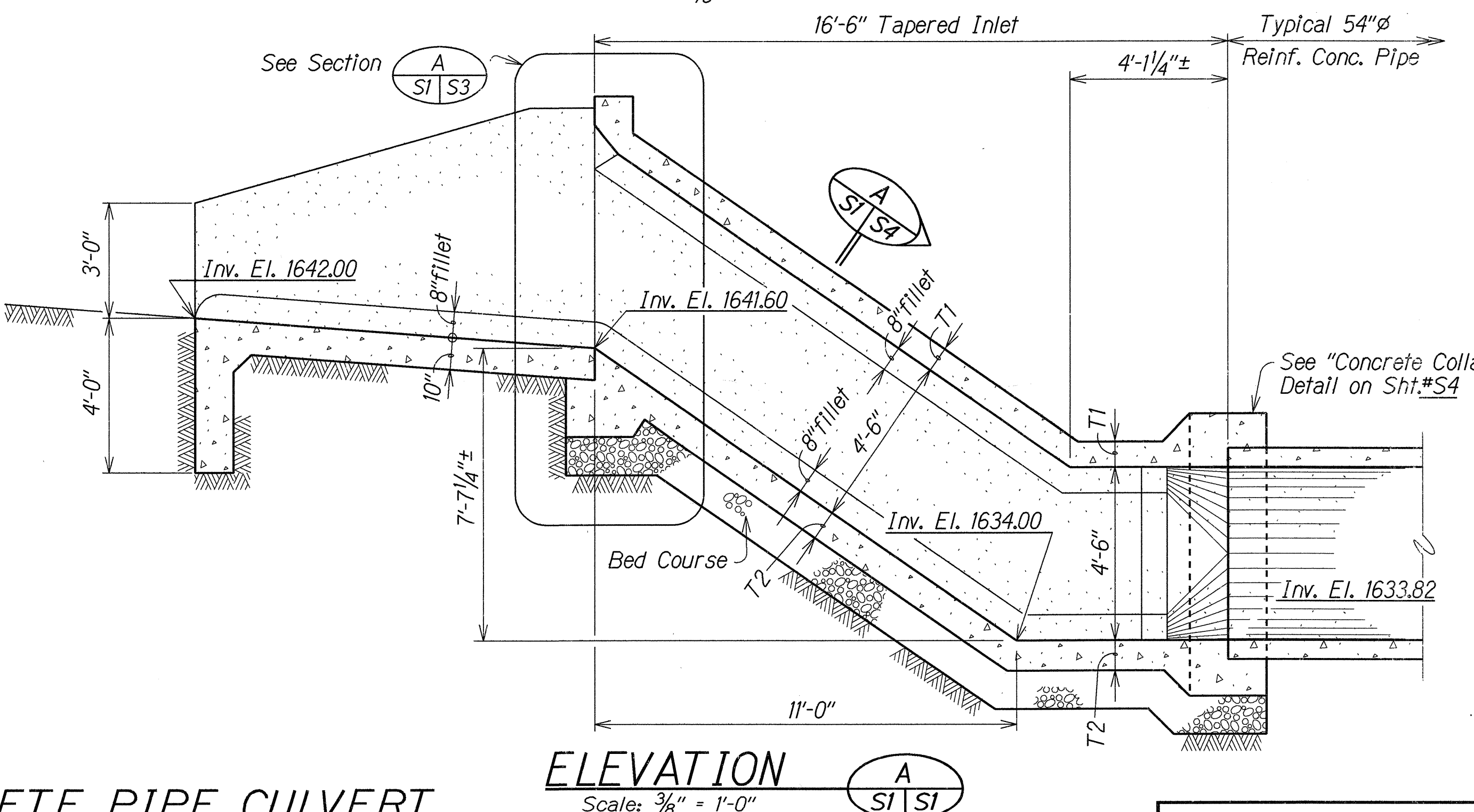
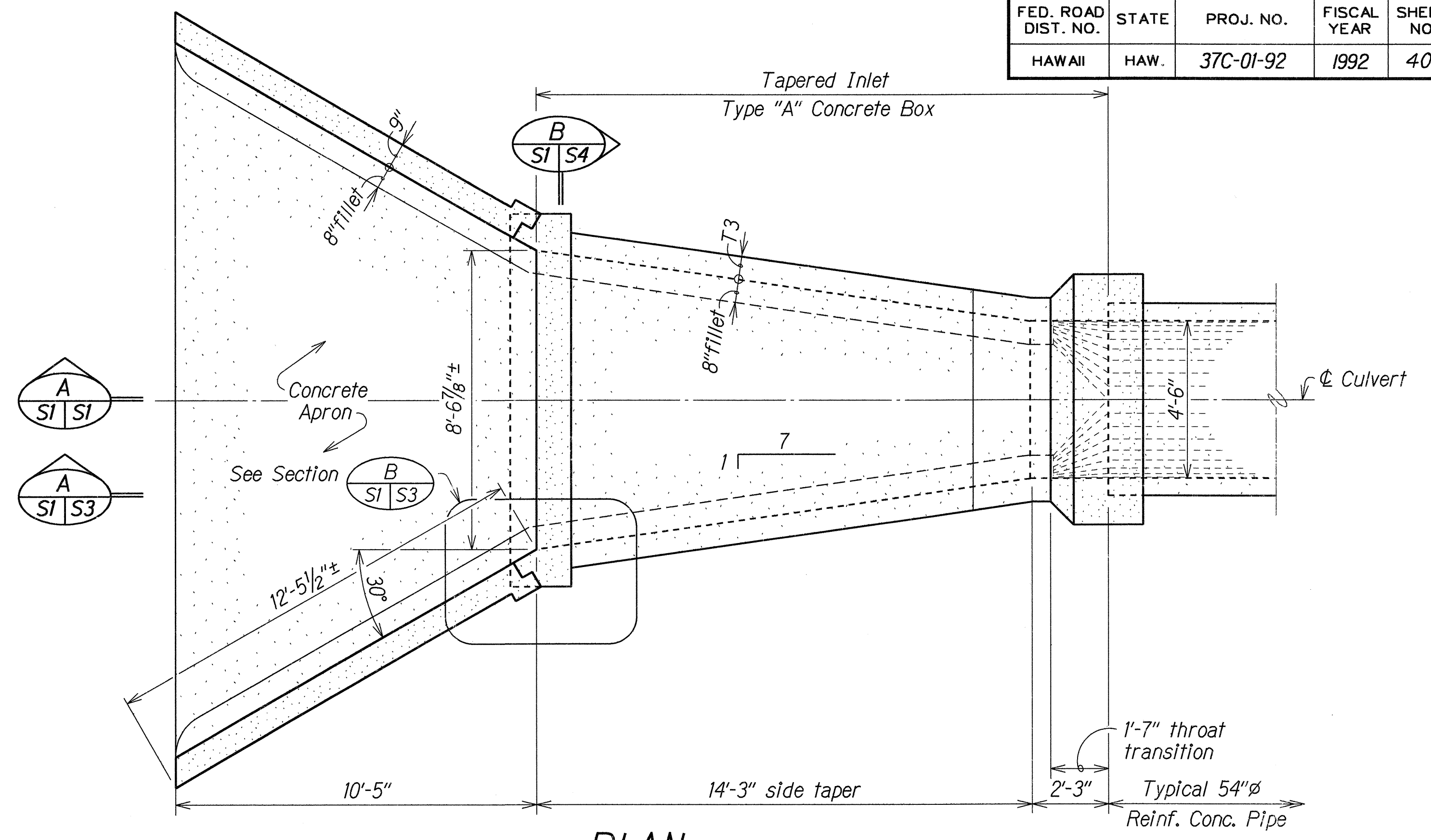
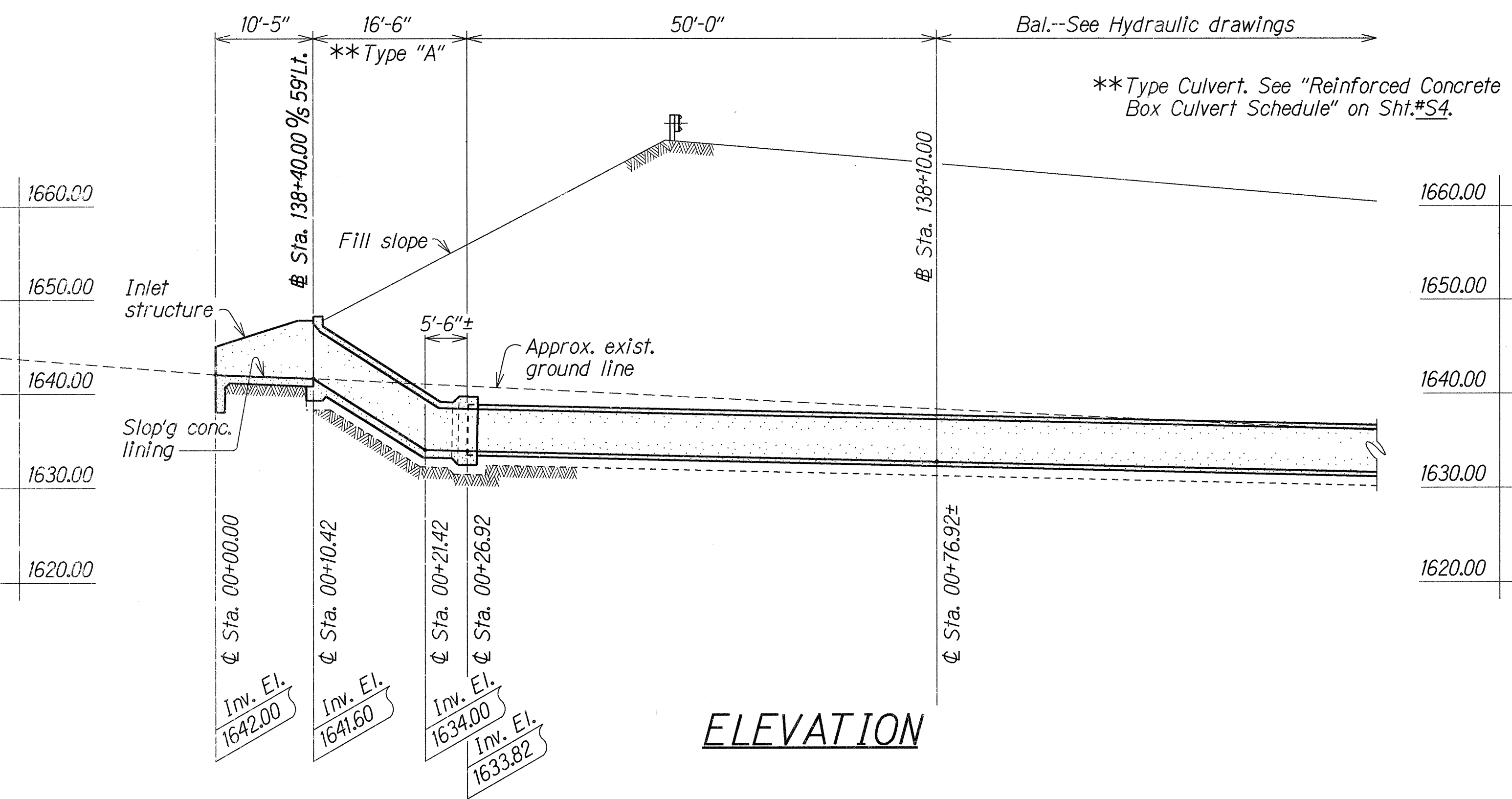
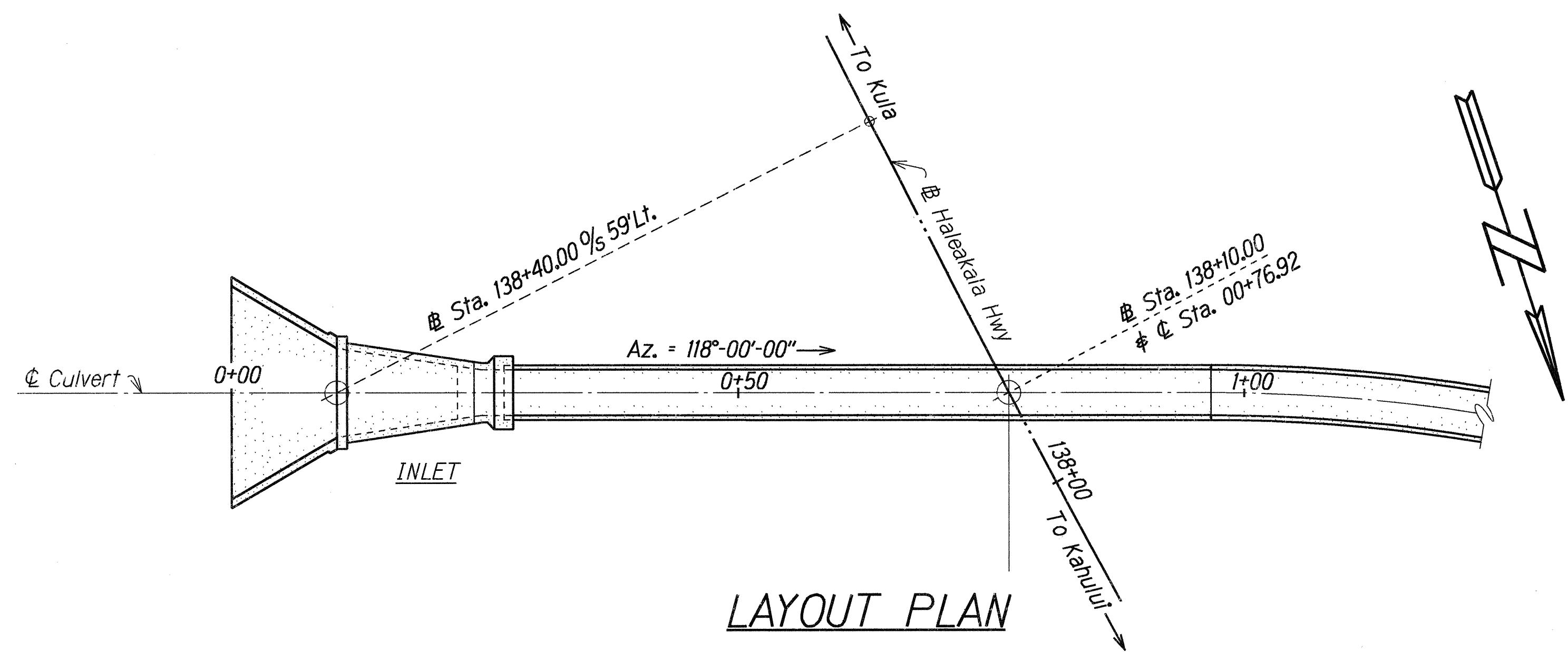


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	37C-01-92	1992	40	66



54"Ø REINFORCED CONCRETE PIPE CULVERT
@ Sta. 138+10
 Scale: 1" = 10'-0"

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

LAYOUT PLAN AND ELEVATION.

PLAN AND ELEVATION AT INLET END

54"Ø REINFORCED CONCRETE PIPE CULVERT @ Sta. 138+10

HALEAKALA HIGHWAY-PUKALANI SECTION-PHASE II

HAMAKUA DITCH TO KULA JUNCTION

Project No. 37C-01-92

Scale: As Noted

Date: Nov. 1990

SHEET No. 51 OF 4 SHEETS

ORIGINAL PLAN	DATE	NOV 1990
DRAWN BY	KSC	
DESIGNED BY	SMA	
CHECKED BY	SMA	
QUANTITIES BY	SMA	
CHECKED BY	DOO/SV	
NO.	10/10/90	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	37C-01-92	1992	41	66

SYMBOLS AND ABBREVIATION

"Detail" or "Section" designation		Sheet no. "Section" is cut or "Detail" is located	Sheet no. "Detail" is drawn on
B :	Base Line	<u>I</u>	
C :	Center Line	Inv. = Invert	
A		<u>J</u>	
Adj.	Adjacent	Jt. = Joint	
Approx.	Approximate	<u>L</u>	
B		Lt. = Left	
Bal.	Balance	M	
Bott.	Bottom	Max. = Maximum	
C		Min. = Minimum	
Cl.	Clear	<u>Q</u>	
Conc.	Concrete	O.C. = On Center	
Const.	Construction	<u>R</u>	
Cont.	Continuous	RC = Reinforced Concrete	
CRM	Concrete Rubble Masonry	Reinf. = Reinforcement (Reinforcing)	
C.Y.	Cubic Yards	Roof'g = Roofing	
D		Rt. = Right	
Det.	Detail	<u>S</u>	
Diag.	Diagonal	Sht. = Sheet	
E		Spac'd = Spaced	
Ea.	Each	Spac'g = Spacing	
El.	Elevation	Specs. = Specifications	
Exist. (Exist'g)	Existing	Sta. = Station	
F		Std. = Standard	
Ftg. (Foot'g)	Footing	Stirr. = Stirrup	
G		<u>I</u>	
GRP	Grouted Rubble Pavement	Typ. = Typical	
H		<u>V</u>	
Hdwall.	Headwall	Vert. = Vertical	
Hor. (Horiz.)	Horizontal	W	
Hwy.	Highway	Waterproof'g = Waterproofing	

GENERAL STRUCTURAL NOTES:

DESIGN SPECIFICATIONS:

AASHTO Standard Specifications for Highway Bridges (14th Edition)

DESIGN LOADS:

- Vertical earth pressure: 120 pcf
- Lateral earth pressure: 60 pcf

ALLOWABLE DESIGN STRESSES:

- Reinforced Concrete: $f_c = 1,200$ psi
- Reinforcing Steel: $f_c = 20,000$ psi

MATERIALS:

- Reinforced Concrete: Class A
- Reinforcing Steel--ASTM A615, Grade 40
- Asphalt roll roofing shall be ASTM D224 Type II and shall be incidental to Class A concrete.

CONSTRUCTION REQUIREMENTS:

- Refer to Hawaii Standard Specifications for Road and Bridge Construction, 1985 and Special Provisions.
- Except as noted otherwise, all vertical dimensions are measured plumb.

GENERAL NOTES

- Refer to Standard Plans for additional details and notes not covered by details and typical drawings.
- All items noted "Incidental" will not be paid for separately.
- The Contractor shall verify the locations of all utility lines near culverts and notify their respective owners before commencing with work.
- Excavation for culverts shall be accomplished by maintaining as near a vertical cut as possible and it shall be the Contractor's responsibility to maintain the stability of existing earthwork throughout the course of work.
- The Contractor shall be solely responsible for the protection of adjacent property, utilities and existing and new structures from damage due to construction and shall repair any damage at his 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.
- In the event of over-excavation, the space between the footing and ground shall be filled with a minimum of Class D concrete at the Contractor's expense and as directed by the Engineer.

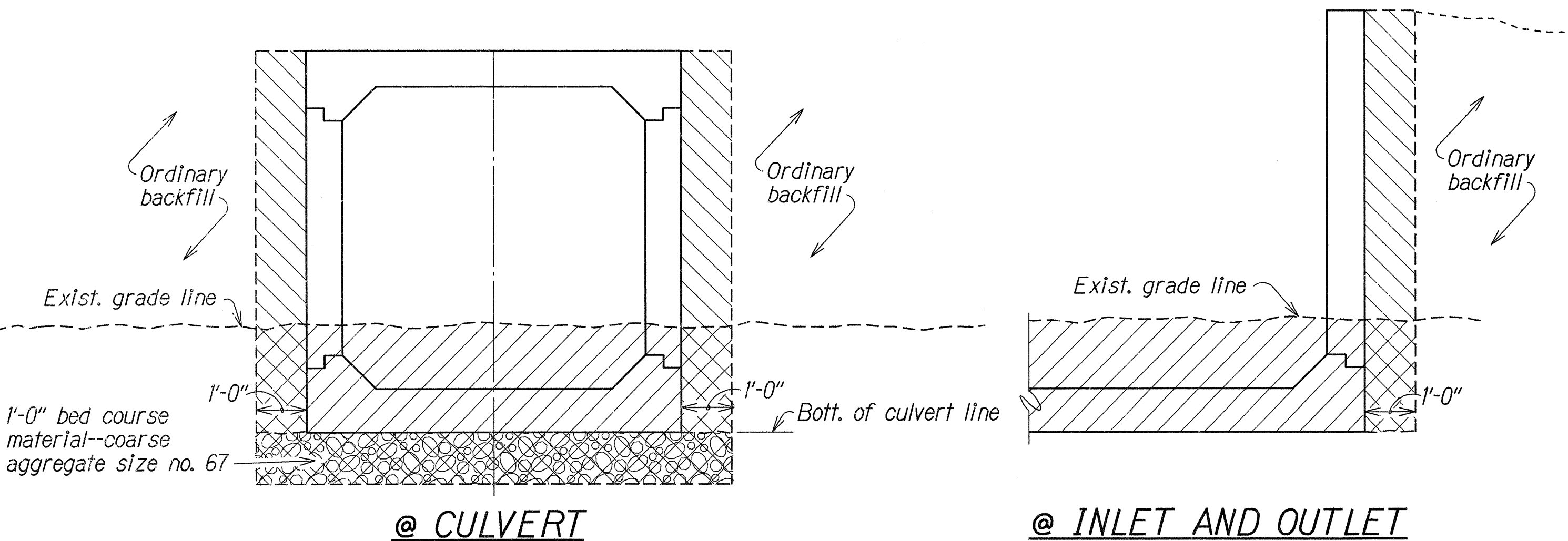
ESTIMATED QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
206.4201	Structure Excavation for Box Culvert (Incl. Tapered Inlet Box) and Inlet Structure	Cu. Yd.	40 C.Y.
206.7001	Structure Backfill for Box Culverts (Incl. Tapered Inlet Box) and Inlet Structure Excluding Bed Course	Cu. Yd.	15 C.Y.
503.0140	Concrete In Inlet Structure	Lump Sum	(12 C.Y.)
503.1030	Concrete In Box Culverts And Collars (Incl. Tapered Inlet Box)	Lump Sum	(12 C.Y.)
602.0032	Reinforcing Steel In Box Culverts (Incl. Tapered Inlet Box) and Inlet Structure	Lump Sum	(3,040 Lbs.)
603.0010	Bed Course Material	Cu. Yd.	5 C.Y.

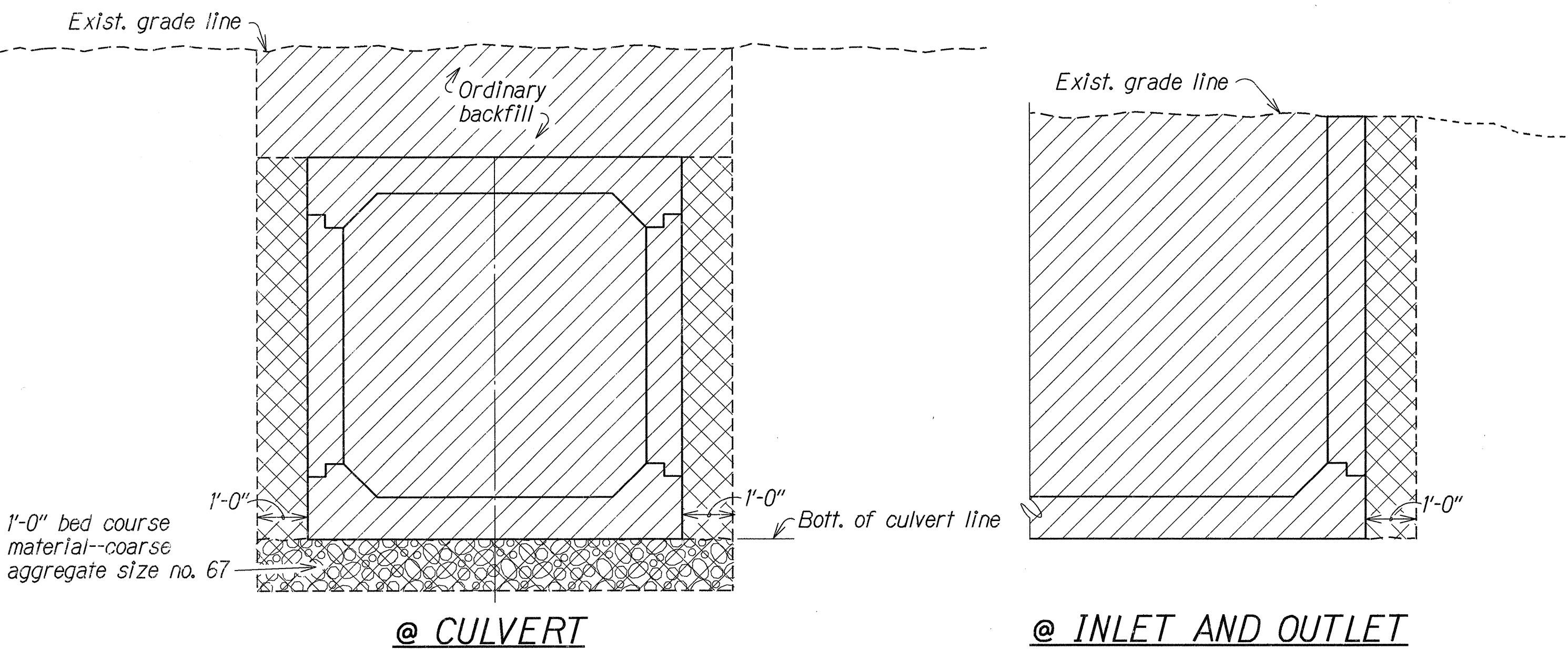
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
GENERAL NOTES, ESTIMATED QUANTITIES AND STRUCTURE EXCAVATION AND BACKFILL PAY LIMITS	
54" REINFORCED CONCRETE PIPE CULVERT @ STA. 138+10 HALEAKALA HIGHWAY--PUKALANI SECTION--PHASE II HAMAKUA DITCH TO KULA JUNCTION Project No. 37C-01-92	
Scale: As Noted	Date: Nov. 1990.

SHEET No. 52 OF 4 SHEETS

Hatched area shown thus denotes limits of structure excavation.
 Hatched area shown thus denotes limits of structure backfill.
 Bed course material shall be incidental to structural backfill.



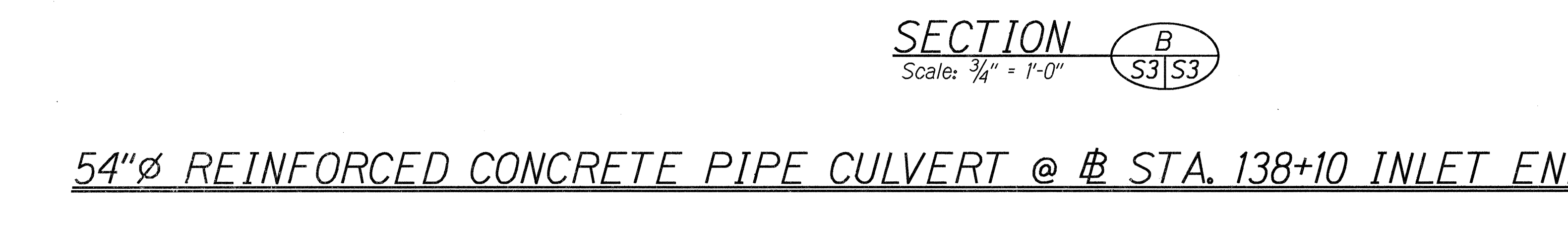
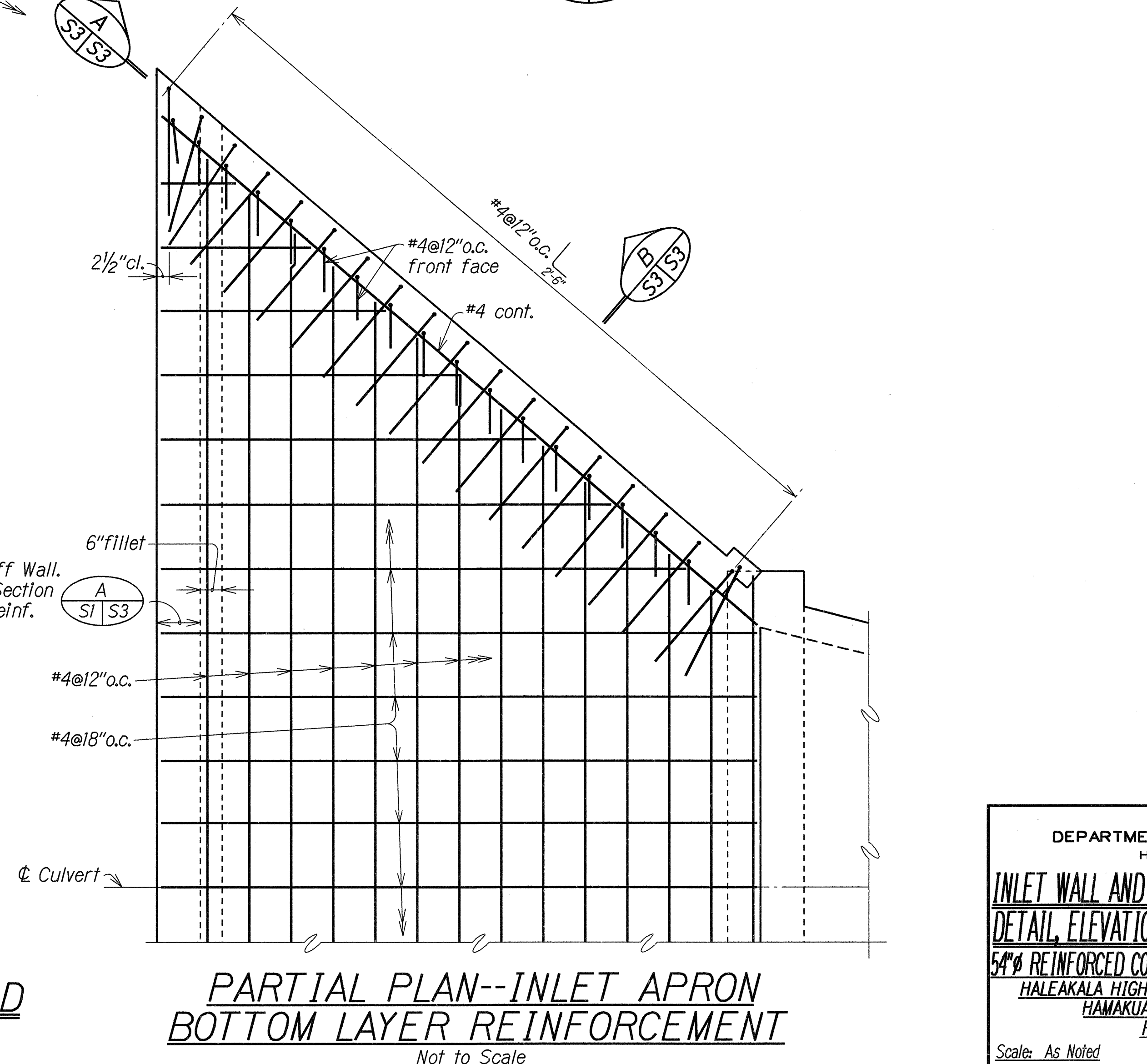
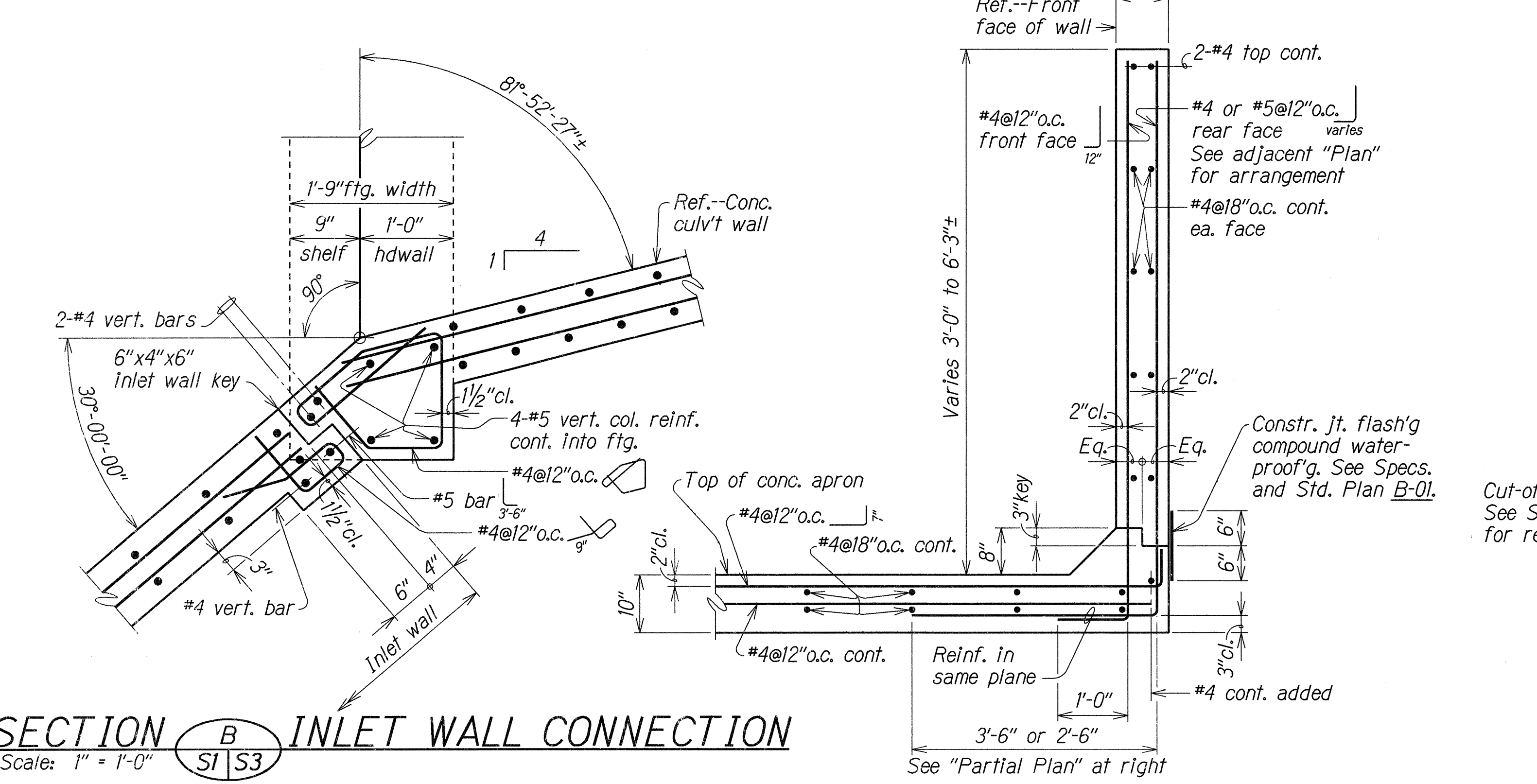
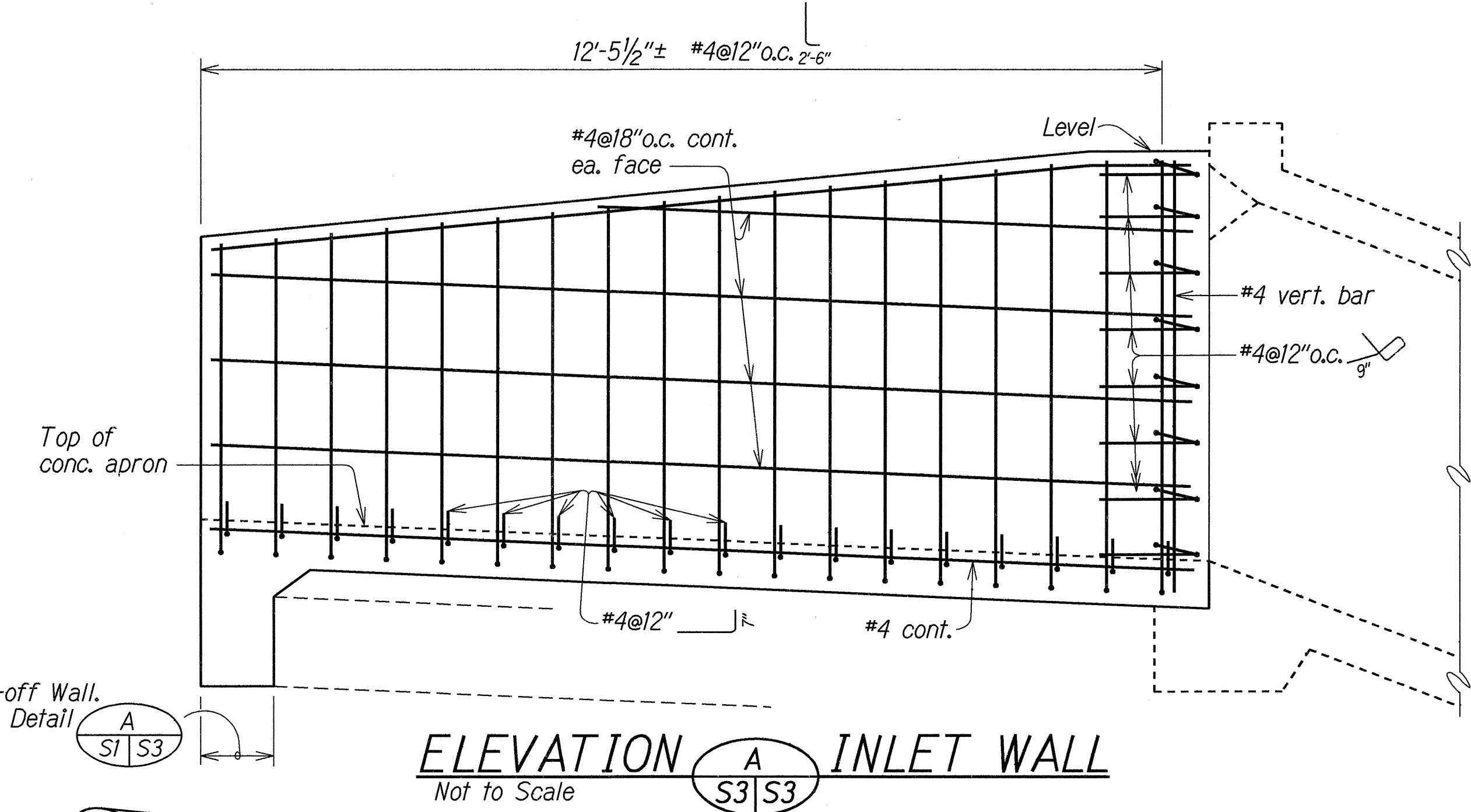
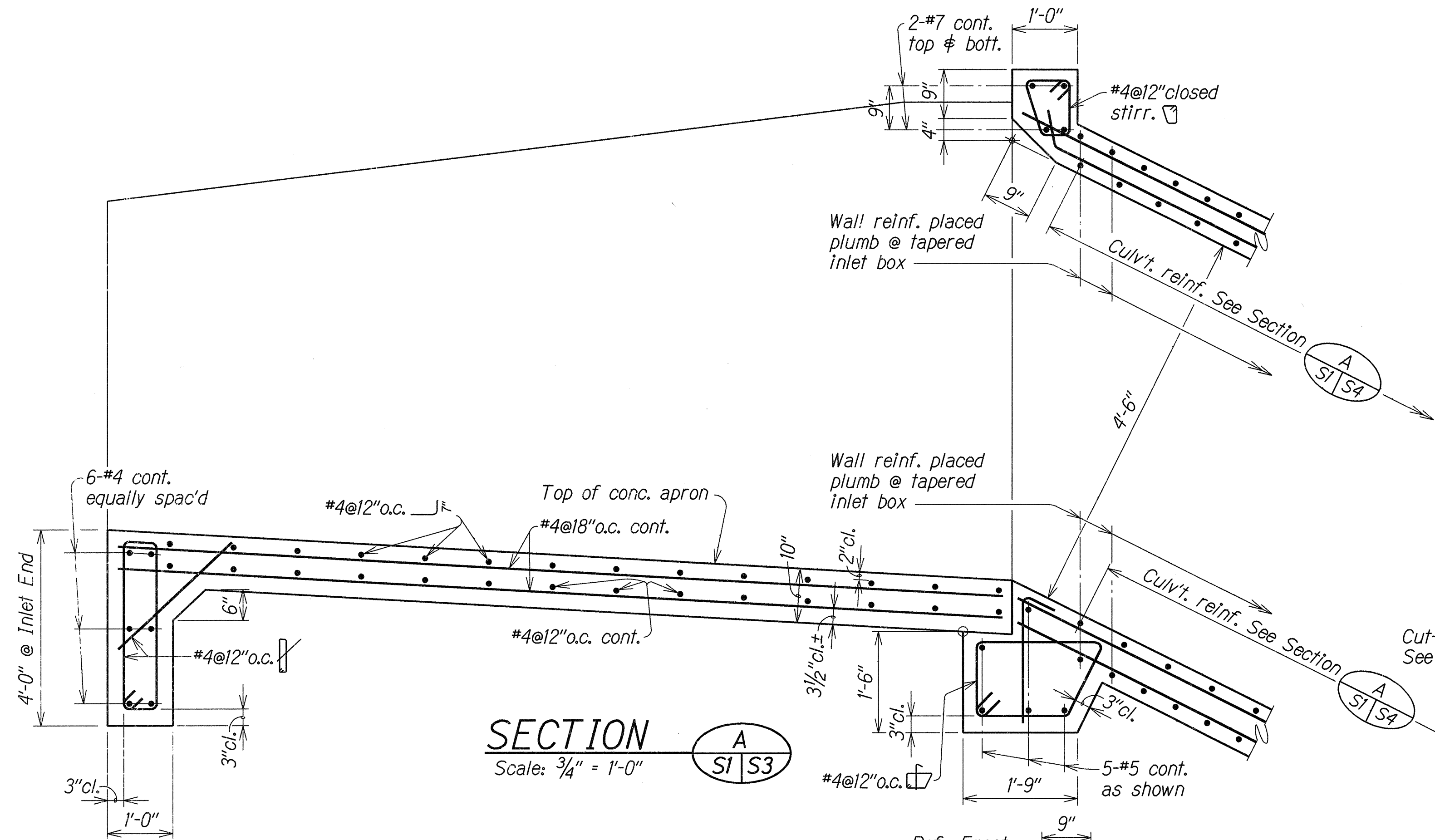
Hatched area shown thus denotes limits of structure excavation.
 Hatched area shown thus denotes limits of structure backfill.
 Bed course material shall be incidental to structural backfill.



TYPICAL STRUCTURE EXCAVATION AND STRUCTURE BACKFILL PAY LIMITS

SURVEY PLOTTED BY	DATE
DRAWN BY	NOV 1990
CHECKED BY	NOV 1990
DESIGN FILE	NOV 1990
QUANTITIES BY	NOV 1990
CHECKED BY	NOV 1990

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	37C-01-92	1992	42	66



54"Ø REINFORCED CONCRETE PIPE CULVERT @ STA. 138+10 INLET END

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

INLET WALL AND APRON SECTIONS, CONNECTION

DETAIL, ELEVATION AND PARTIAL PLAN INLET END

54"Ø REINFORCED CONCRETE PIPE CULVERT @ STA. 138+10

HALEAKALA HIGHWAY--PUKALANI SECTION--PHASE II

HAMAKUA DITCH TO KULA JUNCTION

Project No. 37C-01-92

Scale: As Noted

Date: Nov, 1990

SHEET No. S3 OF 4 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	37C-01-92	1992	43	66

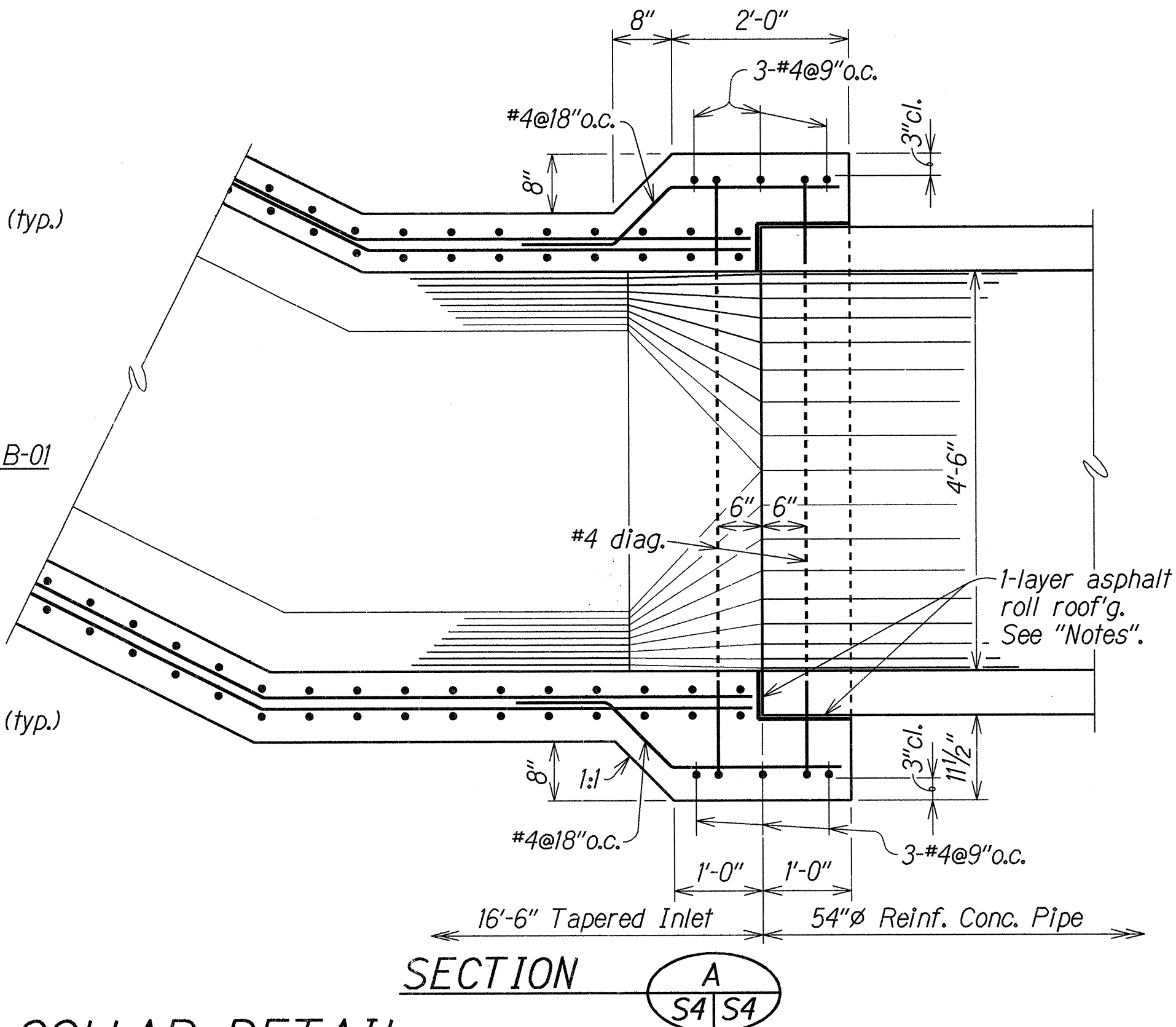
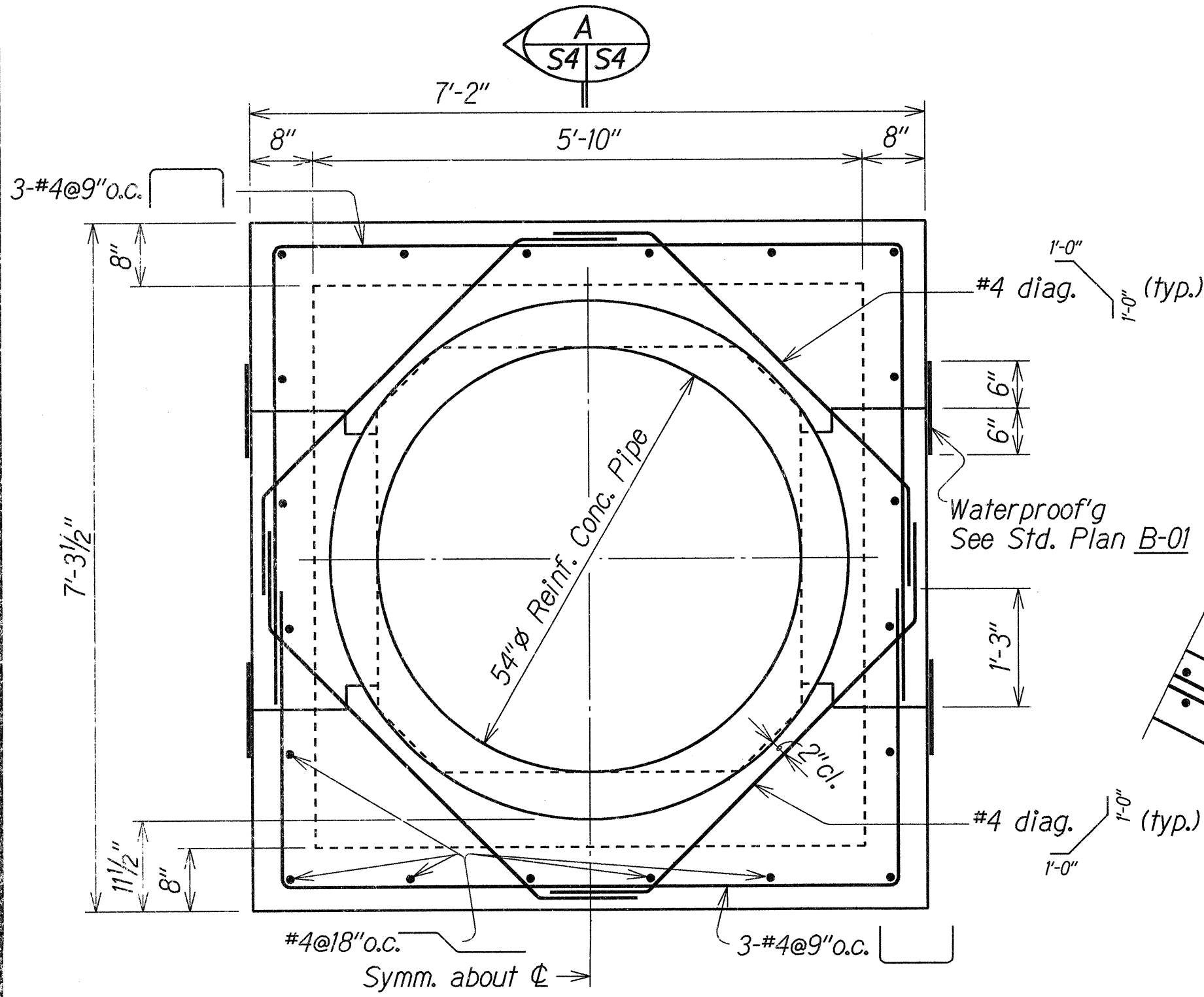
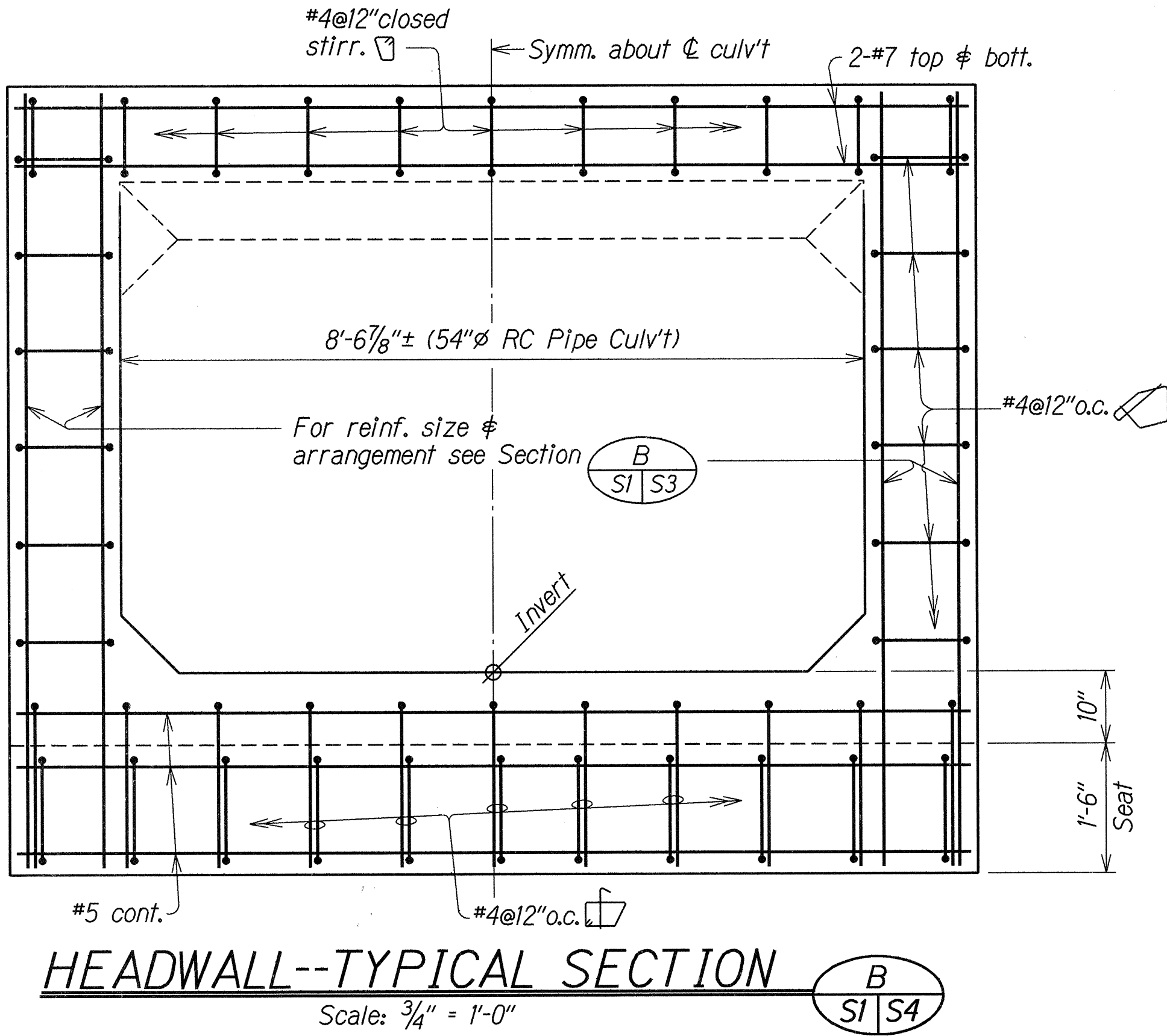
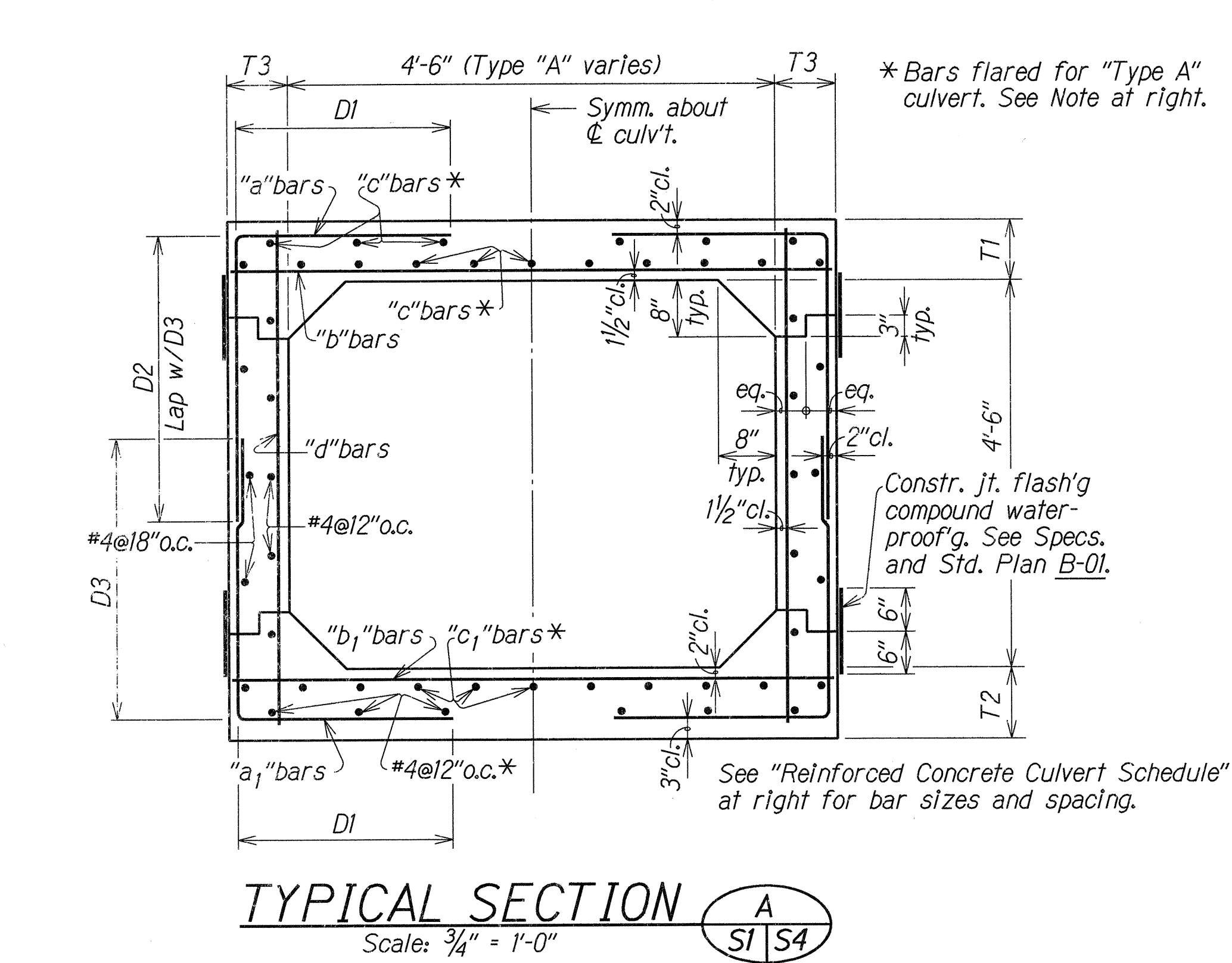
SPAN AND HEIGHT			54"PIPE	
TYPE			A**	
CONC.	TOP SLAB		T1	8"
	BOTTOM SLAB		T2	9½"
	SIDE WALLS		T3	8"
REINFORCING STEEL *	DIMENSION		D1	2'-6"
	DIMENSION		D2	3'-2"
	DIMENSION		D3	3'-2"
	T1		"a" bar	#5@8½"
			"b" bar	#5@7"
			Cont. "c" bar	#4@12"*
	T2		"a₁" bar	#5@8½"
			"b₁" bar	#5@7"
			Cont. "c₁" bar	#5@9"*
	T3	Vertical (inside face) "d" bar		#5@12"
		Vertical (outside face) "e" bar		—
QUAN.	CONCRETE: C.Y. per linear foot			
	REINFORCING STEEL: Lbs. per linear foot			

* Note: Where bars are flared, the reinforcing steel spacing given in this table shall be at the widest separation of the flared bars.

** Note: Type A refers to the rectangular shape tapered inlet end of the culverts. See "Plan" and "Elevation".

REINFORCED CONCRETE PIPE CULVERT SCHEDULE

SURVEY PLOTTED BY	DATE
DRAWN BY	NOV 1990
DESIGNED BY	NOV 1990
QUANTITIES BY	NOV 1990
CHECKED BY	NOV 1990
ORIGINAL PLAN	
DESIGN FILE	
NO.	



54"Ø REINFORCED CONCRETE PIPE CULVERT @ # STA. 138+10

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

CONCRETE COLLAR, HEADWALL, SECTION @

INLET END AND PIPE CULVERT SCHEDULE

54"Ø REINFORCED CONCRETE PIPE CULVERT @ # STA. 138+10

HALEAKALA HIGHWAY--PUKALANI SECTION--PHASE II

HAMAKUA DITCH TO KULA JUNCTION

Project No. 37C-01-92

Scale: As Noted

Date: Nov. 1990