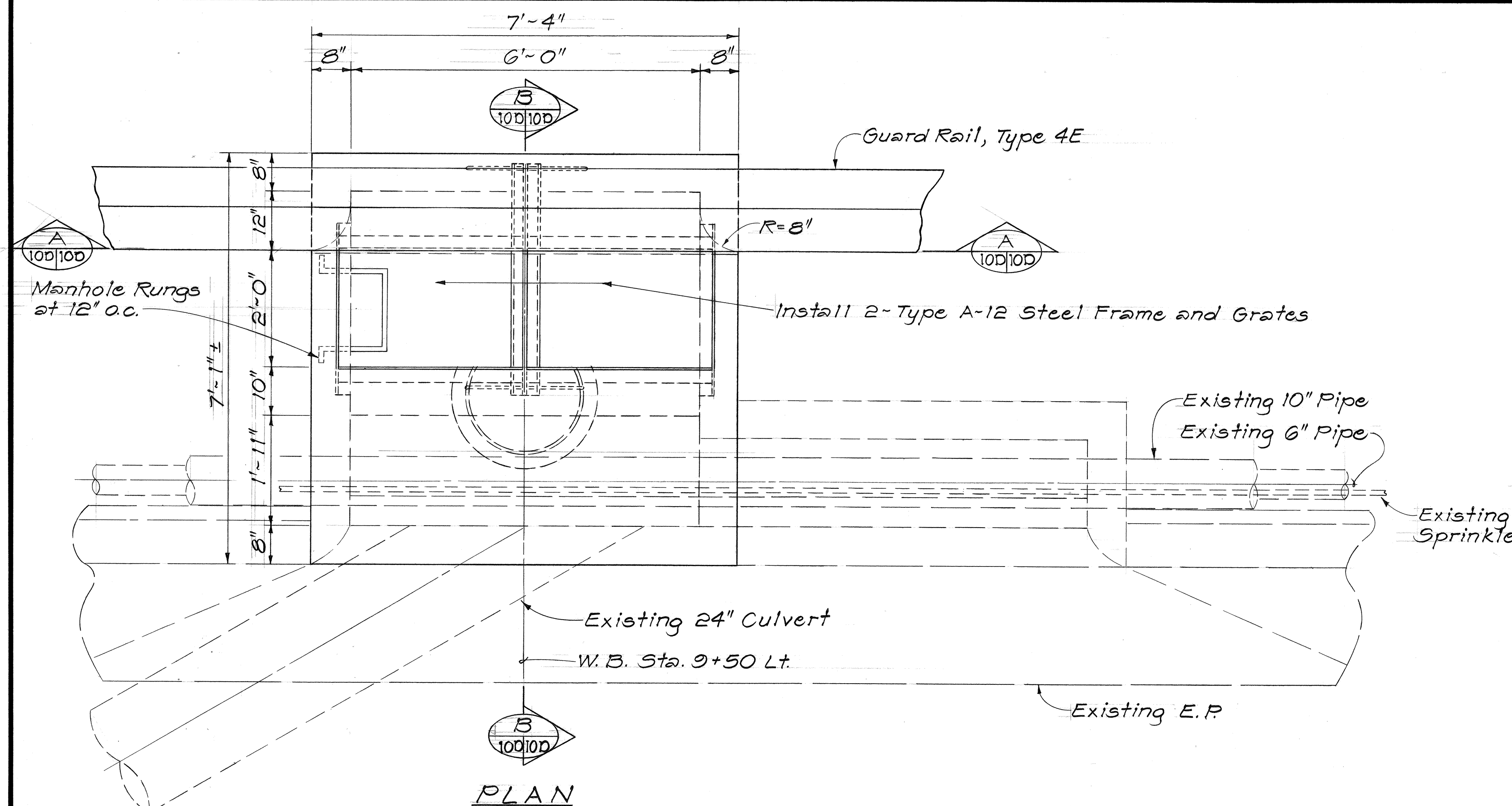
DRAINAGE AND SPRINKLER PLAN

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 1" = 20' DATE: JUNE 1983
SHEET No. 90 OF 30 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	58	191



DETAILS OF RECONSTRUCTED TYPE 2/C.O. G.D.I. #17
AT W.B. STA. 9+50 LT.
Scale: 3/4" = 1'-0"

SURVEY PLOTTED BY	DATE
DRAWN BY	
CHECKED BY	
NOTES BOOK	
NO.	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)
SCALE: 3/4" = 1'-0" DATE: JUNE 1983
SHEET NO. 100 OF 30 SHEETS

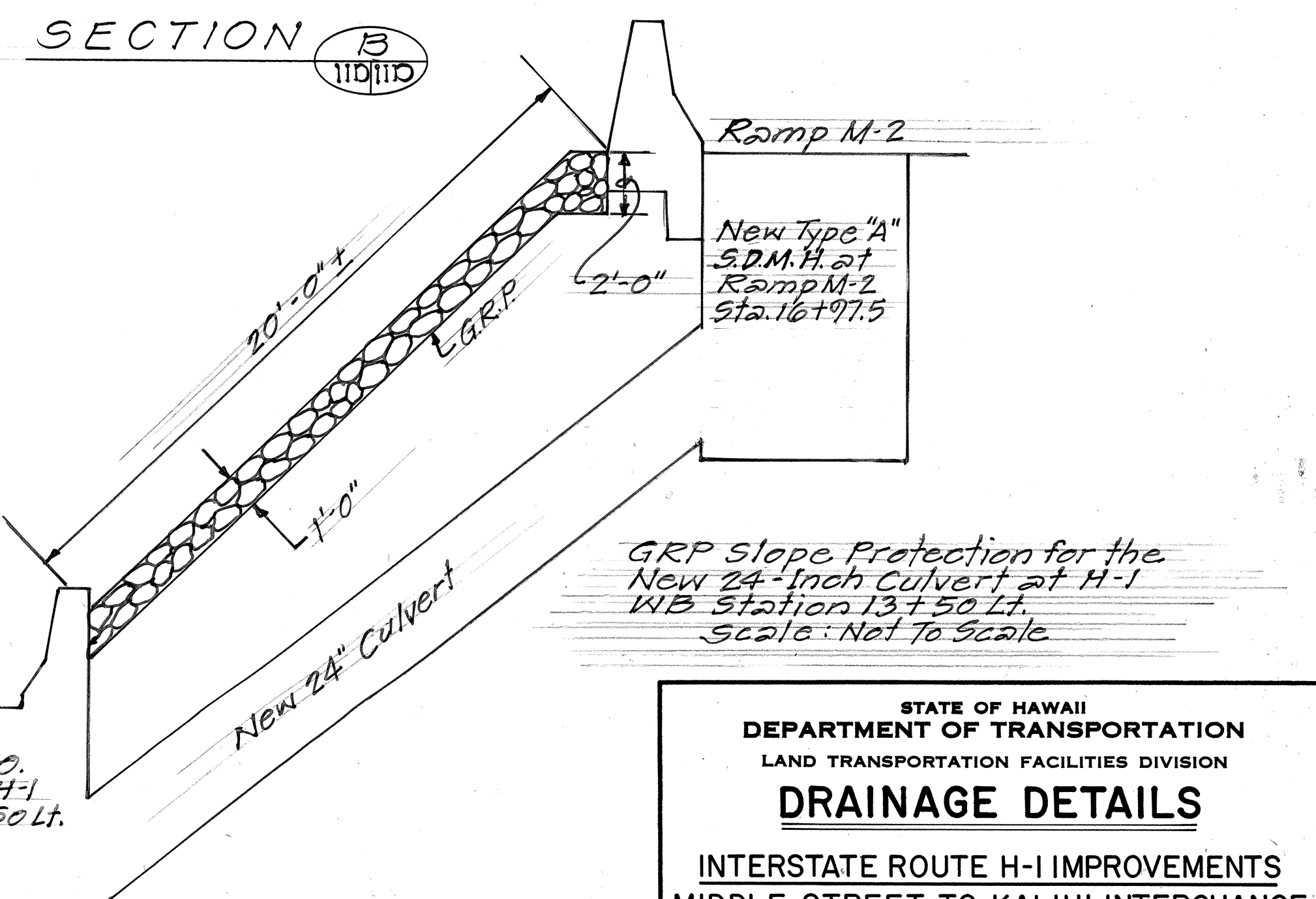
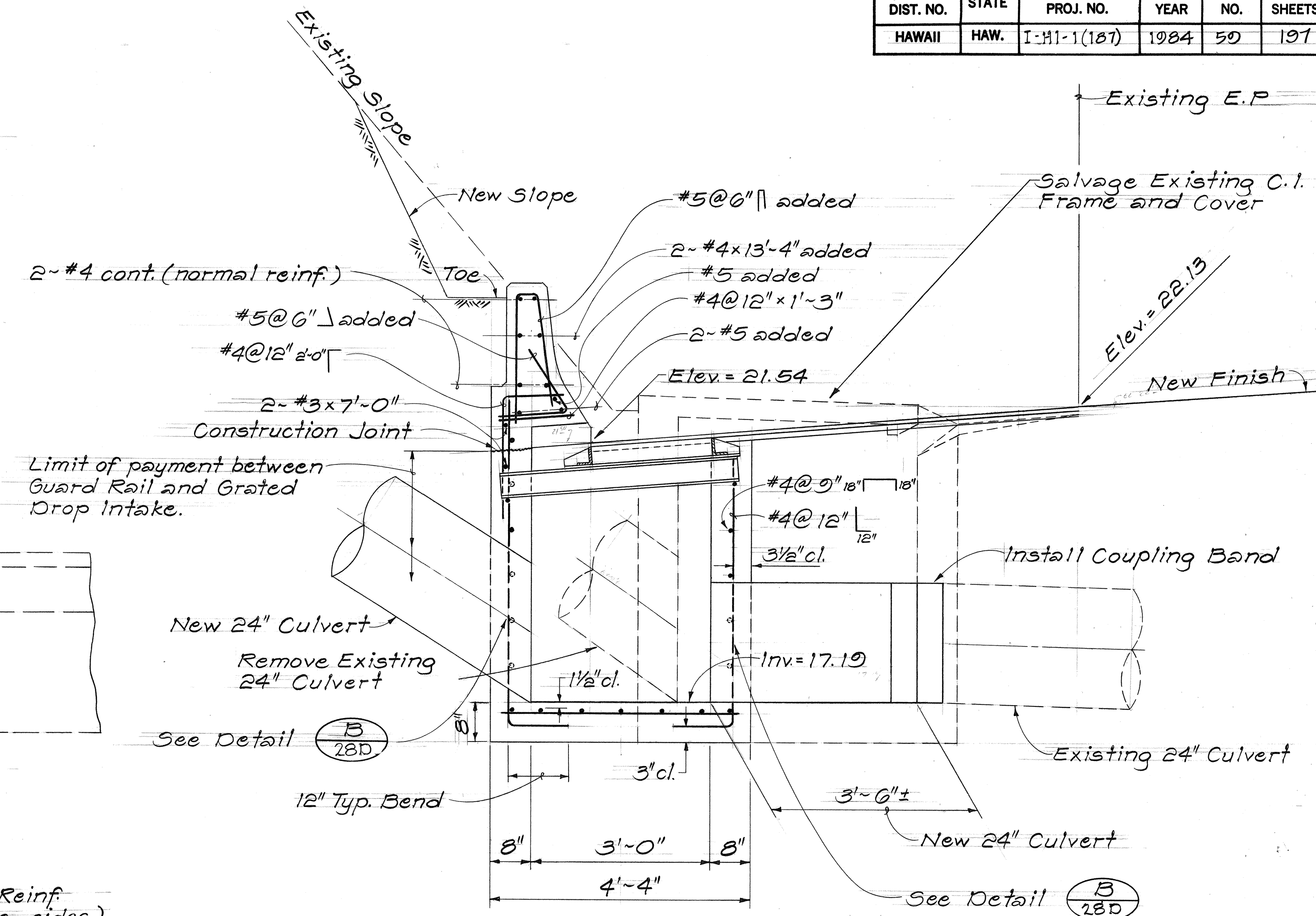
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I - HI - I(187)

SCALE: 3/4" = 1'-0" DATE: JUNE 1983

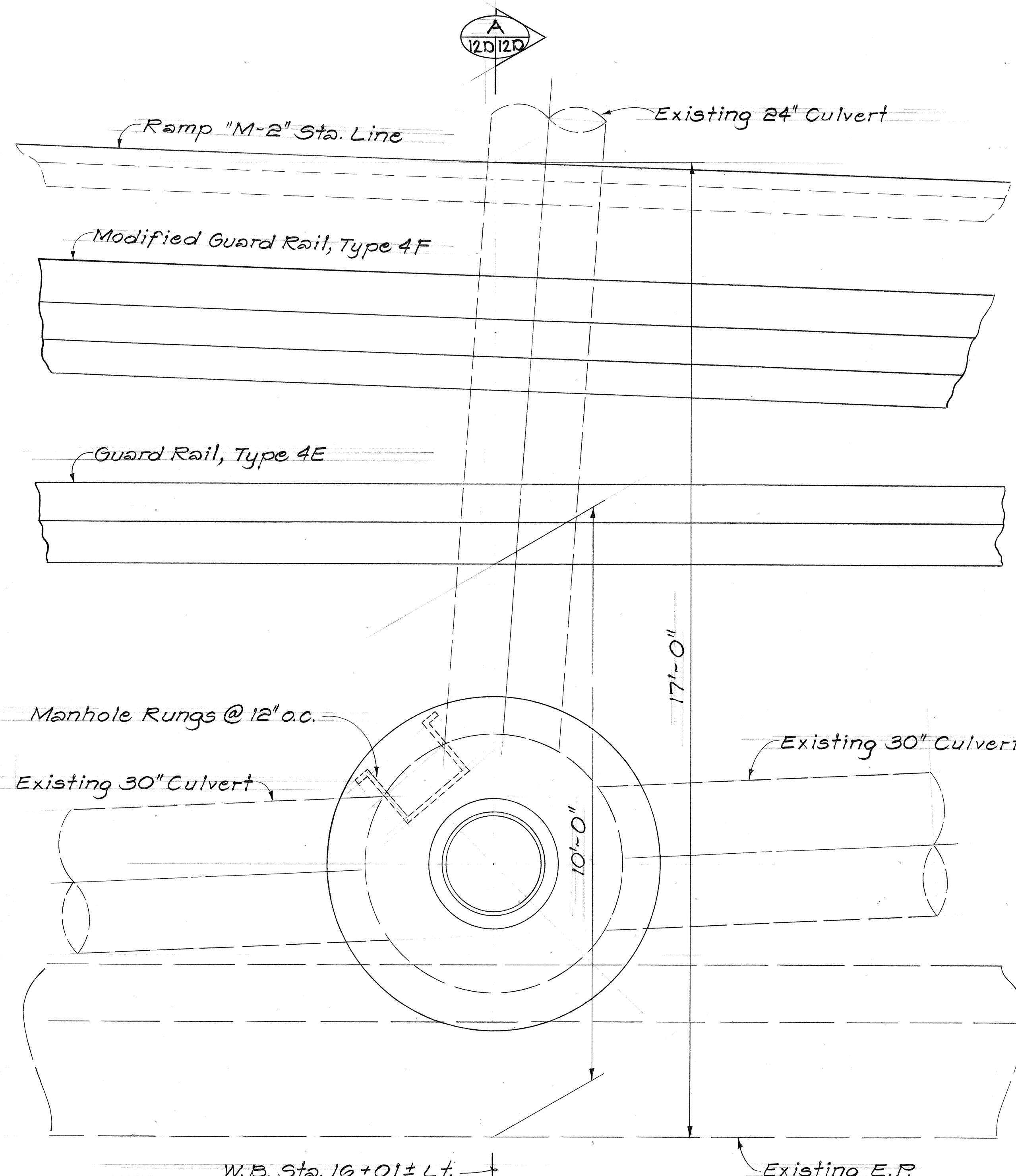
SHEET NO. 11 OF 30 SHEETS



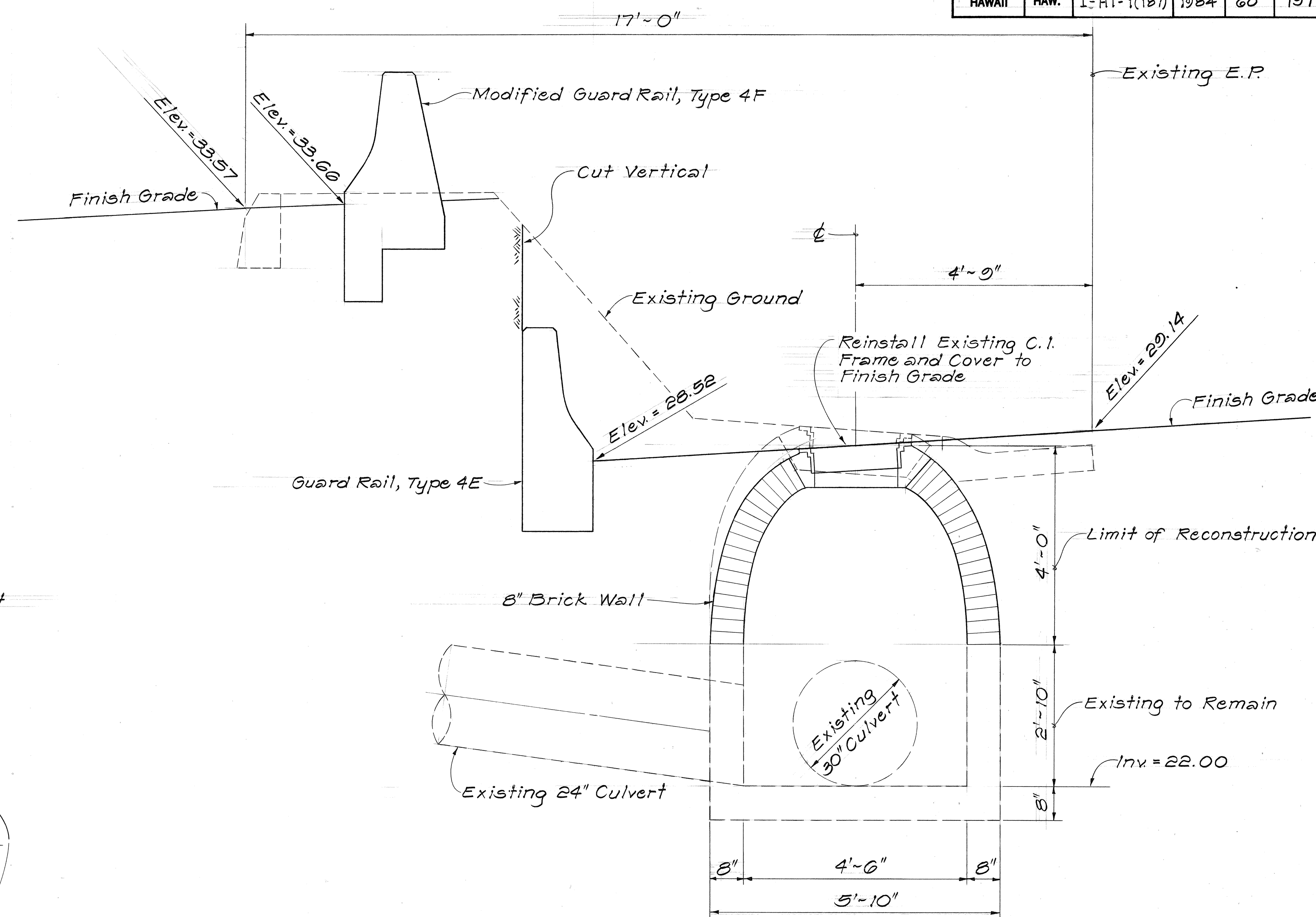
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I - HI - I(187)
SCALE: 3/4" = 1'-0" DATE: JUNE 1983
SHEET NO. 11 OF 30 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	60	197



PLAN



SECTION A-A

RECONSTRUCTION OF TYPE "D" S.D.M.H. #14 AT W.B. STA. 16+01± LT.

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

SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
NOTED BY	
CHECKED BY	
NO.	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

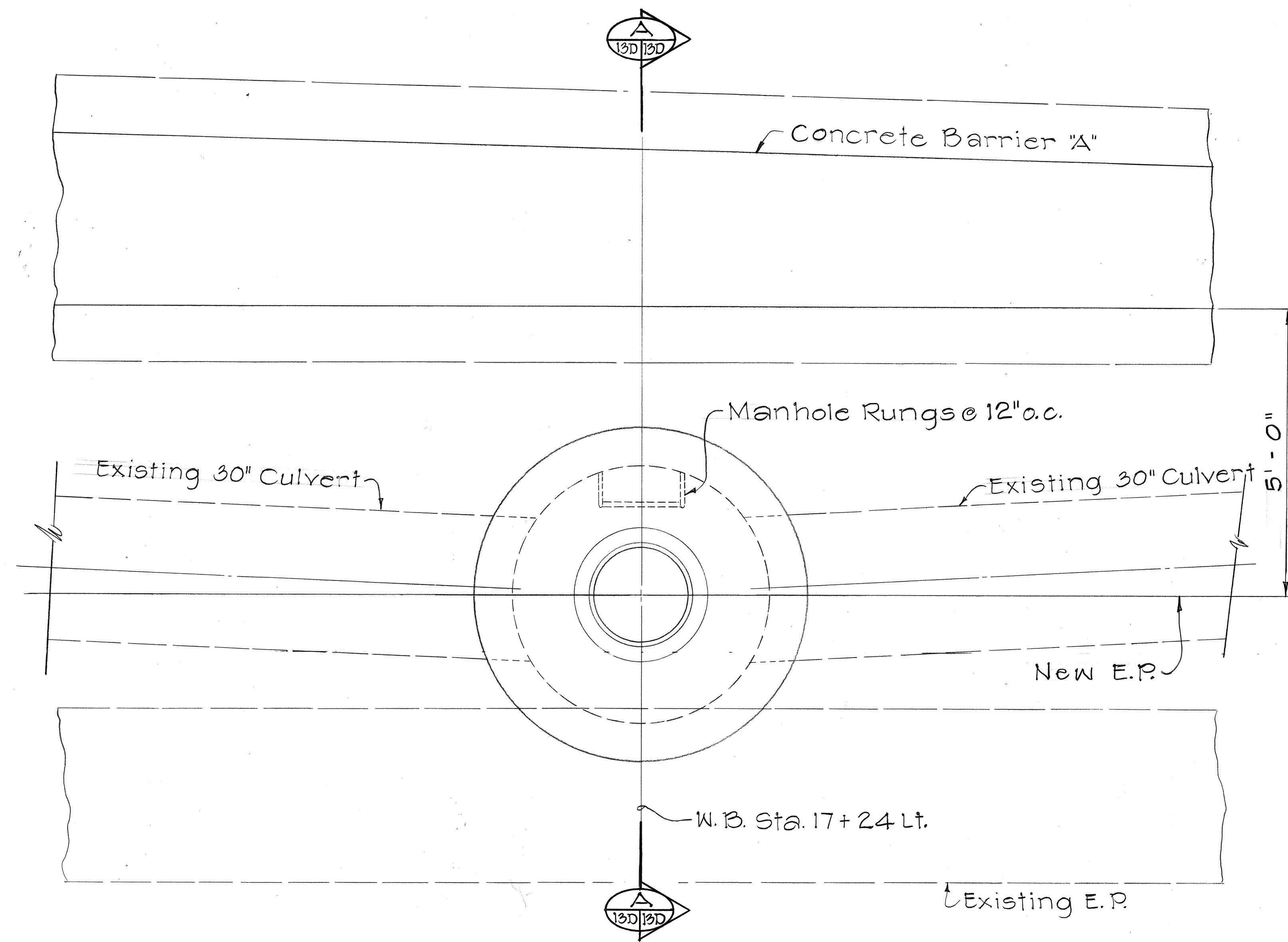
DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 3/4" = 1'-0" DATE: JUNE 1983

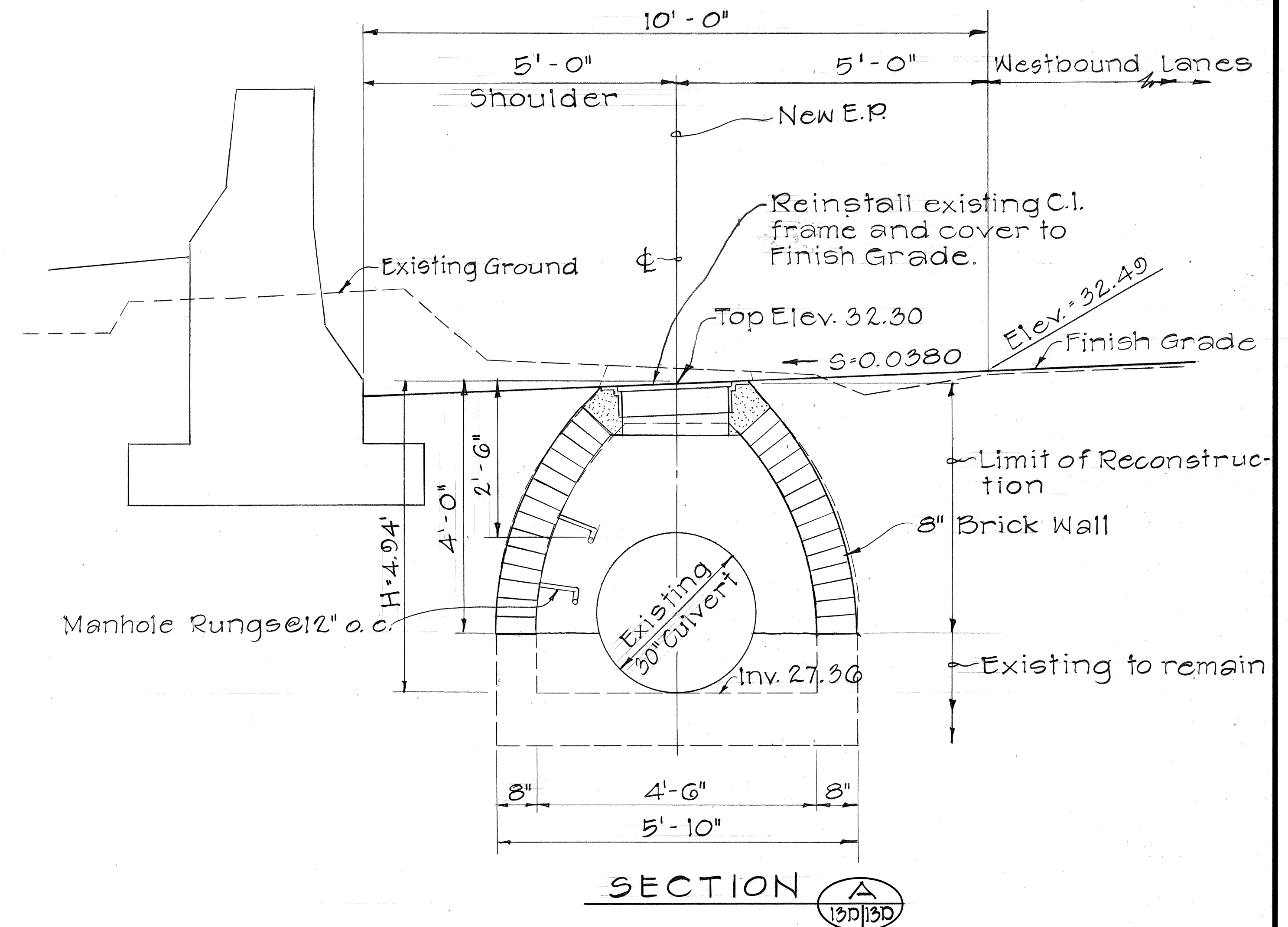
SHEET NO. 120 OF 30 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	61	197



PLAN

RECONSTRUCTION OF TYPE "D" S.D.M.H. 14A AT W.B. STA. 17+24 LT.
Scale: 3/4" = 1'-0"



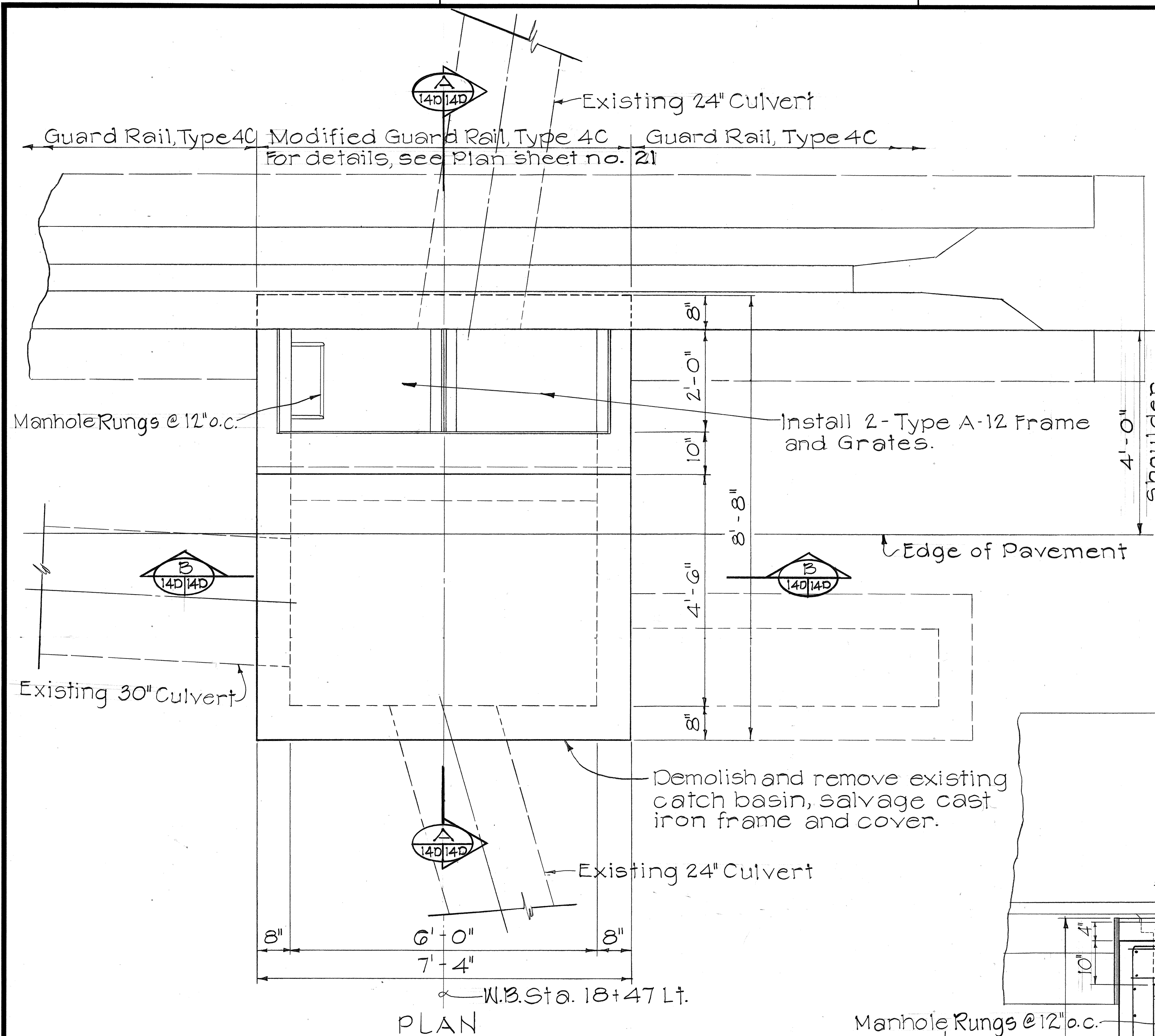
SECTION



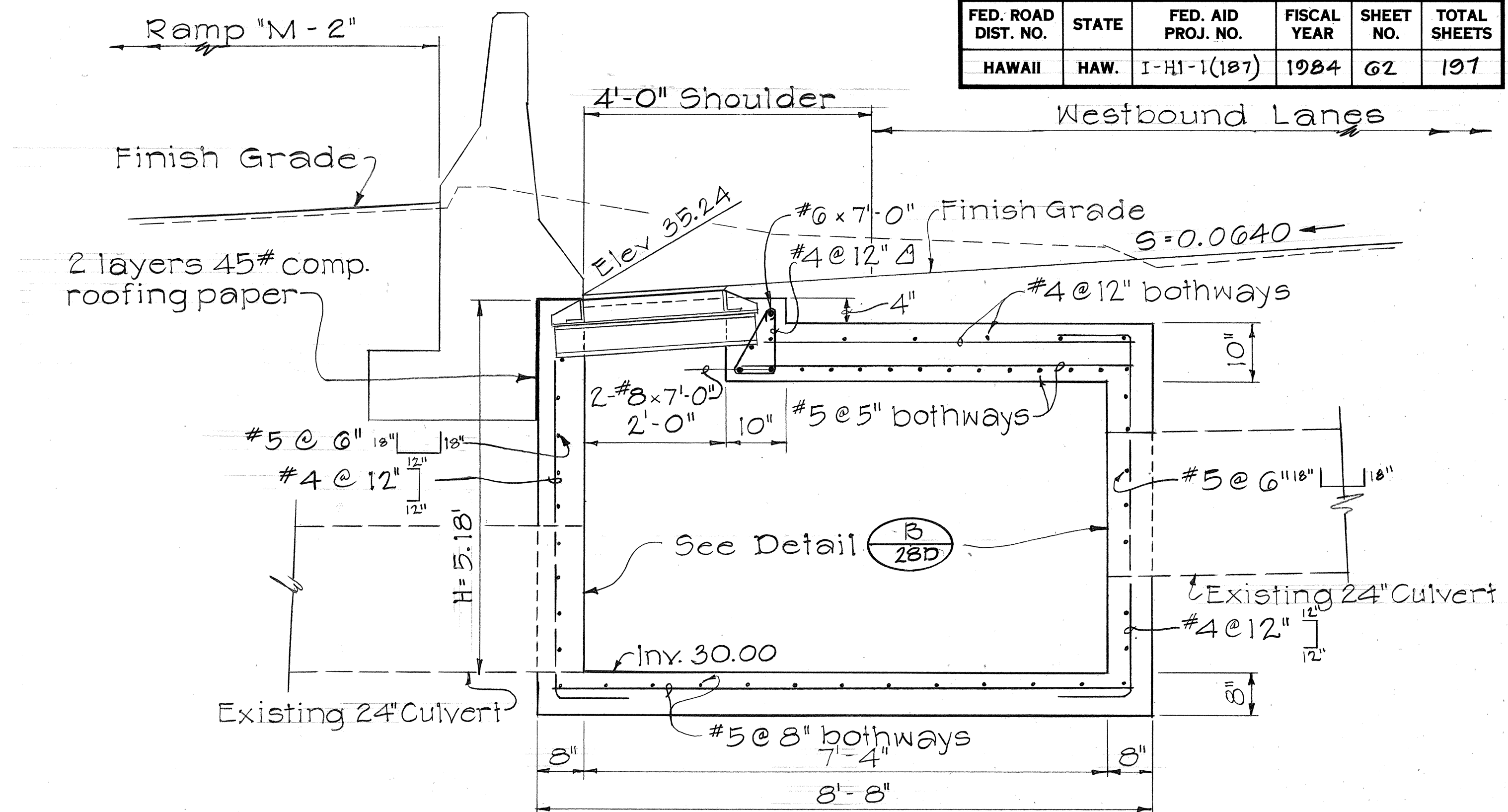
SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
NOTED BY	
CHECKED BY	
NO.	

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
DRAINAGE DETAILS	
INTERSTATE ROUTE H-1 IMPROVEMENTS MIDDLE STREET TO KALIHI INTERCHANGE WESTBOUND LANES F.A.I. PROJ. NO. I-HI-1(187)	
SCALE: 3/4" = 1'-0"	DATE: JUNE 1983
SHEET No. 130 OF 39 SHEETS	

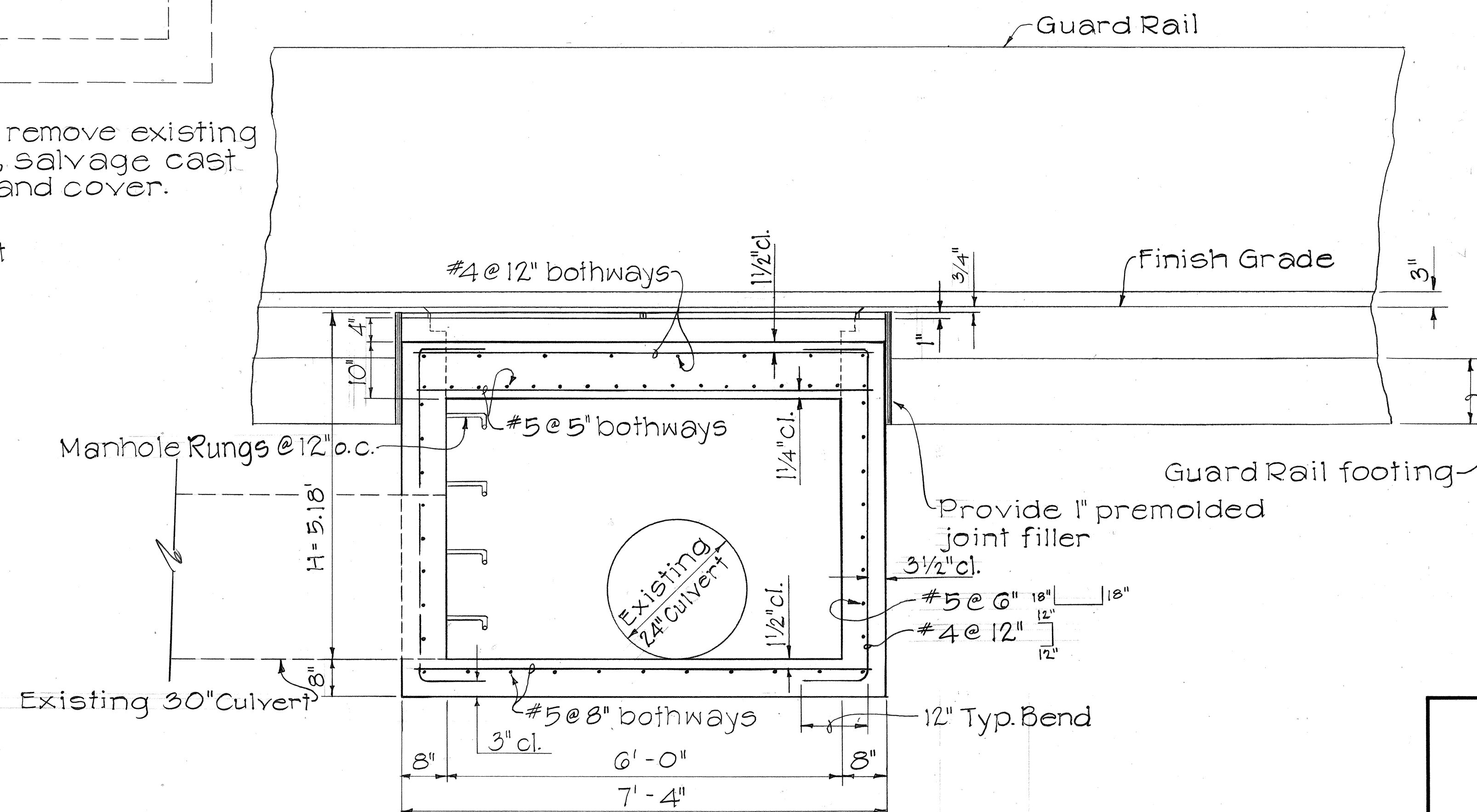
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	62	197



PLAN



SECTION A
14D/14D



SECTION B
14D/14D

DETAILS OF TYPE 2 G.D.I. #32 AT W.B. STA 18+47 LT.
Scale: 3/4" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

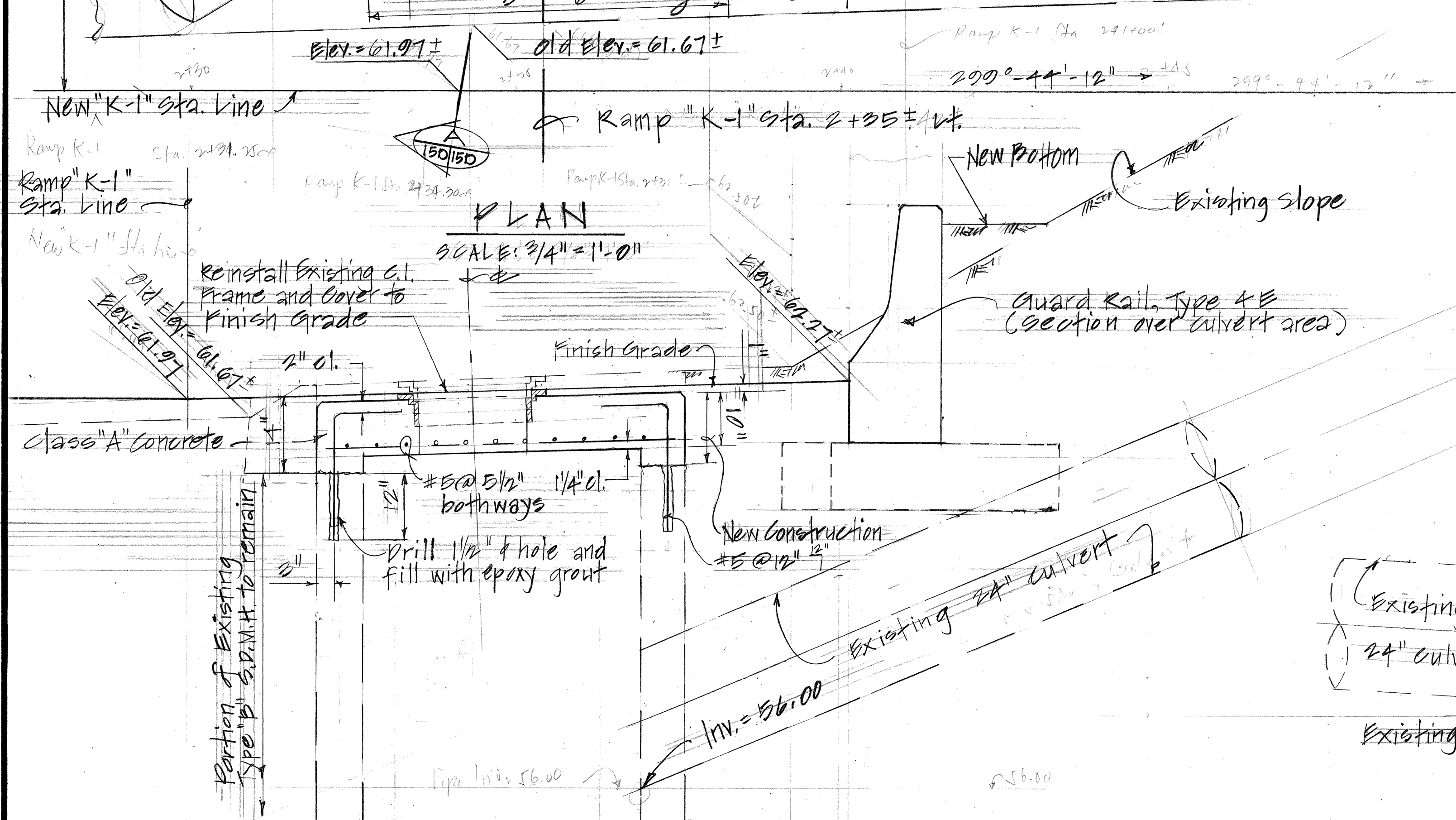
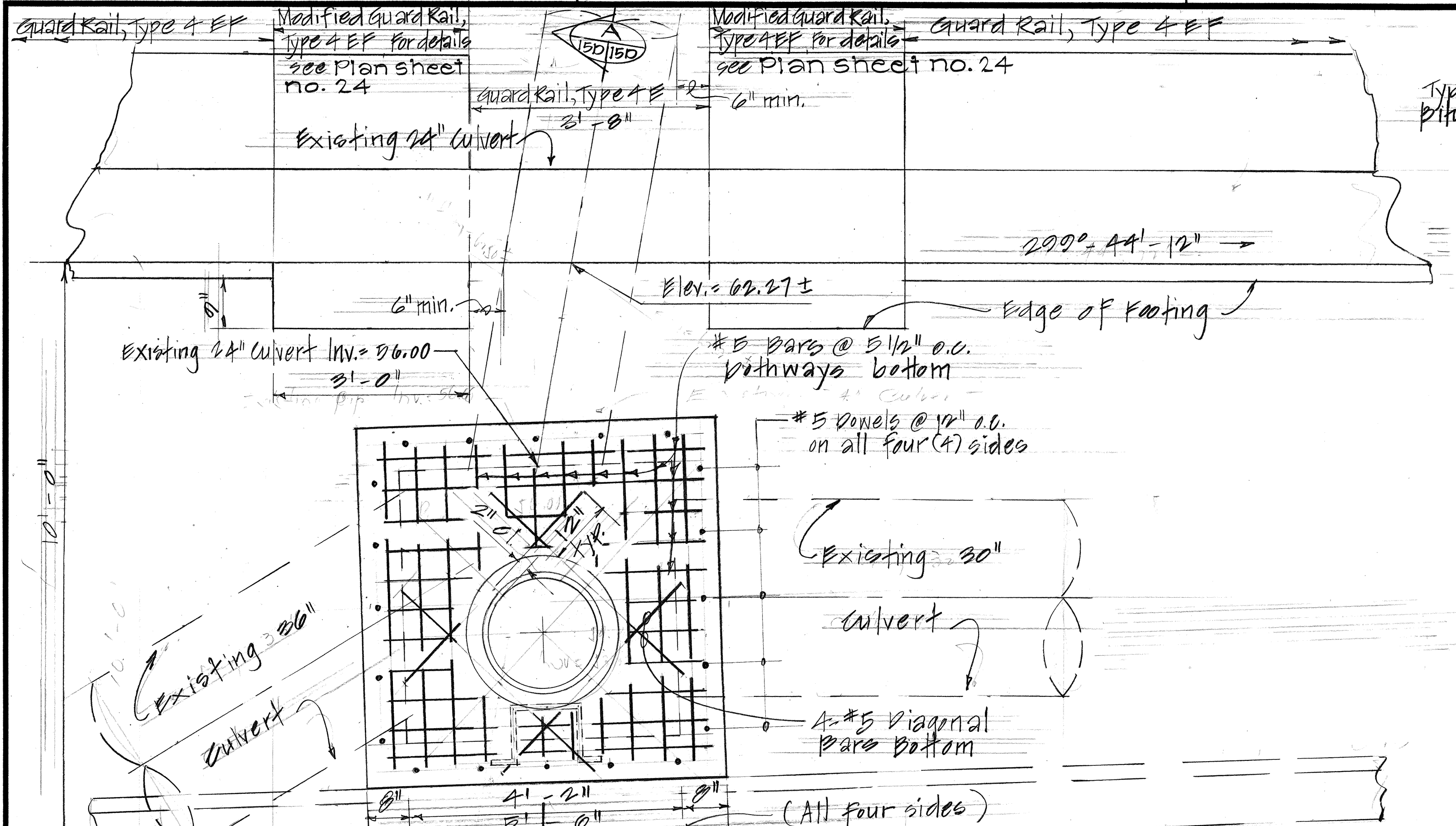
DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 3/4" = 1'-0" DATE: JUNE 1983

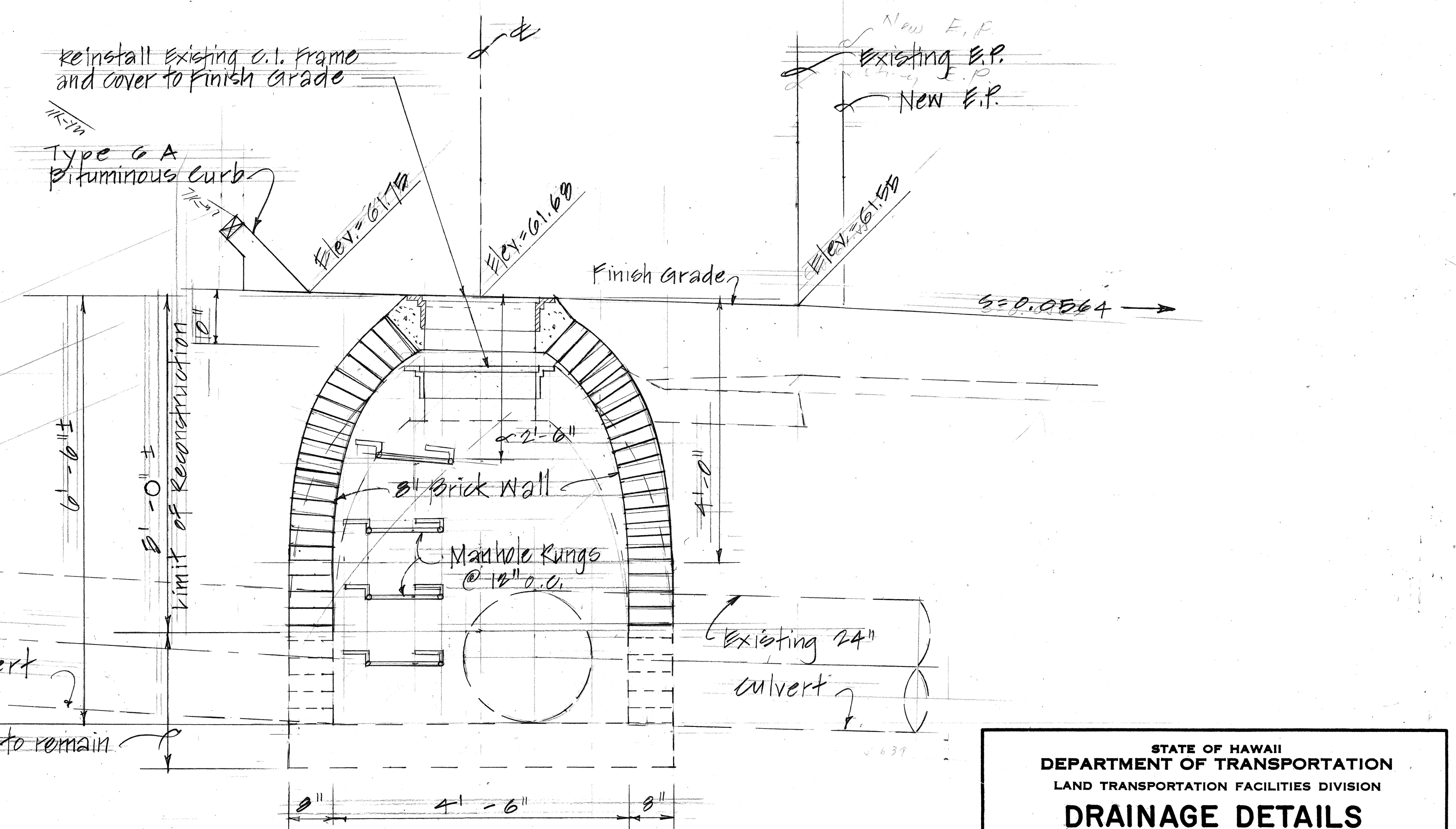
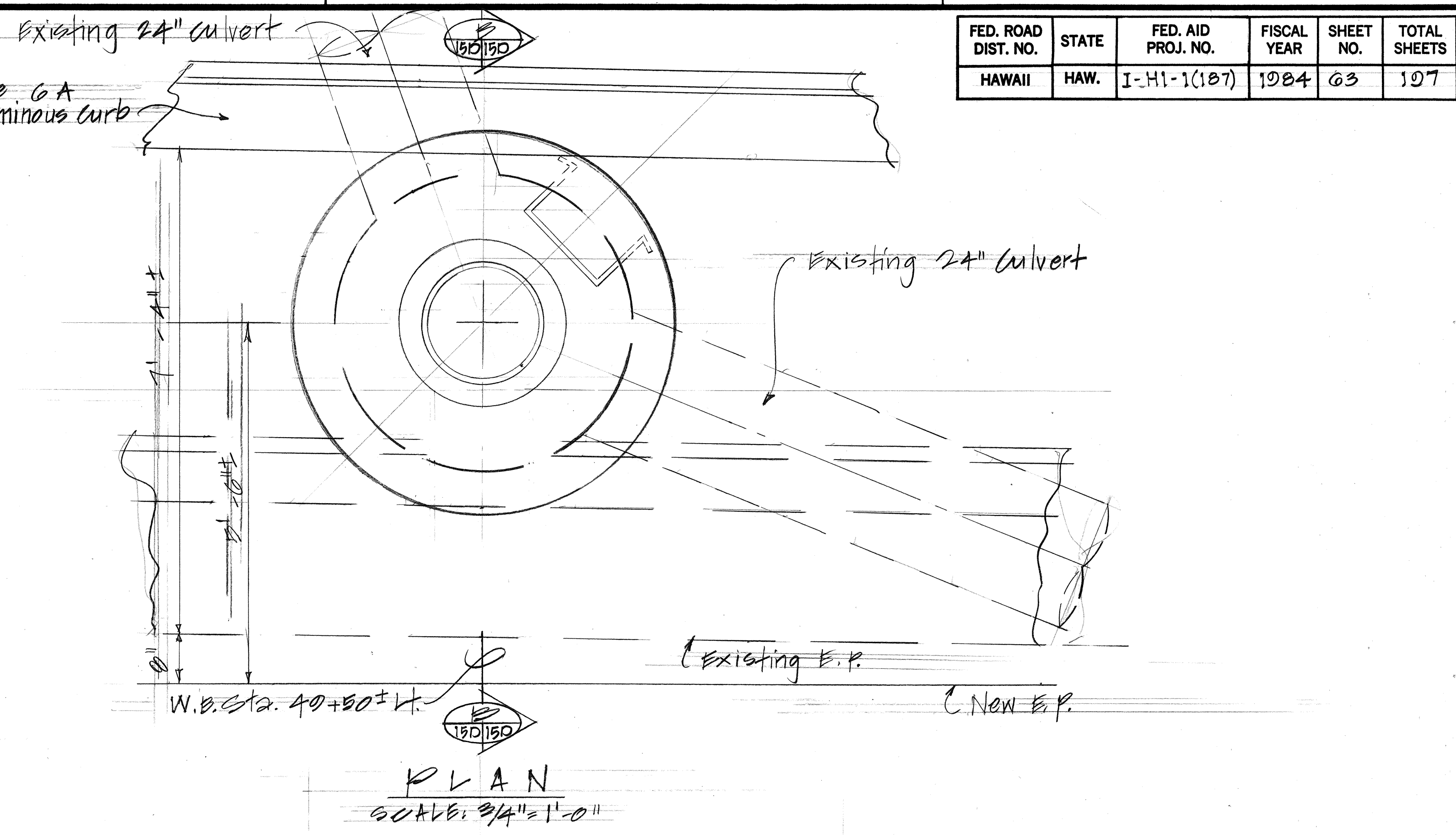
SHEET No. 140 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	63	107



SECTION A
SCALE: 3/4" = 1'-0" (150/150)

DETAILS OF RECONSTRUCTED TOP SLAB FOR EXISTING TYPE "B" S.D.M.H. #22 RAMP "K-1" STA. 2+35 ± 1 FT.



SECTION B
SCALE: 3/4" = 1'-0" (150/150)

RECONSTRUCTION OF EXISTING TYPE "B" S.D.M.H. #31 AT W.B. STA. 49+50 ± 1 FT.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

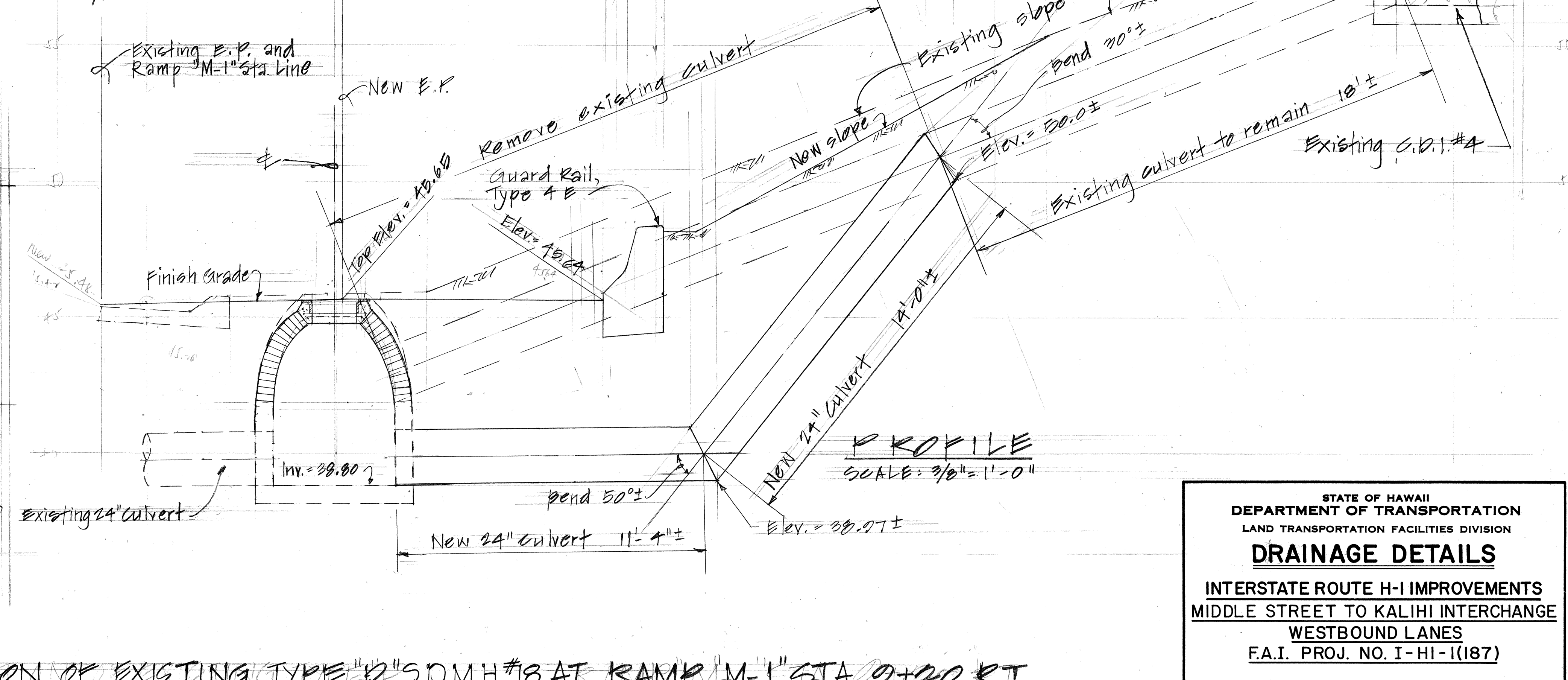
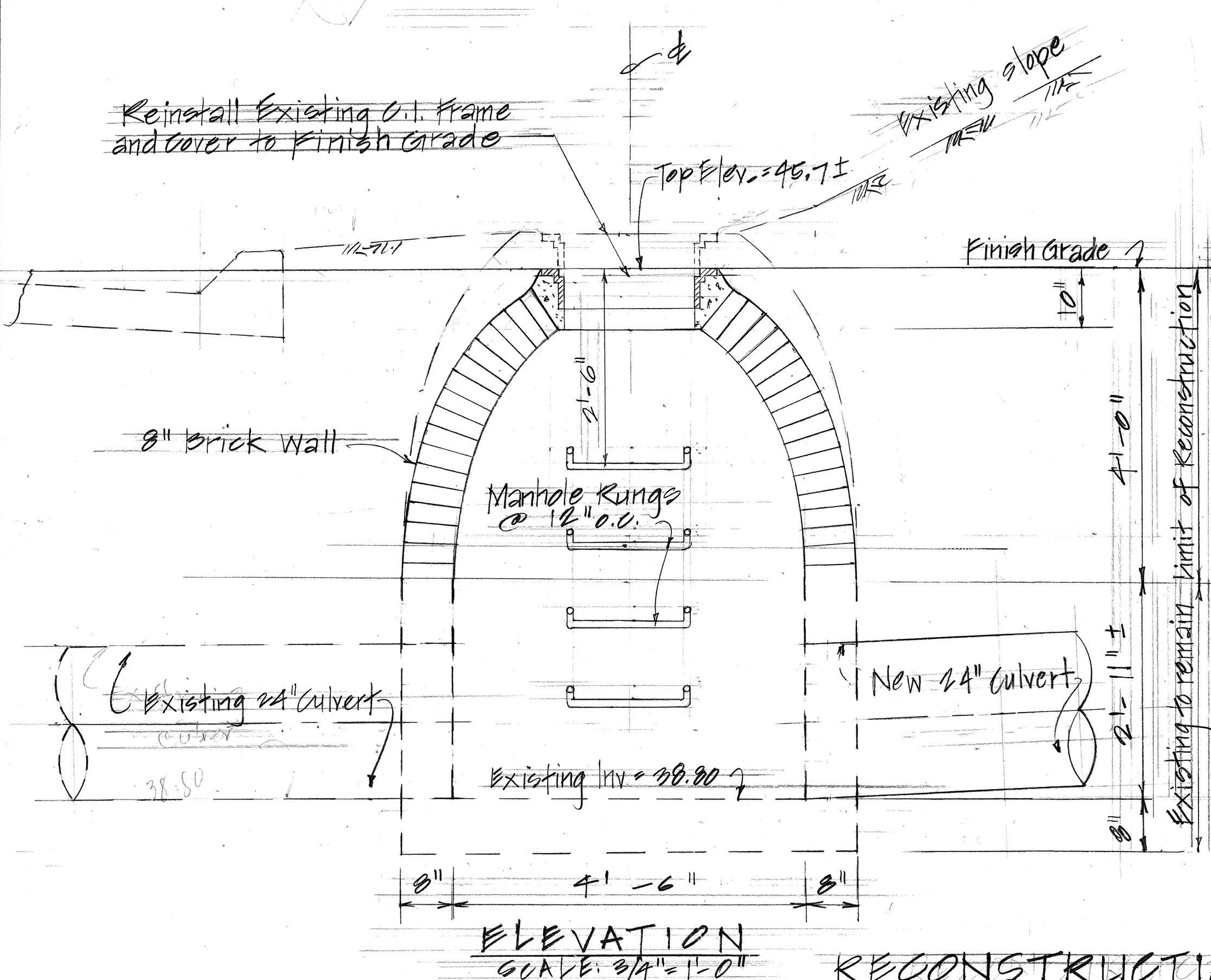
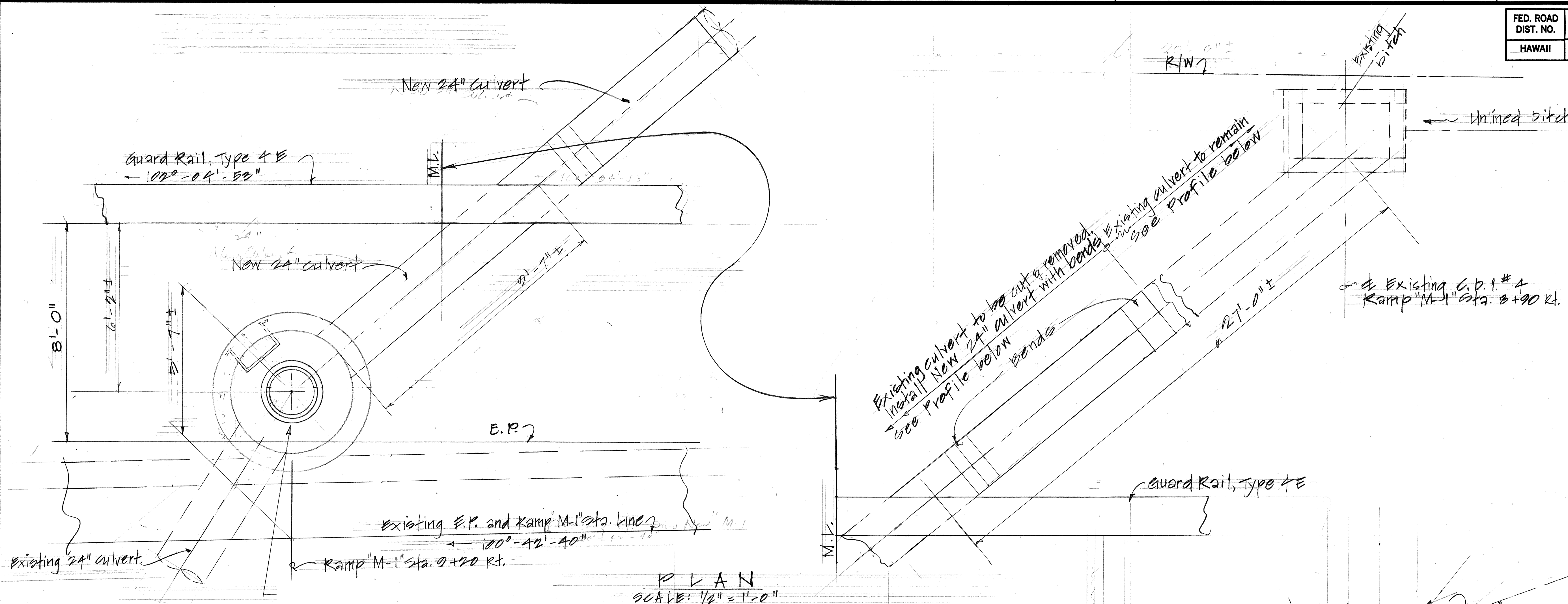
DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 3/4" = 1'-0" DATE: JUNE 1983
SHEET NO. 150 OF 30 SHEETS

DATE	_____
SURVEY PLOTTED BY	_____
DRAWN BY	_____
TRACED BY	_____
NOTED BY	_____
CHECKED BY	_____

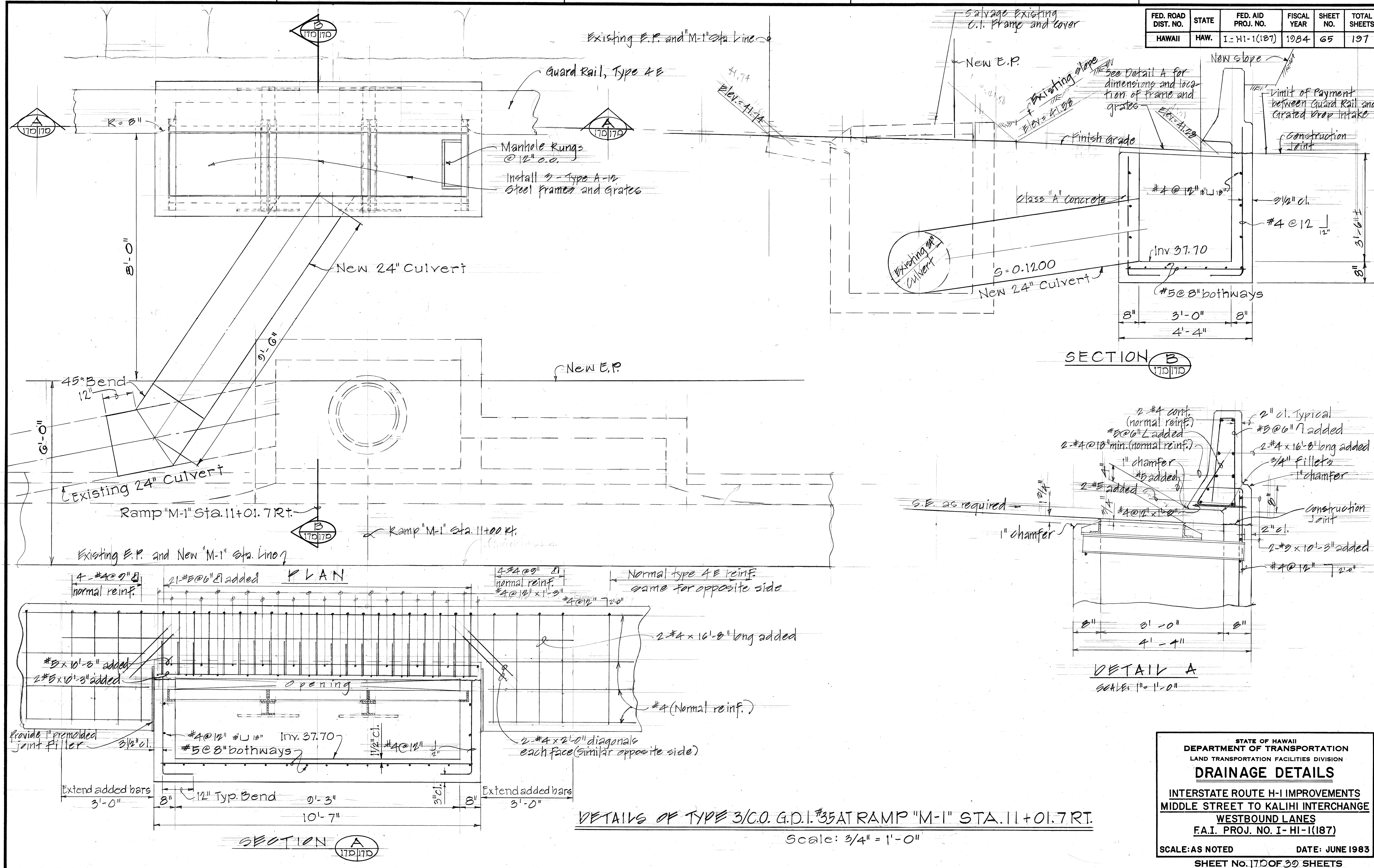
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	64	197



RECONSTRUCTION OF EXISTING TYPE "D" S.D.M.H. #18 AT RAMP "M-1" STA. 9+20 RT.

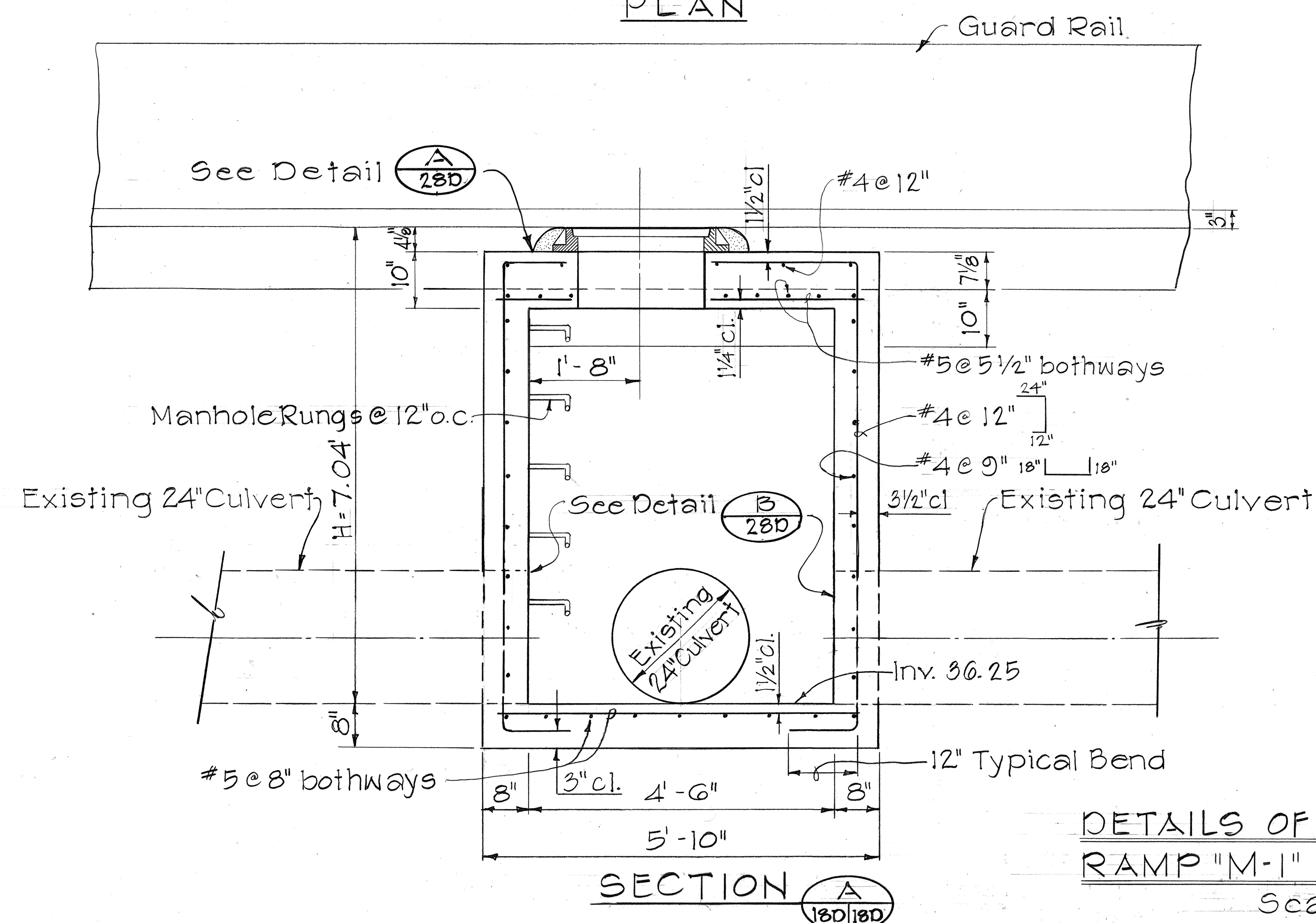
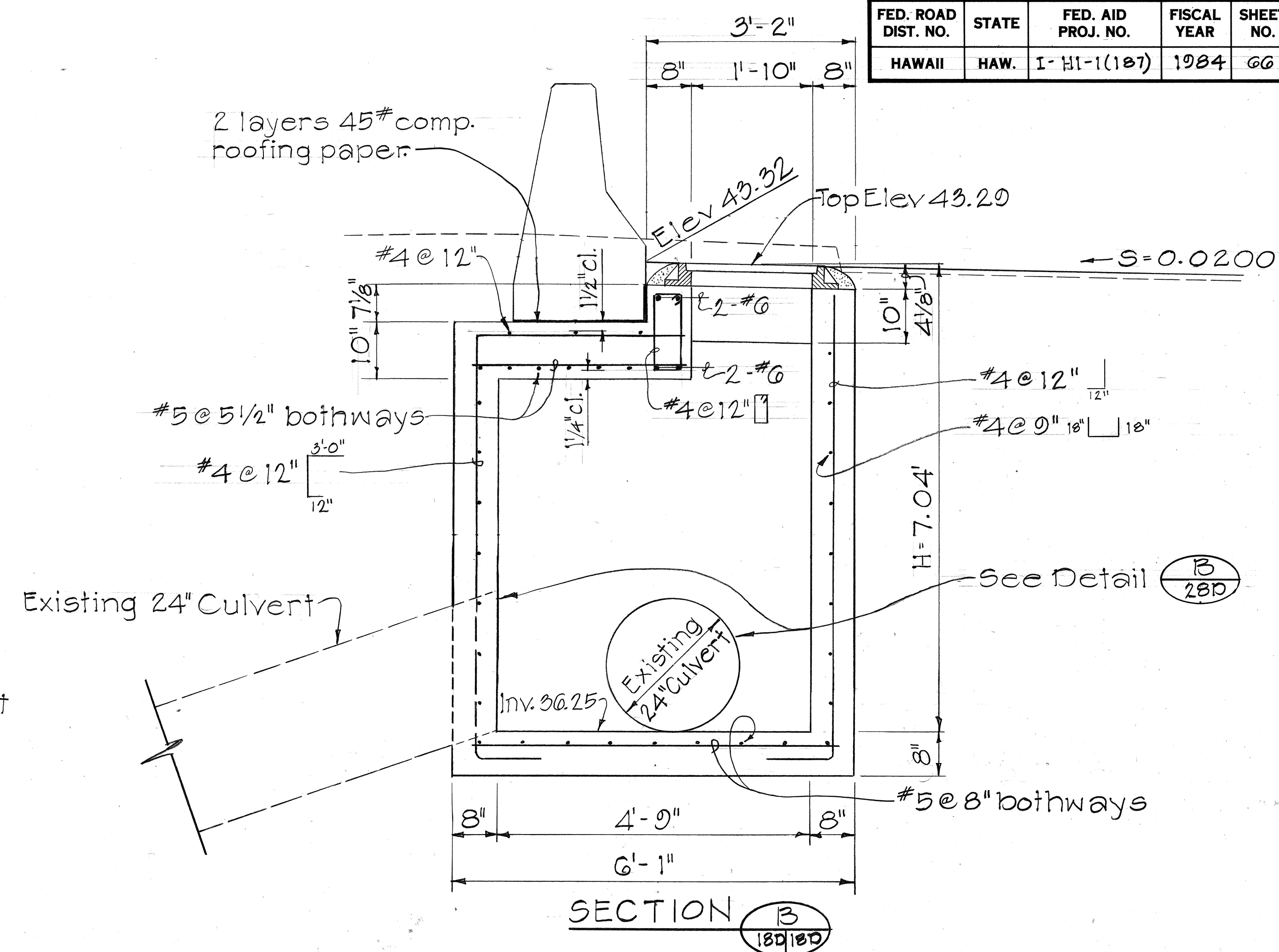
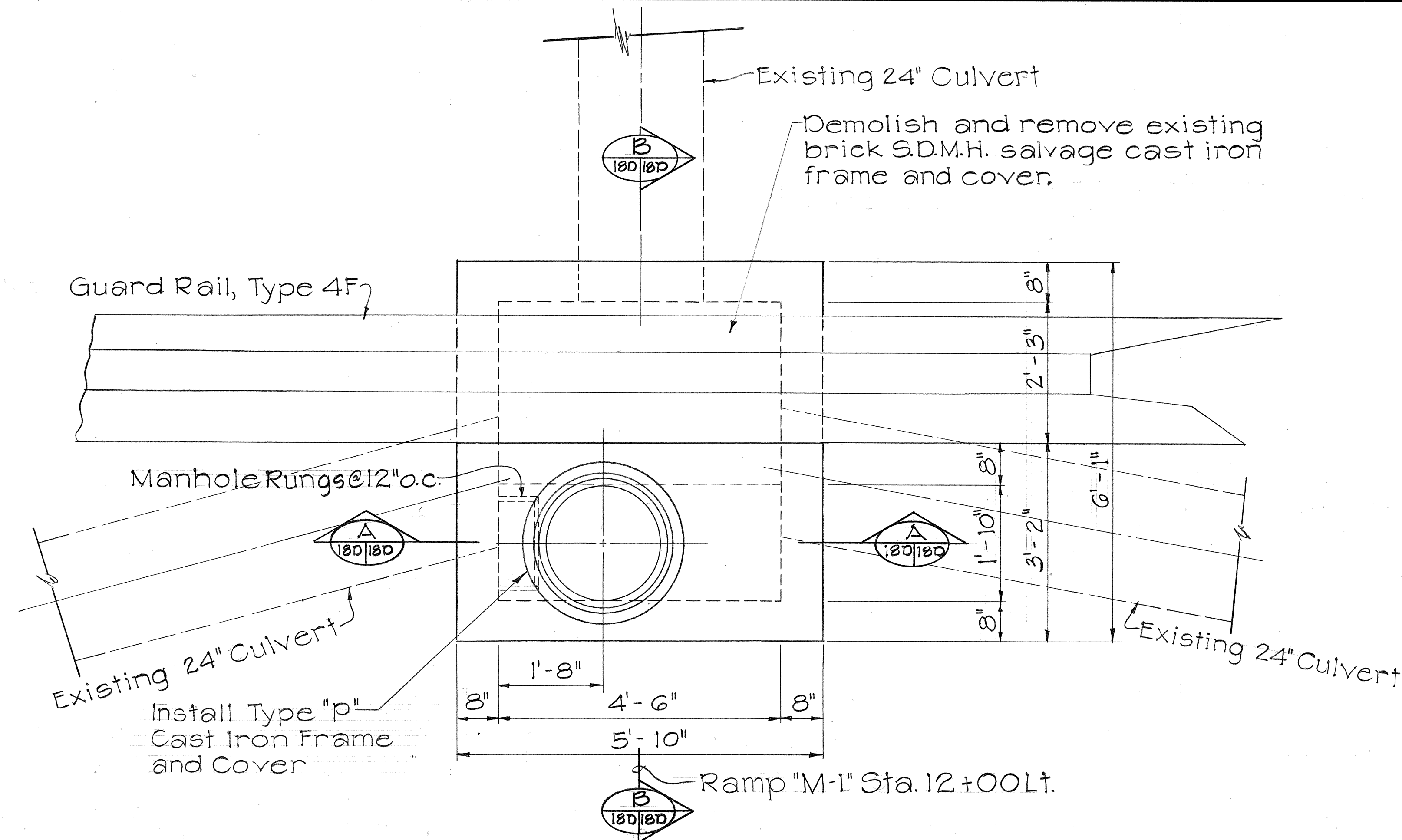
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)
SCALE: AS NOTED DATE: JUNE 1983
SHEET NO. 160 OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-11-1(187)	1984	65	197



STATE OF HAWAII	
DEPARTMENT OF TRANSPORTATION	
LAND TRANSPORTATION FACILITIES DIVISION	
DRAINAGE DETAILS	
INTERSTATE ROUTE H-1 IMPROVEMENTS	
MIDDLE STREET TO KALIHI INTERCHANGE	
WESTBOUND LANES	
F.A.I. PROJ. NO. I-11-1(187)	
SCALE: AS NOTED	DATE: JUNE 1983
SHEET NO. 170 OF 39 SHEETS	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	66	197



DETAILS OF TYPE "M" S.D.M.H. #15 AT
RAMP "M-1" STA. 12+00 LT.
Scale: 3/4" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

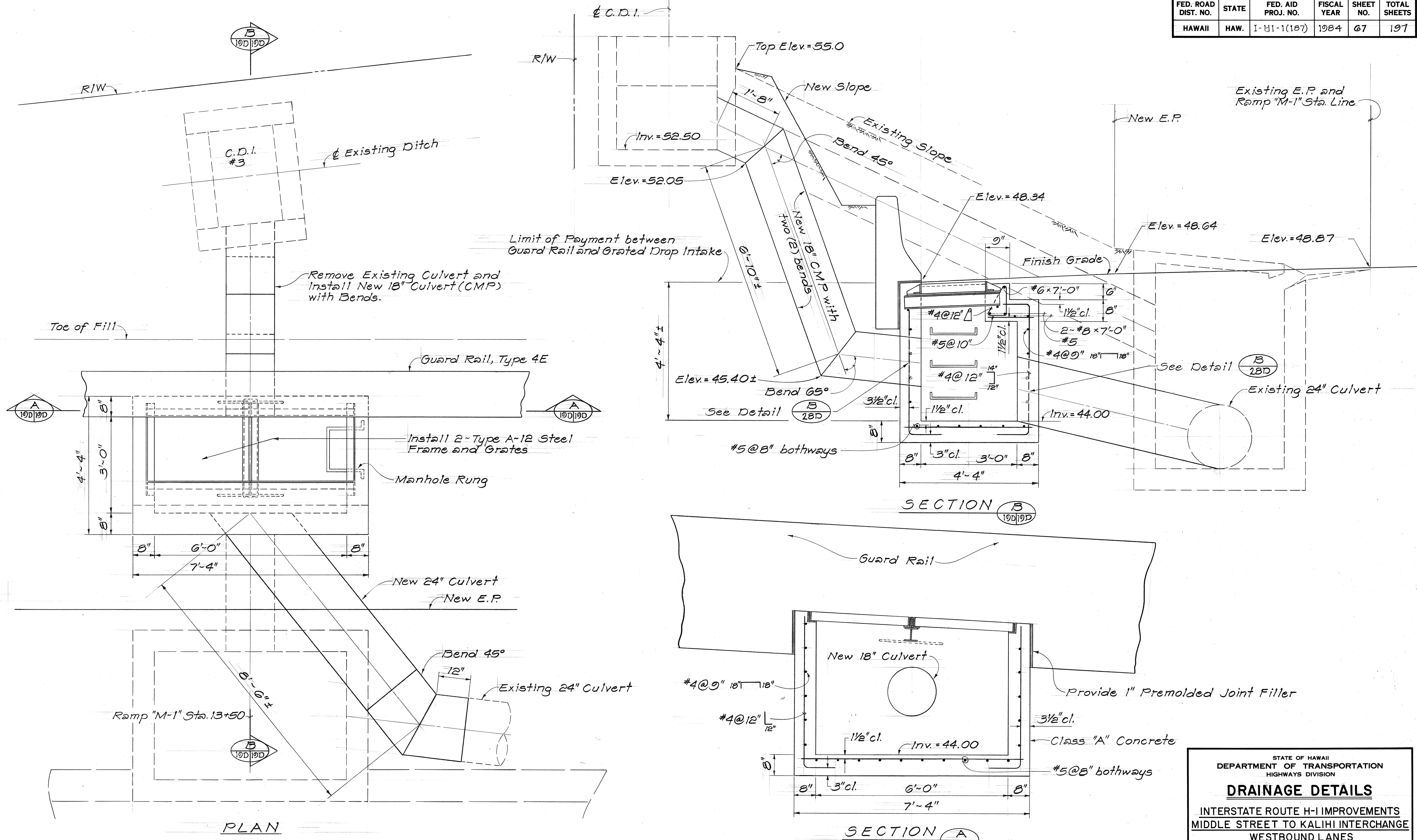
DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 3/4" = 1'-0" DATE: JUNE 1983

SHEET NO. 18D OF 30 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	67	197



DETAILS OF TYPE 2 G.D.I. #31 AT RAMP "M-1" STA. 13+50 RT.
Scale: 3/4"=1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

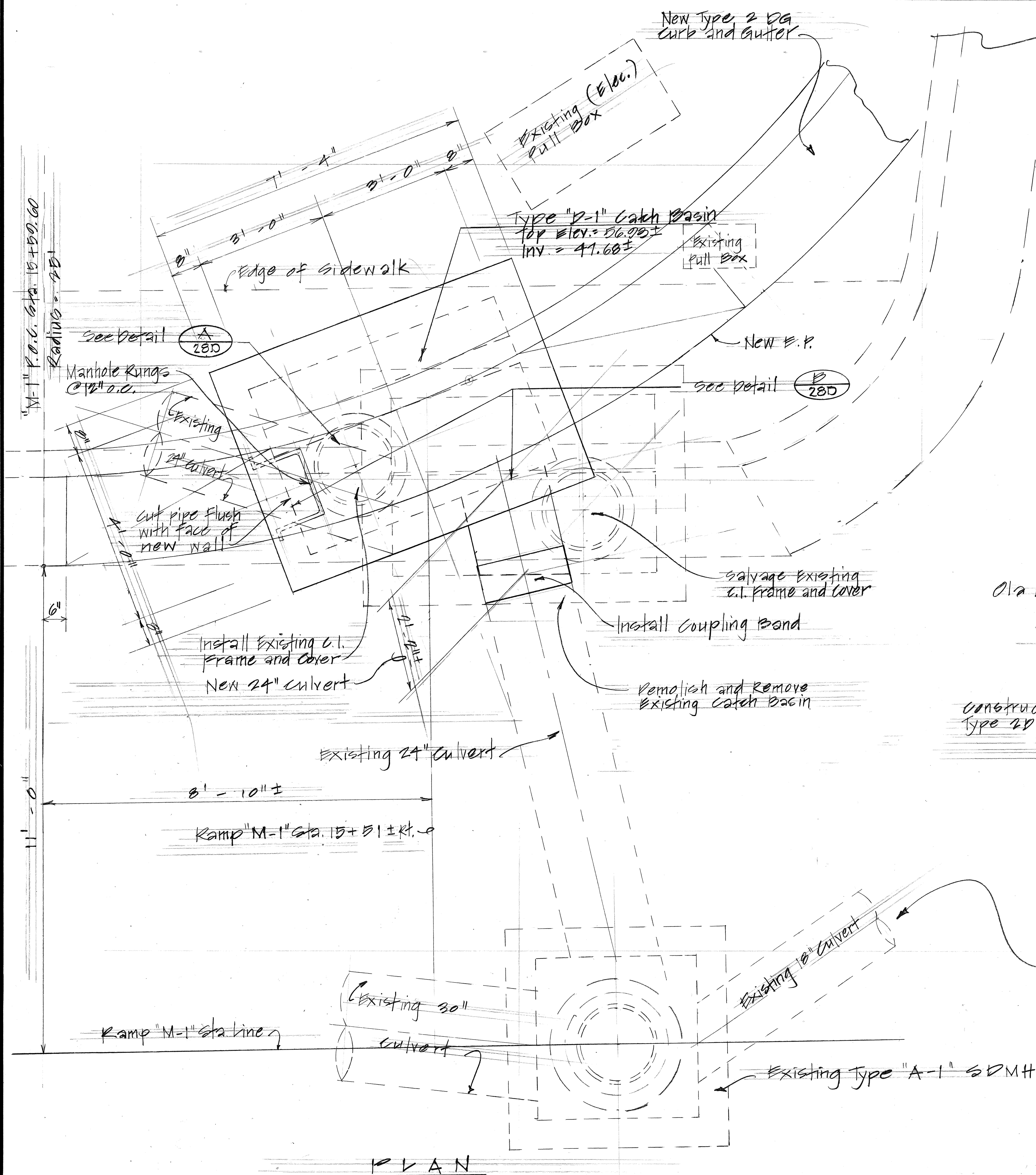
INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 3/4"=1'-0" DATE: JUNE 1983

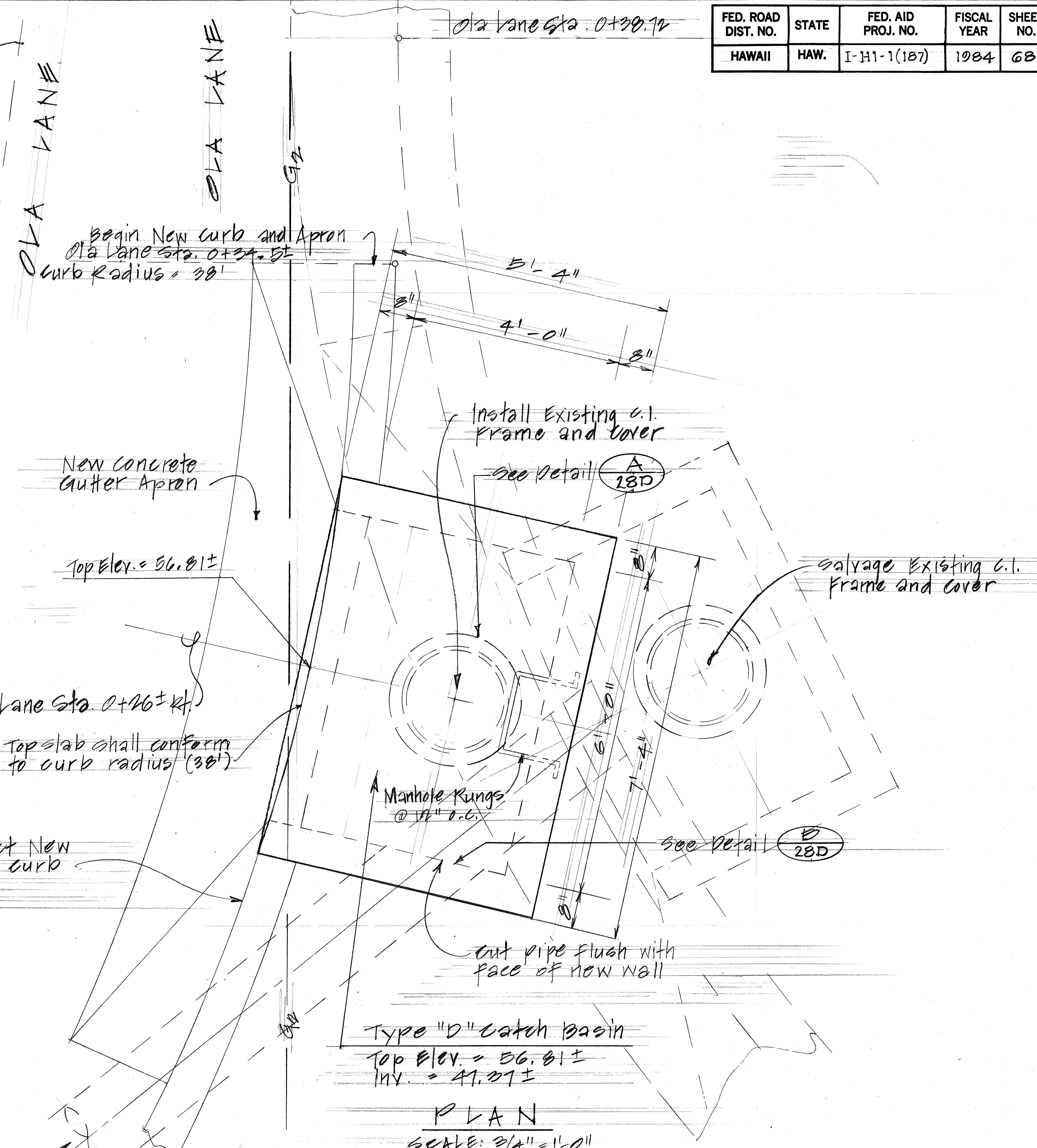
SHEET NO. 100 OF 30 SHEETS

ORIGINAL PLAN	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.	I-H-1-1(187)	1984	68	197



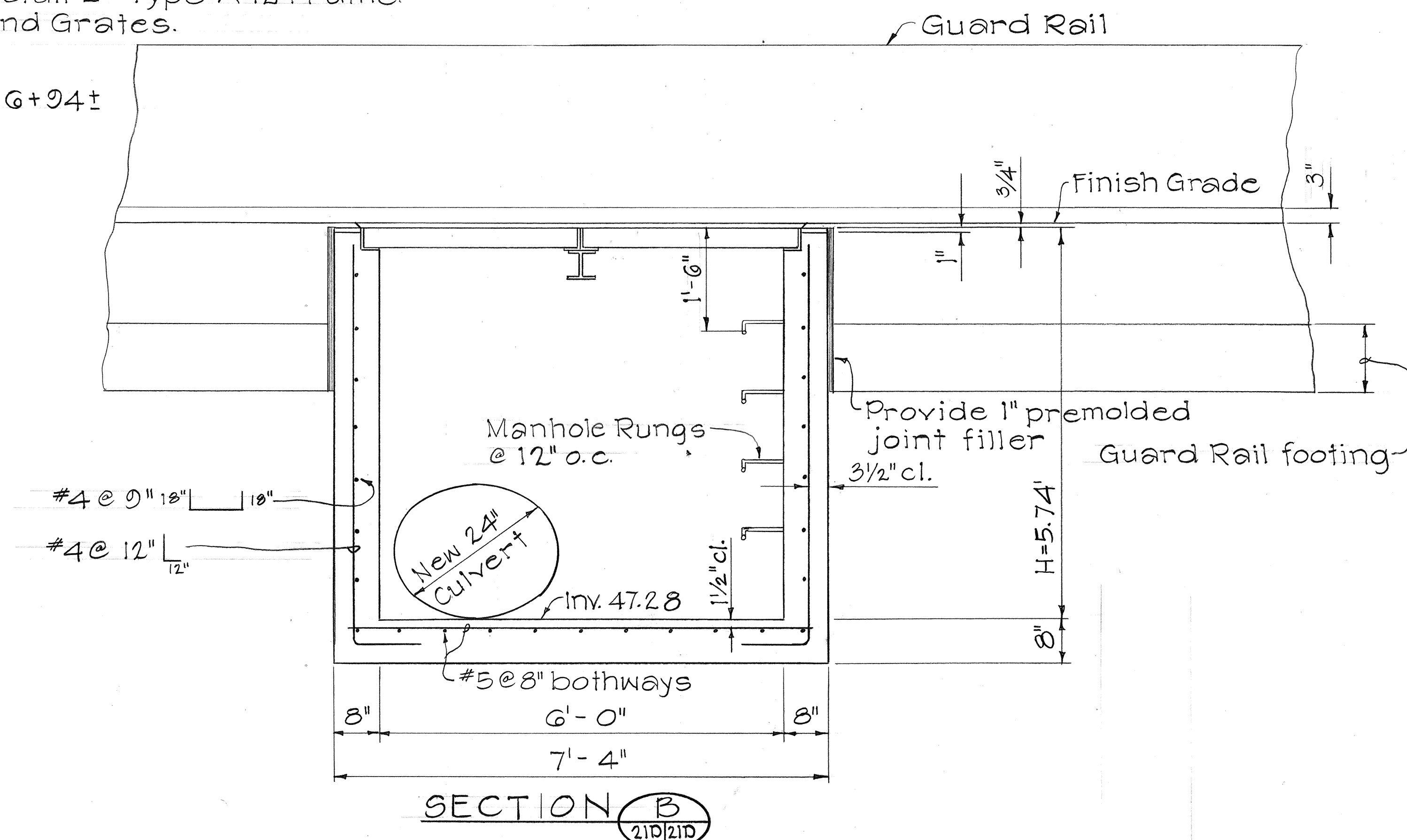
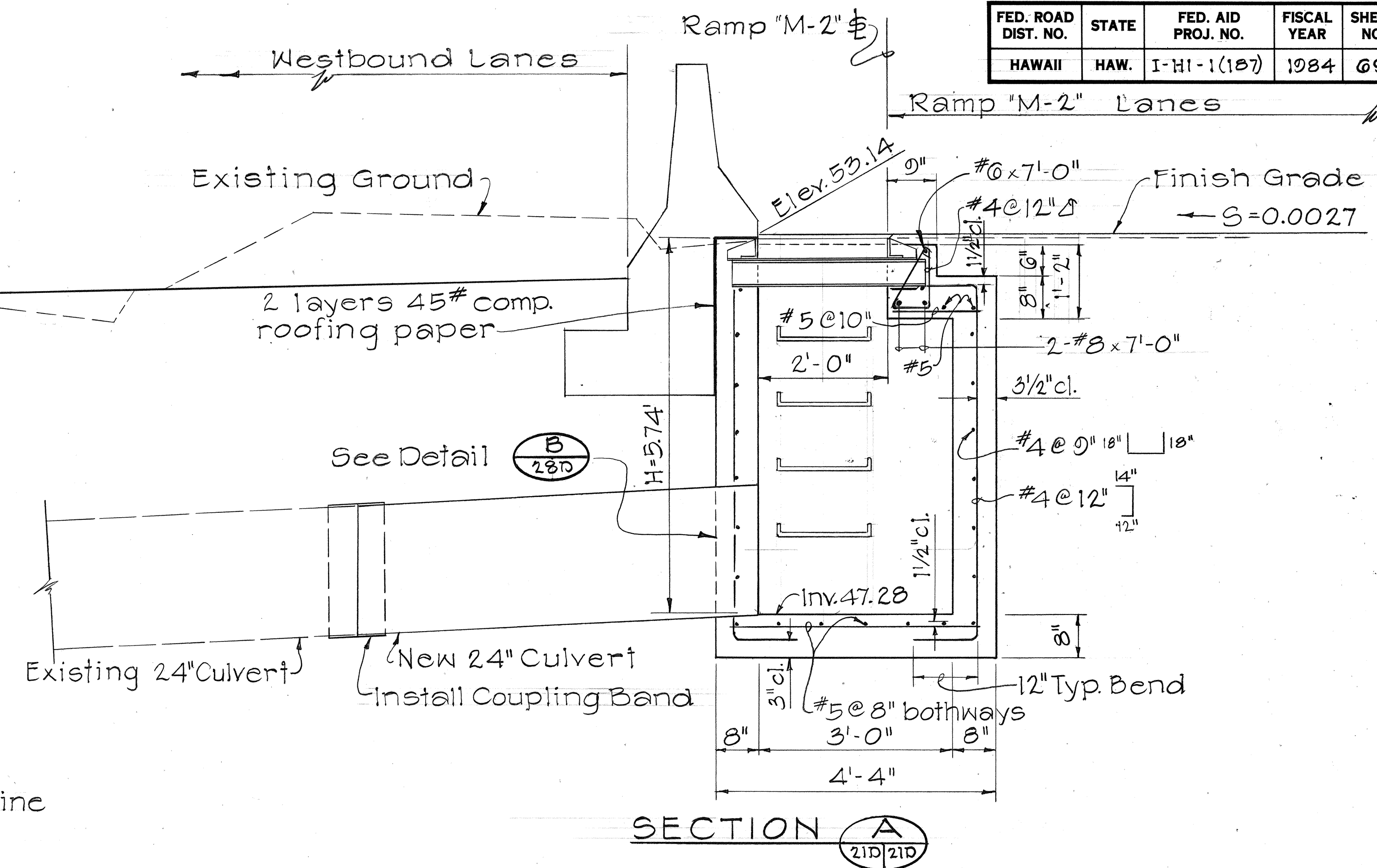
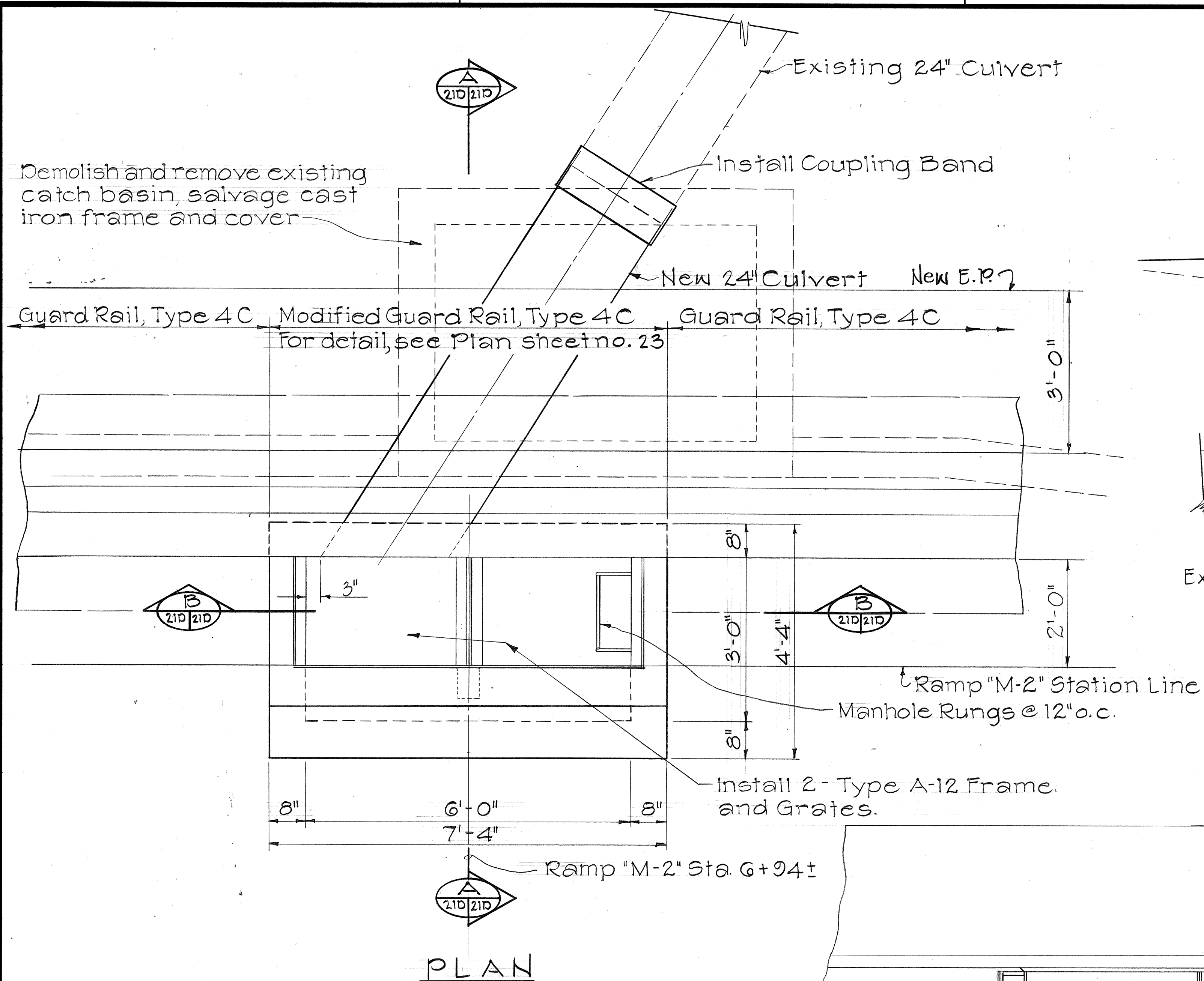
PLAN
SCALE: 3/4" = 1'-0"
DETAILS OF TYPE "D1" C.B. #27 AT RAMP "M-1" STA. 15+51 ± RT.



PLAN
SCALE: 3/4" = 1'-0"
DETAILS OF TYPE "D" C.B. #20 AT OLA LANE STA. 0+26 ± RT.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
DRAINAGE DETAILS
INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-H-1-1(187)
SCALE: 3/4" = 1'-0" DATE: JUNE 1983
SHEET NO. 20 OF 30 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	69	197



DETAILS OF TYPE 2 G.D.I. #38 AT RAMP "M-2" STA. G+94±

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

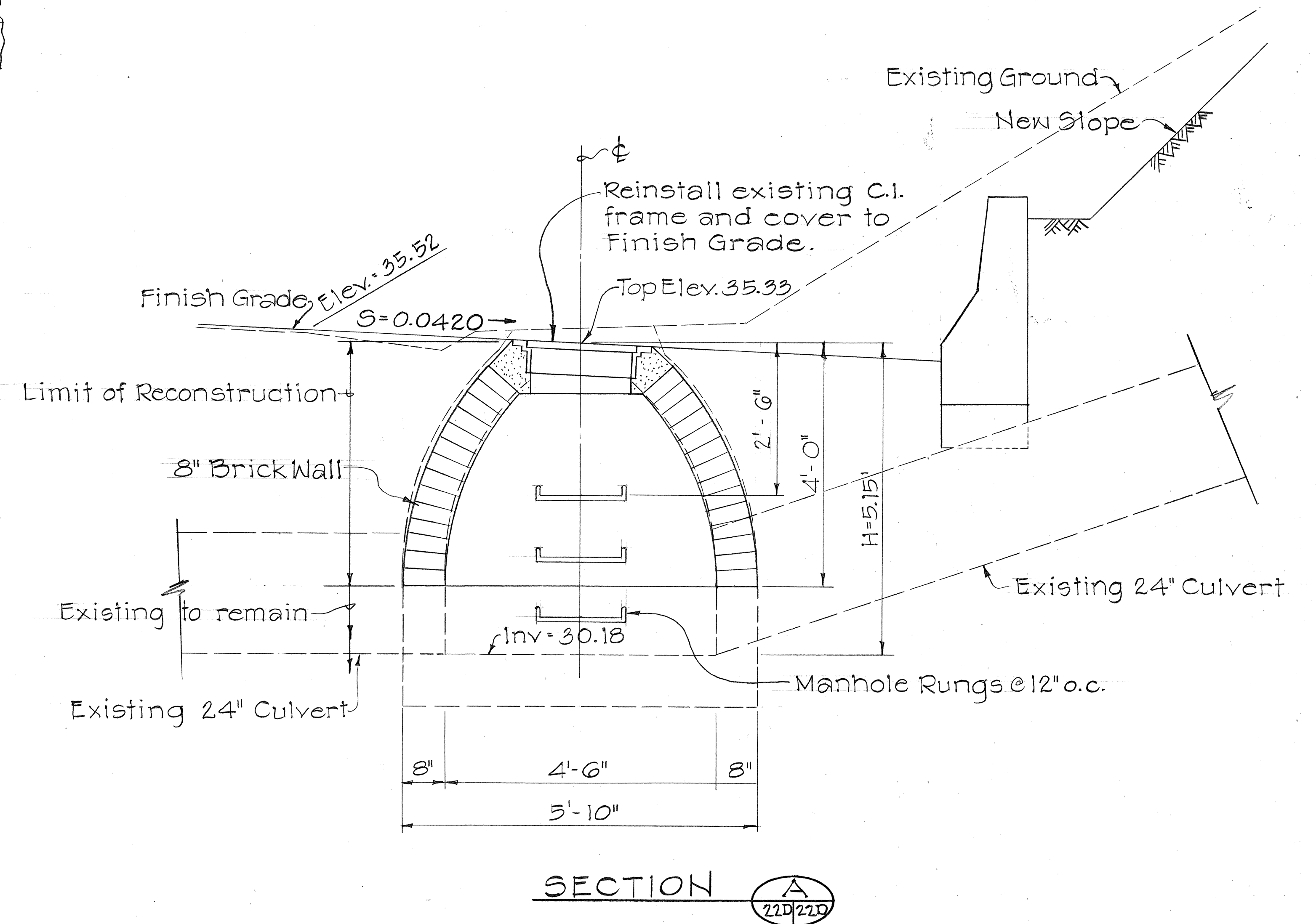
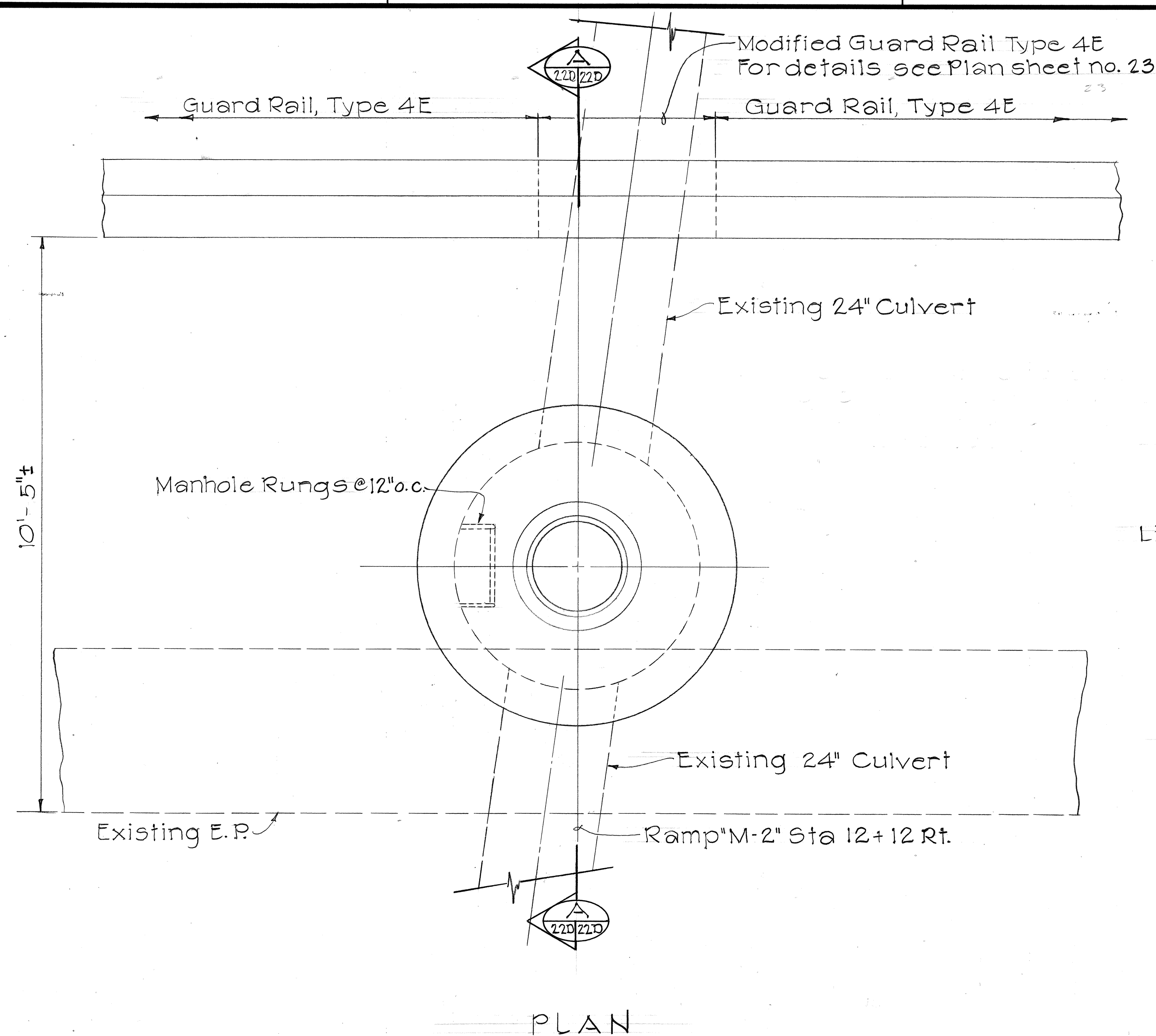
DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 3/4" = 1'-0" DATE: JUNE 1983

SHEET NO. 21D OF 39 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	70	197



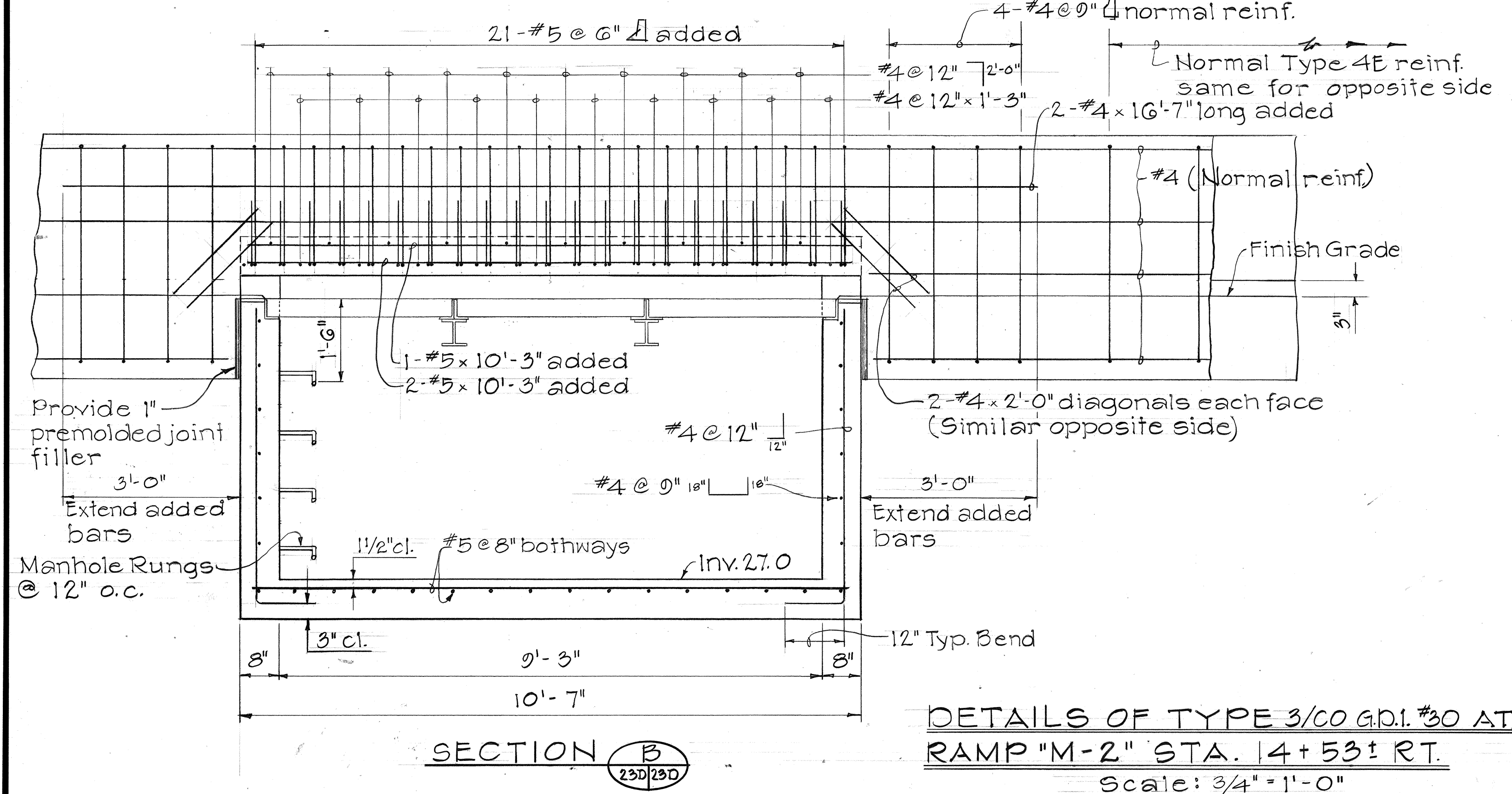
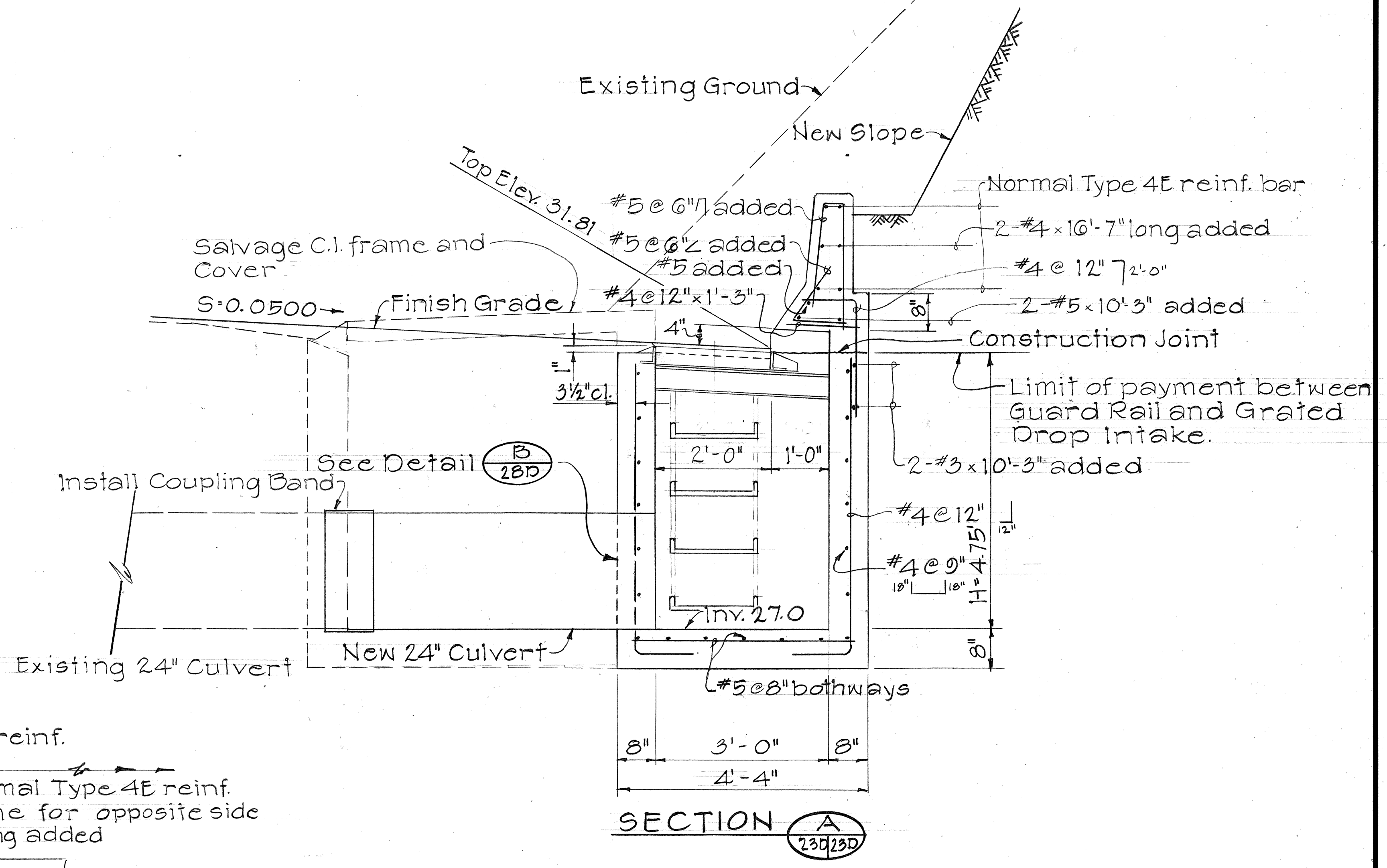
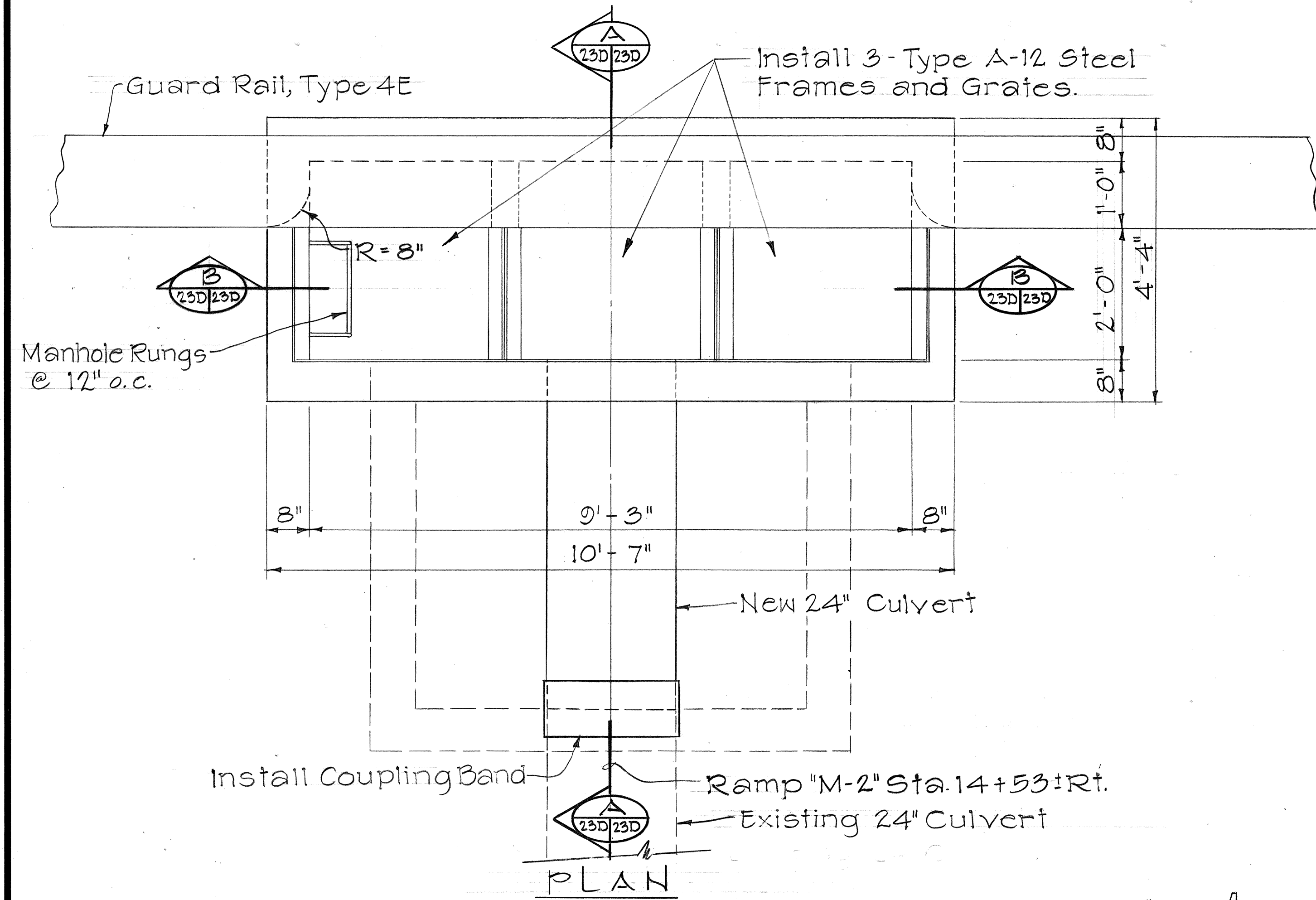
RECONSTRUCTION OF TYPE "D" S.D.M.H. #16 AT RAMP "M-2" STA. 12+12 RT.

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

ORIGINAL PLAN	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
NO.	

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
DRAINAGE DETAILS	
INTERSTATE ROUTE H-1 IMPROVEMENTS MIDDLE STREET TO KALIHI INTERCHANGE WESTBOUND LANES F.A.I. PROJ. NO. I-HI-1(187)	
SCALE: 3/4" = 1'-0"	DATE: JUNE 1983
SHEET No. 22 OF 39 SHEETS	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	71	197



DETAILS OF TYPE 3/CO G.D.I. #30 AT
RAMP "M-2" STA. 14+53± RT.
Scale: 3/4" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

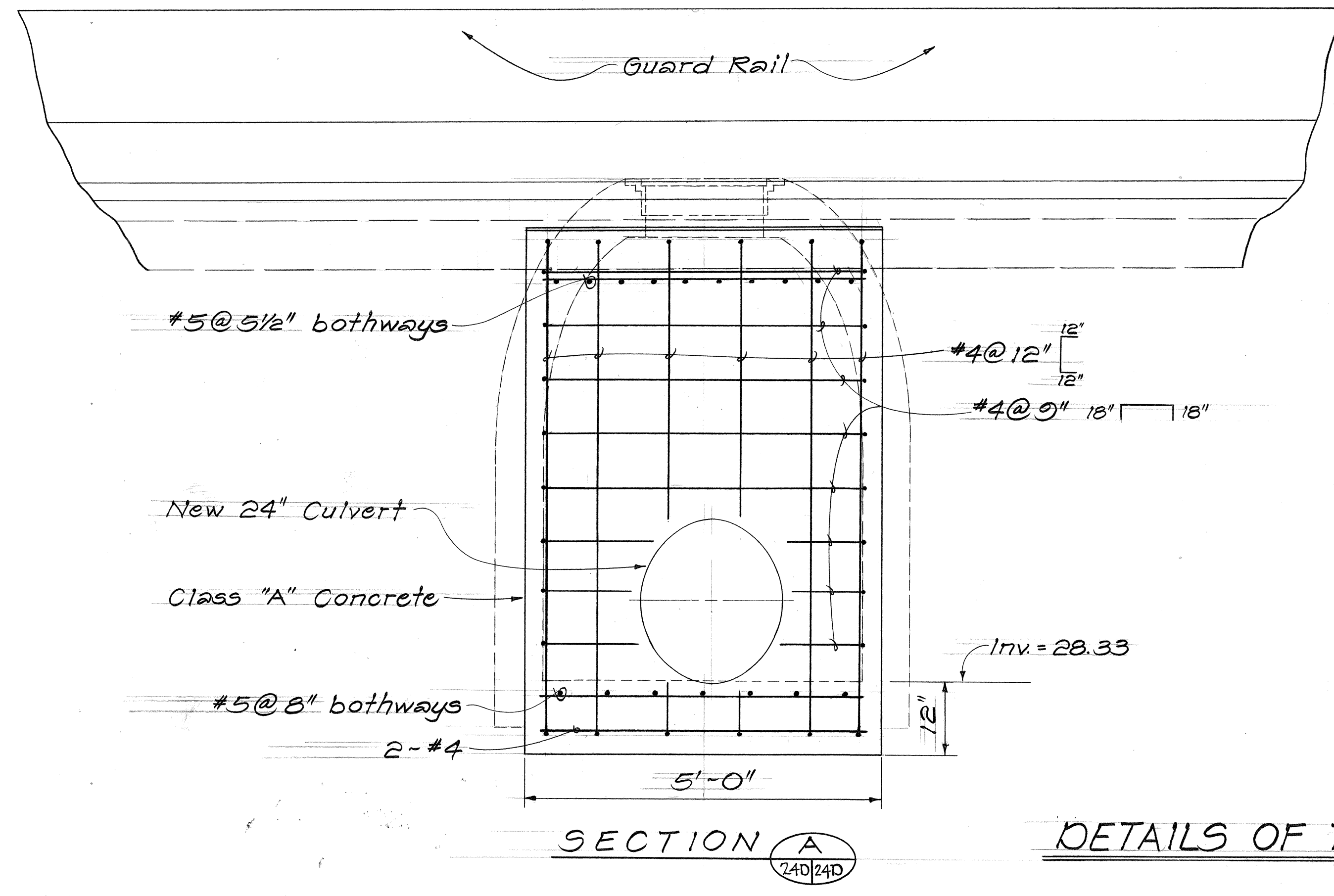
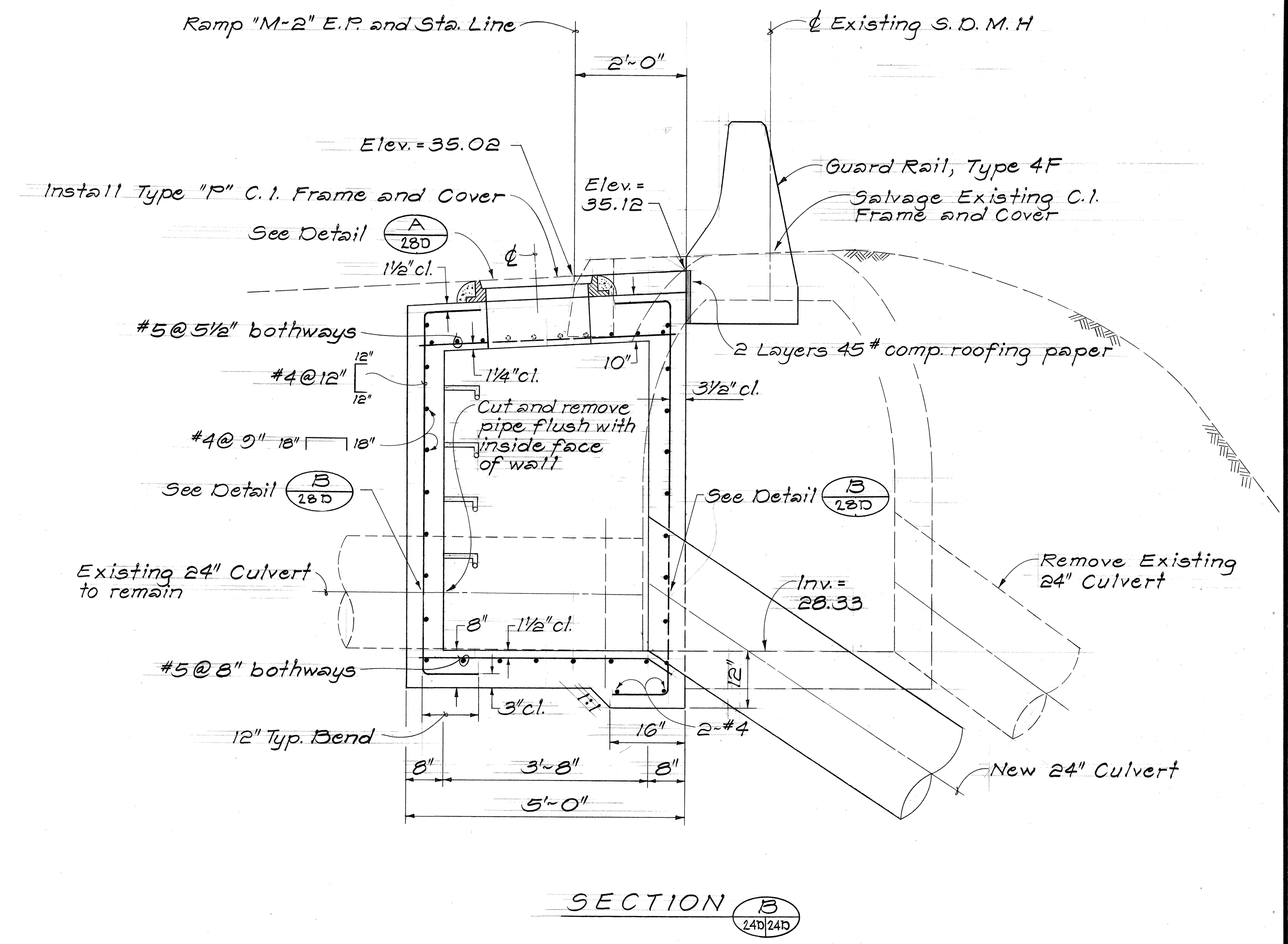
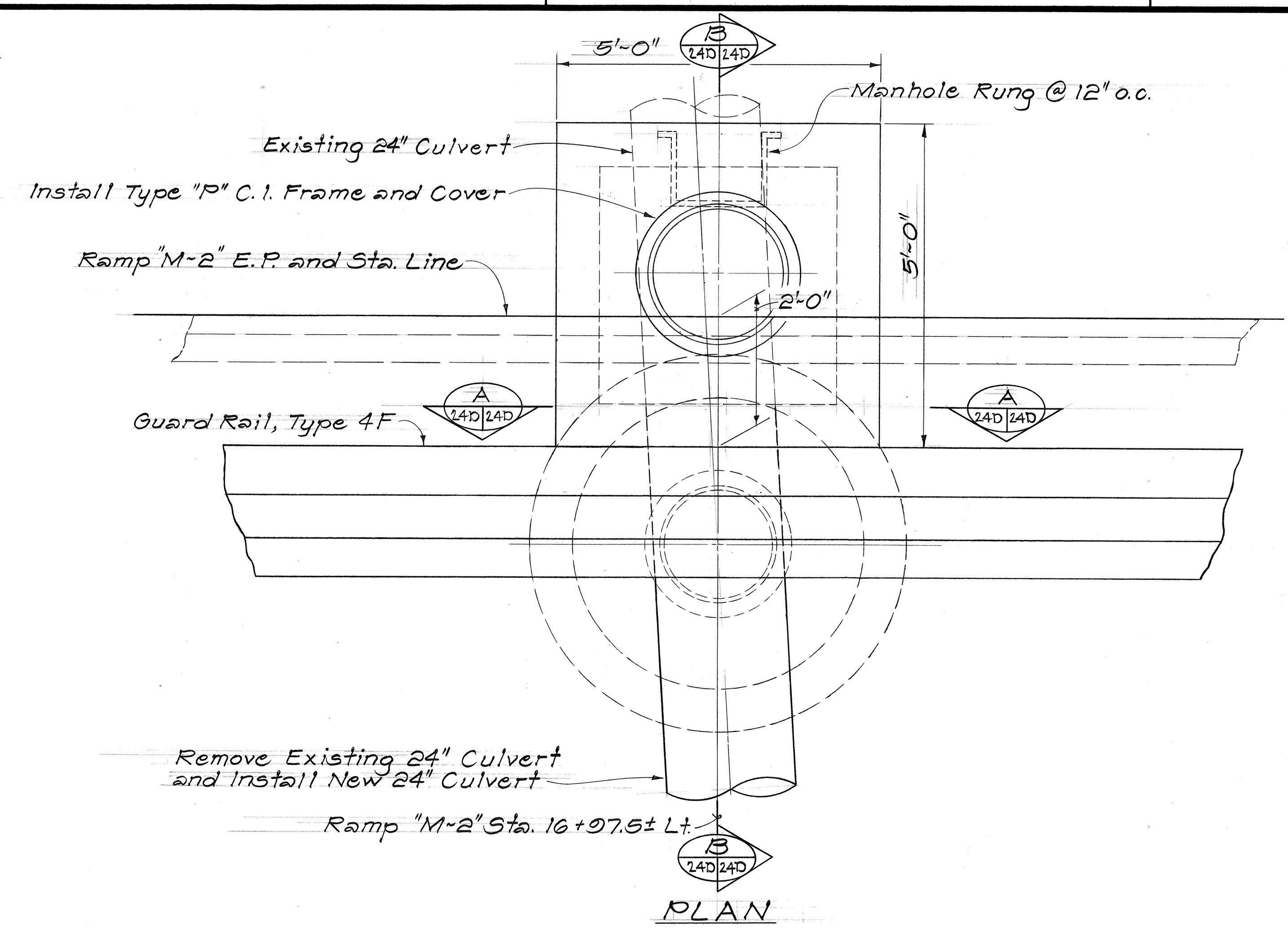
DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: AS NOTED DATE: JUNE 1983
SHEET No. 23D OF 39 SHEETS

DATE	
SURVEY PLOTTED BY	
ORIGINAL PLAN	
DESIGNED BY	
CHECKED BY	
NOTE BOOK	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	72	197



DETAILS OF TYPE "A" S. D. M. H. #11 AT RAMP "M-2" STA. 16+97.5±

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NO. 1	DRAWN BY	" "
2	DESIGNED BY	" "
3	QUANTITIES BY	" "
4	CHECKED BY	" "

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

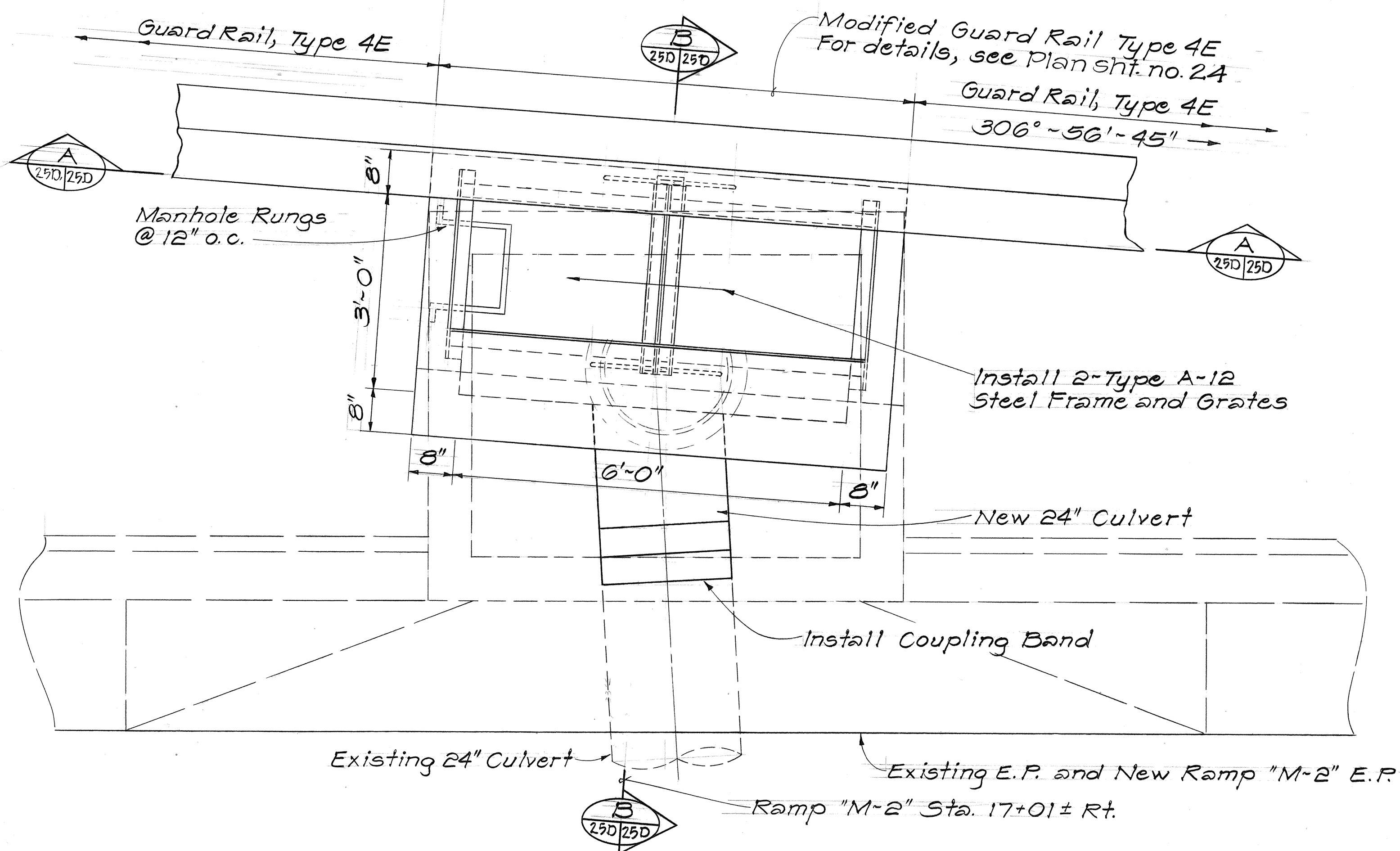
DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

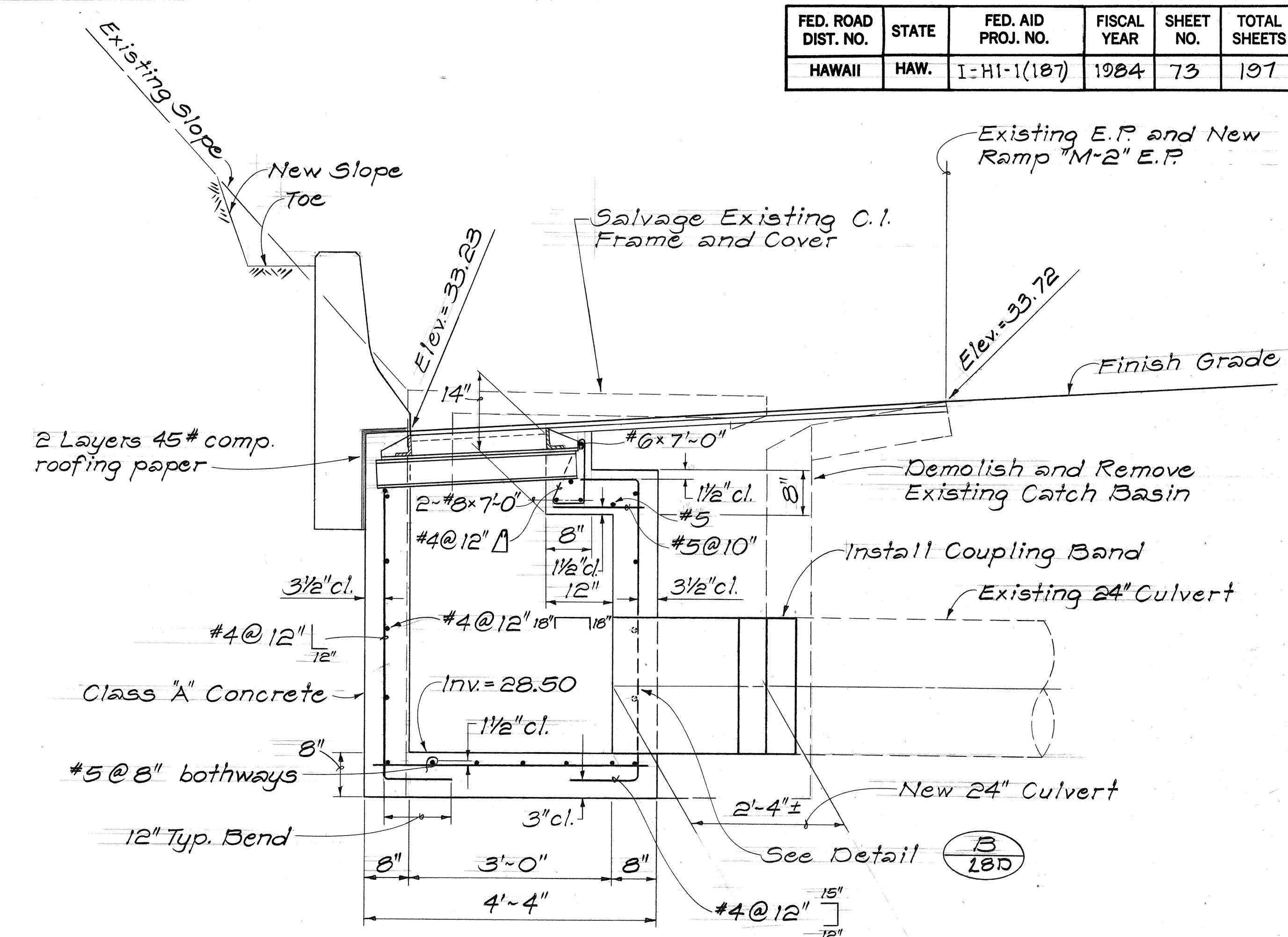
SCALE: 3/4" = 1'-0" DATE: JUNE 1983

SHEET No. 24 DOF 30 SHEETS

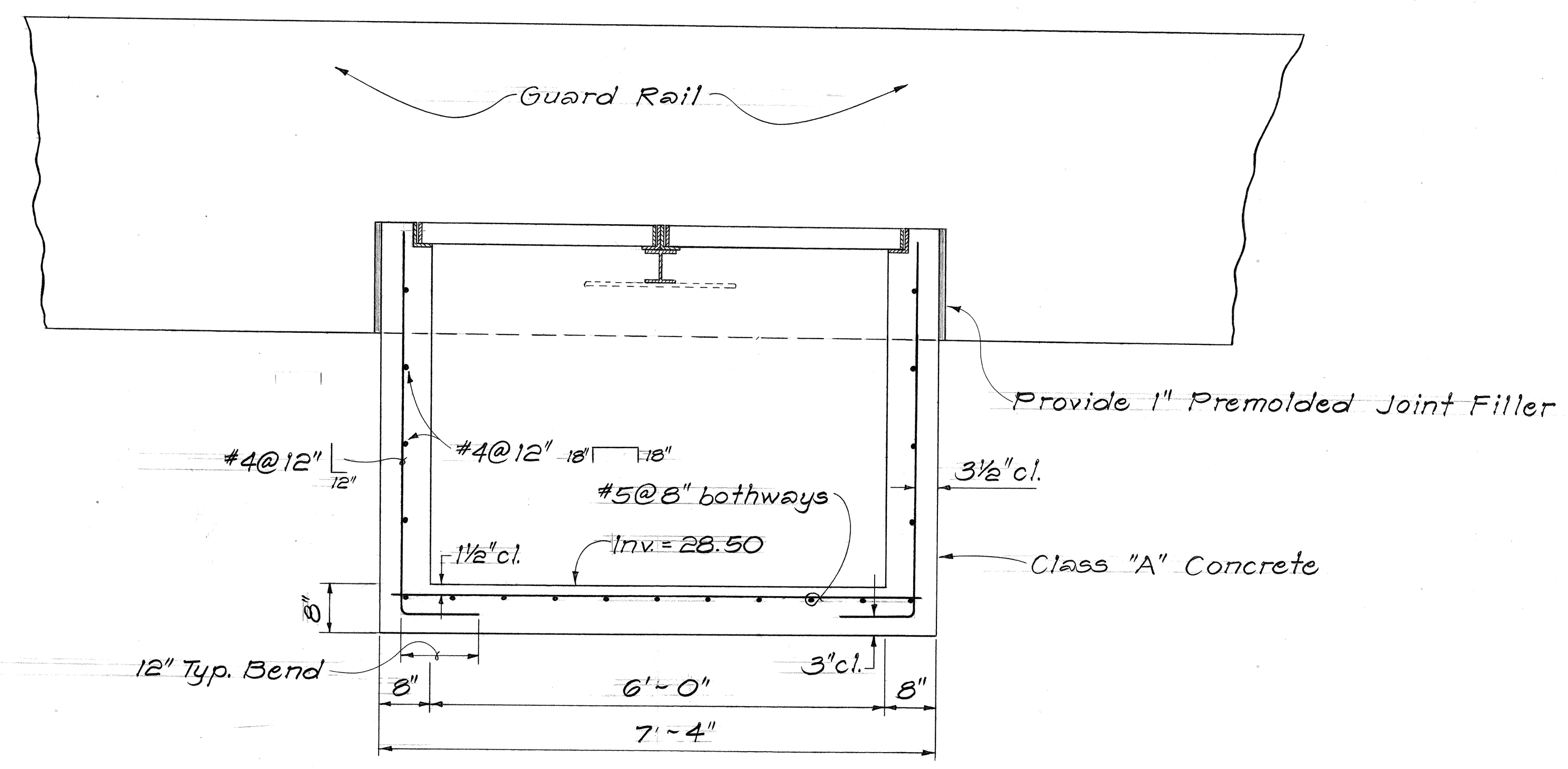
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	73	197



PLAN



SECTION B 18D



SECTION A 25D 25D

DETAILS OF TYPE 2 G.D.I. #24 AT RAMP "M-2" STA. 17+01± RT.

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

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

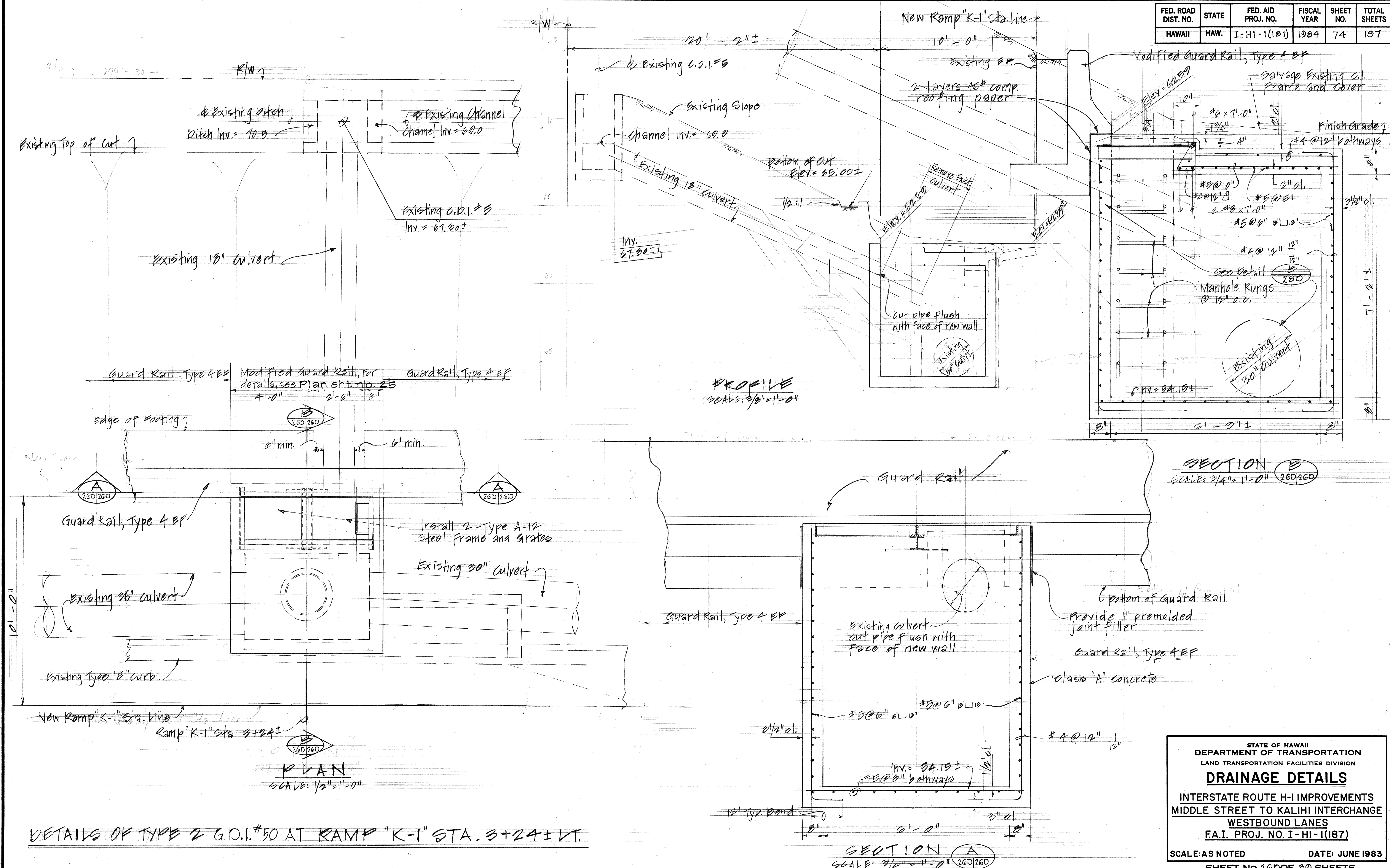
DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 3/4" = 1'-0" DATE: JUNE 1983

SHEET No. 25D OF 30 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	74	197



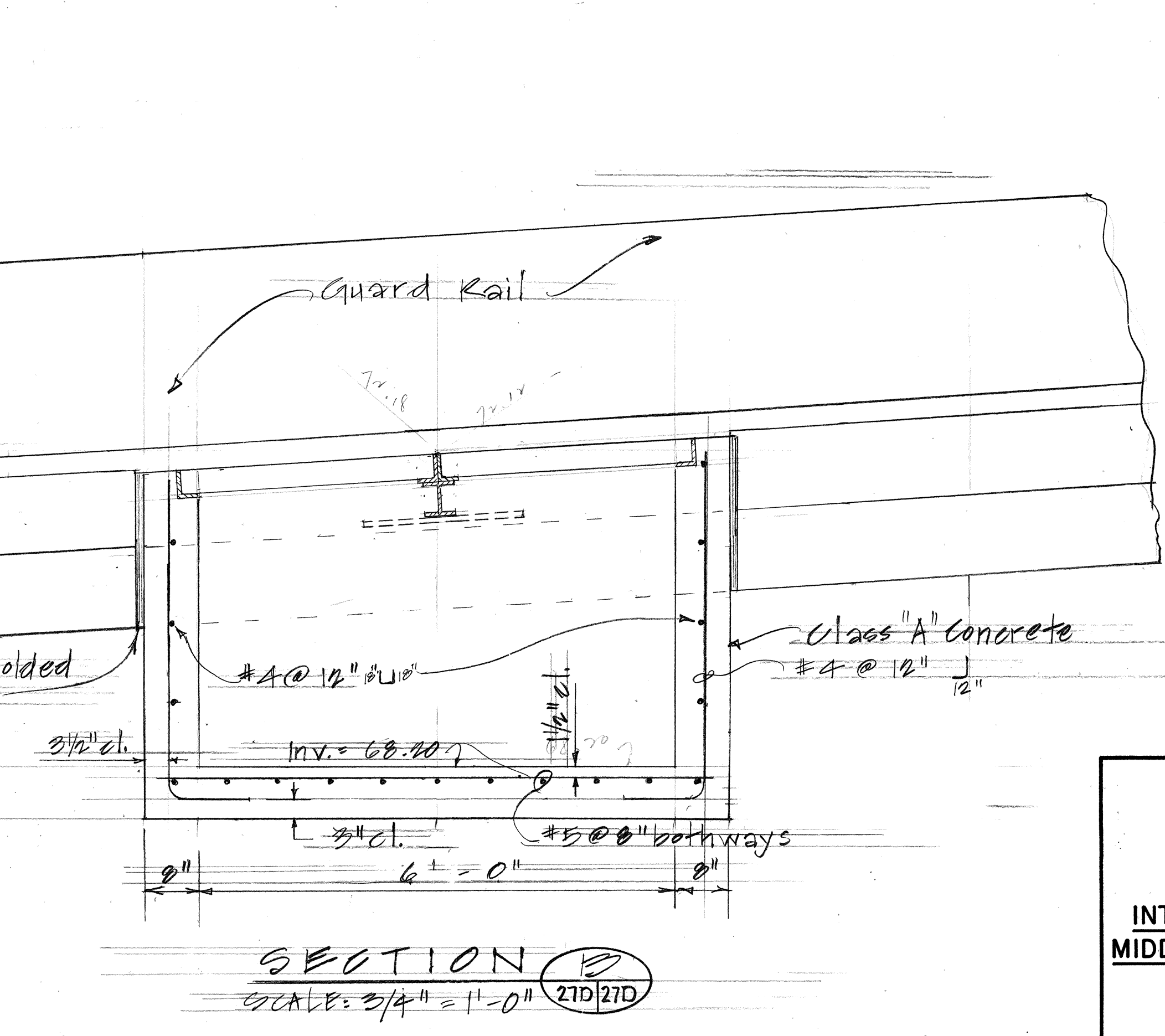
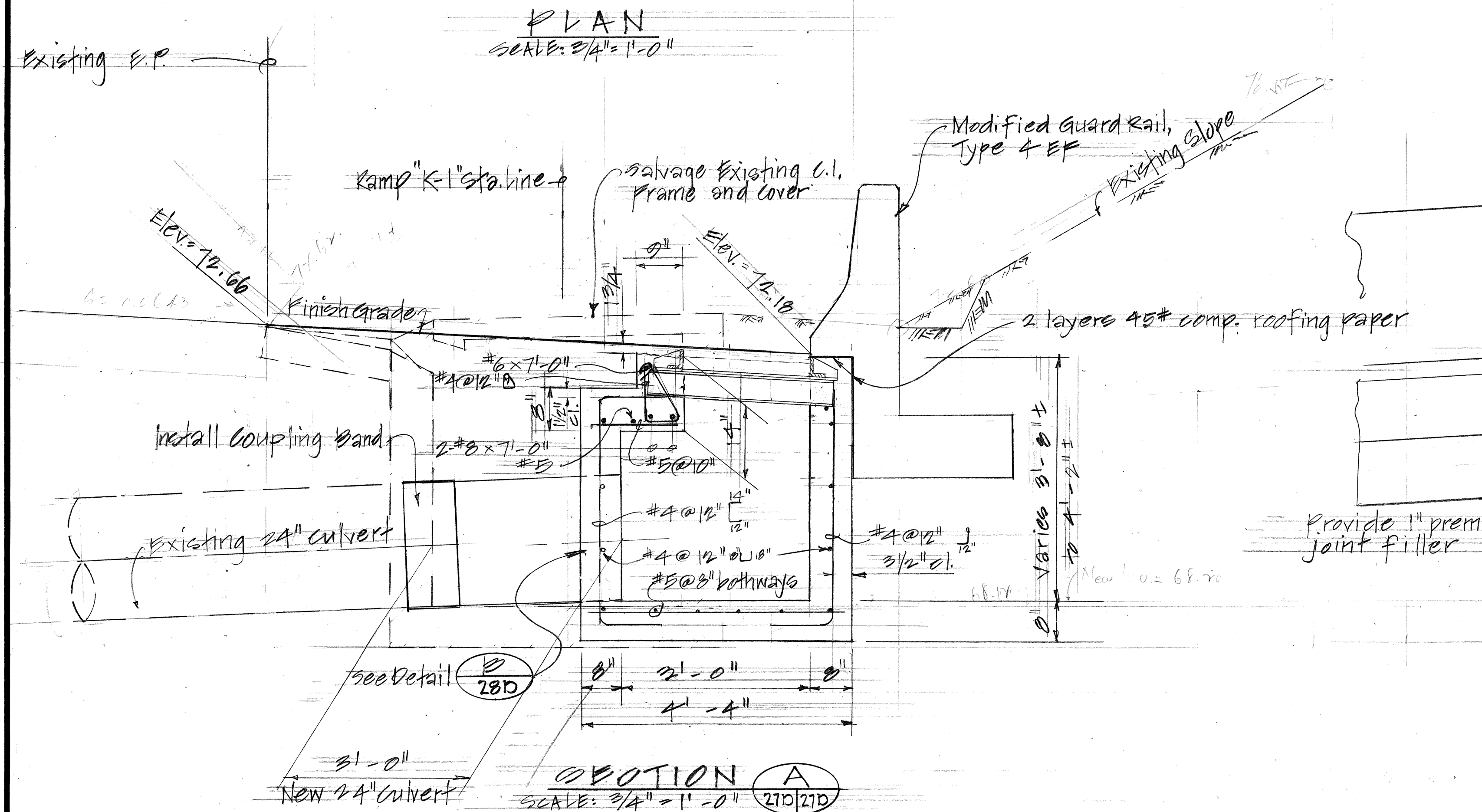
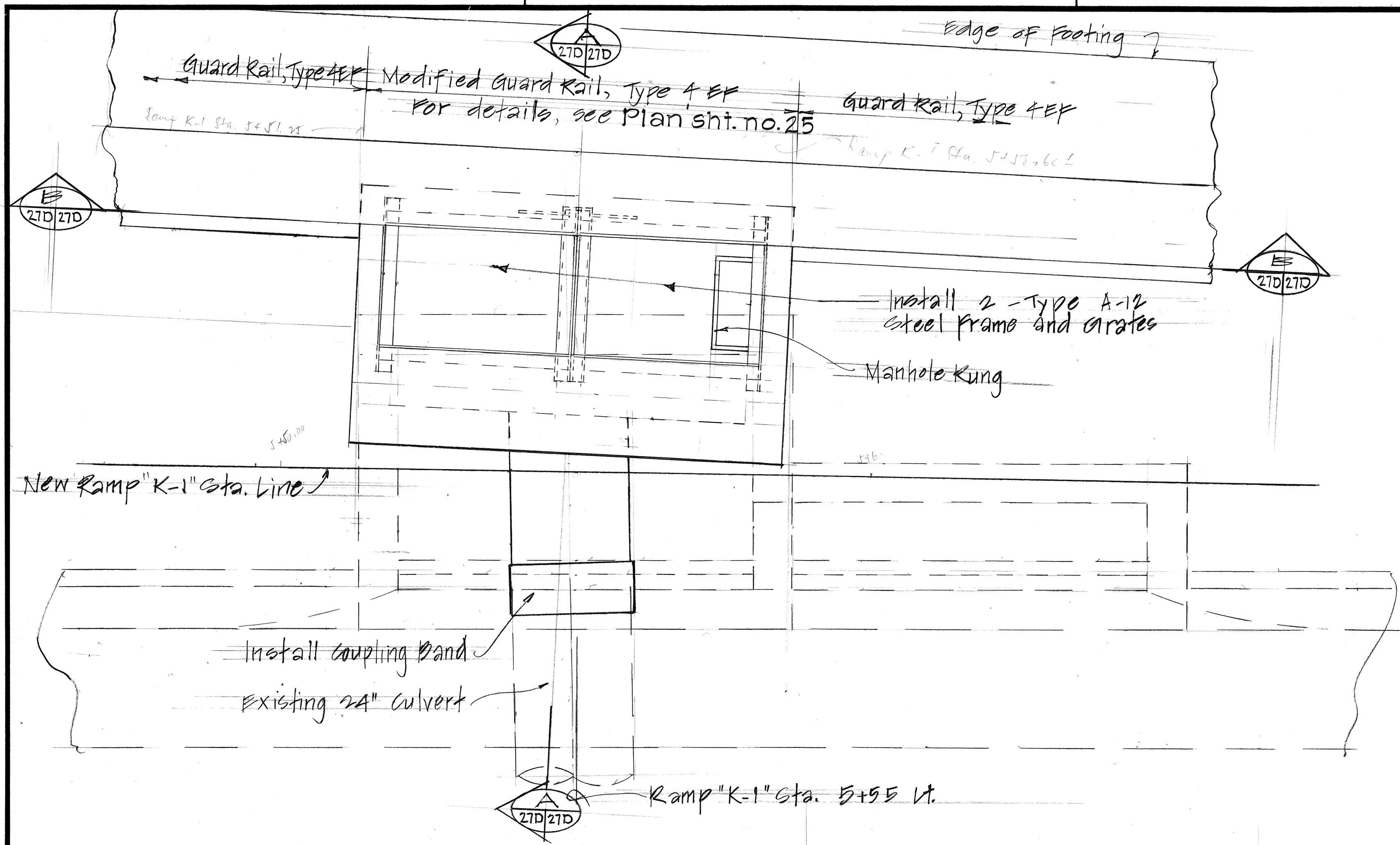
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: AS NOTED DATE: JUNE 1983
SHEET NO. 26 OF 30 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	75	197



DETAILS OF TYPE 2 G.D.I. #51 AT RAMP "K-1" STA. 5+55± LT.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

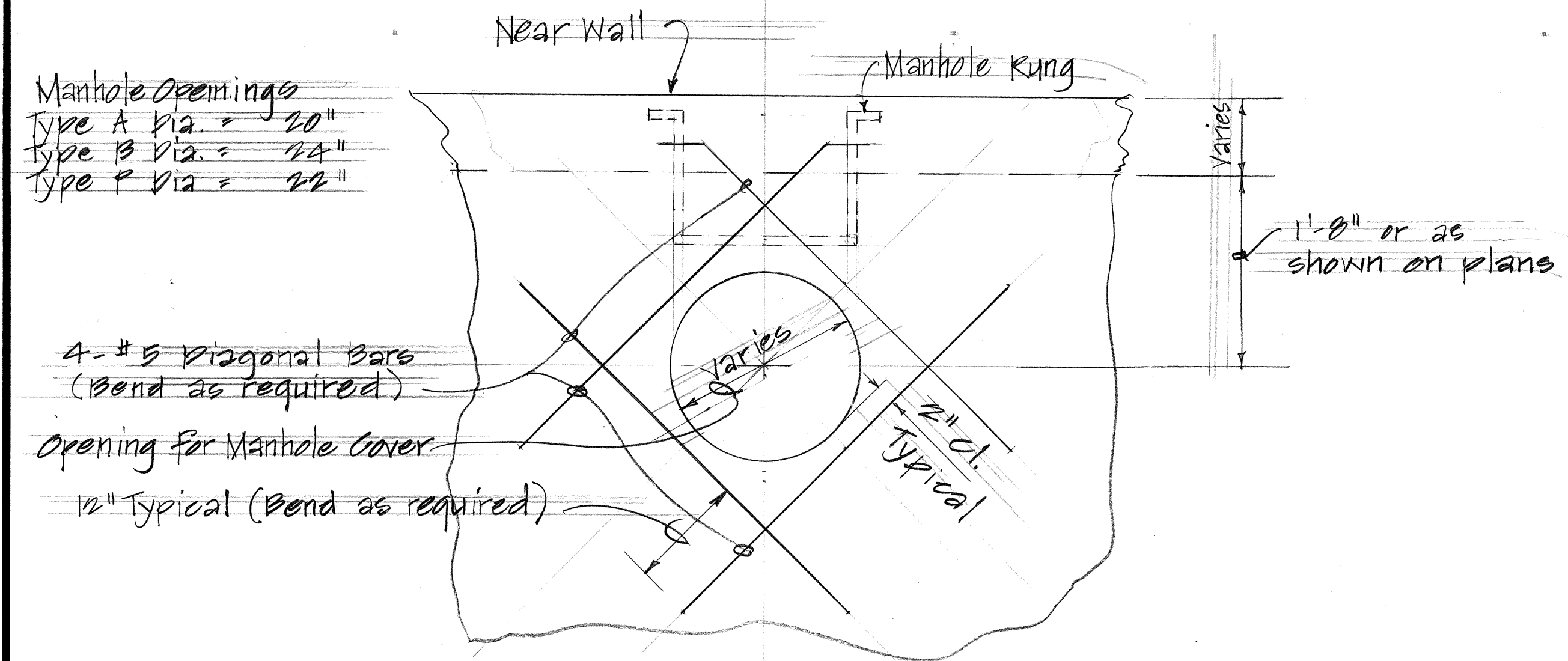
DRAINAGE DETAILS
INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 3/4" = 1'-0"
SHEET No. 27 OF 30 SHEETS

DATE: JUNE 1983

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

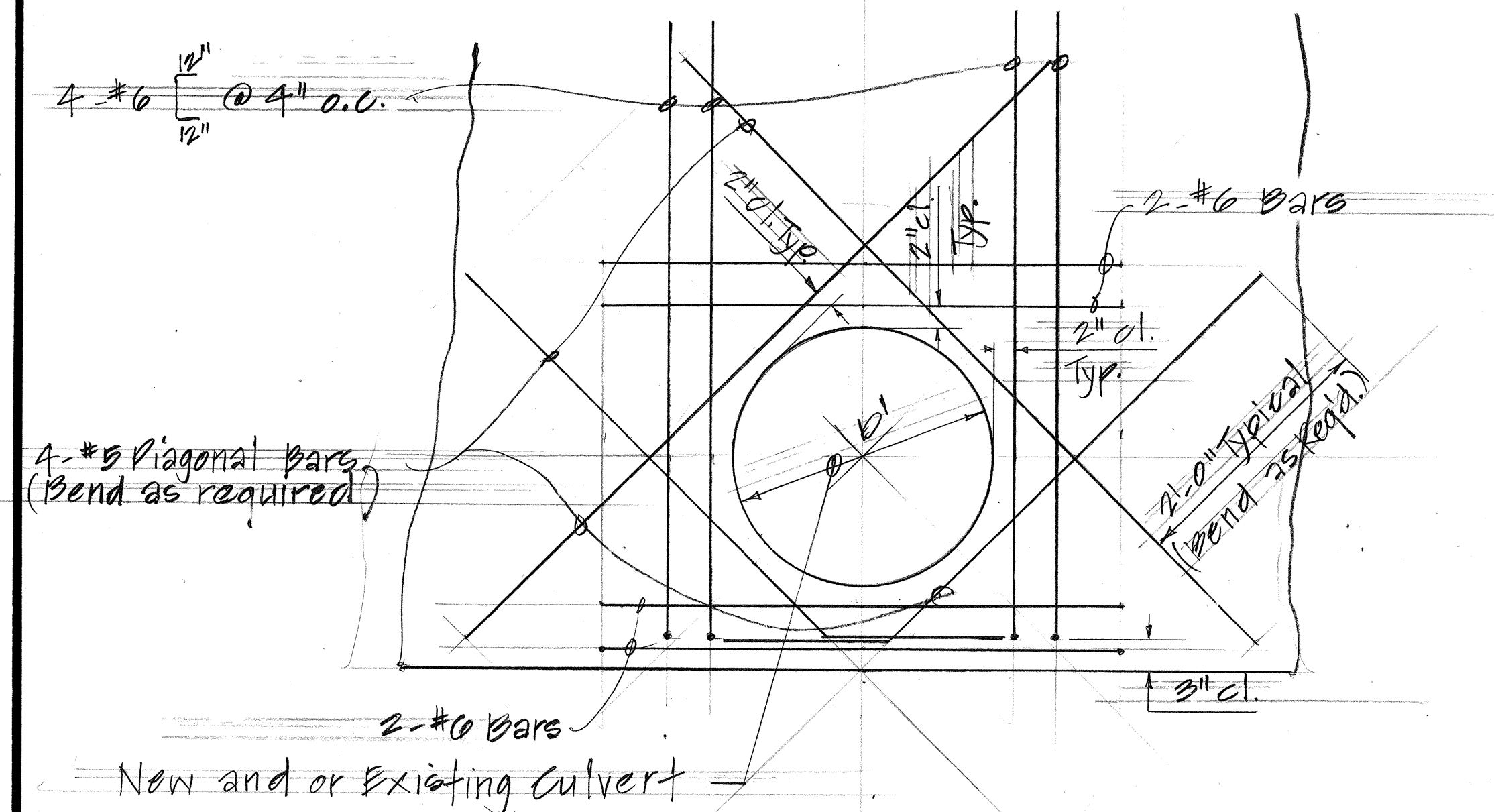
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	76	137



ADDED REINFORCING FOR MANHOLE OPENINGS

A
28D

SCALE: 1" = 1'-0"



ADDED REINFORCING FOR CULVERT OPENINGS

B
28D

SCALE: 1" = 1'-0"

ORIGINAL PLAN	DATE
DESIGNED BY	
NOTED BY	
CHECKED BY	
DATE	

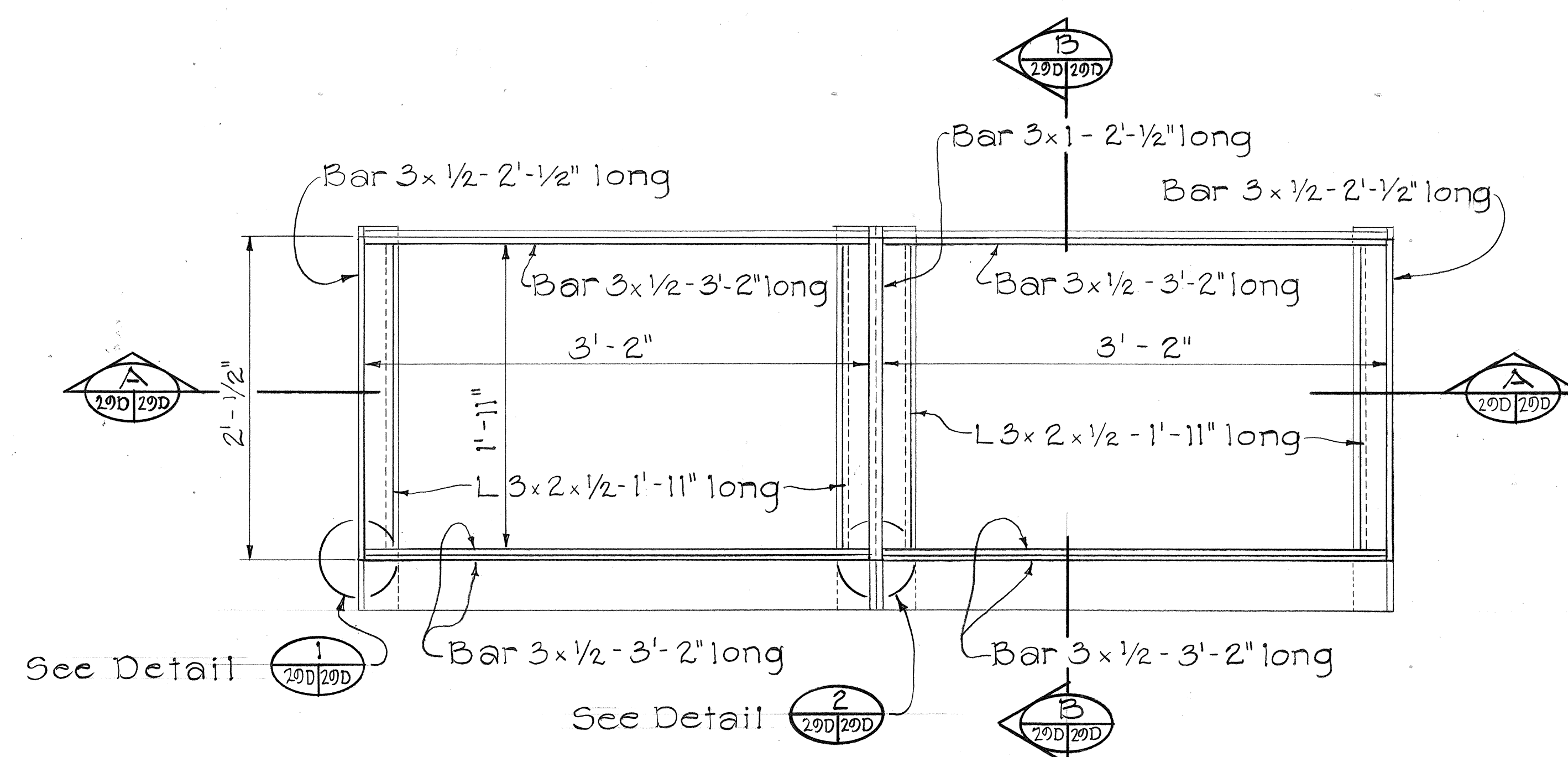
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION

DRAINAGE DETAILS

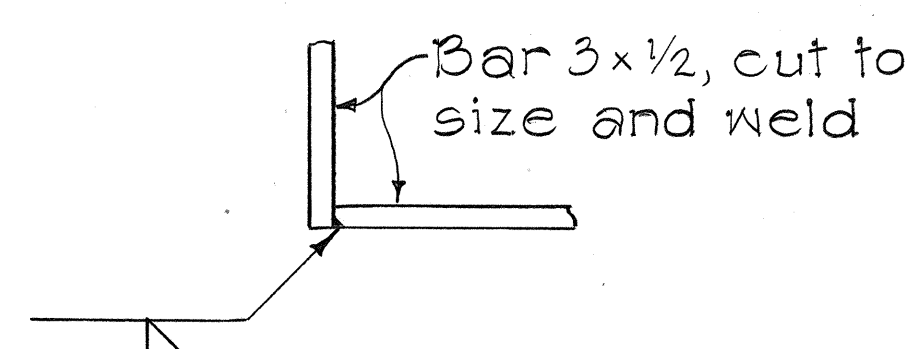
INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 1" = 1'-0" DATE: JUNE 1983
SHEET NO. 28 OF 30 SHEETS

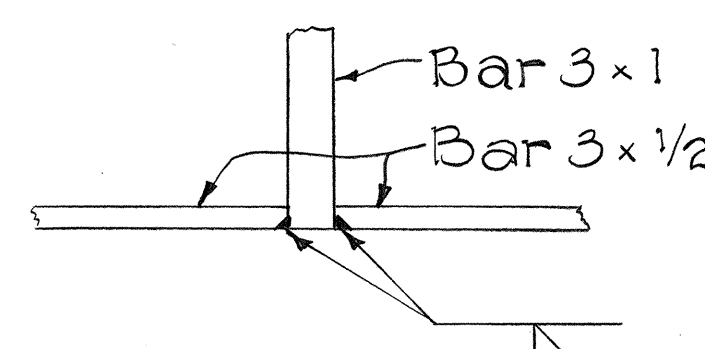
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	77	197



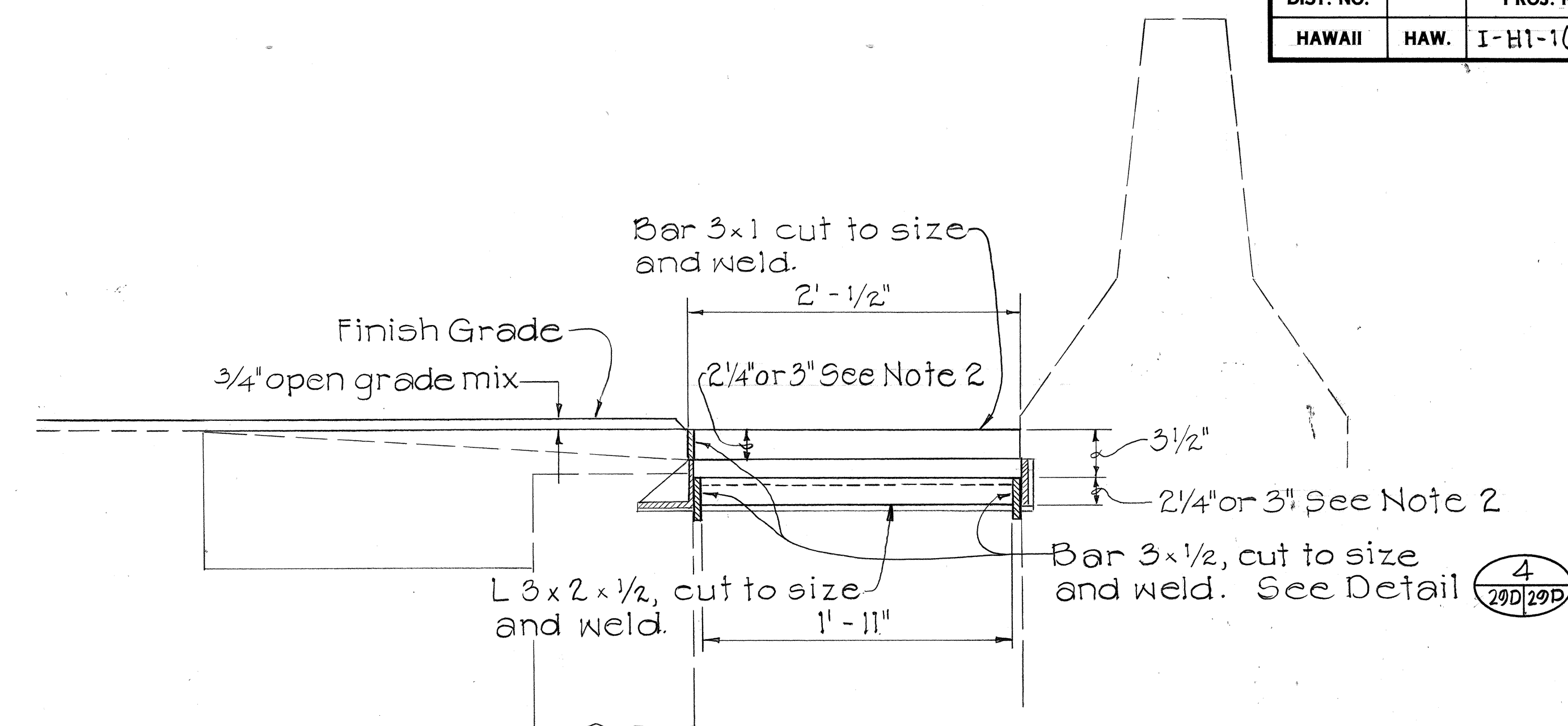
PLAN



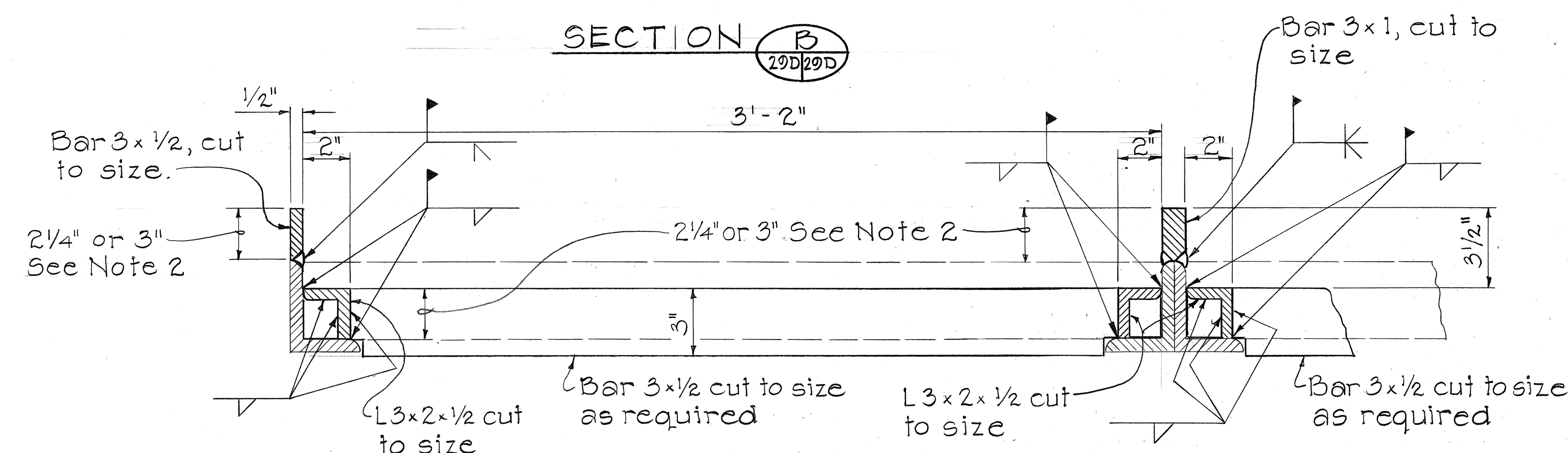
DETAIL 1
Scale: 3" = 1'-0"



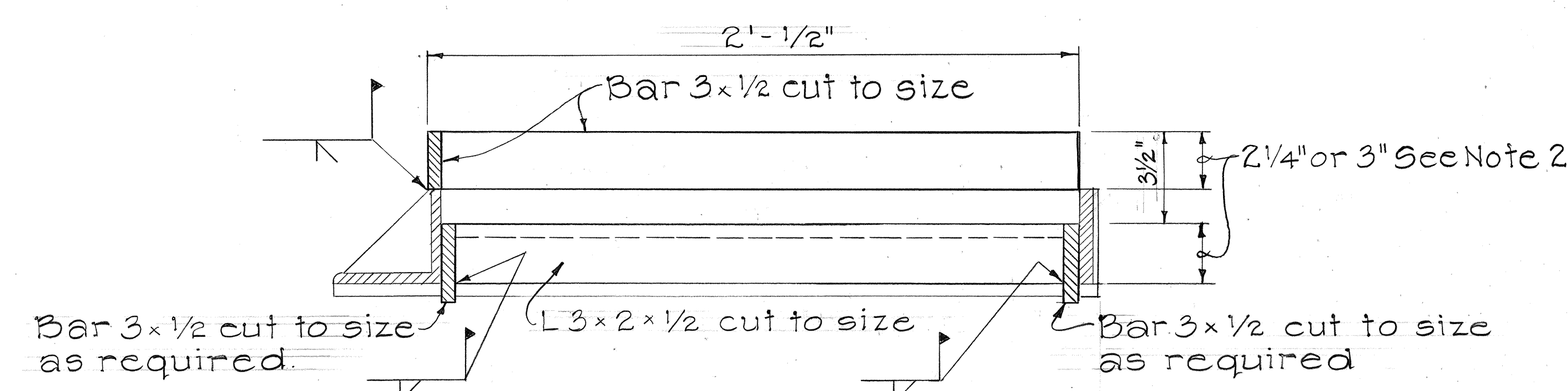
DETAIL 2
Scale: 3" = 1'-0"



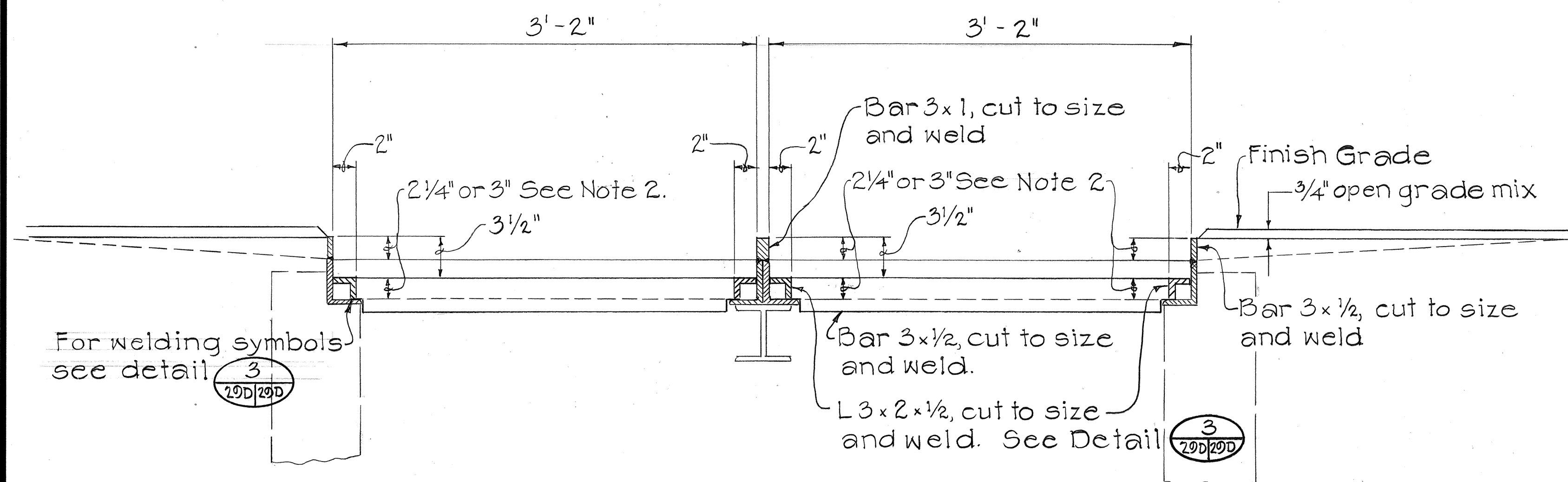
SECTION B-B



DETAIL 3
Scale: 3" = 1'-0"



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



SECTION A-A

NOTES:

1. All fillet welds, 5/16"
2. Height of adjustment varies. For structures located between Middle St. and Kalihi Stream adjustment shall be 2 1/4". For structures located between Kalihi Stream and Kalihi Interchange adjustment shall be 3".

DETAILS TO ADJUST MEDIAN G.D.I. FRAMES AND GRATES
Scale: 1 1/2" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

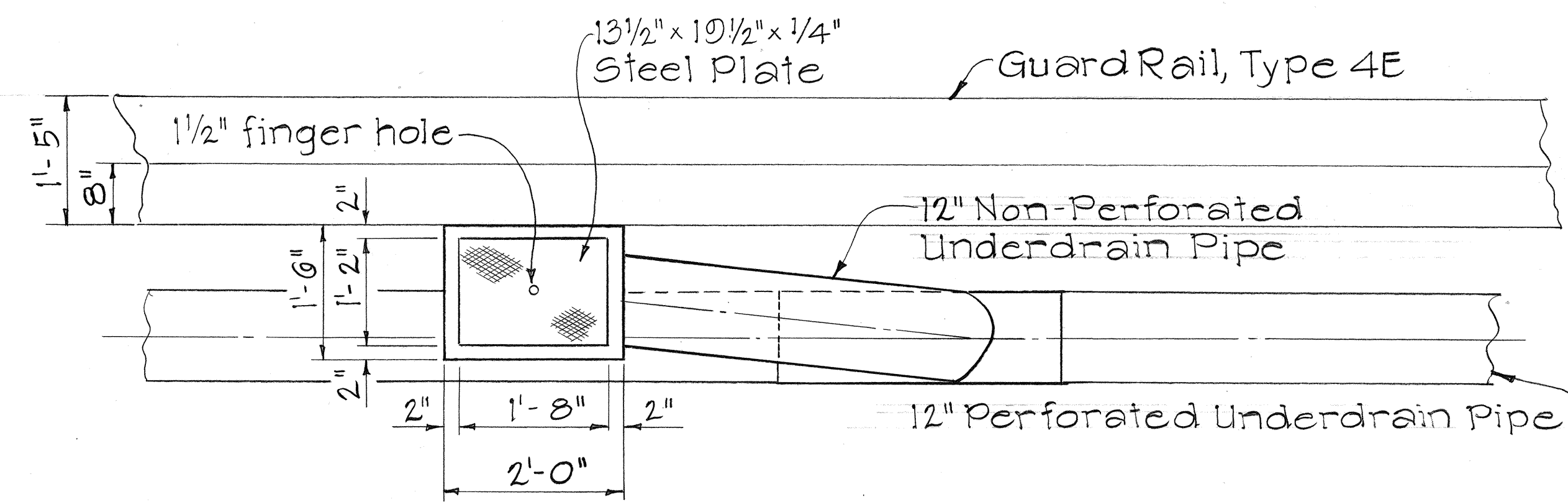
DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

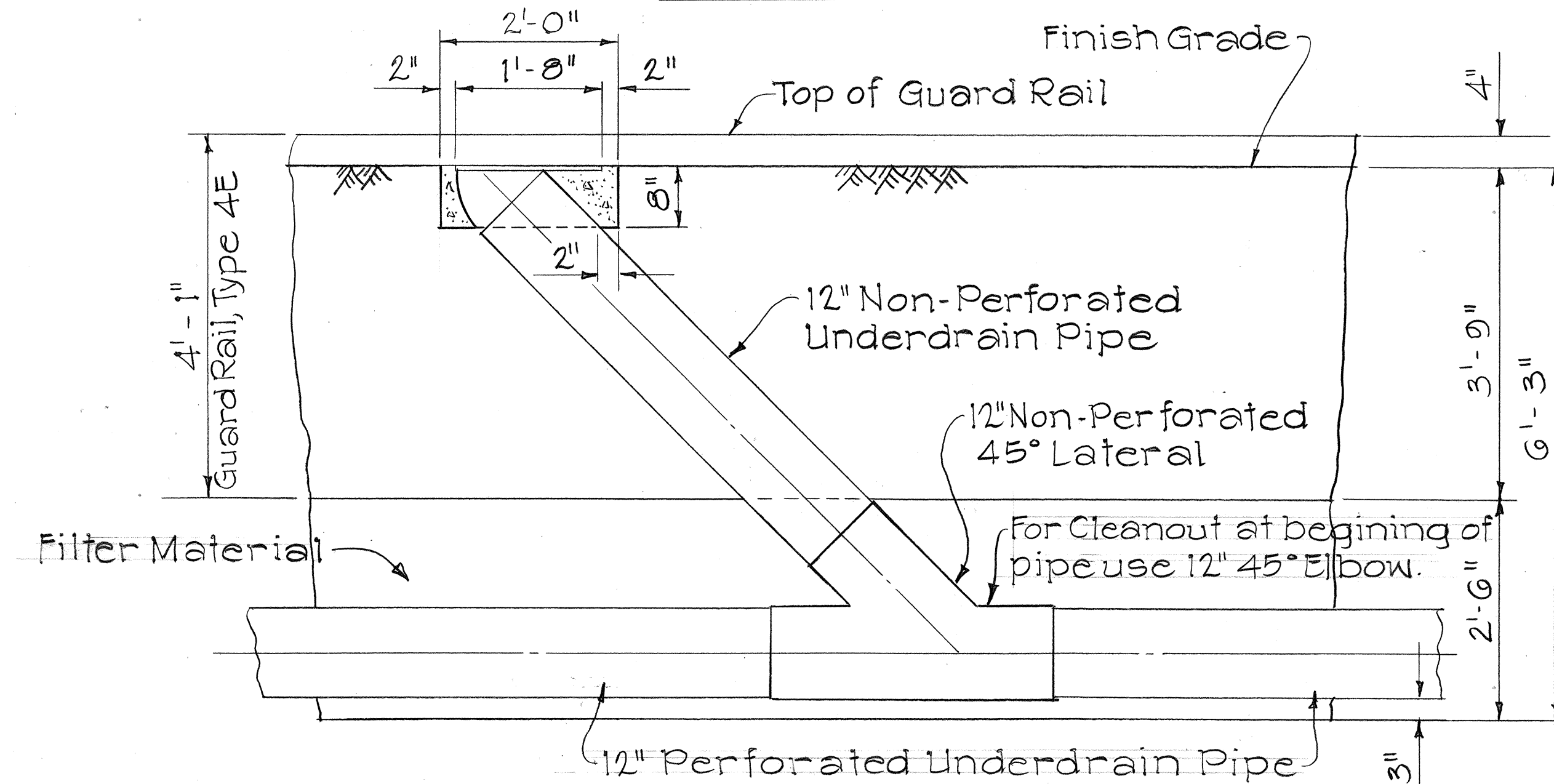
SCALE: AS NOTED DATE: JUNE 1983
SHEET NO. 20 OF 39 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
CHECKED BY	
NOTE BOOK	
QUANTITIES BY	
CHECKED BY	

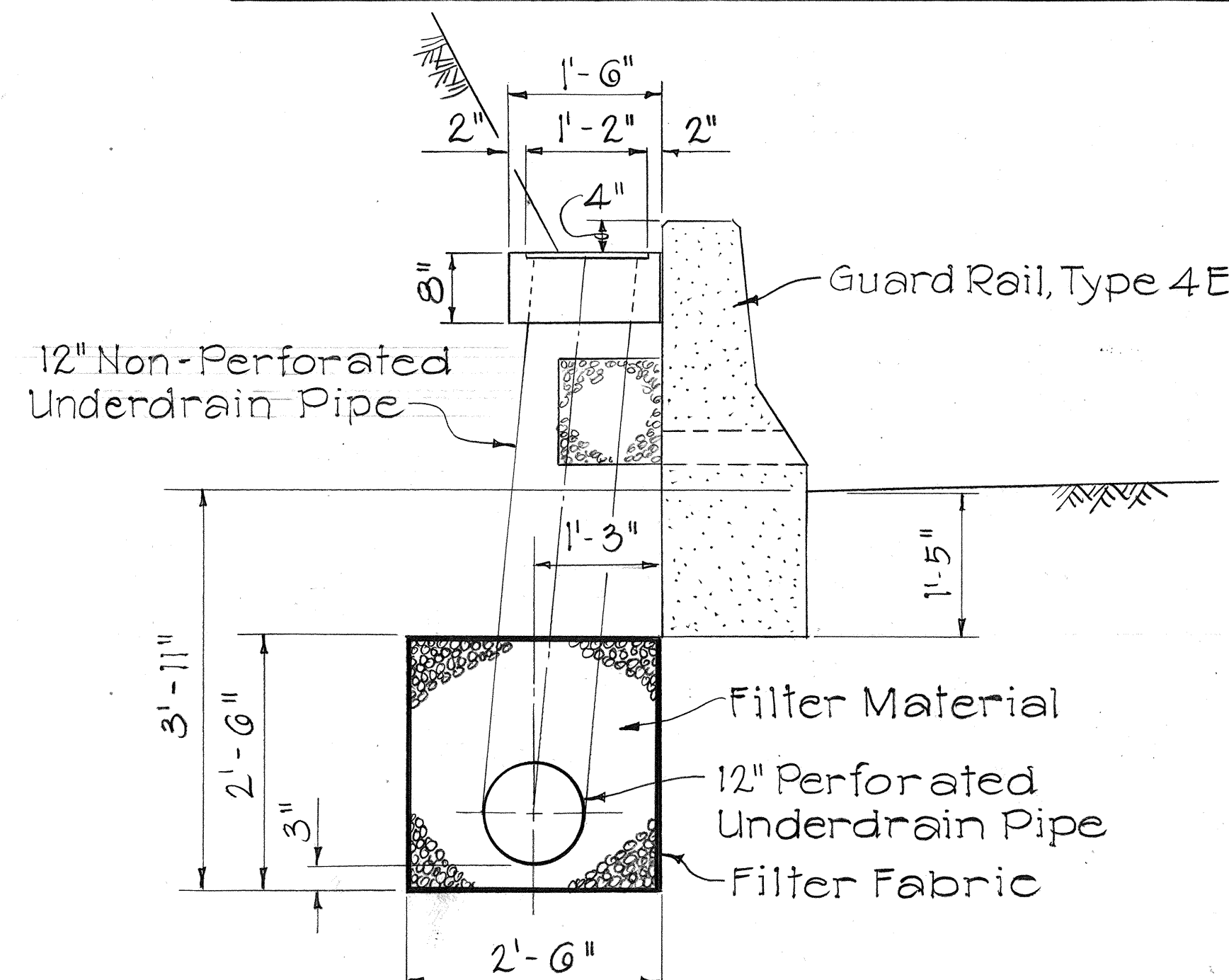
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	78	197



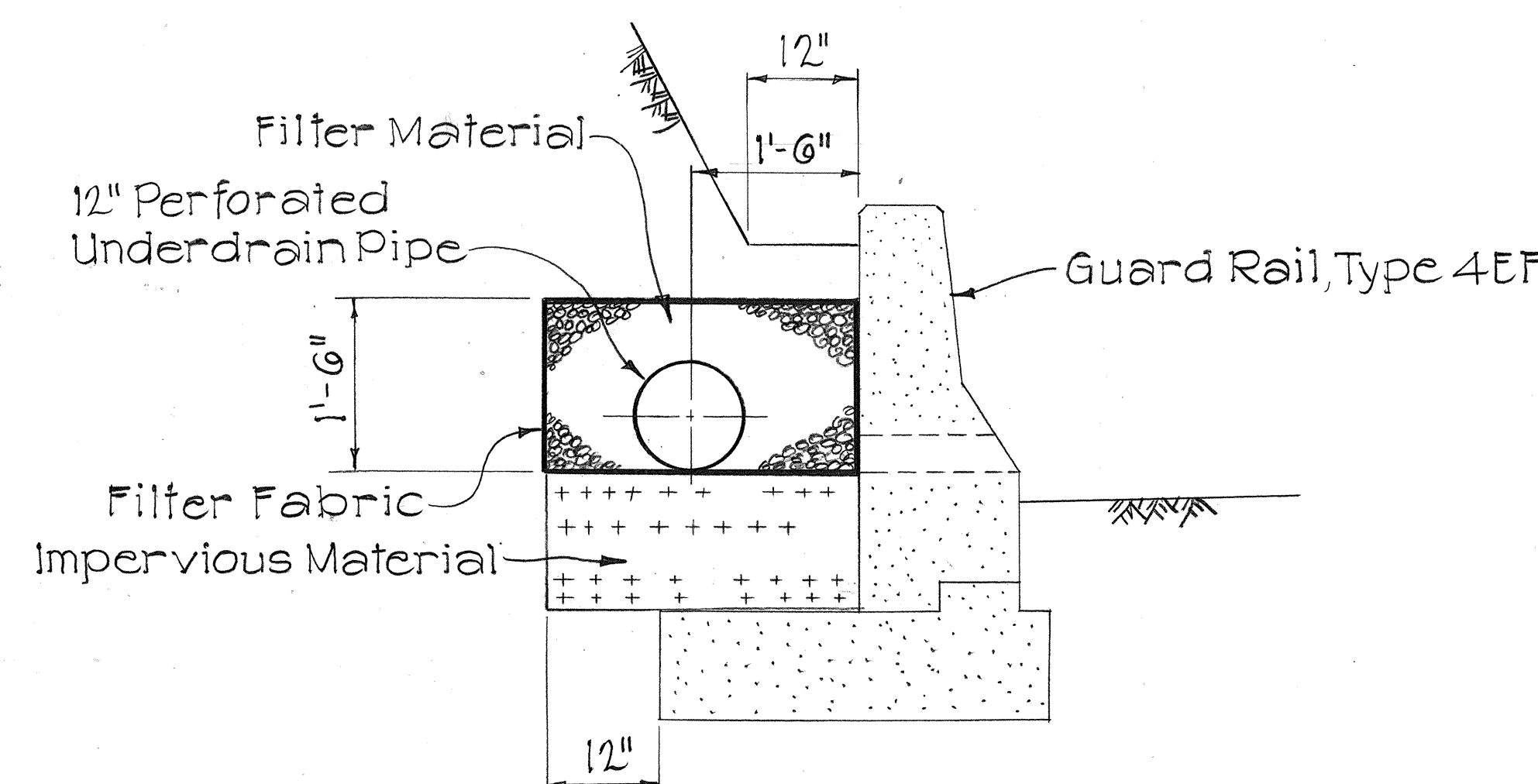
PLAN



CLEANOUT AT INTERMEDIATE POINTS



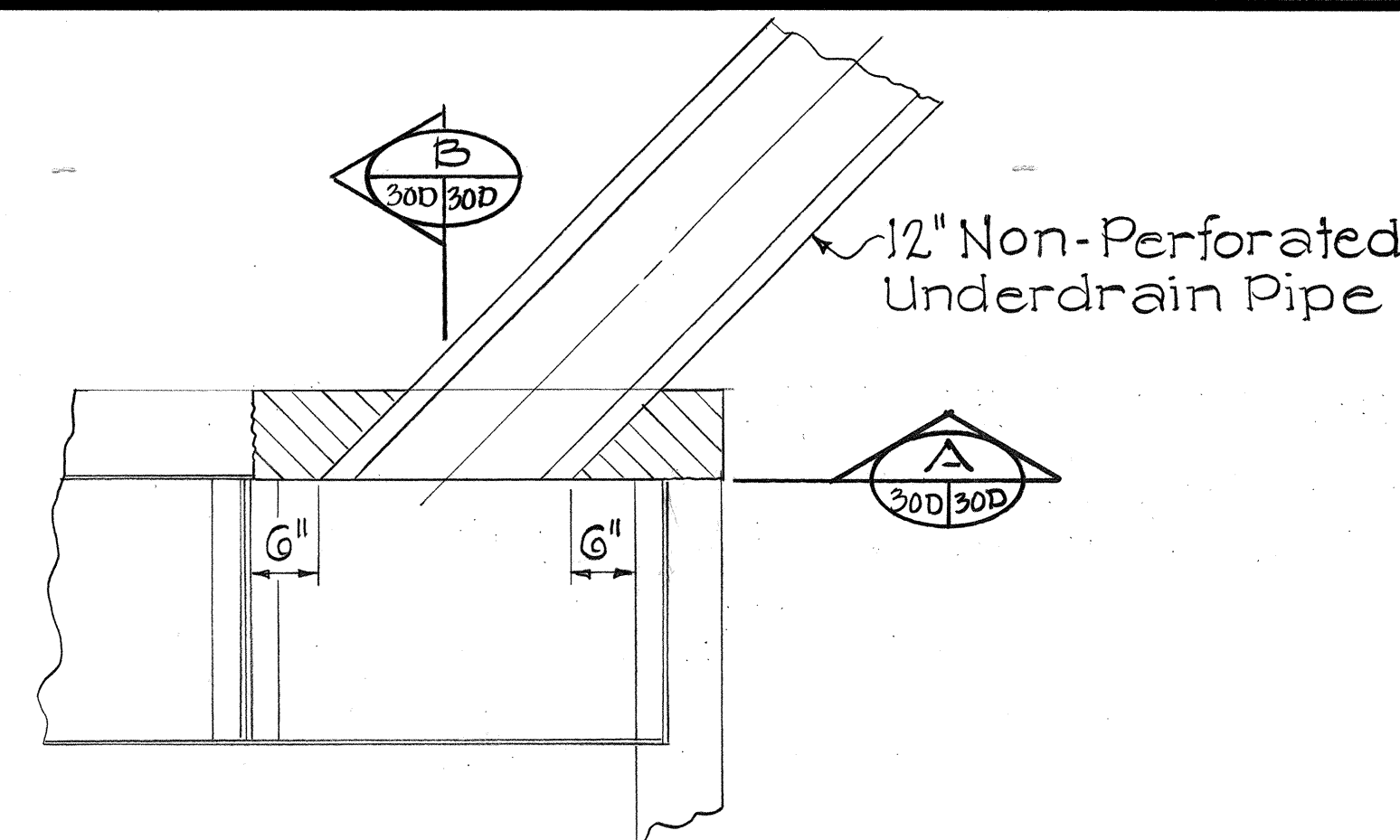
UNDERDRAIN ALONG GUARDRAIL TYPE 4E



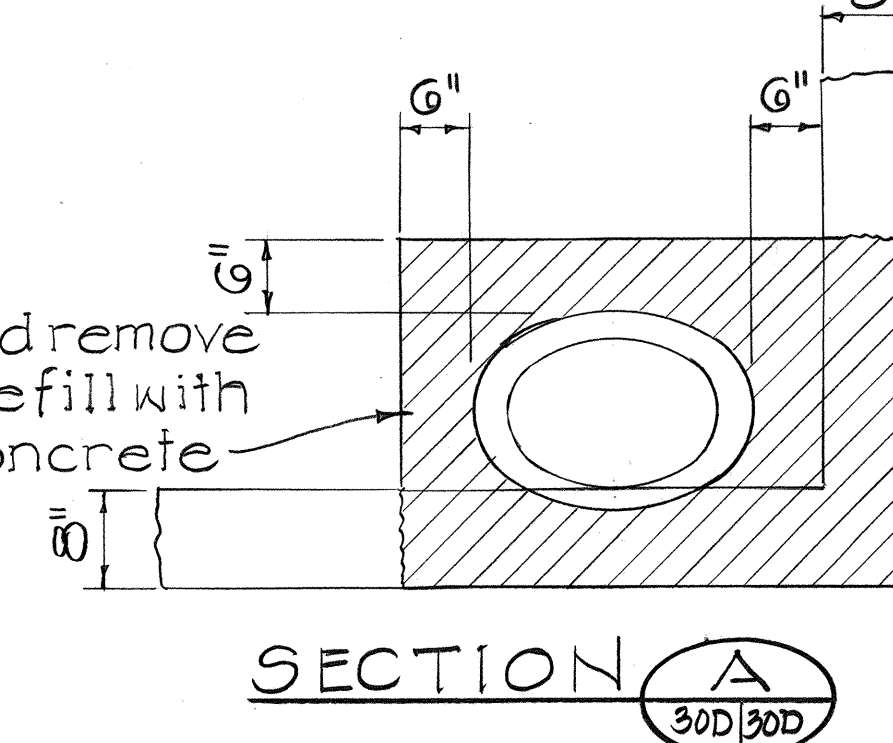
UNDERDRAIN ALONG GUARDRAIL TYPE 4EF

DETAIL FOR UNDERDRAIN PIPE SYSTEM

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

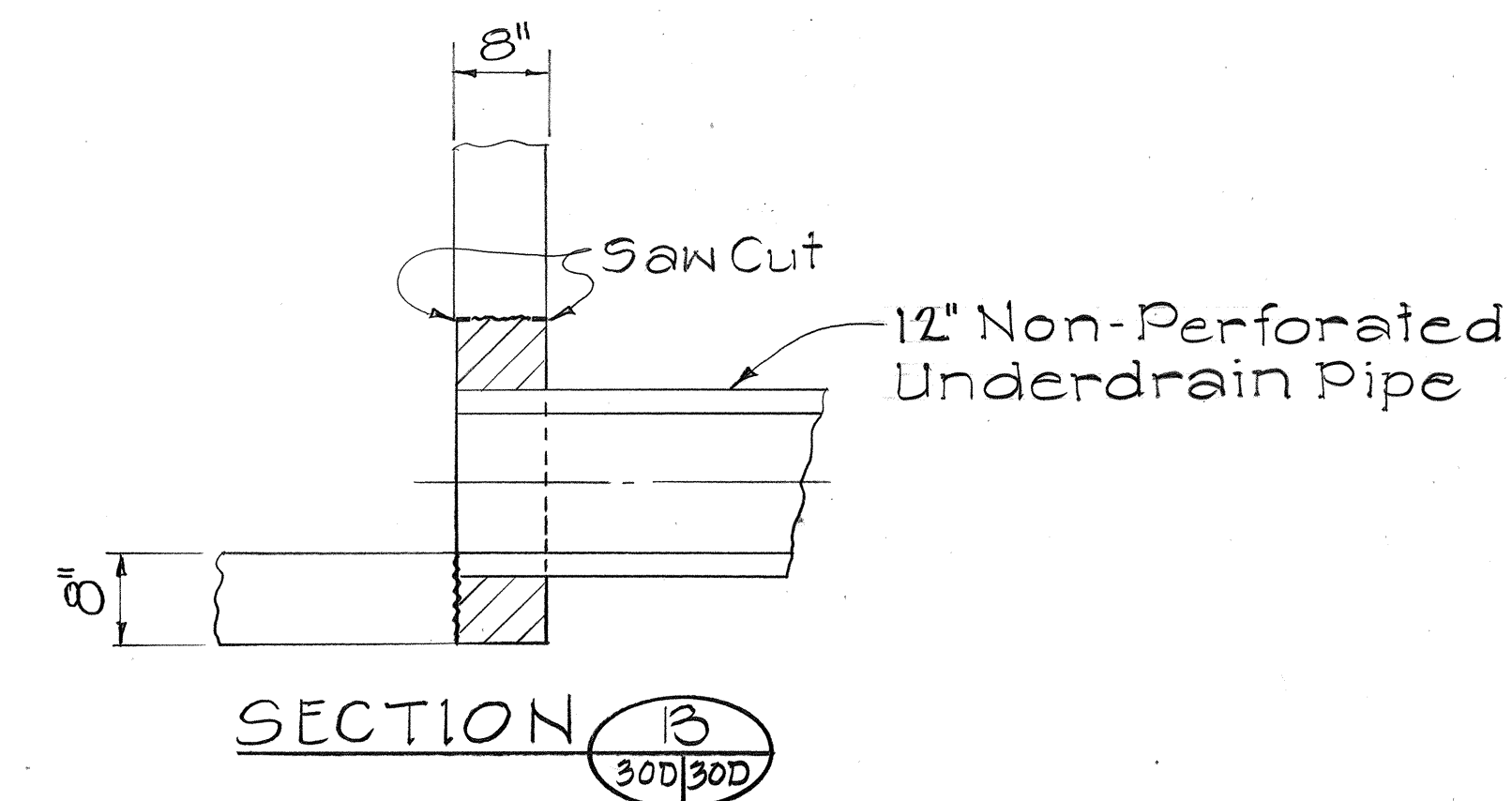


PLAN

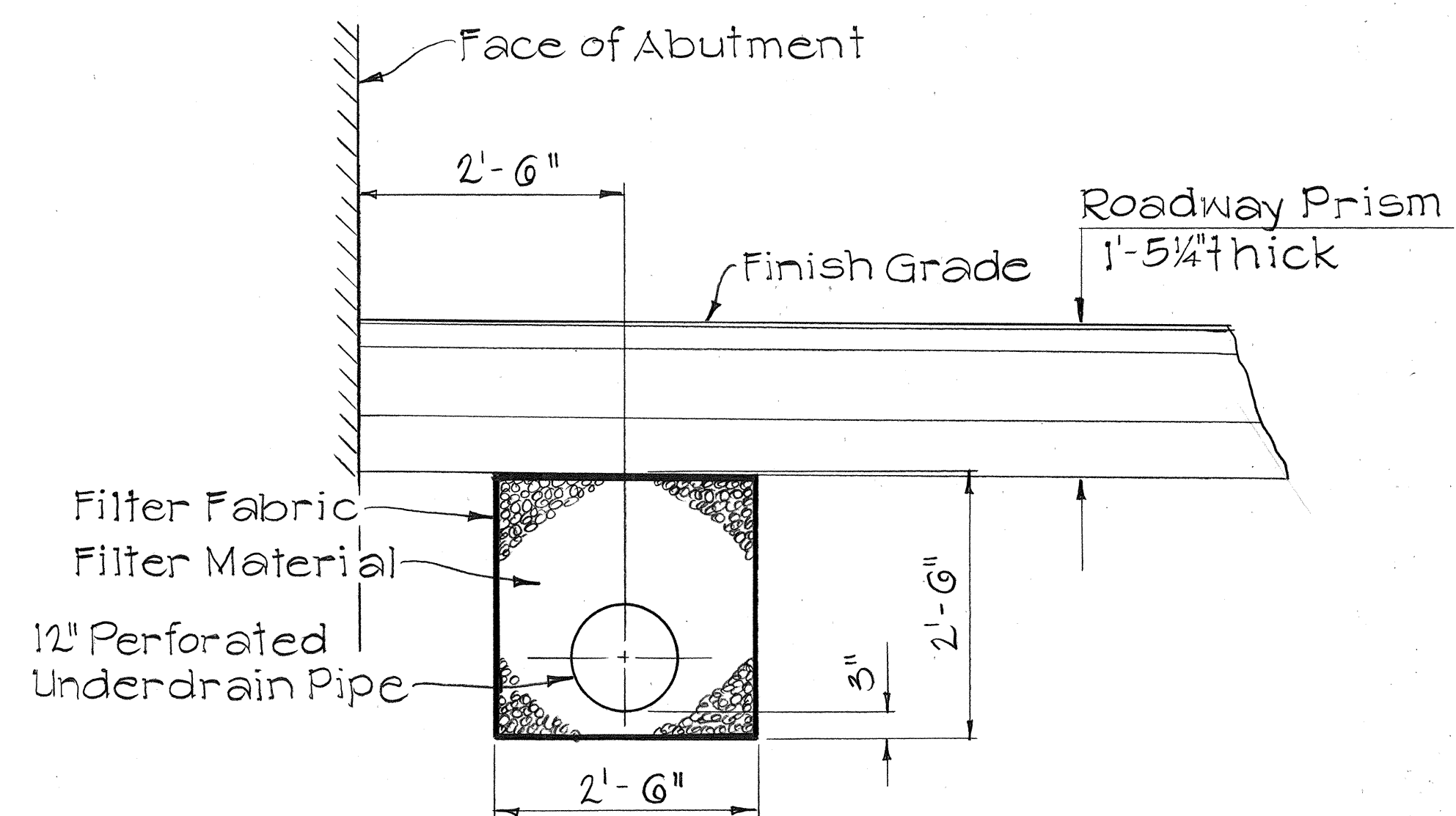


SECTION A

DETAIL OF UNDERDRAIN CONNECTION TO EXISTING G.O.I.



SECTION B



UNDERDRAIN ALONG GULICK OVERPASS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

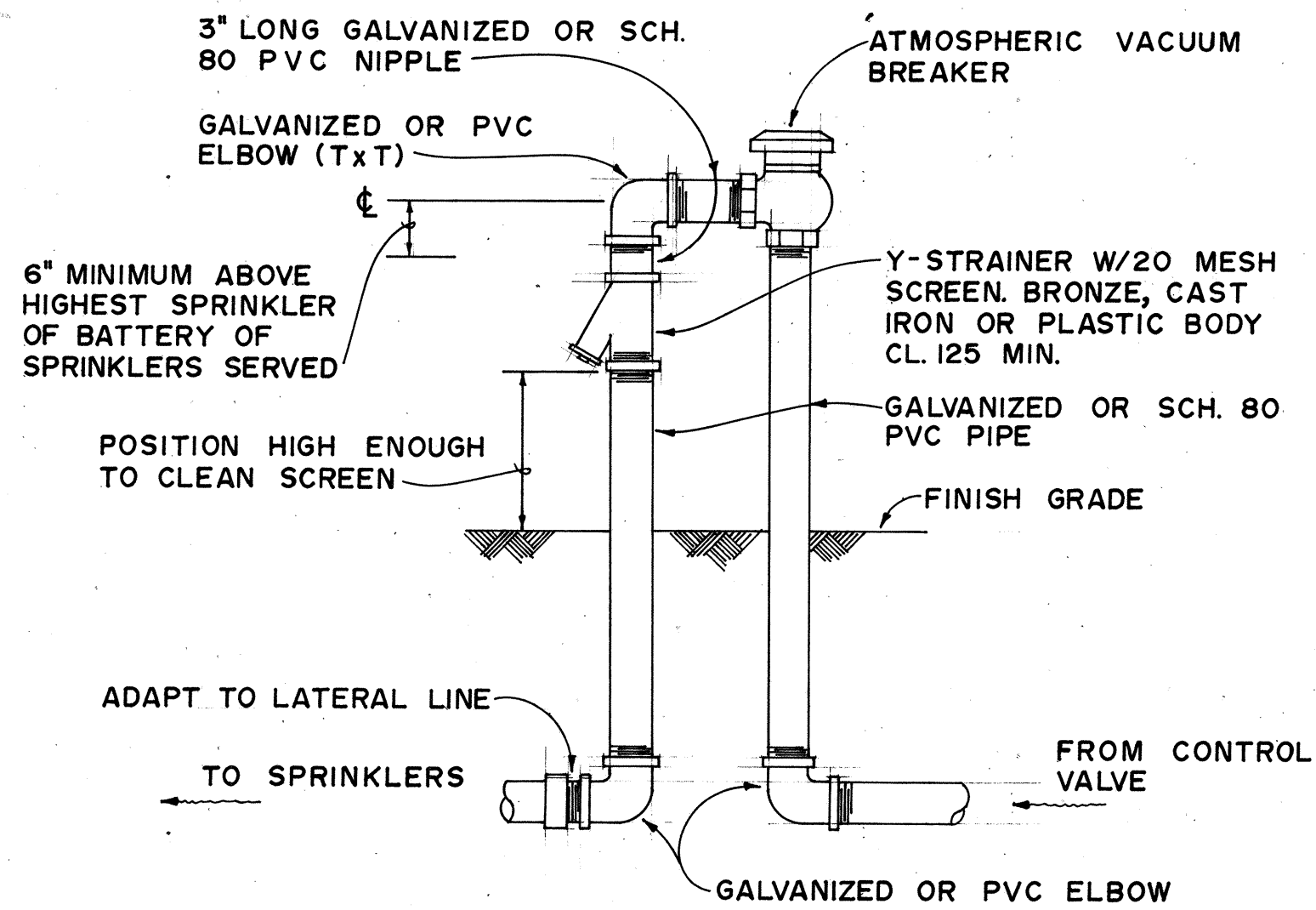
DRAINAGE DETAILS

INTERSTATE ROUTE H-1 IMPROVEMENTS
MIDDLE STREET TO KALIHI INTERCHANGE
WESTBOUND LANES
F.A.I. PROJ. NO. I-HI-1(187)

SCALE: 3/4" = 1'-0" DATE: JUNE 1983

SHEET NO. 30 OF 30 SHEETS

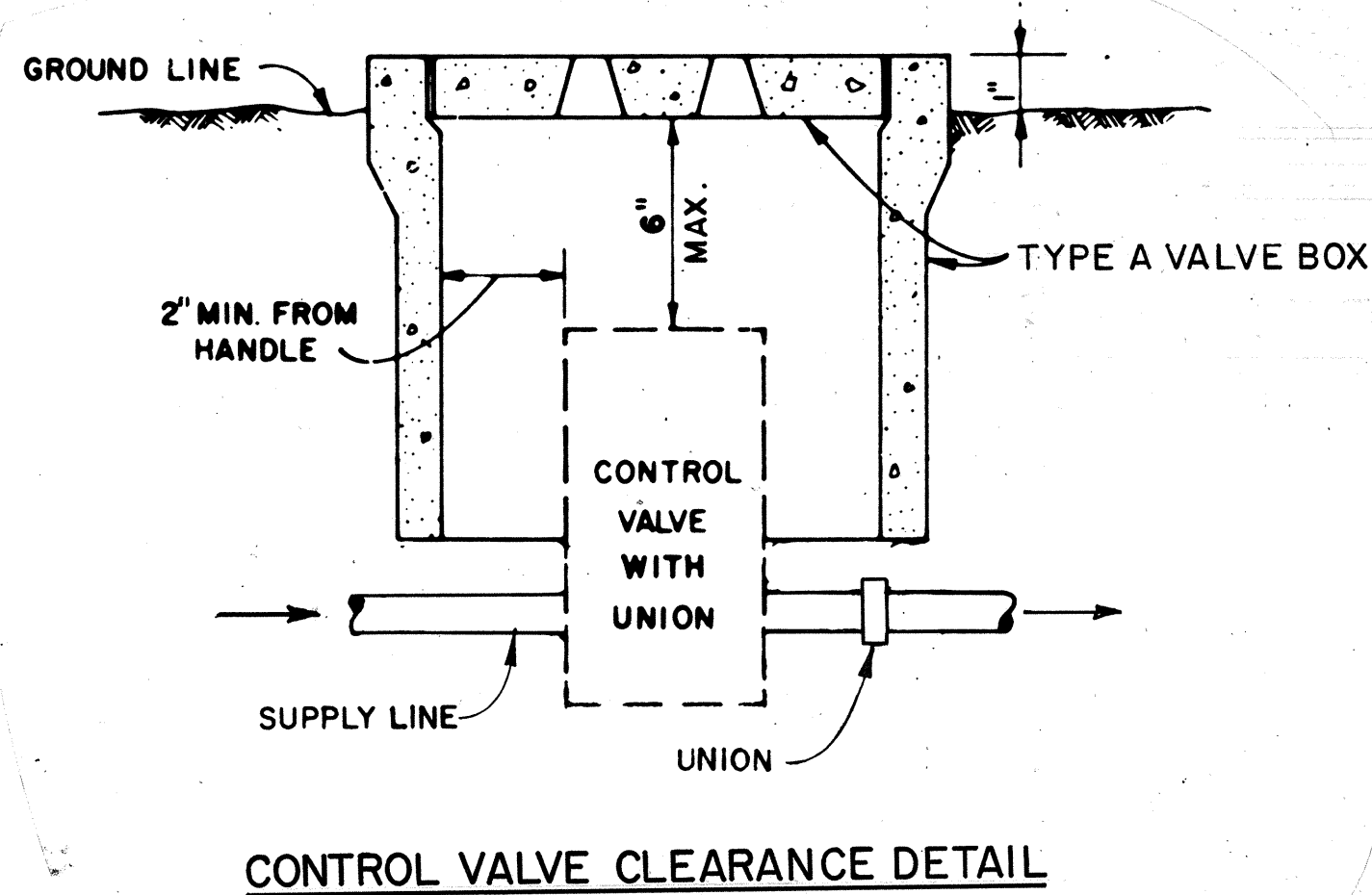
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	70	197



ATMOSPHERIC VACUUM BREAKER UNIT DETAIL

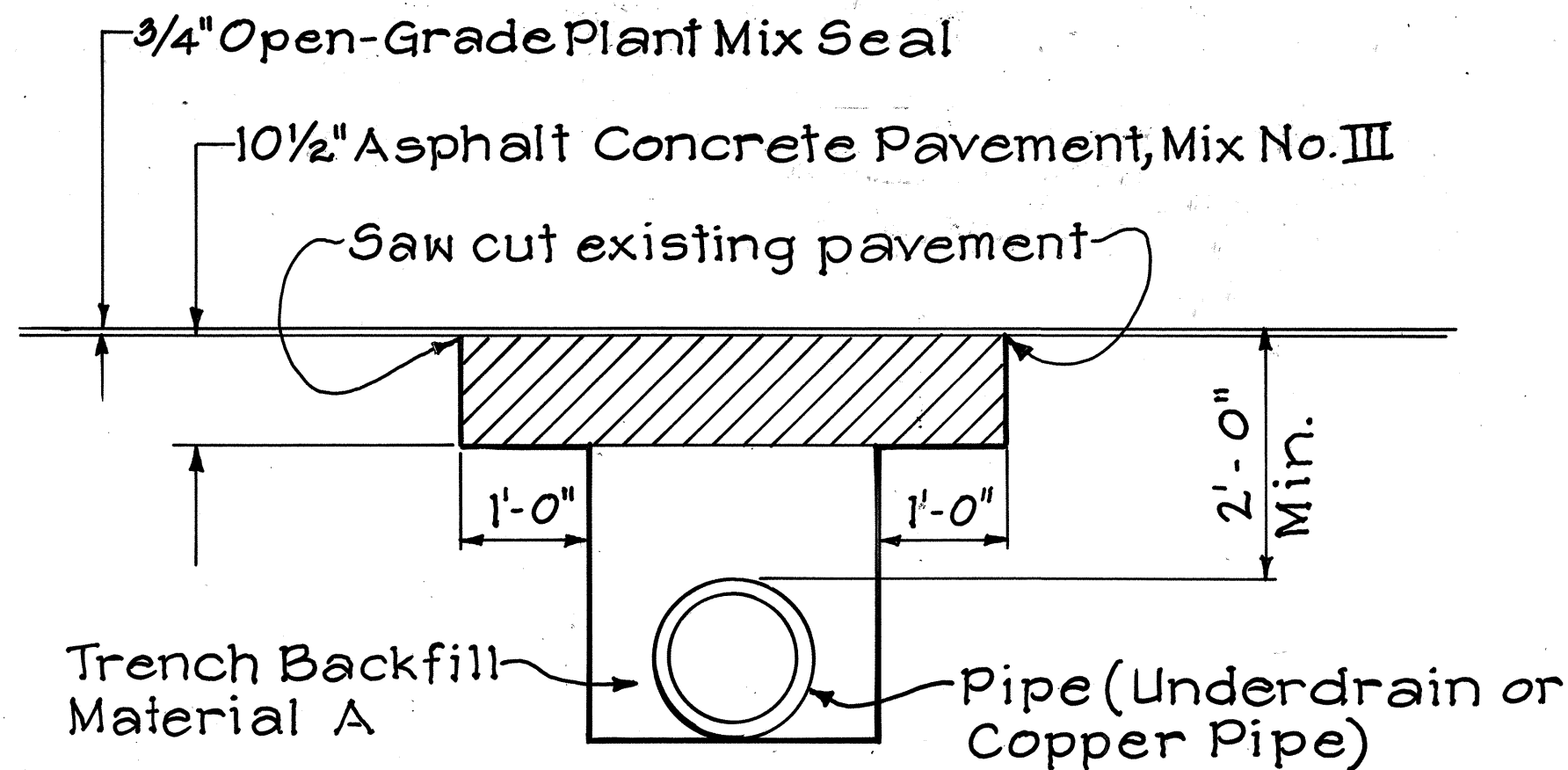
NOTES:

1. ATMOSPHERIC VACUUM BREAKER, Y-STRAINER AND PIPE ABOVE FINISH GRADE SHALL BE PRIME COATED AND PAINTED WITH TWO COATS OF DARK GREEN ENAMEL PAINT.
2. GALVANIZED PIPE BELOW FINISH GRADE SHALL BE PAINTED WITH TWO COATS OF ASPHALT PAINT.



ESTIMATED QUANTITIES FOR SPRINKLER SYSTEM

Relocation of Existing Sprinkler Lines	= 88 L.F.
Relocating Existing Valve with Valve Box	= 3 Ea.
2 1/2 - Inch Copper Pipe	= 40 L.F.
2 1/2 - Inch Galvanized Steel Pipe, Copper Pipe or PVC Pipe	= 20 L.F.
2 - Inch Atmospheric Vacuum Breaker Unit	= 1 Ea.
1/2 - Inch PVC Pipe	= 260 L.F.
3/4 - Inch Copper Pipe or PVC Pipe	= 180 L.F.
1 - Inch Copper Pipe or PVC Pipe	= 100 L.F.
1 1/4 - Inch Copper Pipe or PVC Pipe	= 100 L.F.
1 1/2 - Inch Copper Pipe or PVC Pipe	= 40 L.F.
2 - Inch Copper Pipe or PVC Pipe	= 100 L.F.
S-12 (Q, H, F) Sprinkler Head	= 20 Ea.
I-35 (Q, H, F) Sprinkler Head	= 4 Ea.
Emitter with 6 Multiple Outlets at 1 gph/outlet	= 8 Ea.



TRENCH DETAIL ROADWAY CROSSING

NOTE:

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

1. The materials and construction requirements for pavement restoration shall conform to the applicable sections of the Standard Specifications. Payment for pavement restoration and other improvements shall be considered incidental to the various contract items.
2. The width of the trench shall be as narrow as practical to facilitate installation, approximately twice the outside diameter of the pipe with a minimum of 8 inches.

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

11/30/83 New items added to Estimated Quantities for Sprinkler System.

DATE REVISION

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION LAND TRANSPORTATION FACILITIES DIVISION	
SPRINKLER DETAILS	
INTERSTATE ROUTE H-1 IMPROVEMENTS MIDDLE STREET TO KALIHI INTERCHANGE WESTBOUND LANES F.A.I. PROJ. NO. I-HI-1(187)	
SCALE: AS NOTED	DATE: JUNE 1983
SHEET No. 31 OF 30 SHEETS	

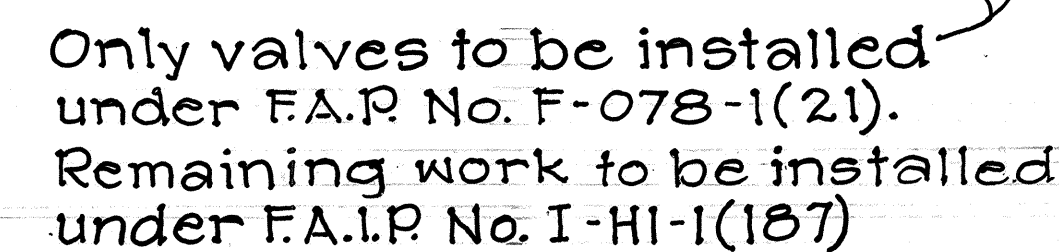
The diagram illustrates the layout of a trench for electrical conduits. It shows a main line trench and a lateral trench branching off. Key labels include:

- FINISH GRADE**: Indicated at the top of the trench sections.
- LATERAL**: Points to the branching trench.
- CONTROL WIRES (TAPE OR PLEAD WIRE AT INTERVALS)**: Points to small circles representing control wires.
- 120 VOLT CONDUIT WIRES**: Points to a larger circle representing a main conduit.
- MAIN LINE**: Points to the primary trench section.
- 6" FOR ROCK AREAS COMPACTED TRENCH BACKFILL CUSHION**: A dimension indicating the required backfill cushion in rock areas.
- 4" MINIMUM**: A dimension indicating the minimum width of the trench.
- LATERAL, MAIN LINE, ELECTRICAL CONDUIT OR CONTROL WIRE**: A bracketed label pointing to the various components within the trench.

 The diagram uses dashed lines to show the trench profile and solid lines for the ground surface. Arrows indicate the direction of the main line and lateral connections.

NOTES:

1. PIPES UNDER ROADWAY SHALL HAVE MINIMUM COVER OF 24 INCHES AND SHALL NOT BE IN THE ROADWAY STRUCTURE.
2. THERE SHALL BE A 3" MINIMUM CLEARANCE BETWEEN CONTROL WIRE BUNDLE, CONDUIT, MAIN AND LATERAL LINES.
3. THE WIDTH OF THE TRENCH SHALL BE AS NARROW AS PRACTICAL TO FACILITATE INSTALLATION. APPROXIMATELY TWICE THE OUTSIDE DIAMETER OF THE PIPE WITH A MINIMUM OF 8".



TRENCH DETAIL

True North

35' Typ.

1/4"

1"

3/4"

1/2"

1 1/2"

1"

3/4"

12' Typ.

10' 10" Typ.

WALKWAY/BIKEWAY

24 KAULA STREET 25

CC-3 3/4" C-2 1 1/2" C-3 2" C-1 1 1/2"

JET SPRINKLER

GALV. STEEL COUPLING

LOCATION OF EXISTING FIELD OFFICE AND PROJECT SITE LABORATORY

Approximately 500 feet west of the intersection of Kaula Street and Ala Mahalo Street.

Only valves to be installed under F.A.P. No. F-078-1(21). Remaining work to be installed under F.A.I.P. No. I-41-1(187)

Diagram illustrating the assembly of a tie rod for a manhole cover, showing the connection between the vertical pipe and the lateral line.

Components and Labels:

- JET SPRINKLER
- GALV. STEEL COUPLING
- GALV. STEEL PIPE
- 12 GA. TIE WIRE
- 36" NO. 4 REINFORCING BAR (TIE BAR)
- GROUND LINE
- PVC COUPLING
- PVC SCH. 40 STREET EL (TXT)
- PVC SCH. 40 90° EL (TXT)
- 4" L. PVC SCH. 80 NIPPLE
- 6" L. PVC SCH. 80 NIPPLE
- PVC SCH. 40 90° EL.
- LATERAL LINE

Dimensions:

- 24"
- 24"

Notes:

- Only valves to be used under F.A.P. No. Remaining work to be done under F.A.I.P. No.
- NOTE: This is done during the construction of the manhole.

A detailed cross-sectional diagram of a shrubbery sprinkler riser assembly. The assembly is shown vertically, starting from a horizontal lateral line at the bottom. A tee fitting (labeled 'TEE (SxSxT)') connects the riser to the lateral line. Above the tee, the riser consists of a '6" L. FLEXIBLE NIPPLE', a 'COUPLING', and a section of '1/2" SCH. 80 PVC OR GALV. RISER' pipe. The riser pipe has a break symbol (two parallel diagonal lines) indicating it continues upwards. At the top of the riser is a 'SHRUBBERY SPRINKLER' head. A dimension line indicates a height of '18" N' (feet) from the 'FINISH GRADE' to the top of the riser pipe. The ground surface is represented by a wavy line labeled 'FINISH GRADE'. A small rectangular box is present in the upper left corner of the diagram area.

Diagram illustrating the Emitter (Multiple Outlet) Detail. The assembly consists of the following components, labeled from top to bottom:

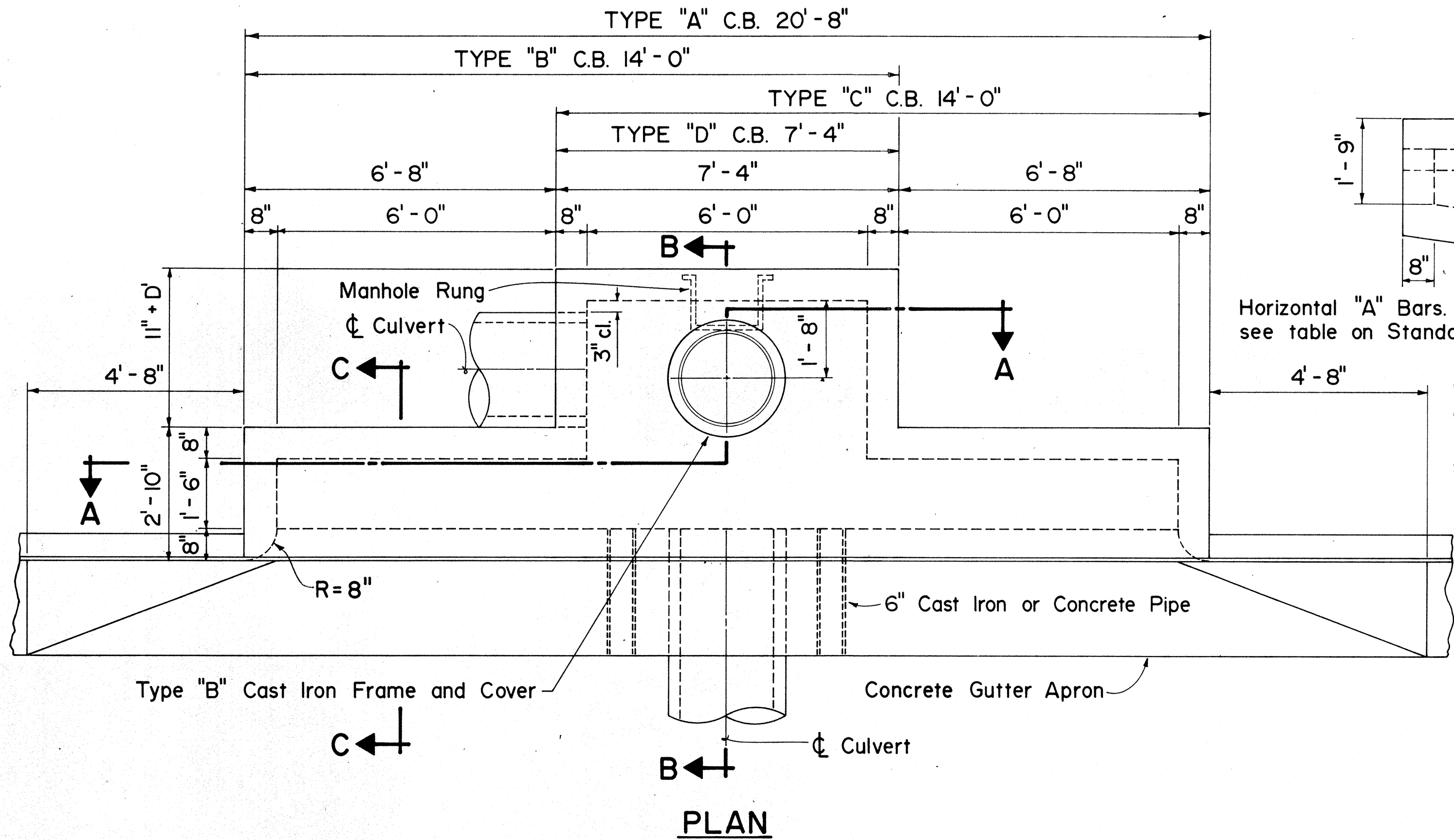
- 3'-0" EMITTER DISTRIBUTION TUBING**: The main horizontal pipe at the surface, with an **INSECT OR BUG CAP AT END**.
- MULTIPLE OUTLET EMITTER**: The vertical riser pipe with multiple outlets.
- 1/2" SCH 80 PVC RISER**: The vertical pipe section above the ground.
- FINISH GRADE**: The ground surface level.
- 1/2" PVC COUPLING**: The connection between the riser and the flexible nipple.
- 1/2" 6' L. FLEXIBLE NIPPLE**: The vertical pipe section below the ground.
- TEE (SxSxT)**: The T-junction connecting the riser to the lateral line.
- LATERAL LINE**: The main horizontal pipe below the ground.

EMITTER (MULTIPLE OUTLET) DETAIL

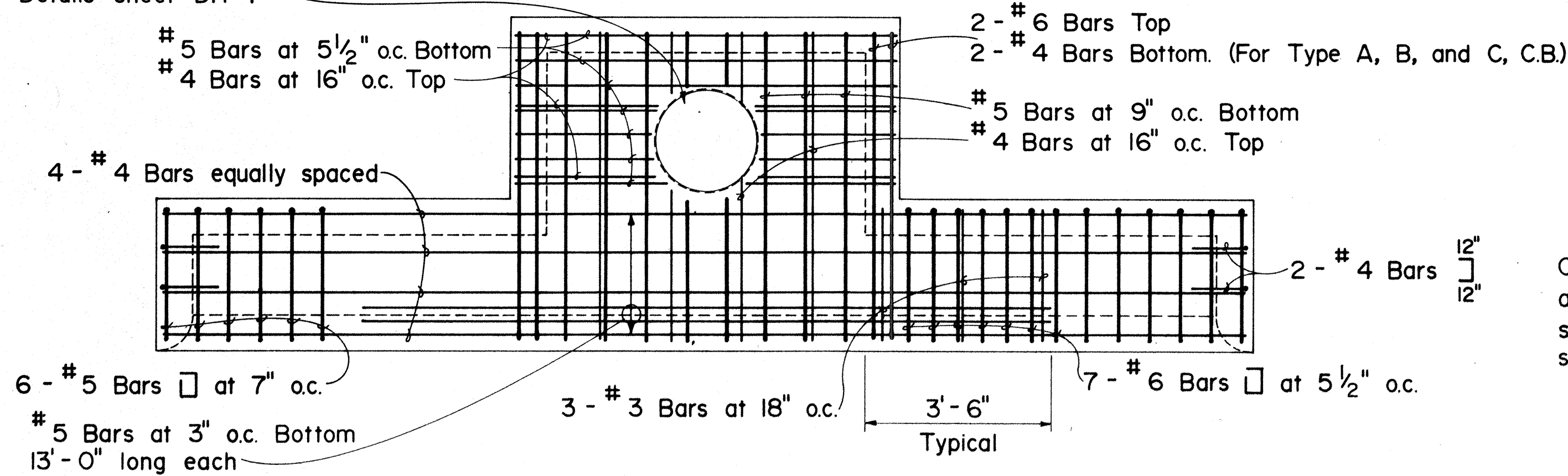
11/30/83	Additional sheet to show Sprinkler Plan and Details.
DATE	REVISION

ADD. 79 S-1

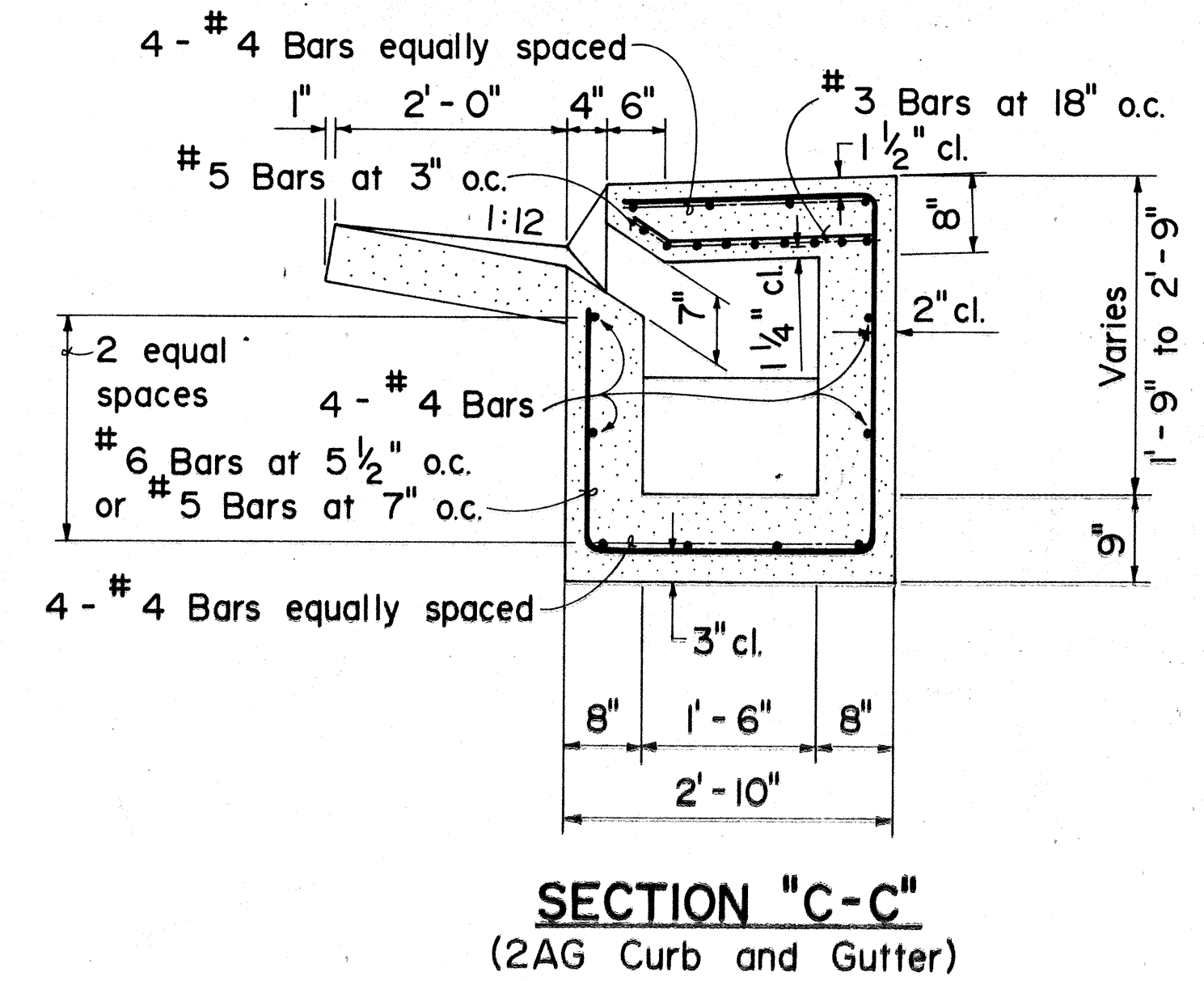
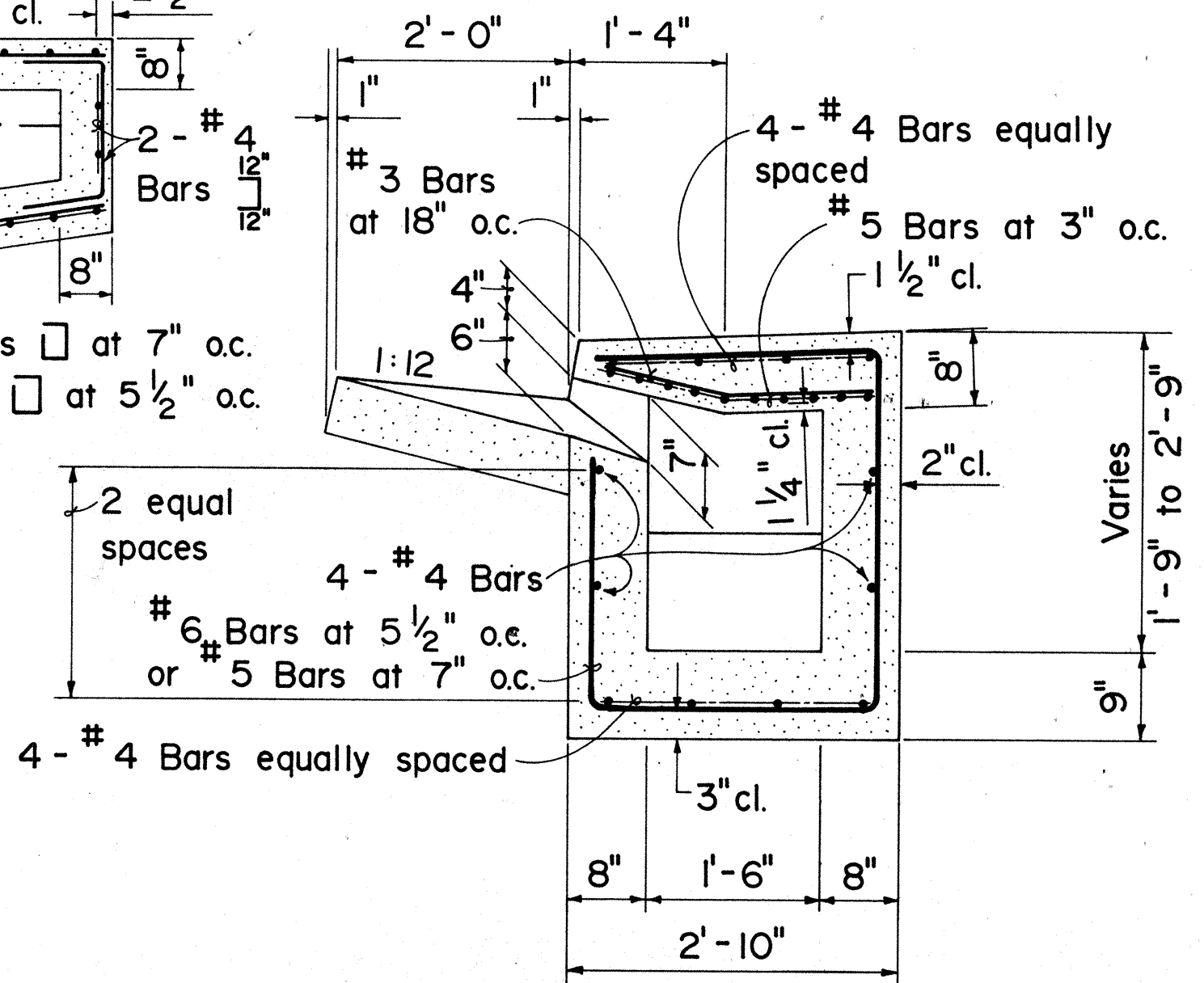
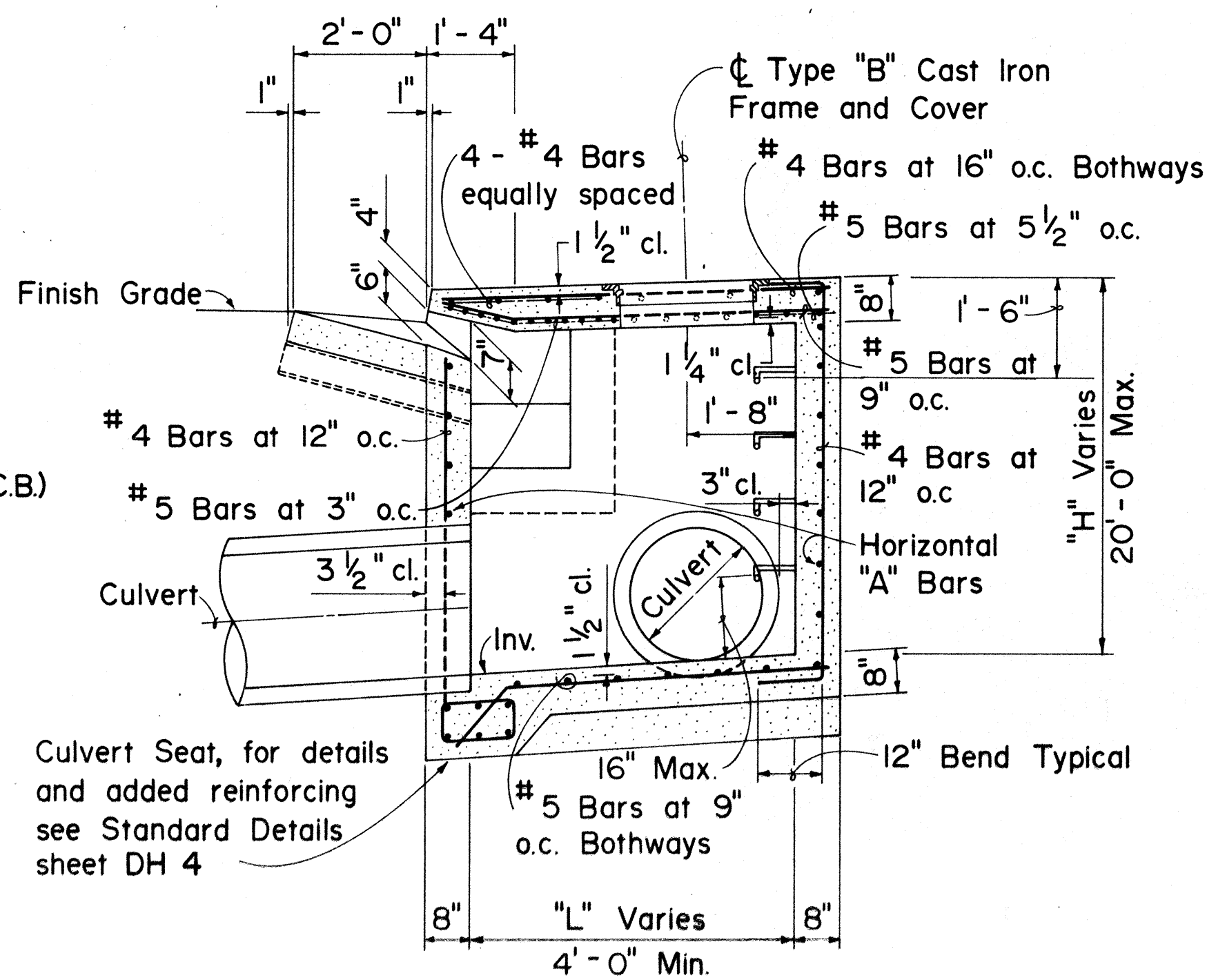
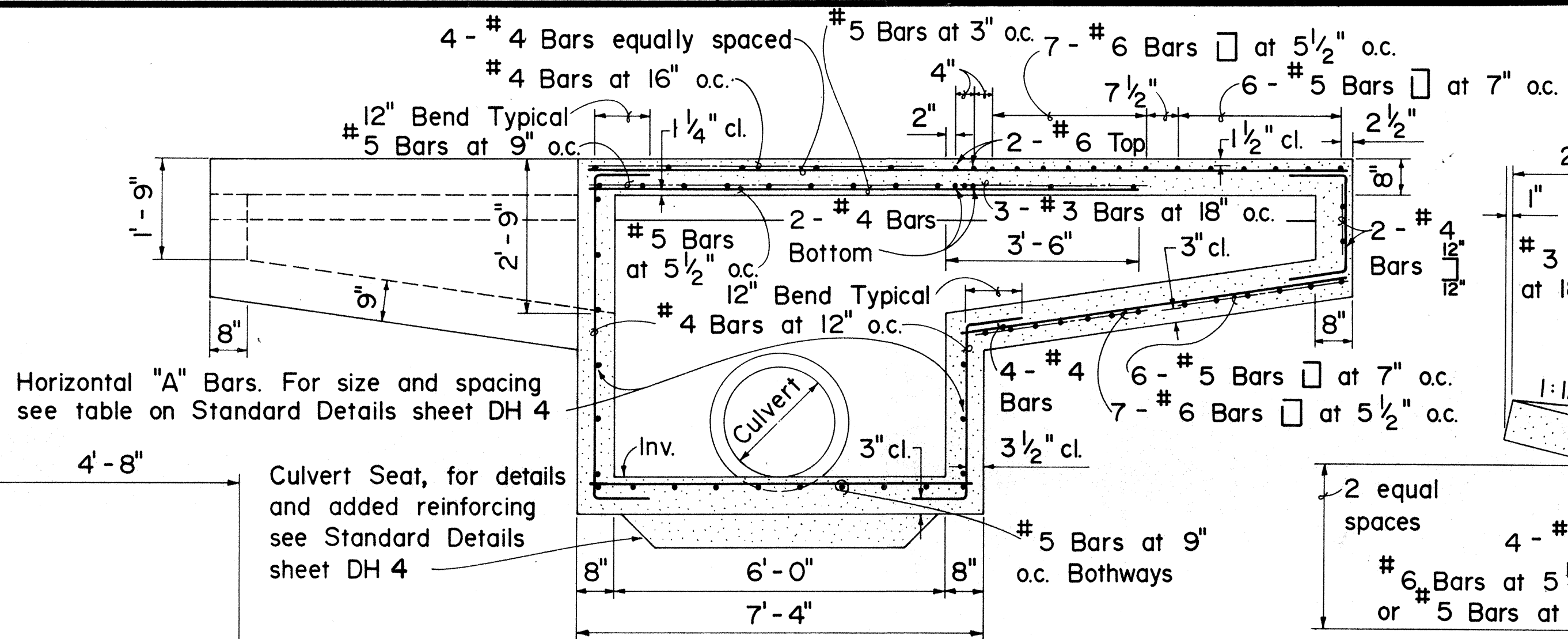
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H1-1(187)	1984	80	197



Opening for Type "B" Cast Iron Frame and Cover. For added reinforcing around hole see Standard Details sheet DH 4



PLAN VIEW OF REINFORCING STEEL



TYPE "A", "B", "C" & "D" CATCH BASIN

APPROVAL RECOMMENDED: *Edward H. Lee* 12/3/80
HYDRAULIC DESIGN ENGINEER DATE

APPROVED: *Robert Zaleski* 12/4/80
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
1	Supersedes Sht. DH 1 approved 12/17/69	H.E.	12/4/80

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STANDARD DETAILS TYPE A, B, C, & D CATCH BASIN
Not To Scale Date: Dec. 1980
SHEET NO. 32 OF 39 SHEETS DH 1

The diagram illustrates the plan view of a catch basin and gutter apron assembly. Key components and dimensions include:

- Basin Types and Dimensions:**
 - Type "A1" C.B. 20' - 8"
 - Type "B1" C.B. 14' - 0"
 - Type "C1" C.B. 14' - 0"
 - Type "D1" C.B. 7' - 4"
- Offsets and Spacing:**
 - 4' - 8" (left and right outer offsets)
 - 6' - 8" (inner offsets between basin sections)
 - 8" (small offsets at transitions)
 - 7' - 4" (width of the central basin section)
 - 6' - 0" (width of the side sections)
- Structural Details:**
 - Type "A" Cast Iron Frame and Cover:** Located at the center of the assembly.
 - Concrete Gutter Apron:** Extends from the basin sections.
 - Culvert:** Indicated by a centerline symbol (⌒) below the apron.
 - Radius:** R = 8" at the corner of the frame.
 - Vertical Dimensions:** 2' - 4", 8' 1' - 0" 8", 2' - 0", 8", and a variable depth "L" with a 4' - 0" minimum.
- Notes:**
 - 1/4 : 12 slope or to sidewalk

12-#5 $\square$ at 7" o.c. 13-#5 $\square$ at 7" o.c. 12-#5 $\square$ at 7" o.c.

2 1/2" 2 1/2"

2-#6 x 7'-0"

3-#4 Bars

#4

Opening for Type "A" Cast Iron Frame and Cover. For added reinforcing around opening see Standard Details sheet DH 4.

#4 Bar

2-#8 x 7'-0"

#4 $\square$ at 8" o.c.

2-#5 Bars

4-#7 Bars at 3" o.c.*

#4 Bars at 12" o.c. Bothways

4-#7 Bars at 3" o.c.*

#5 Bars at 5" o.c.

#5 Bars at 10" o.c.

#4 Bars at 12" o.c.

#4 Bars at 12" o.c.

REINFORCING TOP LAYER

REINFORCING BOTTOM LAYER

Technical drawing of a manhole structure, showing cross-section and plan views with dimensions and reinforcement details.

Cross-Section View (Left):

- Overall width: 4' - 8"
- Section line A-A

Plan View (Right):

- Section line C-C
- Section line D-D
- Reinforcement details:
 - 4 - #7 Bars at 3" o.c. Top & Bottom*
 - 12" Bend Typical
 - #4 Bars at 12" o.c.
 - #5 Bars at 10" o.c.
 - 3 1/2" clear
 - Horizontal "A" Bars. For size and spacing see table on Standard Details sheet DH 4.
 - For PLAN view of wall reinforcing see Standard Details sheet DH 4.
 - #5 Bars at 8" o.c. Bothways
 - 12" Bend Typical
- Manhole Rungs 12" o.c.
- Dimensions:
 - 1' - 9"
 - 2' - 9"
 - 10"
 - 2"
 - 1' - 6"
 - 8"
 - 16" maximum
 - 8"
 - 6' - 0"
 - 7' - 4"
 - 8"
 - 6"
- "H" Varies 20' - 0" maximum
- Gutter Invert

Table:

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(107)	1984	81	107

SECTION 4

1/4 :12 slope or conform to sidewalk

Add 2-#3 x 7'-0" at 10" o.c.

8" 1'-8" 1 1/2" cl. 2'-0" 2" cl. 1'-0" 3 1/2" cl. 8" 12" Bend Typical 8" "L" Varies 4'-0" Minimum

1-#4 Top
1-#5 Bottom } interrupt at manhole frame

4-#7 at 3" o.c. Top & Bottom*
#4 at 12" o.c. Bothways

3-#12

2-#6 x 7'-0"

1-#5 Cont.
8-#4 at 8" o.c.
2-#8 x 7'-0"

#5 Bars at 5" o.c.
#5 Bars at 10" o.c.
#4 Bars at 12" o.c.

#5 Bars at 8" o.c. Bothways

For added reinforcing around culvert opening see Standard Details sheet DH 4.

Culvert

Culvert Seat, for details and added reinforcing see Standard Details sheet DH 4.

"H" Varies 20'-0" Maximum

"L" Varies 4'-0" Minimum

[illegible]

1'-9"

2'-9"

12'-0"

12'-9" at 7" o.c.

3 - #4 Bars

2 - #4 Bars

#4

3 - #4 Bars

#5 at 7" o.c.

12" x 12"

*Replace these bars with #4 Bars at 12" o.c. Top and #5 Bars at 5" o.c. Bottom for "L" less than 5'-0"

NO.	REVISION	APPROVED BY	DATE
I.	Supersedes Sht. DH 3 approved 12-17-69 and replaces Sht. DH 2 approved 12-17-69.	H.T.	12/4/69

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

STANDARD DETAILS

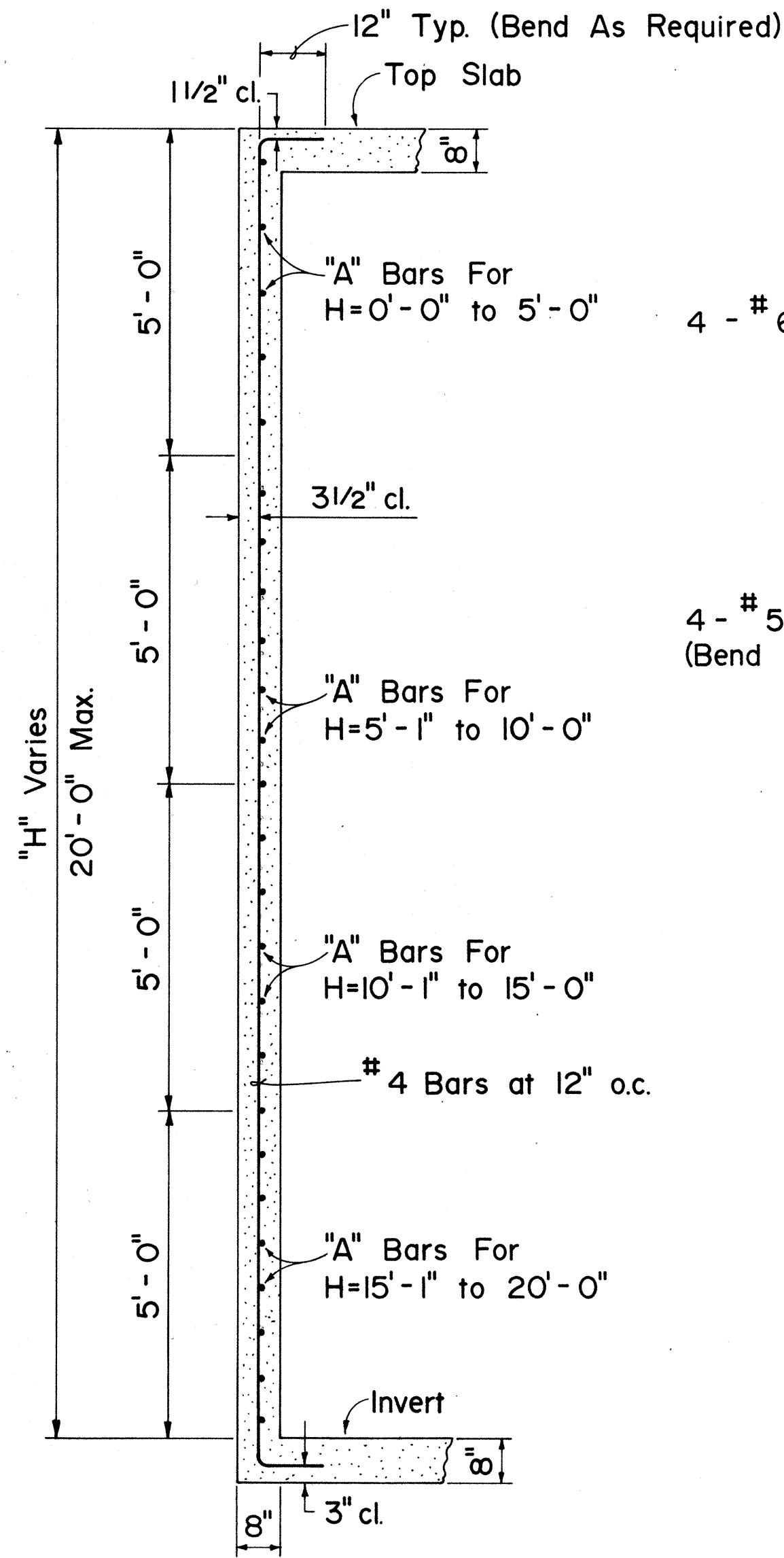
TYPE AI, BI, CI AND DI

CATCH BASIN

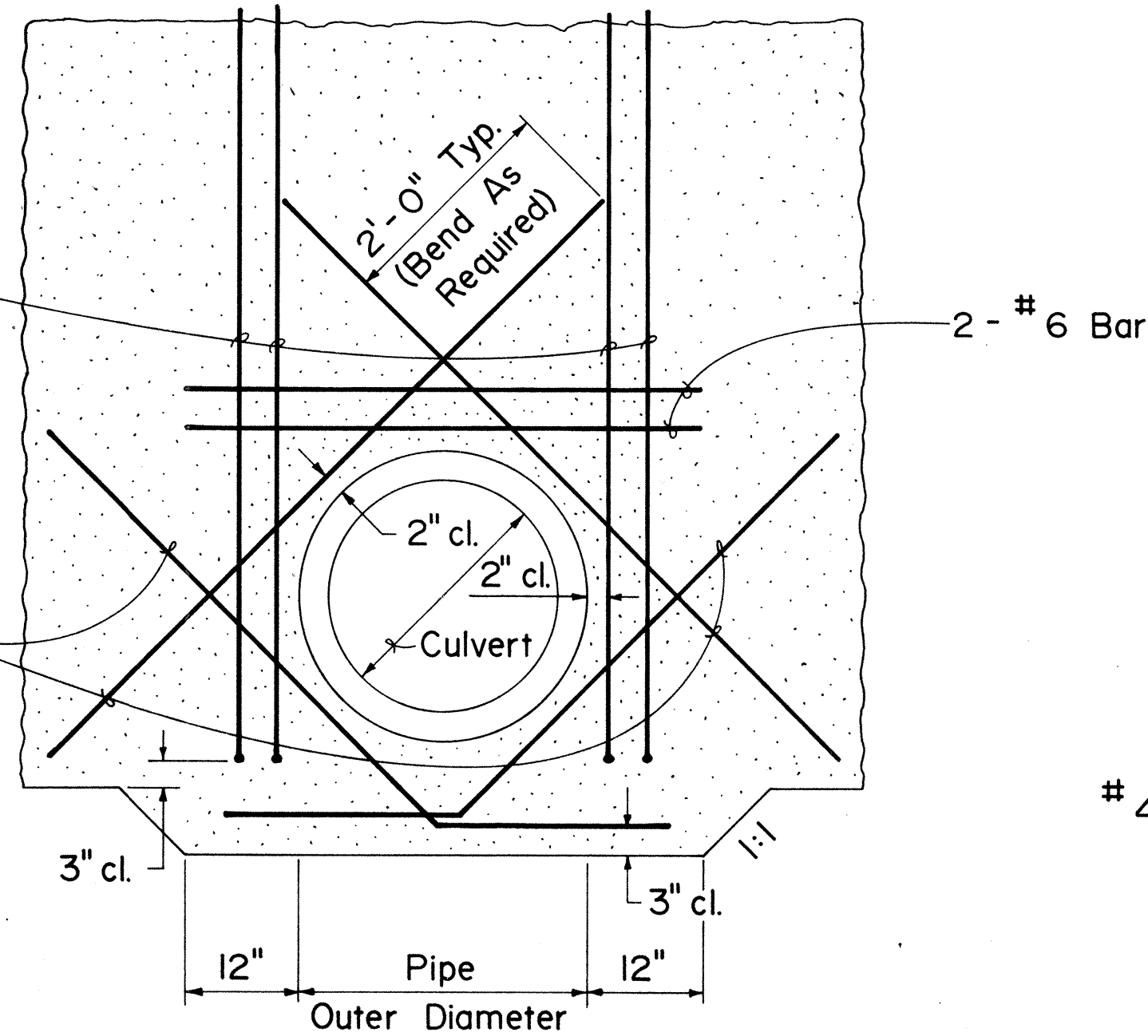
Not To Scale Date: Dec. 1980

SHEET NO. 33 OF 30 SHEETS, DH 2

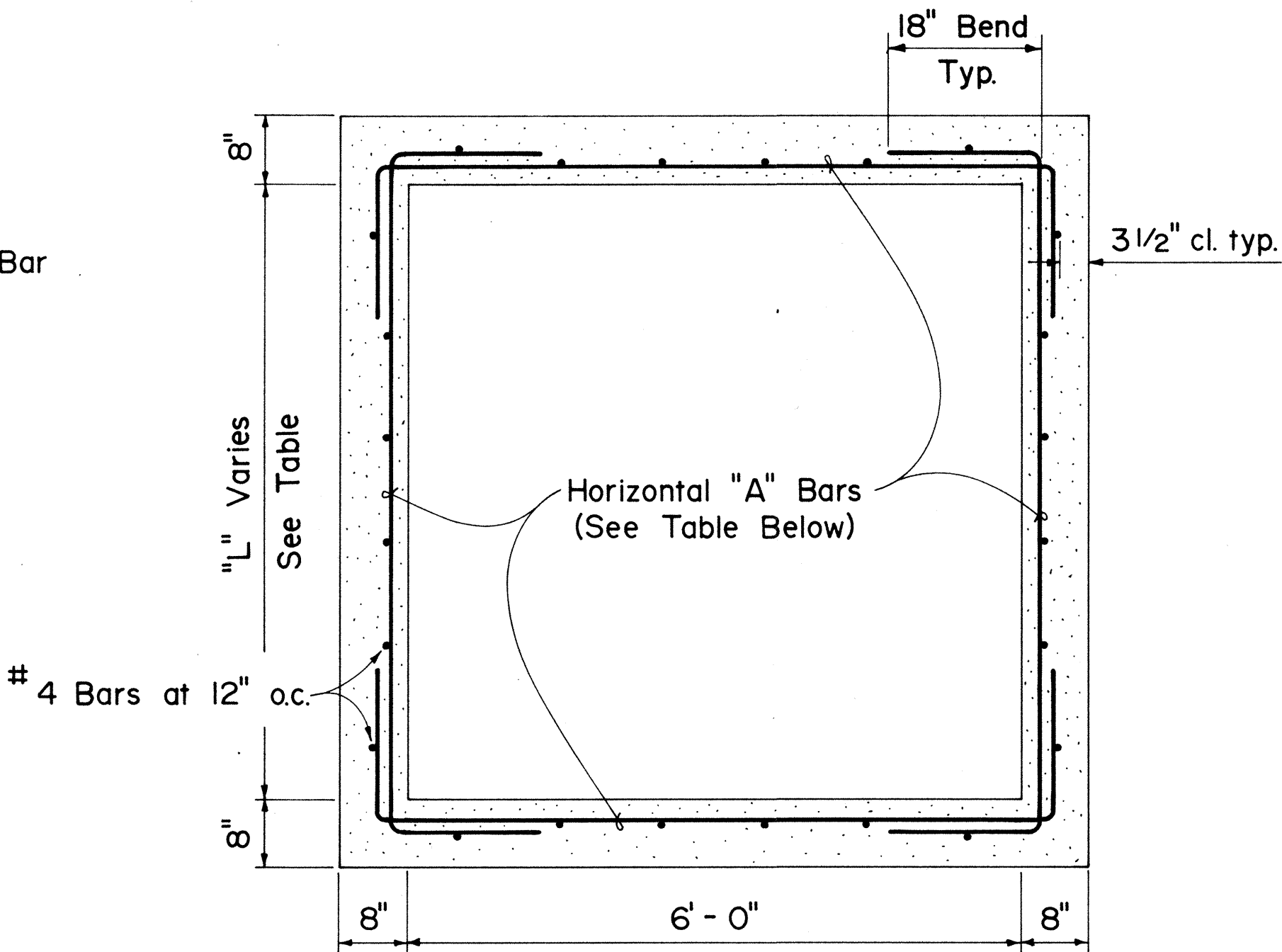
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	82	197



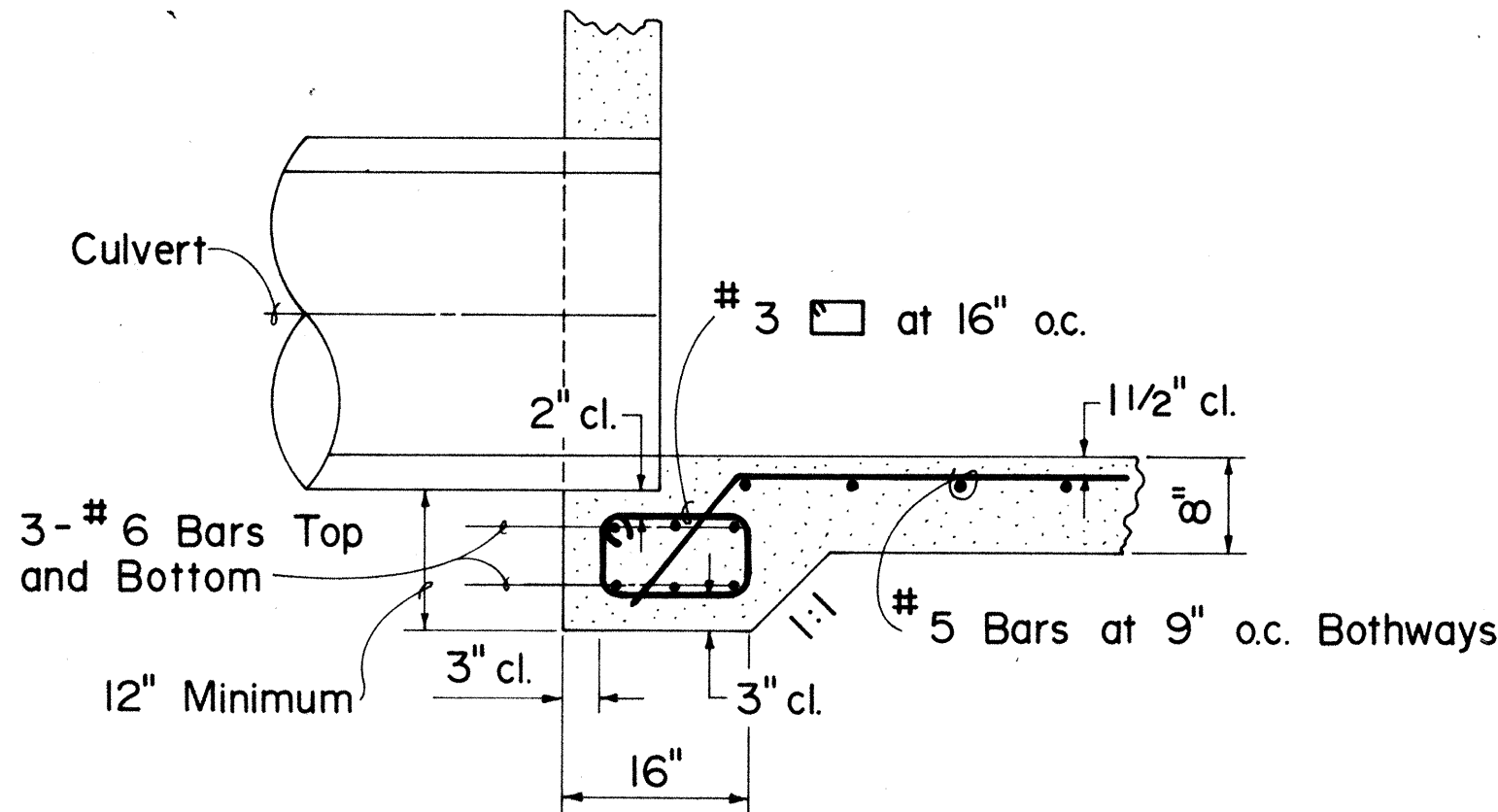
ELEVATION VIEW OF WALL SECTION



ADDED REINFORCING FOR CULVERT OPENINGS

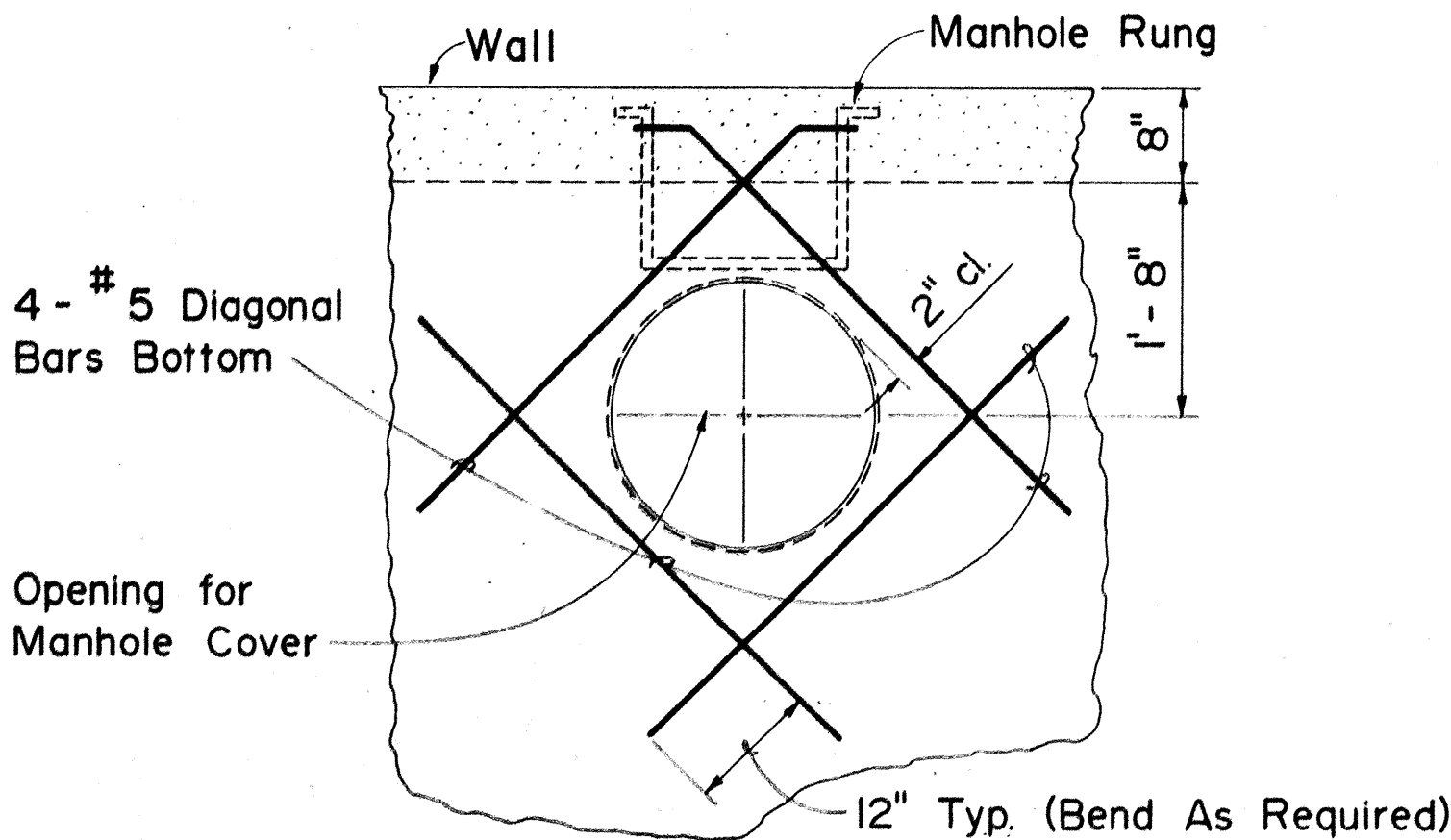


PLAN VIEW OF WALL SECTION



DETAIL OF CULVERT SEAT

HORIZONTAL "A" BARS					
"H" MAX. (FT.)	"L" MAX. (FT.)				
	4'-0"	6'-0"	7'-4"	8'-4"	9'-4"
0'-0" to 5'-0"	# 4 at 12" o.c.	# 4 at 10" o.c.	# 5 at 10" o.c.	# 5 at 8" o.c.	# 5 at 7" o.c.
5'-1" to 10'-0"	# 4 at 9" o.c.	# 5 at 9" o.c.	# 5 at 6" o.c.	N.A.	N.A.
10'-1" to 15'-0"	# 5 at 10" o.c.	# 5 at 6" o.c.	N.A.	N.A.	N.A.
15'-1" to 20'-0"	# 5 at 8" o.c.	N.A.	N.A.	N.A.	N.A.



ADDED REINFORCING FOR MANHOLE OPENING

APPROVAL RECOMMENDED: *[Signature]* 12/3/80
HYDRAULIC DESIGN ENGINEER DATE
APPROVED: *[Signature]* 12/4/80
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
1.	Replaces Sht. DH 4 approved 12-17-69	H-T	12/4/80

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
STANDARD DETAILS TYPICAL REINFORCING DETAILS FOR CATCH BASINS	
Not To Scale	Date: Dec. 1980

SHEET No. 34 OF 30 SHEETS DH 4

Diagram illustrating the dimensions for a manhole with a curb and gutter. The diagram shows a top-down view of a square manhole opening with a circular manhole ring. A curb and gutter is shown around the opening. Dimensions are given for the curb and gutter width (8 inches), the manhole opening size (5'-0" Type "A", 5'-6" Type "B", 6'-0" Type "C"), and the manhole ring diameter (Varies).

Diagram illustrating the reinforcement details for a 48 inch square manhole opening. The reinforcement consists of:

- 4 - #5 Diagonal Bars Bottom
- #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.

[illegible]

"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.

Required)

Grade

3  at 16" o.c.

1 1/2" cl.

2" cl.

5 Bars at 8" o.c. Bothways

3 - # 6 Bars Top and Bottom

12" Minimum

3" cl.

3" cl.

16"

Technical drawing of a pipe box culvert cross-section showing reinforcement details. The drawing includes the following specifications:

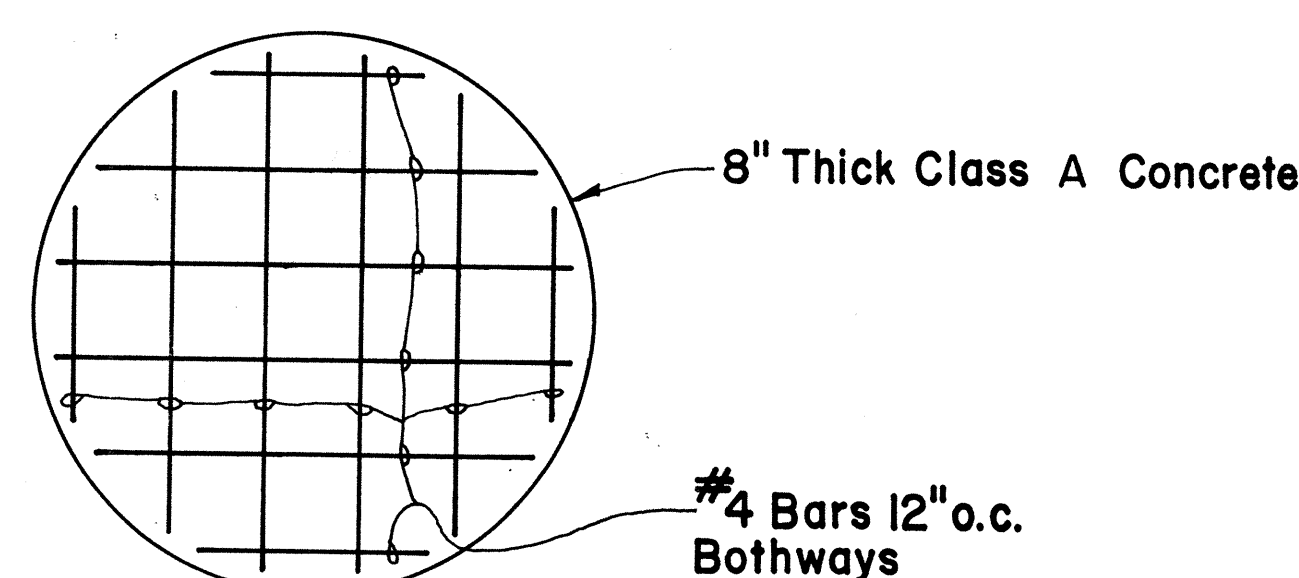
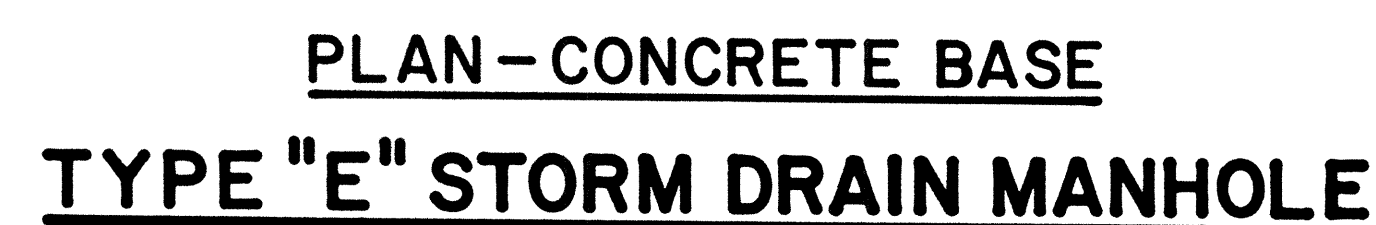
- Reinforcement:**
 - 6 Bar (top horizontal)
 - 4 - #6 (top horizontal, 12" at 4" o.c., 12" at bottom)
 - 4 - #5 Diagonal Bars
- Dimensions and Spacing:**
 - 3 1/2" cl. (top horizontal spacing)
 - 3 1/2" cl. (right side vertical spacing)
 - 3" cl. (bottom horizontal spacing)
 - 12" (bottom horizontal spacing, left and right of pipe)
 - 2" cl. (inner circle spacing)
 - 2" cl. (inner circle spacing)
 - 3" cl. (bottom horizontal spacing, inner)
- Structural Features:**
 - 2'-0" Typ. (Bend As Required) (diagonal bar label)
 - Culvert (inner circle label)
 - 1:1 (slope indicator)
 - Outer Diameter (bottom label)
 - Pipe (bottom label)

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

TYPE "A", "B", & "C" STORM DRAIN MANHOLE

ORIGINAL PLAN	SURVEY PLOTTED BY _____ DATE _____
	DRAWN BY _____
	TRACED BY _____
	DESIGNED BY _____
	QUANTITIES BY _____
	CHECKED BY _____
No. _____	

PLAN TYPE "D" OR "E" STORM DRAIN MANHOLE



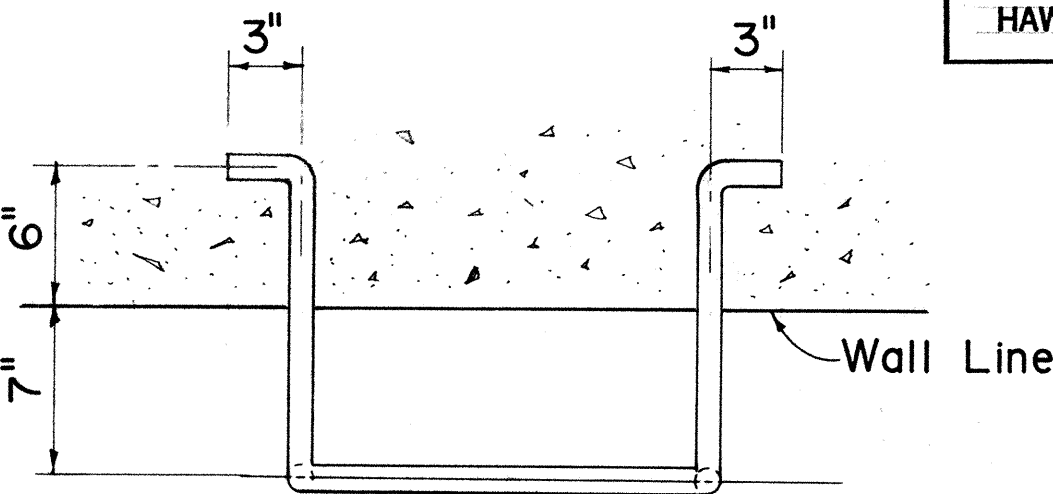
PLAN - CONCRETE BASE
TYPE "D" STORM DRAIN MANHOLE



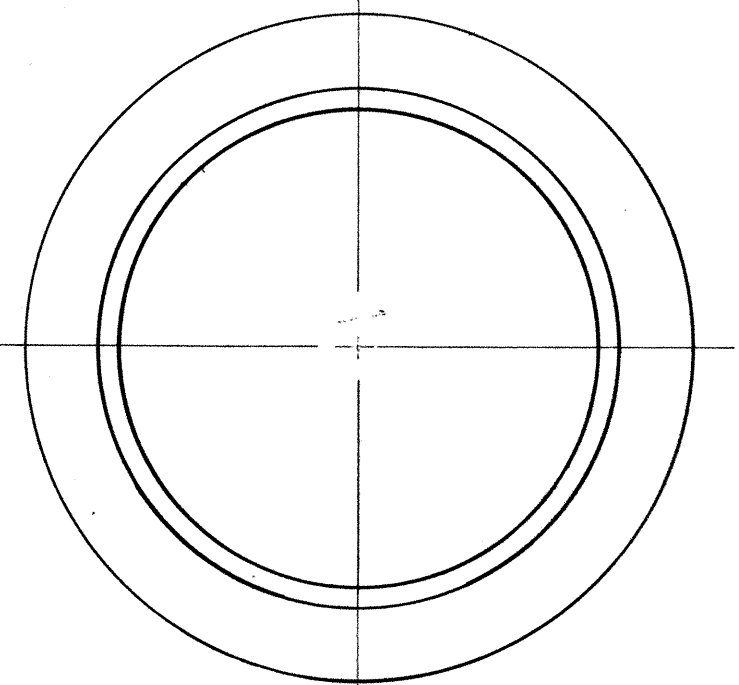
8-20-80
DATE

SHEET No.36 OF 39 SHEETS DH5A

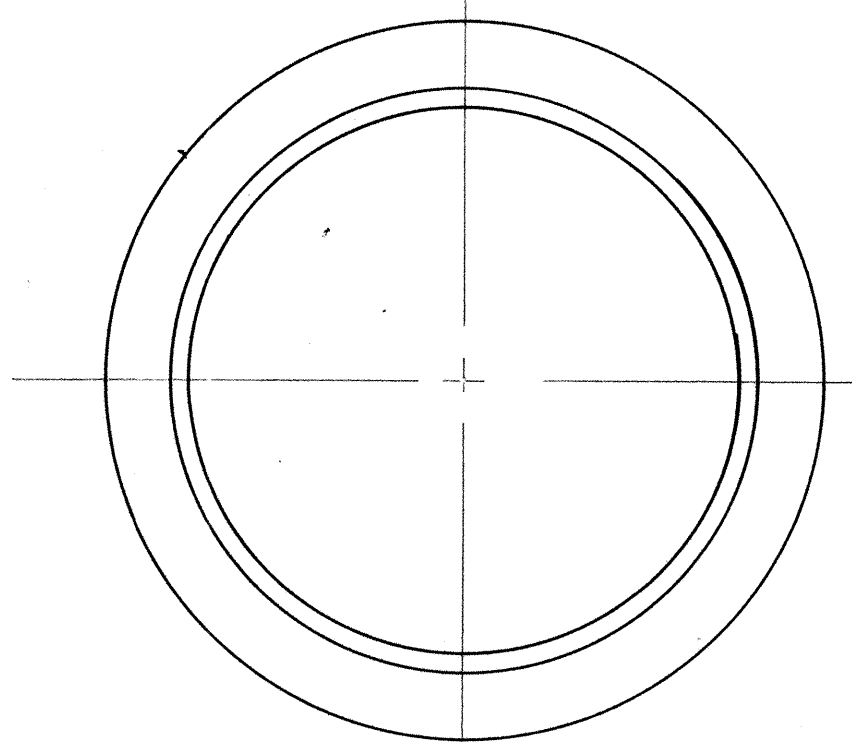
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(187)	1984	85	197



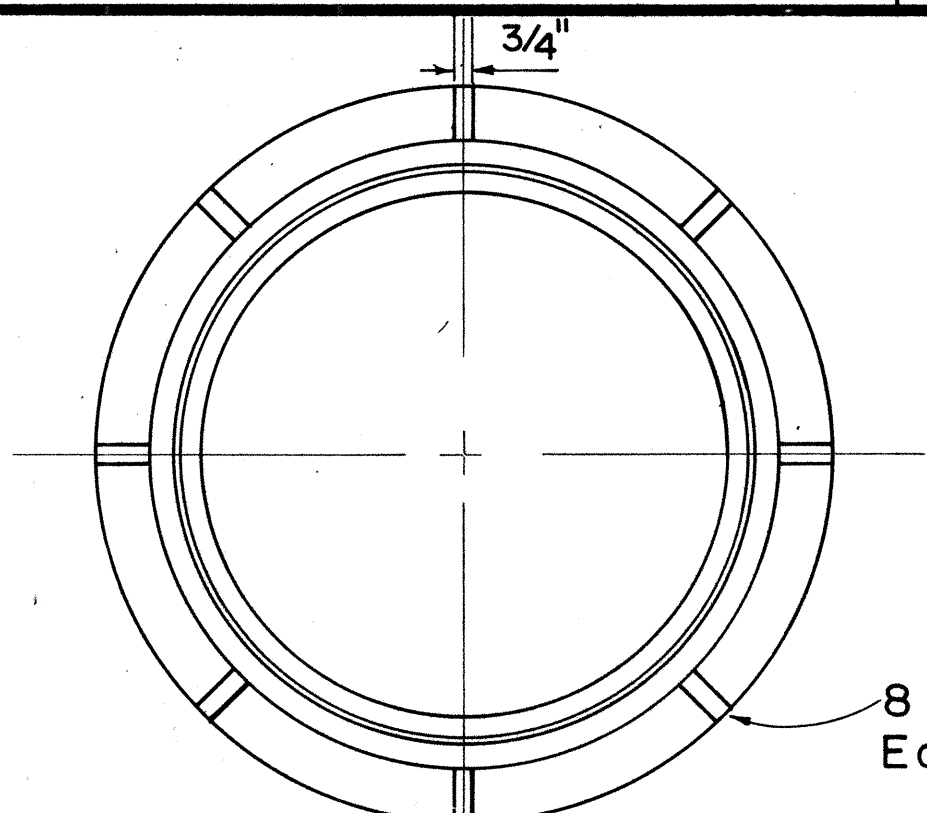
PLAN



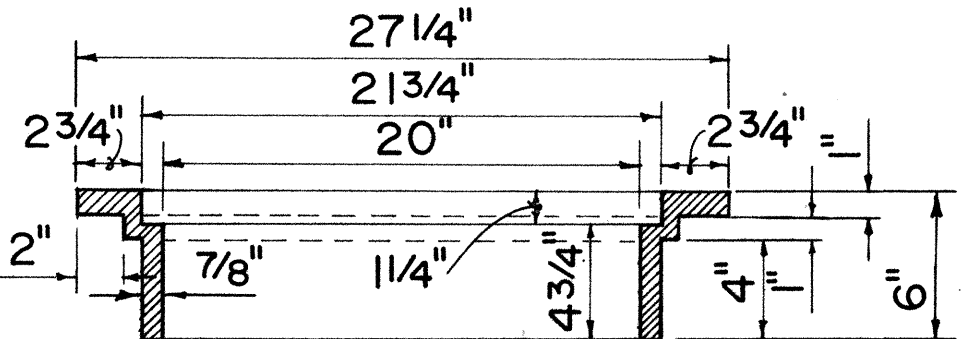
PLAN OF FRAME



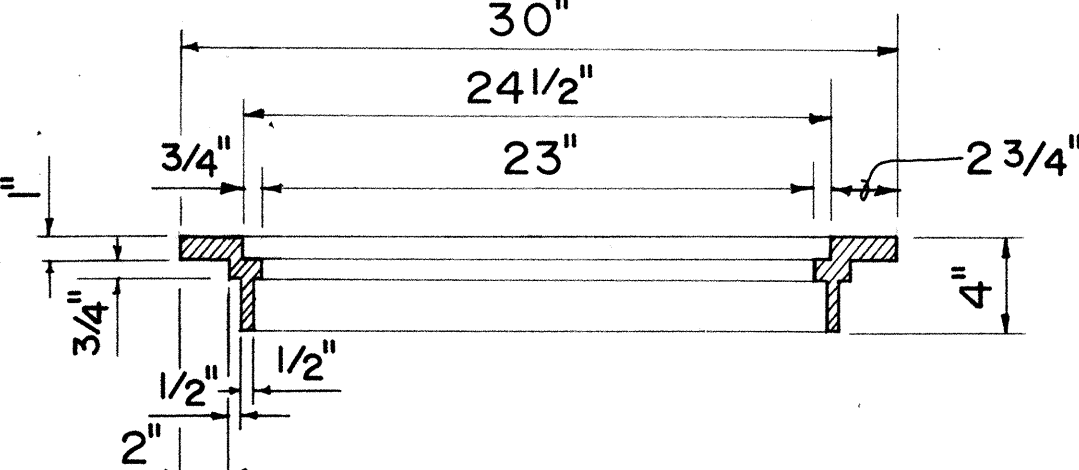
PLAN OF FRAME



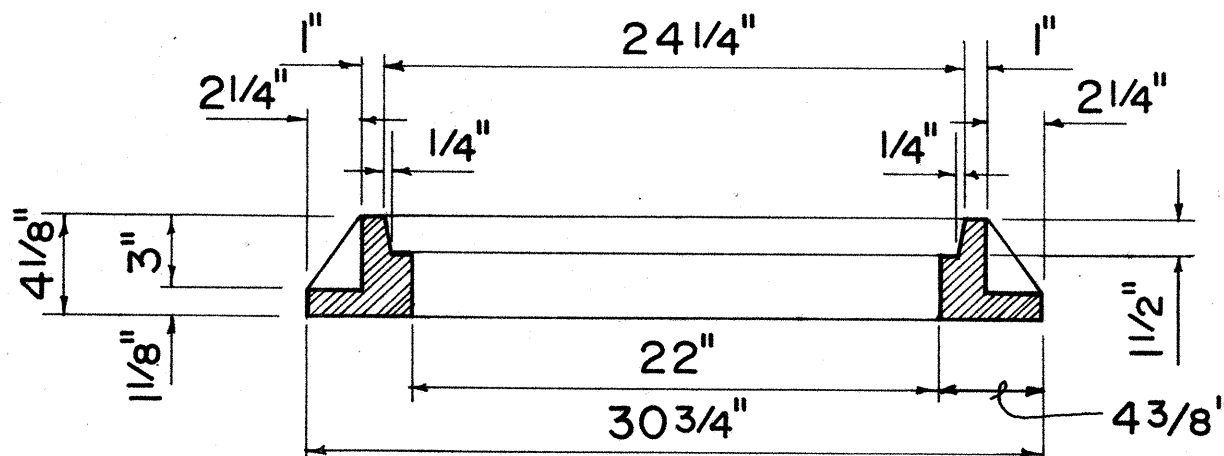
PLAN OF FRAME



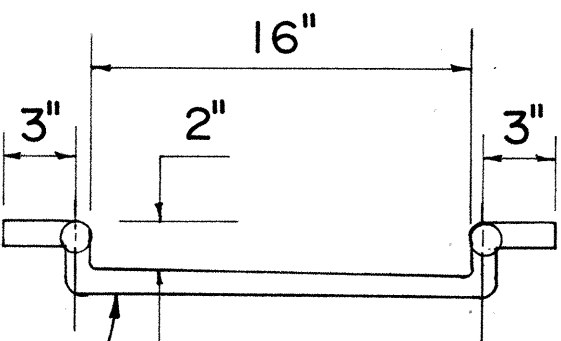
SECTION OF FRAME



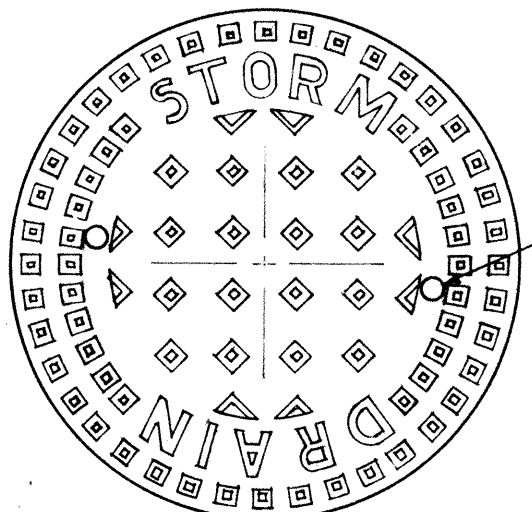
SECTION OF FRAME



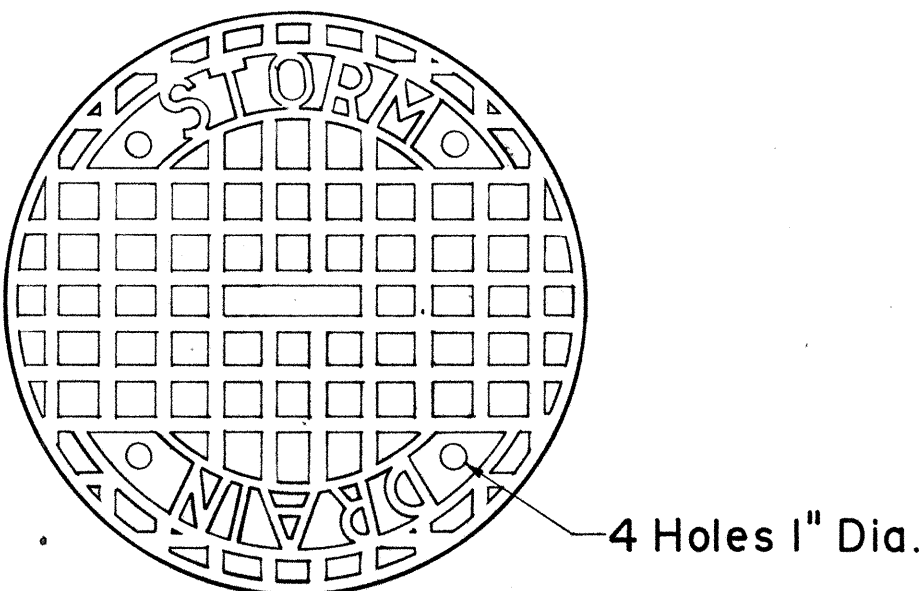
SECTION OF FRAME



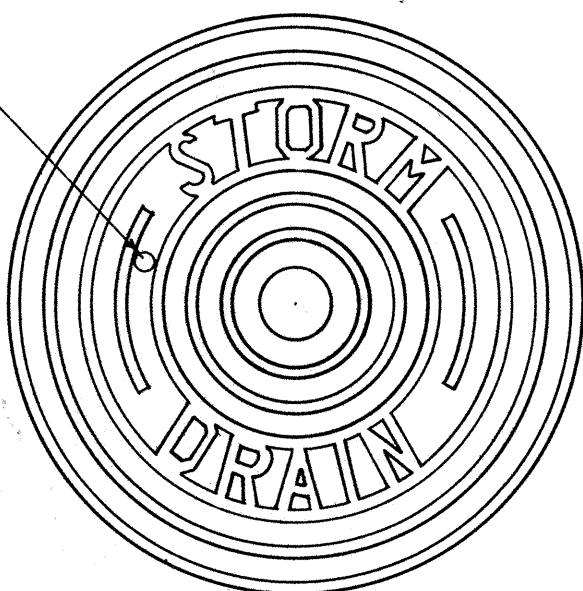
FRONT VIEW



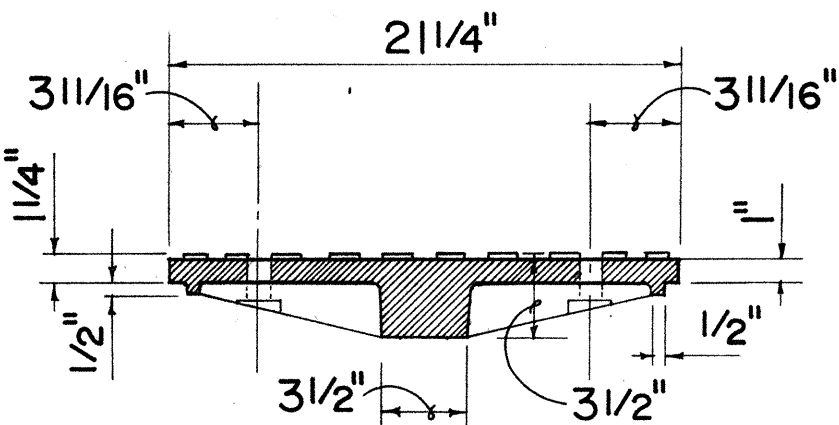
TOP VIEW OF COVER



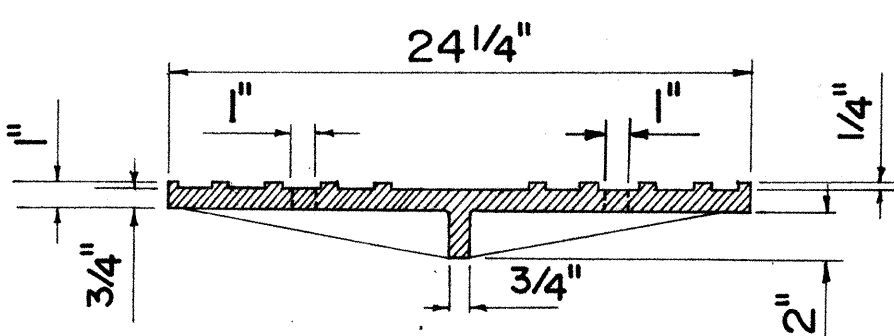
TOP VIEW OF COVER



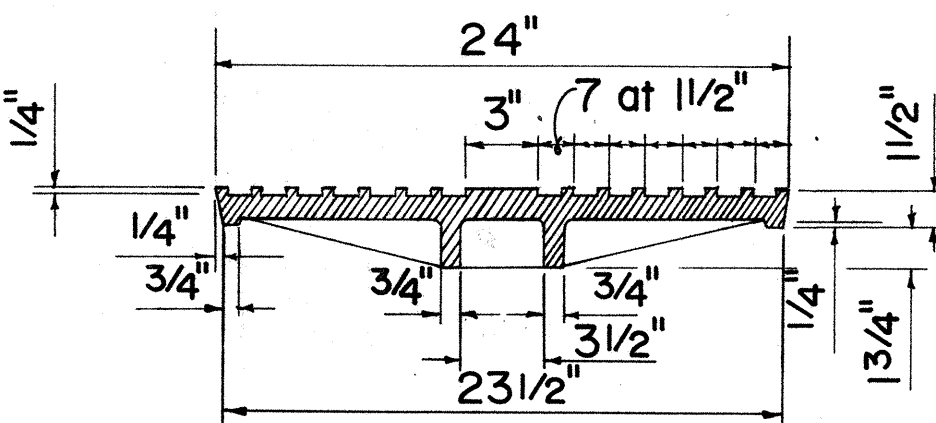
TOP VIEW OF COVER



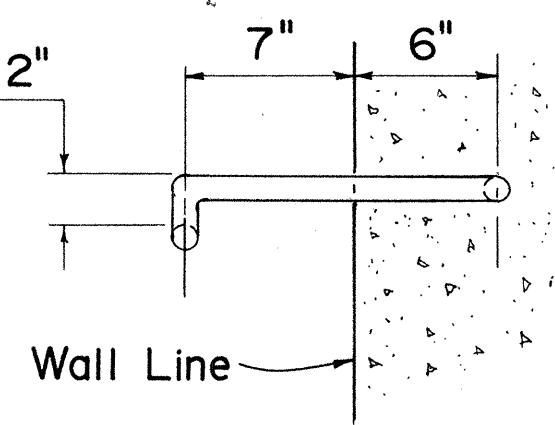
SECTION



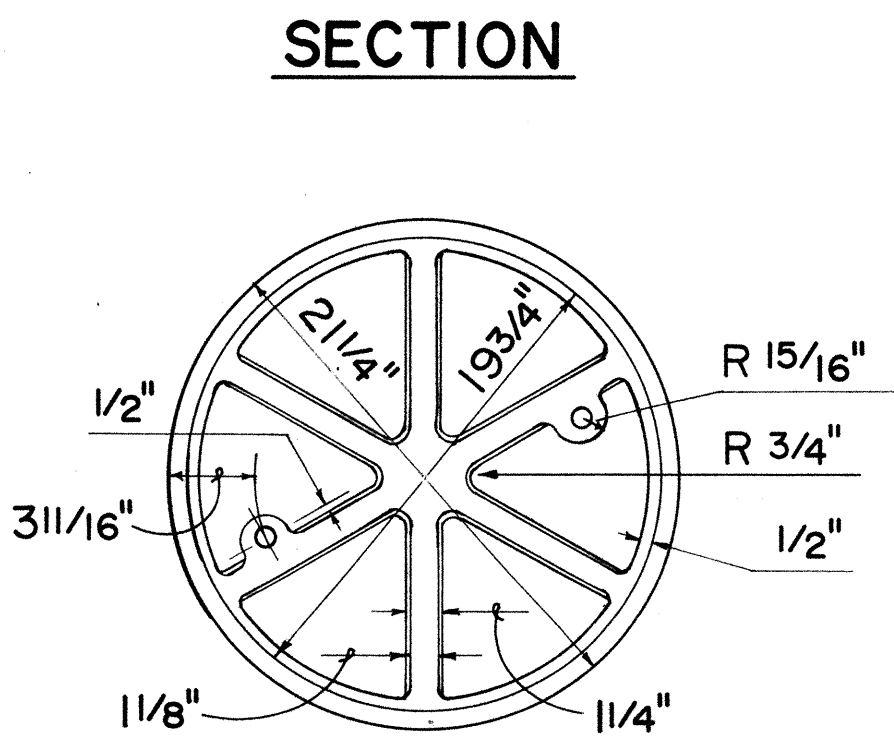
SECTION



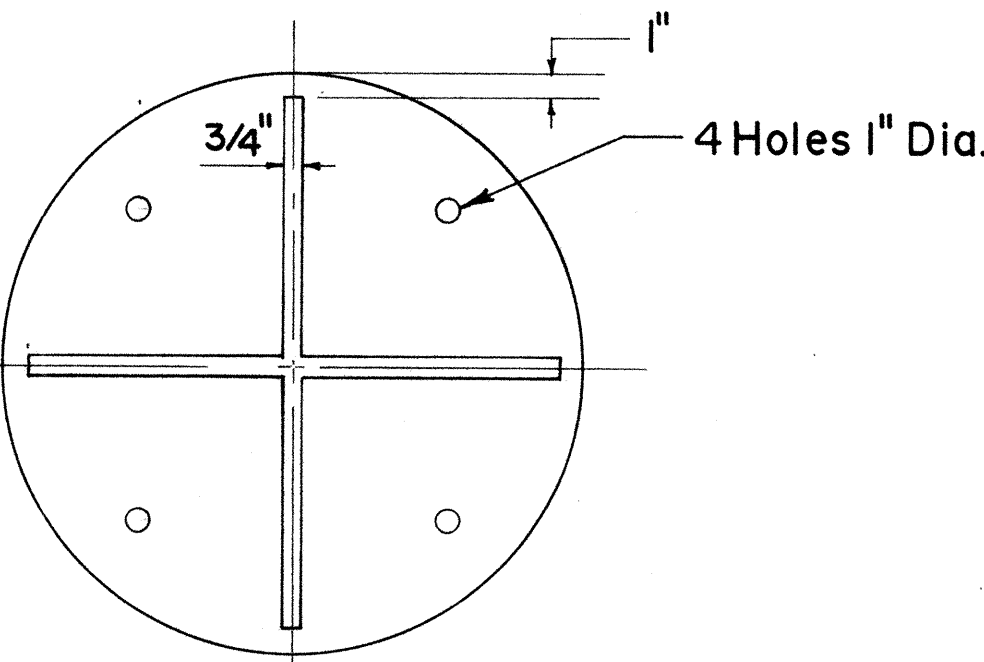
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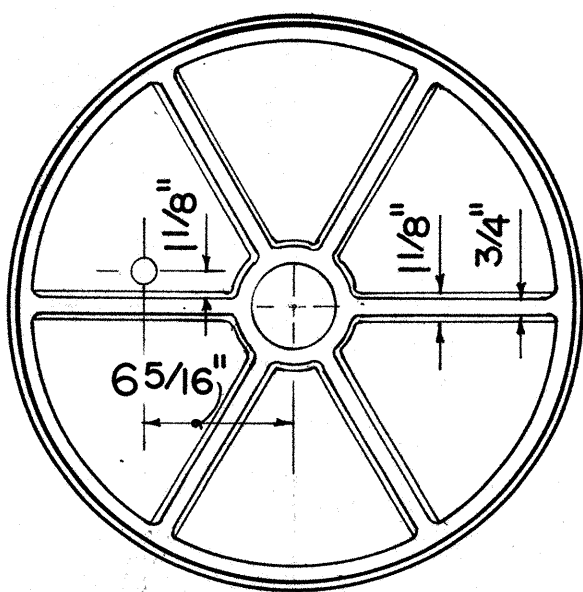
SIDE VIEW



BOTTOM VIEW OF COVER



BOTTOM VIEW OF COVER



BOTTOM VIEW OF COVER

MANHOLE RUNG

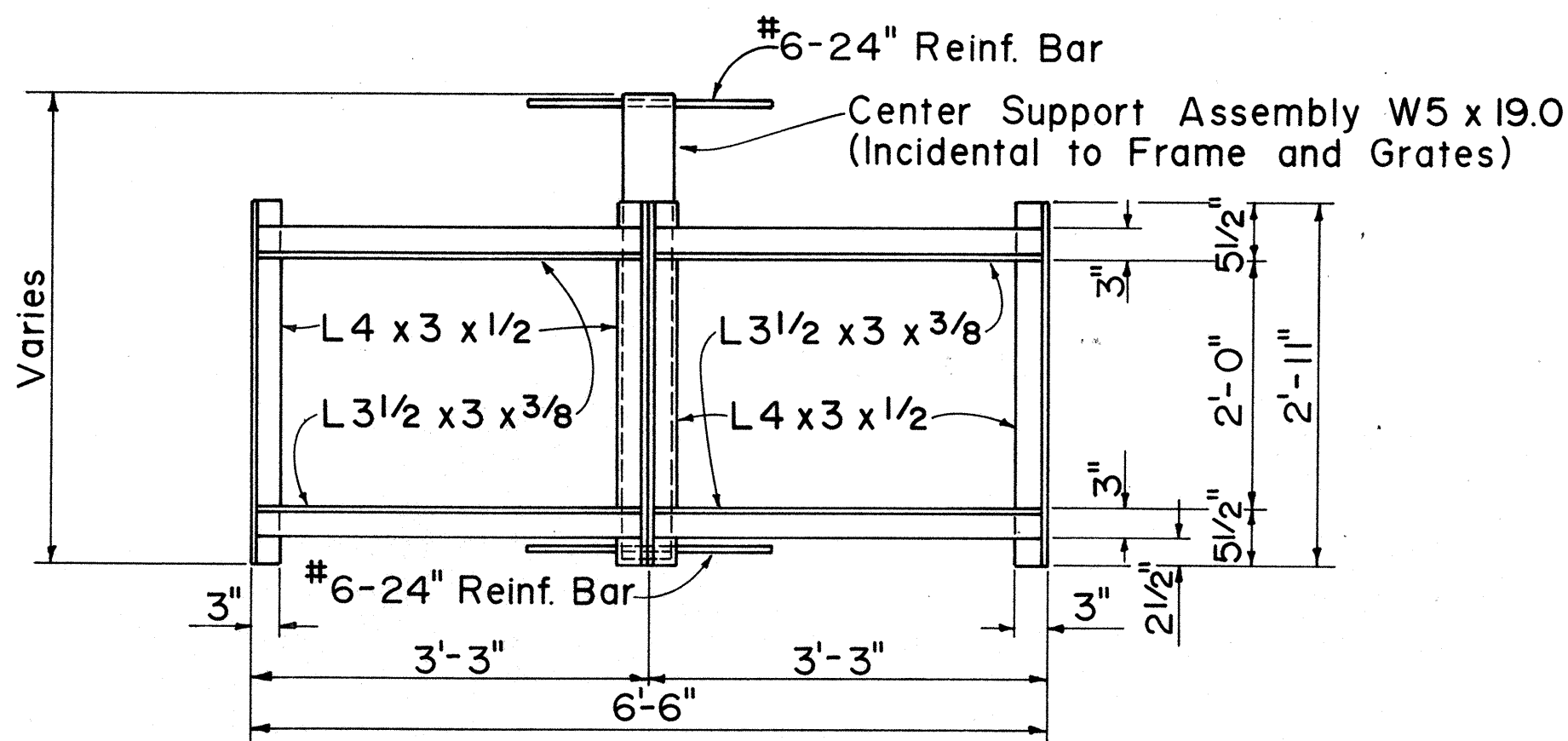
NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 6 approved 12-17-69	H.F.	6/22/79

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

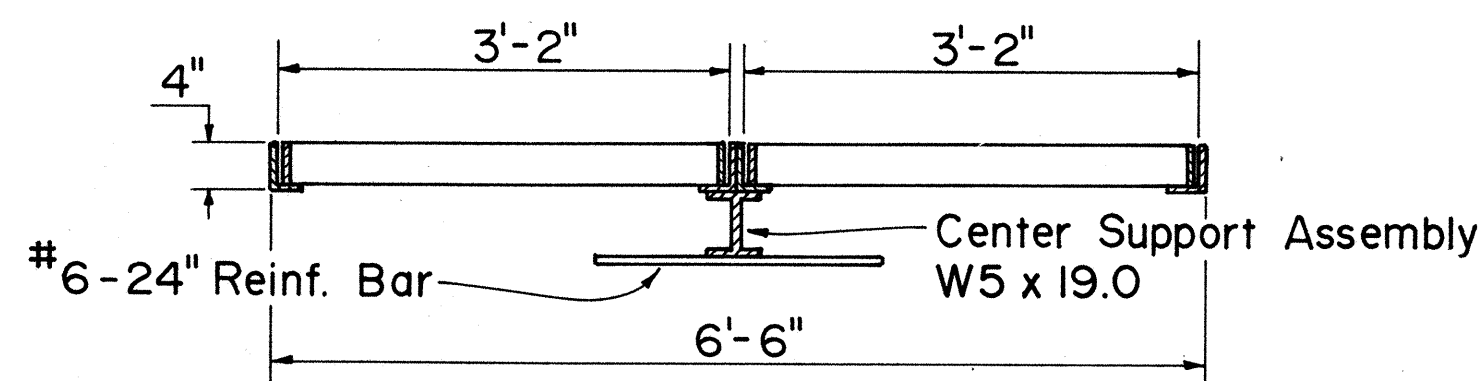
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STANDARD DETAILS CATCH BASIN AND MANHOLE CASTINGS
Not To Scale Date: Dec. 1977
SHEET No. 310 OF 390 SHEETS DH 6

ORIGINAL PLAN	DATE
SUPPLY DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	

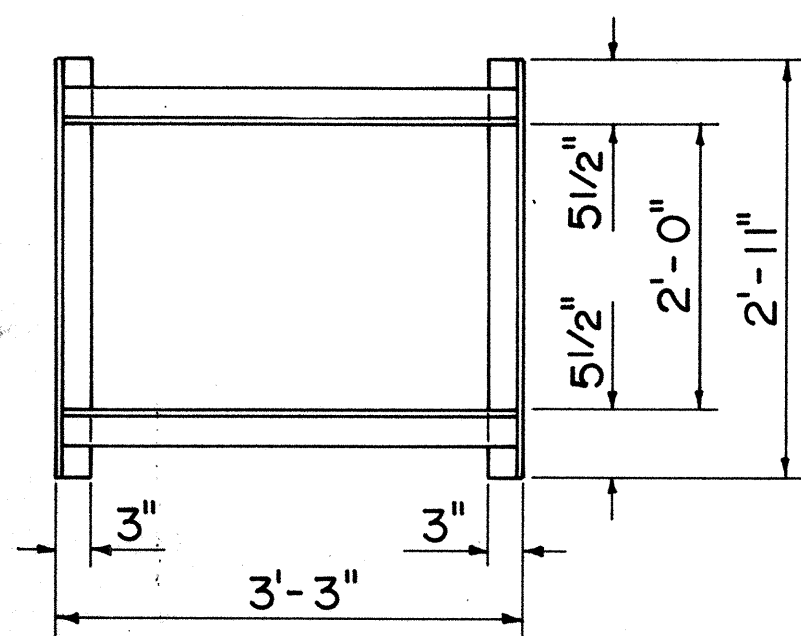
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1-H1-1(12)	1984	86	197



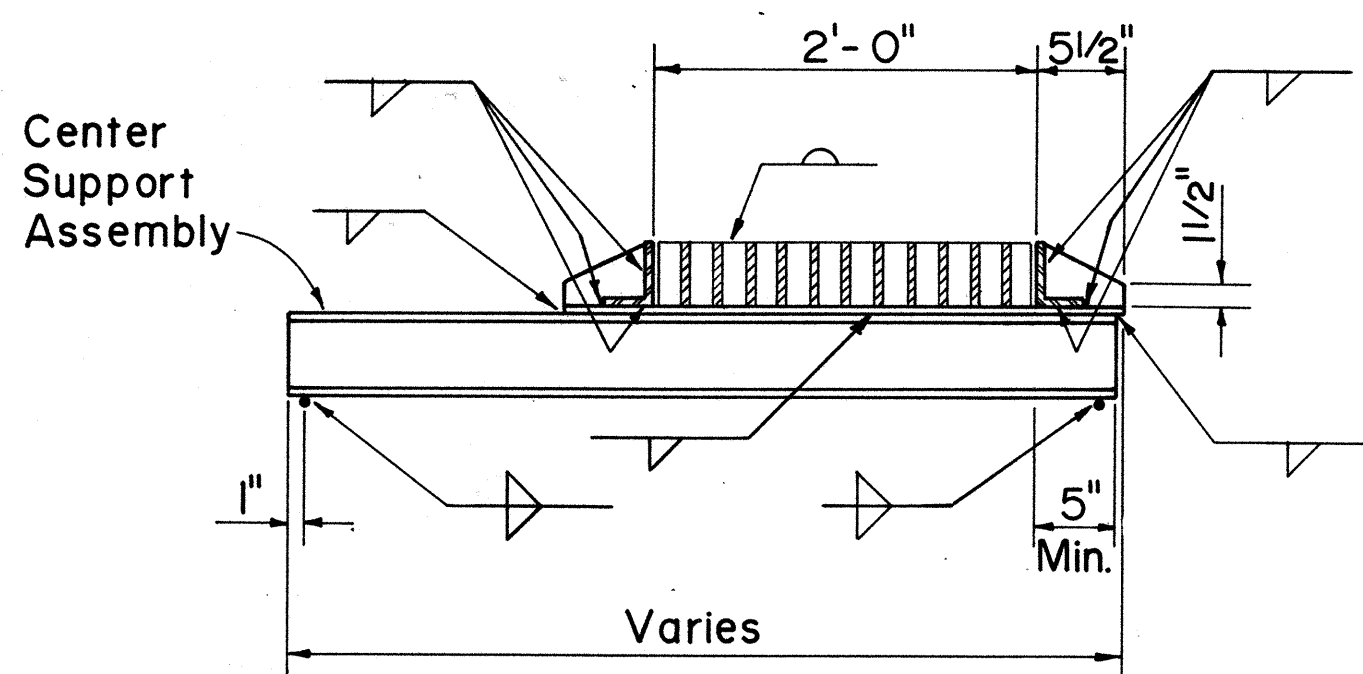
PLAN
(Two or More Grates)



LONGITUDINAL SECTION
(Thru Frame & Grate)

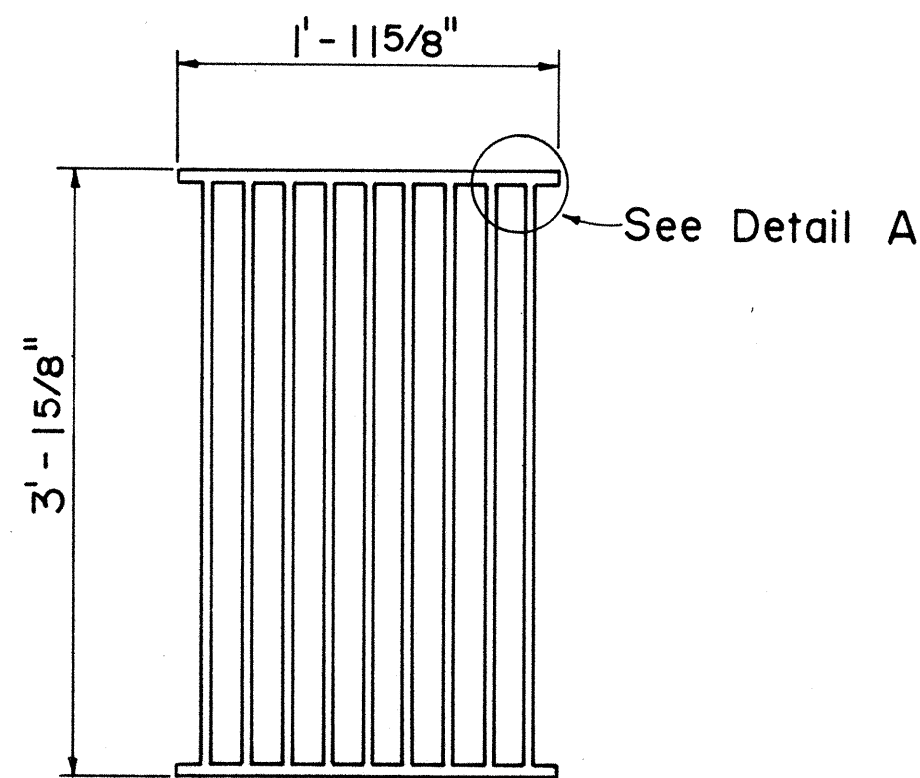


PLAN
(Single Grate)

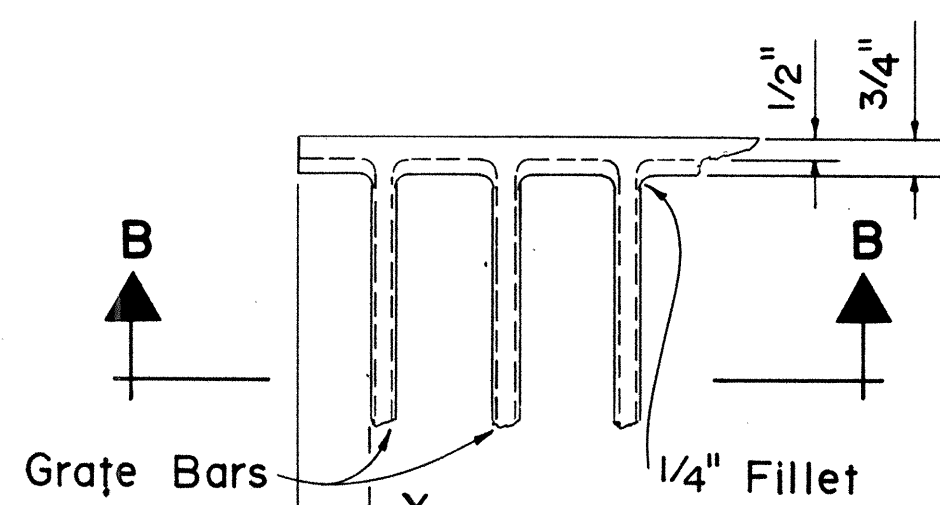


CROSS SECTION
(Thru Frame & Grate)

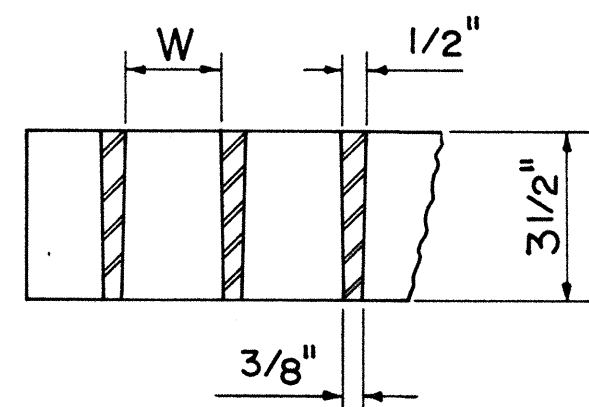
FRAME DETAILS



PLAN

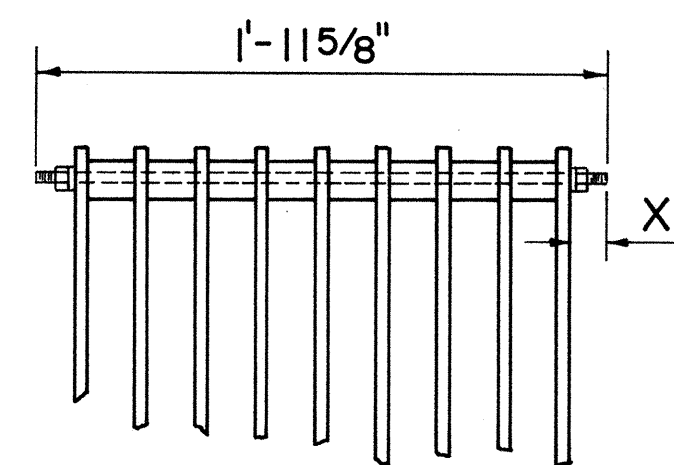


DETAIL A

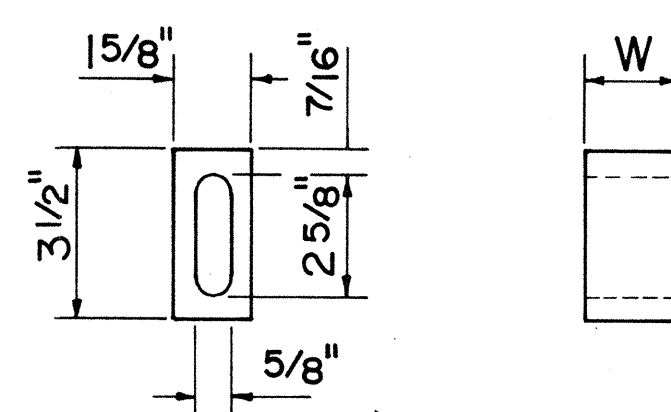


SECTION B-B

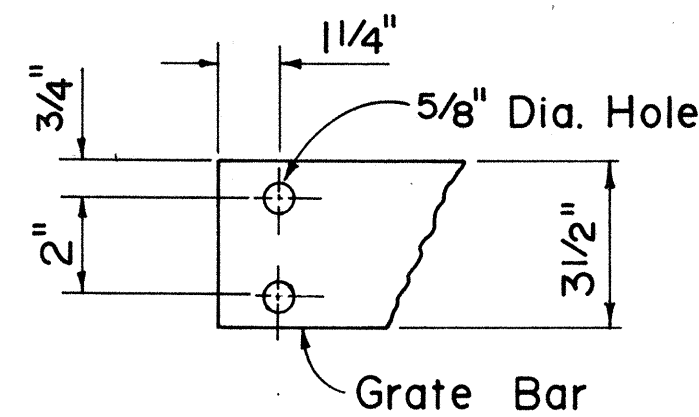
ALTERNATIVE CAST MALLEABLE IRON
OR CAST STEEL GRATE



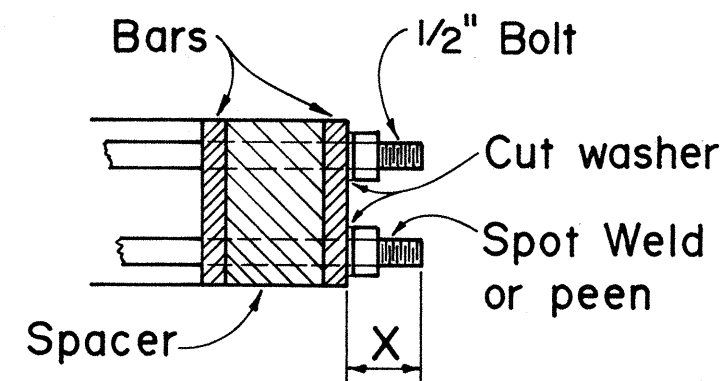
BOLTED END BLOCK



BAR SPACER

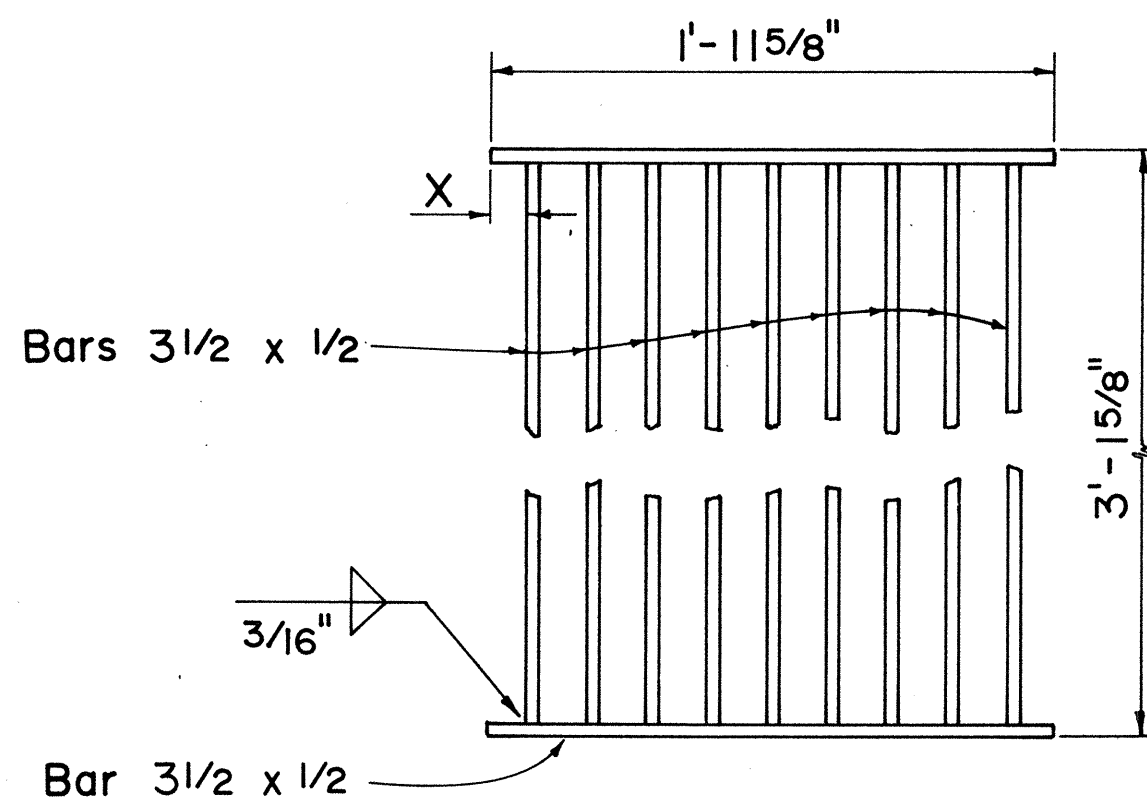


END OF BAR

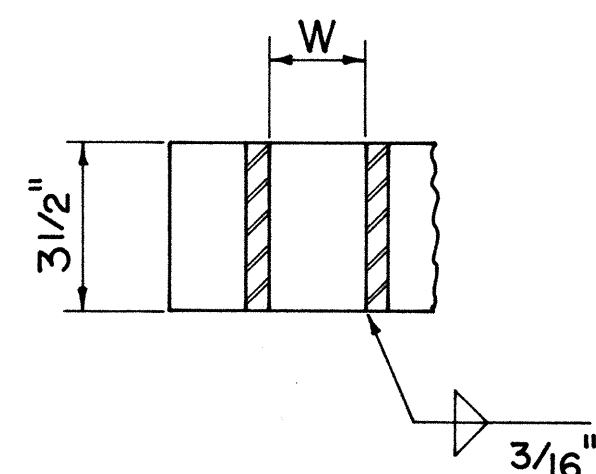


BOLTING DETAIL

ALTERNATIVE BOLTED GRATE



PLAN



SECTION

ALTERNATIVE WELDED GRATE

GRATE BAR SPACING TABLE			
TYPE	NO. BARS	CLEAR BAR SPACING-W	X
A-9	9	2"	1 9/16"
A-12	12	1 3/8"	1 1/4"

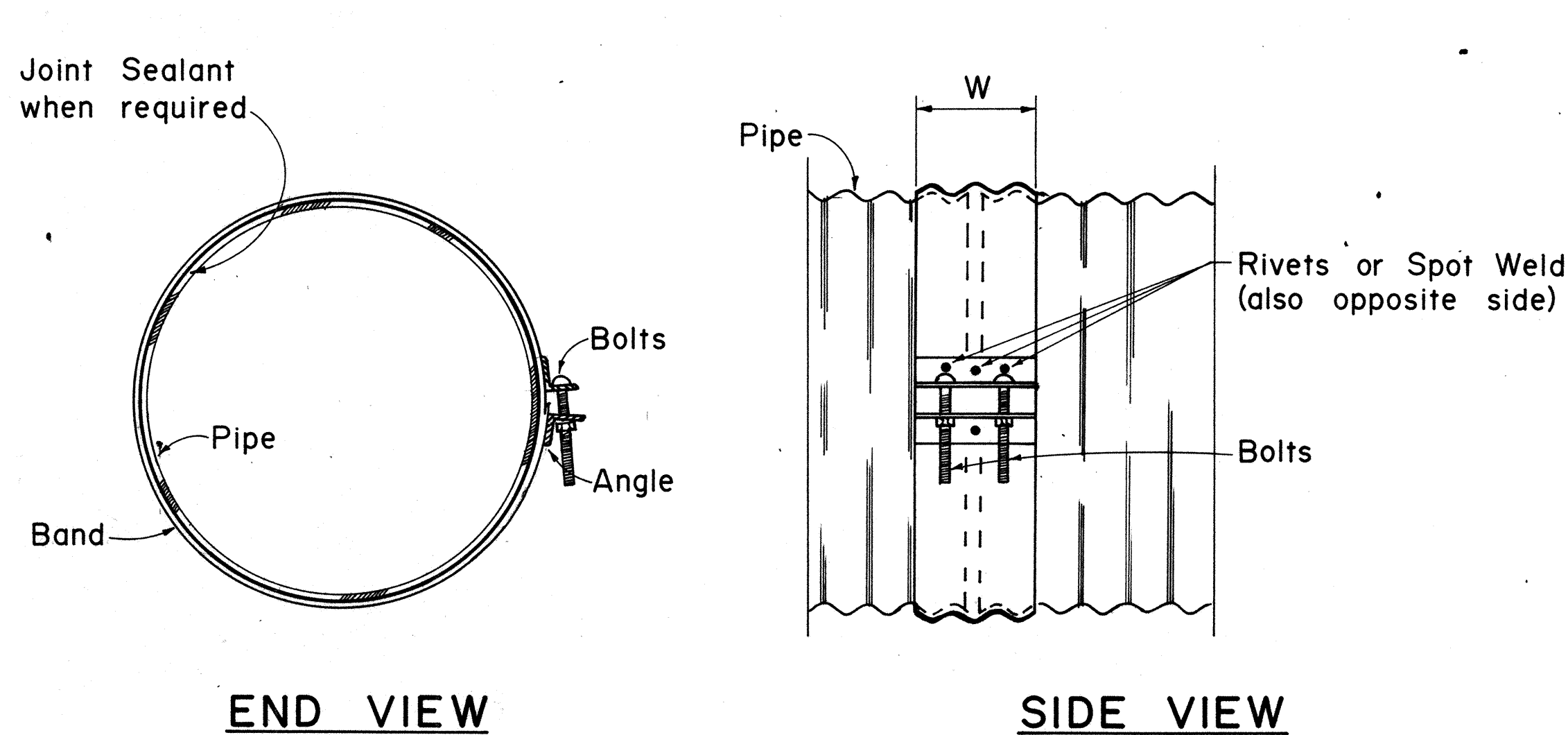
NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 7 approved 12-17-69	H.T.	6/22/79
2.	Revise standard nomenclature for rolled steel shapes.	H.T.	4/21/82

APPROVAL RECOMMENDED:
P. J. J. J.
 HYDRAULIC DESIGN ENGINEER 6-19-79
 DATE
 APPROVED:
Herbert Zalewski
 ASSISTANT CHIEF, ENGINEERING 6-22-79
 DATE

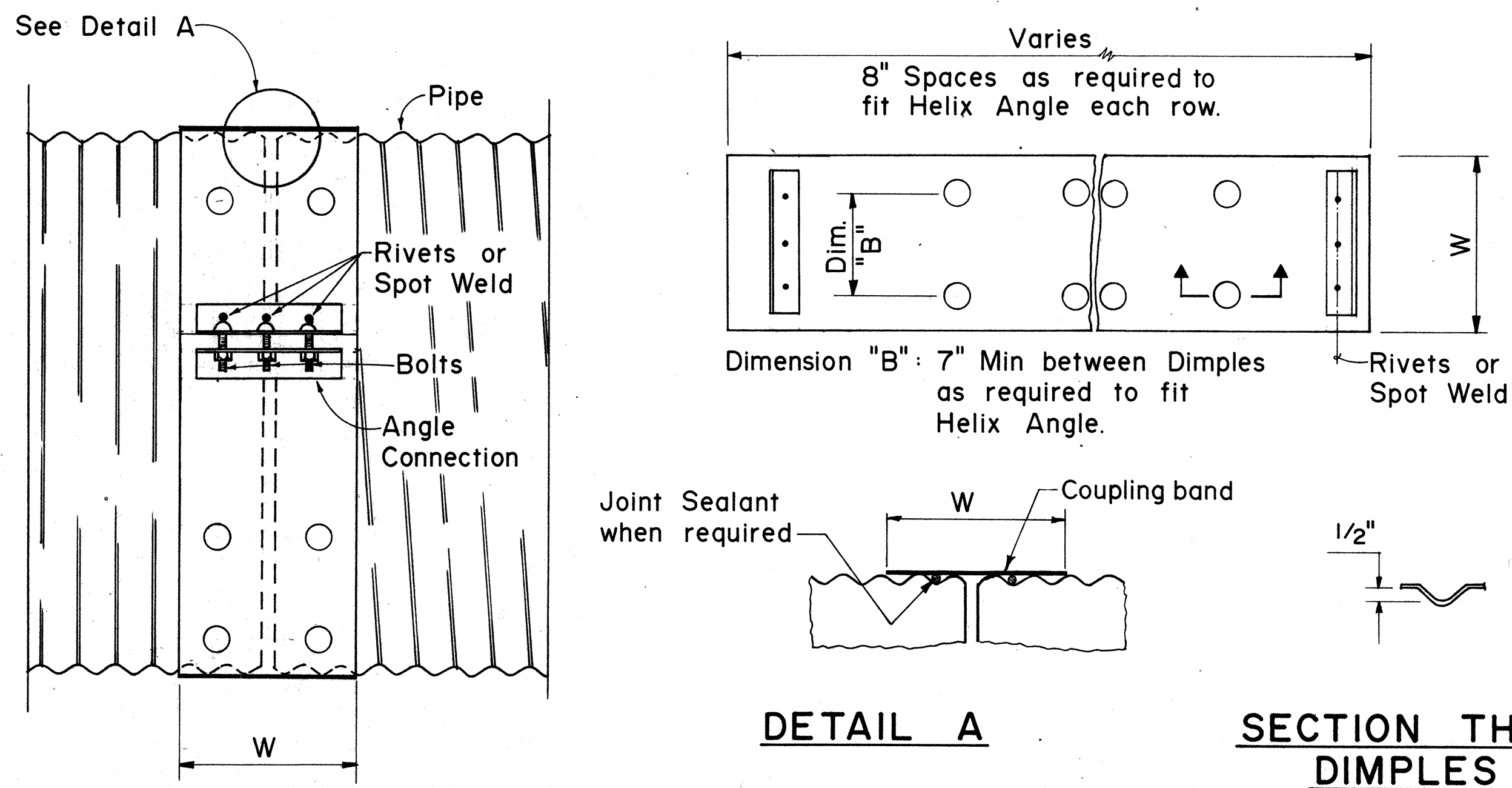
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
 STANDARD DETAILS
 TYPE A-9 AND A-12
 FRAMES AND GRATES
 Not To Scale Date: Dec. 1977

SHEET No. 86 OF 80 SHEETS DH 7

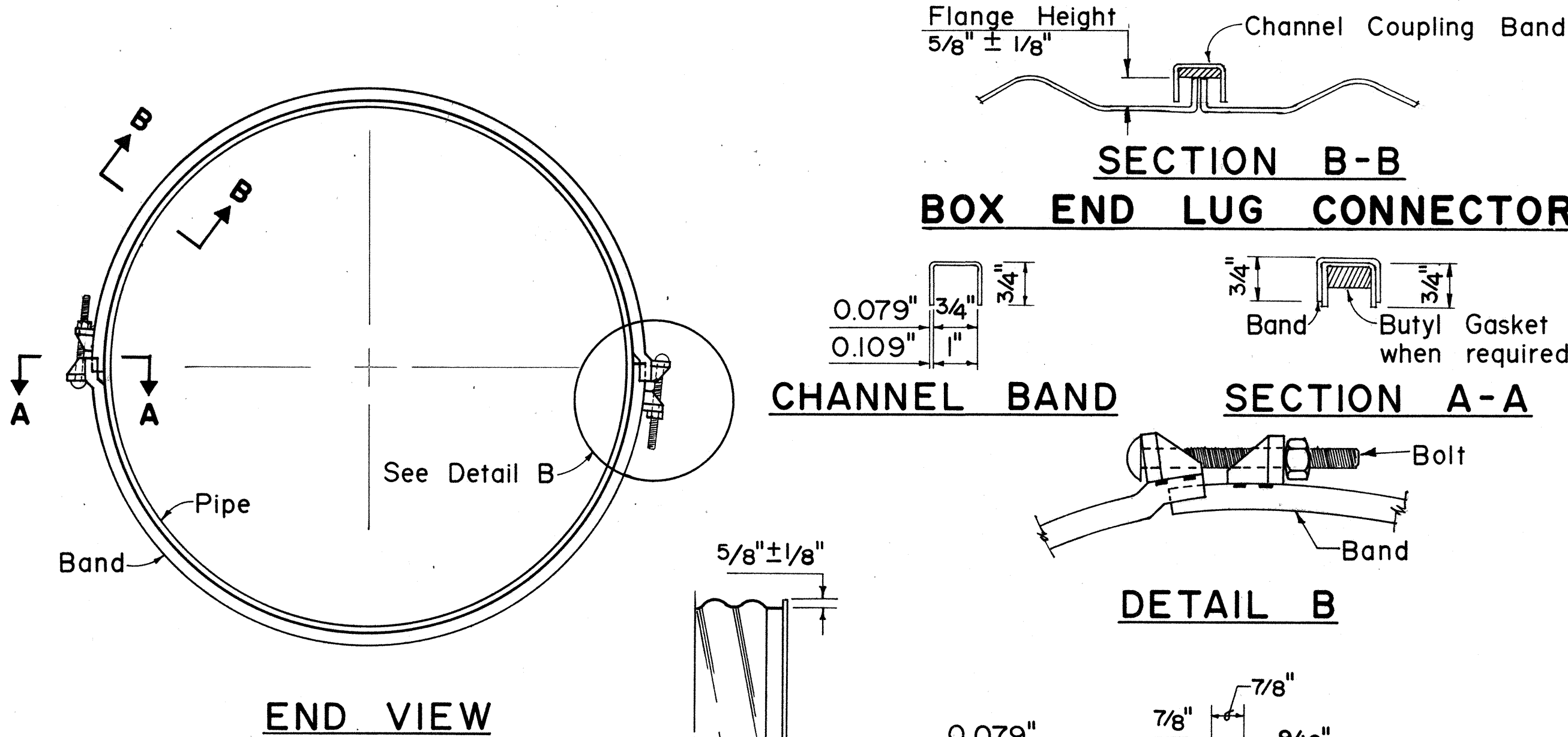
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(107)	1984	87	197



ANNULAR COUPLING BAND



UNIVERSAL COUPLING BAND ANGLE CONNECTION

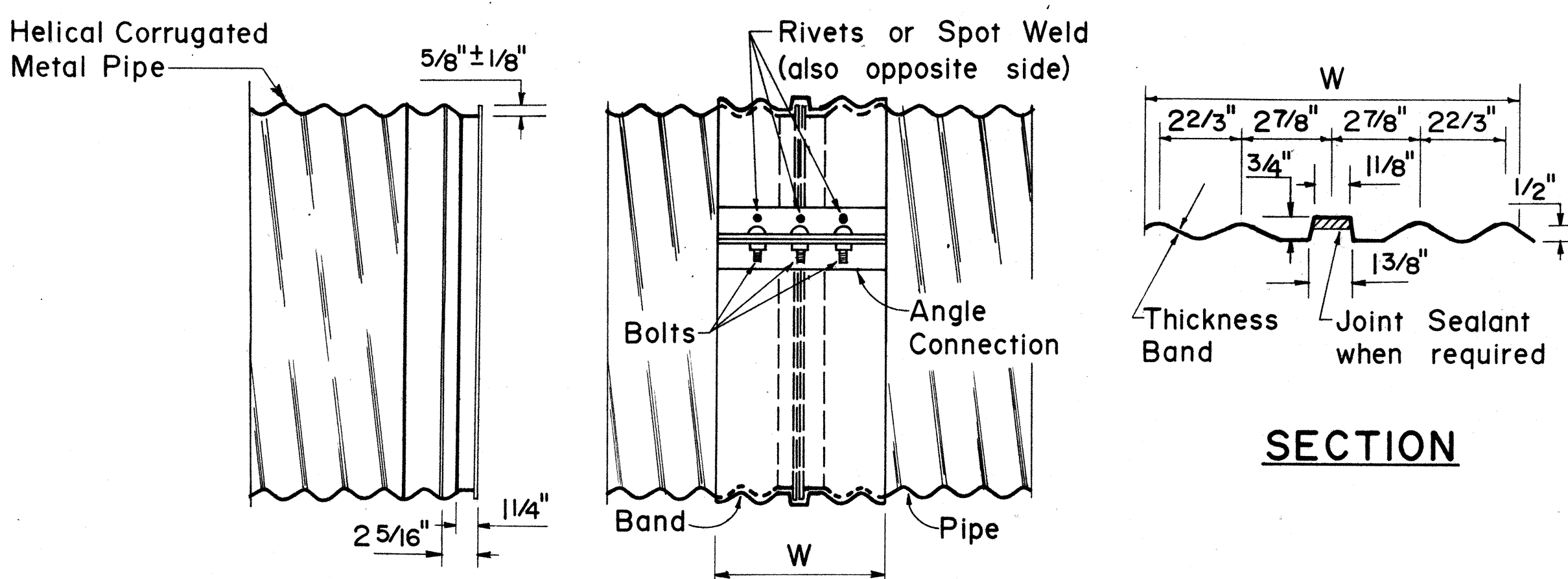


BOX END LUG CONNECTOR

GENERAL NOTES

1. All coupling band connection hardware shall be galvanized or electro plated in accordance with Standard Specifications.
2. For pipe arches use same width band as for round pipe of same periphery.
3. Two pieces band required for pipe greater than 48" diameter.
4. Fillet welds of equivalent strengths may be substituted for spot welds or rivets.
5. Dimensions and thickness shown are in inches and are nominal.

CHANNEL COUPLING BAND FOR USE ON REFORMED END C.M.P.



WING CHANNEL COUPLING BAND FOR REFORMED END H.C.M.P.

COUPLING TYPE	CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS	ANGLE CONNECTIONS-QUANTITIES PER CONNECTION			
					DIMENSIONS	BOLTS	RIVETS	SPOT WELD
UNIVERSAL	22/3 x 1/2	12 - 36	10 1/2	0.075-0.138	2 ea 2x2x3/16 x 7	2 ea 1/2 x 6	3 ea 3/8	3 ea 1/2
		42 - 60	16 1/2	0.164-0.168	2 ea 2x2x3/16 x 12	3 ea 1/2 x 6	4 ea 3/8	5 ea 1/2
	3 x 1	66 - 84	16 1/2	0.164-0.168	2 ea 2x2x3/16 x 12	3 ea 1/2 x 6	4 ea 3/8	
		36 - 72	10 1/2	0.075-0.138	2 ea 2x2x3/16 x 7	2 ea 1/2 x 6	3 ea 3/8	
ANNULAR	22/3 x 1/2	78 - 120	16 1/2	0.075-0.138	2 ea 2x2x3/16 x 12	3 ea 1/2 x 6	4 ea 3/8	
		12 - 36	7	0.075-0.138	2 ea 2x2x3/16 x 7	2 ea 1/2 x 6	3 ea 3/8	3 ea 1/2
		42 - 72	12	0.075-0.168	2 ea 2x2x3/16 x 12	3 ea 1/2 x 6	4 ea 3/8	5 ea 1/2
		78 - 84	12	0.164-0.168	2 ea 2x2x3/16 x 12	3 ea 1/2 x 6	4 ea 3/8	5 ea 1/2
	3 x 1	36 - 42	14	0.075-0.109	2 ea 2x2x3/16 x 12	3 ea 1/2 x 6	4 ea 3/8	
		48 - 84	14	0.075-0.109	2 ea 2x2x3/16 x 12	3 ea 1/2 x 6	4 ea 3/8	5 ea 1/2
		90 - 120	14	0.075-0.109	2 ea 2x2x3/16 x 12	3 ea 1/2 x 6	4 ea 3/8	

COUPLING TYPE	CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS	LUG TYPE CONNECTORS-QUANTITIES PER CONNECTION		
					DIMENSIONS	BOLTS	SPOT WELD
CHANNEL	22/3 x 1/2	12 - 72		0.075-0.138	2 ea Lugs	1 ea 1/2 x 6	4 ea 1/2
	3 x 1	36 - 72		0.075-0.138	2 ea Lugs	1 ea 1/2 x 6	4 ea 1/2
WING	22/3 x 1/2	12 - 72	12	0.075-0.138	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2
		78 - 84	12	0.164-0.168	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2
	3 x 1	36 - 120	12	0.075-0.109	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2

APPROVAL RECOMMENDED:
 9-7-79
 HYDRAULIC DESIGN ENGINEER DATE
 APPROVED:
 9-14-79
 ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
1.	Revise pipe wall thickness from table and delete note #6.	9-7-83	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
C.M.P. COUPLING DETAILS
STANDARD JOINT
Not To Scale Date: Sept. 1979