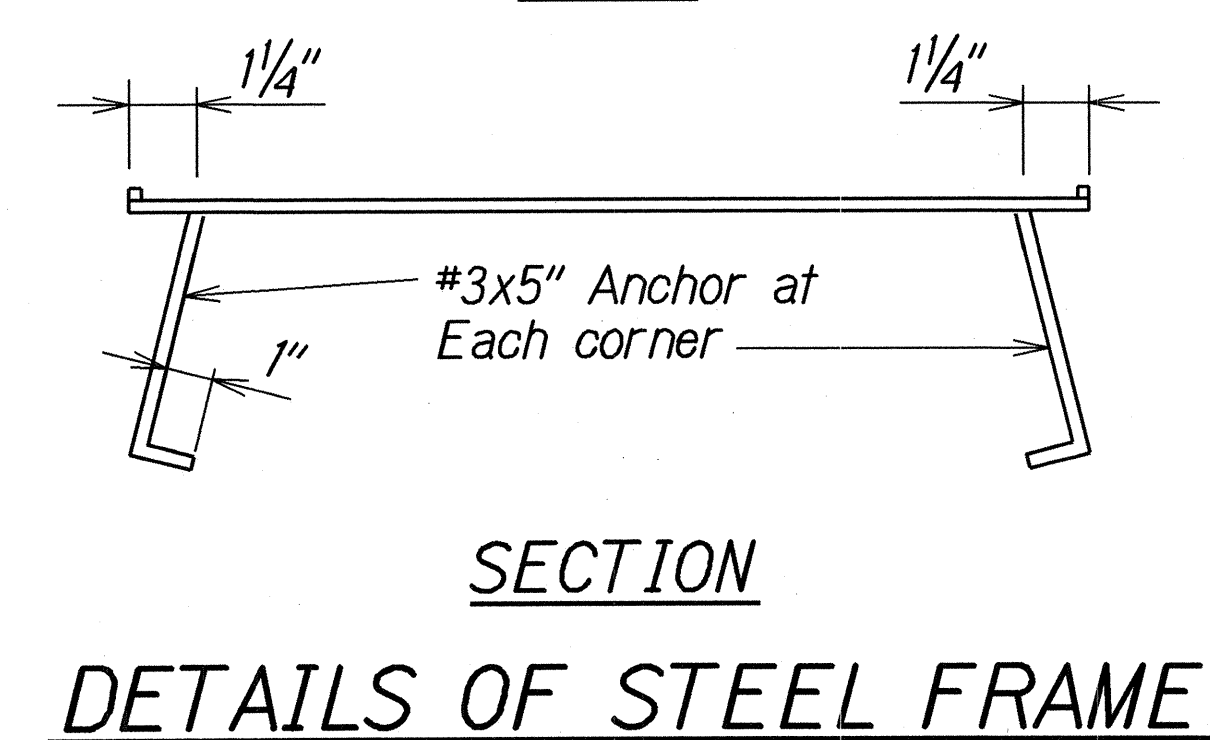
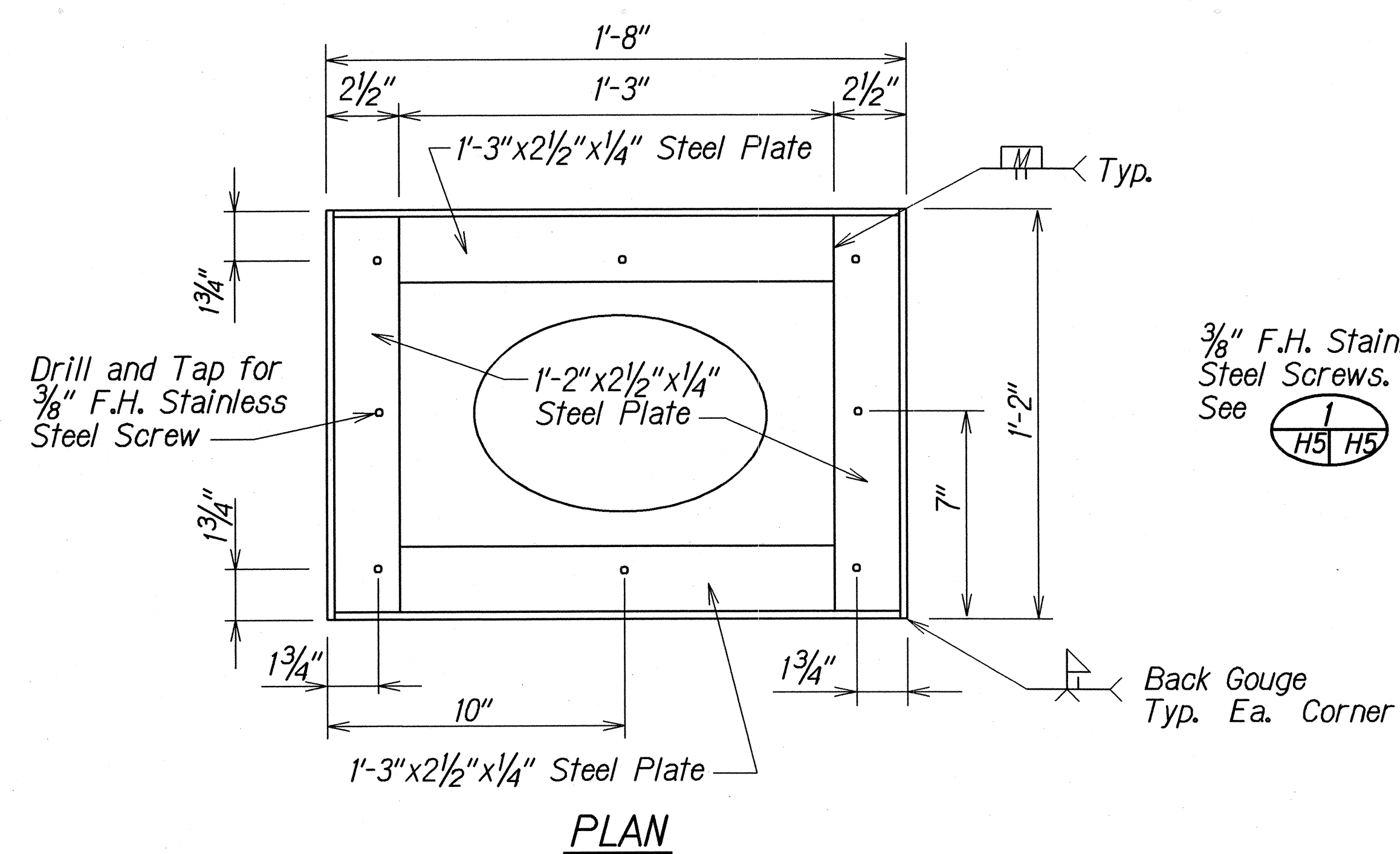
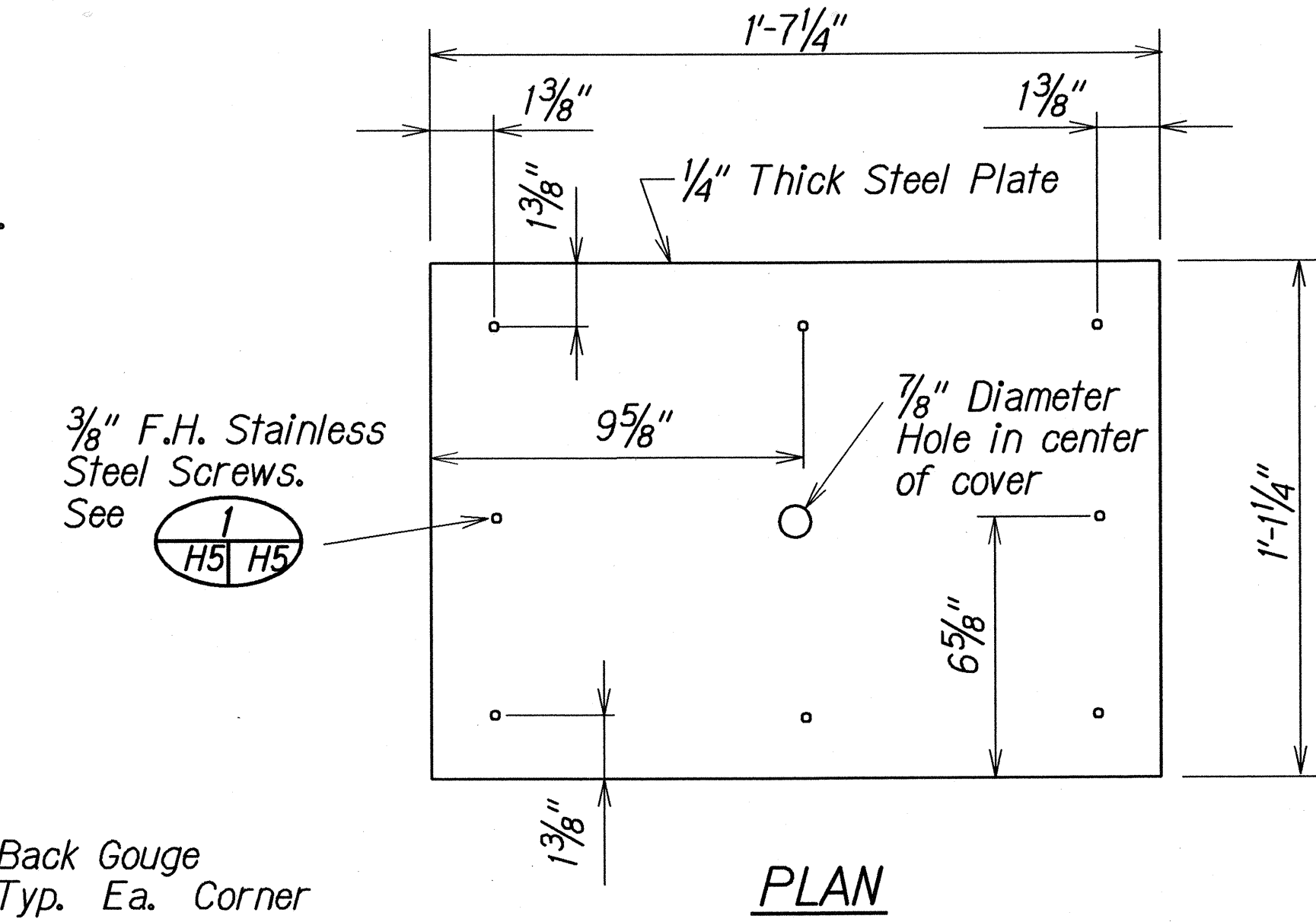


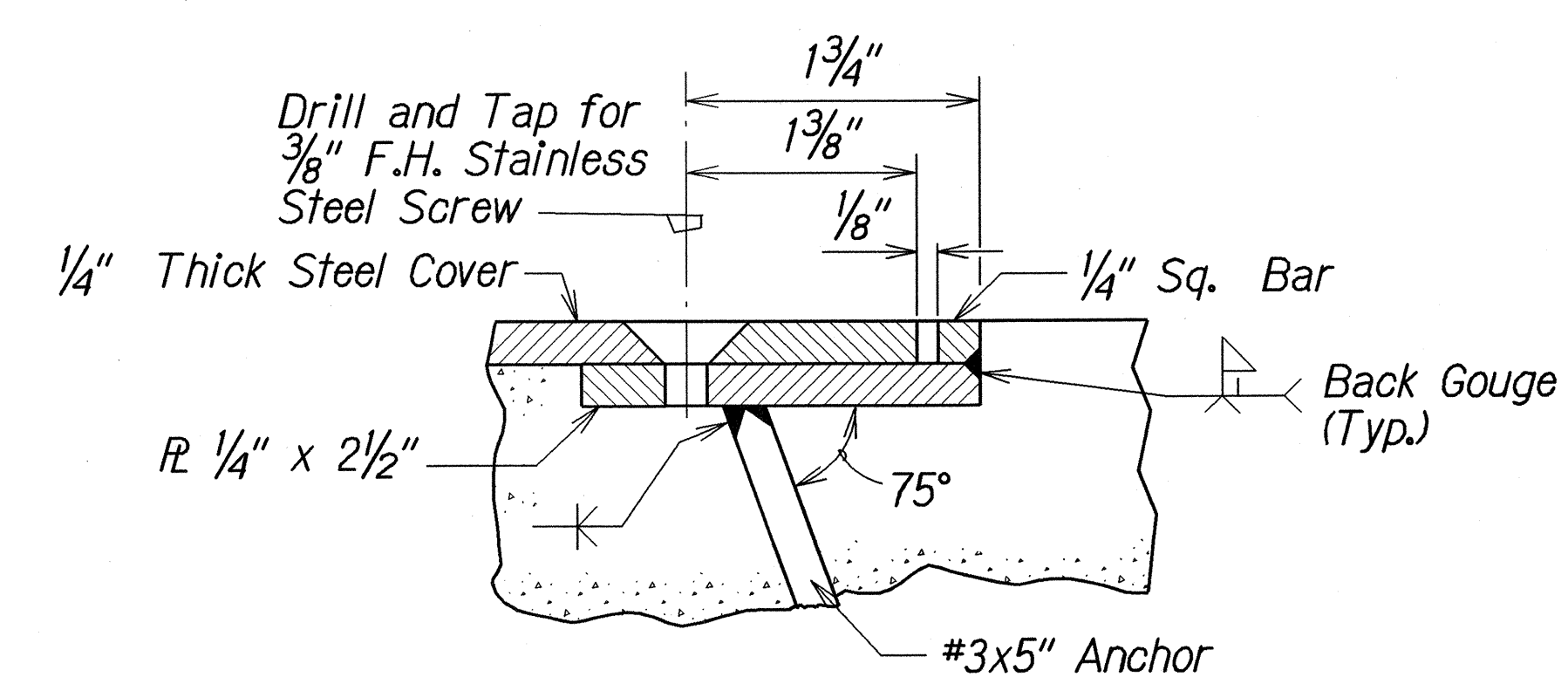
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-01-02	2004	19	40



SECTION
DETAILS OF STEEL FRAME

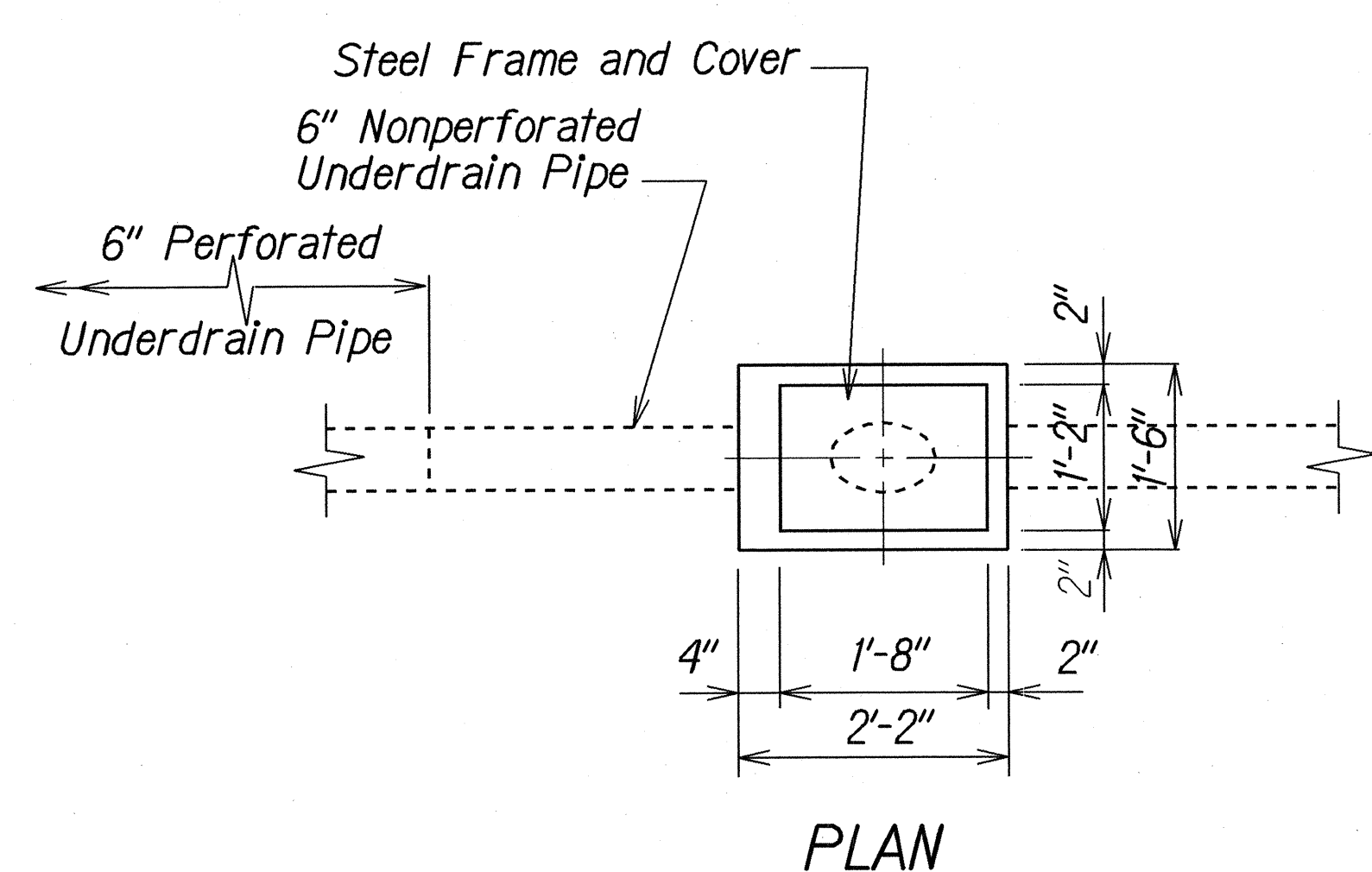


PLAN
DETAIL OF STEEL COVER

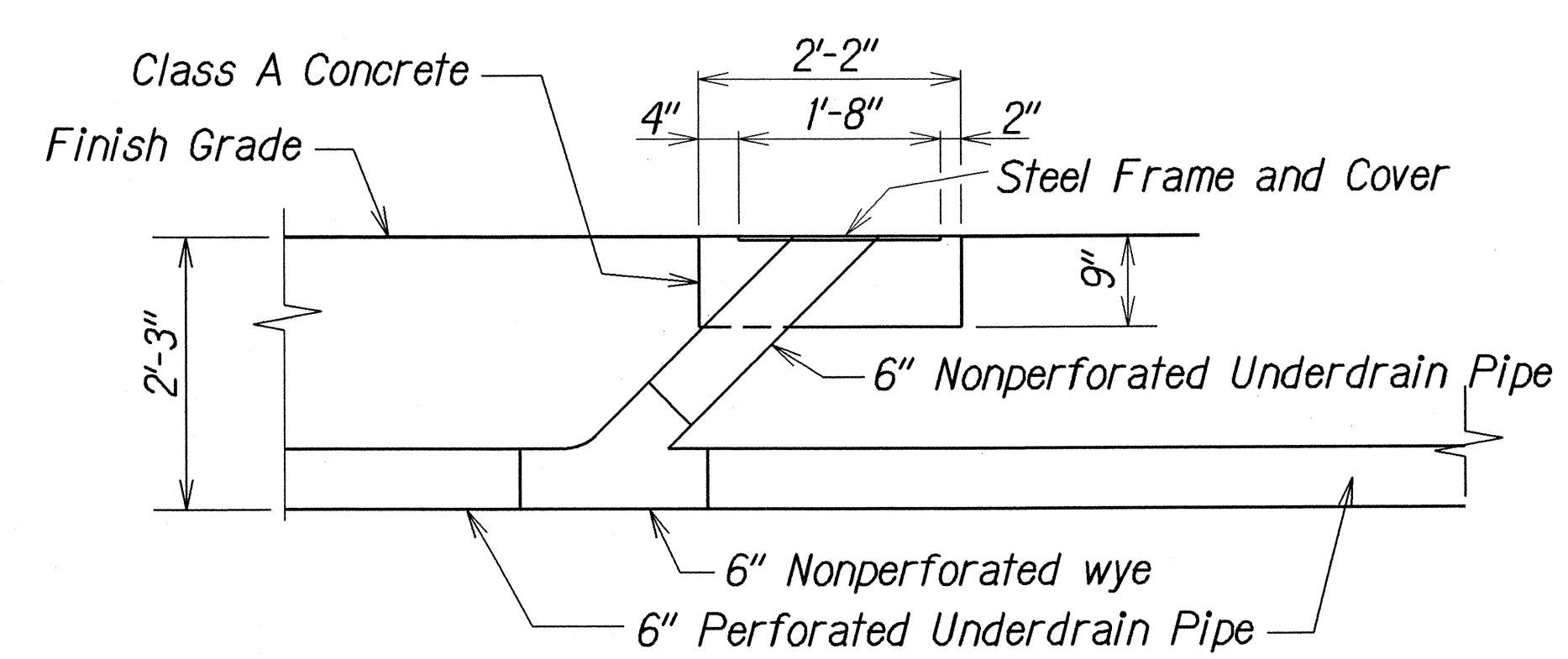


DETAIL
Full Size H5 H5

NOTE: All Steel Parts shall be galvanized in accordance with the requirements of ASTM A123.
DETAILS OF STEEL FRAME AND COVER FOR CLEANOUT
Scale: 3"=1'-0"



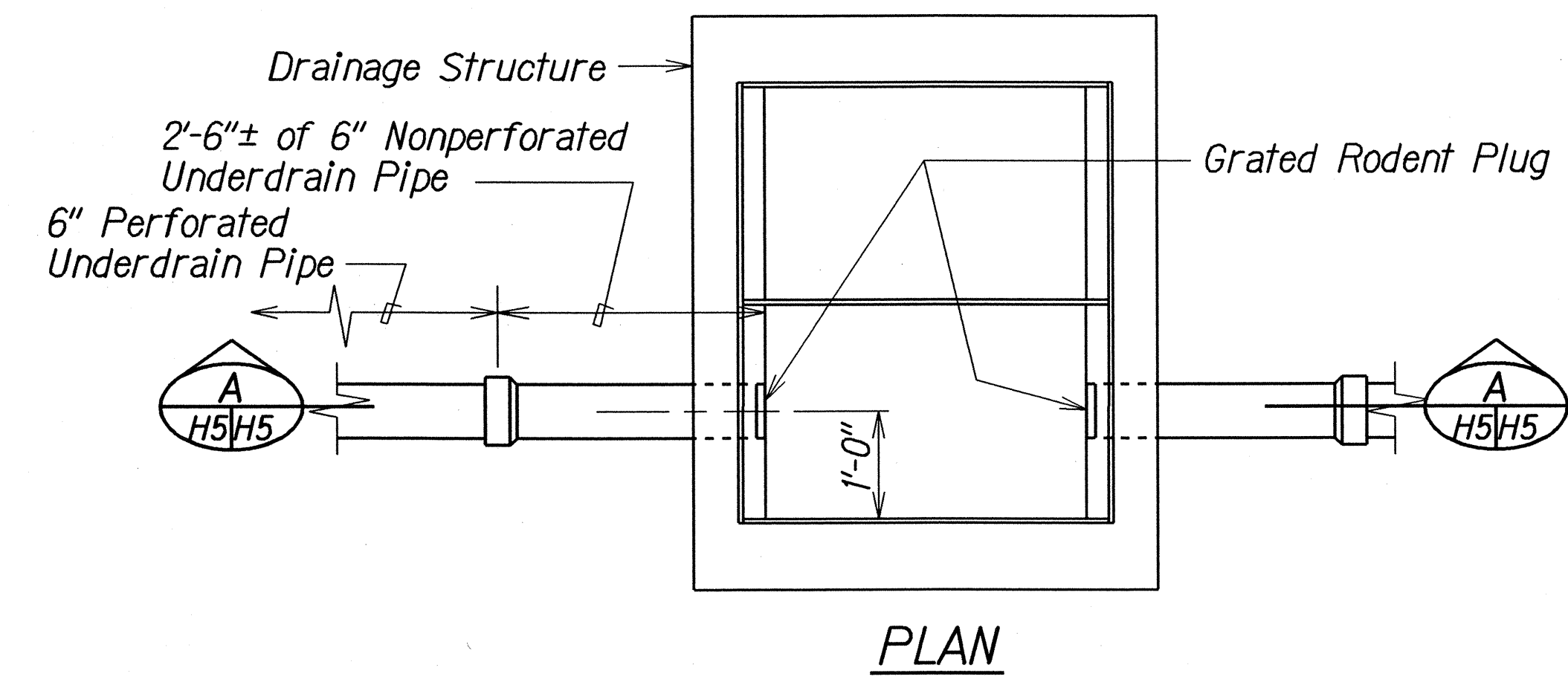
PLAN



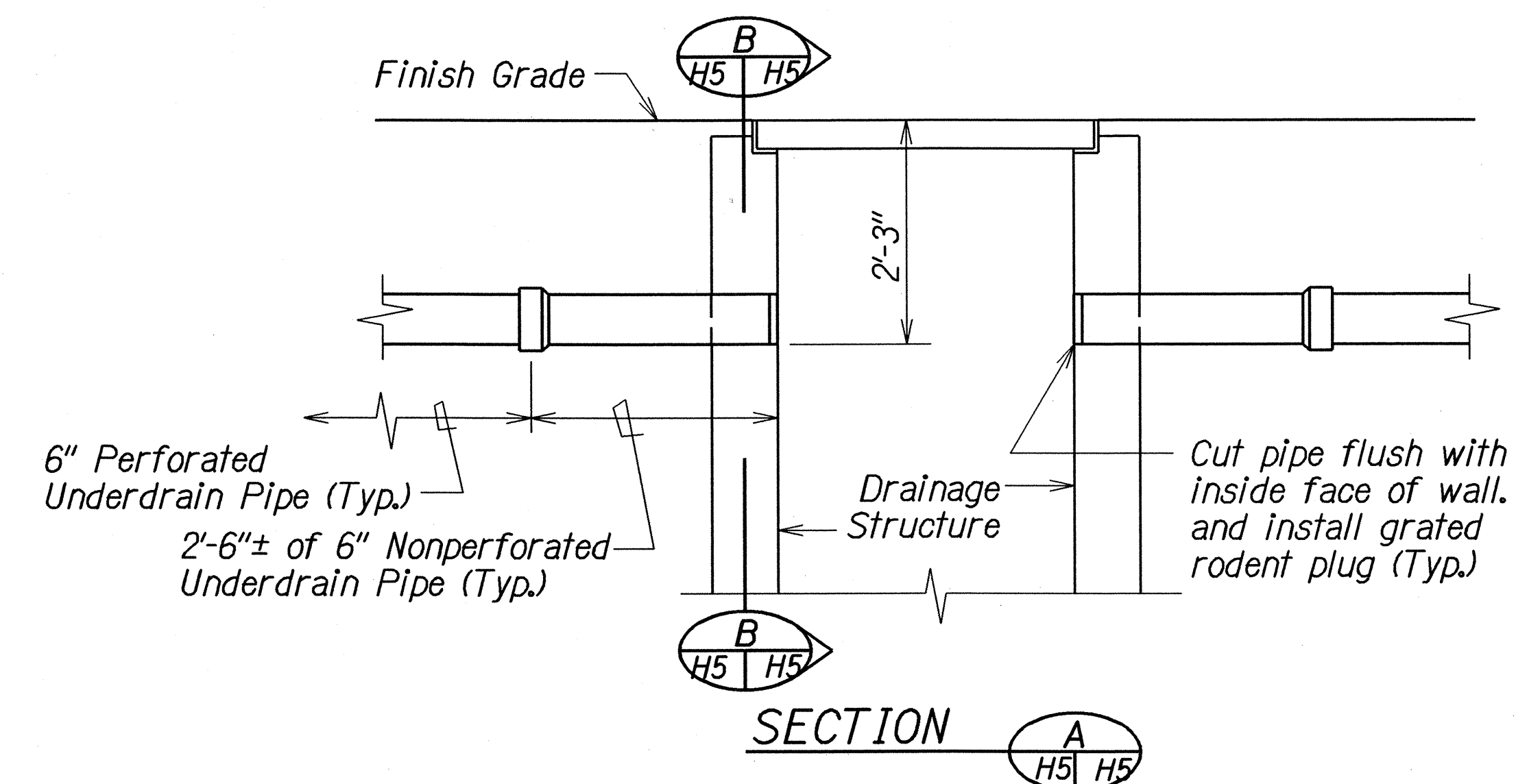
NOTE: Install 45° elbow in lieu of wye where underdrain pipe begins. (See Drainage Plans)

ELEVATION

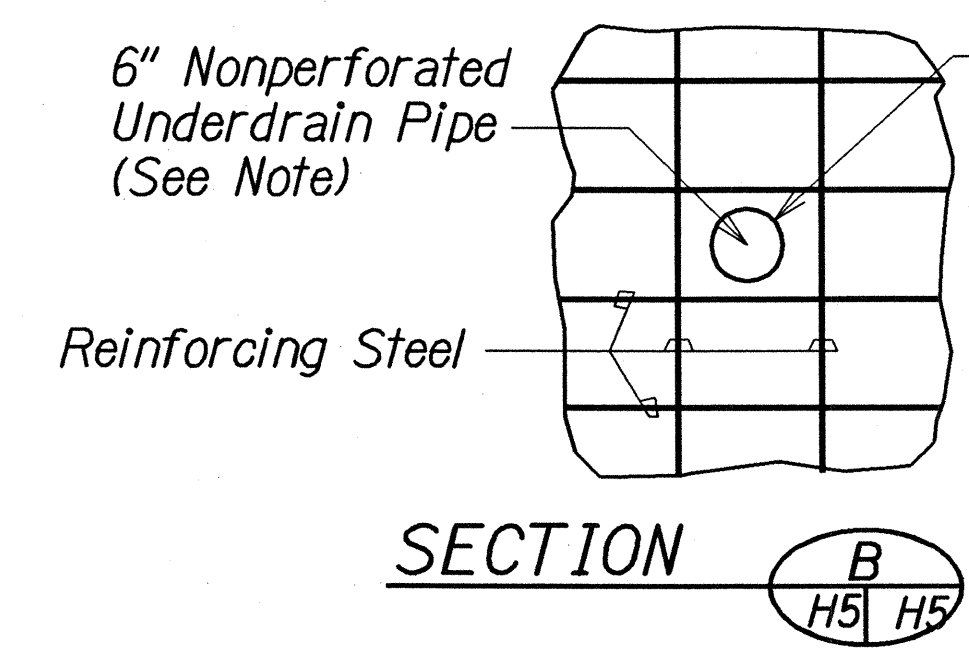
DETAILS OF CLEANOUT
Scale: 3/4"=1'-0"



PLAN



SECTION



- NOTES:
1. The exact invert location of the underdrain connection shall be adjusted to pass between the reinforcing steel.
2. Underdrain pipe connection to concrete box culvert shall be similar to above detail.
3. Provide Grated Rodent Plugs.

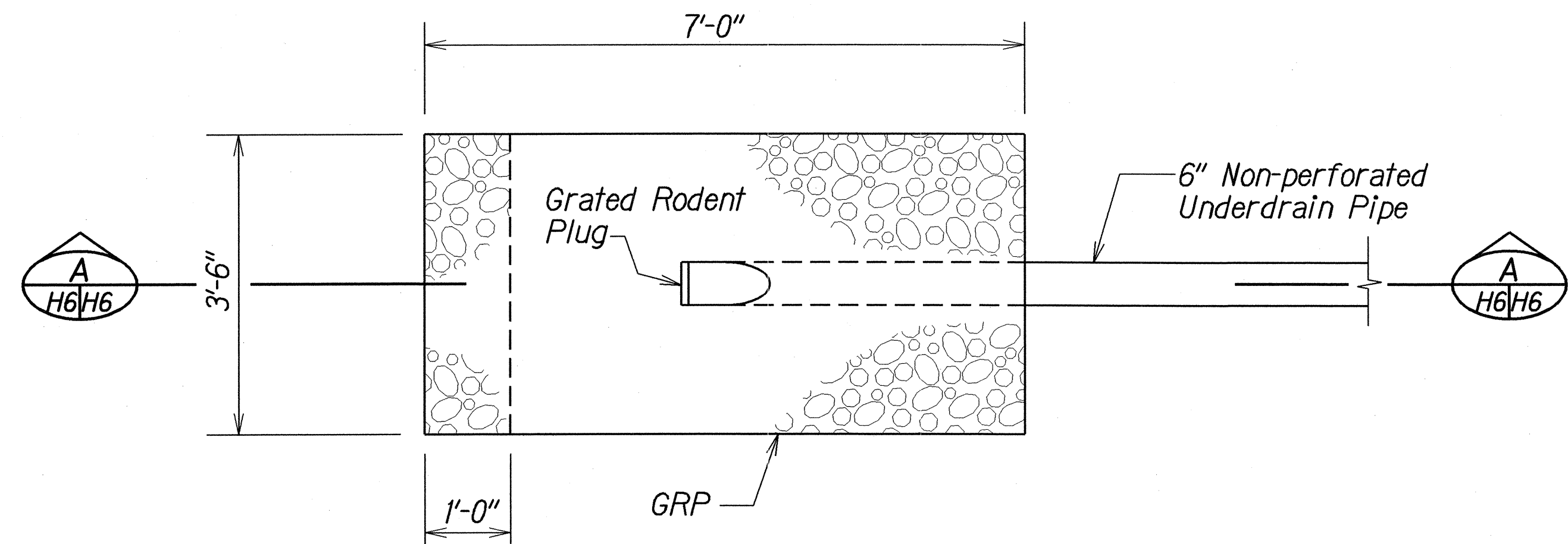
DETAILS OF 6" UNDERDRAIN
CONNECTION TO DRAINAGE STRUCTURES
Scale: 3/4"=1'-0"

DATE	6/9/03
SURVEY PLOTTED BY	...
DRAWN BY	...
DESIGNED BY	...
CHECKED BY	...
ORIGINAL PLAN	...
NOTE BOOK	...
CHIEF ENGINEER	...
CHIEF DESIGNER	...
CHIEF CHECKER	...

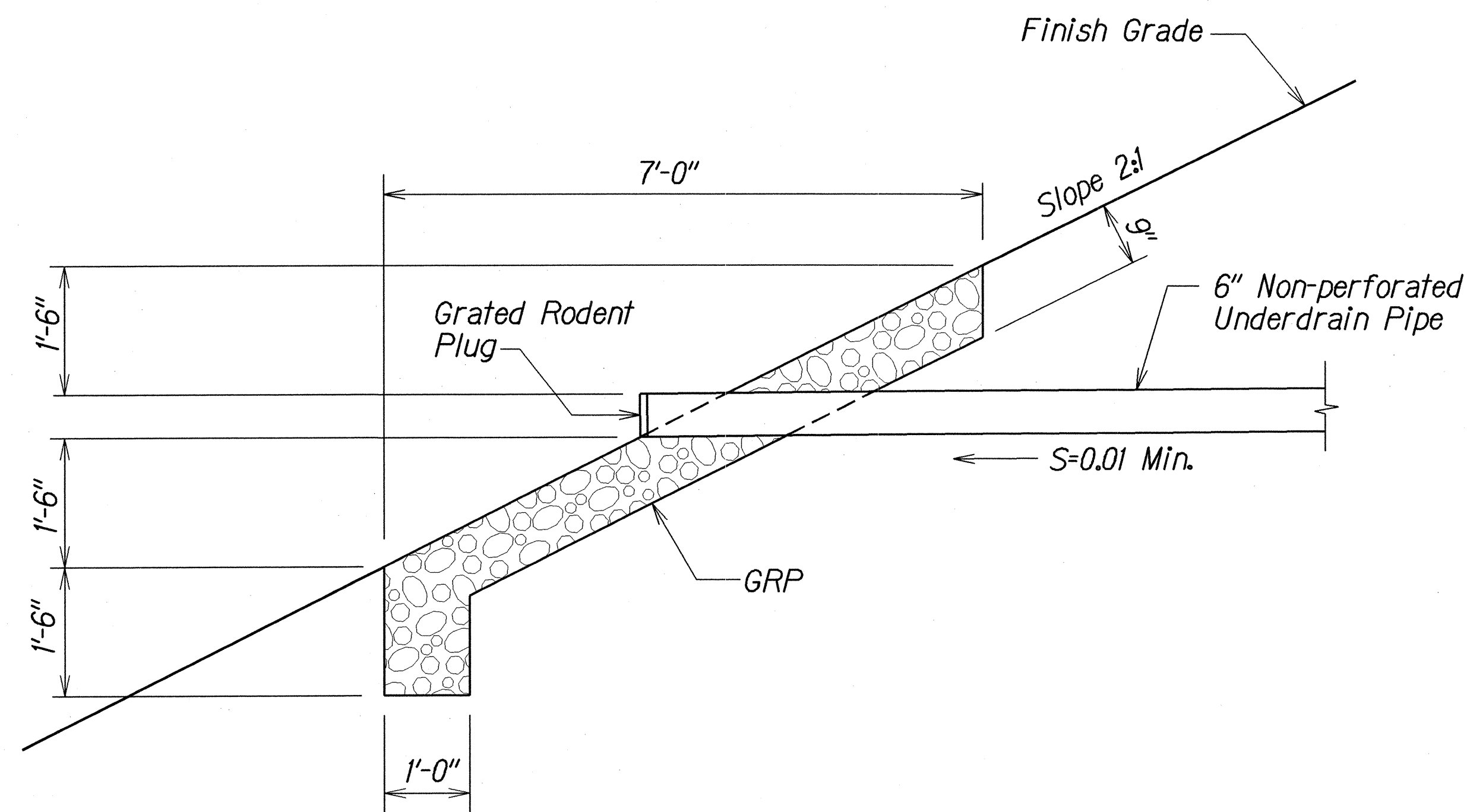
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS
HAWAII BELT ROAD
Traffic Operational Improvements
At Kulaimano Road
Project No. 19J-01-02
Scale: As Shown Date: June, 2003
SHEET No. H5 OF 10 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-01-02	2004	20	40



PLAN

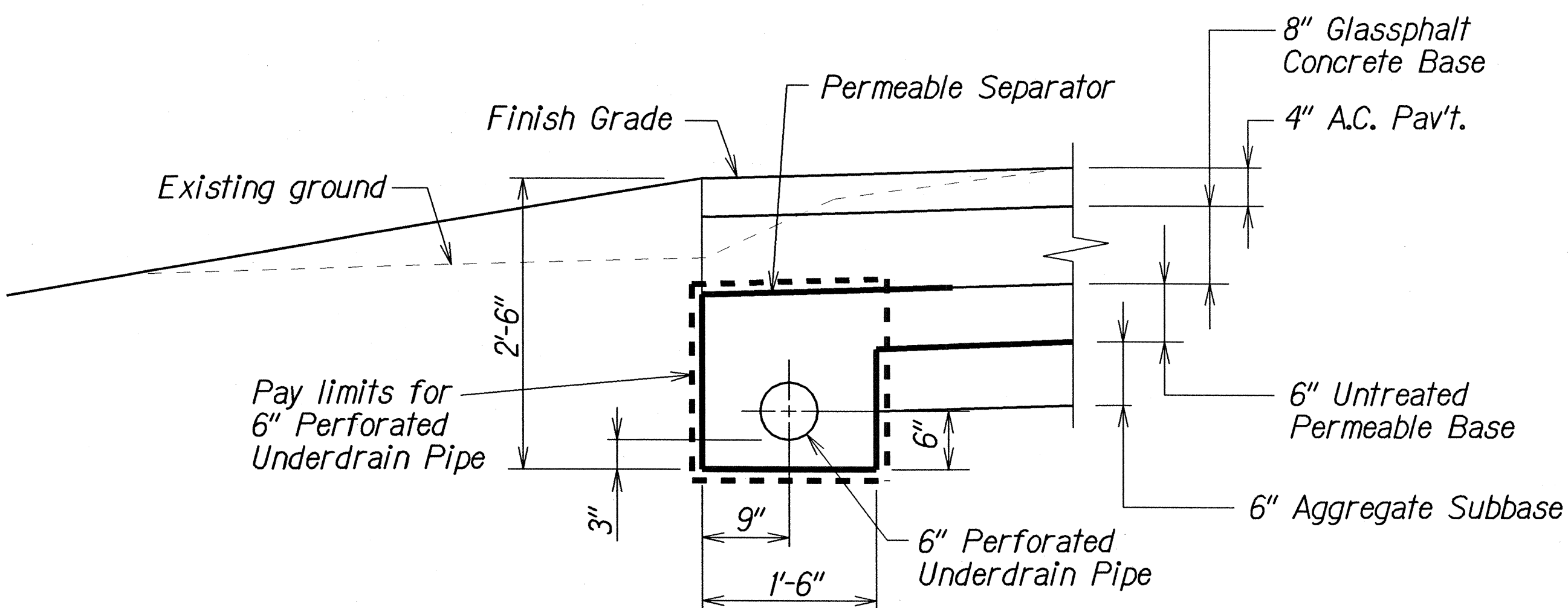


SECTION



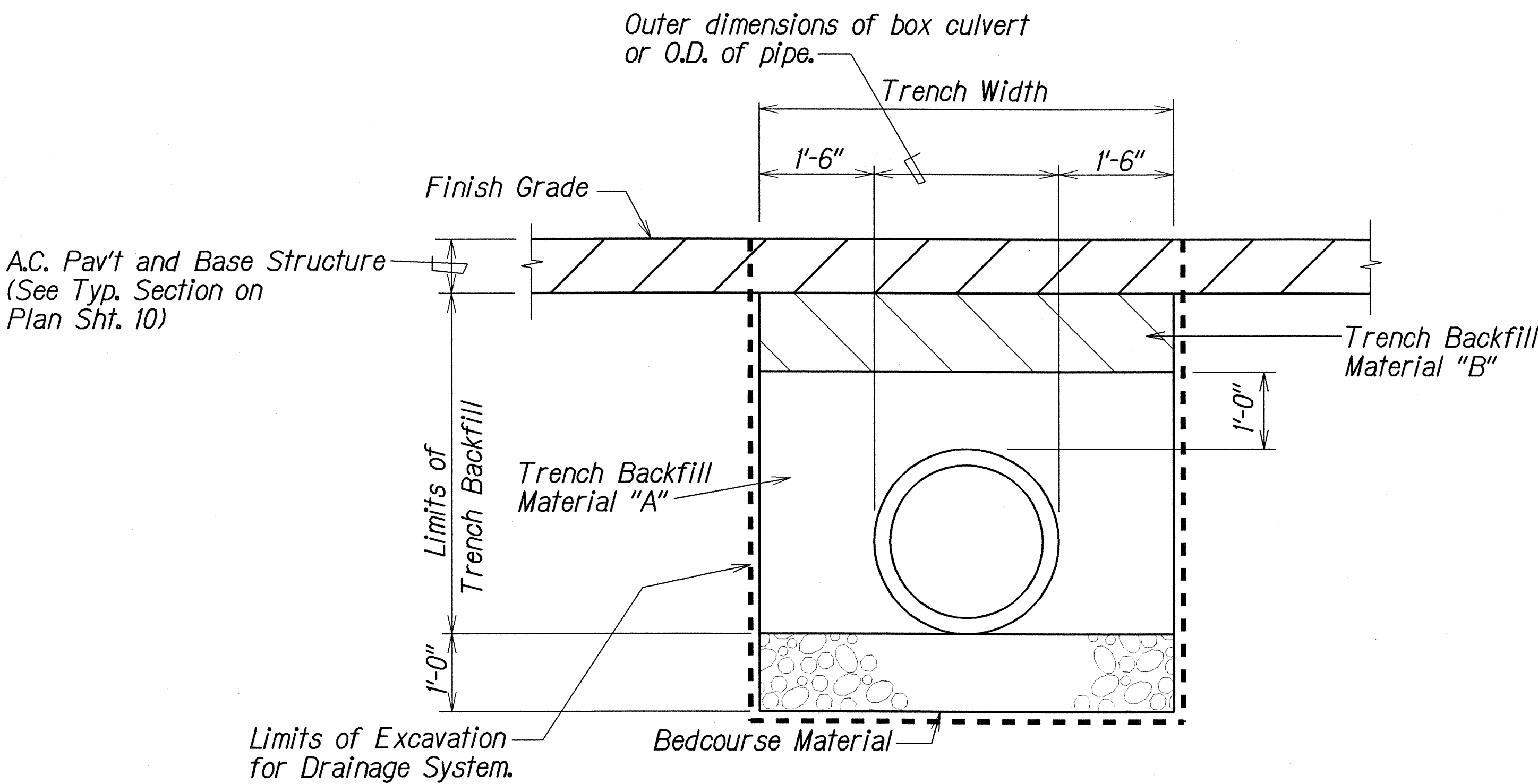
DETAILS OF UNDERDRAIN OUTLET STRUCTURE

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



DETAIL OF 6-INCH PERFORATED UNDERDRAIN PIPE PAY LIMITS

Scale: 1"=1'-0"



DETAIL OF CULVERT TRENCH RESTORATION

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS

HAWAII BELT ROAD
Traffic Operational Improvements
At Kulaimano Road
Project No. 19J-01-02

Scale: As Shown
Date: Sep, 2003

BOX CULVERT GENERAL NOTES

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-01-02	2004	21	40

DESIGN SPECIFICATIONS - AASHTO:

1. AASHTO LRFD Bridge Design Specifications, 1998, with 1999, 2000, 2001 and 2002 interim revisions..

MATERIALS:

- Reinforced concrete: $f'c = 4,000$ psi (min.)
- Reinforcing steel: ASTM A 615, Grade 60.
- Admixture in concrete: See Special Provisions
- All expansion and premolded joint filler shall be incidental to concrete and will not be paid for separately.
- Epoxy shall be "Double Cartridge" type with static mixer. Epoxies that require manual measuring or mixing will not be allowed. Epoxy shall meet the requirements of ASTM C 881, Type IV, Grade 3, Class C.

CONSTRUCTION METHODS:

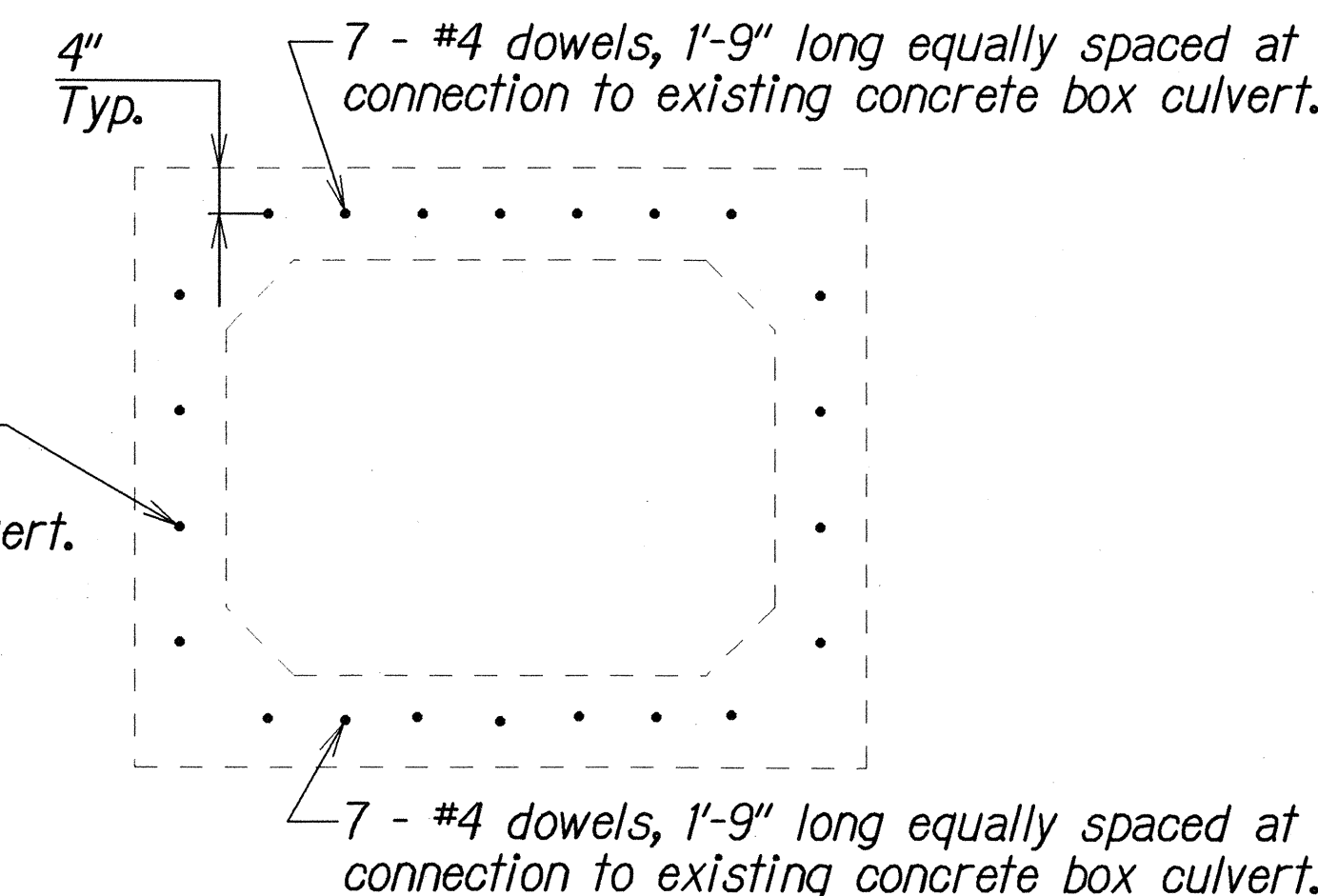
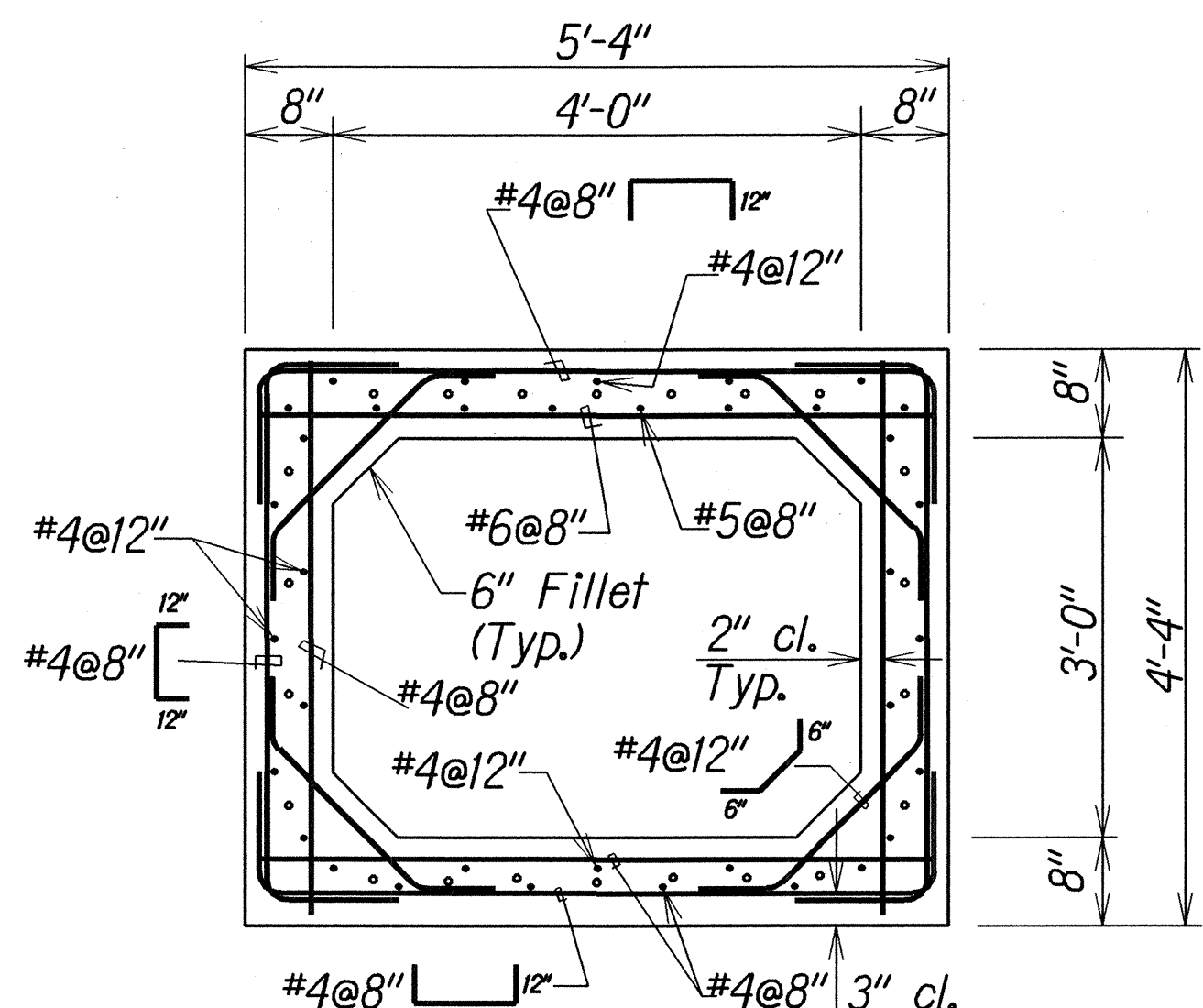
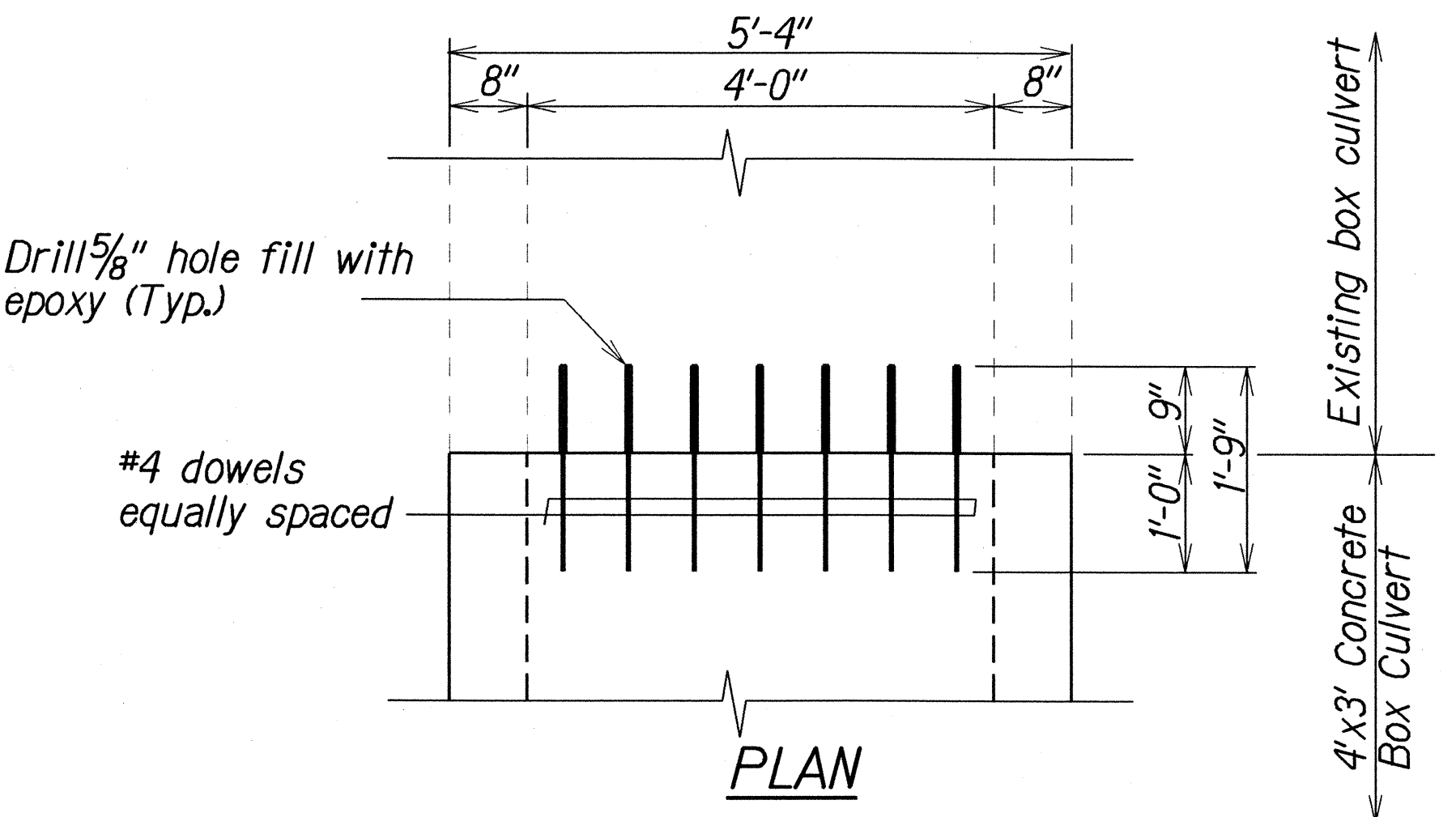
- Refer to Hawaii Standard Specifications for Road, Bridge and Public Works Construction, 1994 Edition and Special Provisions.
- Except as noted otherwise, all dimensions are measured plumb.
- For concrete finish, see Special Provisions.
- For steel reinforcing, all splices shall be staggered where possible.
- Steel reinforcing shall be supported, bent and placed as per the ACI Detailing Manual, 1994.
- For cast-in-place concrete, minimum reinforcement cover unless shown otherwise: concrete cast against earth: 3" walls: 2"
- At time concrete is placed, reinforcing shall be free from mud, oil, laitance or other coatings adversely affecting bond capacity.
- Reinforcement, dowels and other embedded items shall be positively secured before pouring.
- All footings shall bear on firm undisturbed natural soils or properly compacted structural fill.
- All existing reinforcing that can be incorporated in the new work shall be bent as required and cleaned before being utilized in the new work.
- All existing reinforcing that cannot be incorporated in the new work shall be completely removed or removed to a minimum depth of 1 1/2 inches below finish surface and the area patched with mortar.
- All existing concrete faces receiving new concrete in the finish product shall be roughened and cleaned prior to placement of the new pour, unless indicated otherwise or as directed by the Engineer.
- Minimum clear spacing between parallel bars shall be one and one-half (1 1/2) times the diameter of the bars (for non-bundled bars). But in no case shall the clear distance between the bars be less than one and one-half (1 1/2) times the maximum size of the course aggregate.
- Large impacting or vibratory type equipment will not be permitted in the drilling of holes.
- The holes for dowels shall be drilled as shown into the existing concrete surfaces prior to fabrication of reinforcing steel elements. If the drill contacts any existing rebar, the hole shall be filled with epoxy grout and a replacement hole shall be drilled. The Contractor shall not damage any existing rebars. Any damage by the Contractor shall be repaired at the Contractor's expense and at no cost to the State. The drilled holes shall be 1/8" larger. Blow the hole clean with compressed air, brush the hole, and blow it clean again. Holes should be clean and sound, and as per the epoxy manufacture recommendations.
- Place Flashing Compound conforming to Standard Specifications 705.05 on the outside top and side walls, 6" on each side of joints between old and new culverts, clean surface of old culverts as necessary to provide complete bonding. Flashing Compound shall be considered incidental.

REFERENCE:

1. Refer to Standard Plans for additional details and notes not covered by details and typical drawings.

GENERAL:

- All items noted incidental will not be paid for separately.
- The Contractor shall verify the locations of all existing utility lines and notify their respective owners before commencing with any work.
- The Contractor shall verify all grades and dimensions in the field before commencing with any work.
- The Contractor shall be solely responsible for the protection of adjacent property, utilities and existing and new structures from damage due to construction. Repairing any damage shall be at the Contractor's own expense, to the satisfaction of the Engineer. He shall conduct his work in such a manner and provide such temporary shoring or other measures as may be necessary to insure the safety of all concerned and to protect existing structures.
- Excavation for all footings and footing keys shall be accomplished by maintaining as near a vertical cut as possible.
- In the event of over-excavation, the space between the footing or footing key and ground shall be filled with a minimum of Class D concrete at the Contractor's expense and as directed by the Engineer.
- Unless noted otherwise, chamfer all exposed concrete edges three-quarters (3/4) of an inch.
- Excavating, demolishing and/or disposing existing concrete end post and backfilling for new concrete end post shall not be paid for separately but shall be considered incidental.
- Where existing endpost has bridge name and year, new end post shall have existing bridge name and year installed, and shall be considered incidental. See Std. Plan Sht. B-01 for details.



SECTION OF BOX CULVERT

SECTION OF EXISTING BOX CULVERT

DETAILS OF 4' X 3' CONCRETE BOX CULVERT

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NOTED BY: L.G.C.	
DESIGNED BY: C.M.	
CHECKED BY: J.B.	

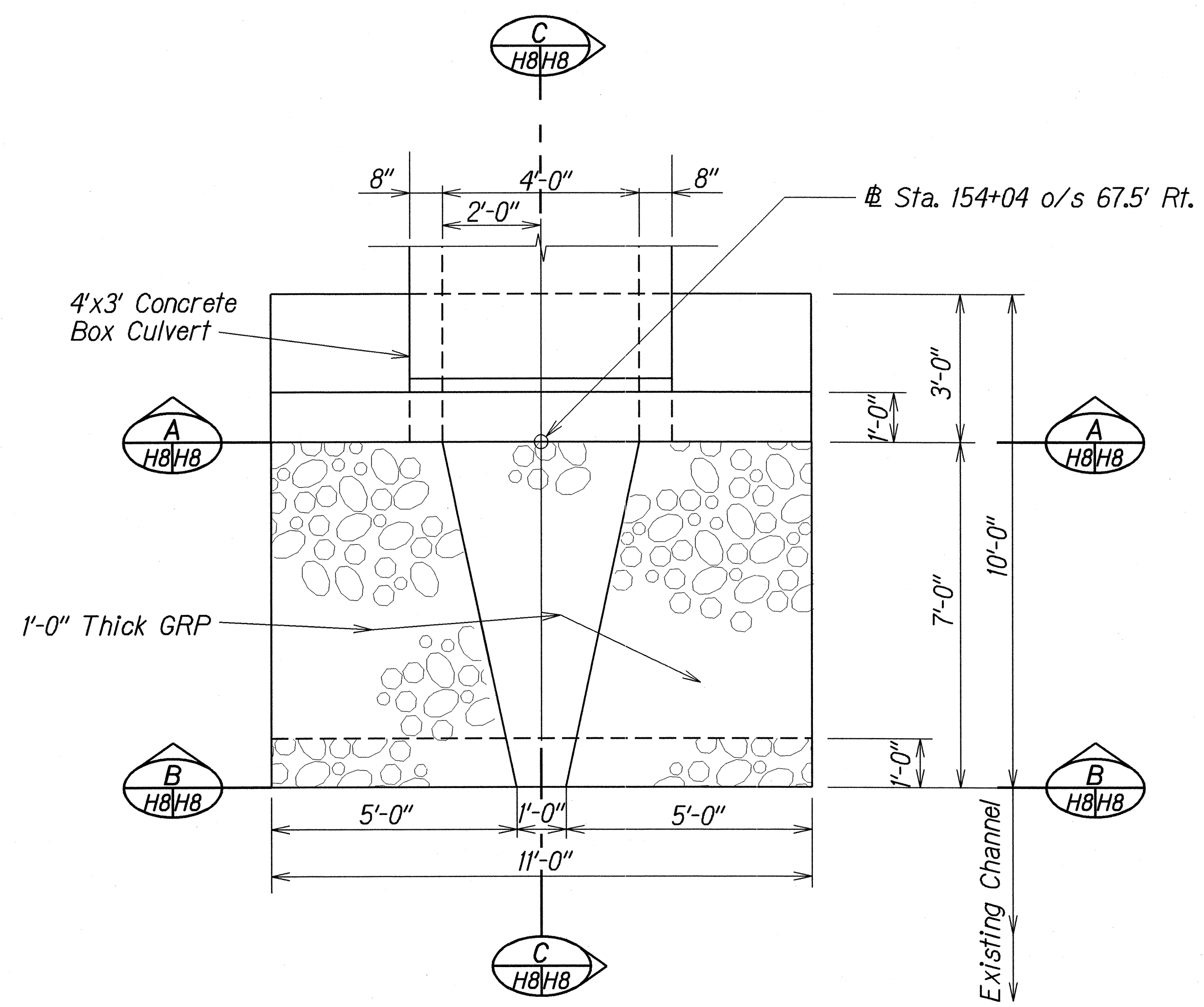
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAILS
HAWAII BELT ROAD
Traffic Operational Improvements
At Kulaimano Road
Project No. 19J-01-02

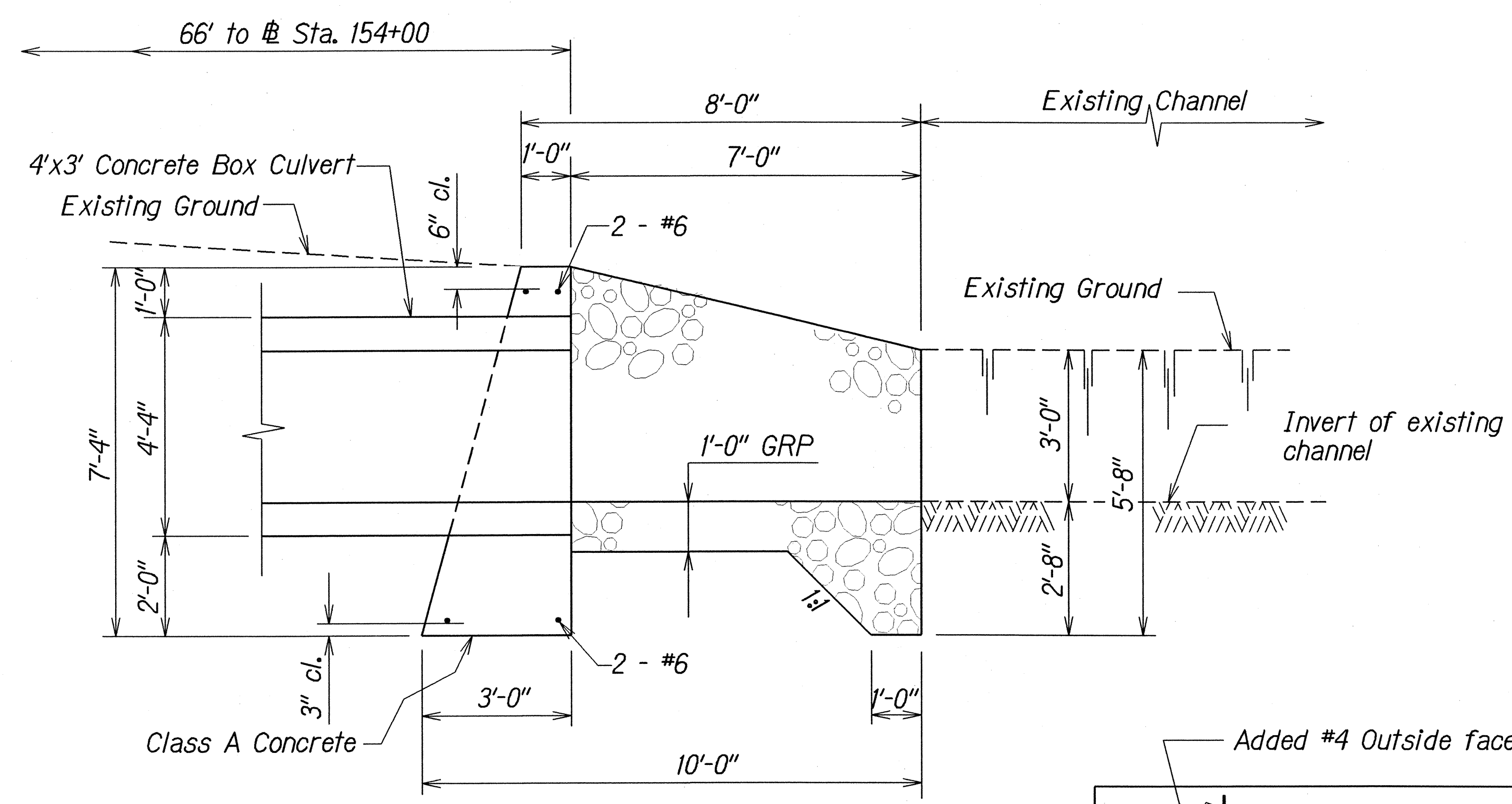
Scale: 3/4" = 1'-0" Date: Sep, 2003

SHEET No. H7 OF 10 SHEETS

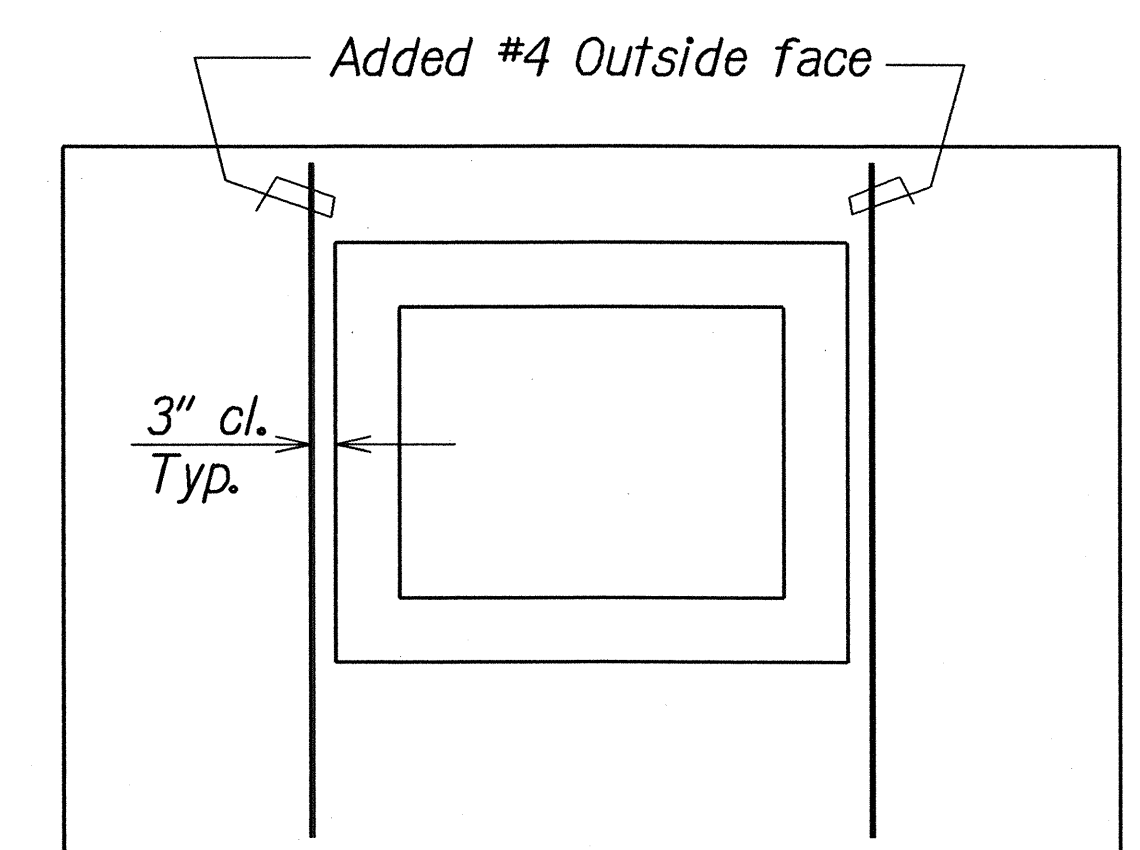
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-01-02	2004	22	40



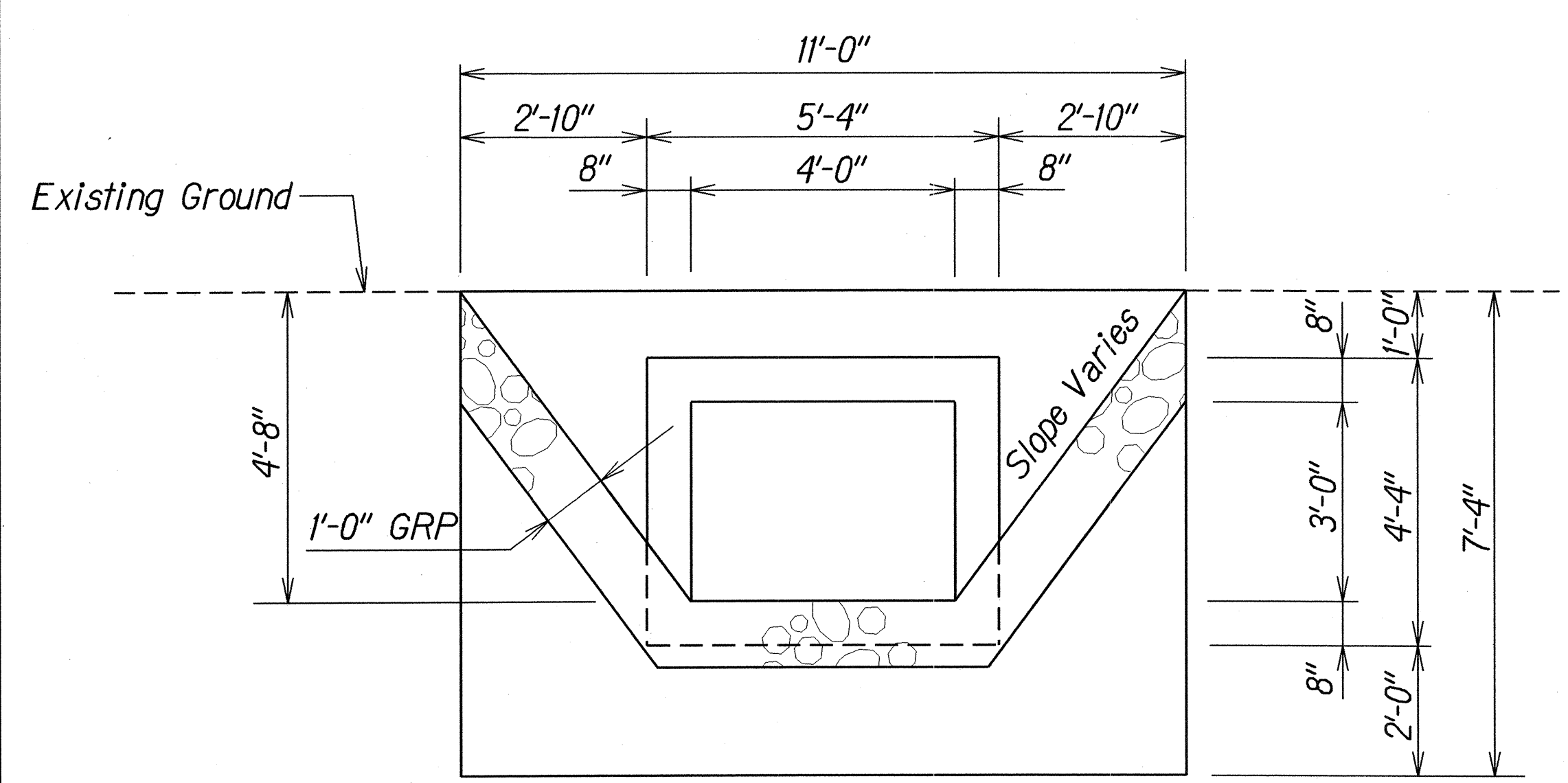
PLAN



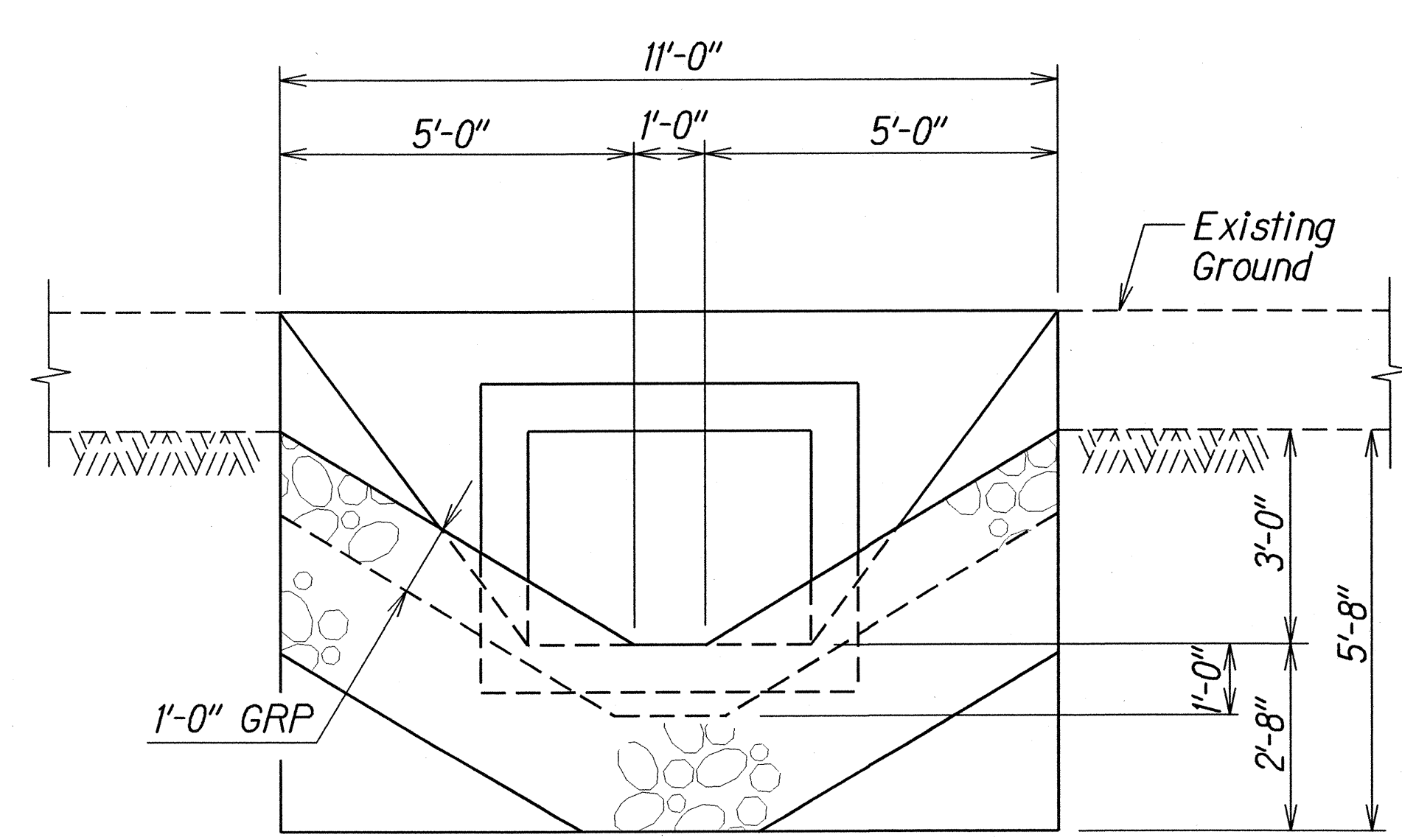
SECTION C



ADDED REINFORCING AROUND CULVERT OPENING



SECTION A



SECTION B

DETAILS OF TYPE "I" OUTLET STRUCTURE AT STA. 154+00 O/S 66' RT.

ORIGINAL PLAN	DATE	6/2/03
SURVEY PLOTTED BY		
DRAWN BY		
CHECKED BY		
NOTED BY		
DESIGNED BY		
APPROVED BY		
CHECKED BY		

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

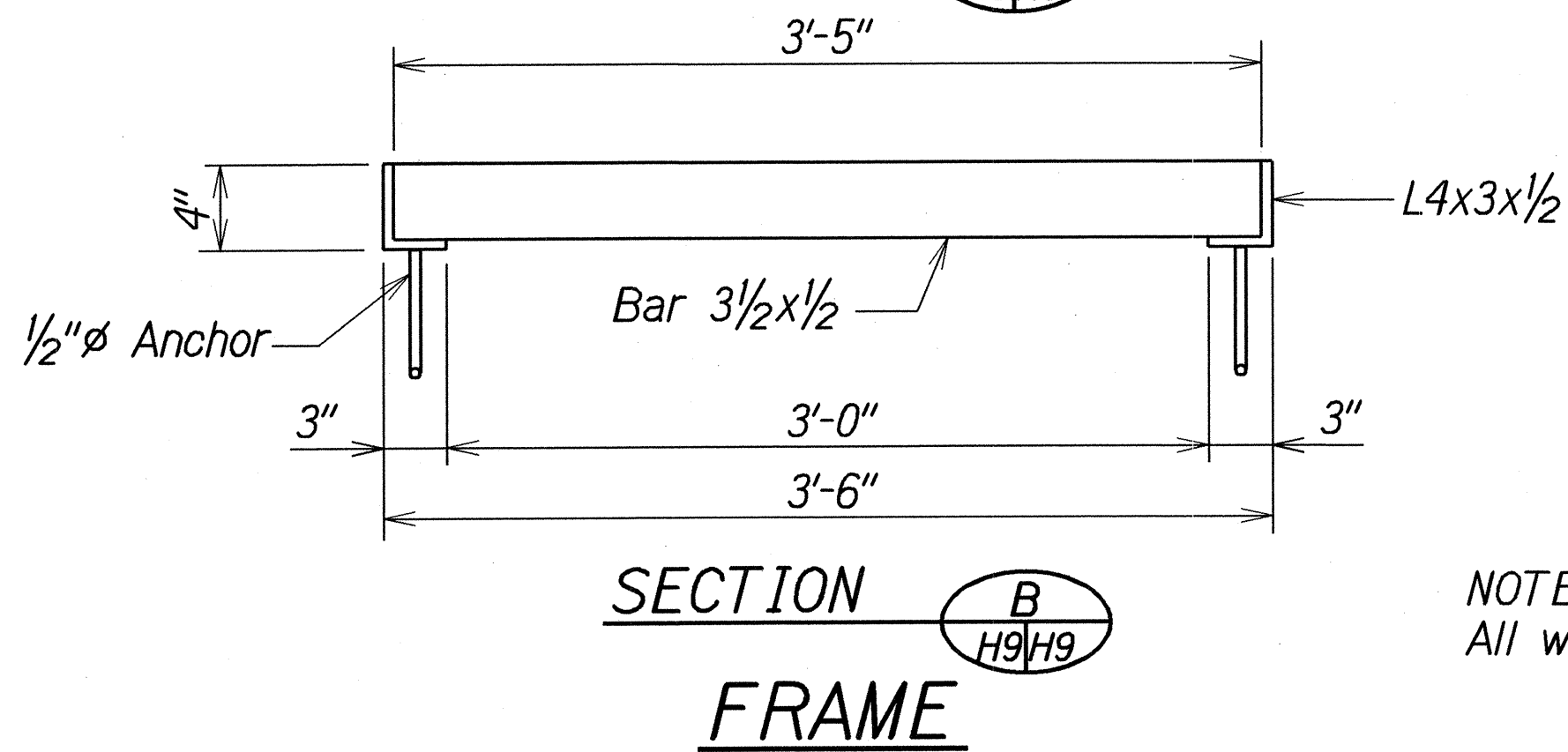
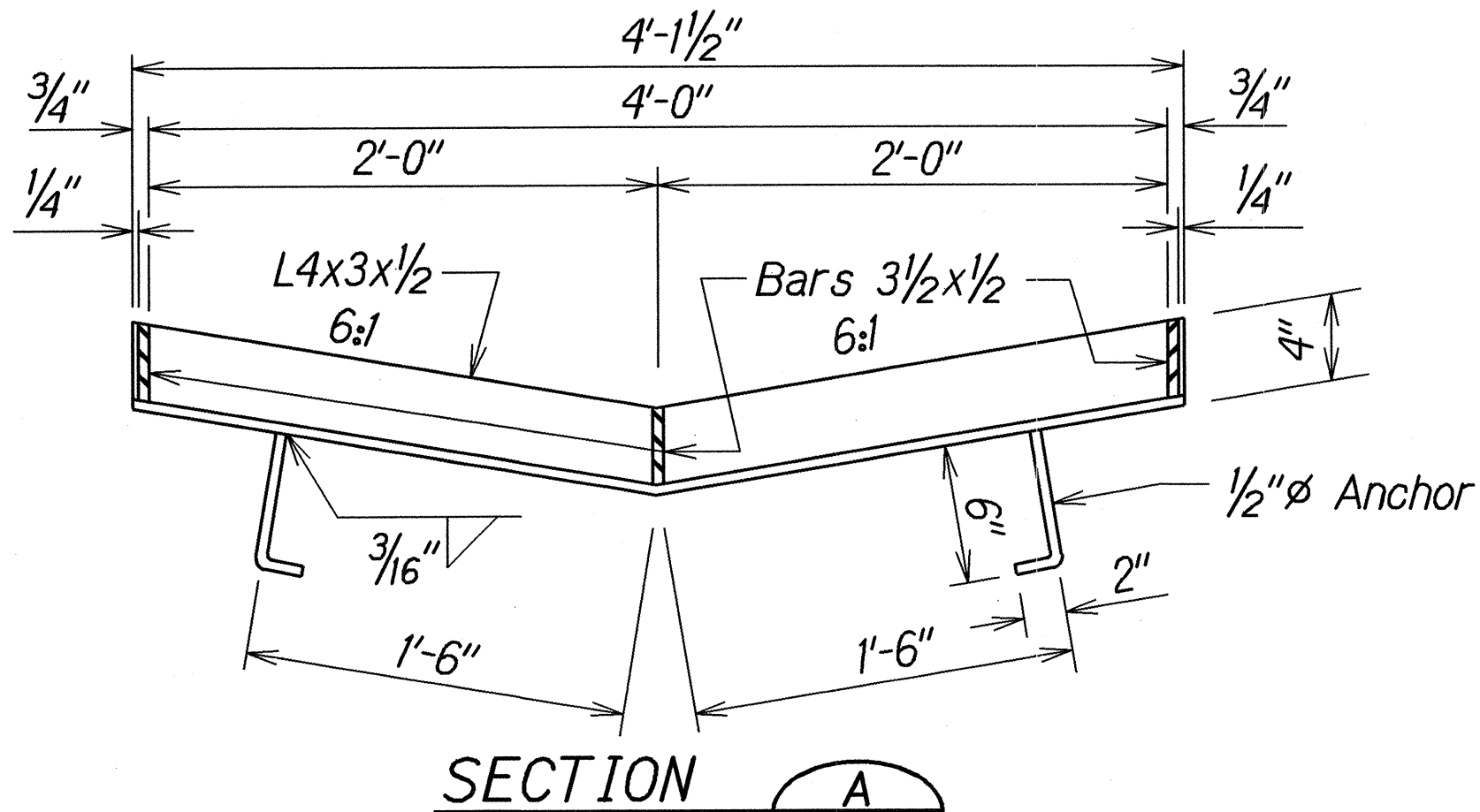
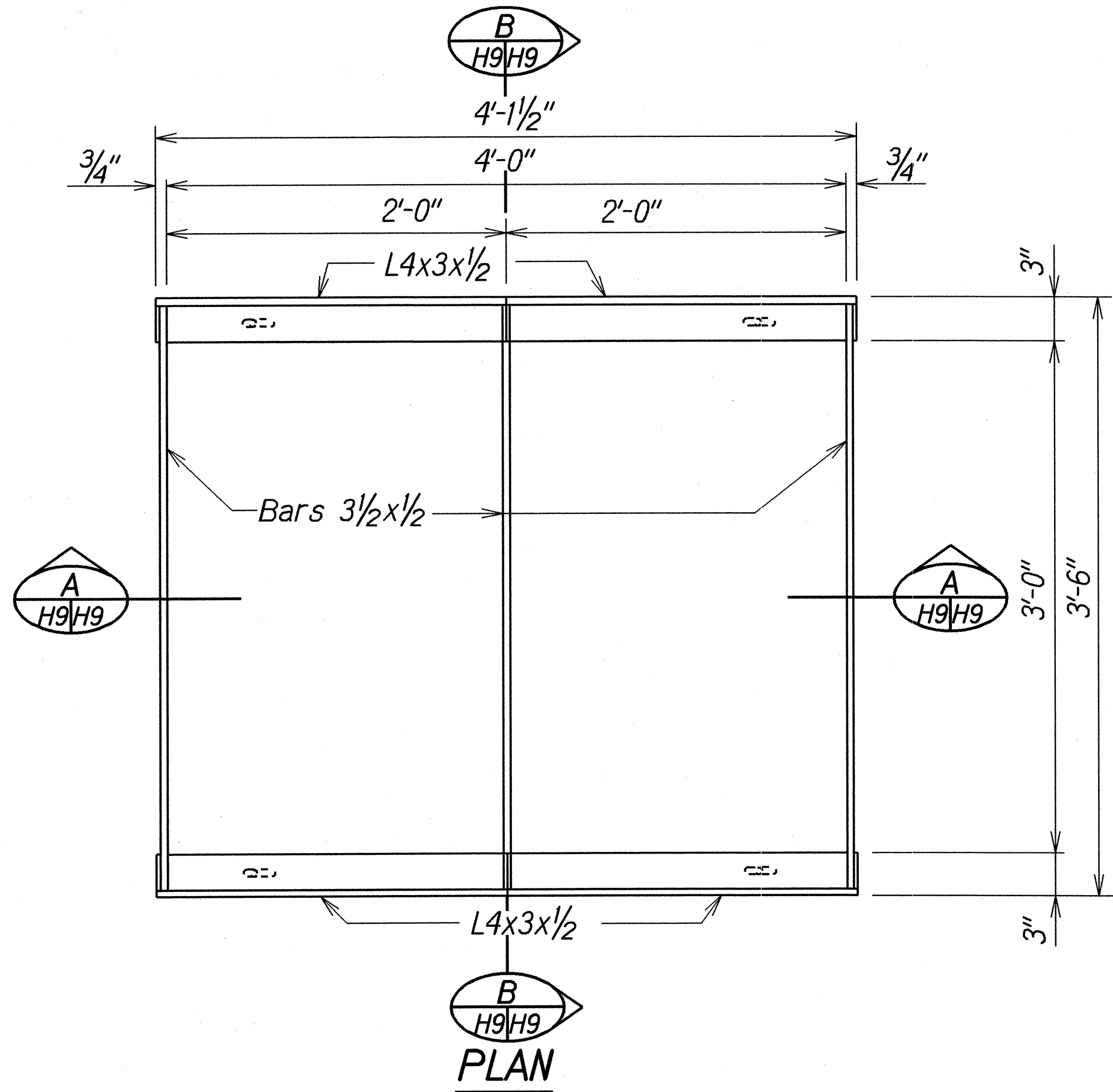
DRAINAGE DETAILS

HAWAII BELT ROAD
Traffic Operational Improvements
At Kulaimano Road
Project No. 19J-01-02

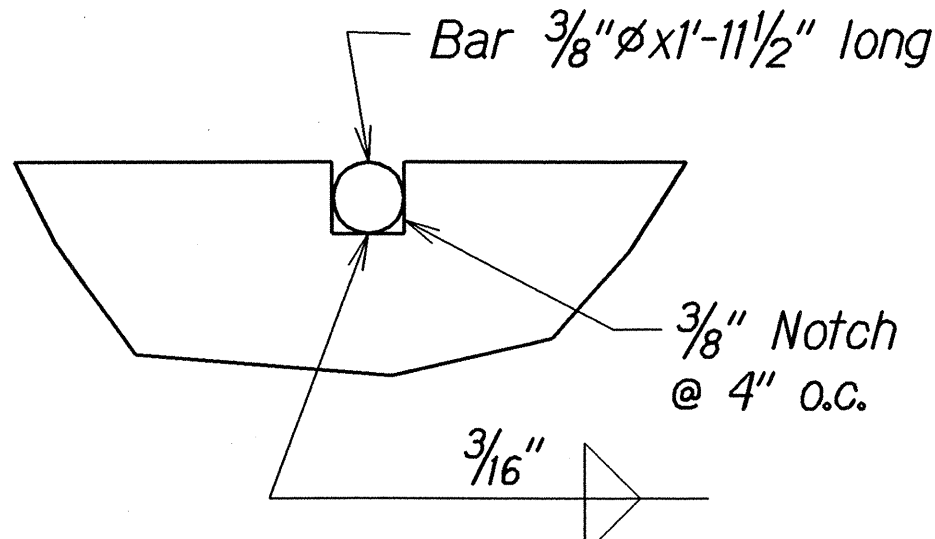
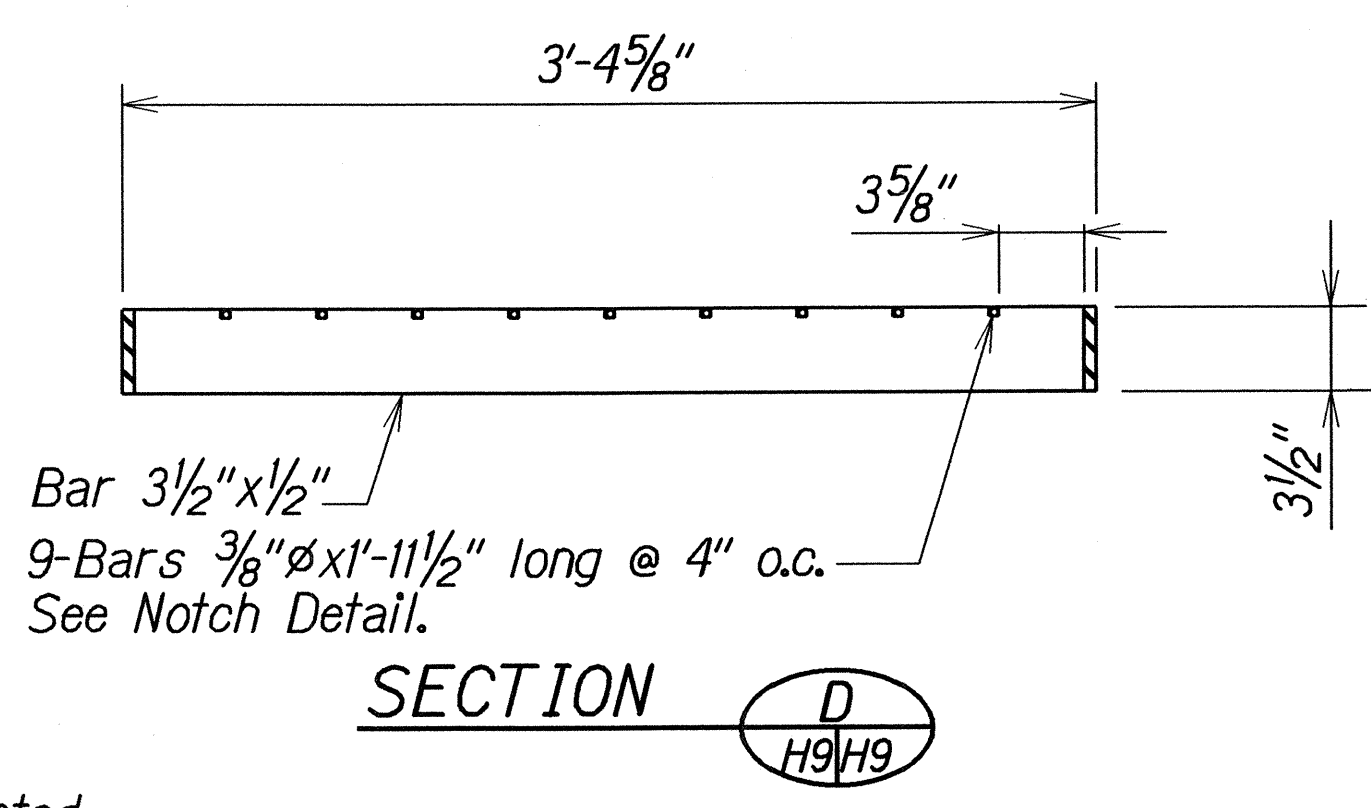
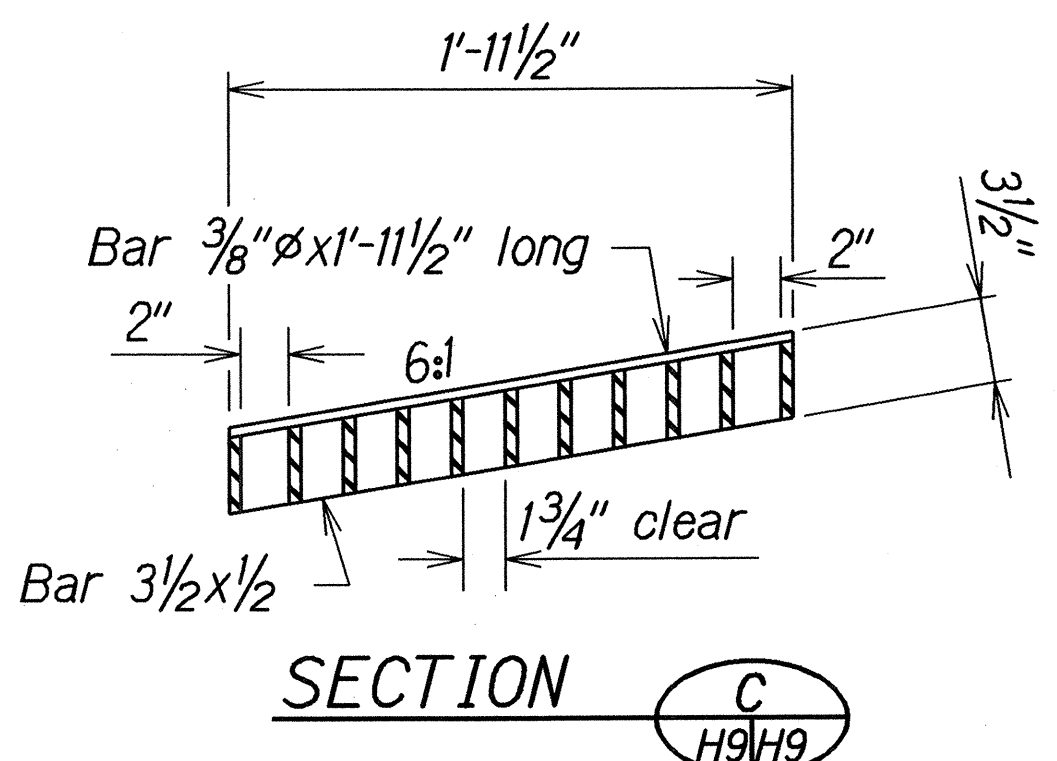
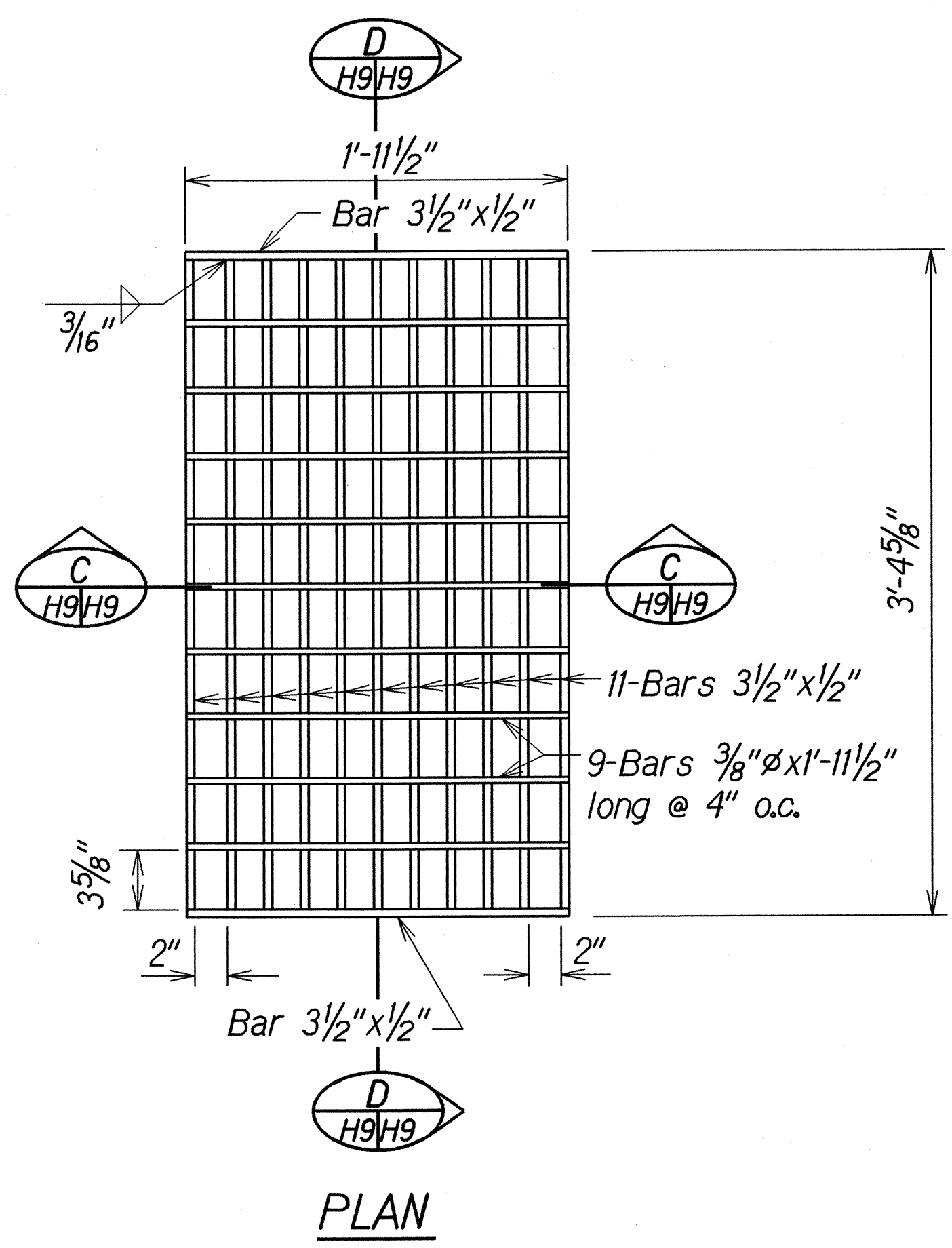
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Date: Sep, 2003

SHEET No. H8 OF 10 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-01-02	2004	23	40



NOTE:
All welds 3/8" unless otherwise noted.



NOTCH DETAIL
Full Size

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE DETAIL
HAWAII BELT ROAD
Traffic Operational Improvements
At Kulaimano Road
Project No. 19J-01-02

Scale: 1 1/2"=1'-0"
Date: June, 2003

SHEET No. H9 OF 10 SHEETS

ORIGINAL PLAN	DATE
SURVEY PLOTTED BY	6/9/03
DRAWN BY	
DESIGNED BY	
CHECKED BY	

DETAILS OF TYPE "61614P" STEEL FRAME AND GRATES

