

COLORADO DEPARTMENT OF HIGHWAYS

PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT NO. F.I. 002-2 (25) UNIT 1 STATE HIGHWAY NO. + H 25 UNIT 2 EL PASO COUNTY *culvert lengthening*

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	F.I. 002-2 (25)	1	1
RIGHT OF WAY		UNIT 1 & UNIT 2		

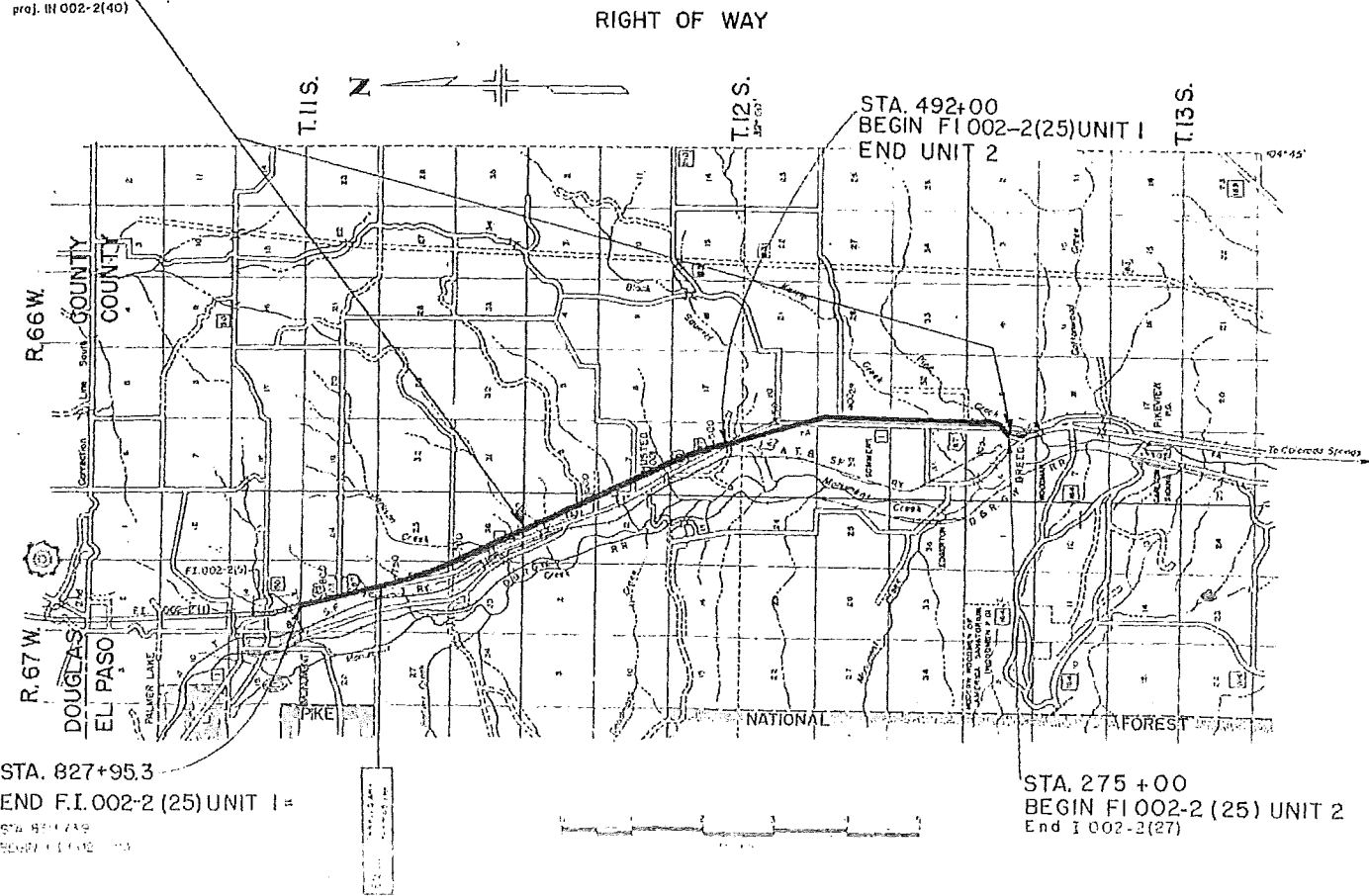
Rev. 9-10-53 S.W.Z.
Rev. 5-28-54 S.W.Z.
Rev. 12-3-59 E.P.W. Access
Rev. 2/7/61 E.P.W. NOTE

INDEX OF SHEETS
SHEET NO. 1 TITLE SHEET.
2-4 TABULATION OF PROPERTIES.
5-24 PLAN AND PROFILE SHEETS SHOWING R.O.W.
25-29 OWNERSHIP MAP

- CONVENTIONAL SIGNS**
- CENTER LINE
 - RIGHT-OF-WAY LINE
 - TOWNSHIP OR RANGE LINE
 - SECTION LINE
 - QUARTER SECTION LINE
 - SIXTEENTH SECTION LINE
 - PROPERTY OR TRACT LINE
 - CITY LIMITS
 - RAILROAD
 - BARBED WIRE FENCE
 - WOVEN WIRE - COMBINATION FENCE
 - SNOW FENCE
 - TELEPHONE LINE
 - TELEGRAPH LINE
 - POWER LINE
 - PRESENT ROAD (PLAN SHEET)
 - COUNTY LINE
 - ACCESS DENIED BY DEED
 - DEED LINE (CONTROL OF ACCESS)

NOTE
From South end of proj. ROW. sta. 276 +48.8 to North line of USAF Academy property sta. 649 +34.0 the R.O.W. was conveyed to the USAF Academy. For Easement from the Academy for present (1960) S.H. No. 1 see proj. IN 002-2(40)

SCALES OF ORIGINAL TRACINGS
ON PLAN 1 IN. = 100 FT.
ON PROFILE 1 IN. = 100 FT. HORIZONTAL
1 IN. = 10 FT. VERTICAL
GRADE LINE ON PROFILE IS SHOWN AS GRADE OF FINISHED ROAD
GROSS LENGTH OF PROJECT
NET LENGTH OF PROJECT



STA. 827+95.3
END F.I. 002-2 (25) UNIT 1
Sta. 827+95.3
Sta. 827+114.2

STA. 275+00
BEGIN F.I. 002-2 (25) UNIT 2
End F.I. 002-2(27)

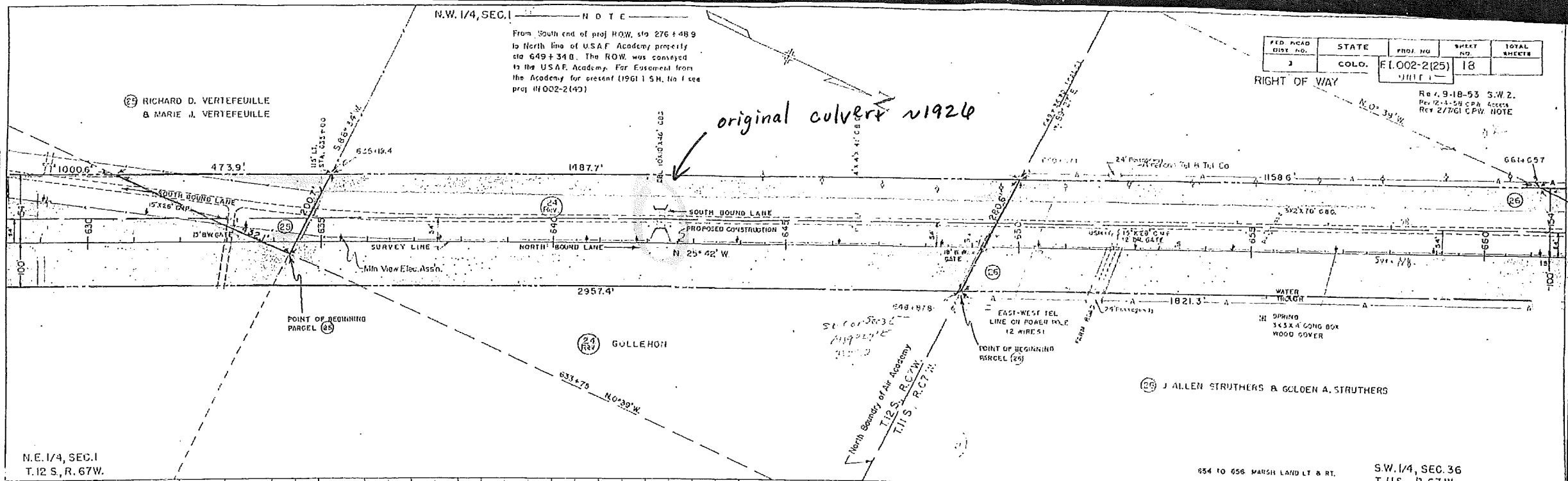
N.W. 1/4, SEC. 1

NOTE
From South end of prop ROW, sta 276+48.9 to North line of USAF Academy property sta 649+34.8. The ROW was conveyed to the USAF Academy. For Easement from the Academy for present (1961) SH, to see proj #1002-2(43)

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
3	COLO.	E. 1002-2(25)	18	

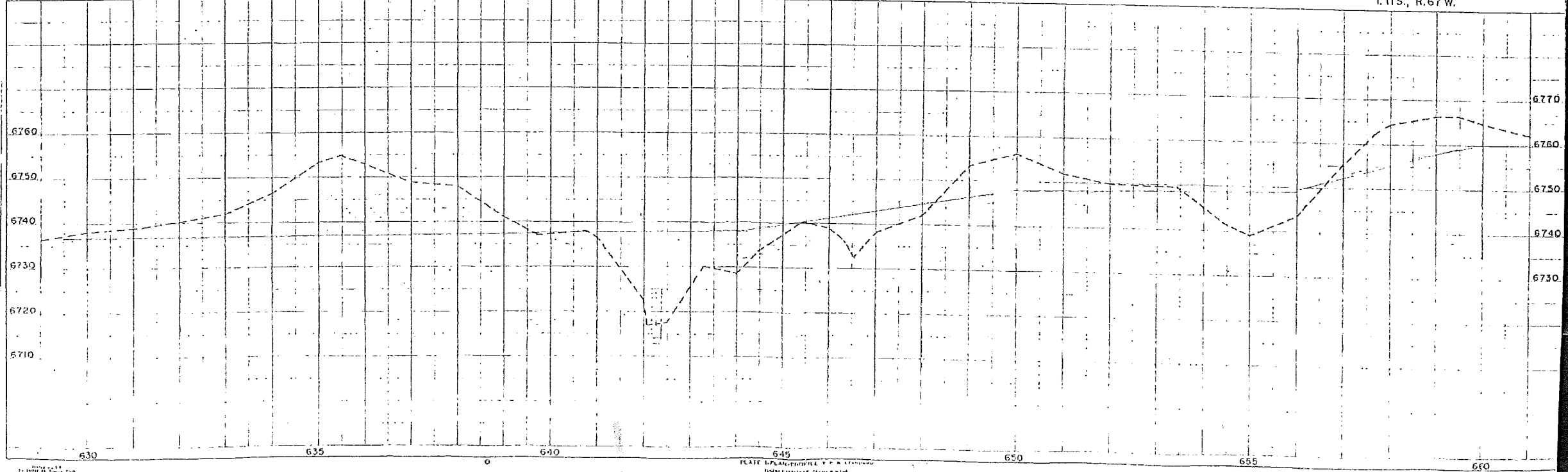
Re 4, 9-18-53 S.W. 2.
Rev 12-1-58 CPA Access
Rev 2/7/61 CPW. NOTE

original culvert ~1926



N.E. 1/4, SEC. 1
T. 12 S., R. 67 W.

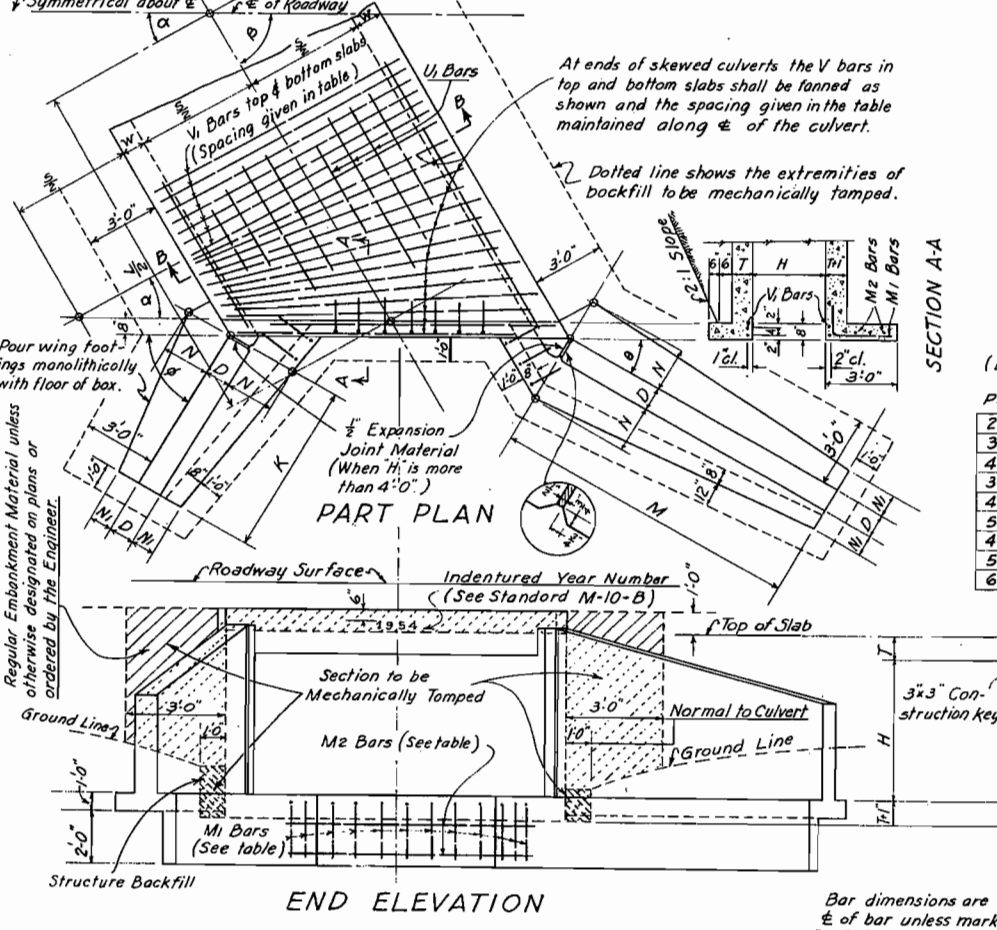
S.W. 1/4, SEC. 36
T. 11 S., R. 67 W.



Dimensions & Quantities (see Standard M-50-AW for Wings)

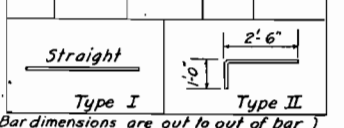
Height of Fill Allowed	Type	Span S	Height H	Slab T	Wall W	Bar Size & Spacing		No. Bars Required	Quantities for One Lin. Ft. of Box		Quantities for Two Headwalls	
						V ₁ Size Spa.	V ₂ Size Spa.		Concrete Cu. Yds.	Steel Lbs.	Concrete Cu. Yds.	Steel Lbs.
35'-0"	2A	2'-0"	2'-0"	6"	8"	3/4"	12"	8	0.232	17.5	1.30	81
30'-0"	3A	3'-0"	3'-0"	7"	8"	3/4"	12"	10	0.299	26.3	1.50	112
20'-0"	4A	4'-0"	4'-0"	7 1/2"	8"	3/4"	12"	12	0.362	31.8	1.50	150
16'-0"	5A	5'-0"	4'-0"	8"	8"	3/4"	12"	16	0.461	37.3	2.10	153
20'-0"	5B	5'-0"	4'-0"	8 1/2"	8"	3/4"	12"	18	0.530	42.7	2.40	157
14'-0"	6A	6'-0"	6'-0"	8 1/2"	8"	3/4"	12"	20	0.579	52.0	2.60	161
20'-0"	6B	6'-0"	5'-0"	10"	8"	3/4"	12"	20	0.500	45.5	2.20	153
12'-0"	7A	7'-0"	7'-0"	9"	9"	3/4"	12"	24	0.598	52.2	2.60	161
15'-0"	7B	7'-0"	10'-0"	9"	9"	3/4"	12"	26	0.605	54.7	2.60	161
20'-0"	7C	7'-0"	11'-0"	9"	9"	3/4"	12"	26	0.654	58.1	2.85	184
10'-0"	8A	8'-0"	9'-0"	10"	10"	3/4"	12"	28	0.704	61.4	3.00	188
16'-0"	8B	8'-0"	11'-0"	10"	10"	3/4"	12"	28	0.753	64.9	3.30	192
20'-0"	8C	8'-0"	12'-0"	10"	10"	3/4"	12"	28	0.871	72.4	3.70	223
7'-0"	9A	9'-0"	10'-0"	11"	11"	3/4"	12"	32	0.720	56.9	2.90	228
14'-0"	9B	9'-0"	12'-0"	11"	11"	3/4"	12"	32	0.820	65.4	3.35	239
20'-0"	9C	9'-0"	14'-0"	11"	11"	3/4"	12"	32	0.938	75.5	3.40	246
5'-0"	10A	10'-0"	10'-0"	12"	12"	3/4"	12"	34	0.887	72.2	3.70	220
10'-0"	10B	10'-0"	12'-0"	12"	12"	3/4"	12"	34	0.972	81.0	3.65	257
16'-0"	10C	10'-0"	14'-0"	12"	12"	3/4"	12"	34	1.072	90.0	3.25	262
5'-0"	11A	11'-0"	11'-0"	12"	12"	3/4"	12"	36	0.938	75.5	3.75	273
9'-0"	11B	11'-0"	12'-0"	12"	12"	3/4"	12"	36	1.023	84.5	3.55	292
13'-0"	11C	11'-0"	14'-0"	12"	12"	3/4"	12"	36	1.084	91.1	3.10	257
5'-0"	12A	12'-0"	12'-0"	12"	12"	3/4"	12"	38	0.887	72.2	3.30	269
10'-0"	12B	12'-0"	14'-0"	12"	12"	3/4"	12"	38	0.937	76.9	3.50	268
4'-0"	13A	13'-0"	13'-0"	12"	12"	3/4"	12"	40	0.844	66.0	3.75	274
8'-0"	13B	13'-0"	14'-0"	12"	12"	3/4"	12"	40	0.905	75.8	3.40	235
4'-0"	14A	14'-0"	14'-0"	13"	13"	3/4"	12"	42	0.866	63.2	3.60	243
8'-0"	14B	14'-0"	15'-0"	13"	13"	3/4"	12"	42	0.927	72.7	3.40	247
10'-0"								44	1.089	90.5	4.40	251
								46	0.963	80.0	3.50	292
								48	1.025	85.9	3.70	297
								50	1.048	88.1	3.90	303
								52	1.072	90.0	4.10	309
								54	1.100	92.7	4.30	314
								56	1.040	83.2	4.50	318
								58	1.108	91.1	4.20	321
								60	1.176	98.6	4.50	337
								62	1.244	106.1	4.80	342
								64	1.311	113.6	5.10	348
								66	1.379	121.1	5.40	354
								68	1.447	128.6	5.70	360
								70	1.515	136.1	6.00	366
								72	1.583	143.6	6.30	372
								74	1.651	151.1	6.60	378
								76	1.719	158.6	6.90	384
								78	1.787	166.1	7.20	390
								80	1.855	173.6	7.50	396
								82	1.923	181.1	7.80	402
								84	1.991	188.6	8.10	408
								86	2.059	196.1	8.40	414
								88	2.127	203.6	8.70	420
								90	2.195	211.1	9.00	426
								92	2.263	218.6	9.30	432
								94	2.331	226.1	9.60	438
								96	2.399	233.6	9.90	444
								98	2.467	241.1	10.20	450
								100	2.535	248.6	10.50	456

SINGLE CONCRETE BOX CULVERT



Bar List for Culvert & Headwalls (See Standard M-50-AW for Wings)

Mark	Size	No. Req'd.	Type	Length
V ₁	See table	10 + 24L/Spa.	I	S + 2W - 6
W ₁	See table	6 + 24L/Spa.	I	H + 2T - 5
U ₁	1/2"	See table	I	L + 1'0"
M ₁	1/2"	See table	II	3'-6"
M ₂	1/2"	4	I	S + 2W - 6 / Cos α



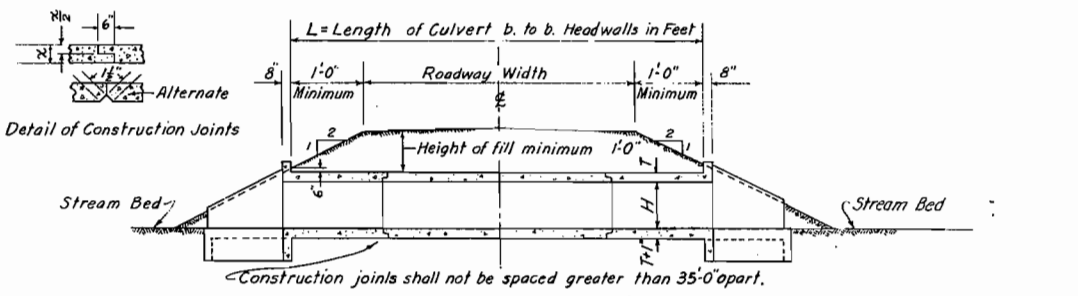
Possible Combinations (Span & Height)

2' x 2'	5' x 5'	9' x 5'	10' x 7'	11' x 8'	11' x 10'
3' x 2'	7' x 4'	8' x 6'	9' x 8'	10' x 9'	14' x 8'
4' x 2'	6' x 5'	7' x 7'	12' x 6'	13' x 7'	13' x 9'
3' x 3'	8' x 4'	9' x 6'	11' x 7'	12' x 8'	12' x 10'
4' x 3'	7' x 5'	8' x 7'	13' x 6'	14' x 7'	14' x 9'
5' x 3'	6' x 6'	10' x 6'	10' x 8'	11' x 9'	13' x 10'
4' x 4'	8' x 5'	9' x 7'	9' x 9'	10' x 10'	14' x 10'
5' x 4'	6' x 7'	8' x 8'	12' x 7'	13' x 8'	
6' x 4'	7' x 6'	11' x 6'	14' x 6'	12' x 9'	

STANDARD M-50-A

Use in conjunction with Standard M-50-AW

FED. ROAD DIV. NO.	DISTRICT	SHEET NO.	TOTAL SHEETS
9	COLO.	002-2(40) 34	



TYPICAL SECTION THROUGH CULVERT

Dimensions & Quantities (see Standard M-50-AW for Wings)

Height of Fill Allowed	Type	Span S	Height H	Slab T	Wall W	Bar Size & Spacing		No. Bars Required	Quantities for One Lin. Ft. of Box		Quantities for Two Headwalls	
						V ₁ Size Spa.	V ₂ Size Spa.		Concrete Cu. Yds.	Steel Lbs.	Concrete Cu. Yds.	Steel Lbs.
10'-0"	6'-6"-A	6'-0"	4'-0"	8 1/2"	8"	1/2"	12"	32	1.000	112.3	3.85	327
15'-0"	6'-6"-B	6'-0"	4'-0"	9 1/2"	8"	1/2"	12"	32	1.148	123.1	4.85	343
20'-0"	6'-6"-C	6'-0"	4'-0"	10 1/2"	8"	1/2"	12"	32	1.282	128.5	5.05	351
10'-0"	8'-8"-A	8'-0"	4'-0"	10"	10"	1/2"	12"	40	1.161	125.7	4.90	337
15'-0"	8'-8"-B	8'-0"	4'-0"	11"	10"	1/2"	12"	40	1.309	141.4	5.10	339
20'-0"	8'-8"-C	8'-0"	4'-0"	12 1/2"	10"	1/2"	12"	40	1.477	174.4	5.80	506
5'-0"	10'-10"-A	10'-0"	8'-0"	10"	12"	5/8"	12"	48	1.569	179.8	6.05	514
10'-0"	10'-10"-B	10'-0"	8'-0"	12"	12"	5/8"	12"	48	1.727	197.4	6.40	524
15'-0"	10'-10"-C	10'-0"	8'-0"	14"	12"	5/8"	12"	48	1.869	207.9	6.65	533
5'-0"	12'-12"-A	12'-0"	8'-0"	12"	12"	5/8"	12"	56	1.763	202.0	6.00	513
10'-0"	12'-12"-B	12'-0"	8'-0"	14"	12"	5/8"	12"	56	1.938	224.6	6.55	529
15'-0"	12'-12"-C	12'-0"	8'-0"	16"	12"	5/8"	12"	56	2.041	225.7	6.75	537
5'-0"	14'-14"-A	14'-0"	8'-0"	12"	12"	5/8"	12"	64	1.935	228.3	7.40	714
10'-0"	14'-14"-B	14'-0"	8'-0"	14"	12"	5/8"	12"	64	2.157	259.8	7.95	733
15'-0"	14'-14"-C	14'-0"	8'-0"	16"	12"	5/8"	12"	64	2.380	255.2	8.70	752
5'-0"	16'-16"-A	16'-0"	8'-0"	12"	12"	5/8"	12"	72	2.202	275.5	9.55	771
10'-0"	16'-16"-B	16'-0"	8'-0"	14"	12"	5/8"	12"	72	2.442	242.5	8.20	740
15'-0"	16'-16"-C	16'-0"	8'-0"	16"	12"	5/8"	12"	72	2.664	258.0	8.90	759
5'-0"	18'-18"-A	18'-0"	8'-0"	12"	12"	5/8"	12"	80	2.886	282.6	9.75	778
10'-0"	18'-18"-B	18'-0"	8'-0"	14"	12"	5/8"	12"	80	3.170	325.5	10.00	784
15'-0"	18'-18"-C	18'-0"	8'-0"	16"	12"	5/8"	12"	80	3.416	365.1	9.85	870
5'-0"	20'-20"-A	20'-0"	8'-0"	12"	12"	5/8"	12"	90	2.973	294.5	10.05	876
10'-0"	20'-20"-B	20'-0"	8'-0"	14"	12"	5/8"	12"	90	3.283	315.0	10.90	895
15'-0"	20'-20"-C	20'-0"	8'-0"	16"	12"	5/8"	12"	90	3.528	354.1	11.15	902
5'-0"	22'-22"-A	22'-0"	8'-0"	12"	12"	5/8"	12"	100	3.638	384.7	10.55	889
10'-0"	22'-22"-B	22'-0"	8'-0"	14"	12"	5/8"	12"	100	3.855	372.0	11.60	1003
15'-0"	22'-22"-C	22'-0"	8'-0"	16"	12"	5/8"	12"	100	4.077	392.9	12.50	1023
5'-0"	24'-24"-A	24'-0"	8'-0"	12"	12"	5/8"	12"	11				

STANDARD M-50-AW

Use in conjunction with Standard M-50-A and M-55-A

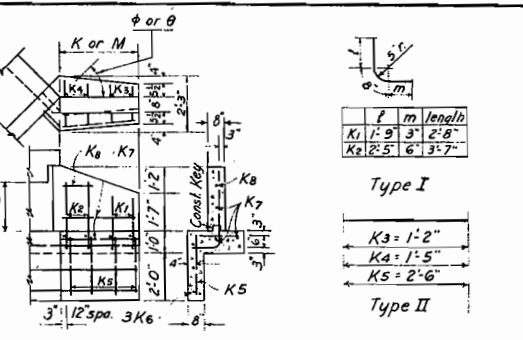
FED. ROAD DIV. NO.	DISTRICT	SHEET NO.	TOTAL SHEETS
9	COLO.	002-2(40) 35	

Rev. 5-2-56, Deleted Finish Note, J.C.R.

TABLE SHOWING VALUES OF K AND M WHEN β AND H ARE GIVEN

β	α	φ	θ	H=2'-0"		H=3'-0"		H=4'-0"		H=5'-0"		H=6'-0"		H=7'-0"		H=8'-0"		H=9'-0"		H=10'-0"	
				K	M	K	M	K	M	K	M	K	M	K	M	K	M	K	M	K	M
45°	45°	67°30'	22°30'	2.4	6.2	3.7	8.7	4.0	11.7	5.1	14.2	6.1	16.5	7.9	18.8	8.8	20.1	9.8	23.2	10.7	25.5
60°	30°	60°	30°	2.9	4.9	3.1	6.7	3.5	8.1	4.0	10.7	4.5	12.7	5.3	14.5	6.3	16.0	7.3	17.9	8.3	19.6
75°	15°	52°30'	37°30'	3.0	3.1	4.2	5.5	5.7	7.3	6.1	8.1	7.3	9.5	8.1	10.4	8.1	10.4	9.0	11.3	11.4	13.9
90°	0°	45°	45°	3.4	3.4	4.8	4.8	6.3	6.3	7.8	7.8	8.1	8.1	10.2	10.2	11.4	11.4	12.7	12.7	13.9	13.9
105°	15°	37°30'	52°30'	3.1	3.0	5.5	4.2	7.3	5.7	9.5	8.1	10.4	9.0	11.3	9.9	13.2	11.4	14.7	12.3	16.0	12.3
120°	30°	30°	60°	4.9	2.9	6.7	3.1	8.1	3.5	10.7	4.0	12.7	7.3	14.5	8.3	16.0	9.3	17.9	10.3	19.6	11.3
135°	45°	22°30'	67°30'	6.2	2.4	8.7	3.7	11.7	4.0	14.2	5.1	16.5	6.1	18.8	7.9	20.1	8.8	23.2	9.8	25.5	10.7

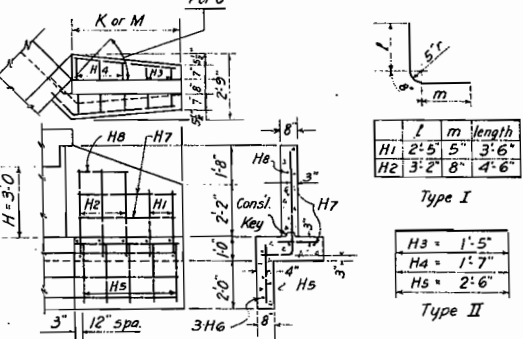
β EQUALS THE ANGLE BETWEEN β OF CULVERT AND α OF ROADWAY. α EQUALS THE ANGLE BETWEEN α OF CULVERT AND A NORMAL TO α OF ROADWAY.
 φ AND θ ARE ANGLES BETWEEN THE WINGWALL AND A LINE PARALLEL WITH THE CENTER LINE OF ROADWAY.
 EXAMPLE FOR USING THE ABOVE TABLE. SUPPOSE A STREAM MAKES AN ANGLE OF β=65° WITH THE CENTER LINE OF ROADWAY. THEN, FROM THE TABLE, SELECT THE NEAREST ANGLE β=60°. THEN α, φ AND θ EQUAL 30°, 60° AND 30° RESPECTIVELY. IF THE DESIRED HEIGHT "H" OF CULVERT IS 8'-0", THEN "K" AND "M" WILL BE 9'3" AND 16'-0". LOCATE THE WING DETAIL WHEN H=8'-0" ON THIS SHEET.



BAR LIST & QUANTITIES FOR ONE WING WHEN H=2'-0"

When φ or θ equals	Number of Bars Required								Length of Bars								Quantities for One Wing					
	K1	K2	K3	K4	K5	3-K6	3-K7	1-K8	F1	F2	F3	F4	F5	F6	F7	3-F8	7-F9	1-F10	1-F11	Concrete	Steel	
22°30'	4	3	4	3	8	8-3"	5-10"	2-2"	1-07	1.07	0.82	0.47	0.82	0.47	0.82	0.47	0.82	0.47	0.82	0.47	0.82	0.47
30°	3	2	3	2	6	6-2"	4-5"	1-2"	0.82	0.47	0.82	0.47	0.82	0.47	0.82	0.47	0.82	0.47	0.82	0.47	0.82	0.47
37°30'	2	2	2	2	6	5-0"	3-7"	1-2"	0.68	0.40	0.68	0.40	0.68	0.40	0.68	0.40	0.68	0.40	0.68	0.40	0.68	0.40
45°	2	2	2	2	5	4-4"	3-0"	1-2"	0.57	0.36	0.57	0.36	0.57	0.36	0.57	0.36	0.57	0.36	0.57	0.36	0.57	0.36
52°30'	2	2	2	2	4	4-0"	2-8"	1-2"	0.52	0.33	0.52	0.33	0.52	0.33	0.52	0.33	0.52	0.33	0.52	0.33	0.52	0.33
60°	2	1	2	1	4	3-6"	2-5"	1-0"	0.48	0.28	0.48	0.28	0.48	0.28	0.48	0.28	0.48	0.28	0.48	0.28	0.48	0.28
67°30'	2	1	2	1	4	3-0"	2-0"	1-0"	0.40	0.26	0.40	0.26	0.40	0.26	0.40	0.26	0.40	0.26	0.40	0.26	0.40	0.26

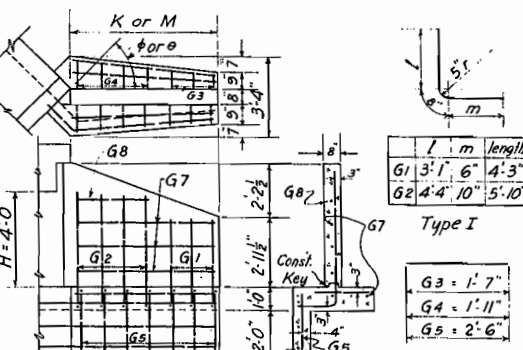
WING DETAIL WHEN H=2'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=3'-0"

When φ or θ equals	Number of Bars Required								Length of Bars								Quantities for One Wing					
	H1	H2	H3	H4	H5	3-H6	4-H7	1-H8	E1	E2	E3	E4	E5	E6	E7	3-E8	7-E9	1-E10	1-E11	Concrete	Steel	
22°30'	4	3	4	3	8	8-4"	6-3"	3-2"	1.78	0.99	1.78	0.99	1.78	0.99	1.78	0.99	1.78	0.99	1.78	0.99	1.78	0.99
30°	3	4	4	3	7	6-8"	5-1"	2-2"	1.12	0.63	1.12	0.63	1.12	0.63	1.12	0.63	1.12	0.63	1.12	0.63	1.12	0.63
37°30'	3	3	3	3	7	6-8"	5-1"	2-2"	0.97	0.54	0.97	0.54	0.97	0.54	0.97	0.54	0.97	0.54	0.97	0.54	0.97	0.54
45°	2	3	3	2	6	5-10"	4-4"	2-2"	0.86	0.52	0.86	0.52	0.86	0.52	0.86	0.52	0.86	0.52	0.86	0.52	0.86	0.52
52°30'	2	2	2	2	5	4-10"	3-6"	1-2"	0.79	0.44	0.79	0.44	0.79	0.44	0.79	0.44	0.79	0.44	0.79	0.44	0.79	0.44
60°	2	2	2	2	5	4-8"	3-3"	1-2"	0.74	0.43	0.74	0.43	0.74	0.43	0.74	0.43	0.74	0.43	0.74	0.43	0.74	0.43
67°30'	2	2	2	2	5	4-8"	3-3"	1-2"	0.74	0.43	0.74	0.43	0.74	0.43	0.74	0.43	0.74	0.43	0.74	0.43	0.74	0.43

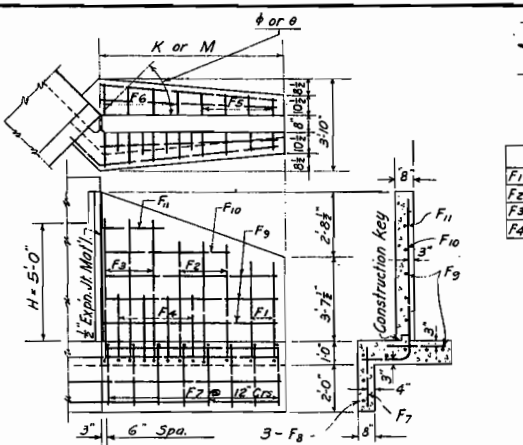
WING DETAIL WHEN H=3'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=4'-0"

When φ or θ equals	Number of Bars Required								Length of Bars								Quantities for One Wing					
	G1	G2	G3	G4	G5	3-G6	7-G7	1-G8	D1	D2	D3	D4	D5	D6	D7	3-D8	7-D9	1-D10	1-D11	Concrete	Steel	
22°30'	6	6	6	6	14	14-3"	11-3"	5-2"	2.89	1.64	2.89	1.64	2.89	1.64	2.89	1.64	2.89	1.64	2.89	1.64	2.89	1.64
30°	4	5	4	5	11	10-9"	8-6"	4-2"	2.21	1.25	2.21	1.25	2.21	1.25	2.21	1.25	2.21	1.25	2.21	1.25	2.21	1.25
37°30'	3	4	3	4	9	8-9"	6-11"	3-2"	1.81	1.01	1.81	1.01	1.81	1.01	1.81	1.01	1.81	1.01	1.81	1.01	1.81	1.01
45°	3	4	3	4	8	7-8"	5-11"	3-2"	1.56	0.92	1.56	0.92	1.56	0.92	1.56	0.92	1.56	0.92	1.56	0.92	1.56	0.92
52°30'	3	3	3	3	7	6-9"	5-3"	2-2"	1.40	0.79	1.40	0.79	1.40	0.79	1.40	0.79	1.40	0.79	1.40	0.79	1.40	0.79
60°	3	3	3	3	7	6-4"	4-10"	2-2"	1.29	0.77	1.29	0.77	1.29	0.77	1.29	0.77	1.29	0.77	1.29	0.77	1.29	0.77
67°30'	2	3	2	3	6	6-0"	4-6"	2-2"	1.21	0.69	1.21	0.69	1.21	0.69	1.21	0.69	1.21	0.69	1.21	0.69	1.21	0.69

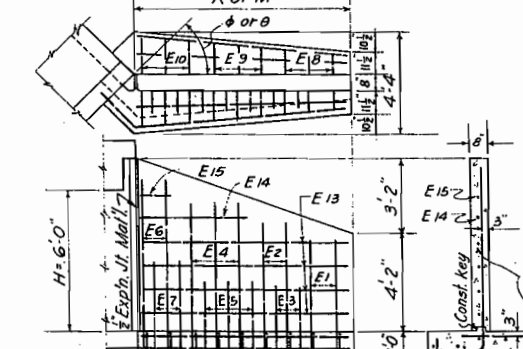
WING DETAIL WHEN H=4'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=5'-0"

When φ or θ equals	Number of Bars Required								Length of Bars								Quantities for One Wing							
	F1	F2	F3	F4	F5	F6	F7	3-F8	7-F9	1-F10	1-F11	Concrete	Steel											
22°30'	5	5	5	5	6	7	8	17	17-3"	13-10"	9-2"	4-2"	4.06	2.37	4.06	2.37	4.06	2.37	4.06	2.37	4.06	2.37		
30°	3	4	4	5	5	6	13	13-3"	10-6"	7-2"	3-2"	3.10	1.80	3.10	1.80	3.10	1.80	3.10	1.80	3.10	1.80	3.10	1.80	
37°30'	3	3	3	4	4	5	11	11-0"	8-7"	5-2"	2-2"	2.55	1.47	2.55	1.47	2.55	1.47	2.55	1.47	2.55	1.47	2.55	1.47	
45°	2	3	3	4	4	4	9	9-6"	7-4"	5-2"	2-2"	2.20	1.30	2.20	1.30	2.20	1.30	2.20	1.30	2.20	1.30	2.20	1.30	
52°30'	2	2	2	3	3	3	4	8	8-6"	6-6"	4-2"	2-2"	1.96	1.13	1.96	1.13	1.96	1.13	1.96	1.13	1.96	1.13	1.96	1.13
60°	2	2	2	3	3	3	4	8	7-9"	5-11"	4-2"	2-2"	1.79	1.09	1.79	1.09	1.79	1.09	1.79	1.09	1.79	1.09	1.79	1.09
67°30'	2	2	2	3	3	3	7	7-3"	5-7"	3-2"	1-2"	1.69	0.97	1.69	0.97	1.69	0.97	1.69	0.97	1.69	0.97	1.69	0.97	

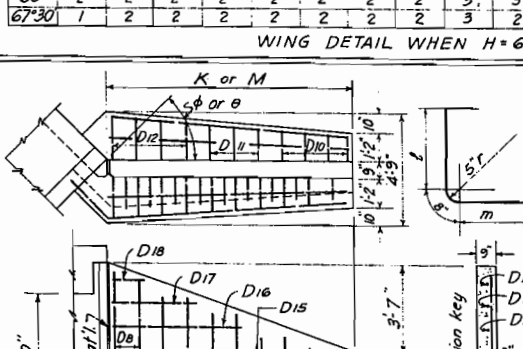
WING DETAIL WHEN H=5'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=6'-0"

When φ or θ equals	Number of Bars Required								Length of Bars								Quantities for One Wing						
	E1	E2	E3	E4	E5	E6	E7	3-E8	7-E9	1-E10	1-E11	Concrete	Steel										
22°30'	4	4	4	4	4	4	5	6	20	19-9"	16-7"	8-2"	5.21	3.17	5.21	3.17	5.21	3.17	5.21	3.17	5.21	3.17	
30°	3	3	3	4	4	4	3	5	4	15	15-0"	12-3"	6-2"	3.99	2.43	3.99	2.43	3.99	2.43	3.99	2.43	3.99	2.43
37°30'	2	3	3	3	3	3	2	4	4	13	12-6"	10-0"	5-2"	3.28	2.03	3.28	2.03	3.28	2.03	3.28	2.03	3.28	2.03
45°	2	2	2	3	3	3	2	3	3	11	10-9"	8-7"	4-2"	2.83	1.71	2.83	1.71	2.83	1.71	2.83	1.71	2.83	1.71
52°30'	1	2	2	3	3	3	2	3	3	10	9-8"	7-7"	4-2"	2.51	1.56	2.51	1.56	2.51	1.56	2.51	1.56	2.51	1.56
60°	2	2	2	2	2	2	2	3	3	9	8-9"	6-11"	3-2"	2.30	1.45	2.30	1.45	2.30	1.45	2.30	1.45	2.30	1.45
67°30'	1	2	2	2	2	2	2	3	3	8	8-3"	6-6"	3-2"	2.17	1.34	2.17	1.34	2.17	1.34	2.17	1.34	2.17	1.34

WING DETAIL WHEN H=6'-0"



BAR LIST & QUANTITIES FOR ONE WING WHEN H=7'-0"

When φ or θ equals	Number of Bars Required								Length of Bars								Quantities for One Wing	
	D1	D2	D3	D4	D5	D6	D7	3-D8	7-D9	1-D10	1-D11	Concrete	Steel					
22°30'																		