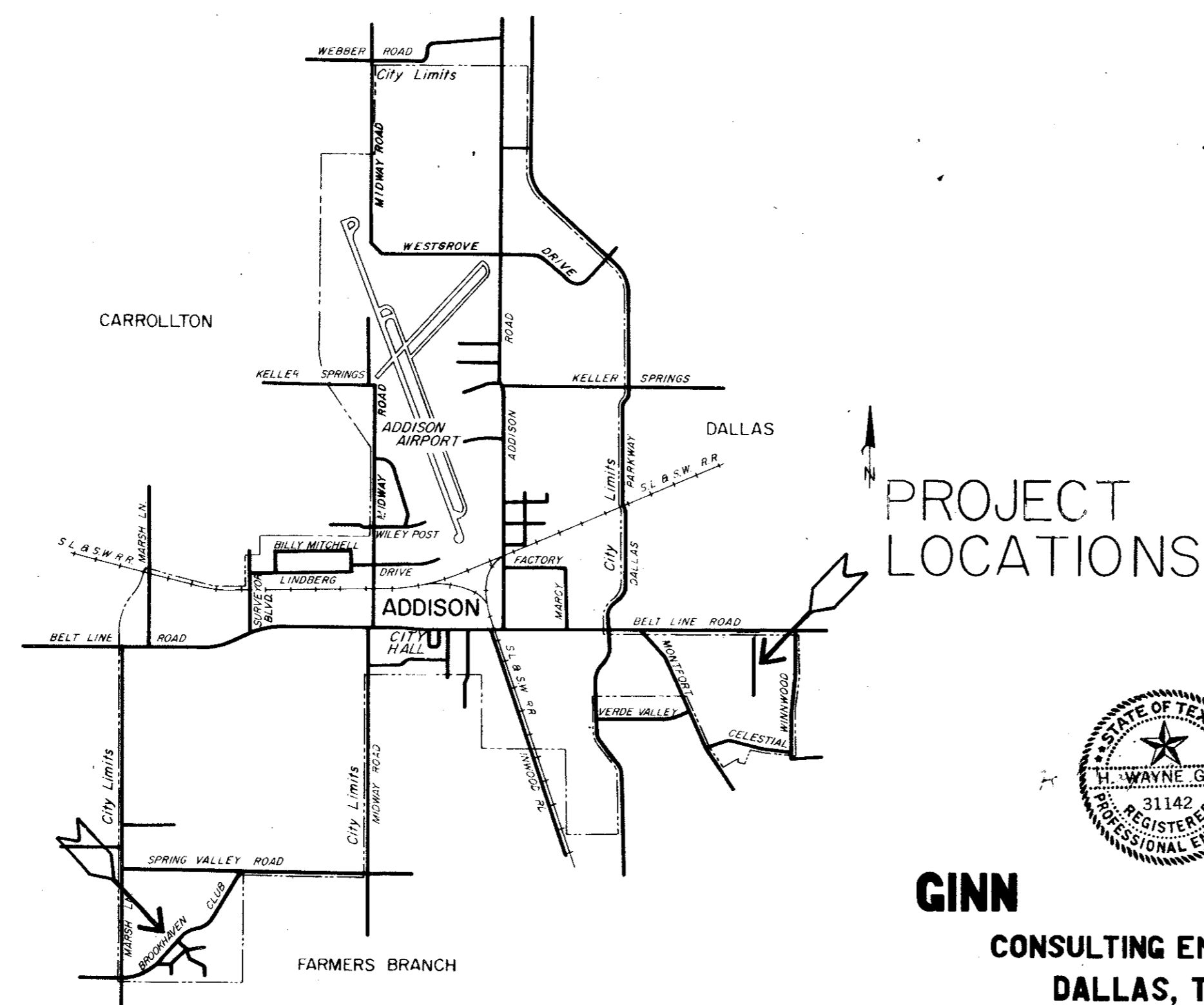


CITY OF ADDISON DALLAS COUNTY, TEXAS

CONSTRUCTION PLANS FOR:

LAKE FOREST & BROOKHAVEN CLUB DR. DRAINAGE IMPROVEMENTS



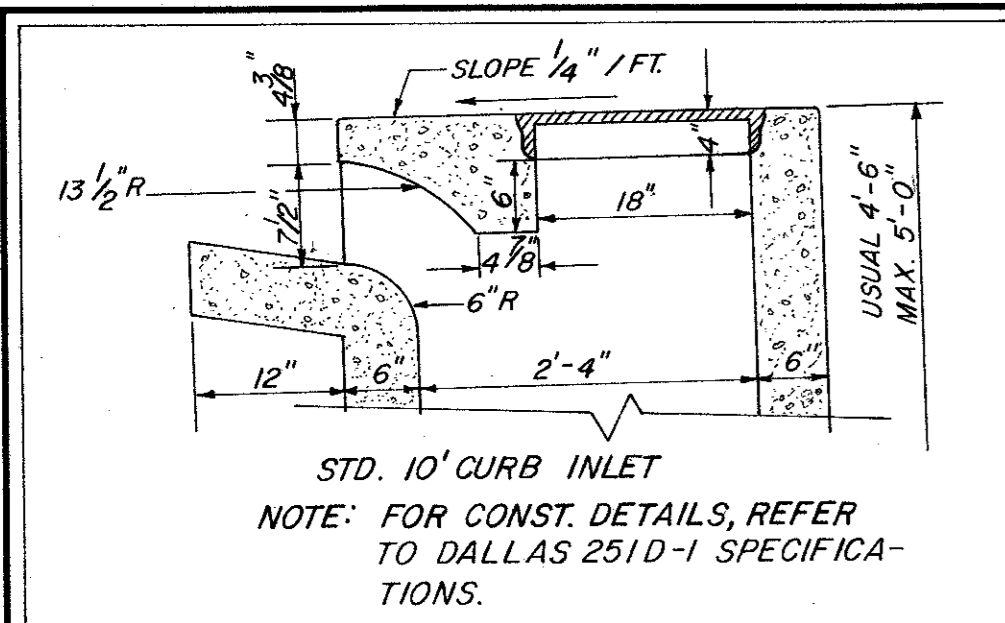
JERRY J. REDDING - MAYOR
COUNCILMEN:

JOHN B. ALLEN
RICHARD RODER
WILLIAM F. SELLMAYER
JERRY EASOM
TERRY ROBERTS

C.J. WEBSTER - CITY ADMINISTRATOR



GINN INC.
CONSULTING ENGINEERS
DALLAS, TEXAS
1980



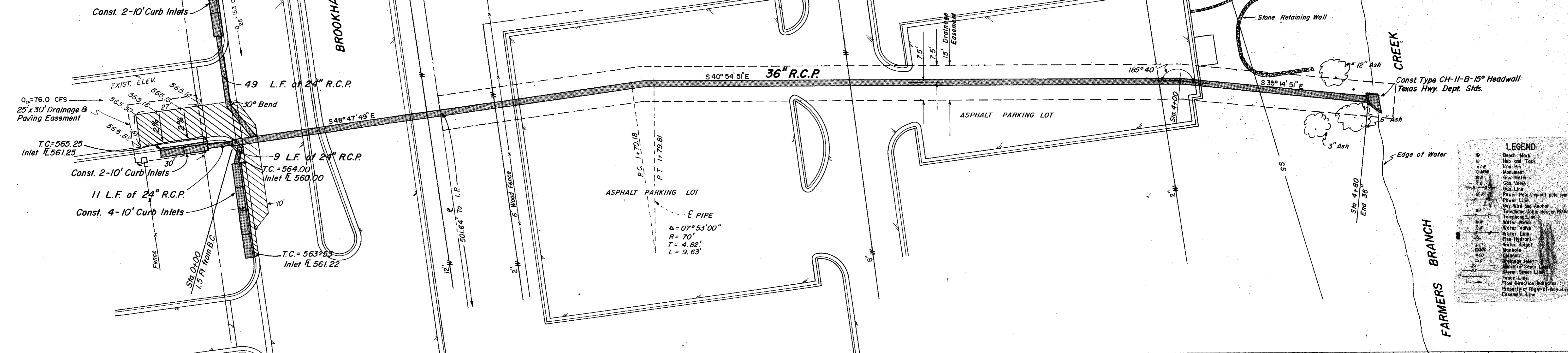
ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QUANTITY
1	T.H.D. 470 Inlets - "Y" Type	Ea.	8
	T.H.D. 470 Inlets - Std. Curb Type	Ea.	
	T.H.D. 470 Inlets - Recd. Curb Type	Ea.	
	T.H.D. 470 Inlets - Grated Type	Ea.	
2	T.H.D. 421 Junction Boxes	Ea.	1
	T.H.D. 464 24" Conc. Pipe	L.F.	
	T.H.D. 464 36" Conc. Pipe	L.F.	
	T.H.D. 464 42" Conc. Pipe	L.F.	
	T.H.D. 464 48" Conc. Pipe	L.F.	490
3	T.H.D. 464 30" Conc. Pipe	L.F.	
	T.H.D. 464 24" Conc. Pipe	L.F.	75
4	T.H.D. 464 18" Conc. Pipe	L.F.	
	6" P.V.C. Sewer Pipe, SDR 35	L.F.	
5	T.H.D. 479 - Adjust Manholes	Ea.	2
	ADJUST 2" WATER LINES	Ea.	1
5A	ADJUST 8" WATER LINE	Ea.	1
6	6" P.V.C. SDR 18 Water Line	L.F.	235
	8" P.V.C. SDR 18 Water Line	L.F.	
7	Miscellaneous Concrete	C.Y.	15
8	6" VALVE	E.A.	5
9	6" VALVE	E.A.	1
10	ASPHALT PAVEMENT REPAIR	S.Y.	500
11	CONCRETE PAVEMENT	S.Y.	125

DUNHILL APTS.
(GEORGE B SOLIMAN)

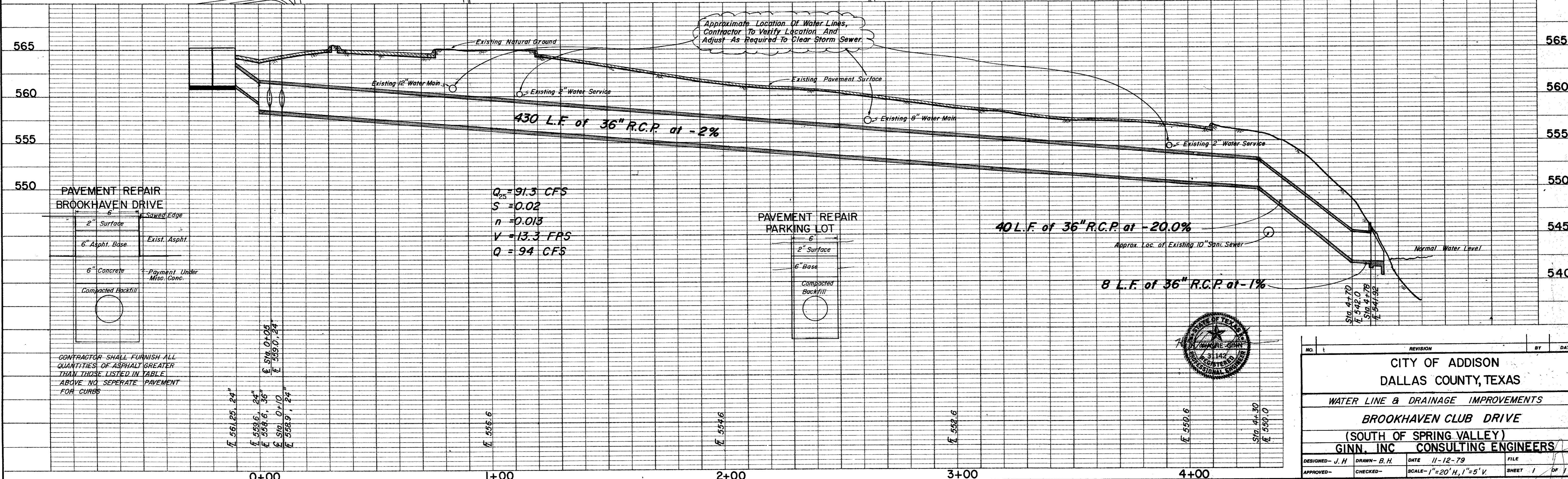
BROOKHAVEN CLUB DR.

GREENHAVEN (MULTIVEST REAL ESTATE VILLAGE FUND) APTS.

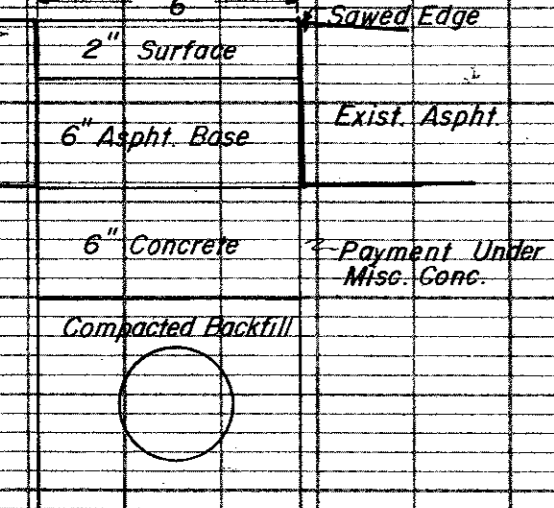
APTS.



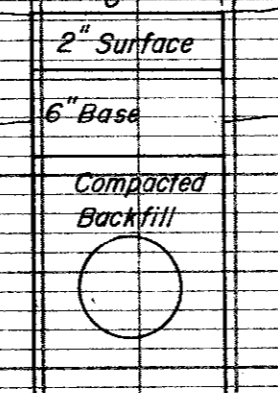
LEGEND	
Symbol	Description
Circle with cross	Manhole
Circle with dot	High and Test
Circle with 'X'	Iron Pin
Circle with 'M'	Manometer
Circle with 'G'	Gas Meter
Circle with 'V'	Gas Valve
Circle with 'S'	Gas Line
Circle with 'P'	Power Pole (typical pole symbol)
Circle with 'W'	Ray Wire and Anchor
Circle with 'T'	Telephone Cable Box, or Riser
Circle with 'F'	Telephone Line
Circle with 'M'	Water Meter
Circle with 'W'	Water Valve
Circle with 'W'	Water Line
Circle with 'F'	Fire Hydrant
Circle with 'S'	Water Spigot
Circle with 'M'	Manhole
Circle with 'S'	Sanitary Sewer
Circle with 'S'	Storm Sewer Line
Circle with 'F'	Flow Direction Indicator
Circle with 'P'	Property or Right-of-Way Line
Circle with 'E'	Easement Line



PAVEMENT REPAIR
BROOKHAVEN DRIVE



PAVEMENT REPAIR
PARKING LOT



CONTRACTOR SHALL FURNISH ALL QUANTITIES OF ASPHALT GREATER THAN THOSE LISTED IN TABLE ABOVE NO SEPERATE PAVEMENT FOR CURBS

NO. 1 REVISION BY DATE

CITY OF ADDISON
DALLAS COUNTY, TEXAS

WATER LINE & DRAINAGE IMPROVEMENTS
BROOKHAVEN CLUB DRIVE
(SOUTH OF SPRING VALLEY)

GINN, INC CONSULTING ENGINEERS

DESIGNED - J.H. DRAWN - B.H. DATE 11-12-79 FILE
APPROVED - CHECKED - SCALE - 1"=20'H, 1"=5'V. SHEET 1 OF 1

STREET WILL BE CLOSED DURING CONSTRUCTION

FINISH FLOOR ELEV. = 567.26

FINISH FLOOR ELEV. = 564.56

FINISH FLOOR ELEV. = 565.25

FINISH FLOOR ELEV. = 569.70

B.M.: 4-4'x8' BOX CULVERT ELEV. = 561.50

ESTIMATED QUANTITIES			
ITEM	DESCRIPTION	UNIT	QUANTITY
1L	CONCRETE ENCASE 8" SEWER	L.S.	1
2L	ADJUST 6" W.L.	L.S.	1
3L	BOX CULVERT & RAILS W/HEADWALL	L.S.	1
4L	REMOVE EXISTING CULVERT	L.S.	1
5L	HOURLY RATE/CHANNEL EXCAV.	HRS.	1
6L	CONCRETE PAVEMENT	S.Y.	150
7L	CONCRETE SLOPE PROTECTION	C.Y.	5

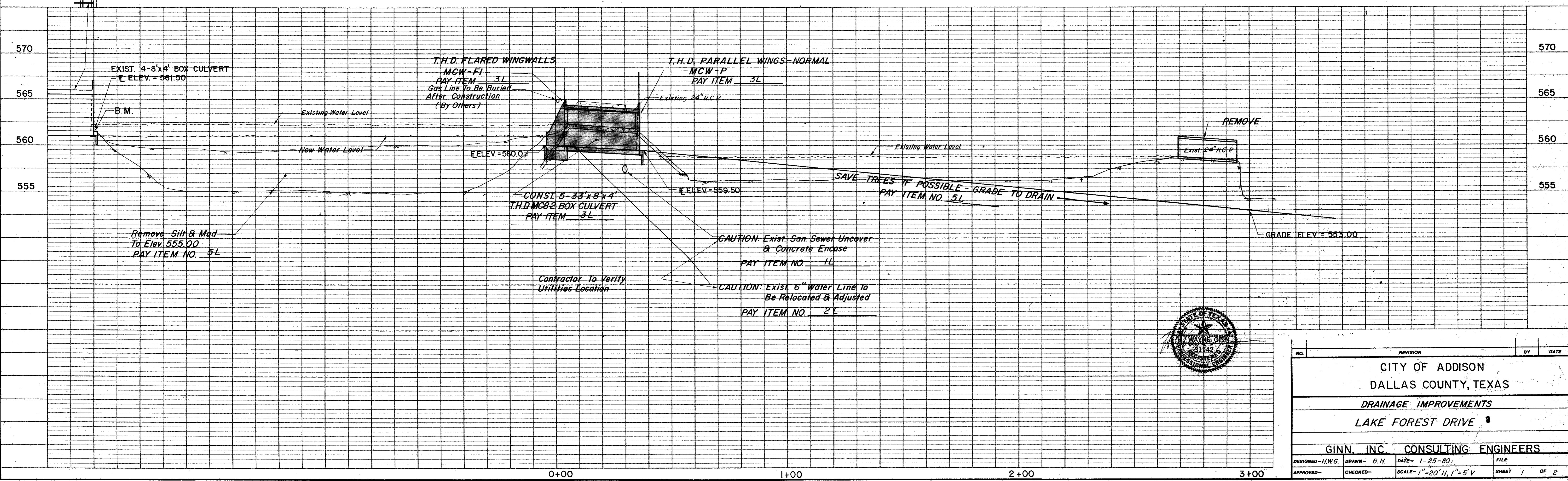
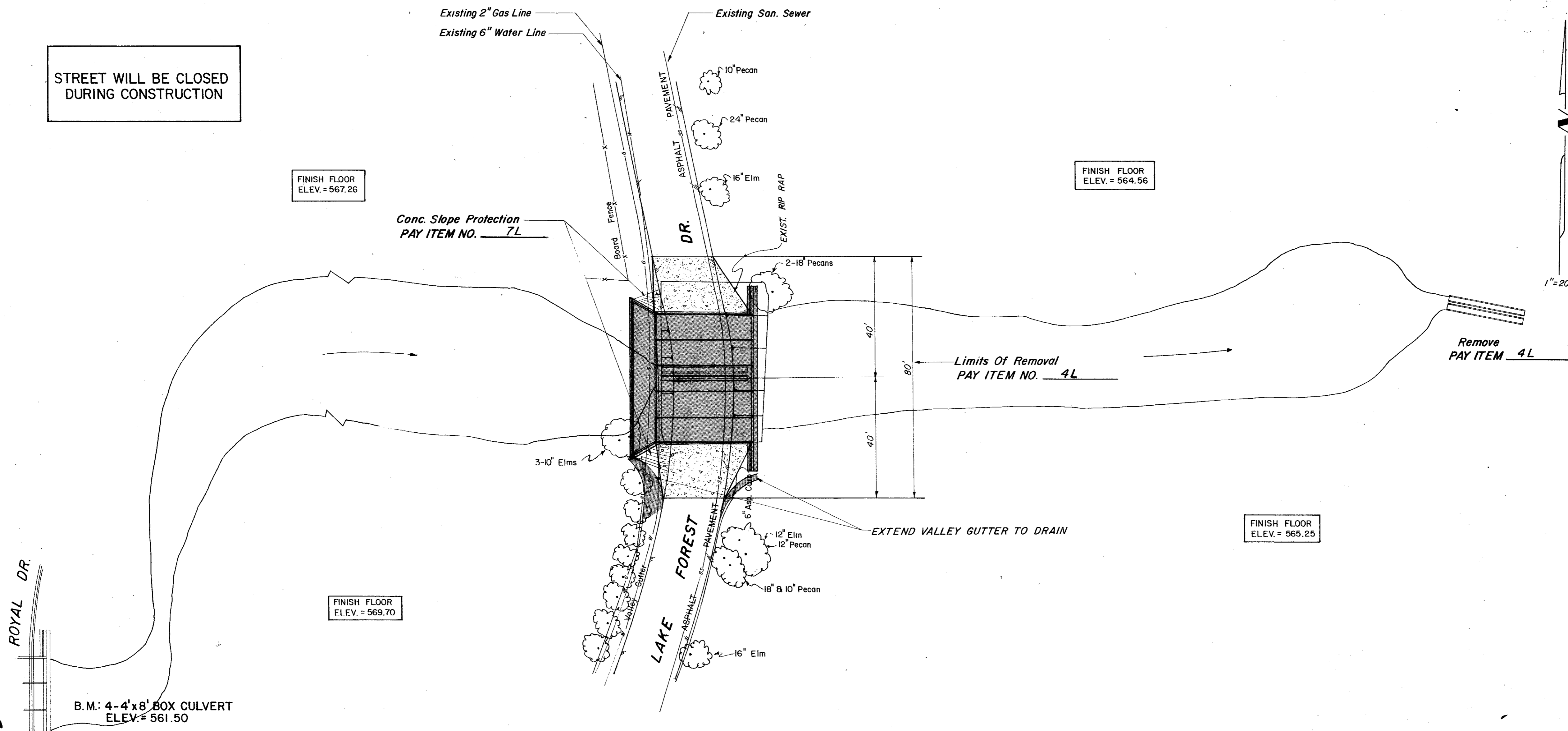
ESTIMATED QUANTITIES				
DESCRIPTION	SPAN	LENGTH OF STRUCT.	CONC. C.Y.	STEEL LBS.
8'x4' BOX CULVERT	5	33'	75	10,960
TOEWALL / UPSTREAM	—	—	1.14	83
FLARED WINGWALL	—	—	2.17	232.5
VERTICAL WEIR	—	—	1.43	153
APRON / UPSTREAM	—	—	6.41	685
PAVING BRACKET	—	—	1.64	364
PARALLEL WINGS-NORM.	—	—	7.40	846

LEGEND

- Bench Mark
- ⊕ Hub and Tack
- ⊕ Iron Pin
- ⊕ Monument
- ⊕ Gas Meter
- ⊕ Gas Valve
- ⊕ Gas Line
- ⊕ Power Pole (typical pole symbol)
- ⊕ Power Line
- ⊕ Guy Wire and Anchor
- ⊕ Telephone Cable Box or Riser
- ⊕ Telephone Line
- ⊕ Water Meter
- ⊕ Water Valve
- ⊕ Water Line
- ⊕ Fire Hydrant
- ⊕ Water Sump
- ⊕ Manhole
- ⊕ Catchment
- ⊕ Drainage Inlet
- ⊕ Storm Sewer Line
- ⊕ Sanitary Sewer Line
- ⊕ Storm Sewer Line
- ⊕ Flow Line
- ⊕ Flow Direction Indicator
- ⊕ Property or Right-of-Way Line
- ⊕ Easement Line

ROYAL DR.

LAKE FOREST DR.



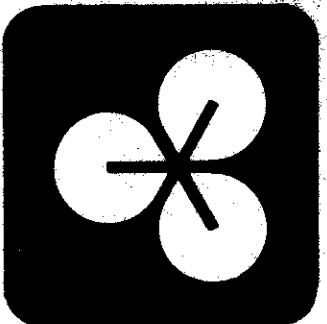
NO. _____ REVISION _____ BY _____ DATE _____

CITY OF ADDISON
DALLAS COUNTY, TEXAS

DRAINAGE IMPROVEMENTS
LAKE FOREST DRIVE

GINN, INC. CONSULTING ENGINEERS

DESIGNED-H.W.G. DRAWN-B.H. DATE-1-25-80 FILE _____
APPROVED-CHECKED-SCALE-1"=20' H, 1"=5' V SHEET 1 OF 2

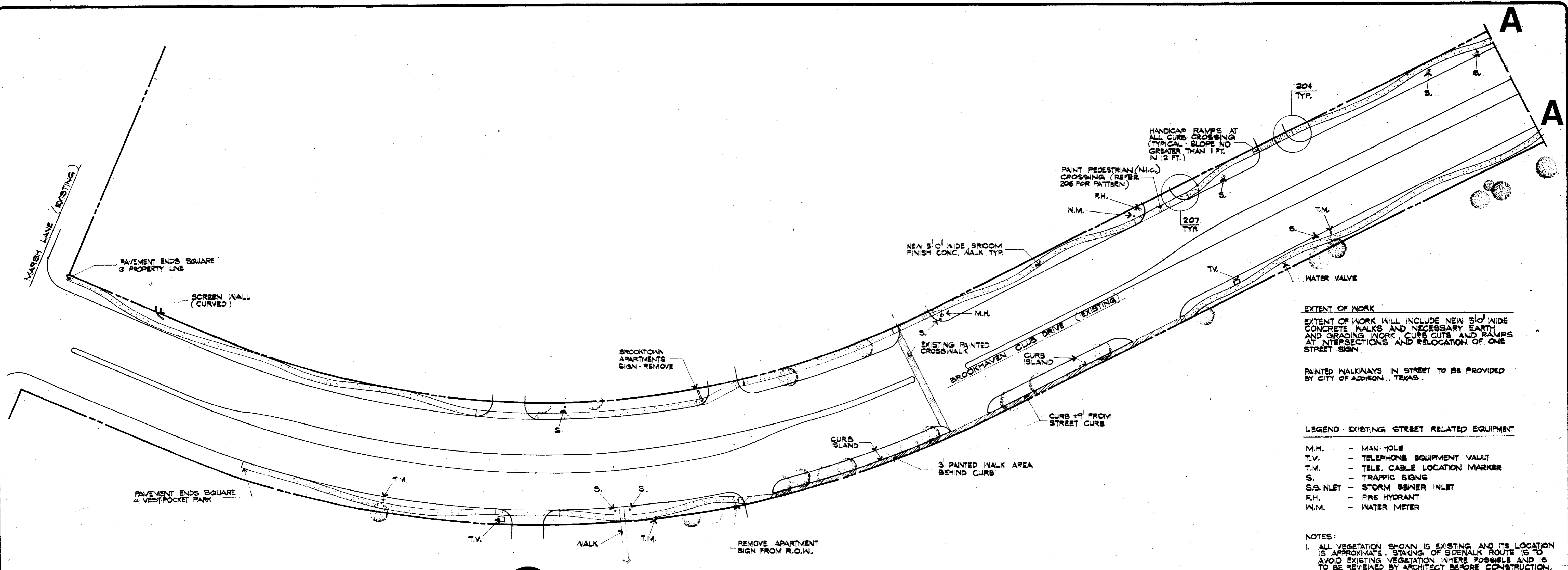


EDI CAPE HOPKINS CLEMENT, INC.
 PLANNING · ARCHITECTURE · INTERIOR DESIGN
 TWO NORTH PARK EAST, 120 · DALLAS · 214 / 750-1945
 AMERICAN INSTITUTE OF ARCHITECTS · AMER. SOC. CONSULTING PLANNERS

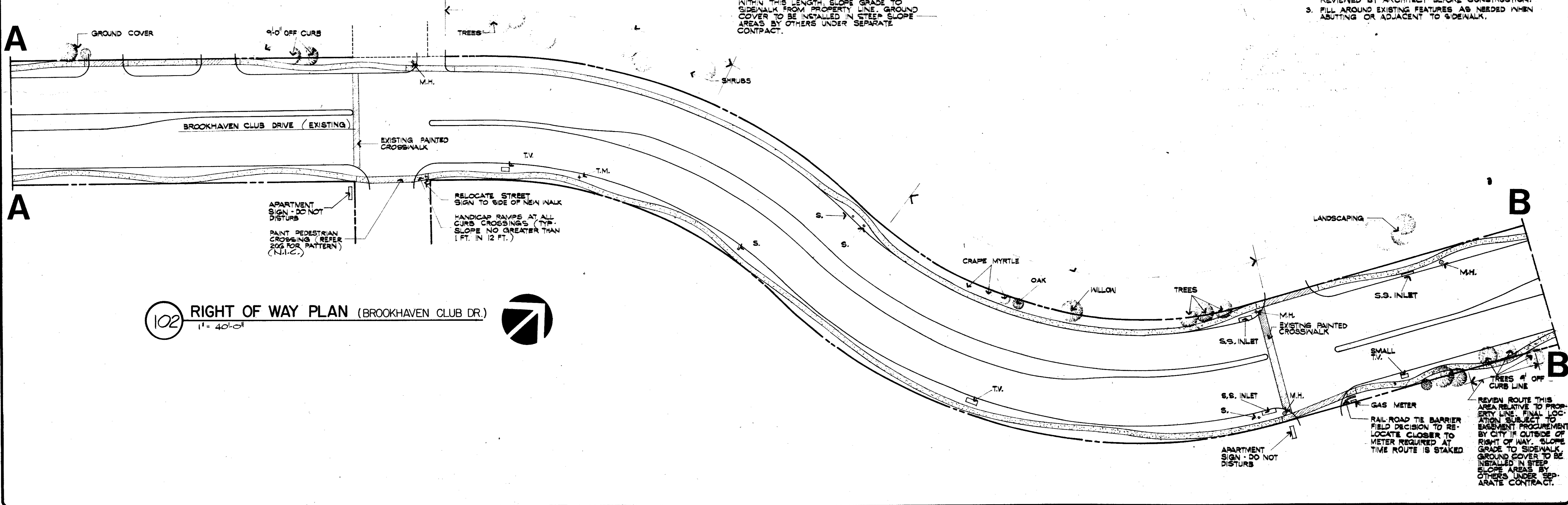
Sidewalks for Brookhaven Club Drive
 Addison, Texas

ISSUE DATE	11/21/74
REVISIONS	

SHEET NUMBER
1



101 RIGHT OF WAY PLAN (BROOKHAVEN CLUB DR.)
 1" = 40'-0"



102 RIGHT OF WAY PLAN (BROOKHAVEN CLUB DR.)
 1" = 40'-0"

EXTENT OF WORK
 EXTENT OF WORK WILL INCLUDE NEW 5'-0" WIDE CONCRETE WALKS AND NECESSARY EARTH AND GRADING WORK, CURB CUTS AND RAMPS AT INTERSECTIONS AND RELOCATION OF ONE STREET SIGN.

PAINTED WALKWAYS IN STREET TO BE PROVIDED BY CITY OF ADDISON, TEXAS.

LEGEND - EXISTING STREET RELATED EQUIPMENT

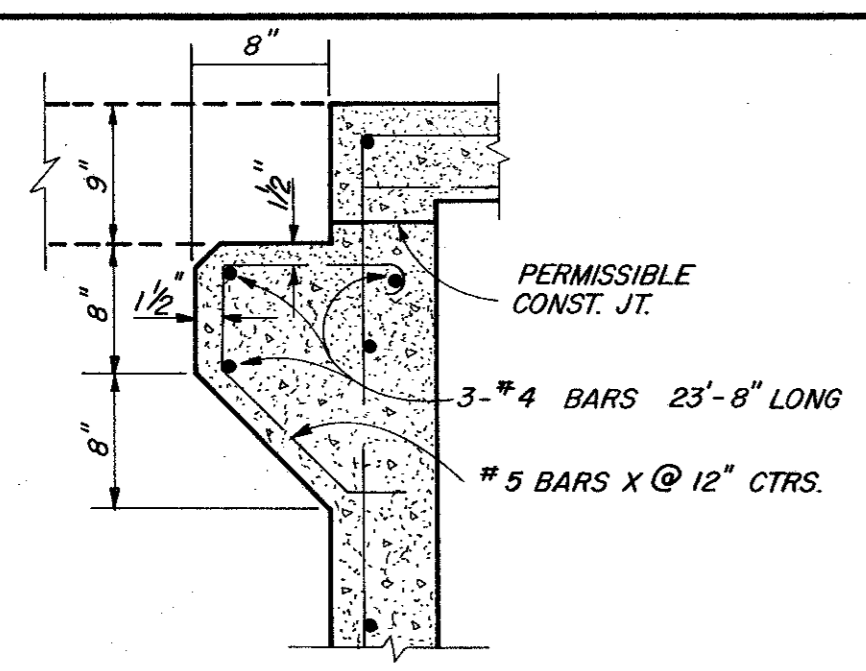
M.H.	- MAN-HOLE
T.V.	- TELEPHONE EQUIPMENT VAULT
T.M.	- TELE. CABLE LOCATION MARKER
S.	- TRAFFIC SIGN
S.S. INLET	- STORM SEWER INLET
F.H.	- FIRE HYDRANT
W.M.	- WATER METER

NOTES:

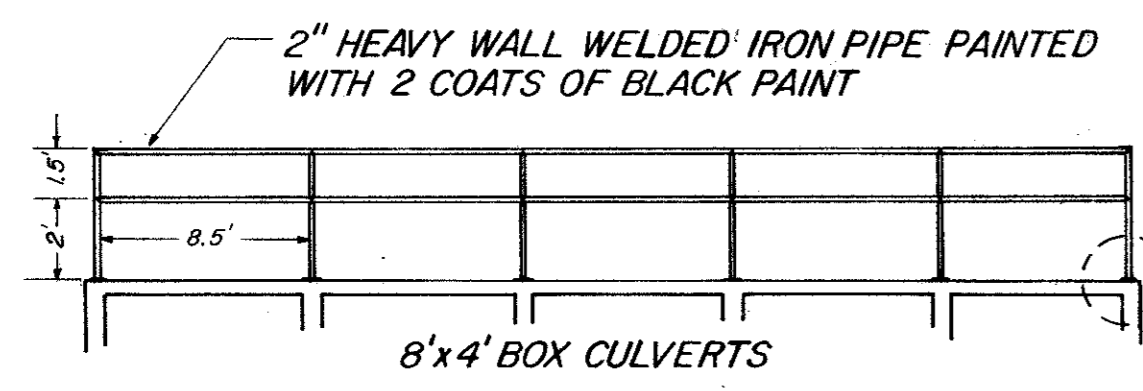
- ALL VEGETATION SHOWN IS EXISTING AND ITS LOCATION IS APPROXIMATE. STAKING OF SIDEWALK ROUTE IS TO AVOID EXISTING VEGETATION WHERE POSSIBLE AND IS TO BE REVIEWED BY ARCHITECT BEFORE CONSTRUCTION.
- LOCATIONS OF ALL EXISTING FEATURES SHOWN SUCH AS MANHOLES, FIRE HYDRANTS, WATER METERS, TELEPHONE EQUIPMENT VAULTS, TELEPHONE CABLE LOCATION MARKERS, TRAFFIC SIGNS & STORM SEWER INLETS ARE APPROXIMATE. STAKING OF SIDEWALK ROUTE IS TO AVOID SUCH EXISTING FEATURES WHERE POSSIBLE AND IS TO BE REVIEWED BY ARCHITECT BEFORE CONSTRUCTION.
- FILL AROUND EXISTING FEATURES AS NEEDED WHEN ABUTTING OR ADJACENT TO SIDEWALK.

WITHIN THIS LENGTH, SLOPE GRADE TO SIDEWALK FROM PROPERTY LINE. GROUND COVER TO BE INSTALLED IN STEEP SLOPE AREAS BY OTHERS UNDER SEPARATE CONTRACT.

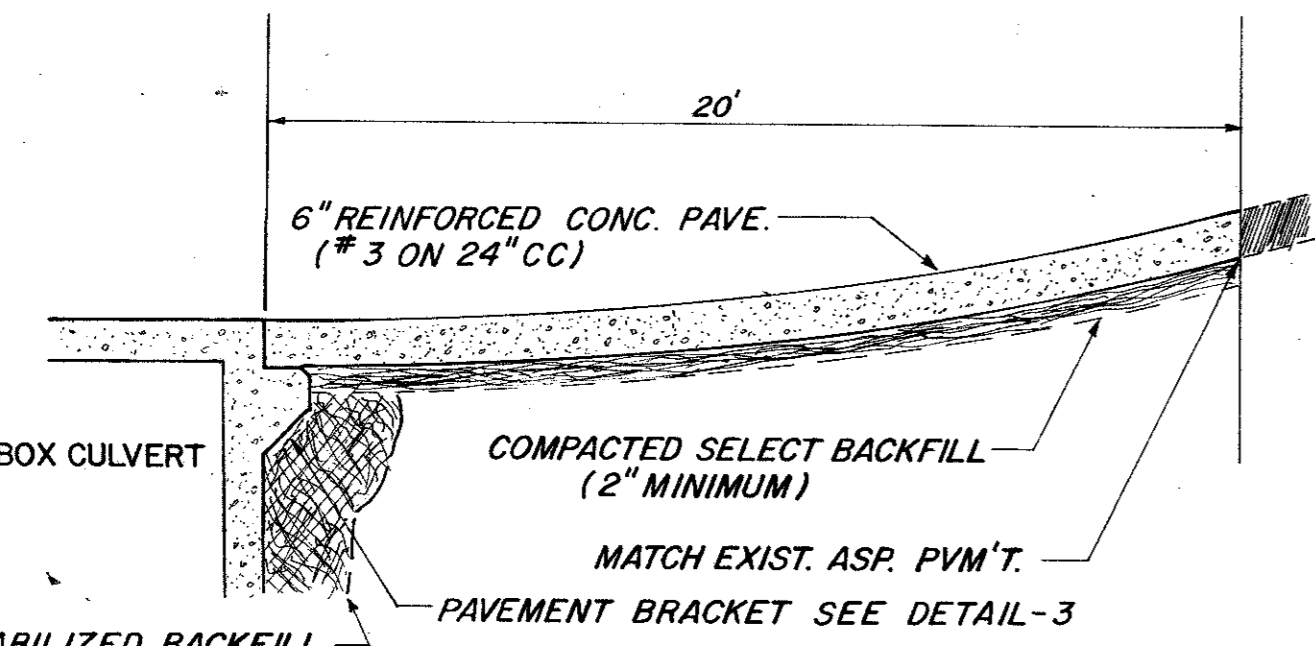
REVIEW ROUTE THIS AREA RELATIVE TO PROPERTY LINE. FINAL LOCATION SUBJECT TO EASEMENT PROCUREMENT BY CITY IF OUTSIDE OF RIGHT OF WAY. SLOPE GRADE TO SIDEWALK. GROUND COVER TO BE INSTALLED IN STEEP SLOPE AREAS BY OTHERS UNDER SEPARATE CONTRACT.



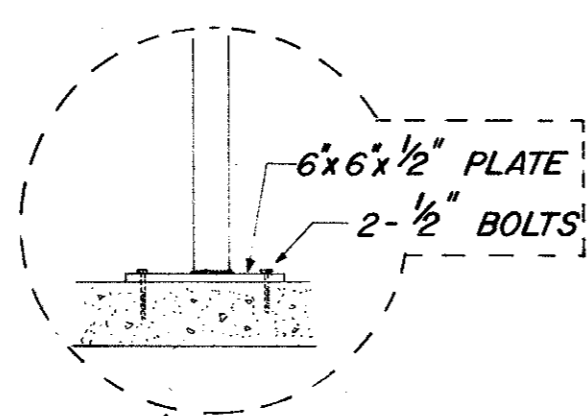
DETAIL-3



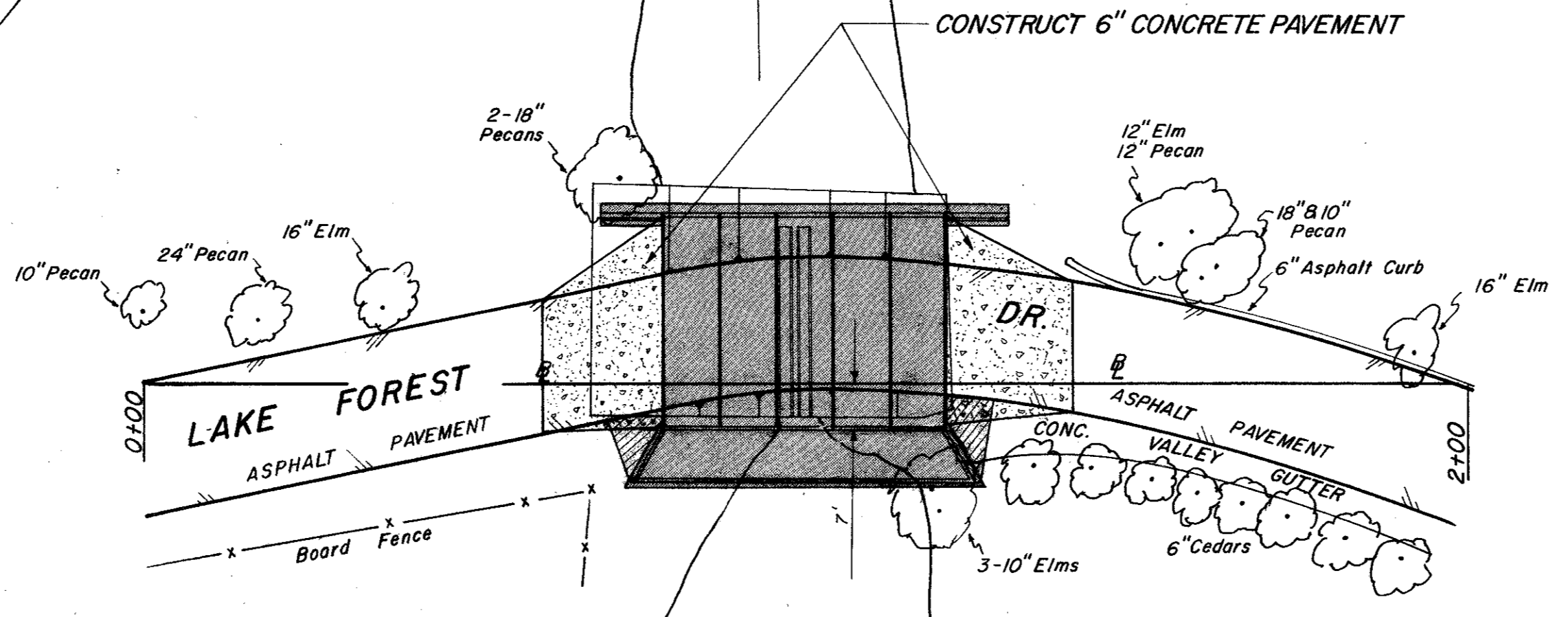
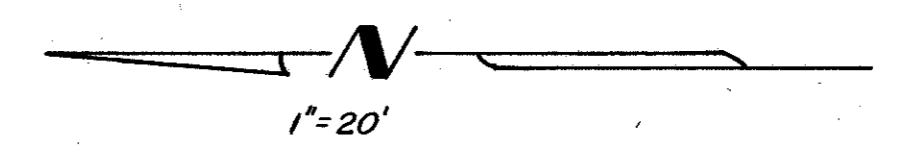
DETAIL-2
(No Scale)



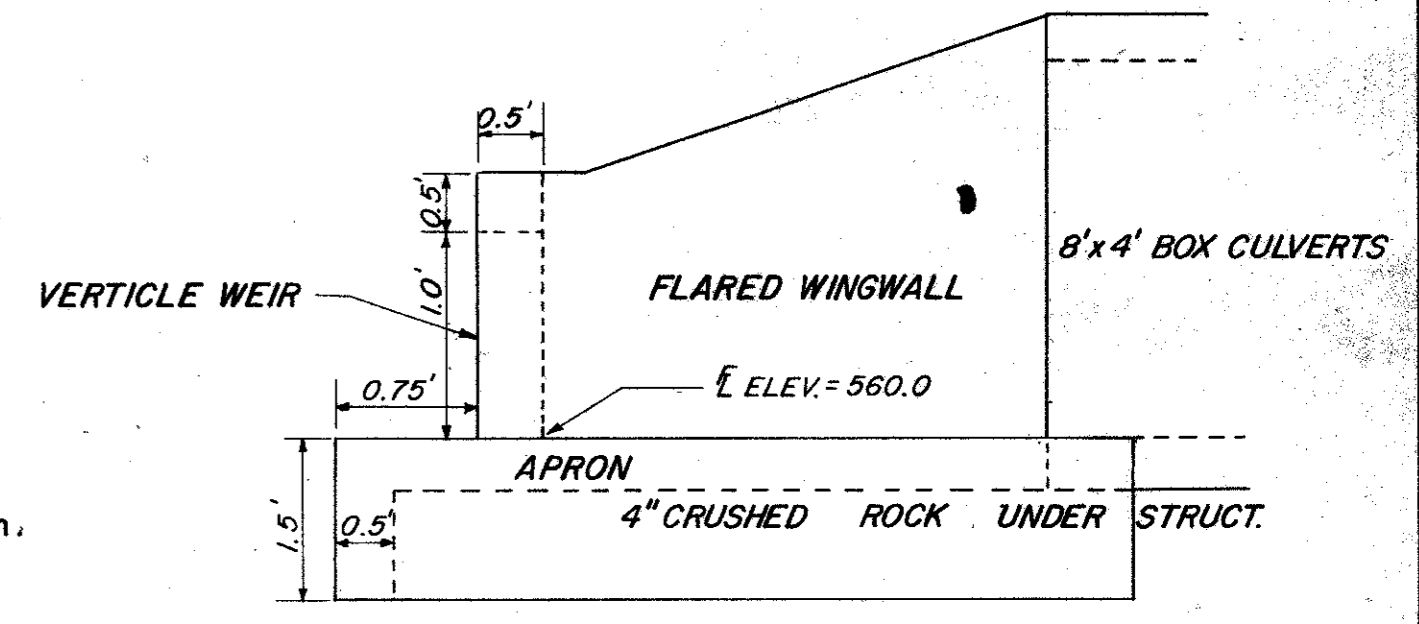
DETAIL-1
(No Scale)



PRIOR TO WORKING ON LAKE FOREST, CONTRACTOR SHALL PERFORM THESE ITEMS:
 1. Remove 10 joints of 24" R.C.P. and store at city facilities on Mildred Street.
 2. Excavate below culverts to allow pond to drain completely. Channel width shall be approx. 30 feet.
 3. Grade to drain to elevation 553.
 4. Save all trees if possible



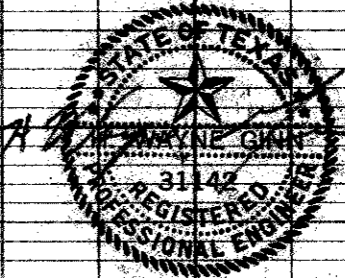
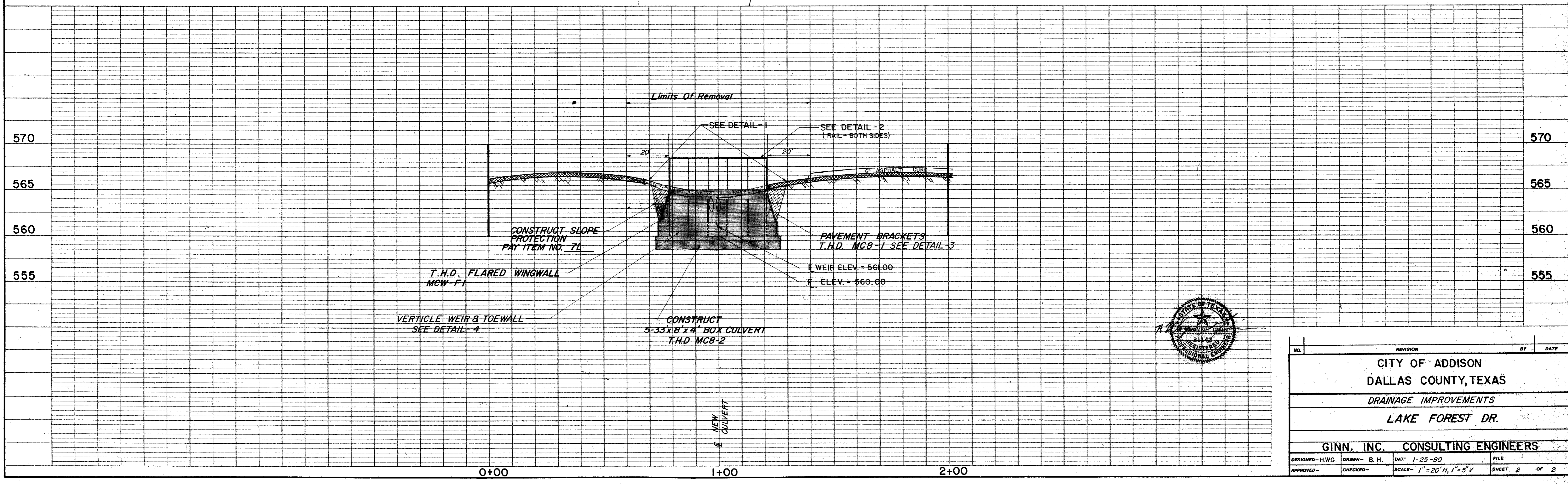
ALL EXPOSED CONCRETE SURFACES SHALL BE TREATED WITH T.H.D. 428 OR APPROVED EQUAL (PRESTON SHIELD)



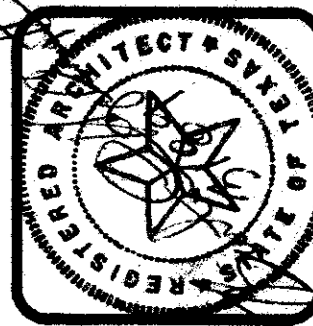
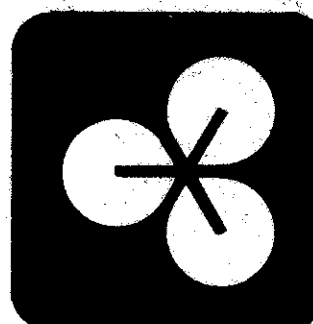
DETAIL-4
(No Scale)

NOTES:

1. See sh.1 for utility location.
2. See sh.1 for quantities.

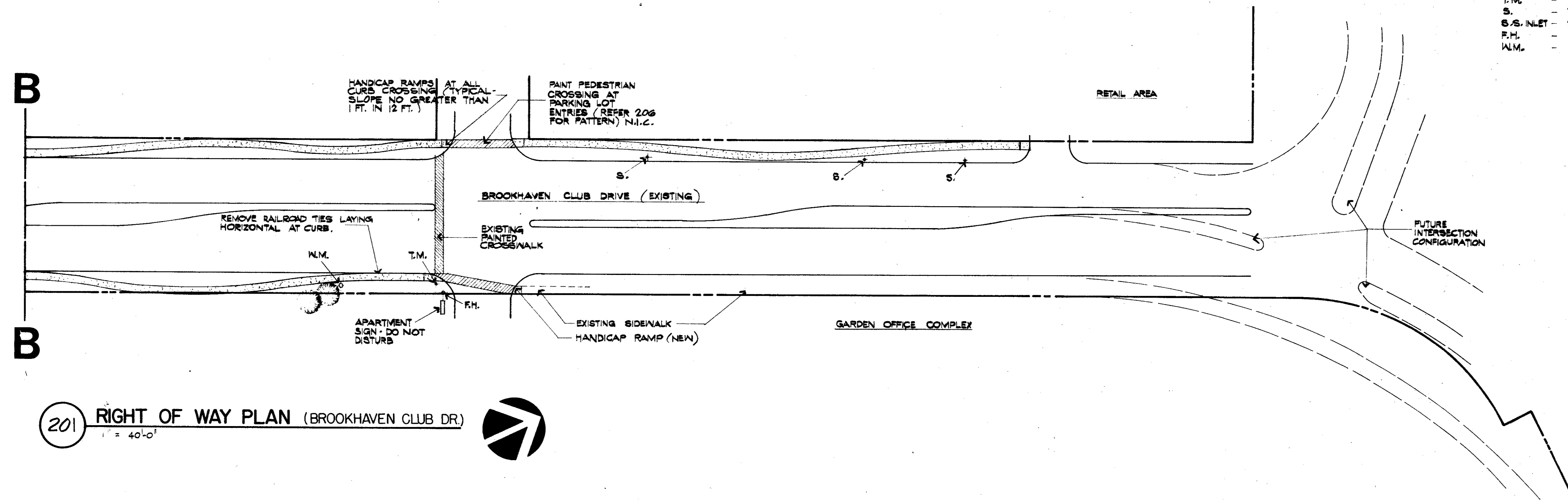


NO.	REVISION	BY	DATE
CITY OF ADDISON DALLAS COUNTY, TEXAS DRAINAGE IMPROVEMENTS LAKE FOREST DR.			
GINN, INC. CONSULTING ENGINEERS			
DESIGNED - HWG	DRAWN - B. H.	DATE 1-25-80	FILE
APPROVED -	CHECKED -	SCALE - 1" = 20' H, 1" = 5' V	SHEET 2 OF 2

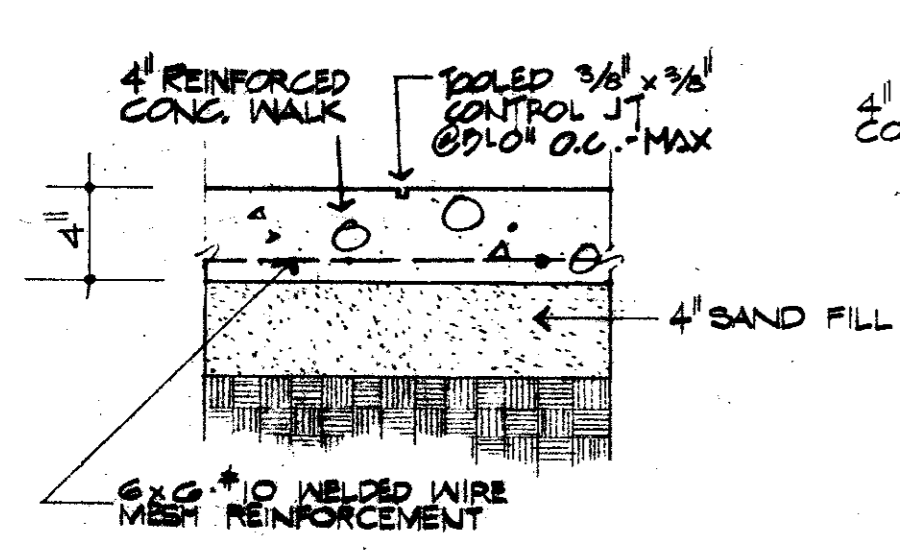


EDI CAPE HOPKINS CLEMENT, INC.
 PLANNING - ARCHITECTURE - INTERIOR DESIGN
 TWO NORTHPARK EAST, 120 · DALLAS · 214/750-1945
 AMERICAN INSTITUTE OF ARCHITECTS · AMER. SOC. CONSULTING PLANNERS

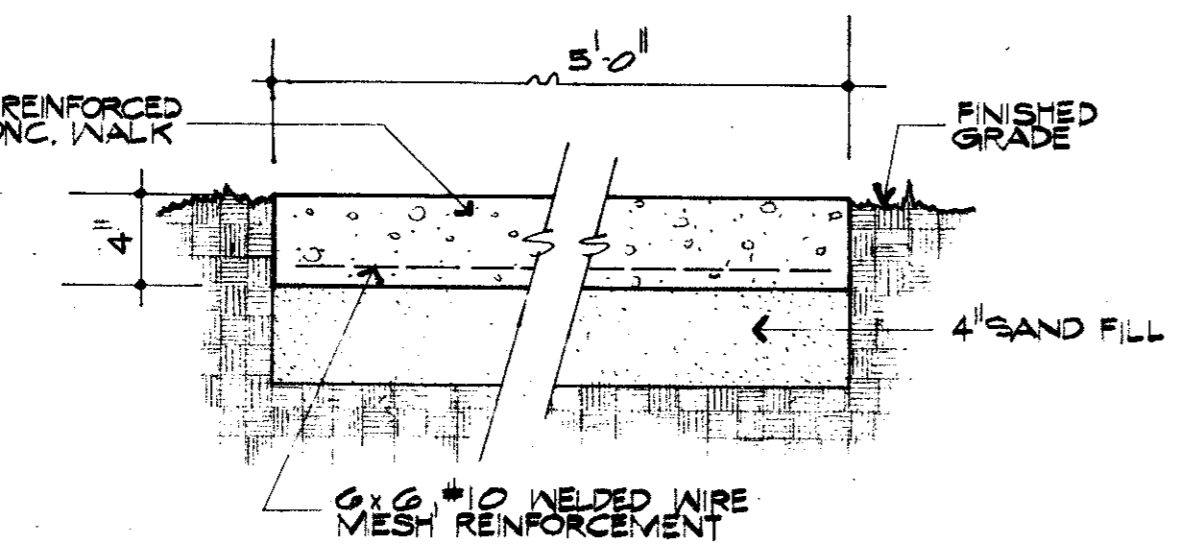
- LEGEND - EXISTING STREET RELATED EQUIPMENT**
- M.H. - MAN-HOLE
 - T.V. - TELEPHONE EQUIPMENT VAULT
 - T.M. - TELE. CABLE LOCATION MARKER
 - S. - TRAFFIC SIGNS
 - S.S. INLET - STORM SEWER INLET
 - F.H. - FIRE HYDRANT
 - W.M. - WATER METER



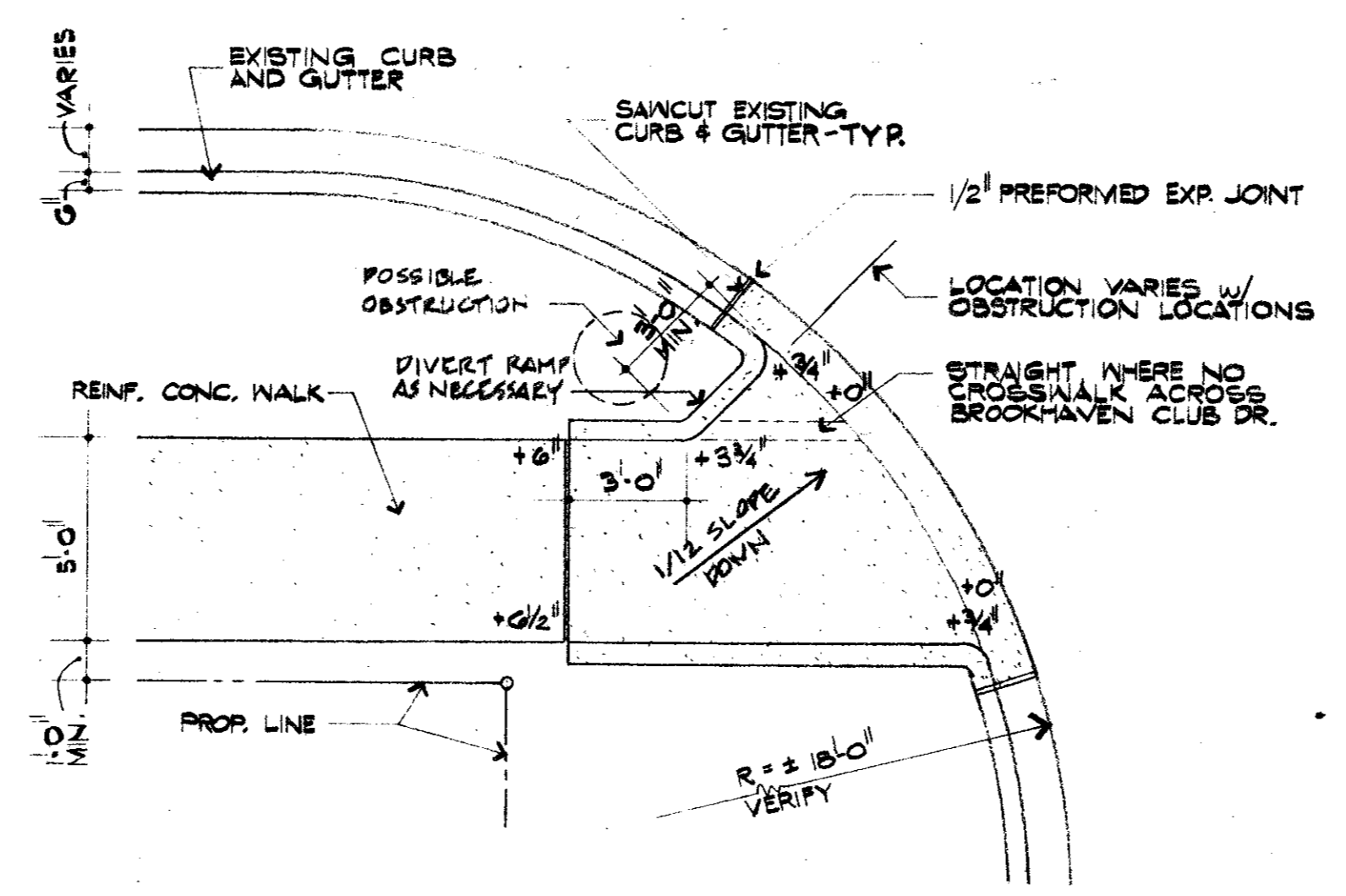
201 RIGHT OF WAY PLAN (BROOKHAVEN CLUB DR.)
 1" = 40'-0"



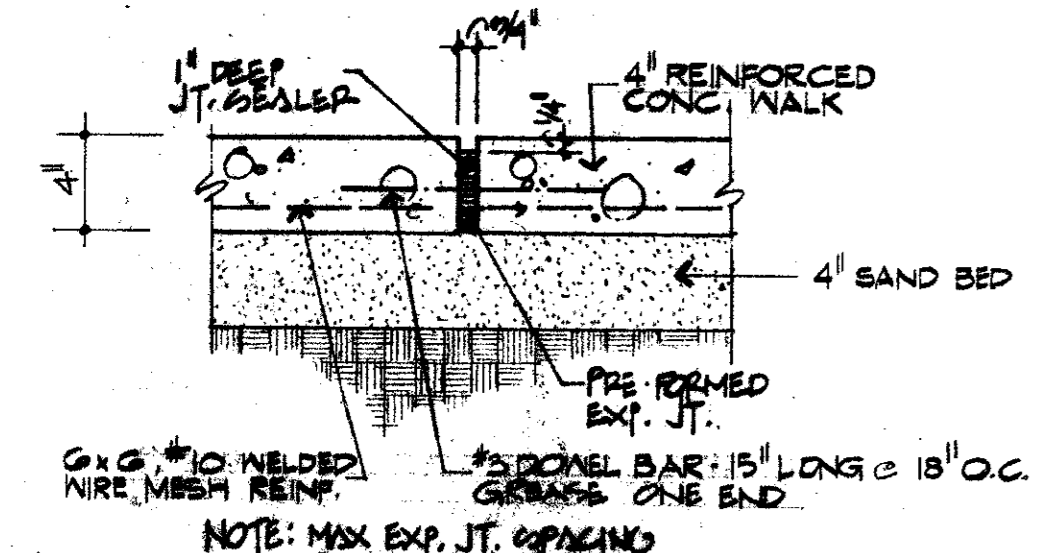
202 CONTROL JT.
 1/4" = 1'-0"



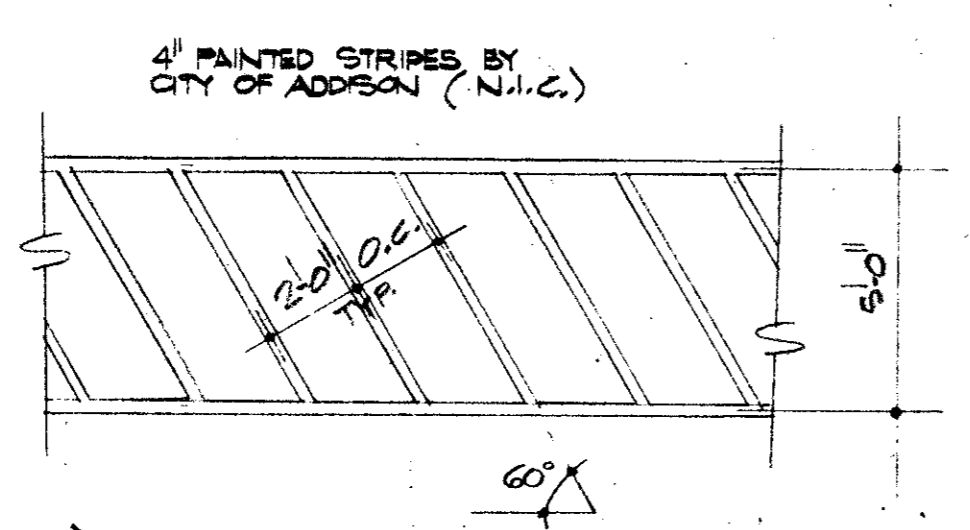
203 CROSS SECTION
 1/2" = 1'-0"



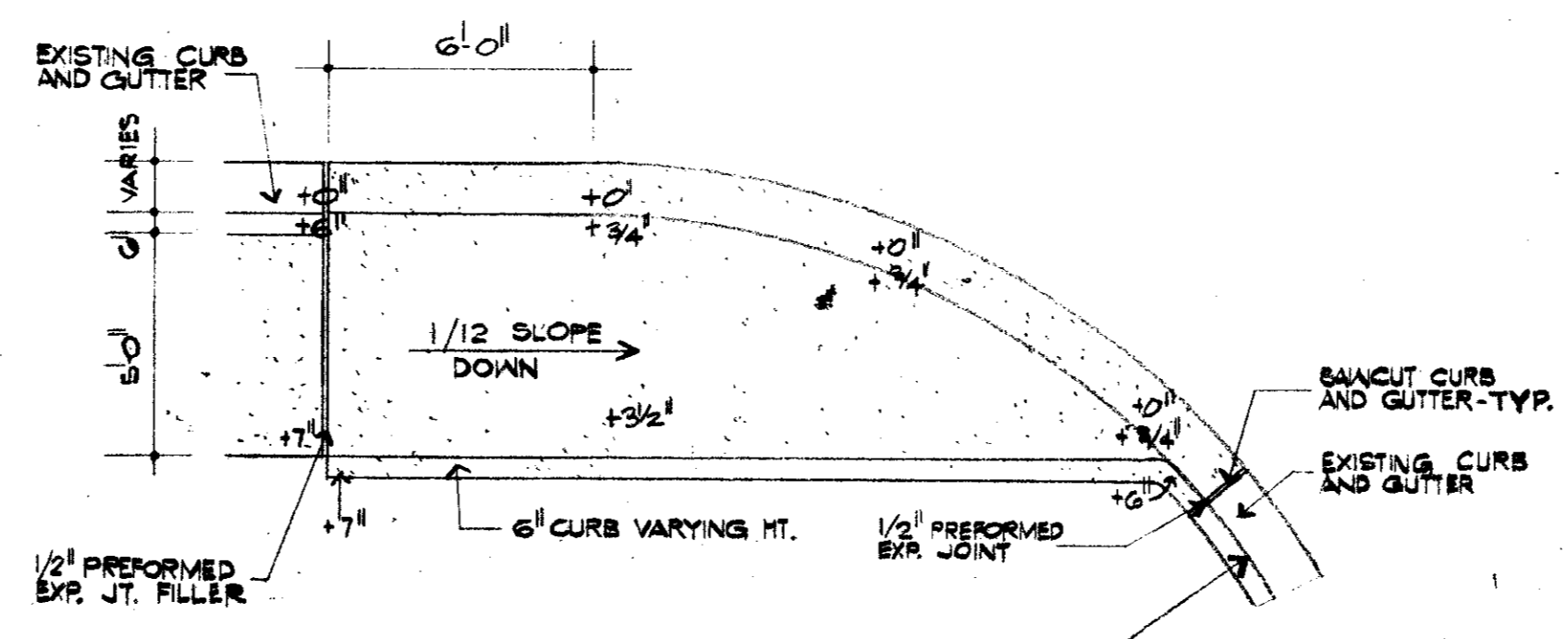
204 TYPICAL RAMP PLAN - TYPE A
 1/4" = 1'-0"



205 EXP. JOINT
 1/4" = 1'-0"



206 (N.I.C.) PEDESTRIAN CROSSING PAINT PATTERN
 1/4" = 1'-0"



207 TYPICAL RAMP PLAN - TYPE B
 1/4" = 1'-0"

Sidewalks for Brookhaven Club Drive
 Addison, Texas

ISSUE DATE	11/21/77
REVISIONS	

SHEET NUMBER
2

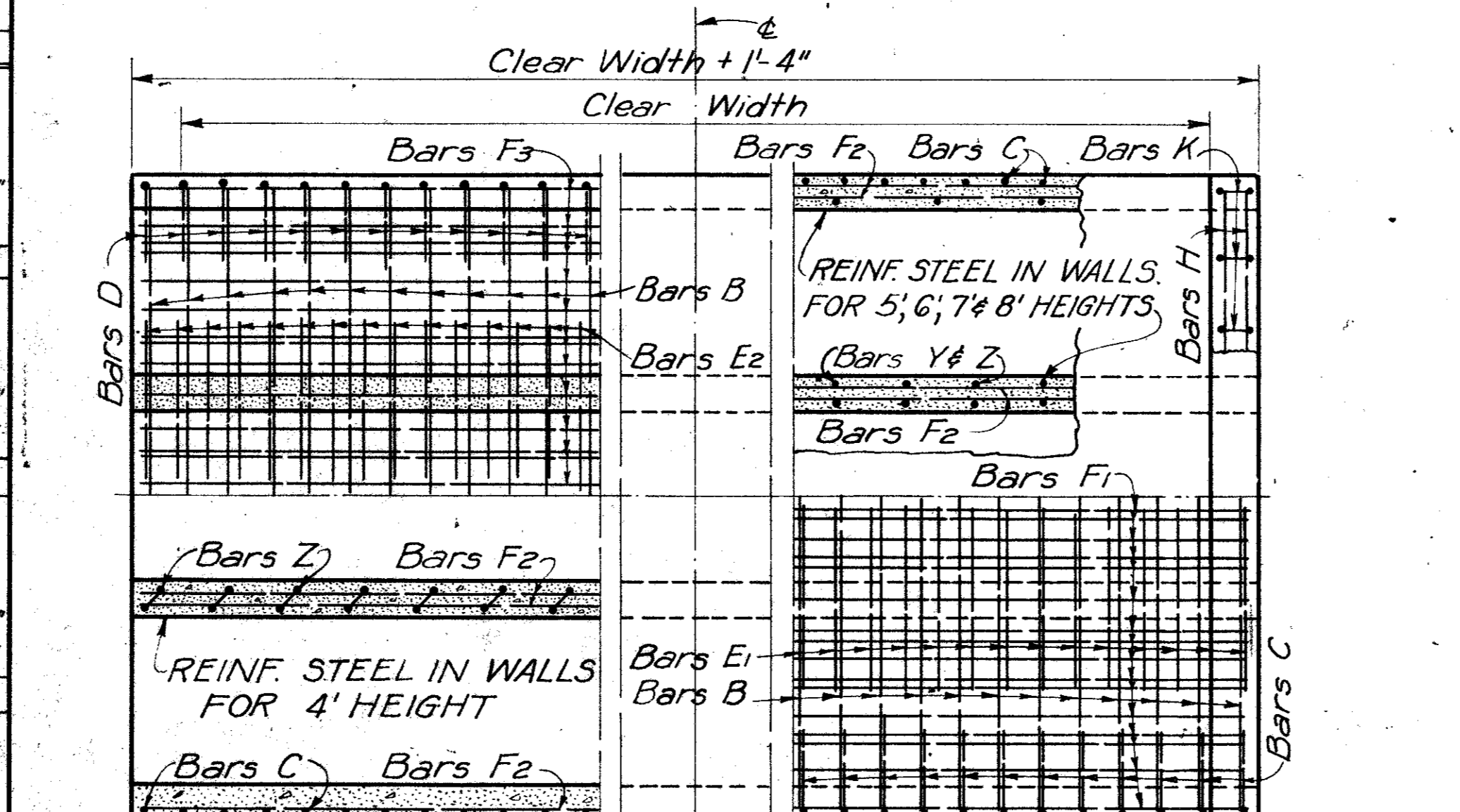
BILLS OF REINFORCING STEEL - FOR 44' CLEAR WIDTH - BARRELS ONLY

Table with columns for MARK, NUMBER, SIZE, SPACING, LENGTH, WEIGHT and rows for 2 SPANS (8'x4', 8'x5', 8'x6', 8'x7'), 3 SPANS (8'x4', 8'x5', 8'x6', 8'x7'), 4 SPANS (8'x4', 8'x5', 8'x6', 8'x7'), and 5 SPANS (8'x4', 8'x5', 8'x6', 8'x7').

PLAN SURVEYED, FLOORED, CHECKED, NOTE BOOK, RT. OF WAY CHECKED, NO.

PROFILE SURVEYED, FLOORED, CHECKED, NOTE BOOK, STRUCTURE NOTATIONS CHECKED, NO.

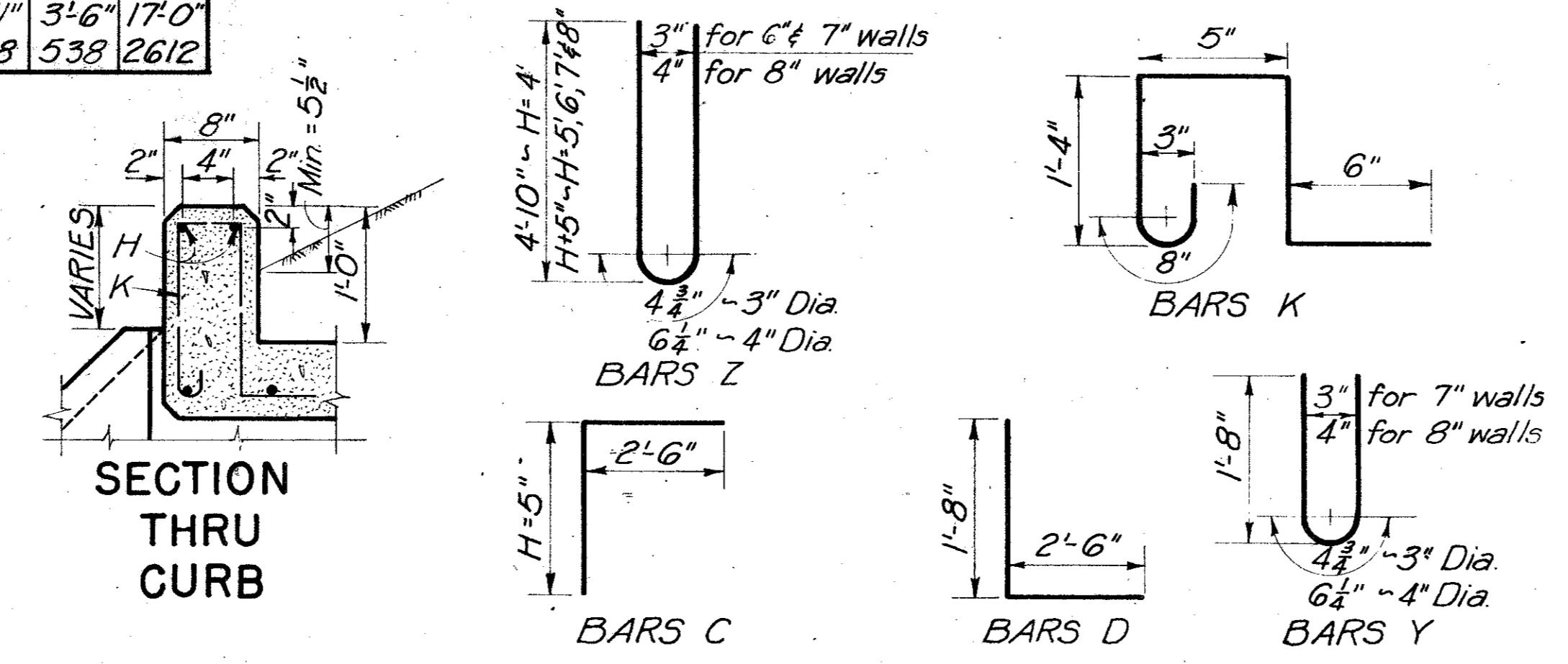
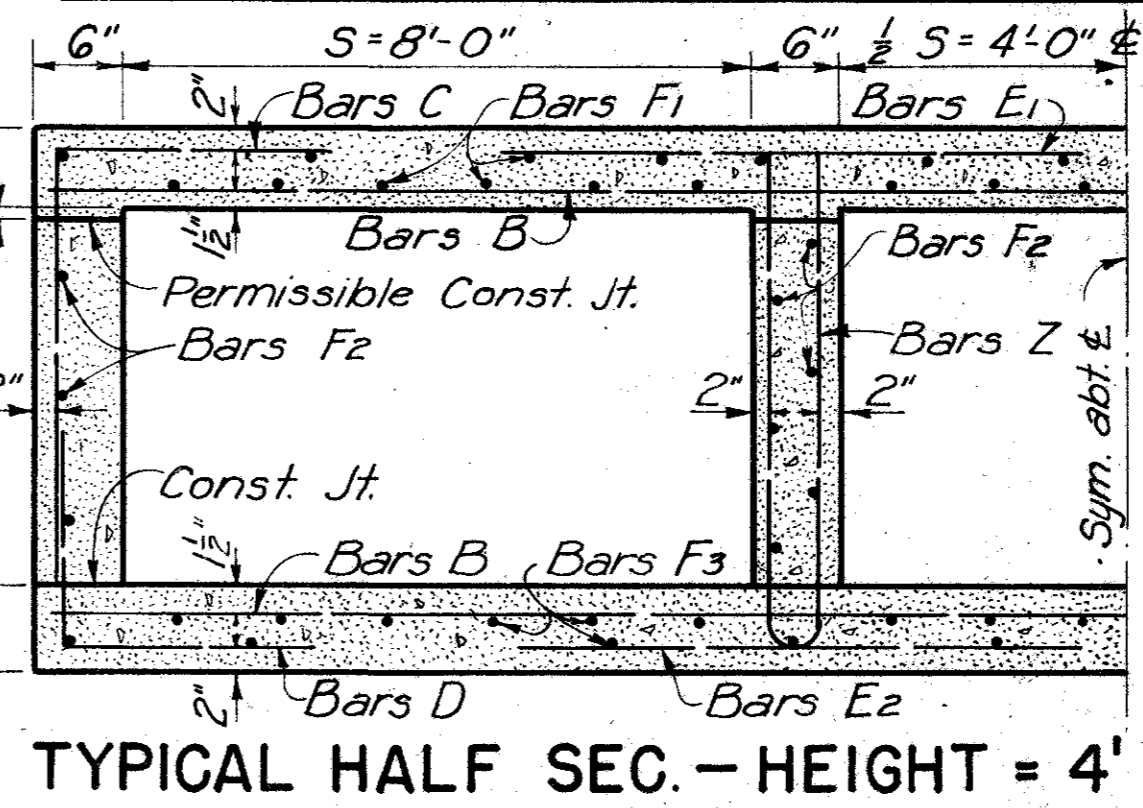
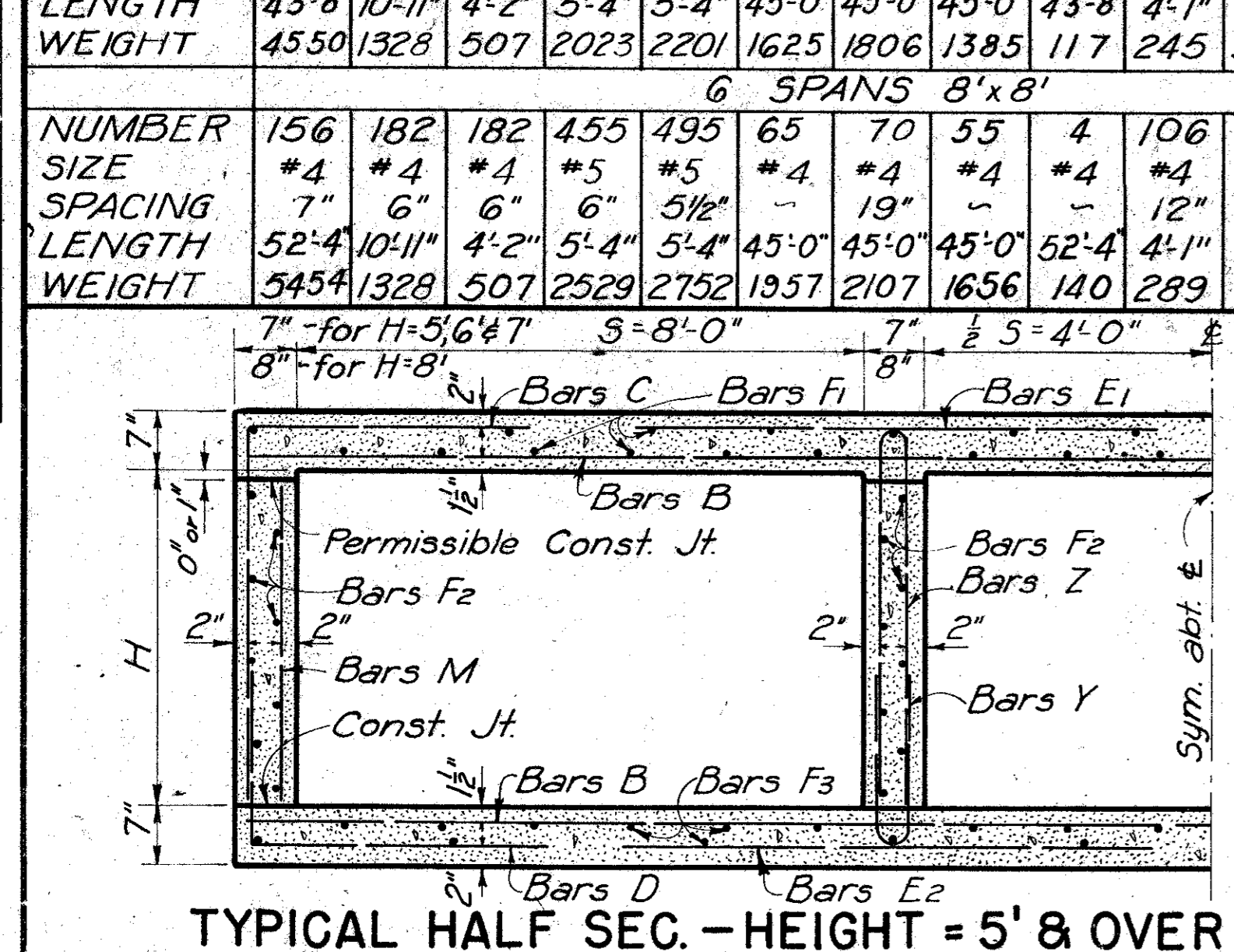
Table showing reinforcement details for various culvert sizes and spans, including bars A through Z and their spacings.



BOTTOM SLAB PART PLANS TOP SLAB NOTE: TOP & BOTTOM SLAB REINF. STEEL SIMILAR FOR CULVERT SIZES SHOWN ON THIS SHEET.

Table titled 'BARREL QUANTITIES FOR 44' CLEAR WIDTH' with columns for CULV. SIZE, NO. OF SPANS, LENGTH OF STRUCT., *BARREL QUANTITIES, and QUANTITIES P.L.F. BBL.

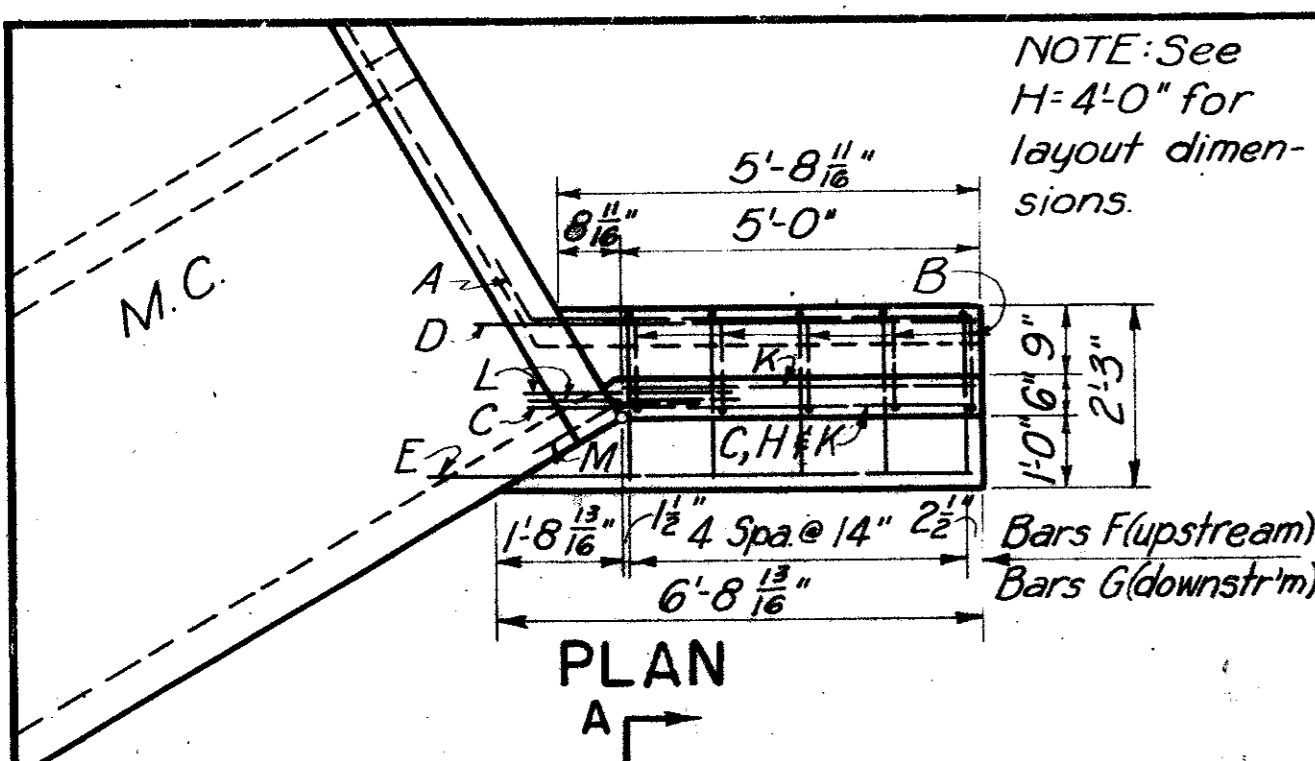
GENERAL NOTES: These quantities do not include toe walls or wings. Design Loading: H-20 or H20 S16- in accordance with A.A.S.H.O. 1957 Standard Specifications. All concrete shall be Class C. Chamfer exposed corners 1/4". All dimensions relating to reinforcing steel are to centers of bars. Quantities of reinforcing steel shown hereon are for 44'-0" clear width between headwalls. Construction Joint at the flow line may be raised a maximum of 6" at the contractor's option. Bars M may be cut off or raised, Bars C & D may be reversed (D on top) and bars Y & Z may be reversed (Y on top).



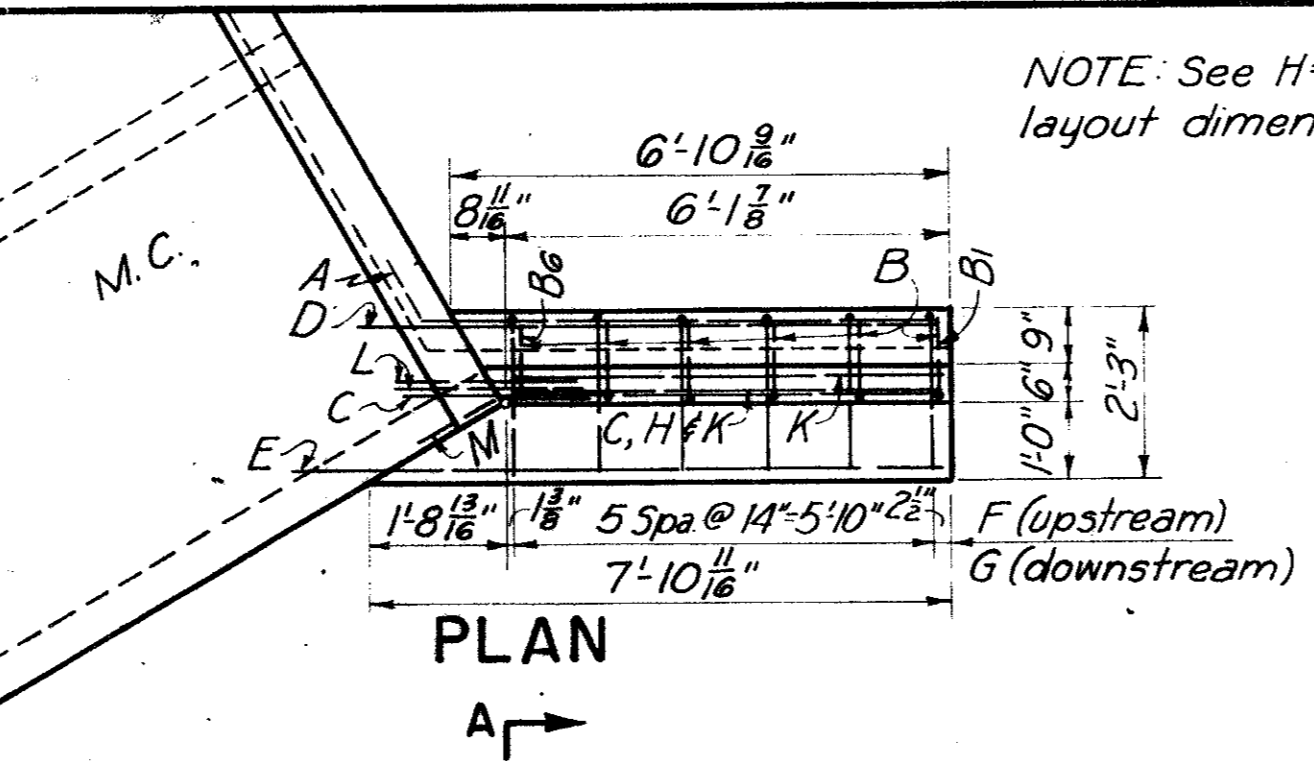
TEXAS HIGHWAY DEPARTMENT MULTIPLE BOX CULVERTS SIZES 8'x4', 8'x5', 8'x6', 8'x7' & 8'x8' 2'-1" TO 4'-0" FILL MC8-2. Includes drawing title, revision history, and department information.

DATE: _____ BY: _____
 SURVEYED, PLOTTED, CHECKED, NO. _____
 NOTE BOOK GRADES CHECKED, RT. OF WAY CHECKED, NO. _____

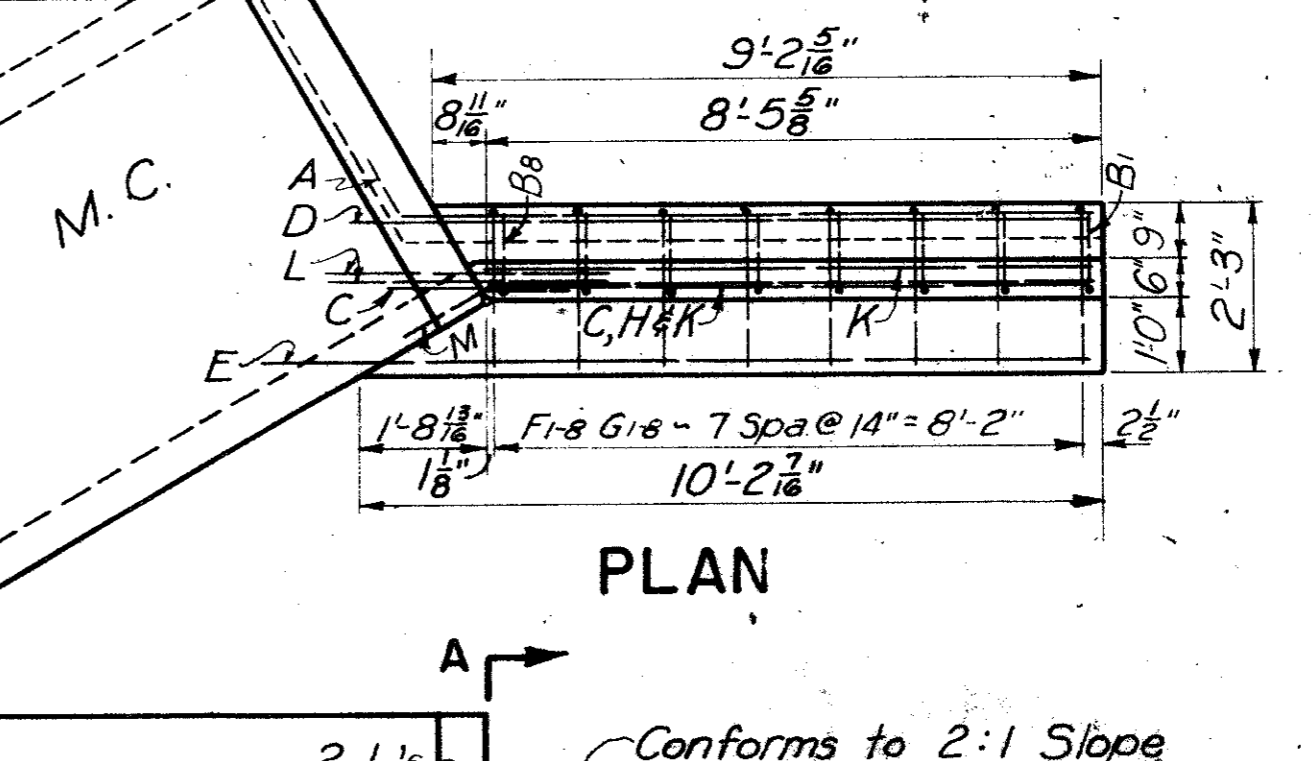
DATE: _____ BY: _____
 SURVEYED, PLOTTED, CHECKED, NO. _____
 NOTE BOOK GRADES CHECKED, E. M. S. NOTED, STRUCTURE INDICATED, NO. _____



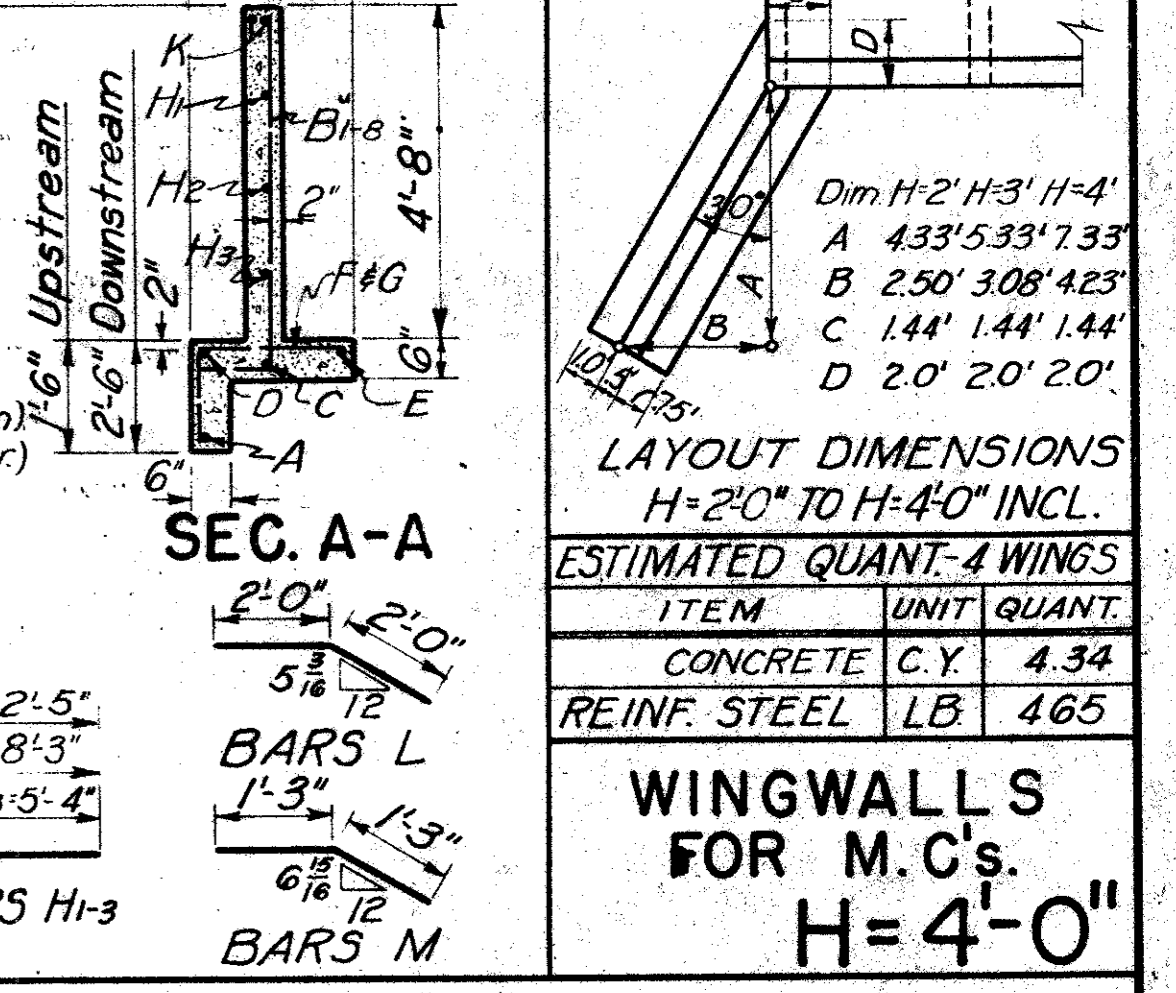
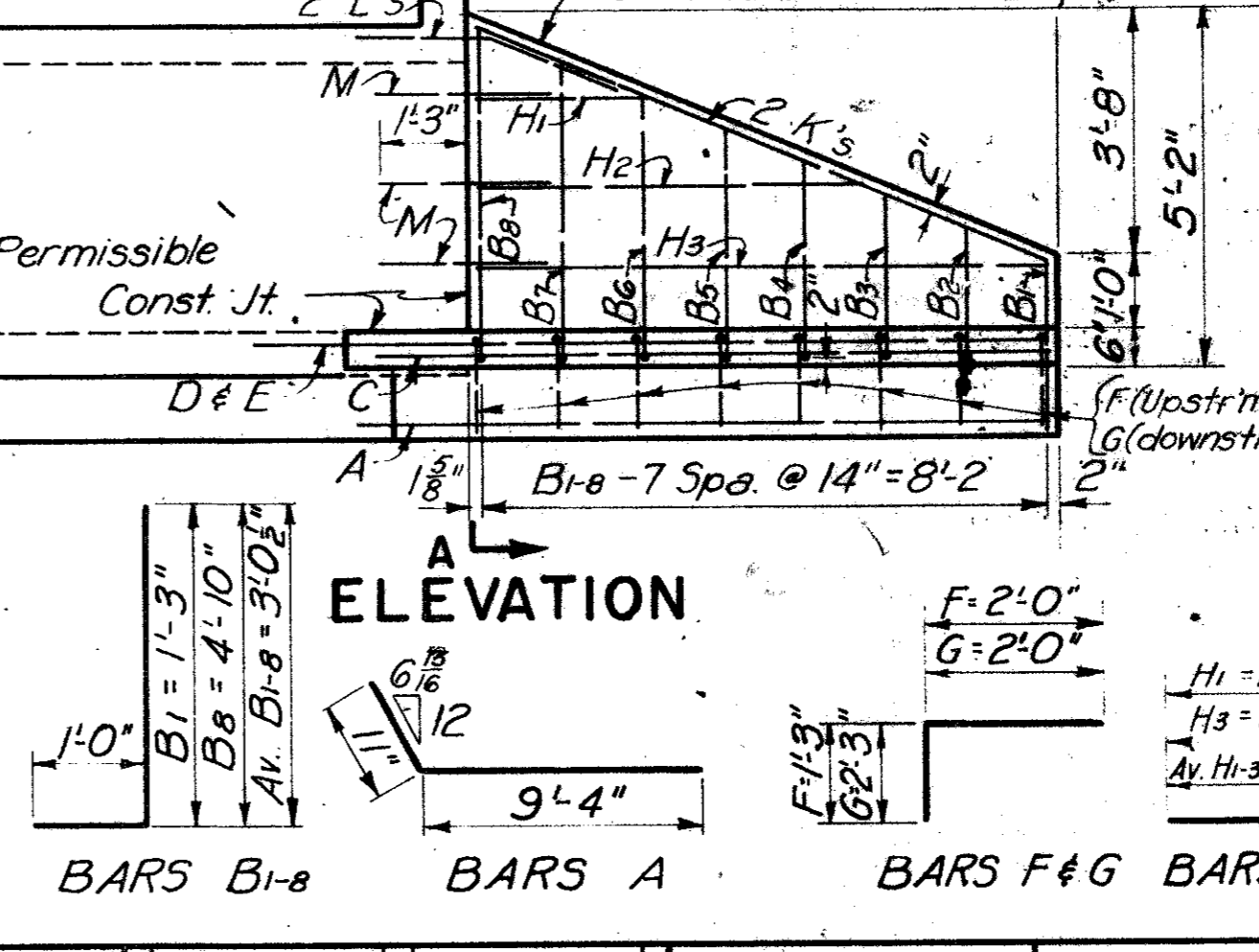
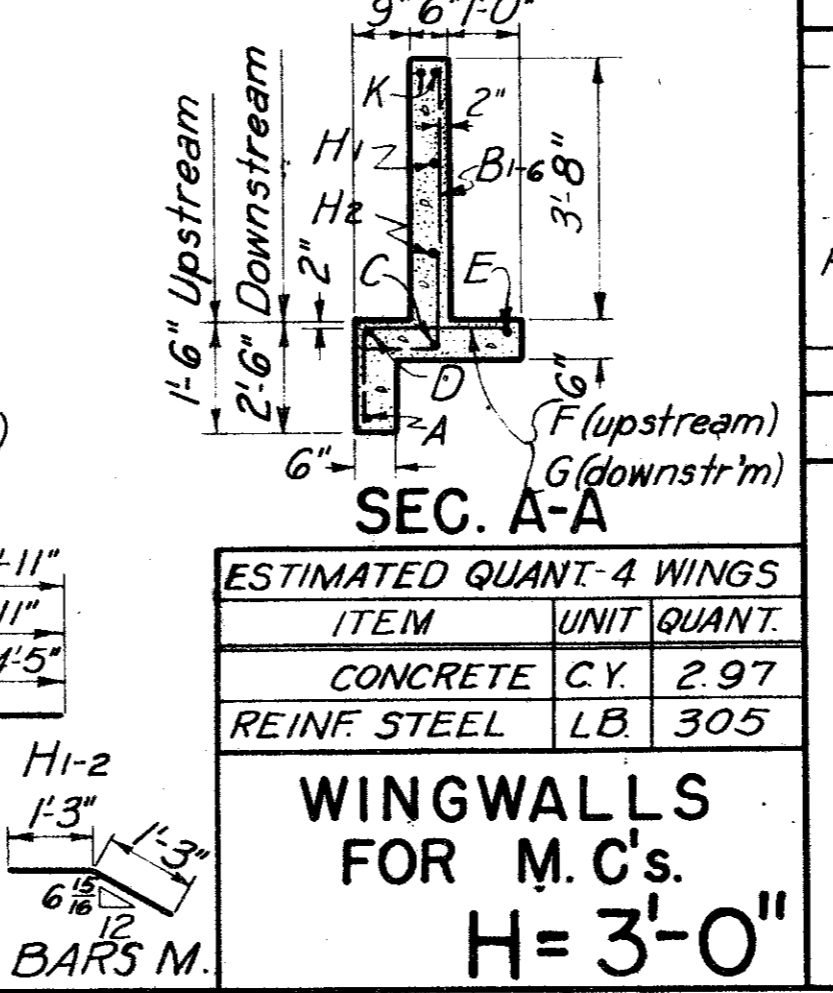
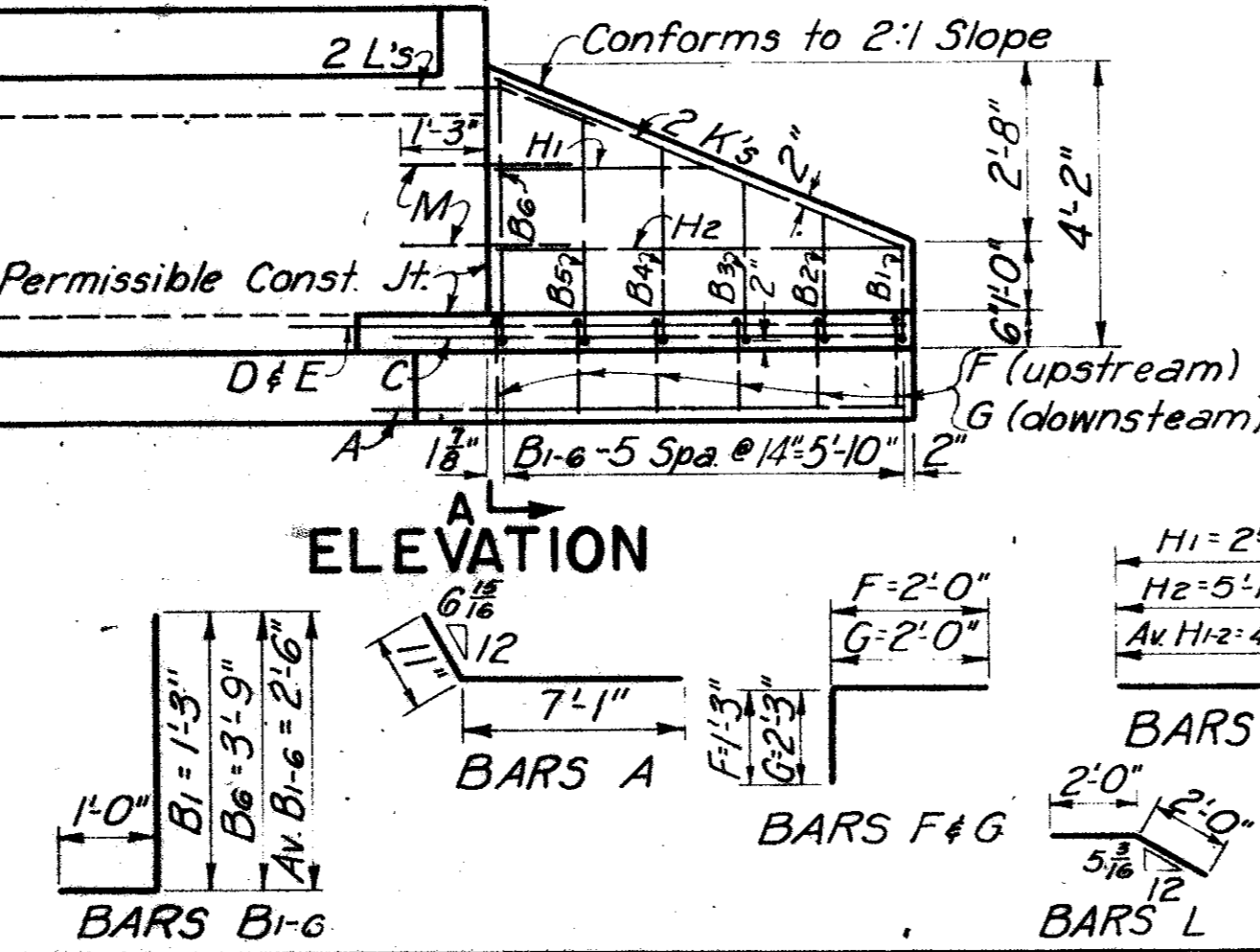
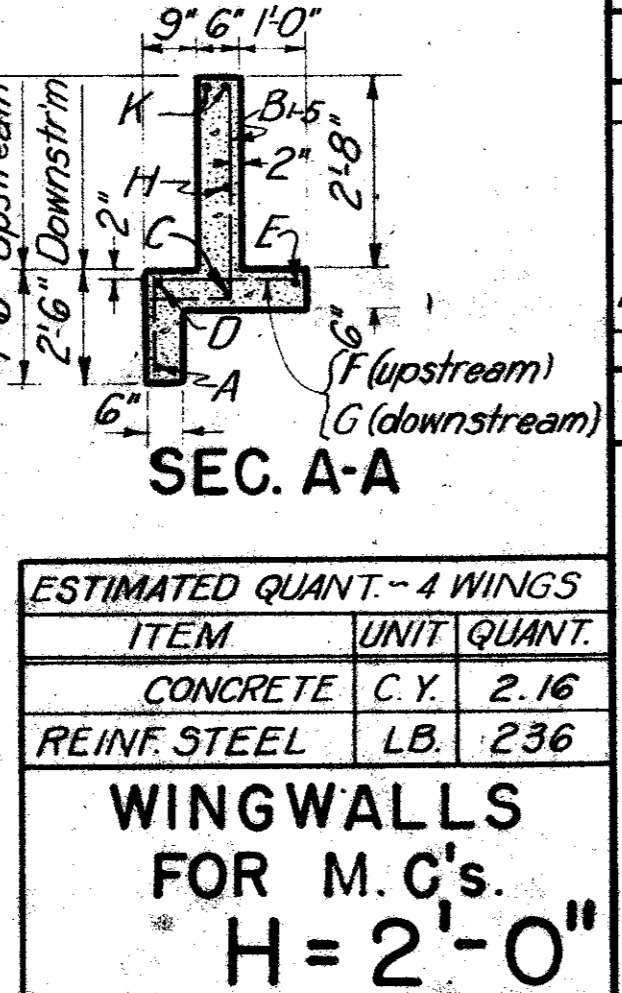
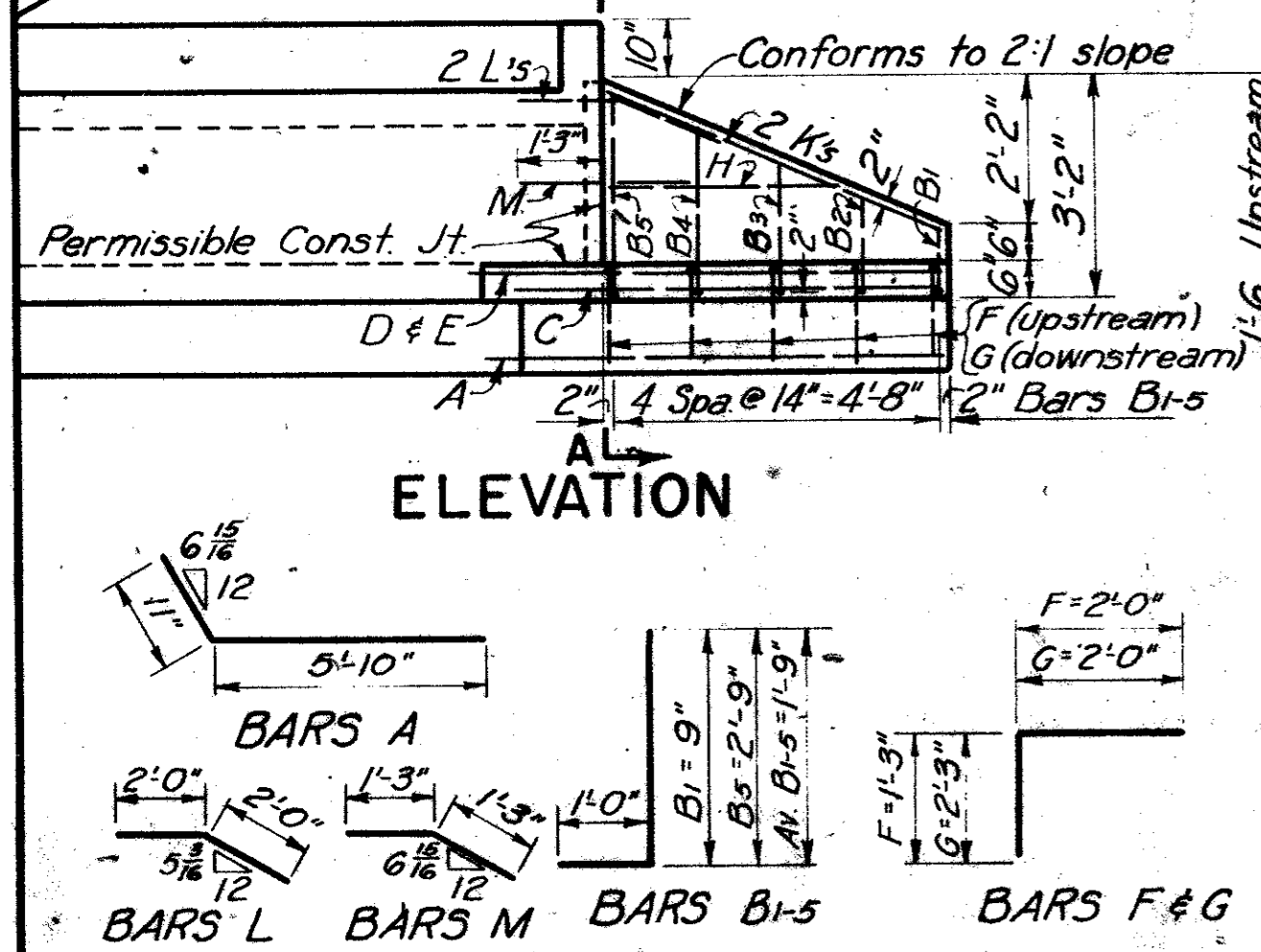
BILL OF REINF STEEL - 4 WINGS					
BAR NO.	SIZE	SPA	LGTH	WT.	
A	4	#4	6'-9"	18	
B	20	#4	14"	Av 29	37
C	4	#4	6'-3"	17	
D	4	#4	6'-9"	18	
E	4	#4	7'-5"	20	
F	10	#4	14"	3'-3"	22
G	10	#4	14"	4'-3"	28
H	4	#4	3'-1"	8	
K	8	#4	5'-2"	28	
L	8	#5	4'-0"	33	
M	4	#4	2'-6"	7	
TOTAL FOR 4 WINGS					236



BILL OF REINF STEEL - 4 WINGS					
BAR NO.	SIZE	SPA	LGTH	WT.	
A	4	#4	8'-0"	21	
B	24	#4	14"	Av 36	56
C	4	#4	7'-5"	20	
D	4	#4	7'-11"	21	
E	4	#4	8'-7"	23	
F	12	#4	14"	3'-3"	26
G	12	#4	14"	4'-3"	34
H	8	#4	15"	Av 45	24
K	8	#4	6'-5"	34	
L	8	#5	4'-0"	33	
M	8	#4	15"	2'-6"	13
TOTAL FOR 4 WINGS					305



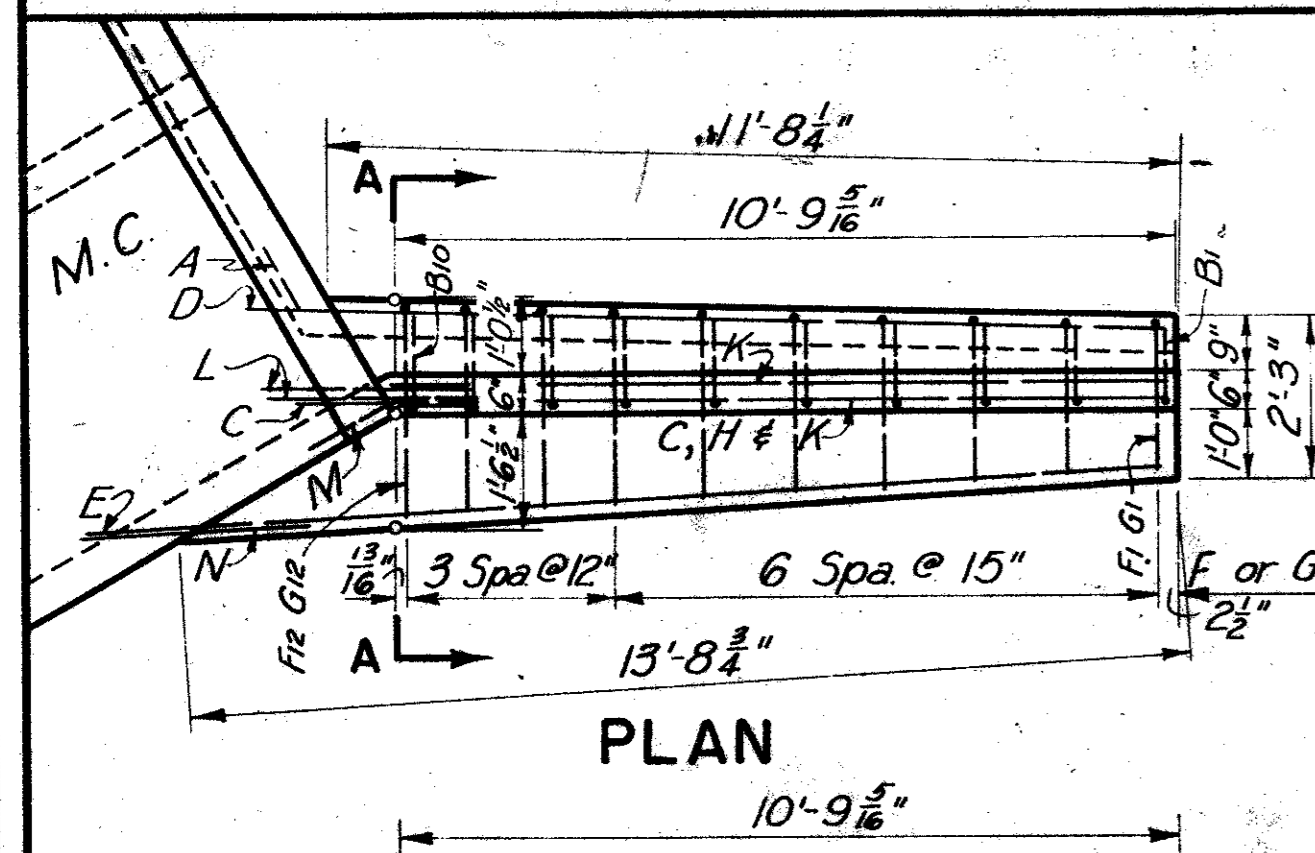
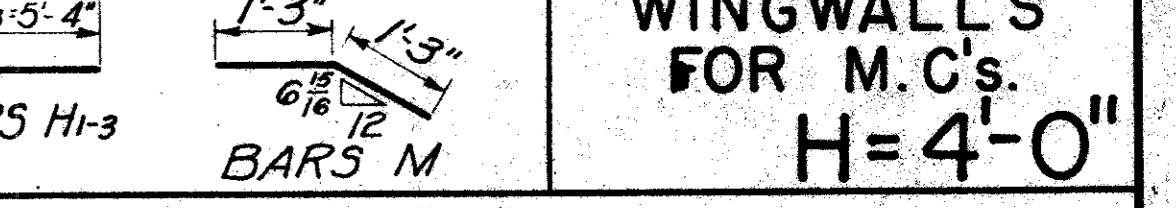
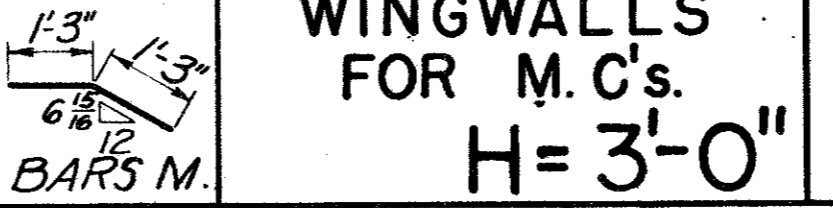
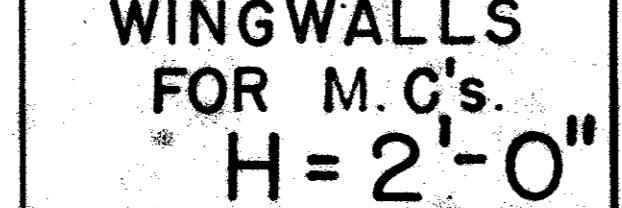
BILL OF REINF STEEL - 4 WINGS					
BAR NO.	SIZE	SPA	LGTH	WT.	
A	4	#4	10'-3"	27	
B	32	#4	14"	Av 40	86
C	4	#4	9'-3"	26	
D	4	#4	10'-2"	27	
E	4	#5	11'-5"	48	
F	16	#4	14"	3'-3"	35
G	16	#4	14"	4'-3"	45
H	12	#4	15"	Av 54	43
K	8	#5	9'-0"	75	
L	8	#5	4'-0"	33	
M	12	#4	15"	2'-6"	20
TOTAL FOR 4 WINGS					465



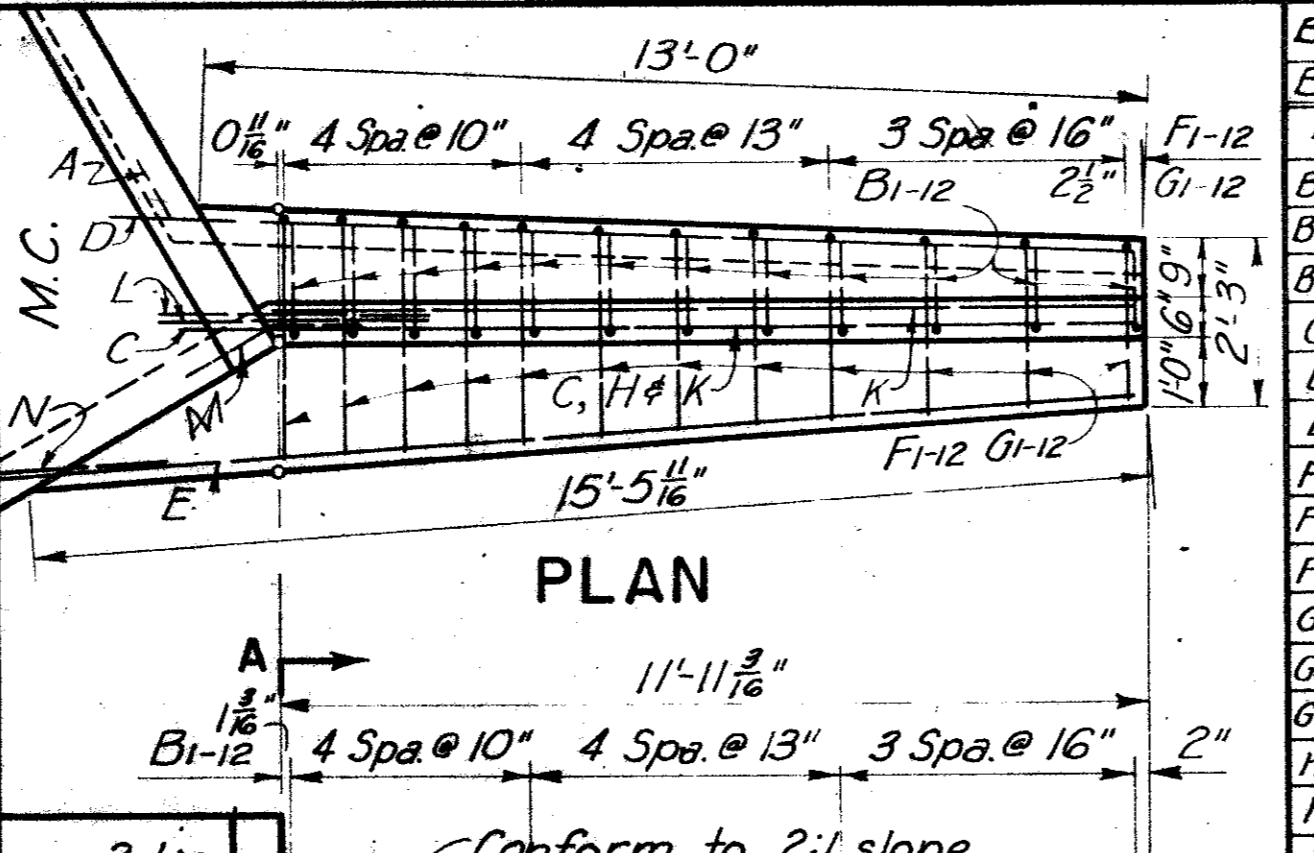
ESTIMATED QUANT - 4 WINGS			
ITEM	UNIT	QUANT.	
CONCRETE	C.Y.	2.16	
REINF. STEEL	LB.	236	

ESTIMATED QUANT - 4 WINGS			
ITEM	UNIT	QUANT.	
CONCRETE	C.Y.	2.97	
REINF. STEEL	LB.	305	

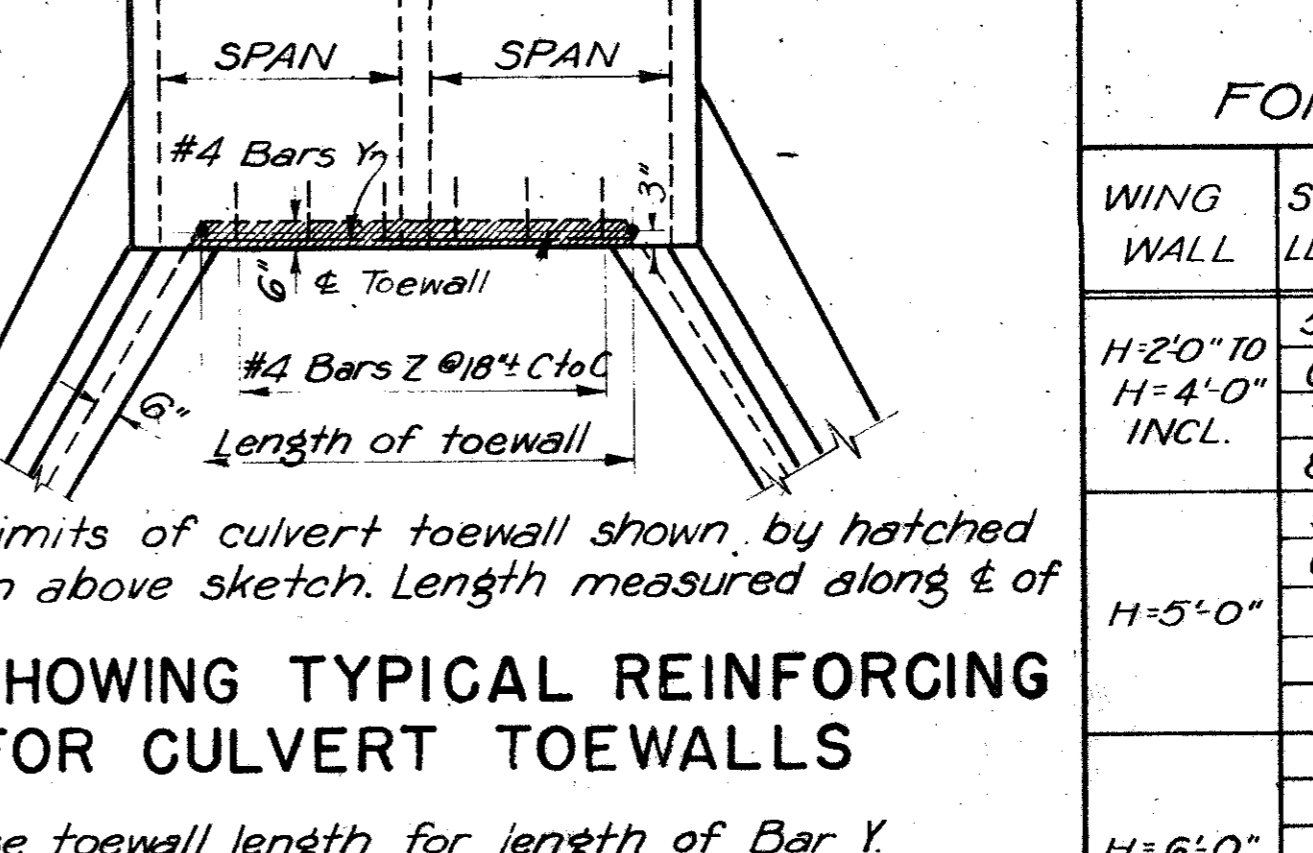
ESTIMATED QUANT - 4 WINGS			
ITEM	UNIT	QUANT.	
CONCRETE	C.Y.	4.34	
REINF. STEEL	LB.	465	



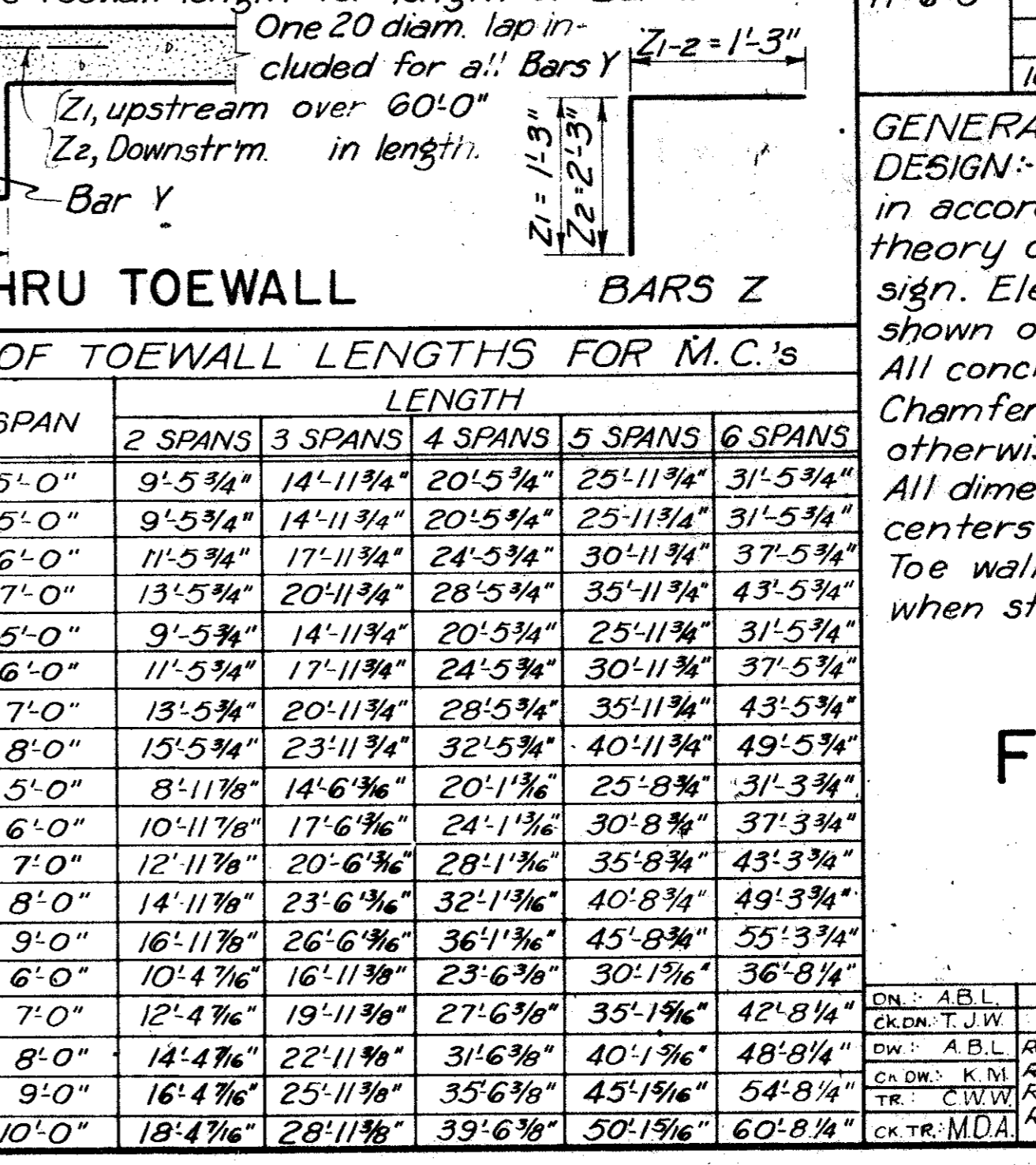
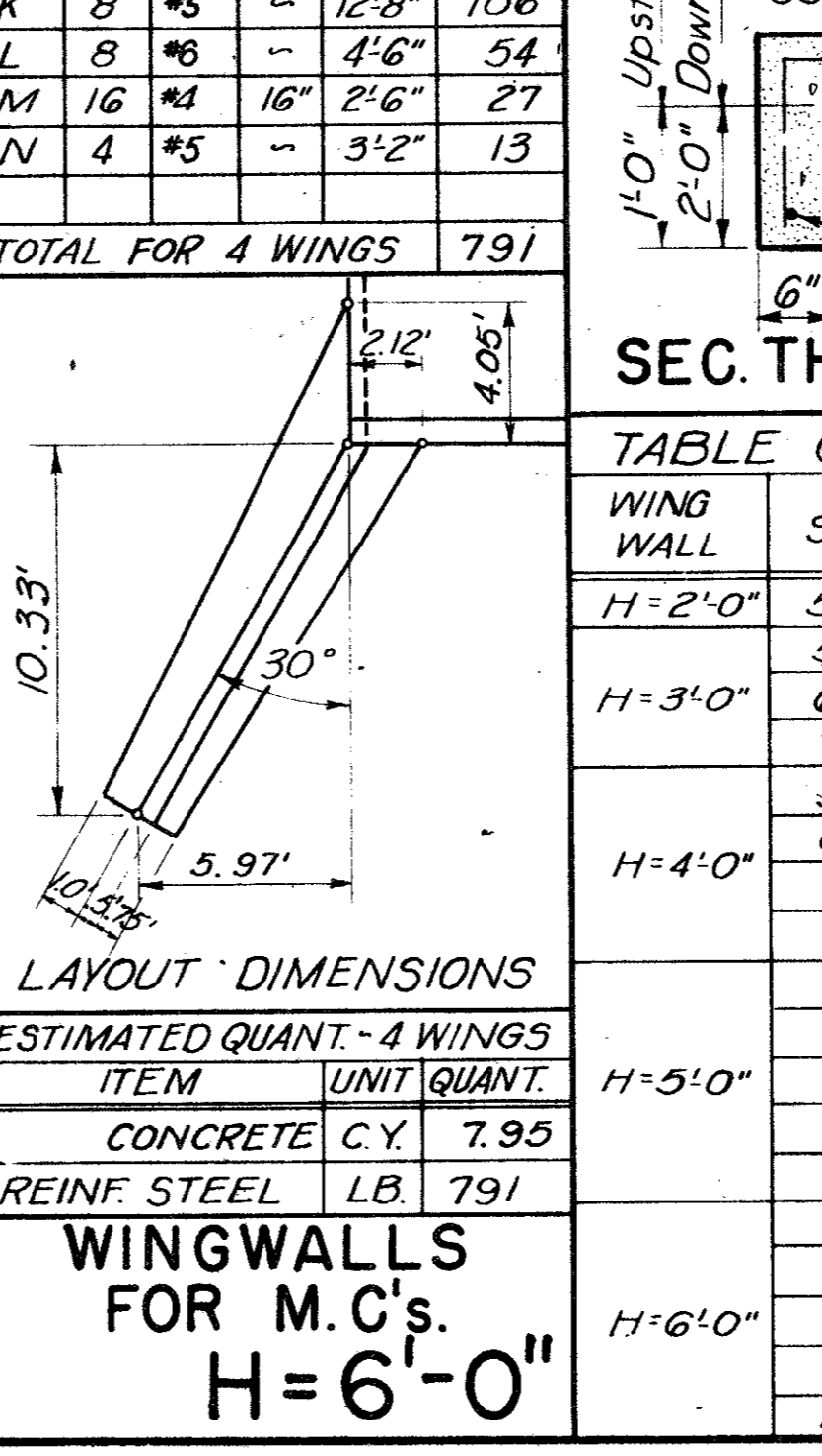
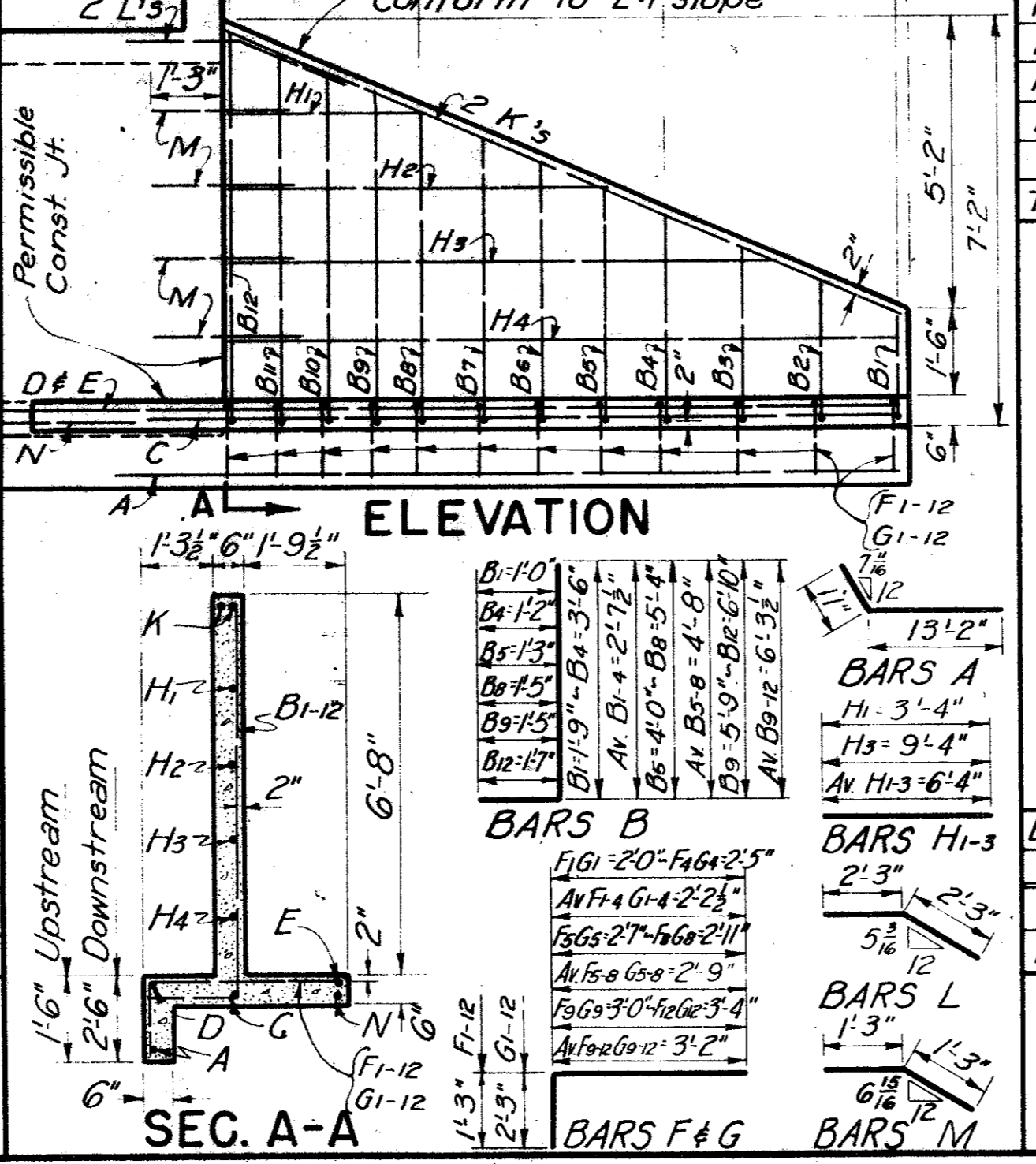
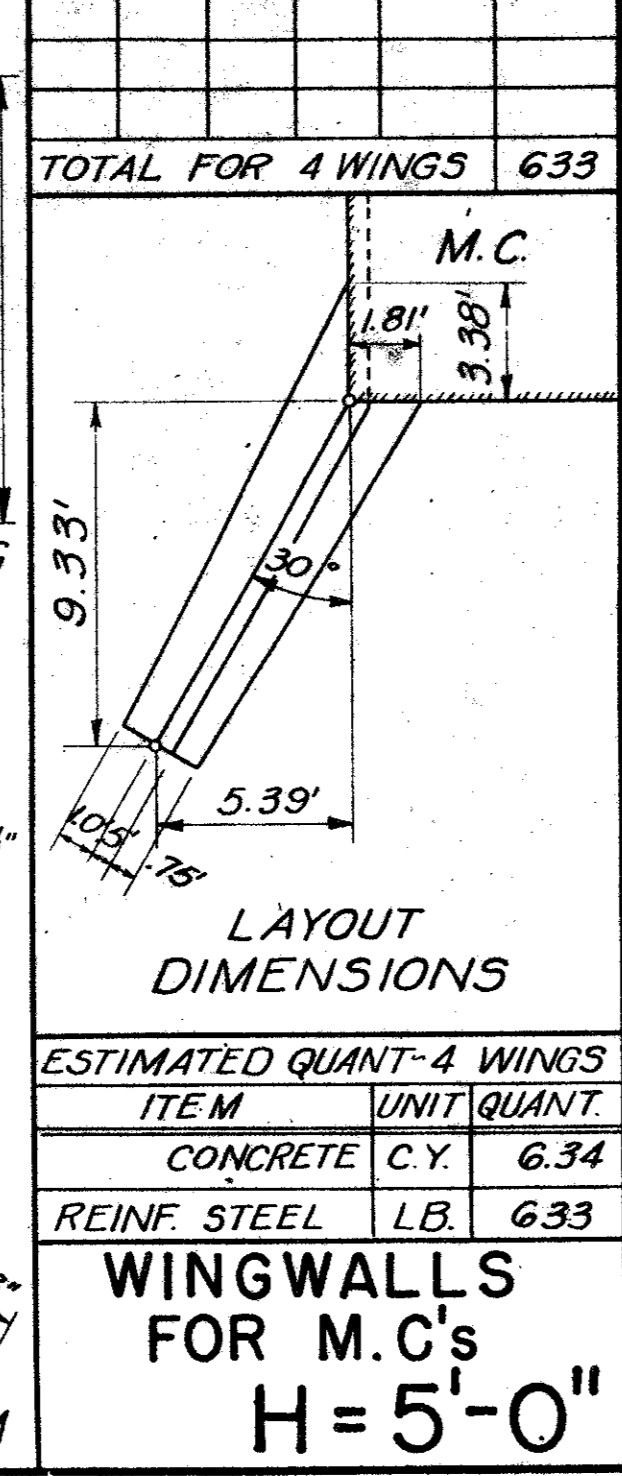
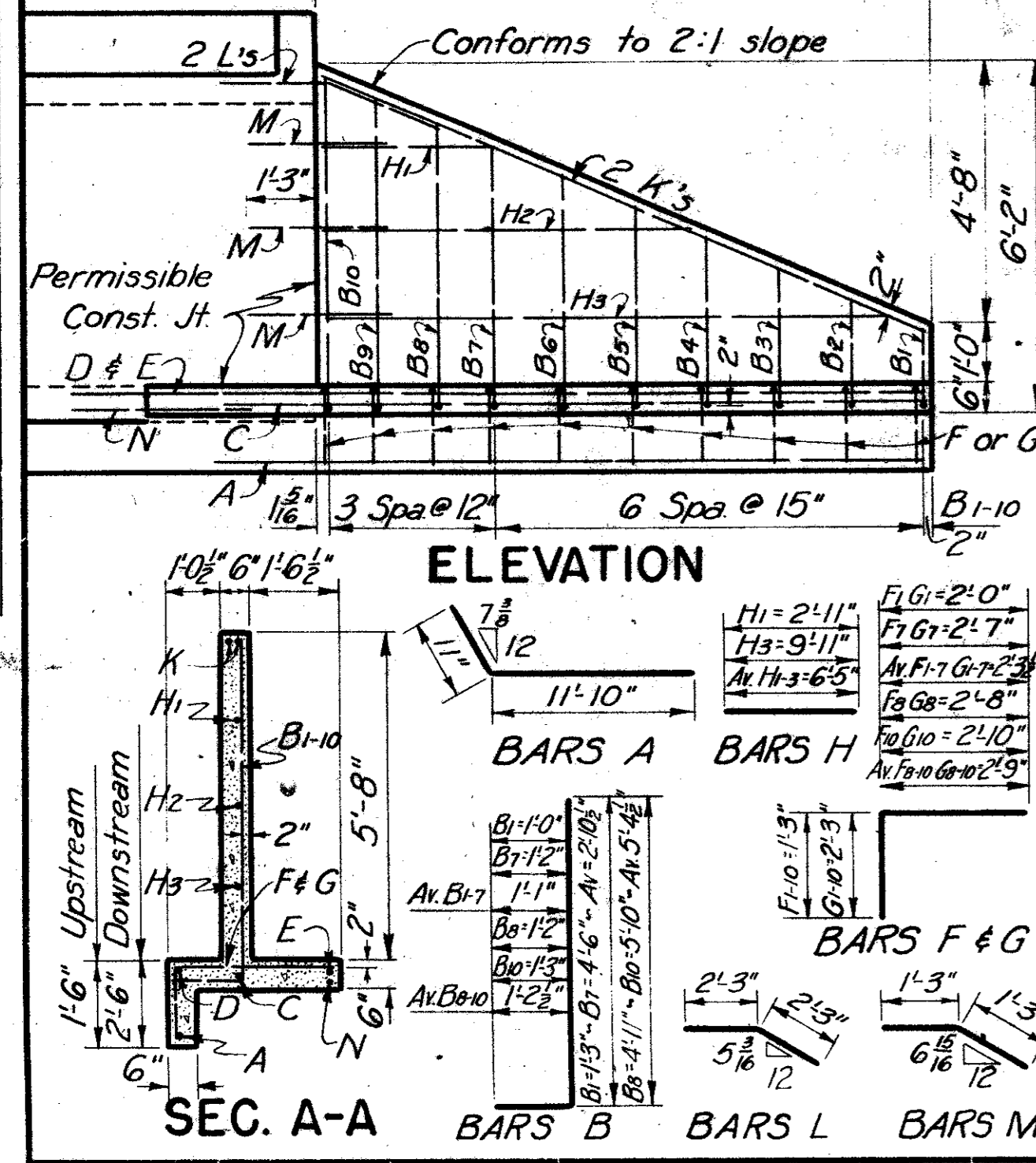
BILL OF REINF STEEL - 4 WINGS					
BAR NO.	SIZE	SPA	LGTH	WT.	
A	4	#4	12'-9"	34	
B	28	#4	15"	Av 31	73
C	4	#4	12'-0"	32	
D	4	#4	12'-9"	34	
E	4	#5	14'-0"	62	
F	14	#4	15"	Av 36	33
G	6	#4	12"	Av 40	16
H	14	#4	15"	Av 46	42
I	6	#4	12"	Av 50	20
J	12	#4	18"	Av 65	51
K	8	#5	11'-6"	36	
L	8	#6	4'-6"	54	
M	12	#4	18"	2'-6"	20
N	4	#5	3'-2"	13	
TOTAL FOR 4 WINGS					633



BILL OF REINF STEEL - 4 WINGS					
BAR NO.	SIZE	SPA	LGTH	WT.	
A	4	#4	14'-1"	38	
B	16	#4	16"	Av 38	39
C	4	#4	13'	Av 60	64
D	4	#4	10"	Av 79	83
E	4	#5	13'-2"	35	
F	4	#4	14'-0"	37	
G	8	#4	16"	Av 35	21
H	8	#4	13"	Av 40	18
I	8	#4	10"	Av 45	24
J	8	#4	16"	Av 45	24
K	8	#4	13"	Av 50	27
L	8	#4	10"	Av 55	29
M	16	#4	16"	Av 45	24
N	4	#5	3'-2"	13	
TOTAL FOR 4 WINGS					791



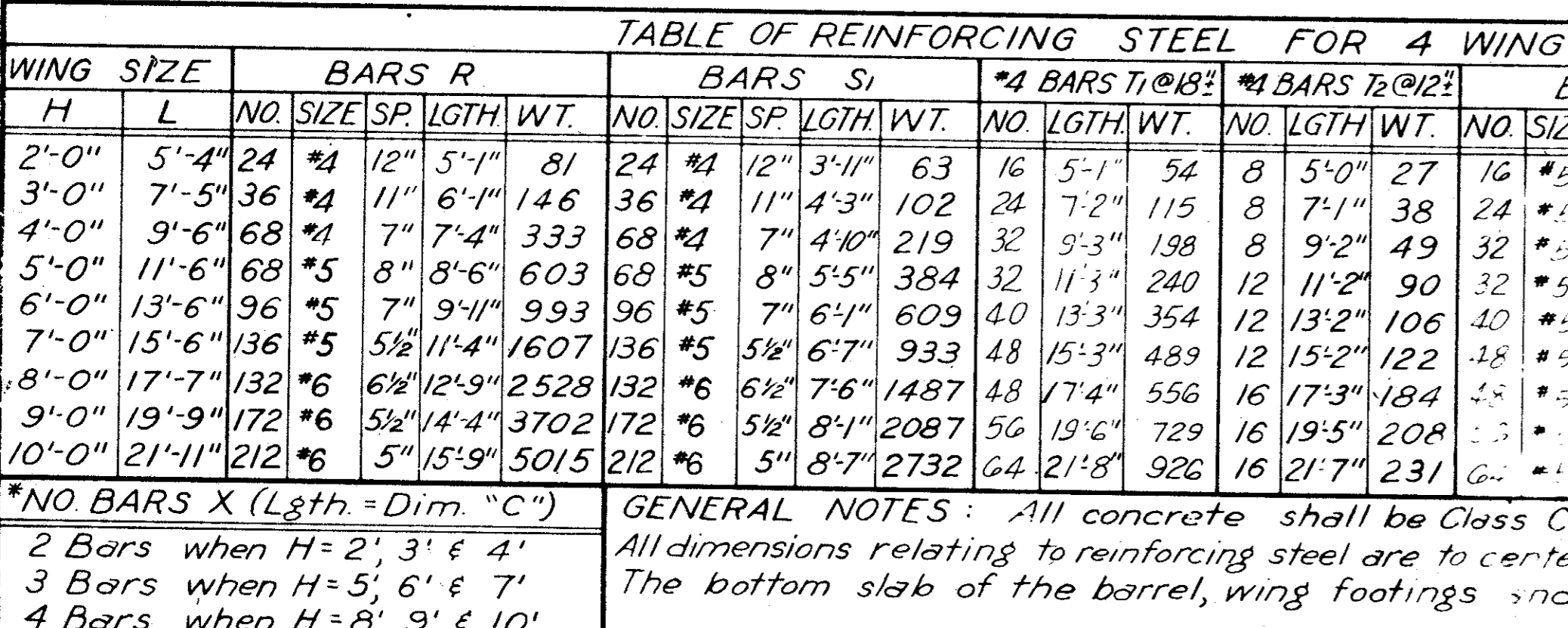
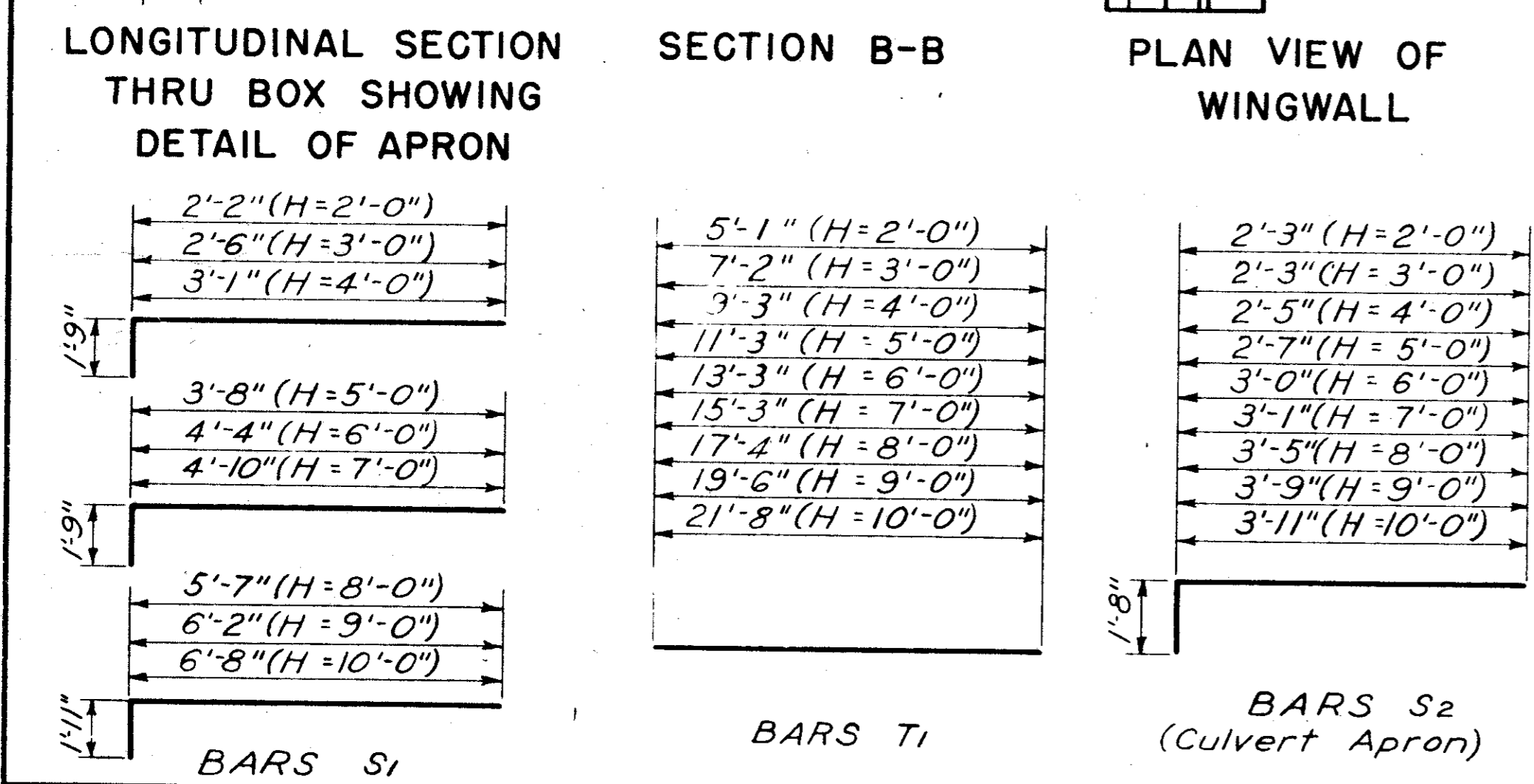
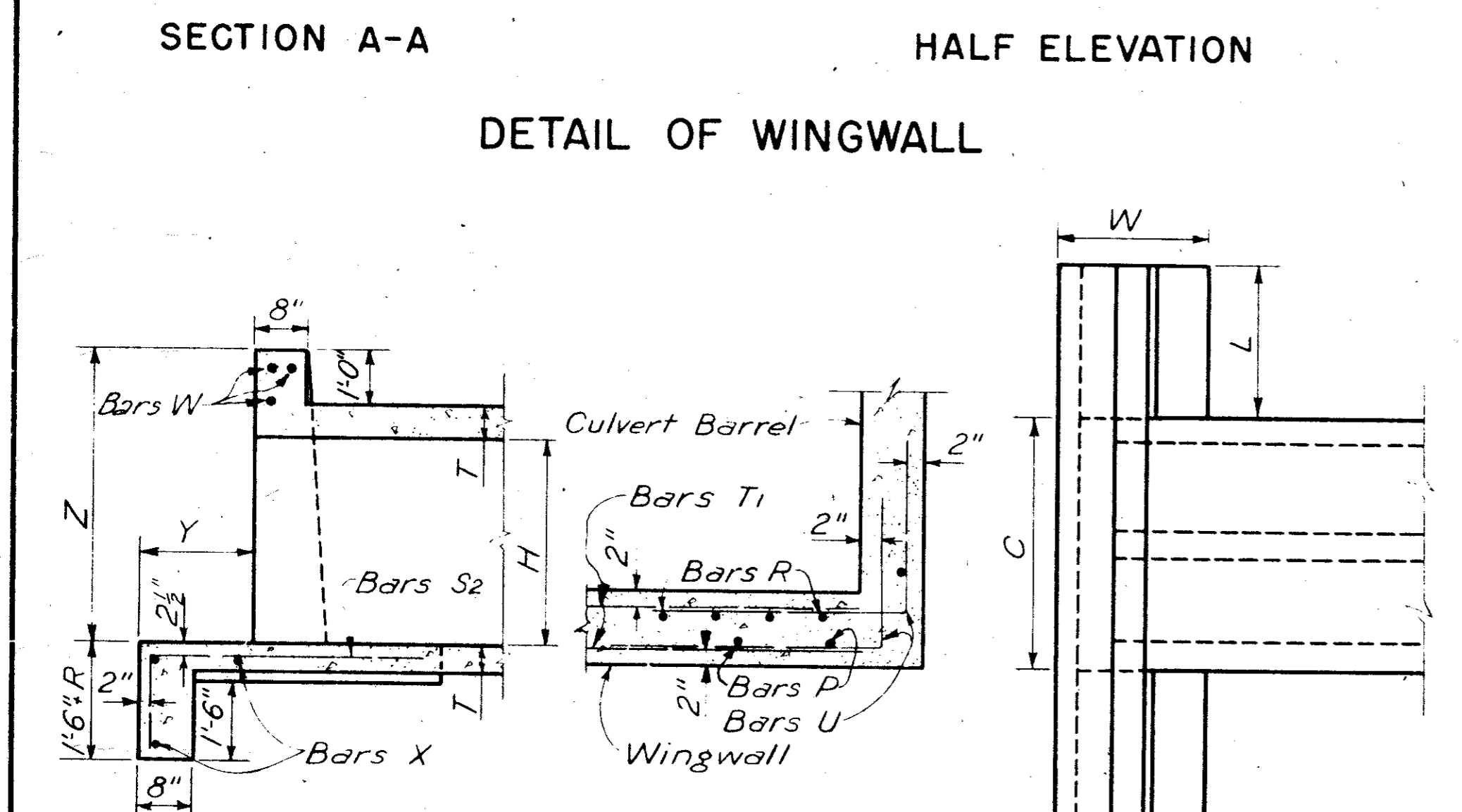
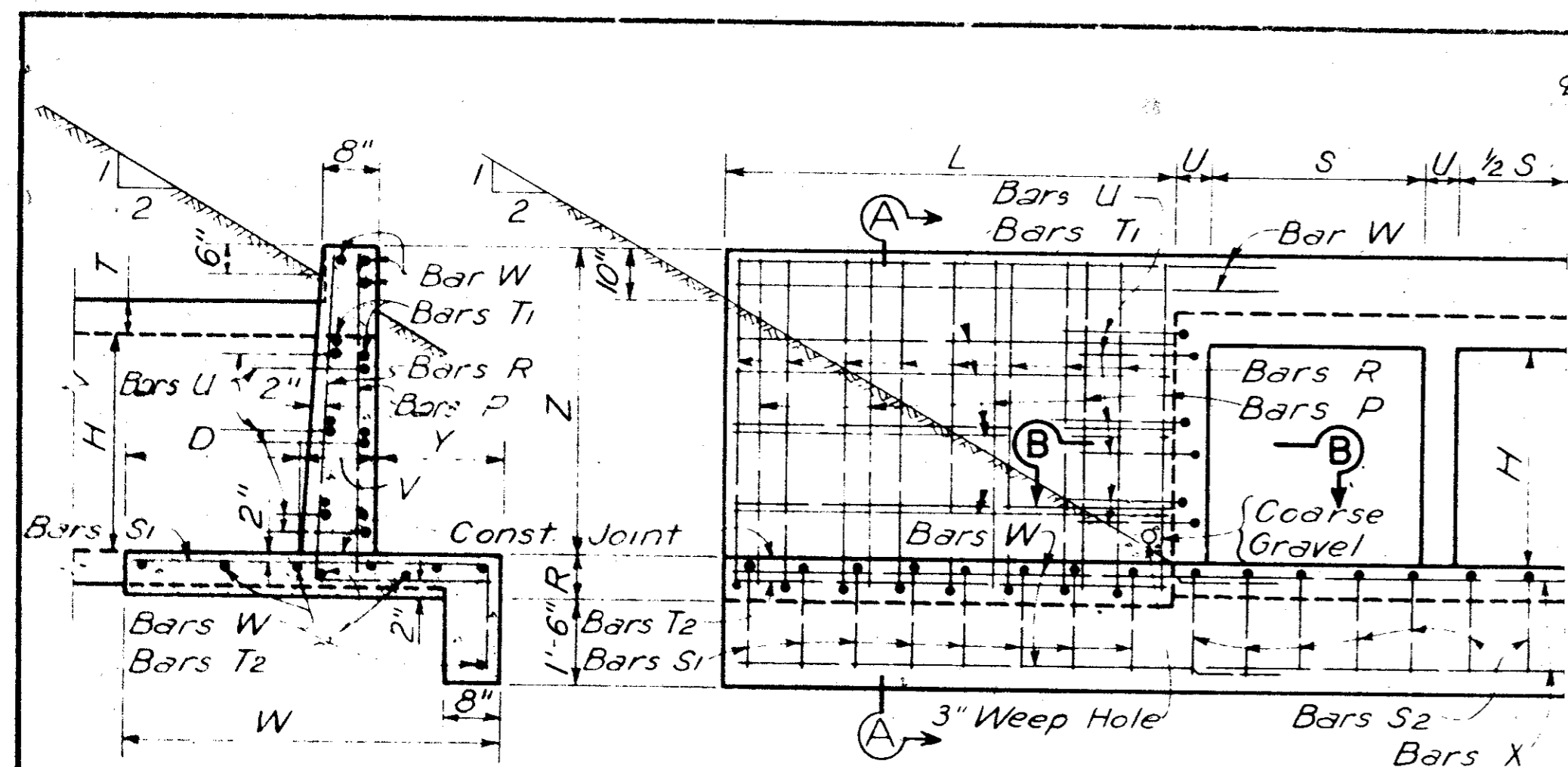
ESTIMATED QUANTITIES FOR TWO CULVERT TOEWALLS											
WING WALL	SPAN LENGTH	2 SPANS		3 SPANS		4 SPANS		5 SPANS		6 SPANS	
		CONC. C.Y.	REINF. LB.	CONC. C.Y.	REINF. LB.	CONC. C.Y.	REINF. LB.	CONC. C.Y.	REINF. LB.	CONC. C.Y.	REINF. LB.
H=2'-0" TO H=4'-0" INCL.	5'-0"	0.53	41	0.83	64	1.14	83	1.44	105	1.75	130
	6'-0"	0.64	51	1.00	76	1.36	101	1.72	129	2.08	154
	7'-0"	0.75	58	1.17	88	1.58	118	2.00	148	2.42	178
H=5'-0"	8'-0"	0.86	63	1.33	100	1.80	135	2.28	166	2.75	202
	9'-0"	0.94	71	1.48	112	2.01	148	2.54	185	3.07	226
	10'-0"	1.02	76	1.61	119	2.20	161	2.78	203	3.37	248



GENERAL NOTES:
 DESIGN: Wing Walls designed in accordance with Rankine's theory of retaining wall design. Elements of design are shown on sketch at right. All concrete shall be Class C. Chamfer all exposed corners 1/4" unless specified otherwise.
 All dimensions relating to reinforcing steel are to centers of bars.
 Toe walls for culvert and wing walls shall be omitted when structure is founded on solid rock.

TEXAS HIGHWAY DEPARTMENT
FLARED WINGWALLS
 FOR MULTIPLE CULVERTS
 H=2'-0" TO 6'-0" INCL.
MCW-F1

WING WALL	SPAN	2 SPANS	3 SPANS	4 SPANS	5 SPANS	6 SPANS
H=2'-0"	5'-0"	9'-5 3/4"	14'-11 3/4"	20'-5 3/4"	25'-11 3/4"	31'-5 3/4"
H=2'-0"	6'-0"	9'-5 3/4"	14'-11 3/4"	20'-5 3/4"	25'-11 3/4"	31'-5 3/4"
H=3'-0"	6'-0"	11'-5 3/4"	17'-11 3/4"	24'-5 3/4"	30'-11 3/4"	37'-5 3/4"
H=3'-0"	7'-0"	13'-5 3/4"	20'-11 3/4"	28'-5 3/4"	35'-11 3/4"	43'-5 3/4"
H=4'-0"	5'-0"	9'-5 3/4"	14'-11 3/4"	20'-5 3/4"	25'-11 3/4"	31'-5 3/4"
H=4'-0"	6'-0"	11'-5 3/4"	17'-11 3/4"	24'-5 3/4"	30'-11 3/4"	37'-5 3/4"
H=4'-0"	7'-0"	13'-5 3/4"	20'-11 3/4"	28'-5 3/4"	35'-11 3/4"	43'-5 3/4"
H=4'-0"	8'-0"	15'-5 3/4"	23'-11 3/4"	32'-5 3/4"	40'-11 3/4"	49'-5 3/4"
H=5'-0"	6'-0"	10'-11 3/8"	17'-6 3/8"	24'-1 3/8"	30'-8 3/8"	37'-3 3/8"
H=5'-0"	7'-0"	12'-11 3/8"	20'-6 3/8"	28'-1 3/8"	35'-8 3/8"	43'-3 3/8"
H=5'-0"	8'-0"	14'-11 3/8"	23'-6 3/8"	32'-1 3/8"	40'-8 3/8"	49'-3 3/8"
H=5'-0"	9'-0"	16'-11 3/8"	26'-6 3/8"	36'-1 3/8"	45'-8 3/8"	55'-3 3/8"
H=5'-0"	6'-0"	10'-4 7/16"	16'-11 3/8"	23'-6 3/8"	30'-1 3/8"	36'-8 1/4"
H=5'-0"	7'-0"	12'-4 7/16"	19'-11 3/8"	27'-6 3/8"	35'-1 3/8"	42'-8 1/4"
H=6'-0"	8'-0"	14'-4 7/16"	22'-11 3/8"	31'-6 3/8"	40'-1 3/8"	48'-8 1/4"
H=6'-0"	9'-0"	16'-4 7/16"	25'-11 3/8"	35'-6 3/8"	45'-1 3/8"	54'-8 1/4"
H=6'-0"	10'-0"	18'-4 7/16"	28'-11 3/8"	39'-6 3/8"	50'-1 3/8"	60'-8 1/4"



REINFORCING FOR 2 CULVERT APRONS												TABLE OF DIMENSIONS												TOTAL QUANTITIES (FOR 4 WINGS AND 2 APRONS)																				
BARS X-#4 @ 12"±						BARS S2-#4 @ 12"±						CULVERT SIZE	WING						APRON						NUMBER OF SPANS																			
NUMBER OF SPANS		LENGTH		NO. WT.		NO. WT.		NO. WT.		NO. WT.			Z		L		R		W		V		D		Y		2		3		4		5		6									
2	3	4	5	6	2	3	4	5	6	5	H	T	Z	L	R	W	V	D	Y	2	3	4	5	6	CONC	REINF	CONC	REINF	CONC	REINF	CONC	REINF	CONC	REINF	CONC	REINF								
WT.		WT.		WT.		WT.		WT.		MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	MC	WT.	WT.	WT.	WT.	WT.	CY	LBS	CY	LBS	CY	LBS	CY	LBS	CY	LBS	CY	LBS							
31	45	60	75	90	31	45	60	75	90	5	2	6	3'-6"	5'-4"	7"	2'-6"	8"	10"	1'-0"	11'-6"	17'-0"	22'-6"	28'-0"	33'-6"	5.11	592	5.75	637	6.38	678	7.01	725	7.65	766	5.11	592	5.75	637	6.38	678	7.01	725	7.65	766

TABLE OF REINFORCING STEEL FOR 4 WINGWALLS																													
WING SIZE		BARS R		BARS S1		#4 BARS T1 @ 18"		#4 BARS T2 @ 12"		BARS U		#4 BARS W @ 12"		TOTAL WEIGHT															
H	L	NO.	SIZE	SP.	LGTH	WT.	NO.	SIZE	SP.	LGTH	WT.	NO.	LGTH	WT.	NO.	LGTH	WT.	NO.	LGTH	WT.	NO.	LGTH	WT.	NO.	LGTH	WT.			
2'-0"	5'-4"	24	#4	12"	5'-11"	81	24	#4	12"	3'-11"	63	16	5'-1"	54	8	5'-0"	27	16	#5	18"	6'-0"	100	20	3'-9"	50	28	6'-7"	123	438

GENERAL NOTES: All concrete shall be Class C. Chaper all exposed corners 3/4" unless specified otherwise. All dimensions relating to reinforcing steel are to center of bars. Provide Weep holes for H=5'-0" and greater. The bottom slab of the barrel, wing footings and walls shall be placed in one continuous operation.

BRIDGE DIVISION
TEXAS HIGHWAY DEPARTMENT
PARALLEL WINGS-NORMAL
FOR MULTIPLE BOX CULVERTS
5' x 2' TO 10' x 10'

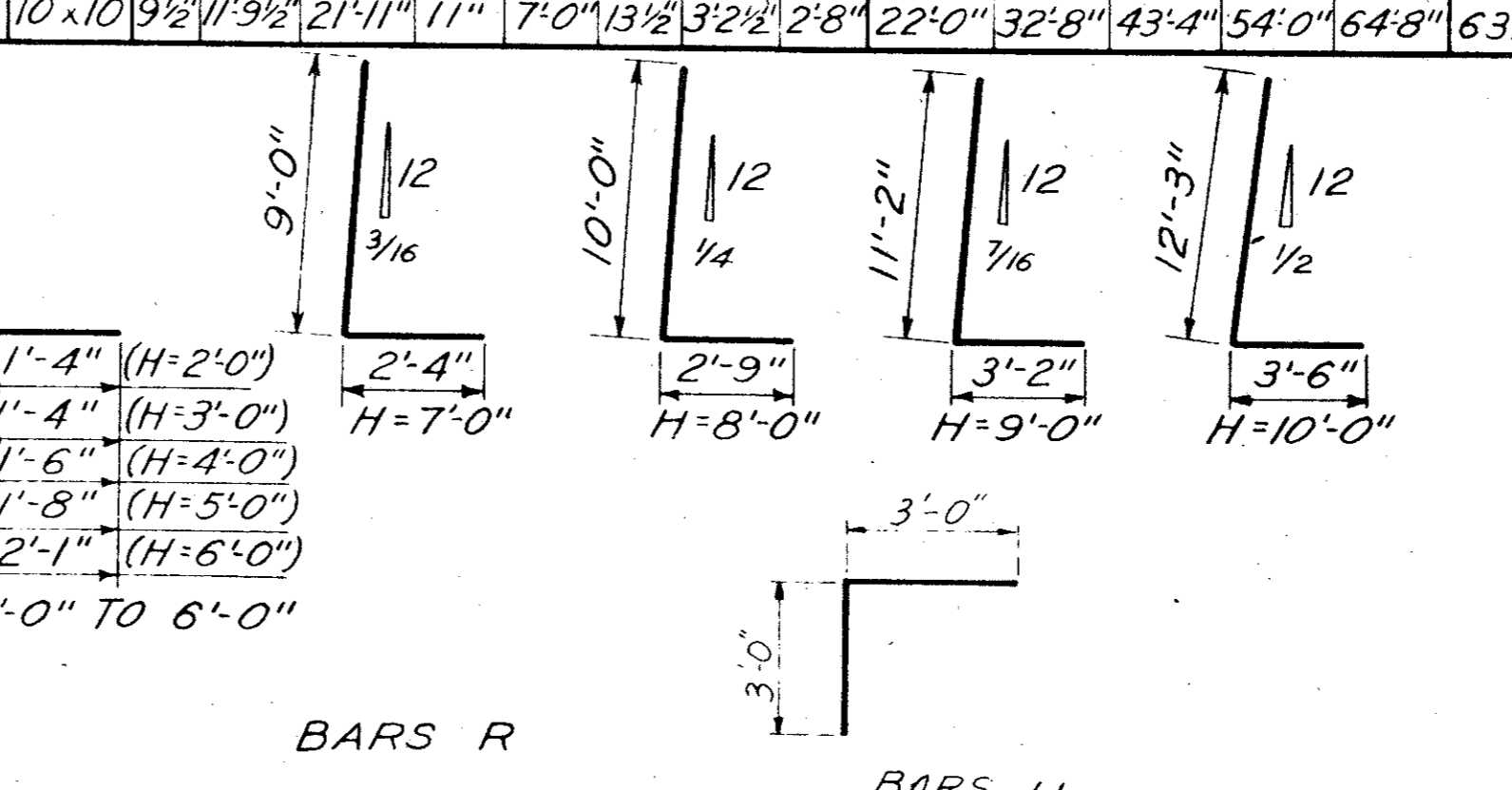
MCW-P

ON: CFS/EWH
DW: WH
DW: MDA
CR: DW: KAM
TR: A-CB
CH: TR: MDA

DRAWING: Original
DATE: Nov. 1949
REV: Jan. 59
REV: 1964
REV: Nov 1967

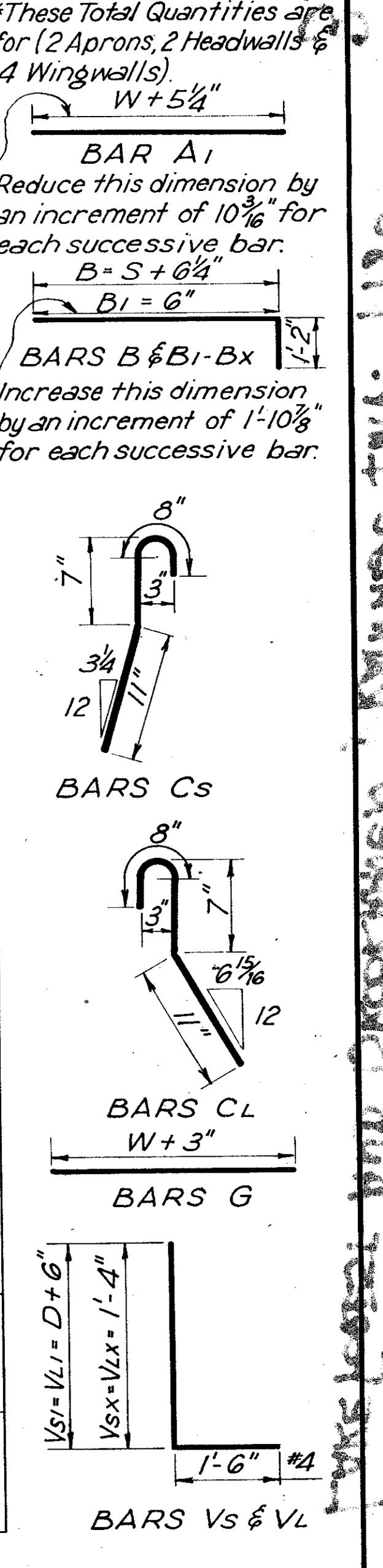
FED. ROAD DIST. NO. 6
STATE: TEXAS
COUNTY: []
CONTROL SECTION NO. []
JOB NO. []
HIGHWAY NO. []

SHEET NO. []



BILL OF REINFORCING STEEL FOR TWO COMPLETE HEADWALLS

NO. OF PIPES	PIPE DIAM	TABLE OF DIMENSIONS										BARS																* TOTAL QUANTITIES		*These Total Quantities are for (2 Aprons, 2 Headwalls & 4 Wingwalls) W+5'4"																										
		D	G	K	X	H	Y	W	S	L	BARS A ₁ -A _x #1 @ 12"±		BARS B #3 @ 18"±		BARS B ₁ -B _x #3 @ 18"±		C _s =2'0" C _L =2'0" BARS D _{s1} -D _{sx} #4 @ 12"± #4 @ 12"±		BARS D _{L1} -D _{Lx} #3 @ 12"±		BARS E 8-#5		BARS F		BARS G 4-#3		BARS S _s 6-#4		BARS S _L 6-#4		BARS V _{s1} -V _{sx} #4 @ 12"±		BARS V _{L1} -V _{Lx} #4 @ 12"±		BARS W _s 2-#5		BARS W _L 2-#5		LBS.	C.Y.																
											No.	Av. Lgth.	Wt.	No.	Lgth.	Wt.	No.	Av. Lgth.	Wt.	No.	Wt.	No.	Wt.	No.	Av. Lgth.	Wt.	No.	Wt.	No.		Av. Lgth.	Wt.	No.	Wt.	No.	Av. Lgth.	Wt.	No.			Av. Lgth.	Wt.	No.	Av. Lgth.	Wt.	No.	Av. Lgth.	Wt.								
1	12"	~	12"	2'-5 1/2"	2'-0"	1'-0"	2'-2 1/2"	10 7/8"	10 3/8"	2	2'-8"	4	4	2'-7"	4	~	~	~	2	3	2	3	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	69	.54	<p>BAR A₁ Reduce this dimension by an increment of 10% for each successive bar. B = S + 6" B₁ = 6"</p>												
2	15"	~	12"	2'-10 3/8"	2'-3"	1'-6"	3'-0 3/8"	1'-5"	1'-5 3/8"	4	3'-1"	8	4	3'-1"	5	2	1'-8"	1	4	5	4	5	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	100		.77											
3	18"	~	12"	3'-2"	2'-6"	2'-0"	3'-9 1/2"	1'-11 1/4"	2'-0 1/4"	4	3'-9"	10	4	3'-7"	5	2	1'-8"	1	4	5	4	5	2	11"	1	2	1'-0"	1	2	1'-0"	1	3'-6"	29	8	4	3'-2"	17	5'-5"	8	2'-9"	11	3'-0"	12		8	3'-5"	18	8	3'-5"	18	3'-10"	8	4'-2"	9	173	1.59
4	24"	~	12"	3'-9 1/2"	3'-0"	3'-0"	4'-4 1/2"	2'-11 1/8"	3'-2 3/8"	6	4'-10"	19	6	4'-8"	11	2	1'-8"	1	4	5	4	5	2	1'-0"	1	2	1'-0"	1	3'-6"	29	8	4	3'-2"	17	5'-5"	8	2'-9"	11	3'-0"	12	8	3'-5"	18		8	3'-5"	18	3'-10"	8	4'-2"	9	237	2.48			

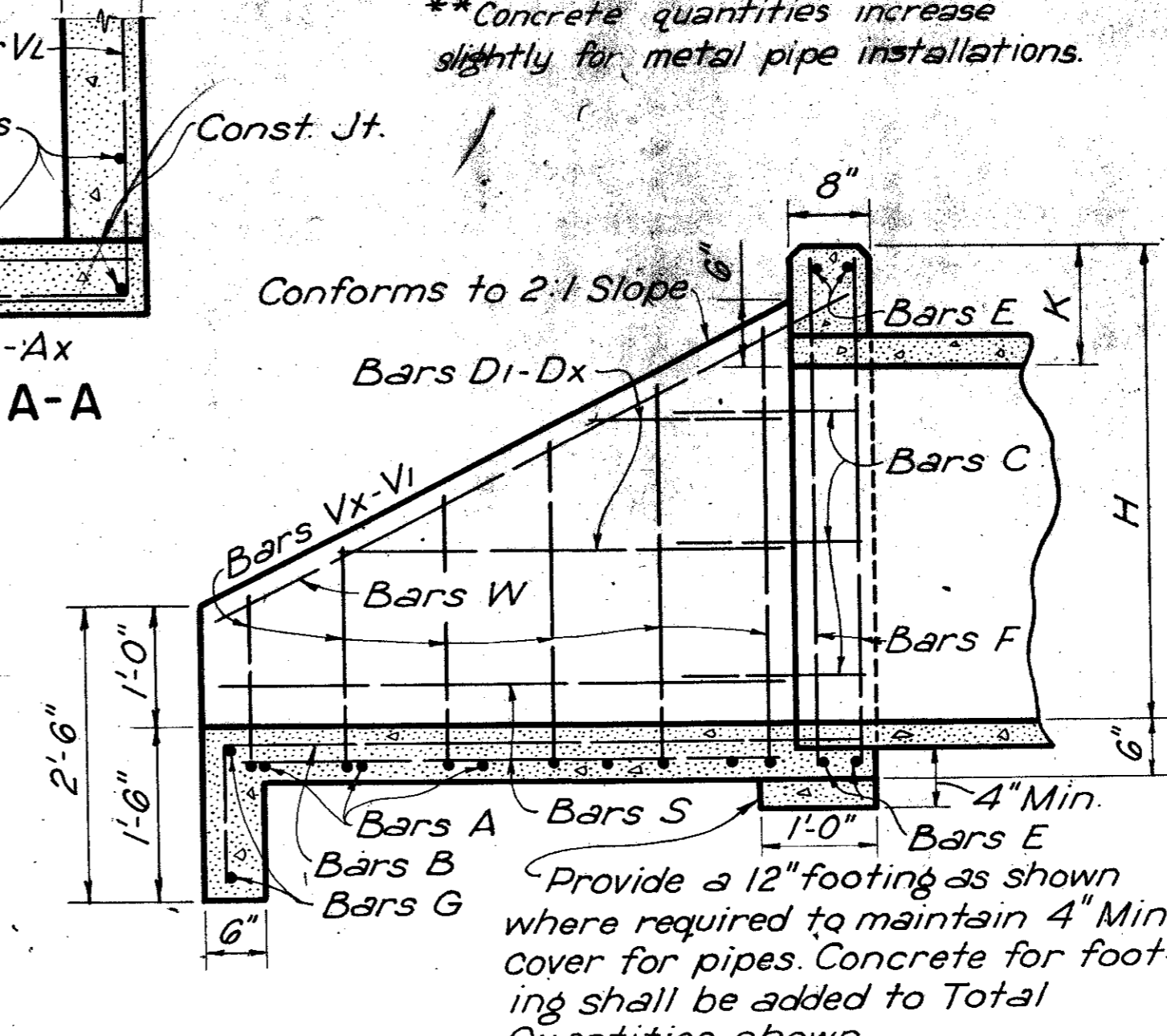
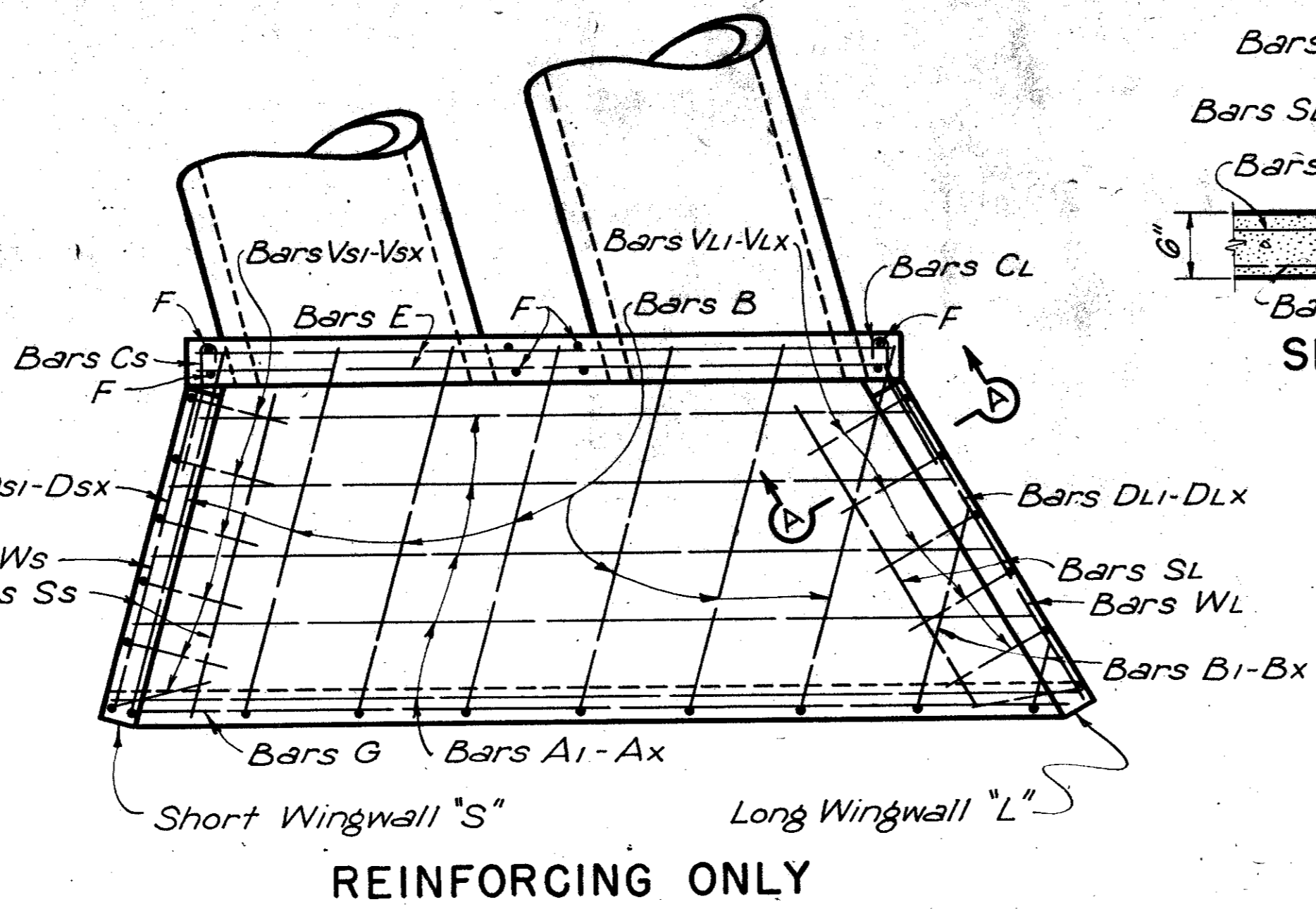
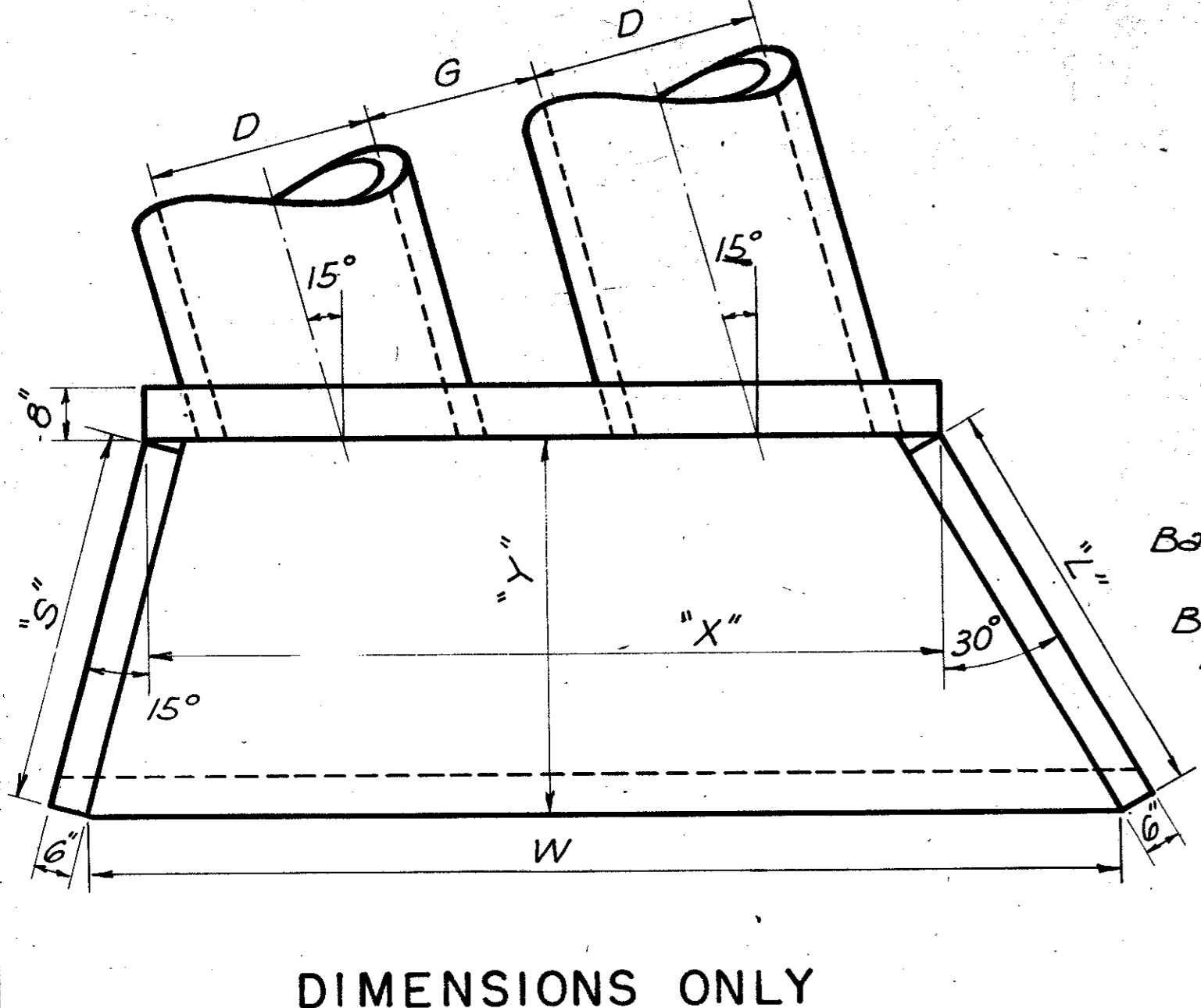


PLAN
PROFILE
NOTE BOOK
NO. OF WKS CHECKED
NO.

*These Total Quantities are for (2 Aprons, 2 Headwalls & 4 Wingwalls) W+5'4"

Reduce this dimension by an increment of 10% for each successive bar.
B = S + 6"
B₁ = 6"

Increase this dimension by an increment of 1'10" for each successive bar.



**Concrete quantities increase slightly for metal pipe installations.

GENERAL NOTES :-
All Concrete shall be Class A.
Dimensions relating to reinforcing steel are to centers of bars.
Steel cover to be 2" from center of outside layer of steel to face of concrete.

Subscripts "s" & "l" for bar markings designate short wingwall (s) and long wingwall (L).
Chamfer all exposed corners 3/4".

TEXAS HIGHWAY DEPARTMENT
CONCRETE HEADWALLS
FOR
PIPE CULVERTS
12 TO 72 INCHES IN DIAMETER
CH-11-B-15°

DN T.H.D.	DRAWING	DATE	FFD ROAD	STATE	FEDERAL AID PROJECT NO.
CKDN T.H.D.	Original	Feb. 1950	6	TEXAS	
DW MDA	Rev. Spec. Bars 3-7-31-51				
CKDW K.M.	Rev. Jan. 59				
TR OCK	Rev. Nov. 24 Quant note				
CKTR MDA					