

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-02-85	1986	14	54

GENERAL STRUCTURE NOTES

DESIGN SPECIFICATION:
AASHTO Standard Specifications for Highway Bridges (13th edition) with 1984 Interim Specifications.

DESIGN LOADS:
Dead Load : Earth load - 120 pcf.
Equivalent fluid pressure - 37 pcf

ALLOWABLE DESIGN STRESSES:
1. Reinforced concrete : $f_c = 0.40 f'_c$
2. Reinforcing steel : $f_s = 20,000$ psi. for Grade 40.

MATERIALS:
1. Reinforced concrete : Class A unless noted otherwise
2. Reinforcing steel: ASTM A 615 Grade 40

CONSTRUCTION METHODS:
1. See current edition (1985) of Hawaii Standard Specifications for Road and Bridge Construction and Special Provisions.
2. All items designated for removal shall be removed in such a manner as to preclude any damage to the existing structure. Large impacting or vibratory types of equipment will not be permitted in the removal operation, nor in drilling holes for dowels. Small vibratory tools approved by the Engineer, will be permitted.
3. Where portion of conc. is to be removed, or saw cut is called for, the line of separation between the portions that is to remain & be removed, shall be saw cut to a minimum depth of 1 1/2 inch or to the depth of the reinforcements.
4. The Contractor shall be responsible for the protection of the exist. and new structures from damage due to construction, & shall repair any damage at his expense, to the satisfaction of the Engineer.
5. Excavation shall be accomplished by maintaining as near a vertical cut as possible, & it shall be the Contractor's responsibility to maintain the stability of the exist. roadway prism & adjacent ground thruout the course of work.
6. All footings shall be excavated & poured neat against undisturbed ground. In case of over excavation, space between footing & ground shall be filled with concrete at the Contractor's expense & as directed by the Engineer. The minimum quality of the fill concrete shall be Class D.
7. All exist. reinforcing, that can be incorporated in the new work, shall be cleaned & utilized as required in the new work, and as directed by the Engineer.
8. Except as otherwise noted, all vertical dimensions are measured plumb.

GENERAL
1. All items noted incidental will not be paid for separately.
2. The Contractor shall verify the location of all existing utility lines & notify the respective owners before commencing with work.
3. Except as otherwise noted on drawings, all exterior corners & re-entrant angles 90° or less in concrete work shall be chamfered 3/4" x 3/4".
4. For concrete finish see standard specifications.

ESTIMATED QUANTITIES

ITEM NO.	ITEM	UNIT	QUANTITIES
202.0441	Removal of Portion Of Concrete Box Culvert	Lump Sum	30 C.Y.
206.7000	Structure Backfill	C.Y.	140 C.Y.
206.8000	Filter Material	C.Y.	13 C.Y.
207.0110	Channel Excavation	C.Y.	104 C.Y.
503.1030	Concrete In Box Culvert	Lump Sum	75 C.Y.
503.1035	Concrete In Outlet Structure	Lump Sum	65 C.Y.
503.1039	2-Inch Diameter Drilled Holes For Dowels	Each	54 Ea.
602.0030	Reinforcing Steel In Box Culvert	Lump Sum	4,800 Lbs
602.0035	Reinforcing Steel In Outlet Structure	Lump Sum	6,100 Lbs.
603.0015	Bed Course Material	C.Y.	30 C.Y.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION

12' x 12' CONCRETE BOX CULVERT
AT STA. 70+42

PLAN, PROFILE, GENERAL NOTE

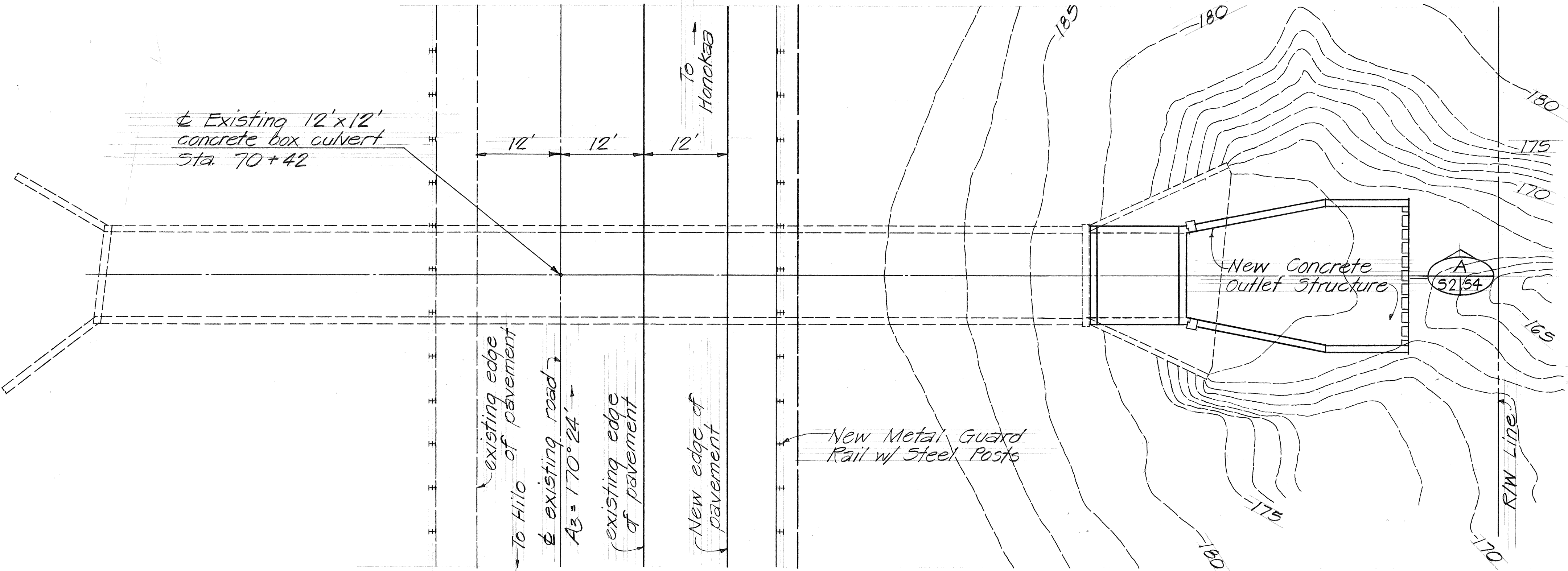
HAWAII BELT ROAD

TRUCK CLIMBING LANES AT PEPEKEO, UHI

PROJECT NO. 19J-02-85

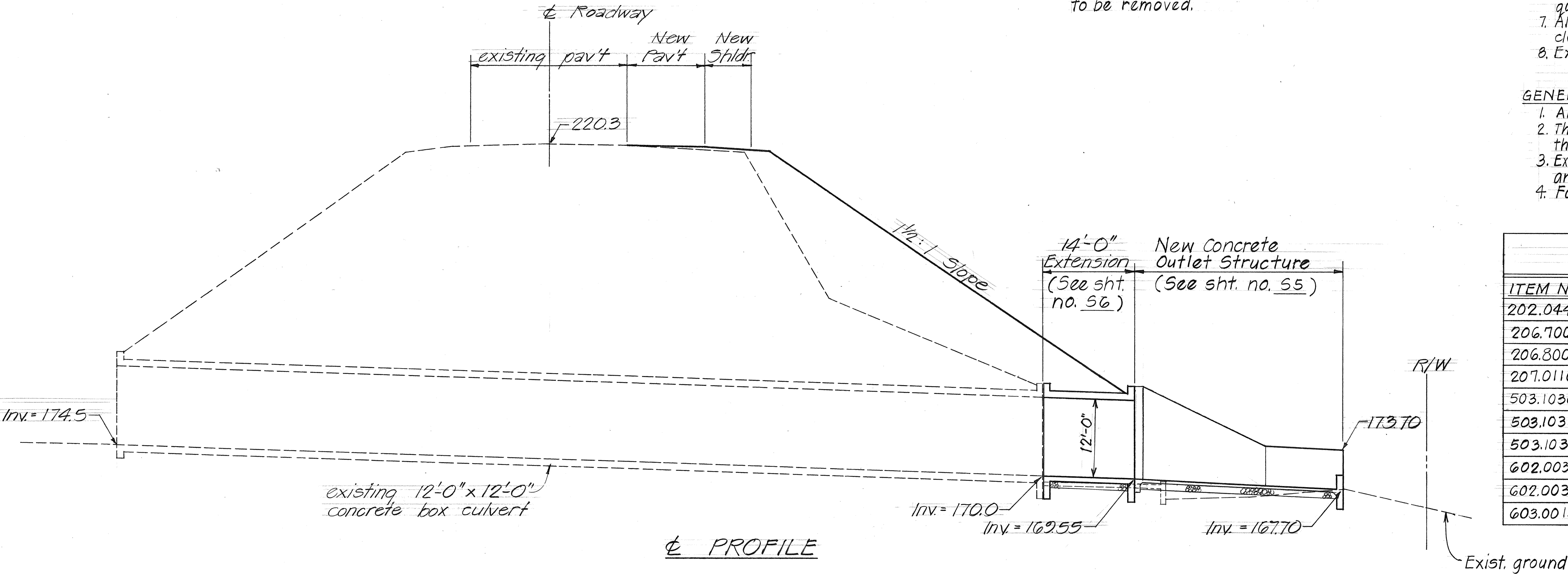
Scale: As Noted Date: Oct., 1985

SHEET NO. 52 OF 7 SHEETS



PLAN

NOTE:
Existing outlet wingwalls and apron to be removed.



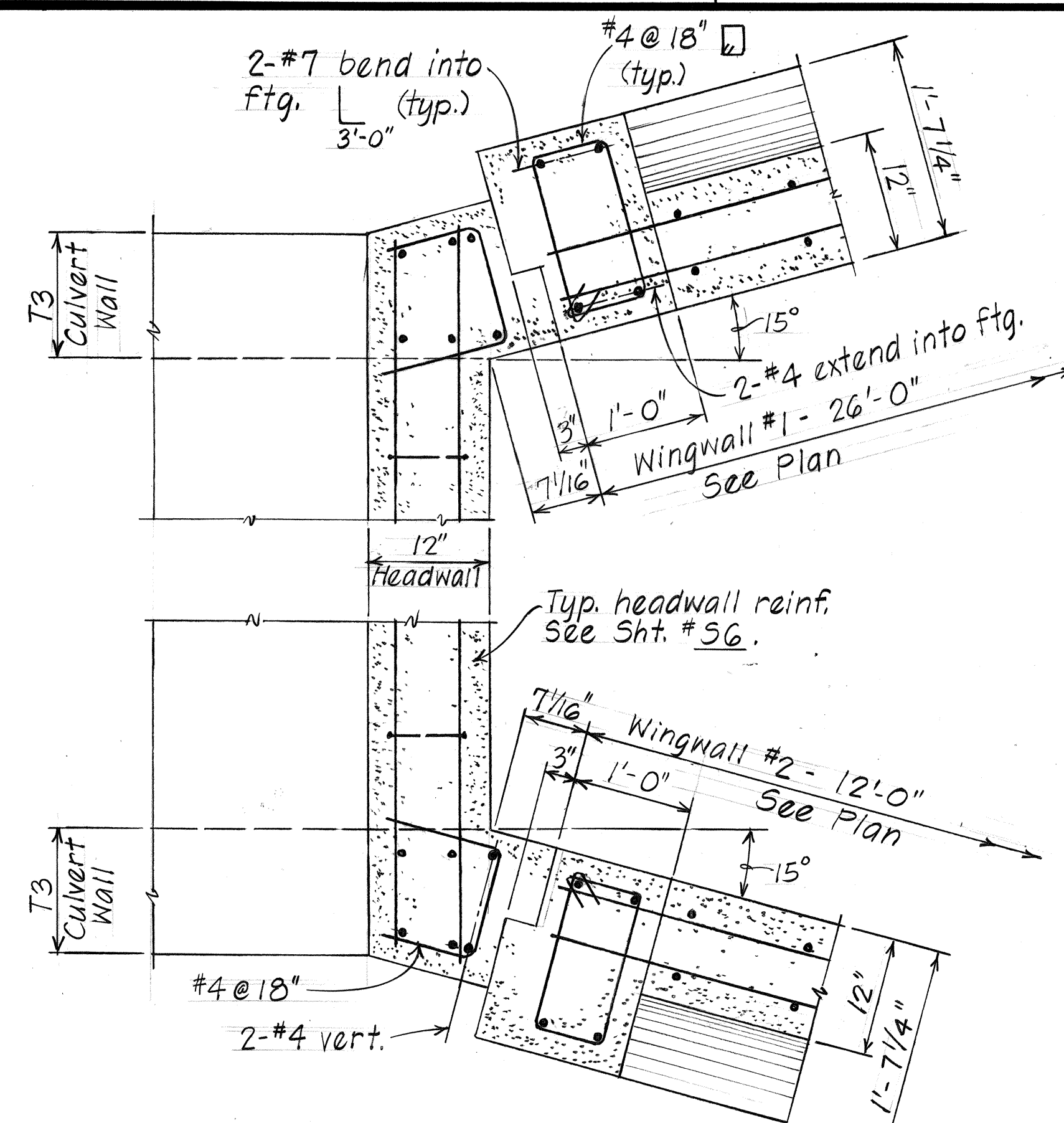
PROFILE

12 x 12' CONCRETE BOX CULVERT
AT STA. 70+42

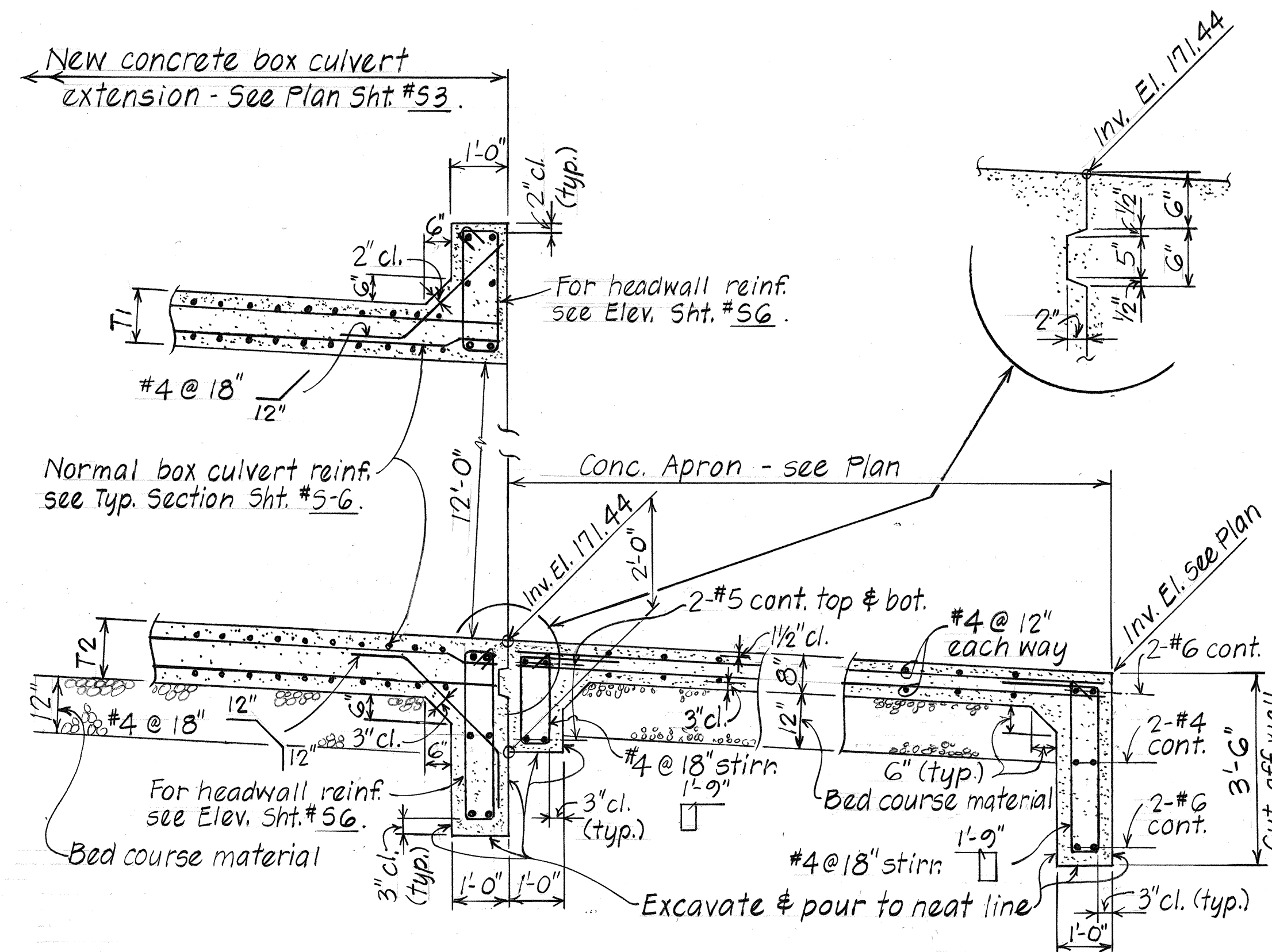
Scale: 1" = 10'

ORIGINAL PLAN	DATE
DRAWN BY L.M.A.	9/85
DESIGNED BY L.M.A.	9/85
CHECKED BY L.A.G.	9/85
NO.	

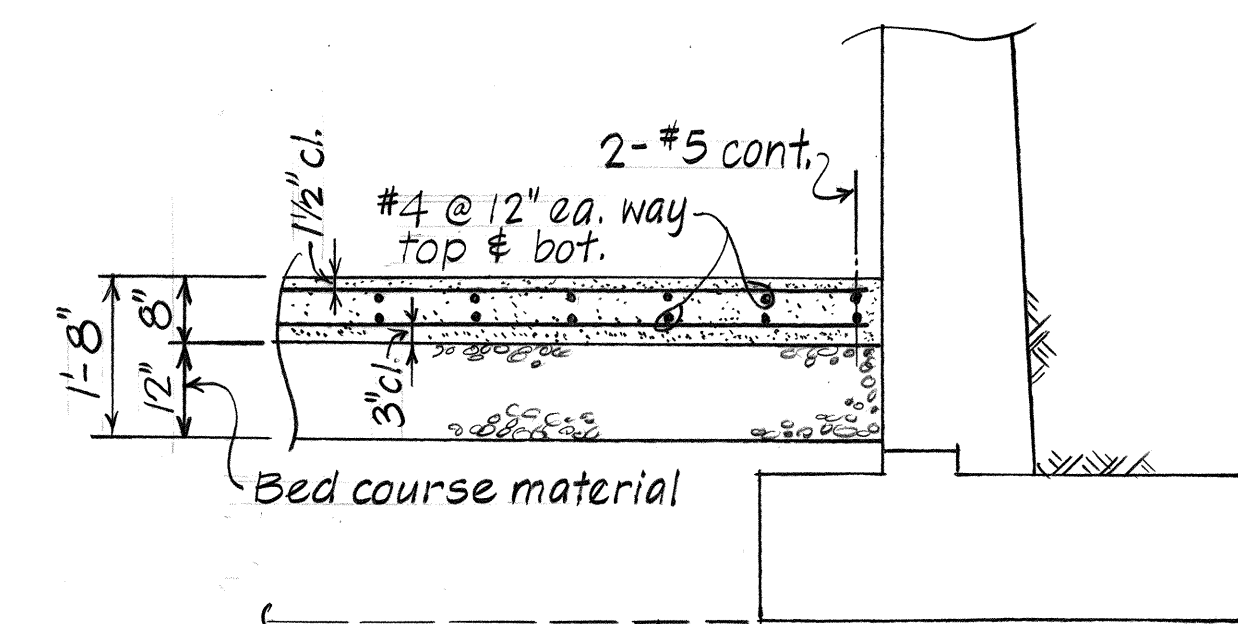
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-02-85	1986	16	54



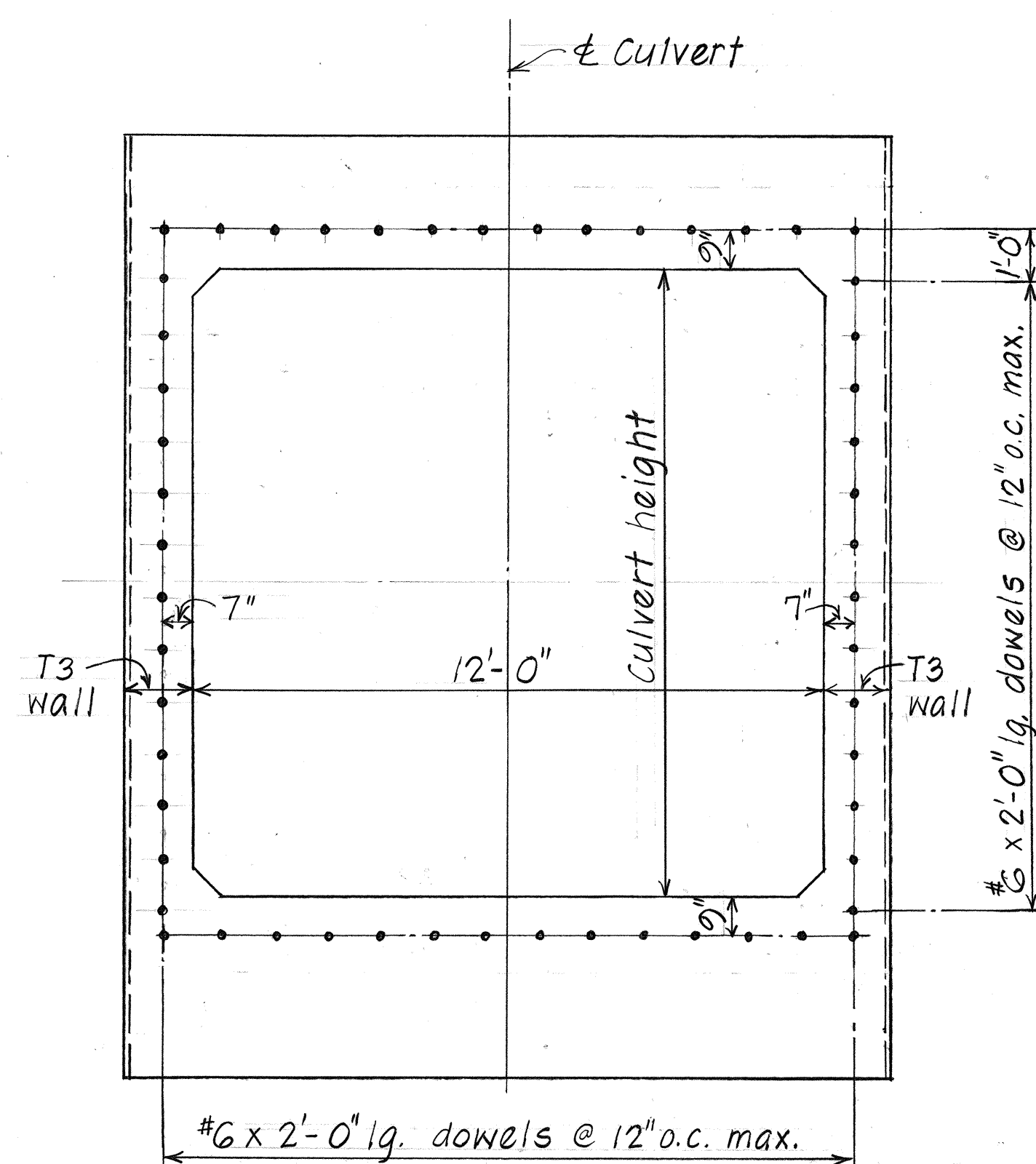
WINGWALL CONNECTION DETAIL
Scale: 1" = 1'-0"



SECTION B
(AT 10 x 12 BOX CULVERT)
Scale: 1/2" = 1'-0"

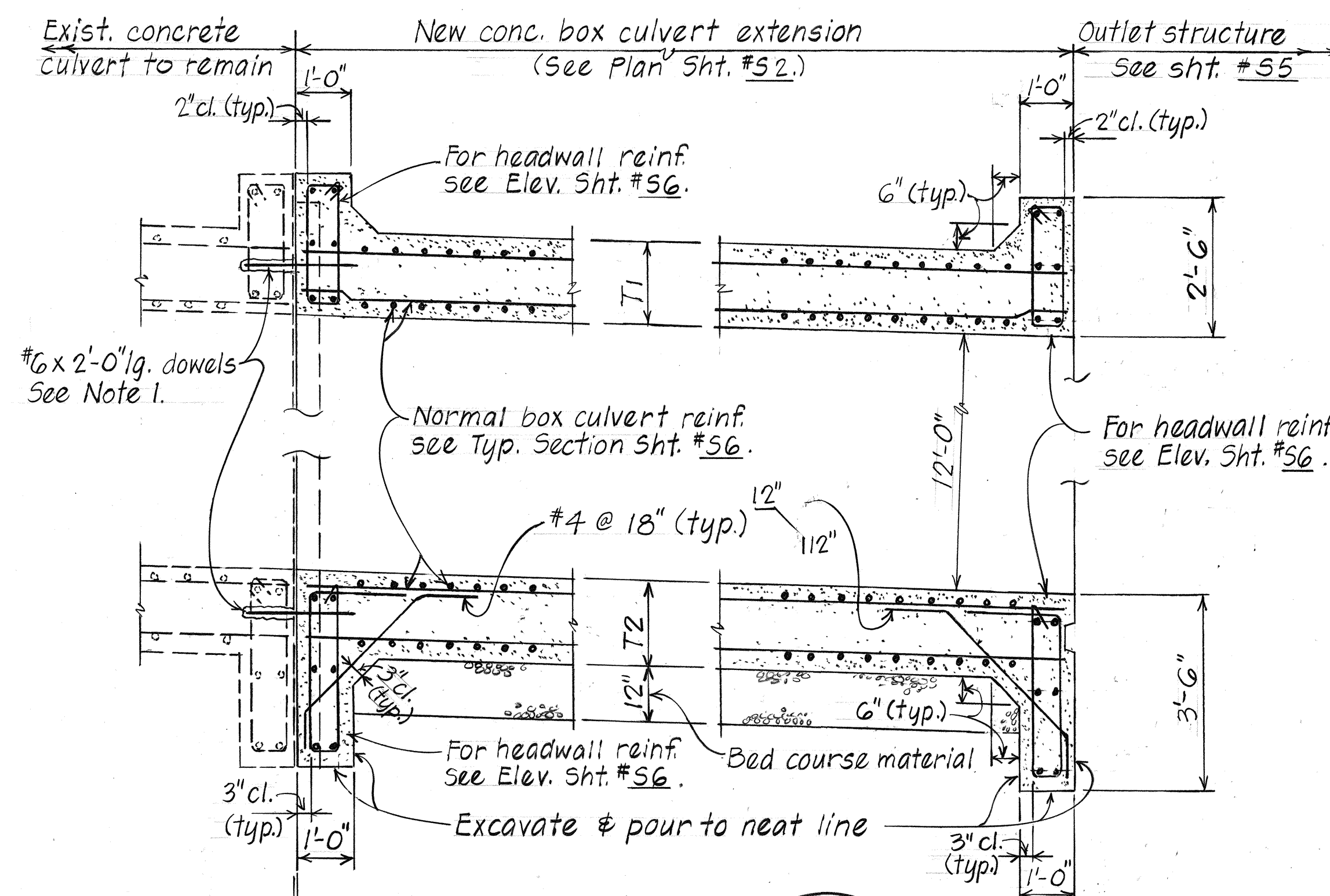


Outline - bot. of cut-off wall
TYPICAL CONC. APRON SECTION @ WINGWALL
Scale: 1/2" = 1'-0"



ELEVATION X
CONNECTION TO EXISTING HEADWALL
Scale: 3/8" = 1'-0"

- NOTE:**
- Dowels connecting new and old culvert shall be set in holes drilled 2" x 1'-0" deep and filled with epoxy grout.
 - Epoxy grout shall be incidental to concrete.



SECTION A
(12 x 12 BOX CULVERT)
Scale: 1/2" = 1'-0"

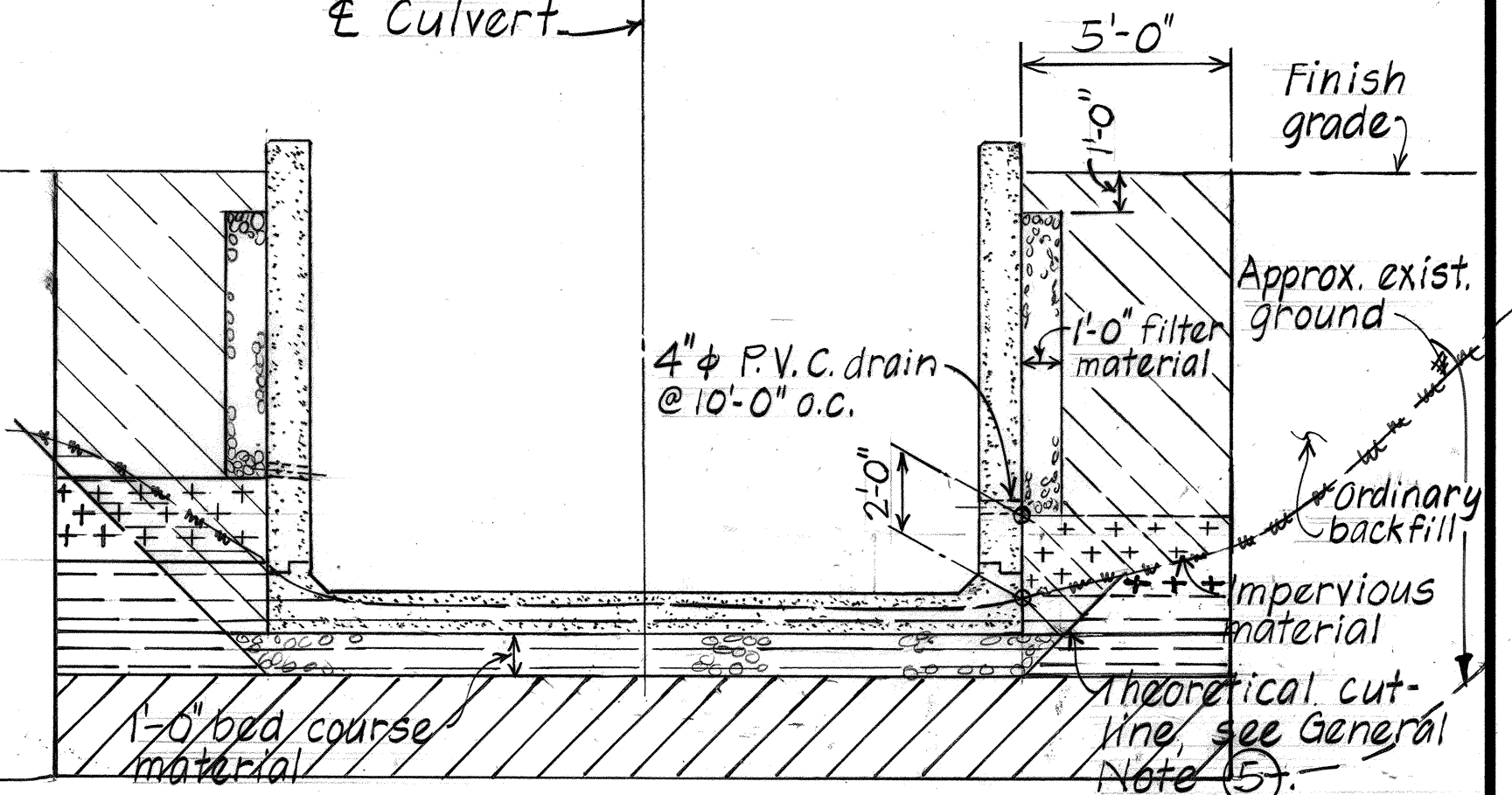
STATE OF HAWAII	
DEPARTMENT OF TRANSPORTATION	
HIGHWAYS DIVISION	
12 x 12 CONCRETE BOX CULVERT	
10 x 12 CONCRETE BOX CULVERT	
SECTIONS & DETAILS	
HAWAII BELT ROAD	
TRUCK CLIMBING LANES AT PEPEKEO, VIII	
PROJECT NO. 19J-02-85	
Scale: As Noted	Date: Oct. 1985
SHEET NO. 54 OF 7 SHEETS	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-02-85	1986	17	54

NOTES:

1. Hatched area shown thus  denotes limits of channel excavation.
2. Hatched area shown thus  denotes limits of structure backfill.

± Culvert

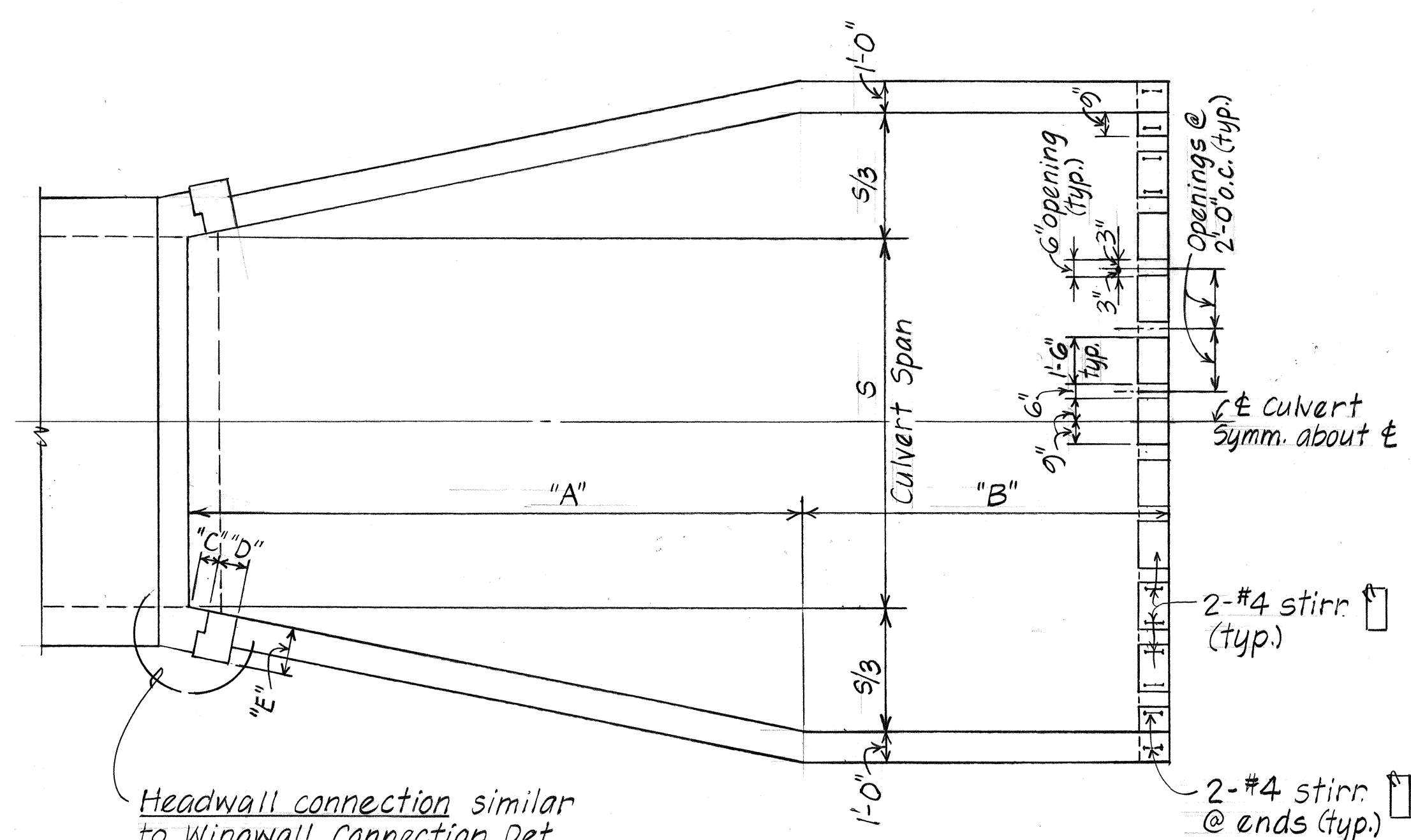
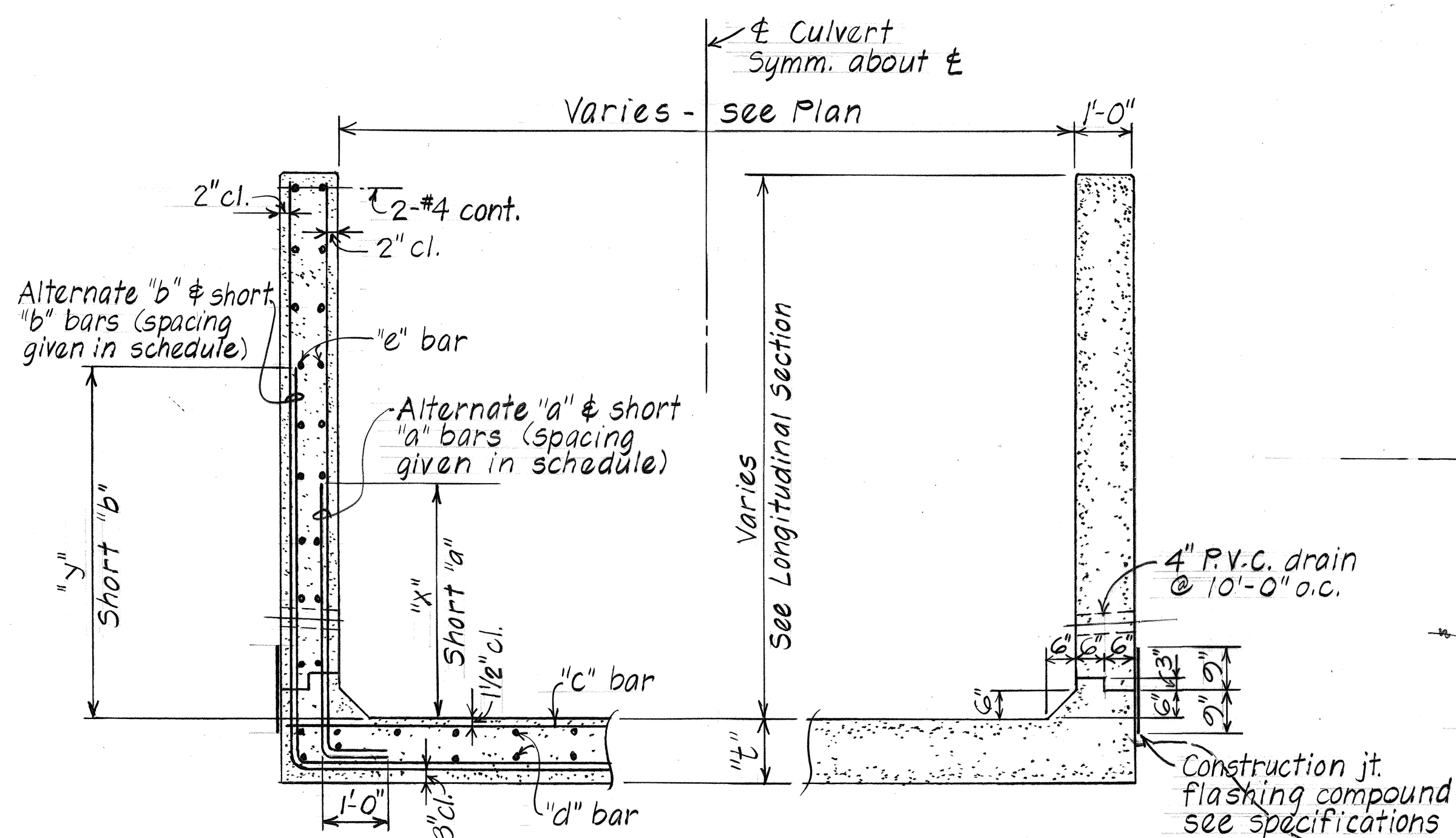


TYPICAL CHANNEL EXCAVATION & BACKFILL PAY LIMITS

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

TYPICAL SECTION OUTLET STRUCTURE

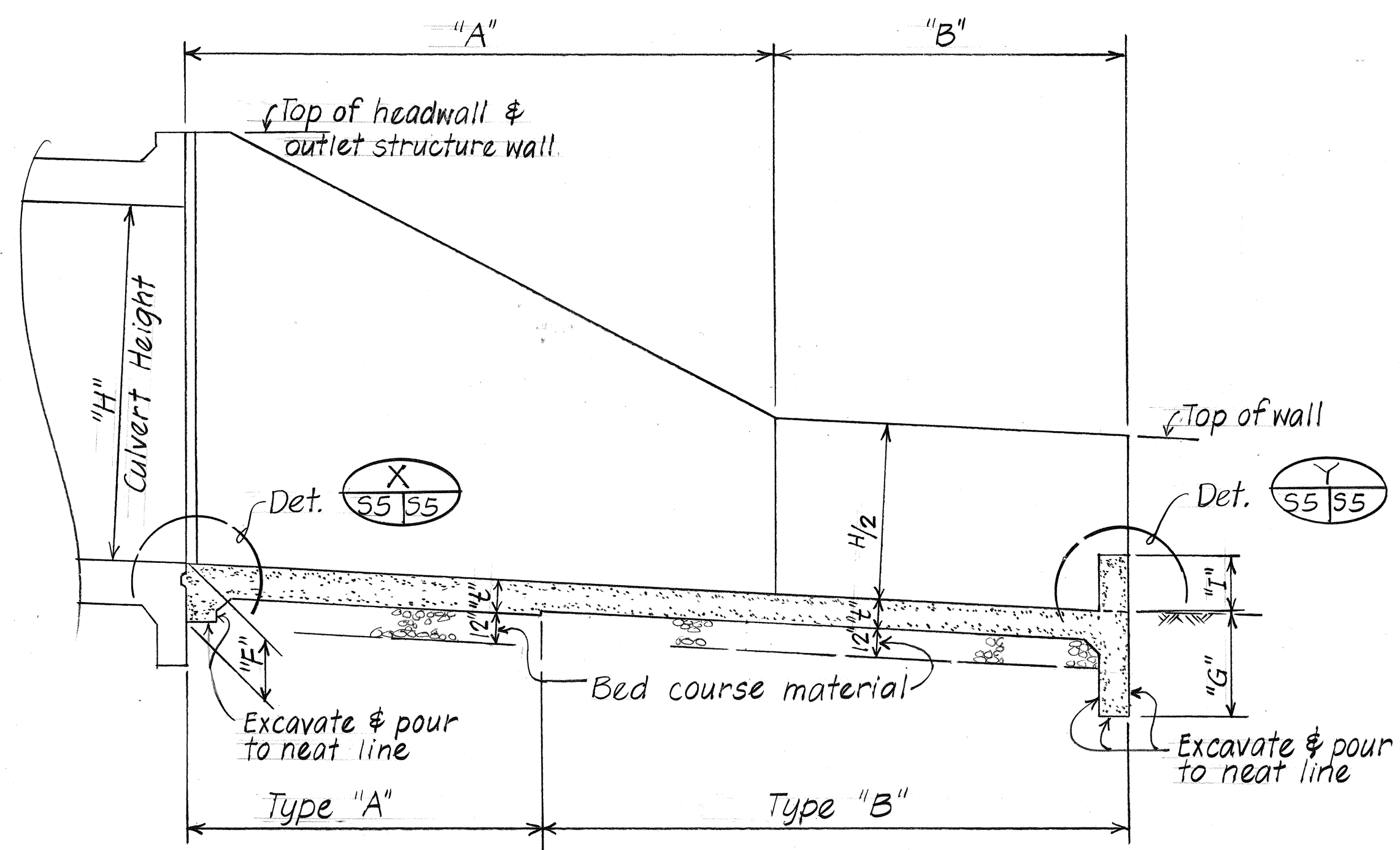
Scale: 1/2" = 1'-0"



PLAN

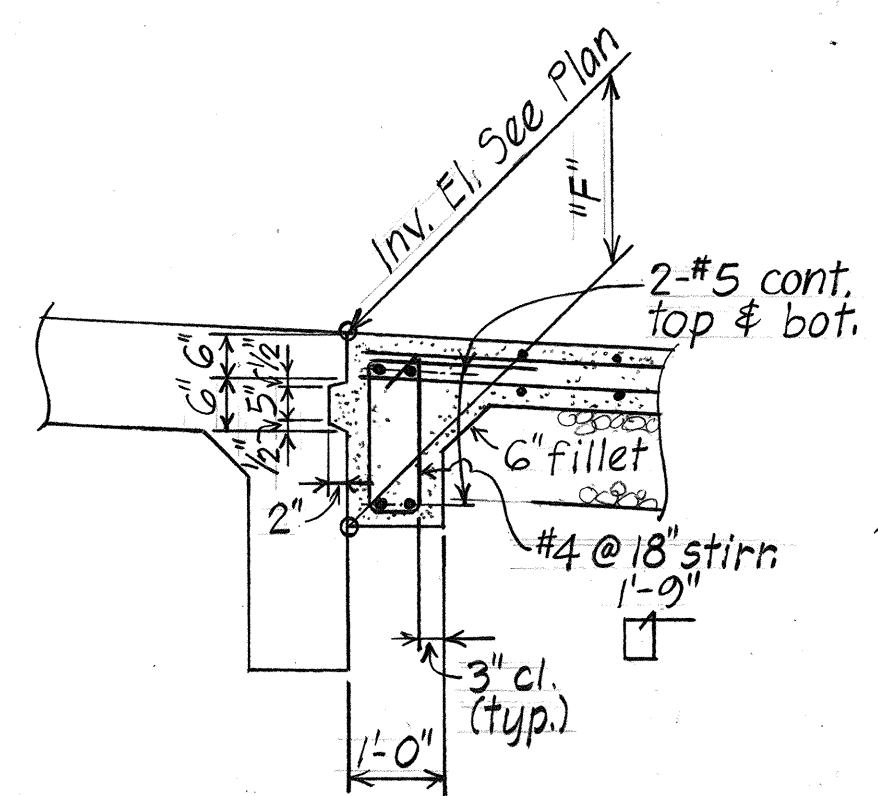
Scale: 1/4" = 1'-0"

Headwall connection similar to Wingwall Connection Det. Sht. #54 & 56.



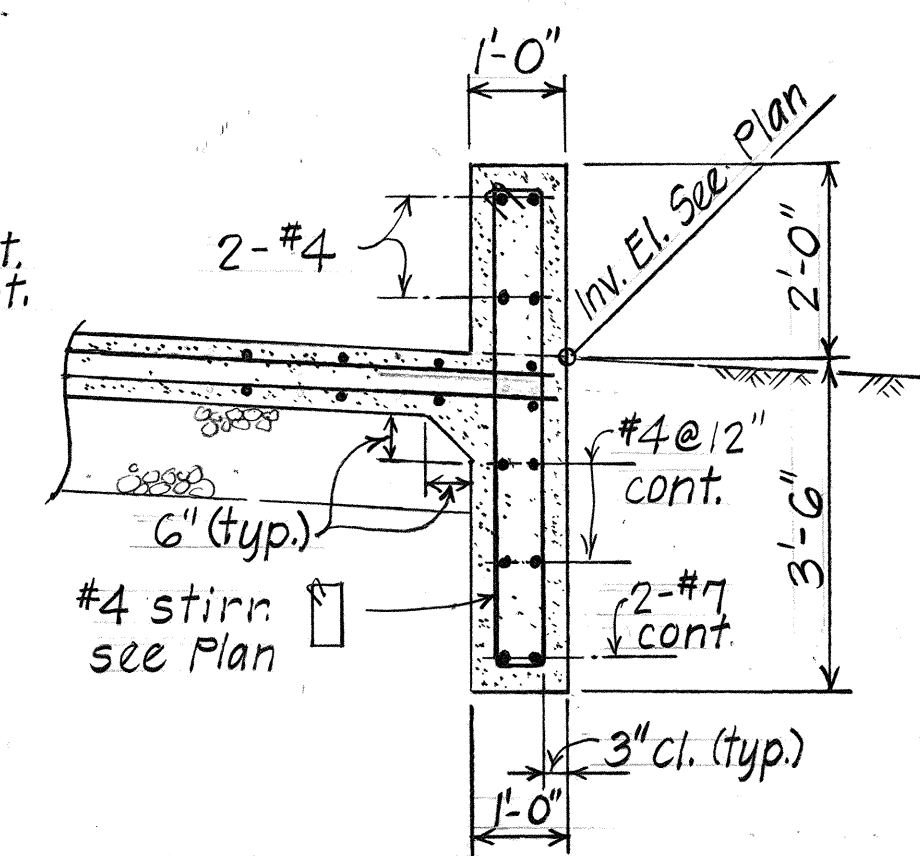
LONGITUDINAL SECTION ALONG & STRUCTURE

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



DETAIL X

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



DETAIL Y

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

OUTLET STRUCTURE - DIMENSIONS & REINFORCING STEEL SCHEDULE			
CULVERT SPAN (S) & HEIGHT (H) S = 12'-0" H = 12'-0"			
	TYPE	"A"	"B"
REINFORCING STEEL	SHORT "a" BAR	"X"	4'-0"
	SHORT "b" BAR	"Y"	6'-0"
	"a" bars	#5 @ 5"	#5 @ 12"
	"b" bars	#5 @ 5"	#5 @ 12"
	"c" bars	#5 @ 5"	#5 @ 12"
	"d" bars	#4 @ 12"	#4 @ 12"
CONCRETE	"e" bars	#4 @ 12"	#4 @ 12"
	"t"	13"	12"
	A	20'-0"	
	B	12'-0"	
	C	0'-6 1/16"	
	D	1'-0"	
DIMENSIONS	E	1'-6"	
	F	2'-0"	
	G	3'-6"	
	I	2'-0"	

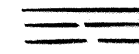
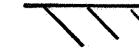
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

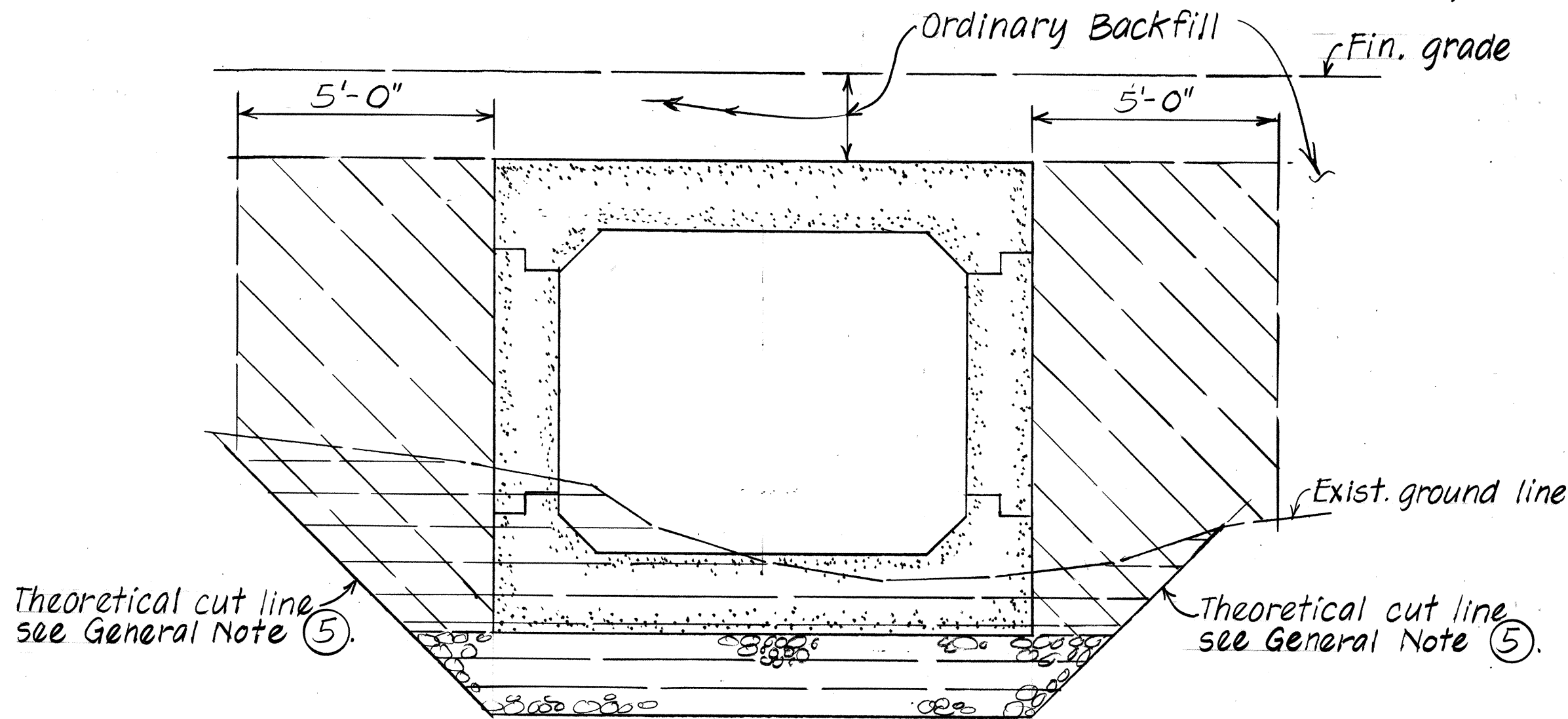
TYPICAL DETAILS
CONCRETE CULVERT OUTLET STRUCTURE

HAWAII BELT ROAD
TRUCK CLIMBING LANES AT PEPEKEO, HI
PROJECT NO. 19J-02-85
Scale: As Noted Date: Sept. 1985
SHEET NO. 55 OF 7 SHEETS

ORIGINAL PLAN	DATE
NO.	0/05
SURVEY PLOTTED BY	0/05
DRAWN BY	0/05
DESIGNED BY	0/05
CHECKED BY	0/05

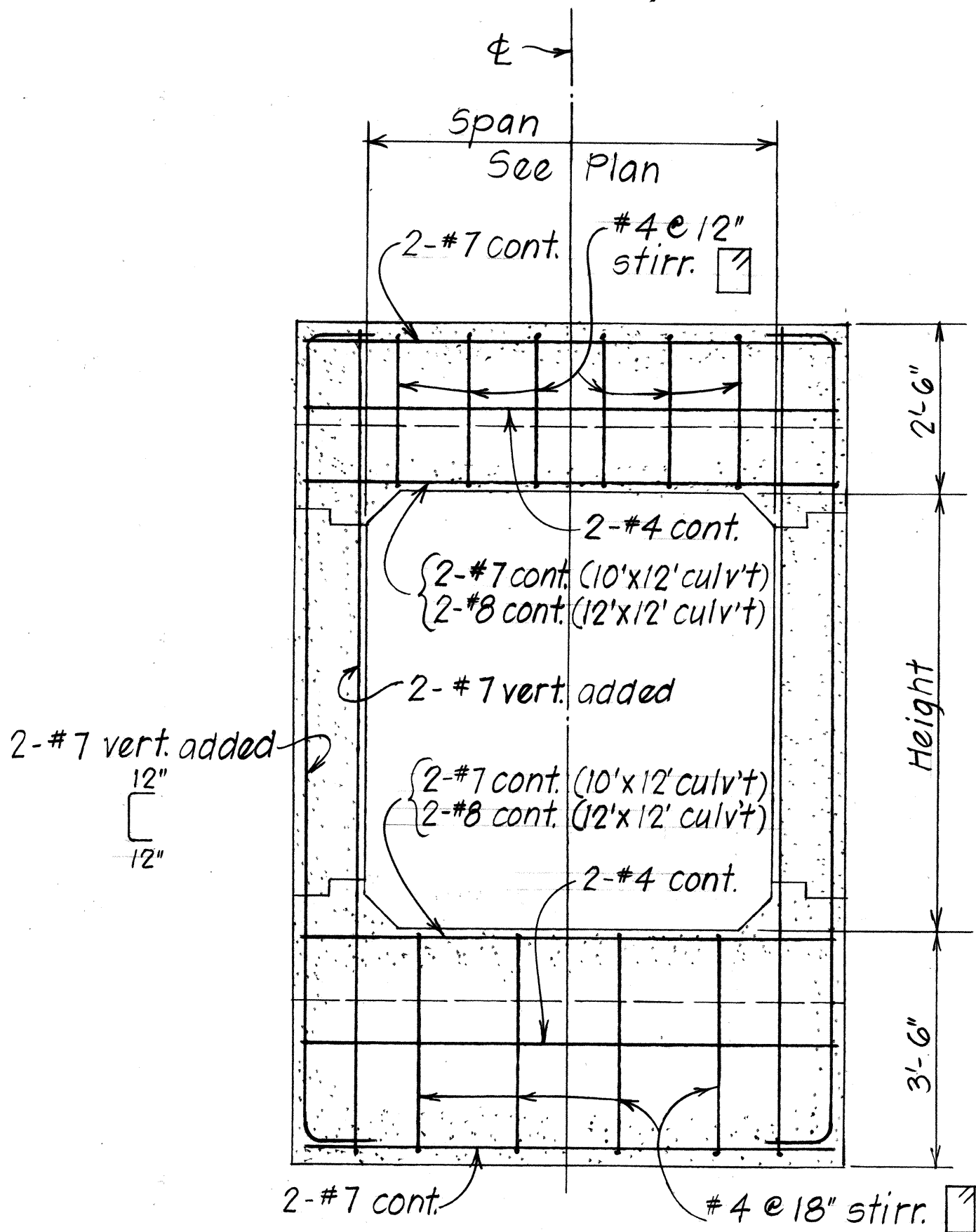
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	19J-02-85	1986	18	54

- NOTES:
- Hatched area shown thus  denotes limits of channel excavation.
 - Hatched area shown thus  denotes limits of structure backfill.

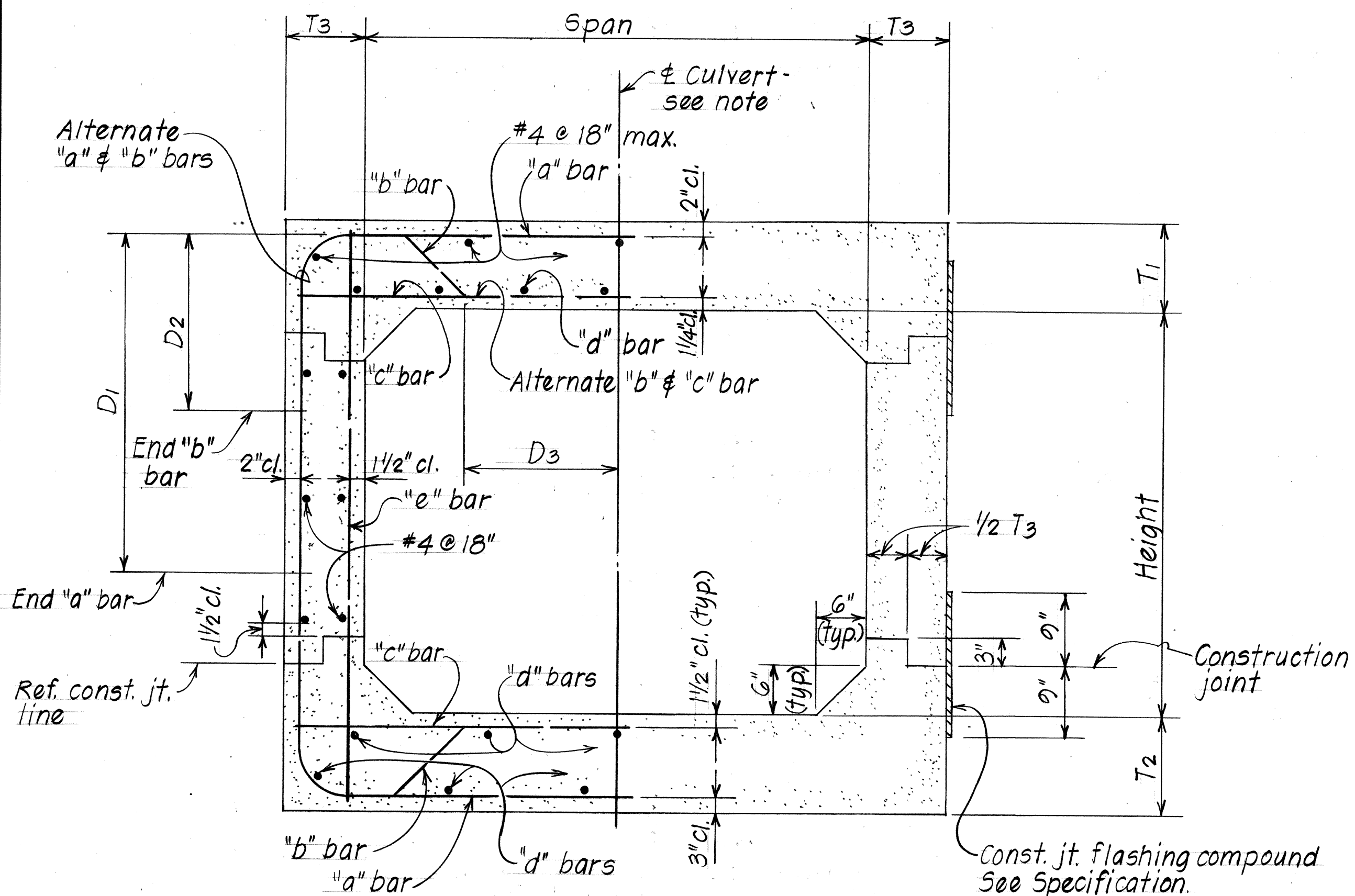


TYPICAL CHANNEL EXCAVATION & BACKFILL
Not to Scale

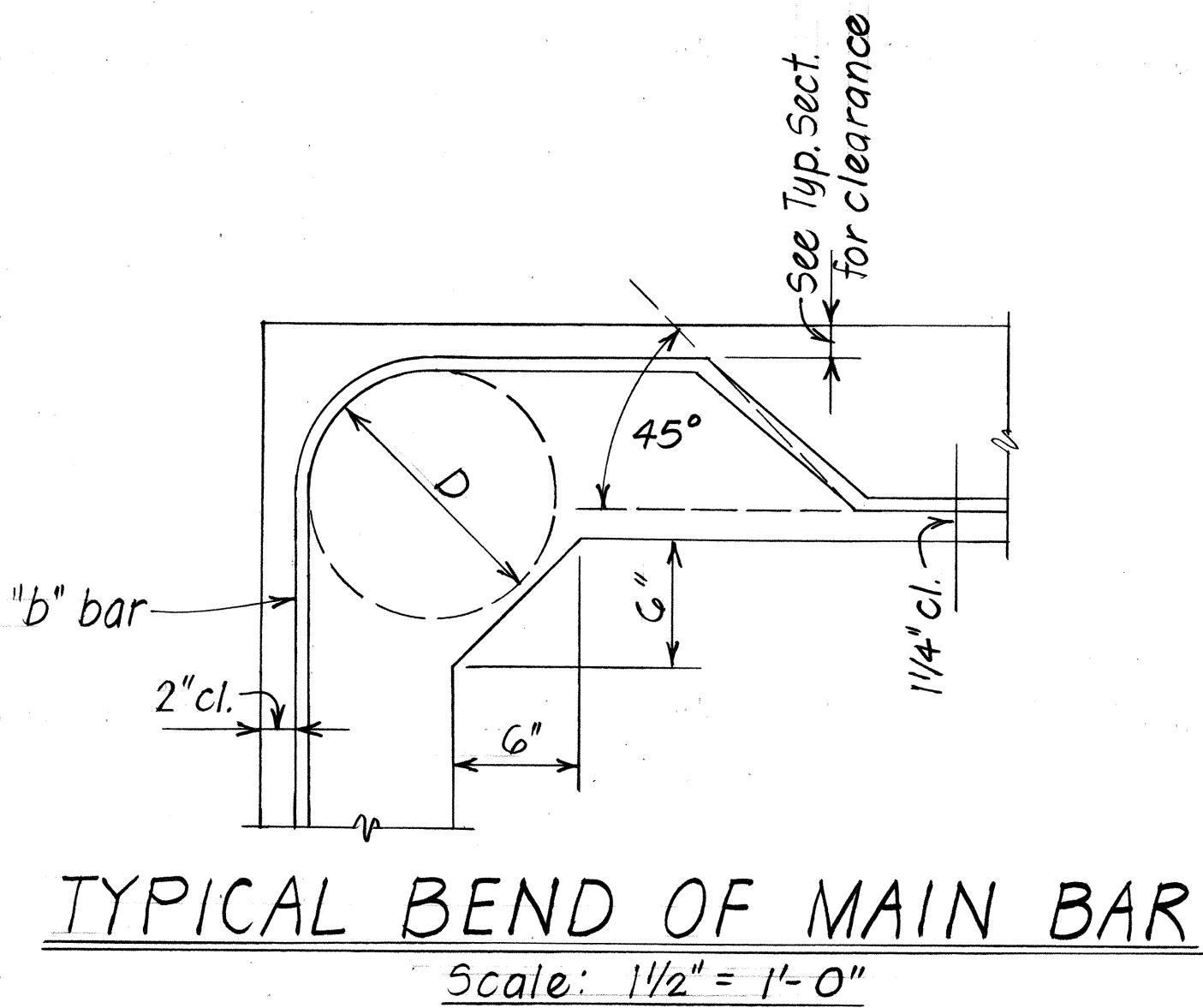
SPAN & HEIGHT		10'-0" x 12'-0"	12'-0" x 12'-0"
TYPE		A	B
MAX. FILL OVER TOP OF SLAB		18'-0"	24'-0"
CONC.	TOP SLAB	T ₁	11 1/2"
	BOTTOM SLAB	T ₂	13"
	SIDE WALLS	T ₃	12 1/2"
REINFORCING STEEL	DIMENSION	D ₁	7'-11"
	DIMENSION	D ₂	3'-7"
	DIMENSION	D ₃	3'-4"
	T ₁	"a" bar	#7 @ 12"
		"b" bar	#7 @ 12"
		"c" bar	#6 @ 12"
		cont. "d" bar	#4 @ 18"
	T ₂	"a" bar	#5 @ 12"
		"b" bar	#7 @ 12"
		"c" bar	#7 @ 12"
		cont. "d" bar	#4 @ 18"
	T ₃	vert. "e" bar	#5 @ 12"
QUAN.		CONCRETE: C.Y. PER LIN. FT.	
		REINFORCING STEEL: LBS PER LIN. FT.	



TYPICAL HEADWALL ELEVATION
Scale: 1/2" = 1'-0"



TYPICAL SECTION THRU
CONCRETE BOX CULVERT
Scale: 1" = 1'-0"



TYPICAL BEND OF MAIN BAR
Scale: 1 1/2" = 1'-0"

SCHEDULE	
BAR SIZE	D
#4	3"
#5	3 3/4"
#6	4 1/2"
#7	5 1/4"
#8	6"
#9	9"

NOTE:
Culvert details are symmetrical about the vertical and horizontal axis at center of culvert except where shown otherwise.

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

TYPICAL DETAILS

ONE CELL CONCRETE BOX CULVERT

HAWAII BELT ROAD

TRUCK CLIMBING LANES AT PEPEKEO, HI

PROJECT NO. 19J-02-85

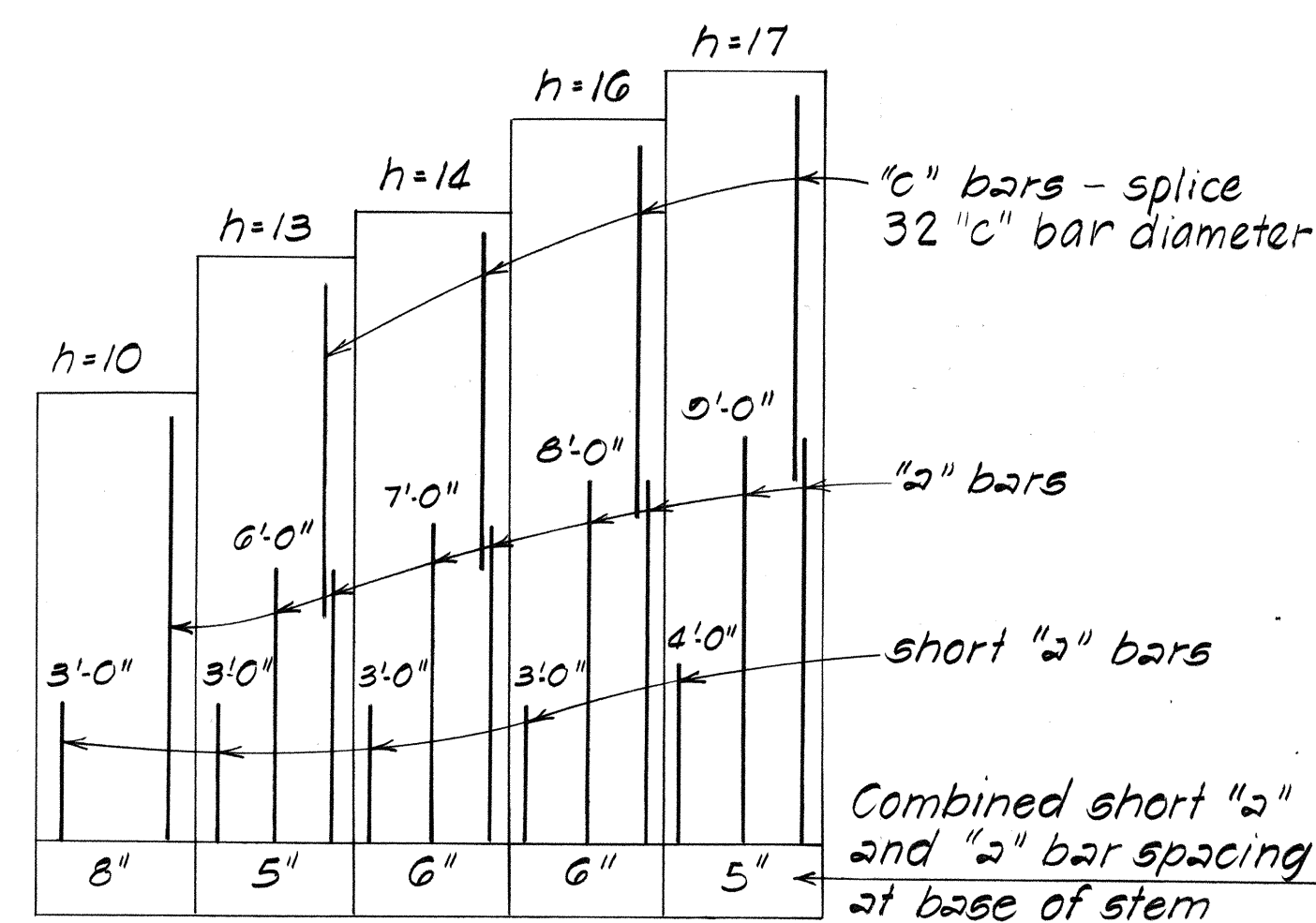
Scale: As Noted Date: Oct. 1985

SHEET NO. 36 OF 7 SHEETS

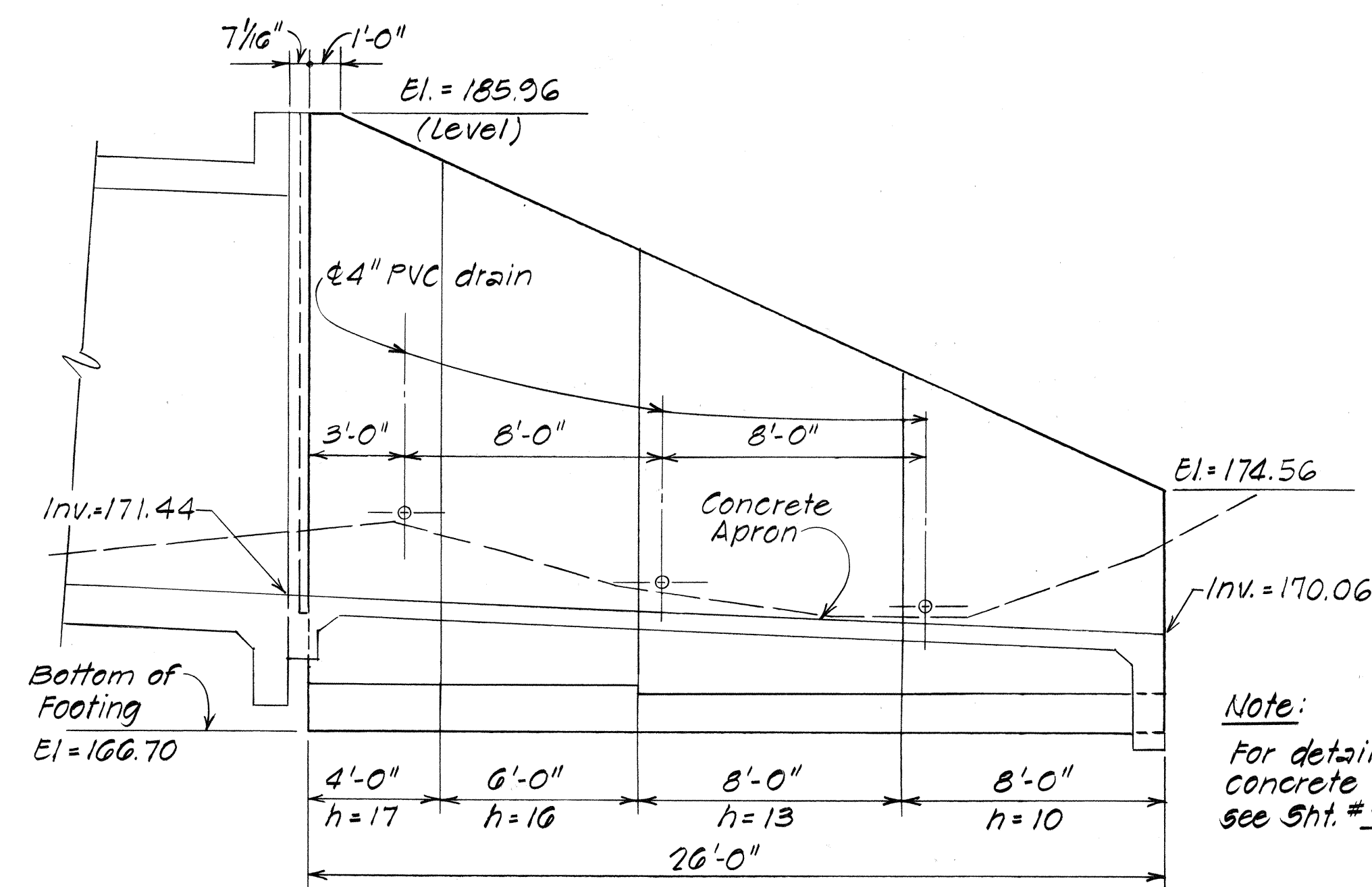
SURVEY PLOTTED BY	DATE
DRAWN BY	9/85
DESIGNED BY	9/85
CHECKED BY	9/85
ORIGINAL PLAN	
NOTE BOOK	
NO.	

SCHEDULE OF DIMENSIONS AND REINFORCING STEEL FOR RETAINING WALL

Maximum "h"	10	13	14	16	17			
a	1'-0"	1'-0"	1'-3"	1'-5"	1'-5"			
t	1'-2"	1'-2"	1'-4"	1'-6"	1'-6"			
L	6'-0"	8'-0"	9'-3"	11'-3"	11'-0"			
E	-	3'-3"	3'-2"	3'-11"	4'-2"			
"a" bars	#5@8"	#6@5"	#6@6"	#7@6"	#7@5"			
"c" bars	-	#5	#5	#6	#6			
"b" bars	#5@8"	#6@5"	#6@6"	#7@6"	#7@5"			



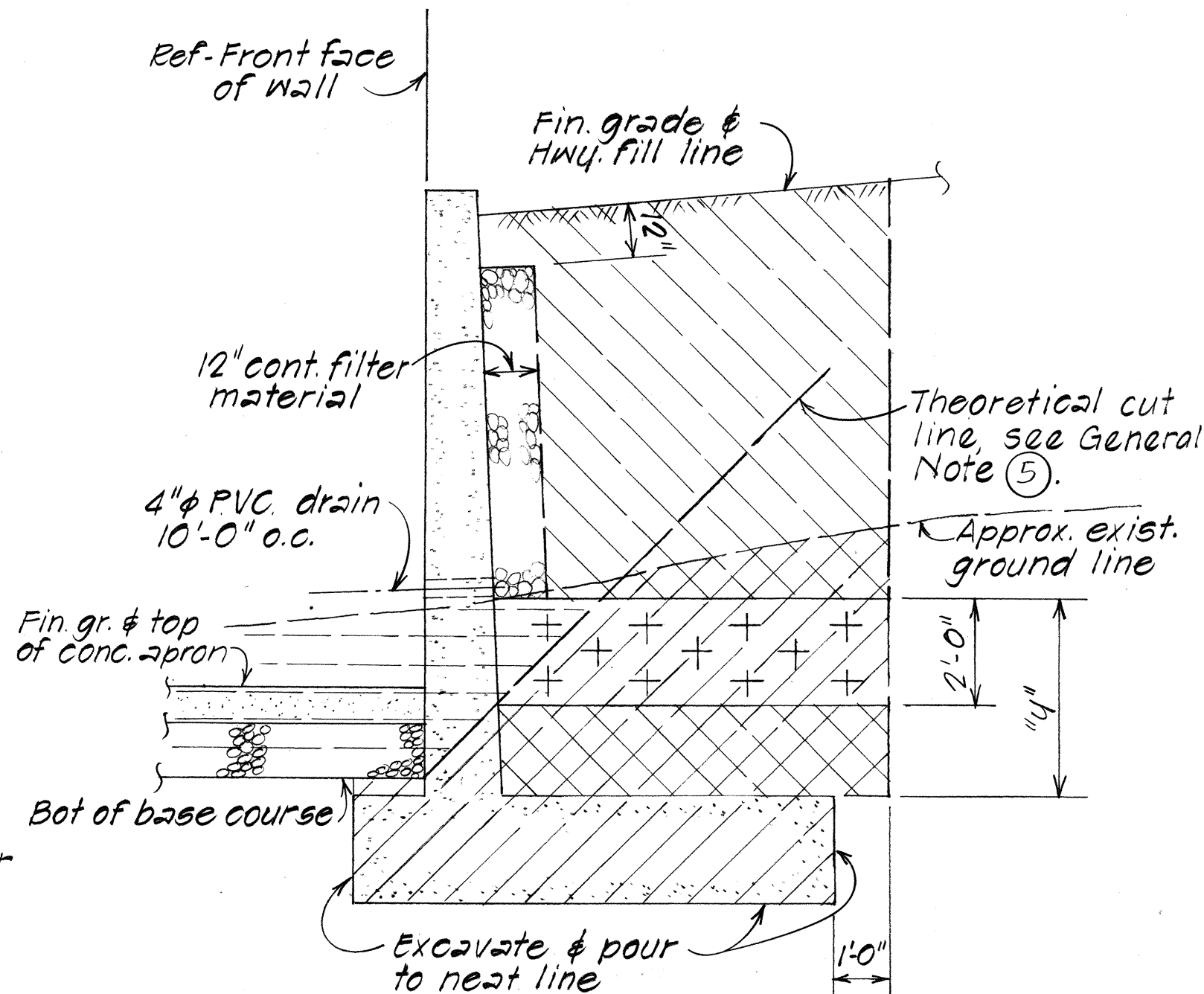
VERTICAL REINFORCING
STEEL ARRANGEMENT



WINGWALL NO. 1

Note:
For details of
concrete apron,
see Sht. #54

WINGWALL ELEVATIONS
Scale: 1/4" = 1'-0"



STRUCTURE EXCAVATION &
DRAINAGE DETAIL
Not to Scale

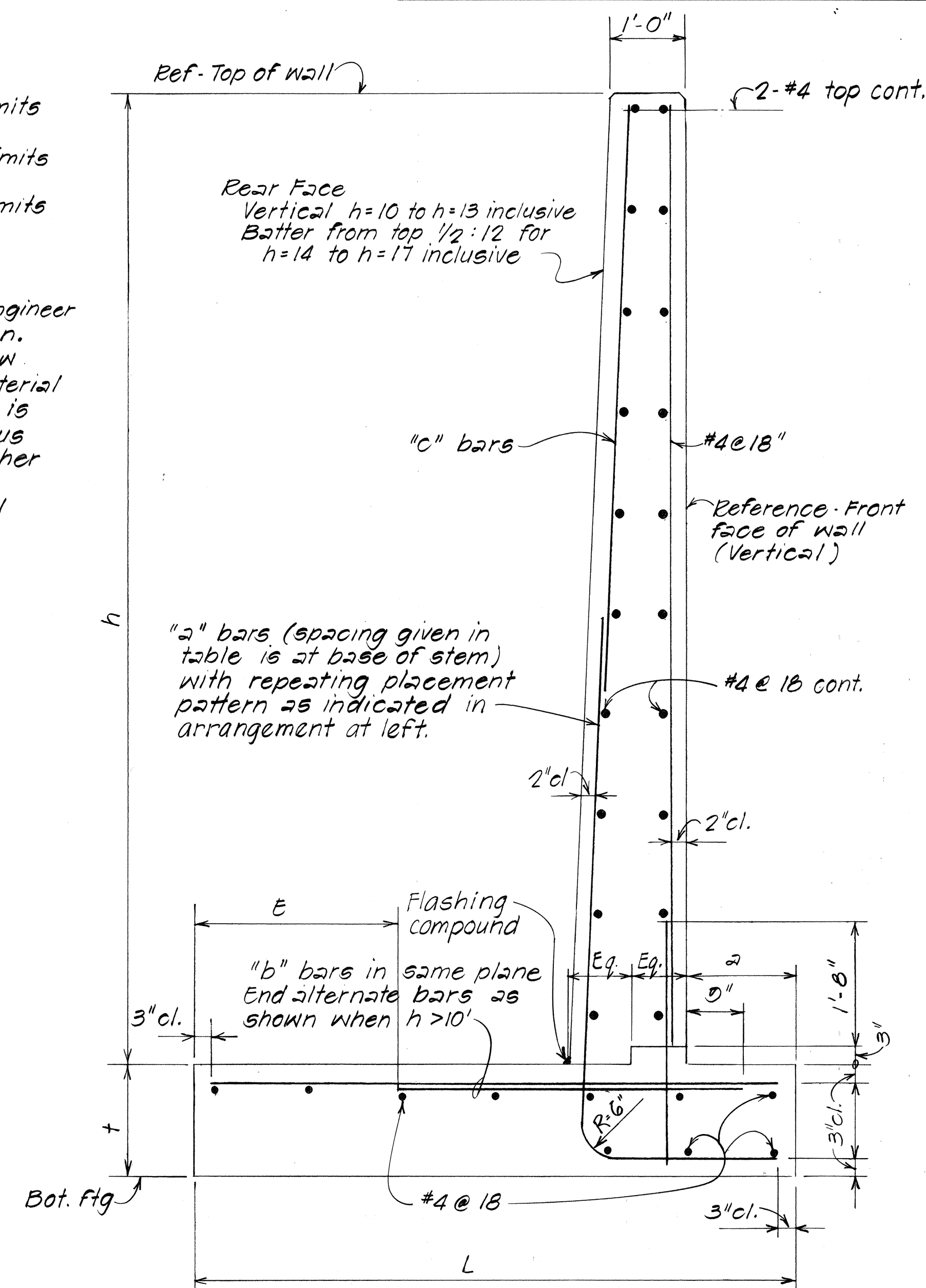
NOTES

HATCHED AREA

1. Hatched area shown thus denotes limits of structure excavation pay line.
2. Hatched area shown thus denotes limits of structure backfill.
3. Hatched area shown thus denotes limits of channel excavation.

IMPERVIOUS MATERIAL

- Impervious material as selected by the Engineer shall be incidental to structure excavation. When "y" is 2'-0" or less, all backfill below PVC drain level shall be impervious material.
- The subgrade upon which filter material is to be placed shall be made as impervious as possible by pneumatic tamping or other approved methods.
- Impervious material shall be incidental to embankment.



TYPICAL WALL SECTION
Not to Scale

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL DETAILS
RETAINING WALL

HAWAII BELT ROAD
TRUCK CLIMBING LANES AT PEPEKEO, UIII
PROJECT NO. 19J-02-85

Scale: As Noted Date: Sept. 1985

SHEET No. 57 OF 7 SHEETS

DATE	01/85
SURVEY PLOTTED BY	H.N.F.
DRAWN BY	H.N.F.
DESIGNED BY	M.Y.
CHECKED BY	L.A.G.T.
ORIGINAL PLAN	
NOTE BOOK	
No.	