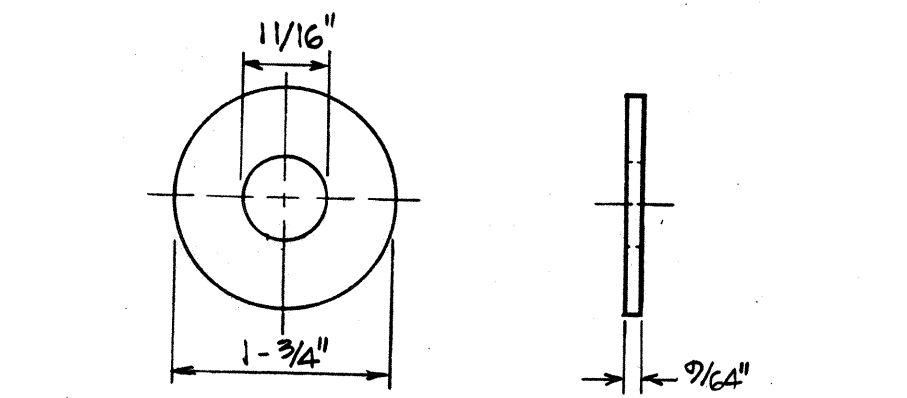
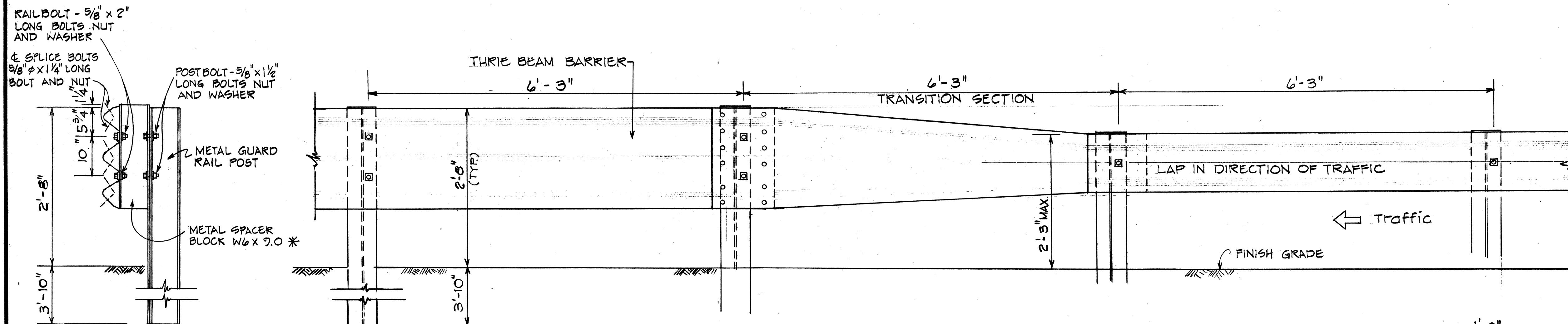
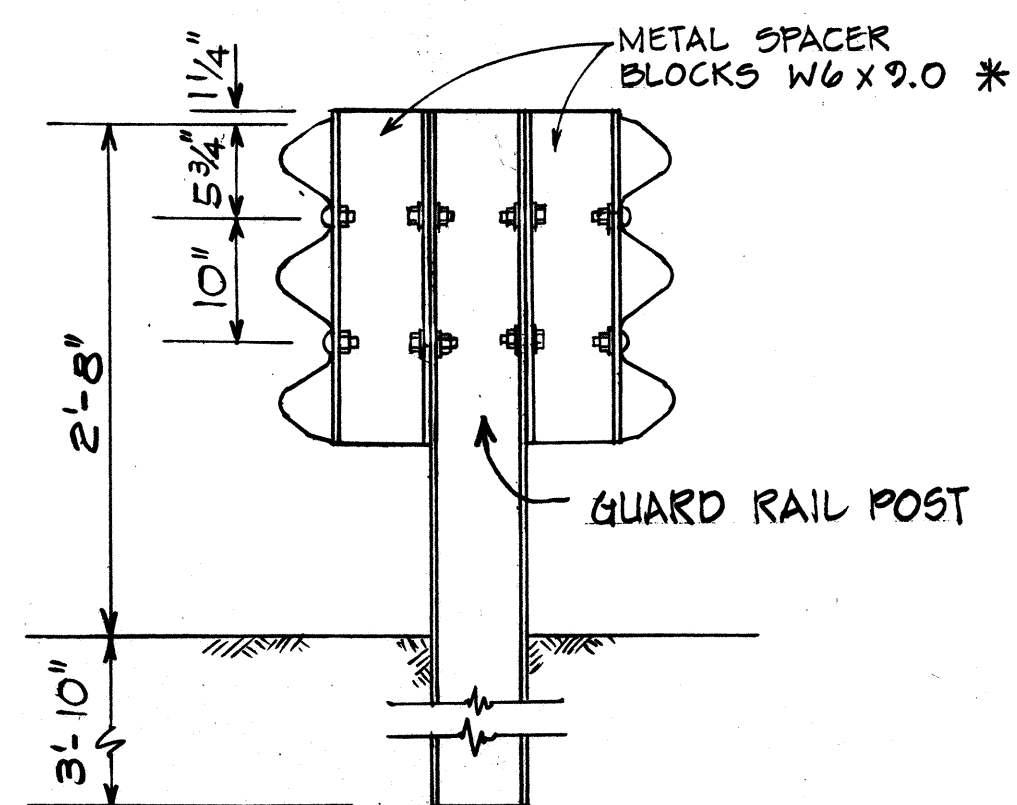


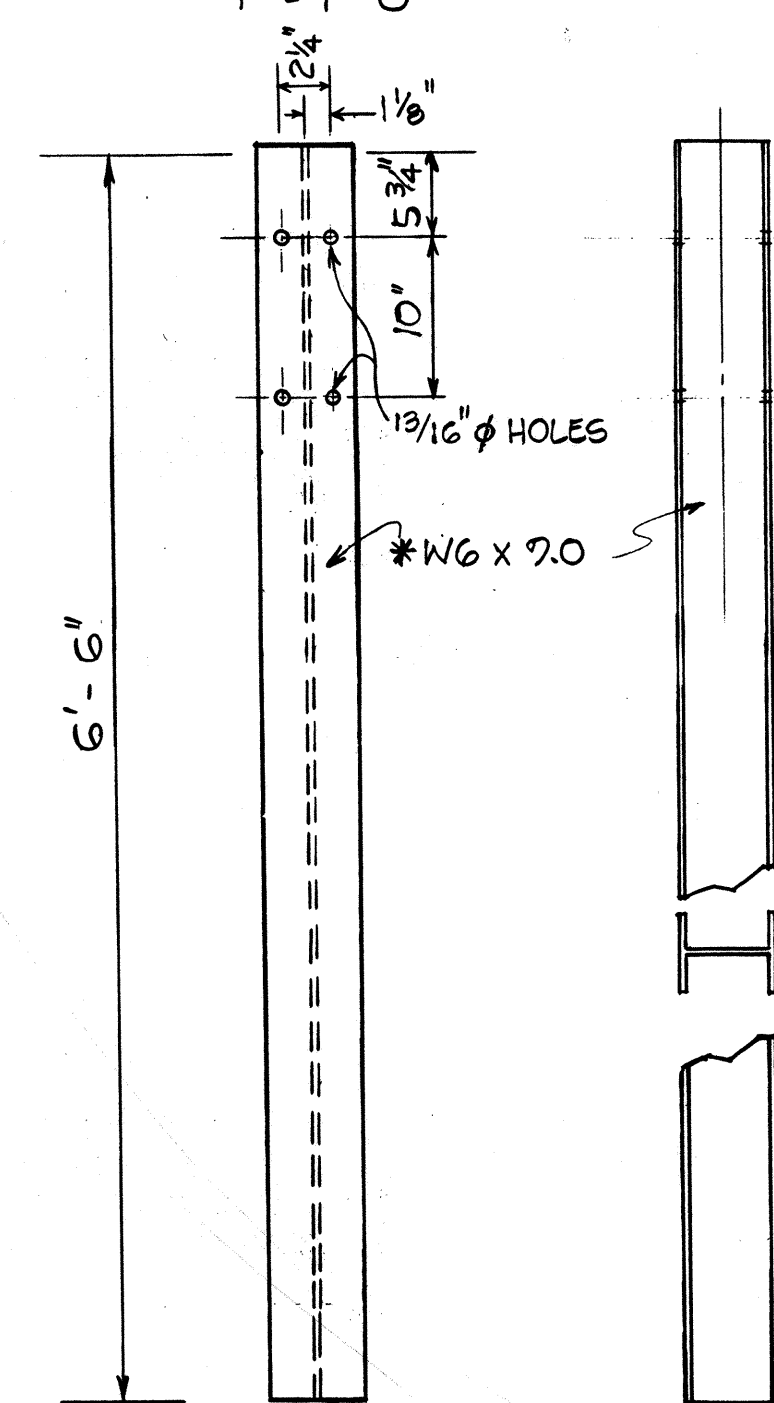
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	440A-0181M 440A-0281	1981	7	13



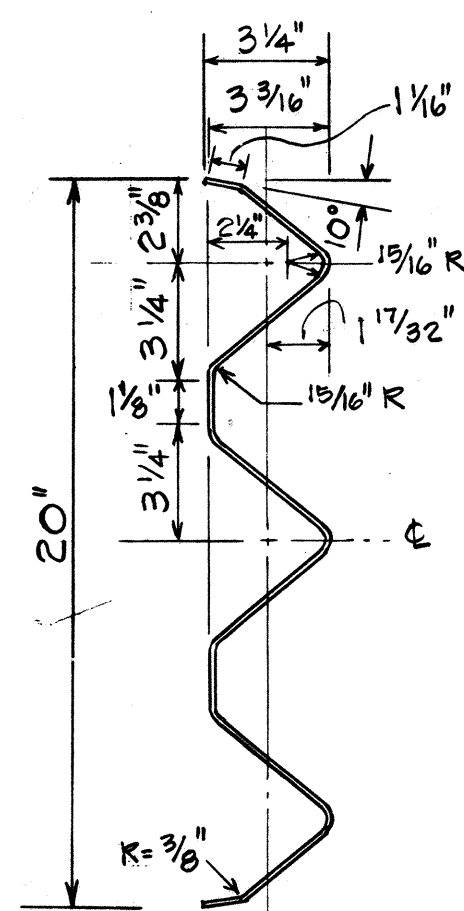
STEEL WASHER FOR 5/8" BOLT



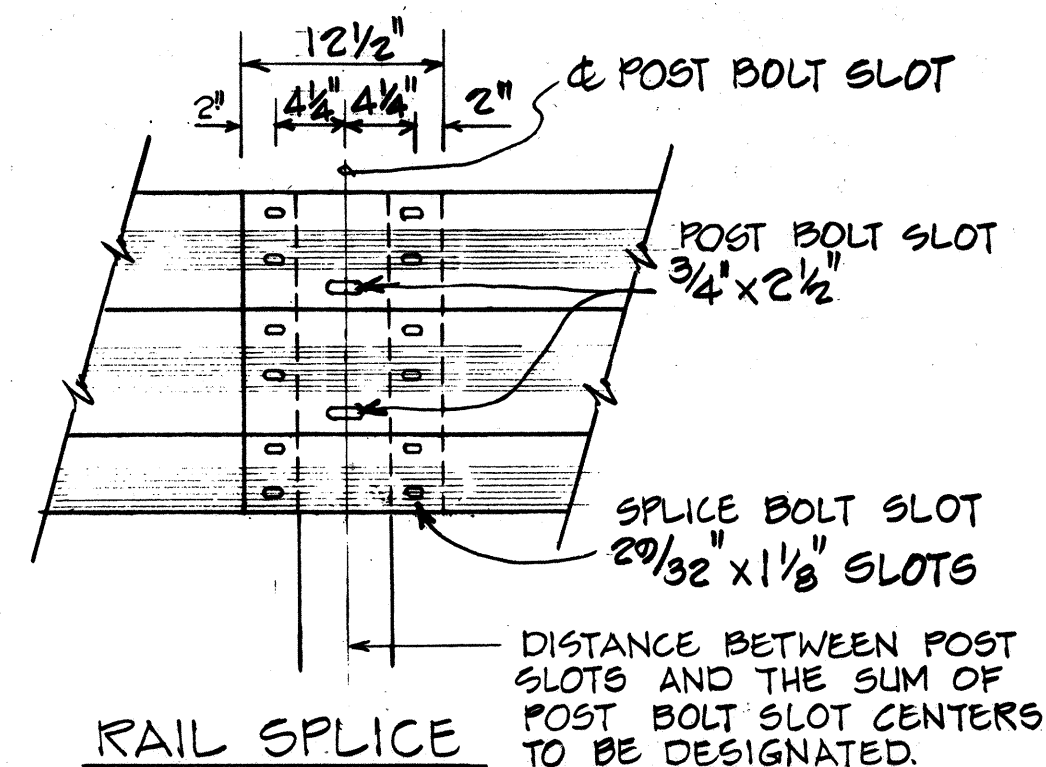
DOUBLE METAL GUARD
RAIL ON METAL POST WITH
METAL SPACER BLOCK



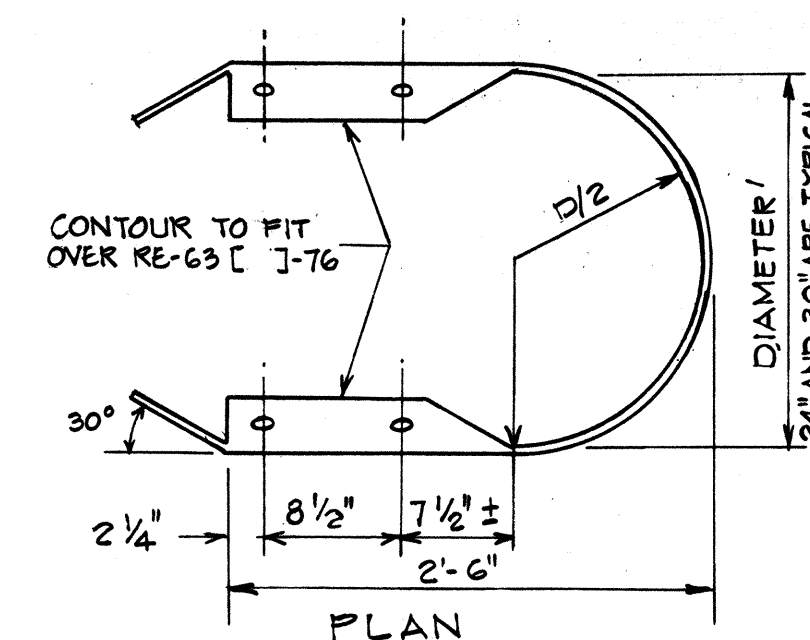
POST DETAILS
1" = 1" = 0"



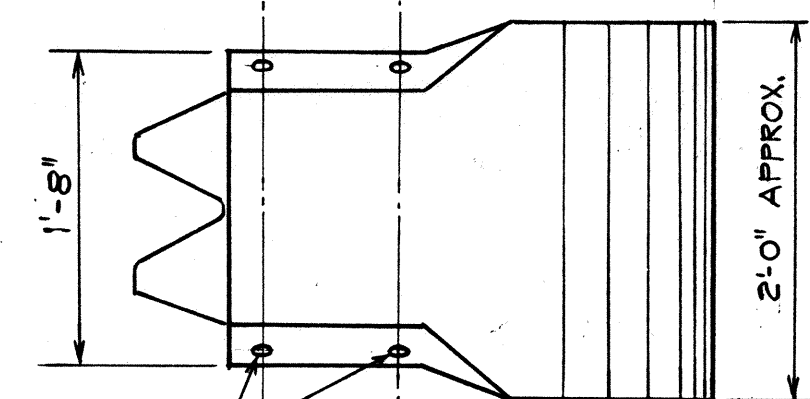
SECTION THRU
RAIL ELEMENT
Scale: $1\frac{1}{2}" = 1'-0"$



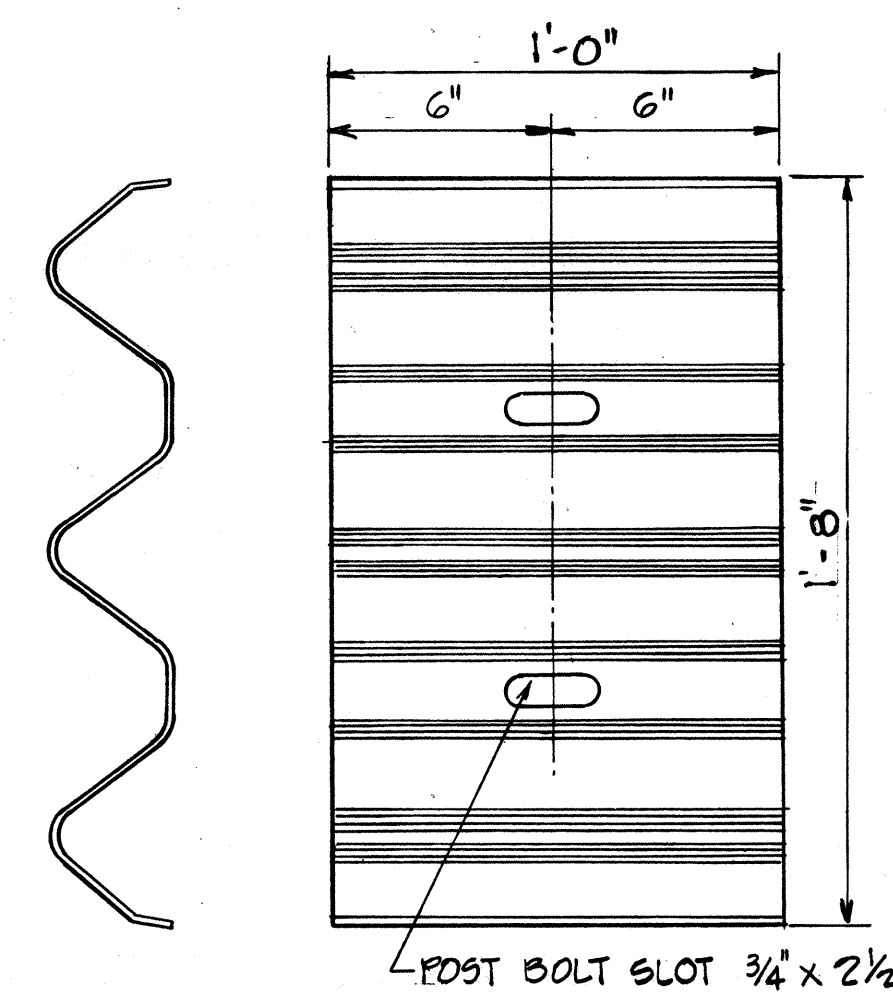
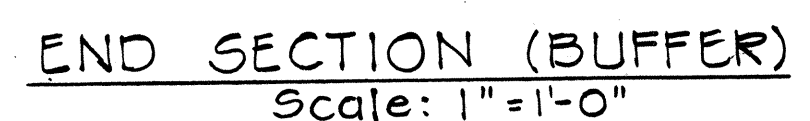
RAIL SPLICE
1" = 1" - 0"



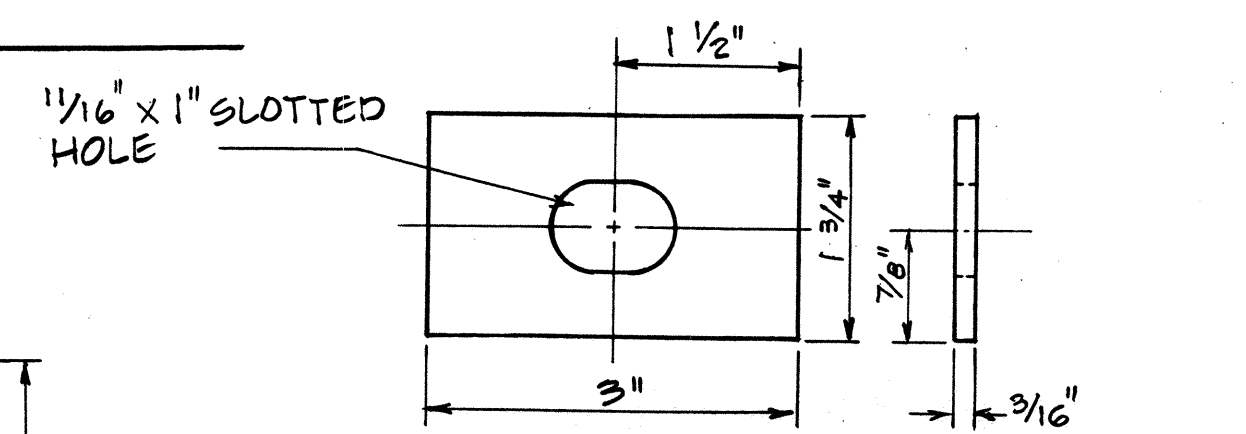
PLAN



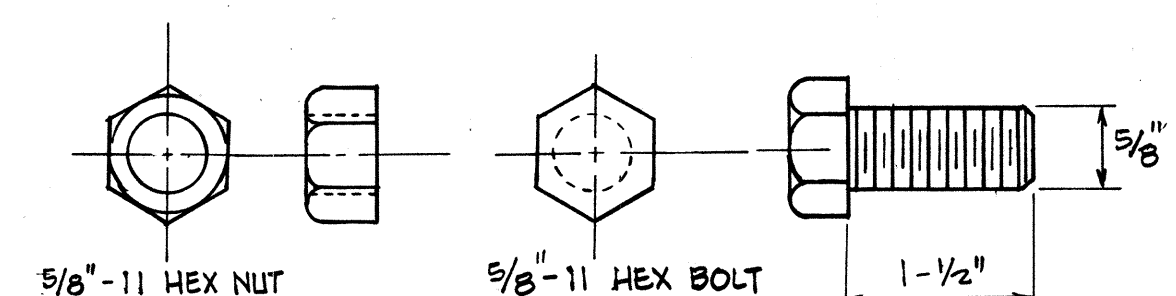
Year	Percentage of U.S. Population Aged 65 and Older
1980	10%
1985	11%
1990	12%
1995	13%
2000	14%
2005	15%
2010	16%
2015	17%
2020	18%



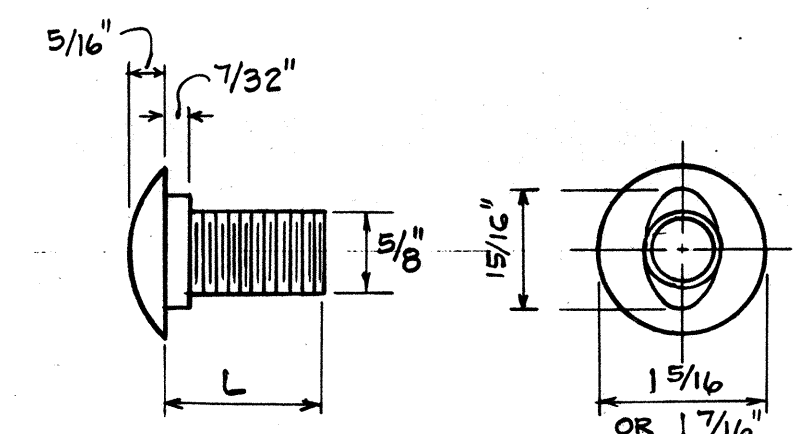
BACK UP PLATE



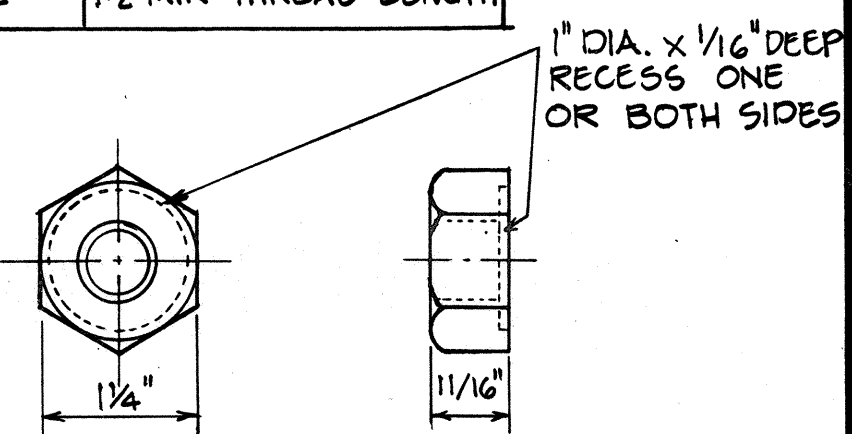
RECTANGULAR PLATE WASHER



5/8" HEX BOLT AND NUT

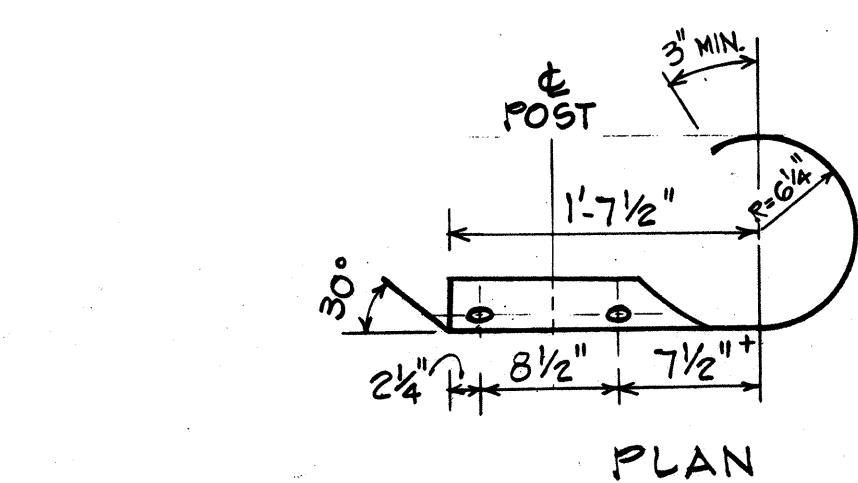


L	THREAD LENGTH
1 1/4"	FULL THREAD
2"	1 1/2" MIN THREAD LENGTH

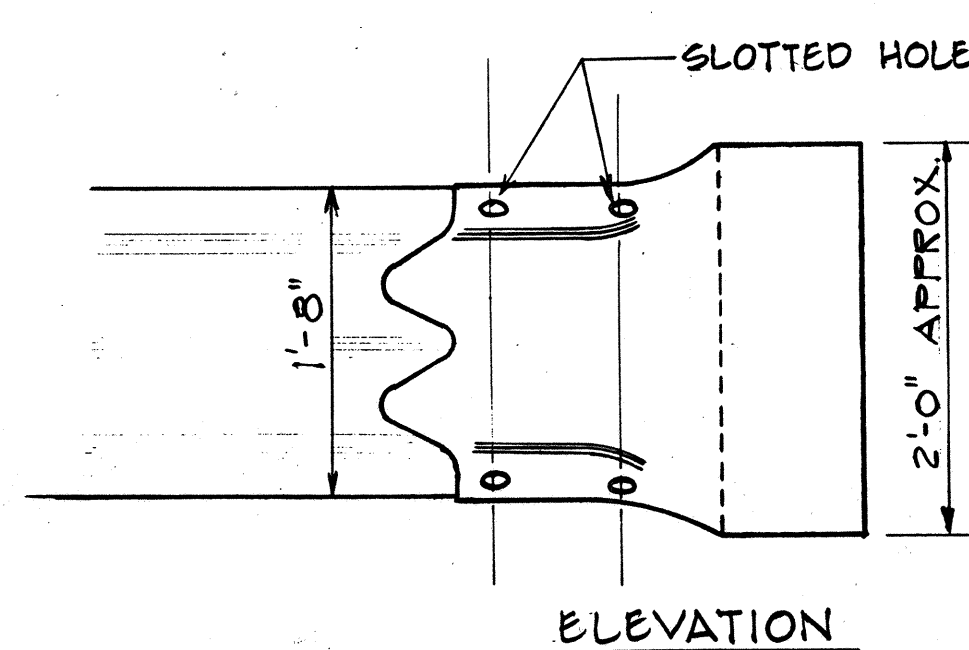


5/8" BUTTON HEAD BOLTS
AND RECESS NUT

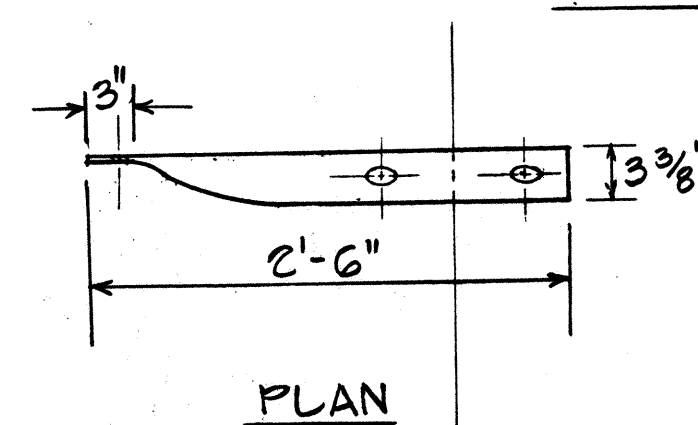
* REPLACED WGx8.5, WHICH IS ACCEPTABLE AS AN ALTERNATE.



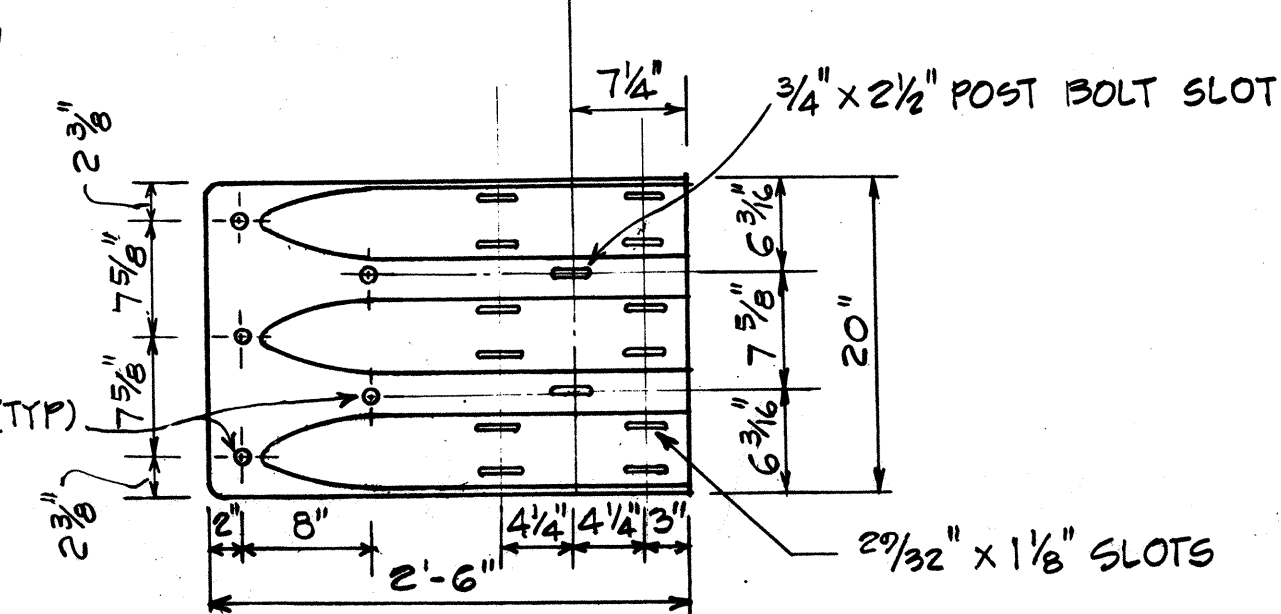
PLAN



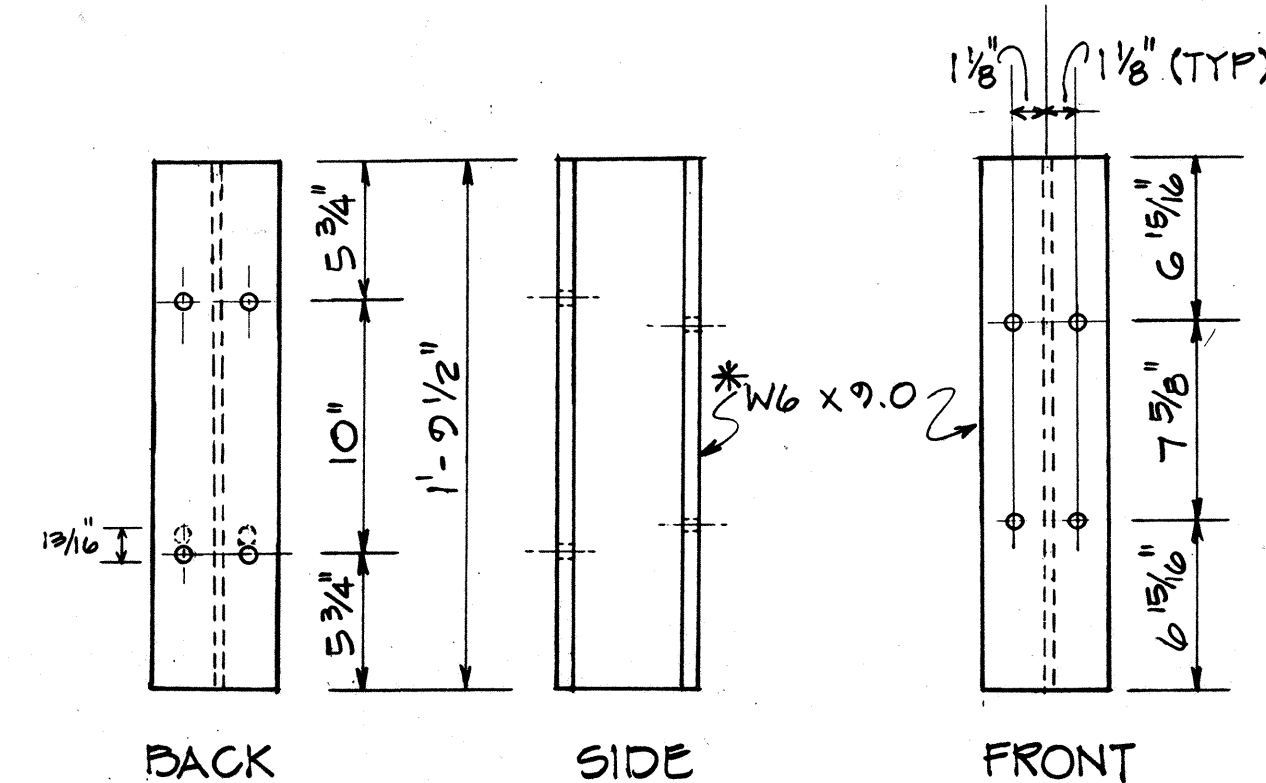
ELEVATION



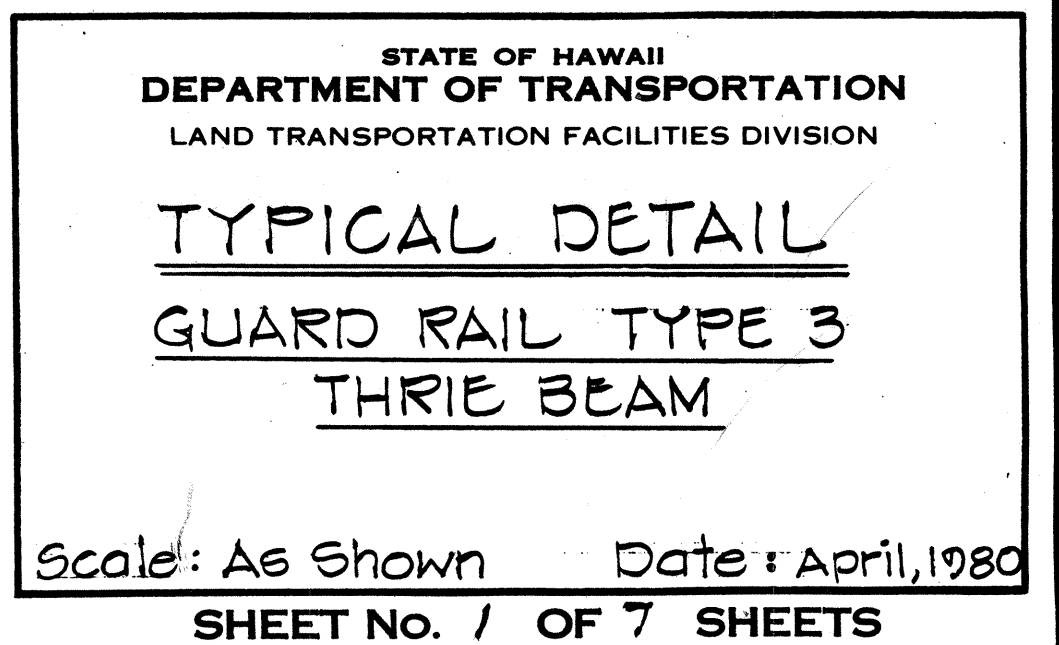
PLAN



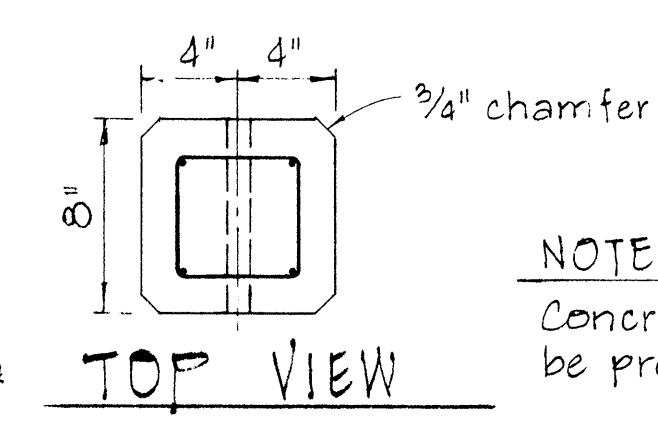
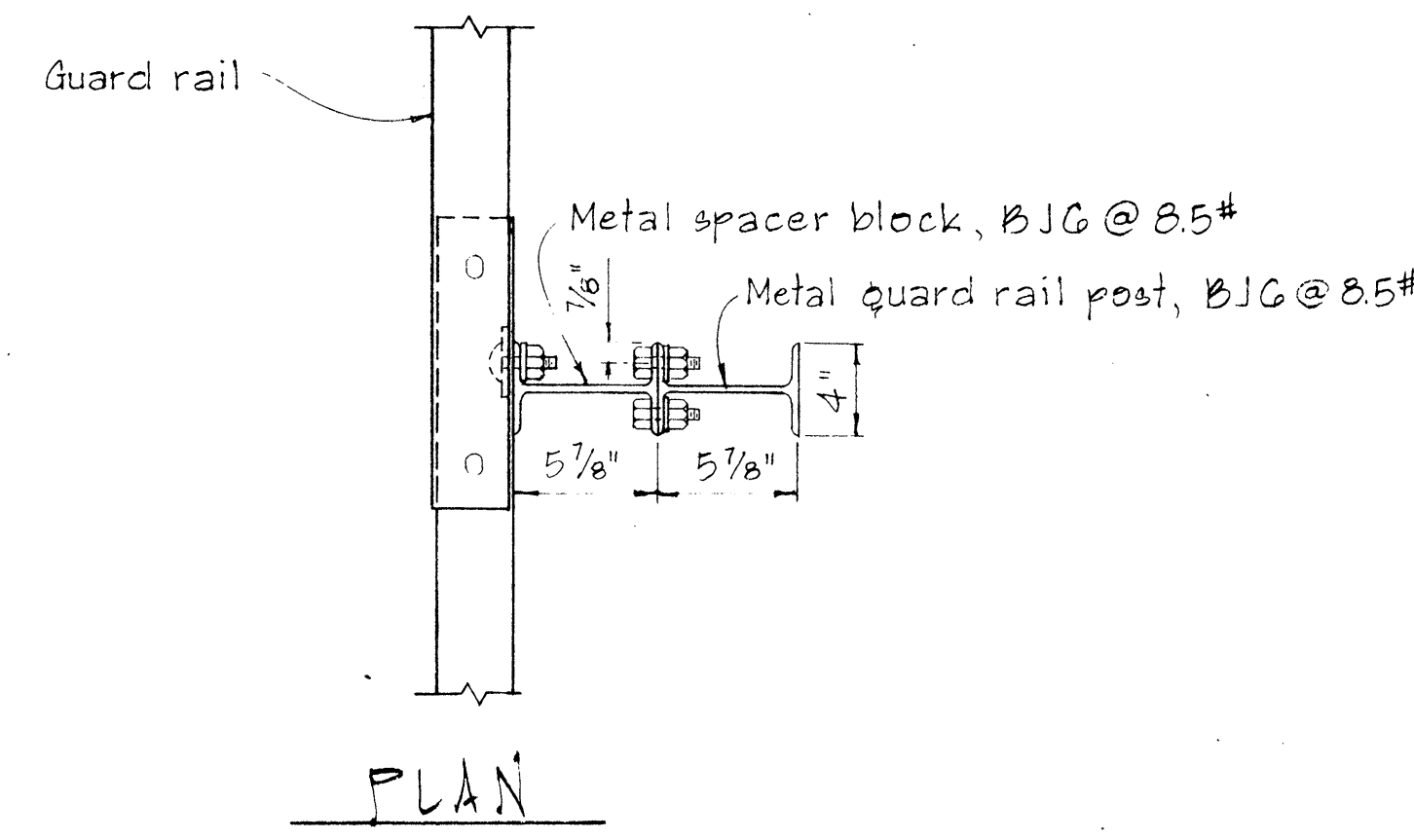
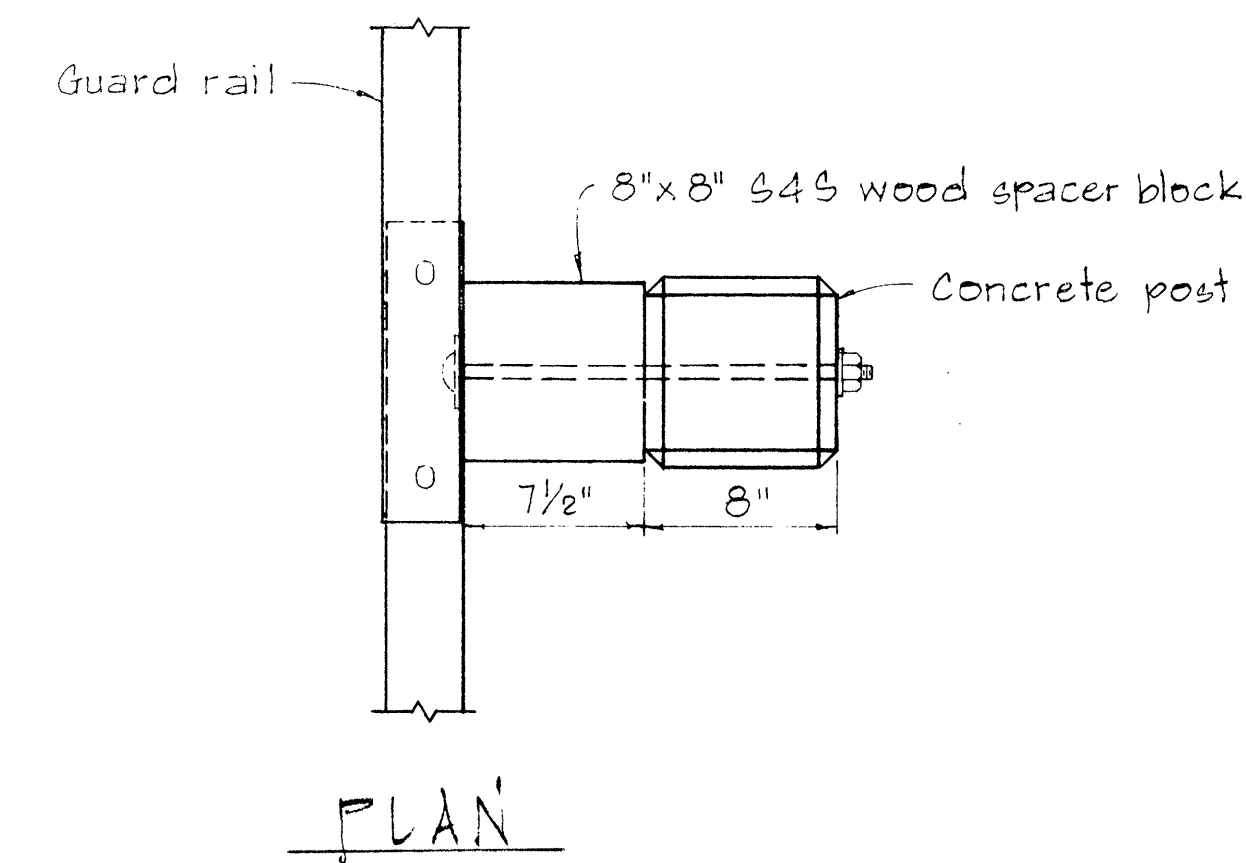
ELEVATION



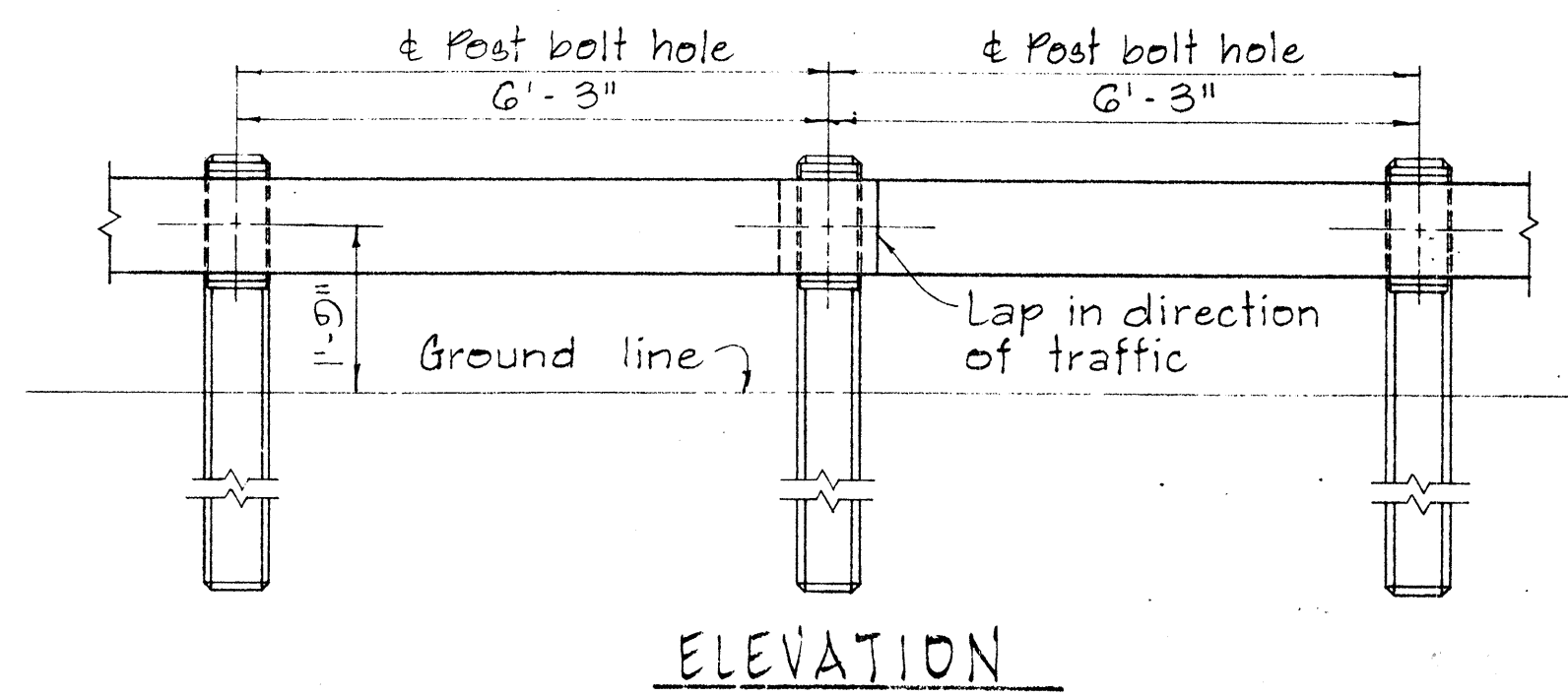
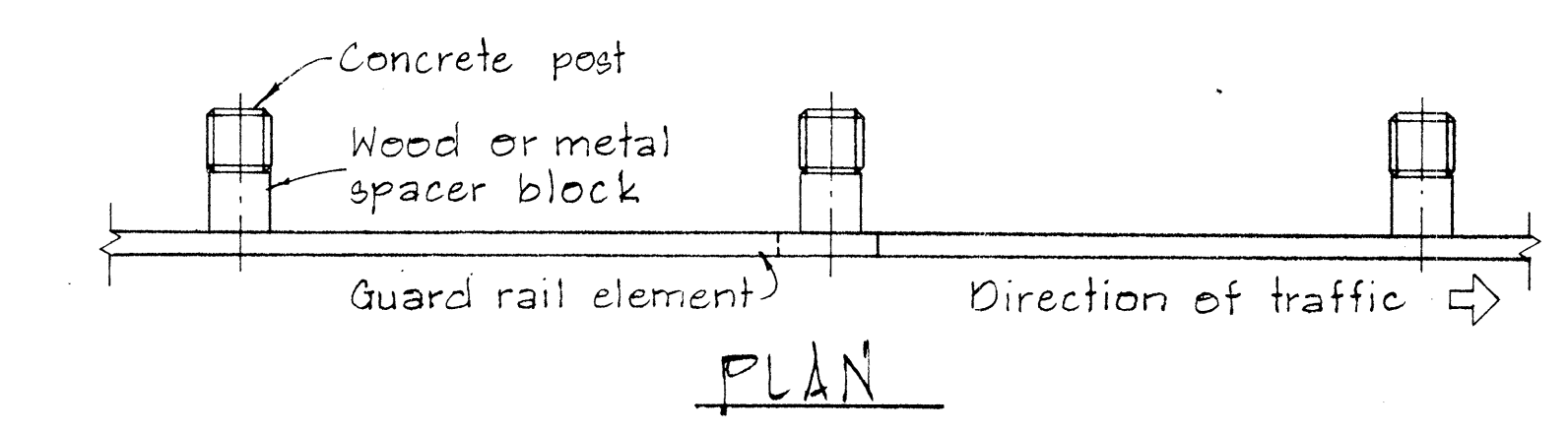
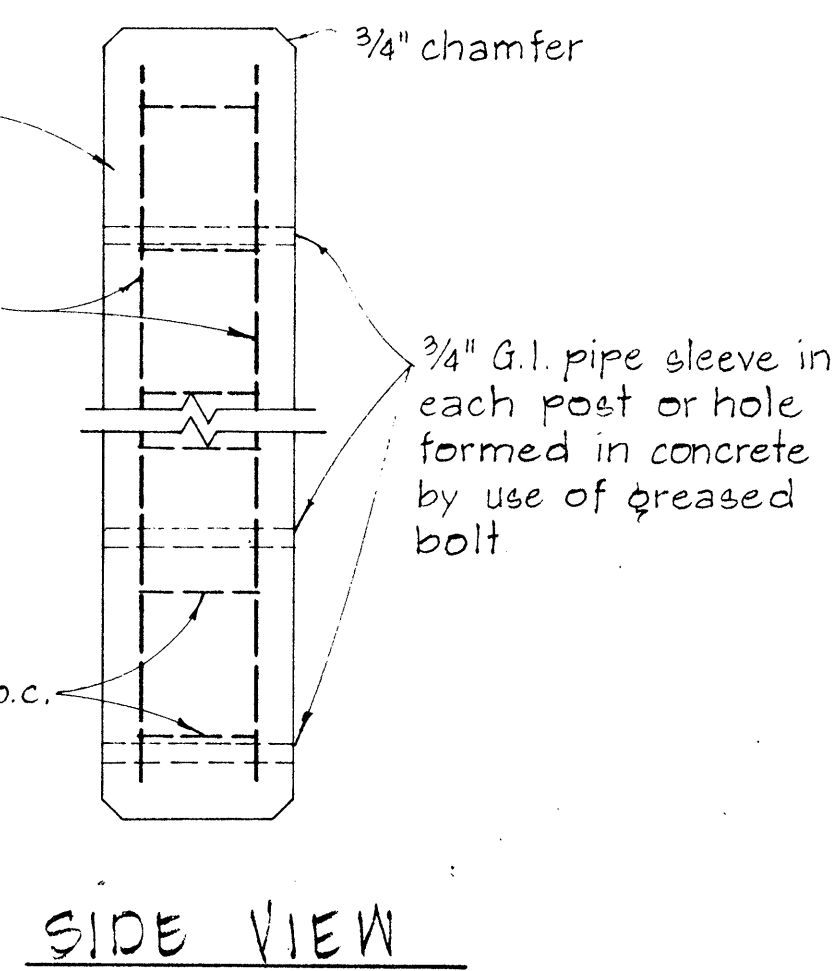
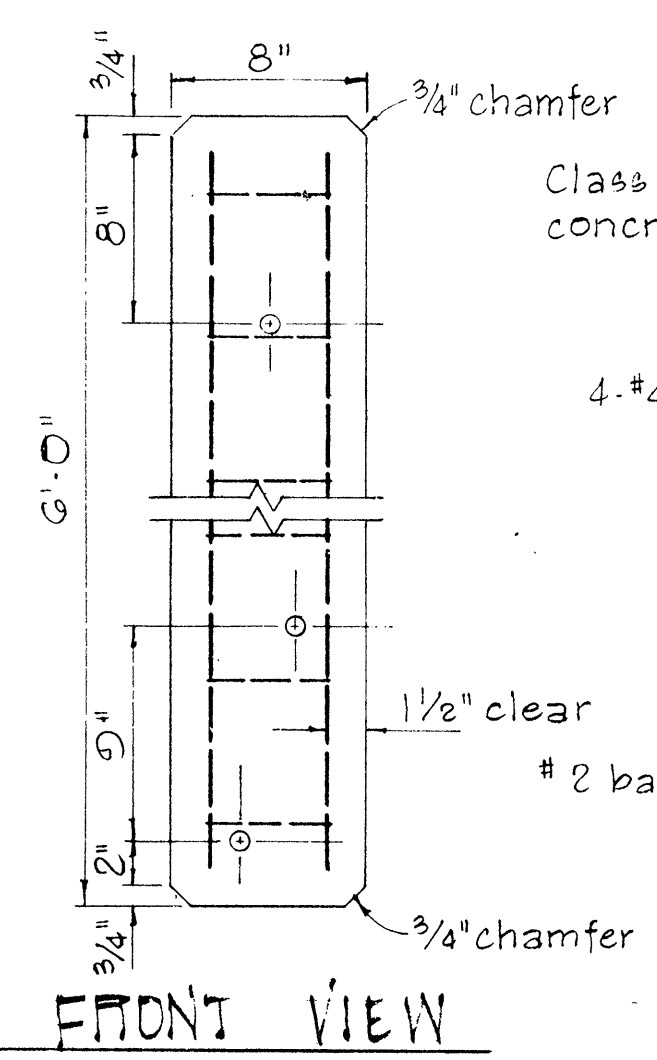
SPACER BLOCK



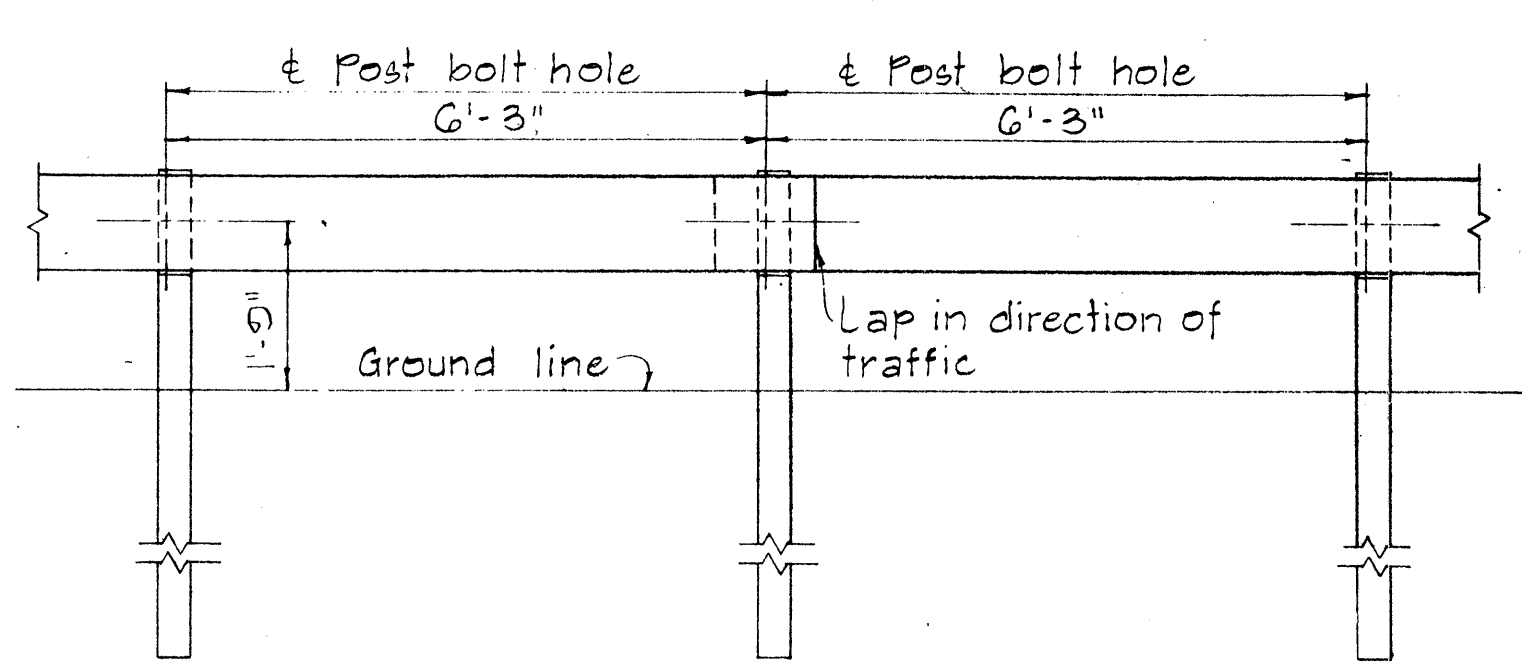
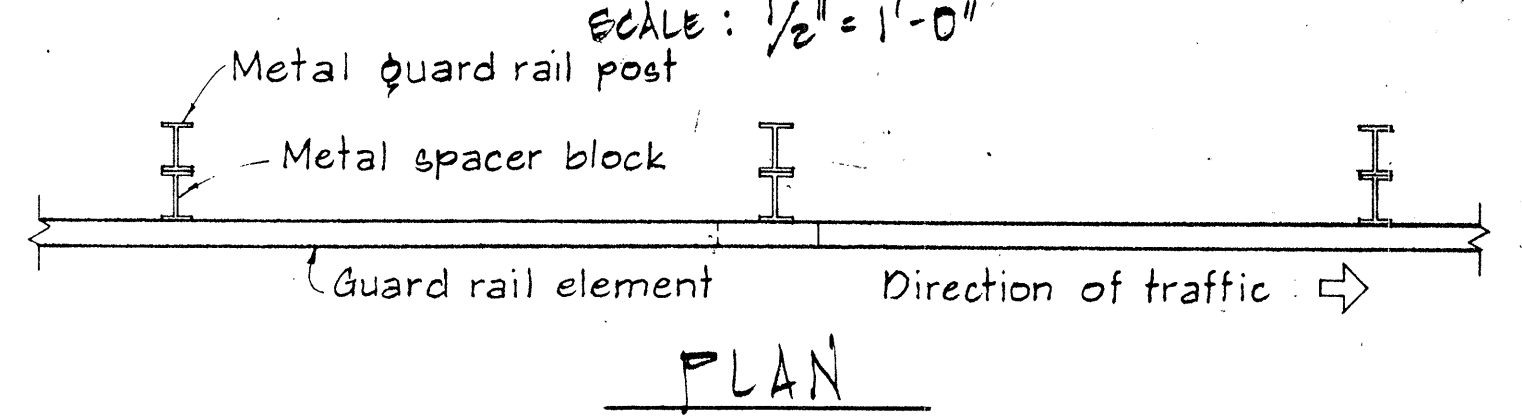
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	440A0181M 440A0281	1981	8	13



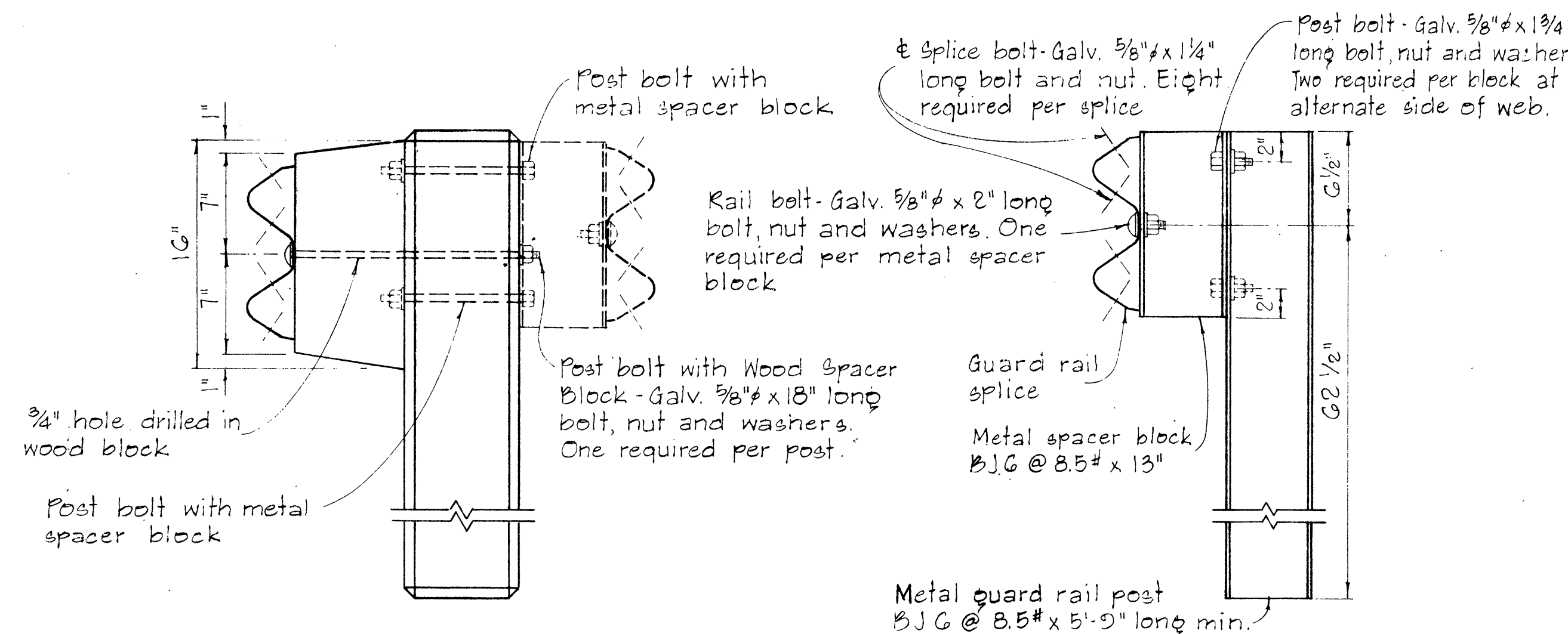
NOTE:
Concrete post shall be precast



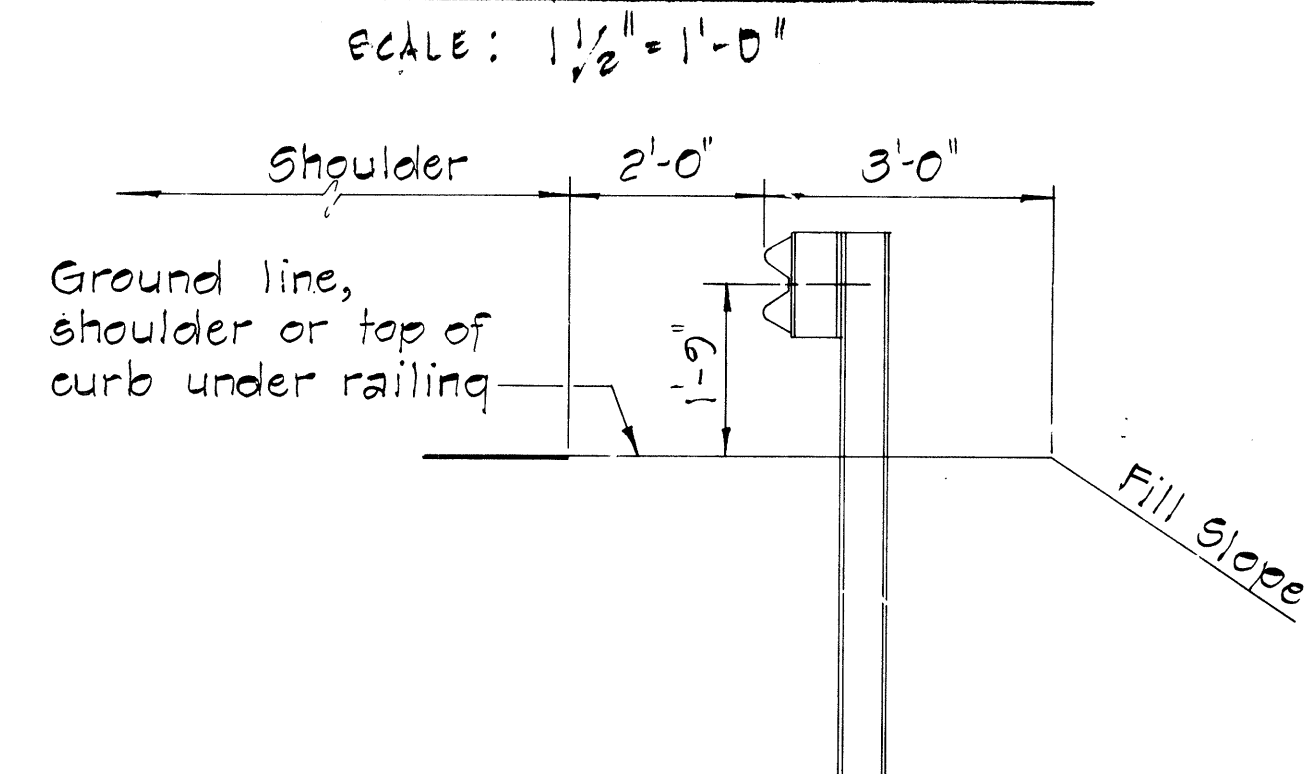
METAL GUARD RAIL ON CONCRETE POST WITH WOOD OR METAL SPACER BLOCK



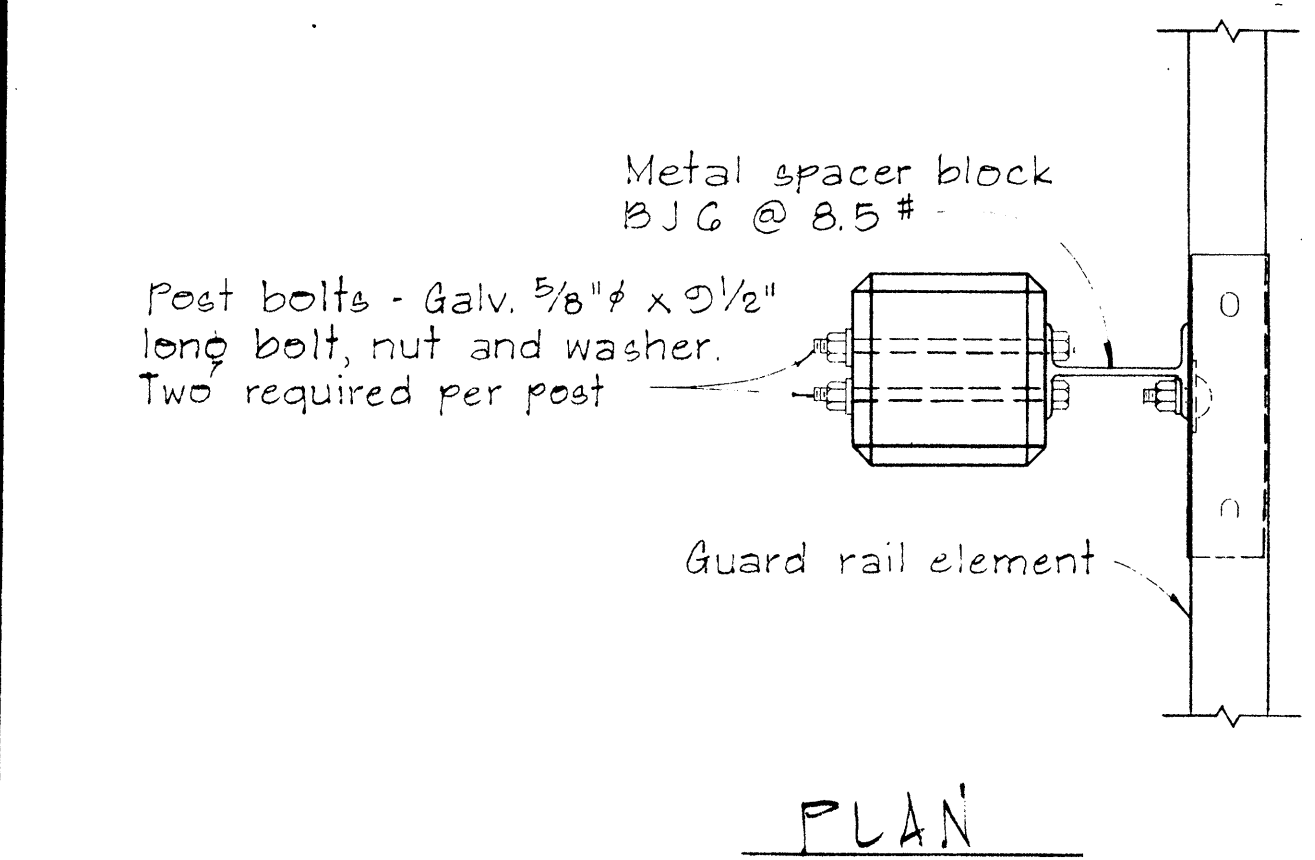
METAL GUARD RAIL ON METAL POST WITH METAL SPACER BLOCK



SINGLE METAL GUARD RAIL ON METAL POST WITH METAL SPACER BLOCK



TYPICAL METAL GUARD RAIL DETAIL



SINGLE METAL GUARD RAIL ON PRECAST CONCRETE POST WITH WOOD OR METAL SPACER BLOCK

APPROVAL RECOMMENDED:
TRAFFIC ENGINEER
12/29/62
DATE

APPROVED:
ASSISTANT CHIEF, ENGINEERING
12-30-69
DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

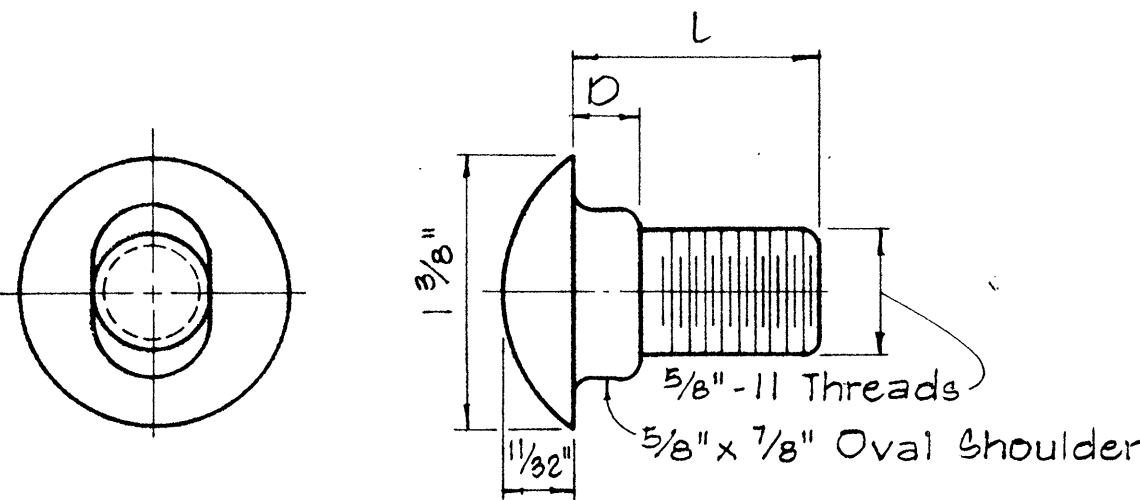
STANDARD DETAILS
METAL GUARD RAIL

SCALE: AS SHOWN
NOV. 1968

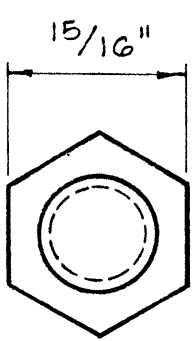
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	440A-0181M 440A-0281	1981	9	13

BOLT DIMENSIONS		
TYPE A BOLT		
	D	L
Splice Bolt	5/16"	1 1/4"
Post Bolt for Conc. Post w/ Double Wood Blocks	3/32"	24"
Post Bolt for Conc. Post w/ Single Wood Block	3/32"	18"
Rail Bolt for Metal Block	3/32"	2"

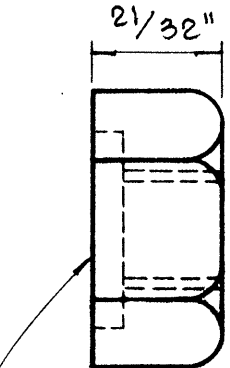
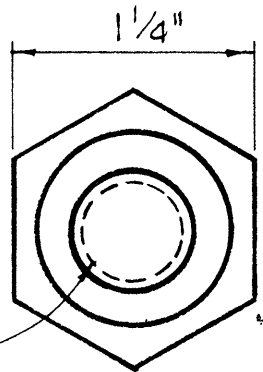
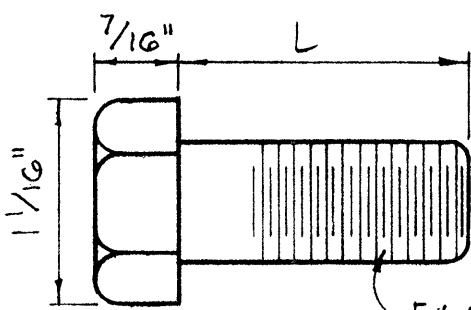
BOLT DIMENSIONS		
TYPE B BOLT		
	D	L
Post Bolt for Conc. Post w/ Metal Blocks	5/16"	5 1/2"
Post Bolt for Metal Post w/ Metal Block	5/16"	1 3/4"



TYPE A BOLT



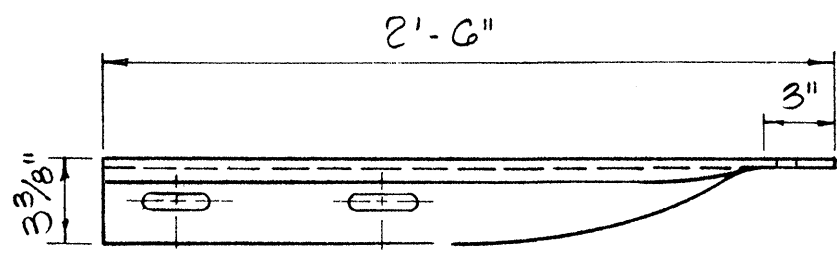
TYPE B BOLT



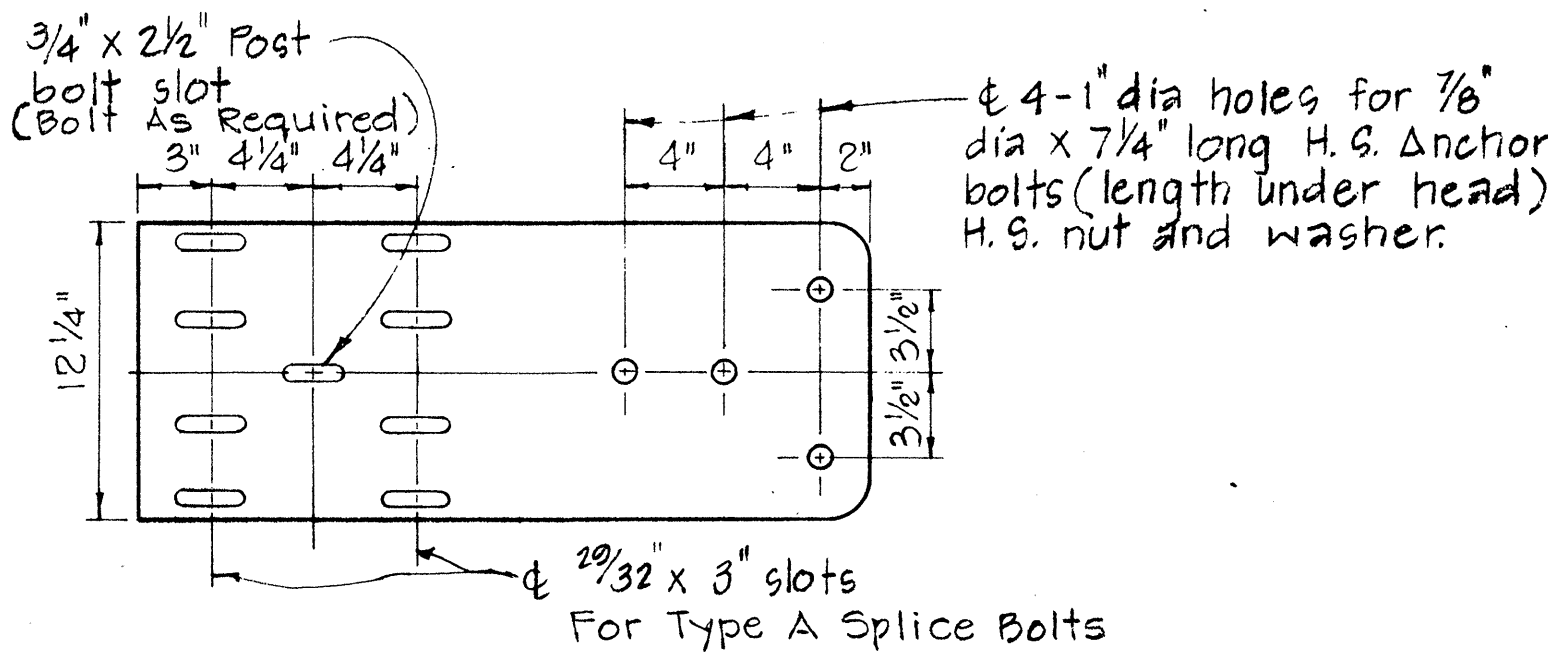
5/32" Deep x 1 5/16" Dia. C Bore for Type A Bolt only. Plain nut for Type B Bolt.

HEXAGON NUT

Scale: Full Size



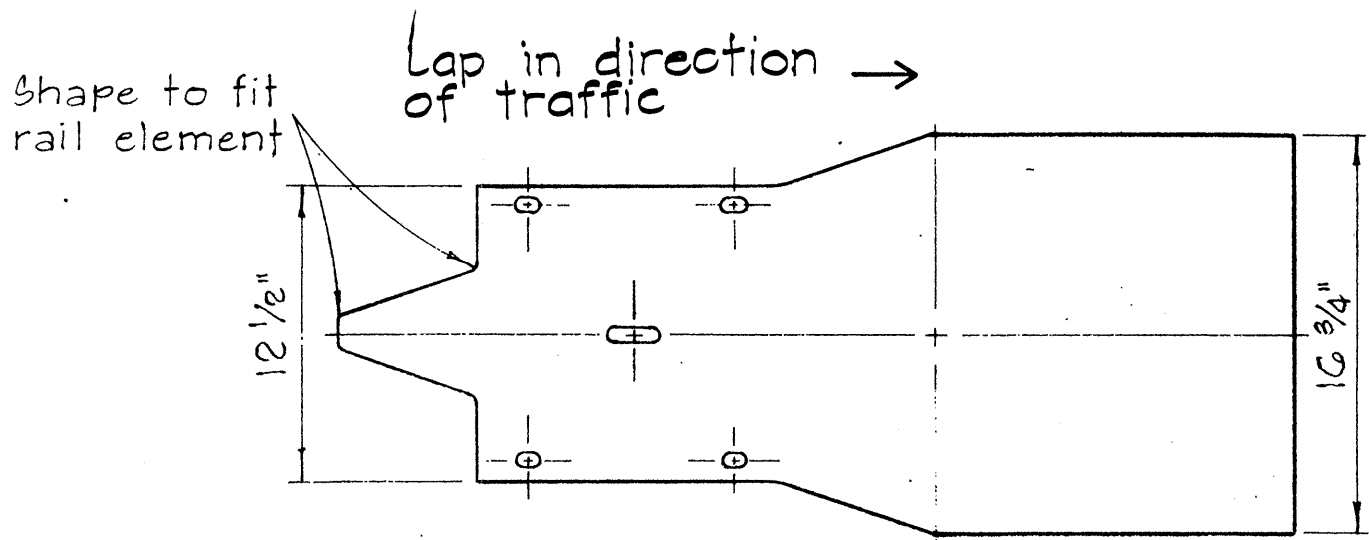
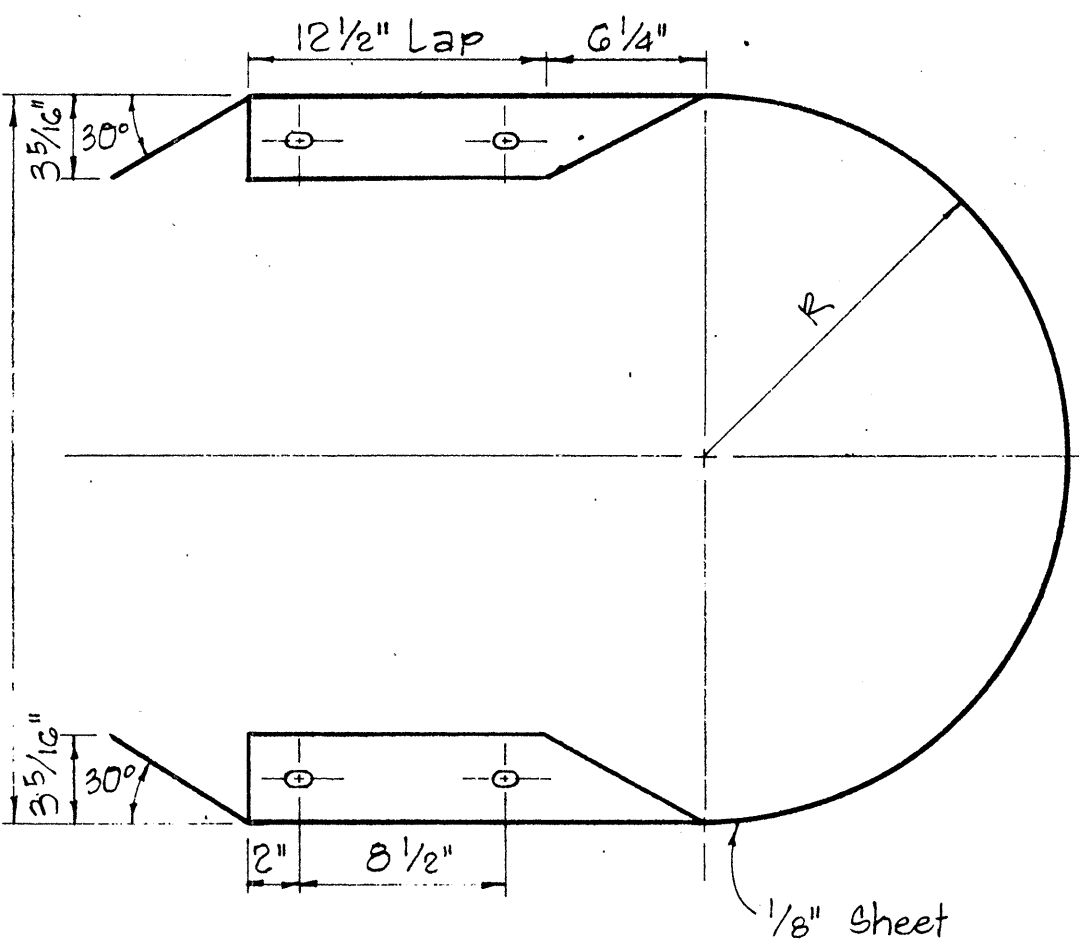
← Lap in direction of traffic



SPECIAL END SHOE

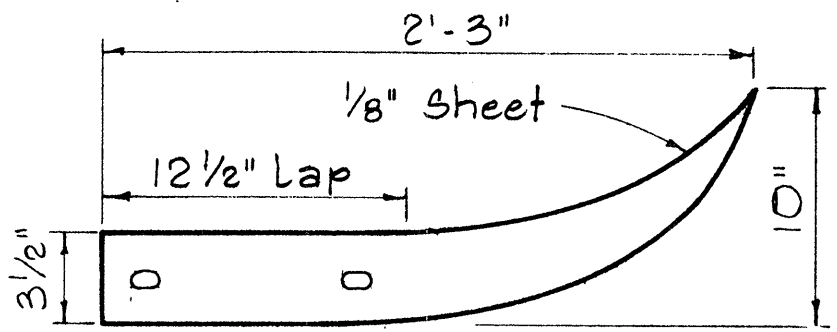
Scale: 1 1/2" = 1'-0"

← Lap in direction of traffic

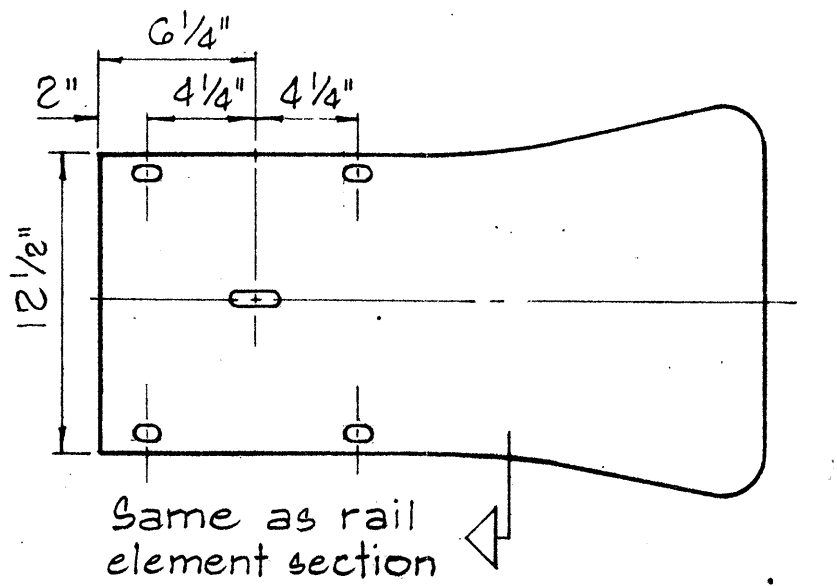


MEDIAN END

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

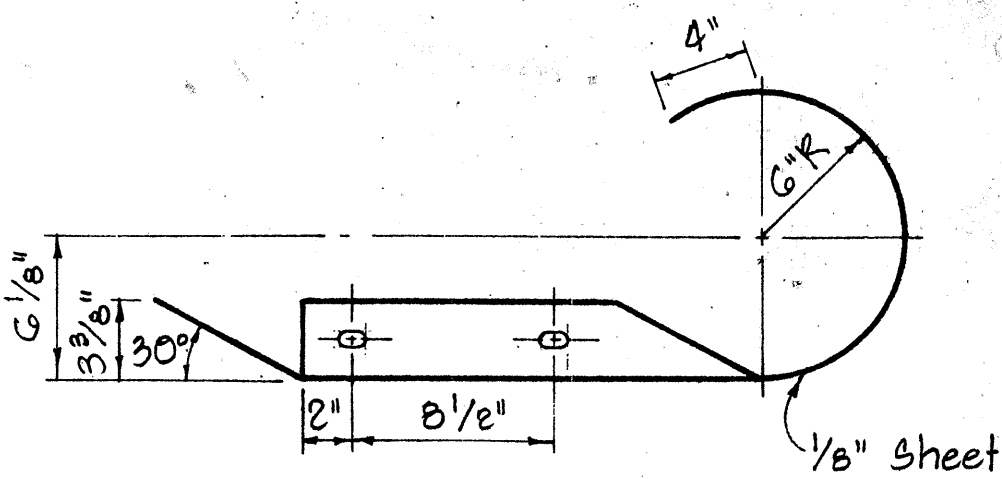


← Lap in direction of traffic

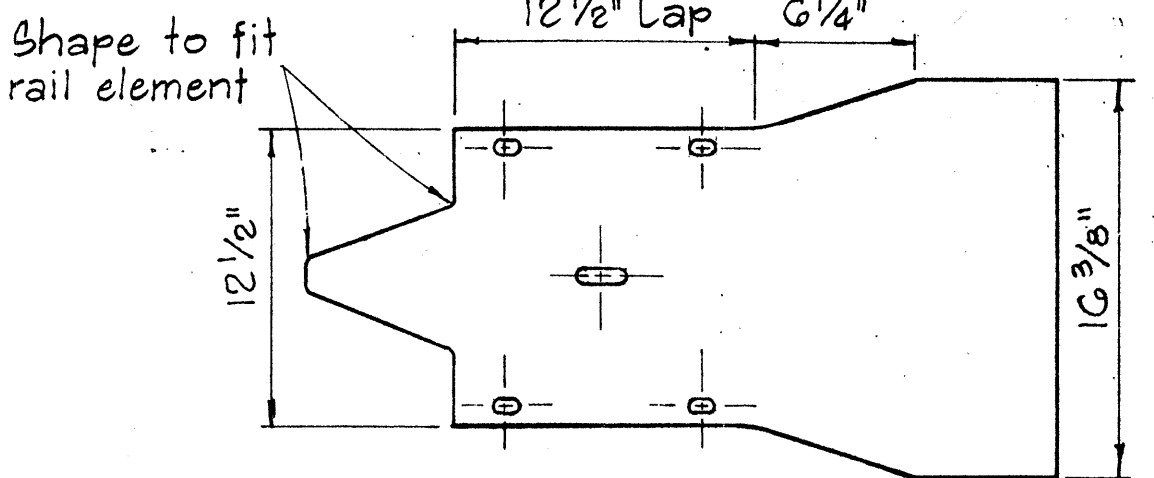


FLARED END

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



← Lap in direction of traffic



CURVED END

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

APPROVAL RECOMMENDED:

TRAFFIC ENGINEER

APPROVED:

ASSISTANT CHIEF, ENGINEERING

12/29/69
DATE

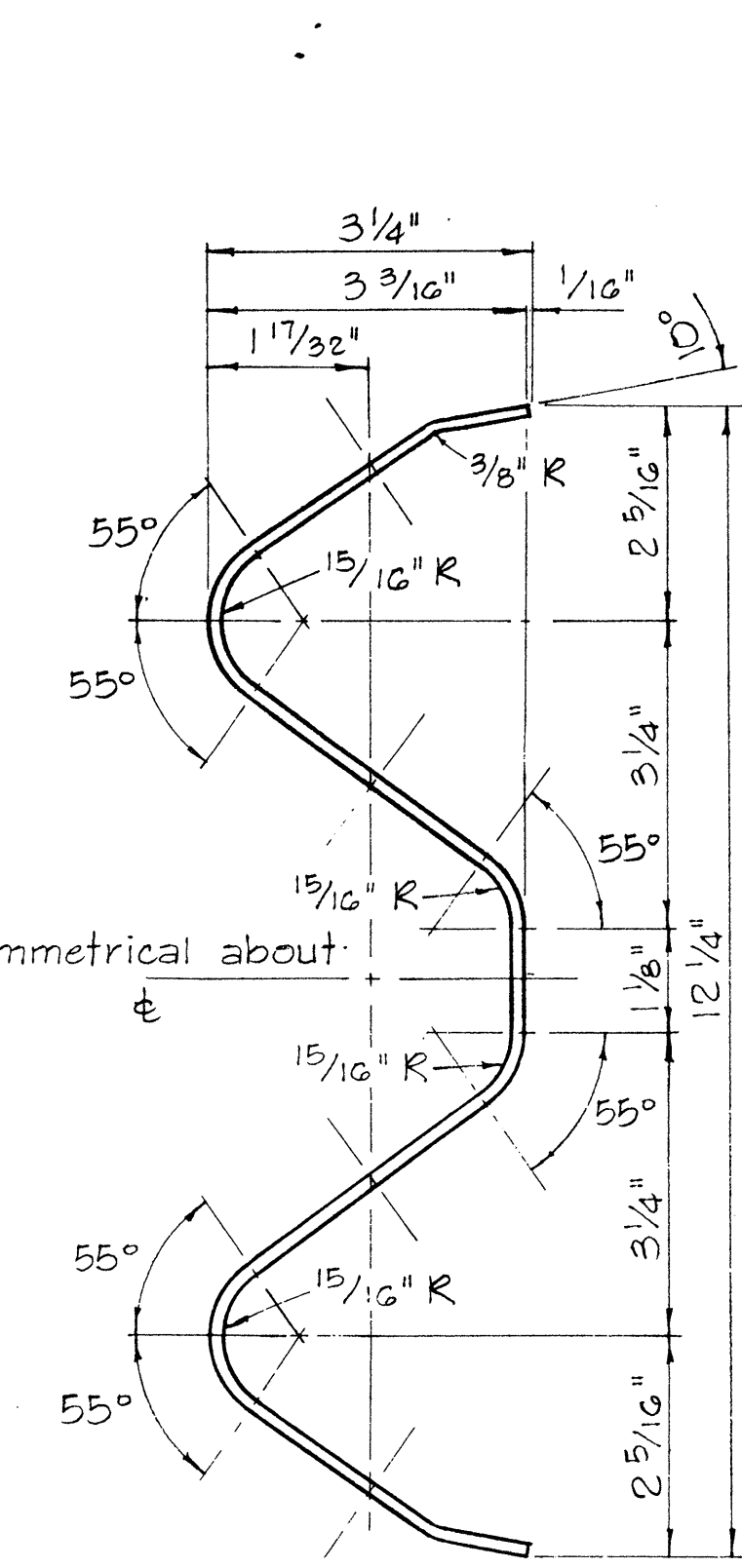
12-30-69
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
METAL GUARD RAIL

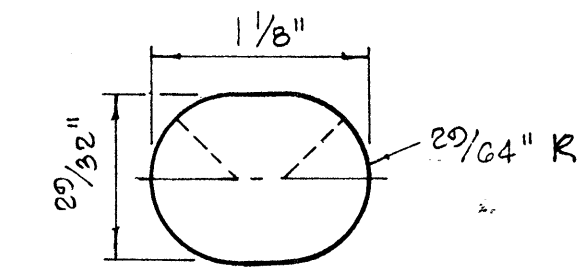
Scale: As Noted August, 1968

SHEET No. 5 OF 7 SHEETS DT 501



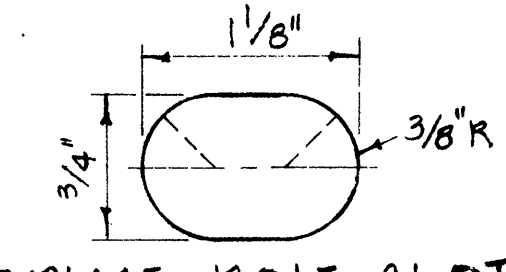
RAIL ELEMENT SECTION

Scale: 6" = 1'-0"

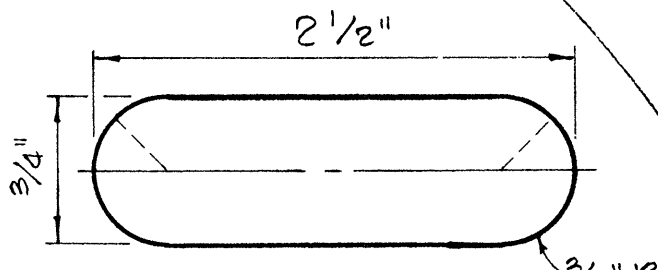


SPlice BOLT SLOT FOR ALL ENDS

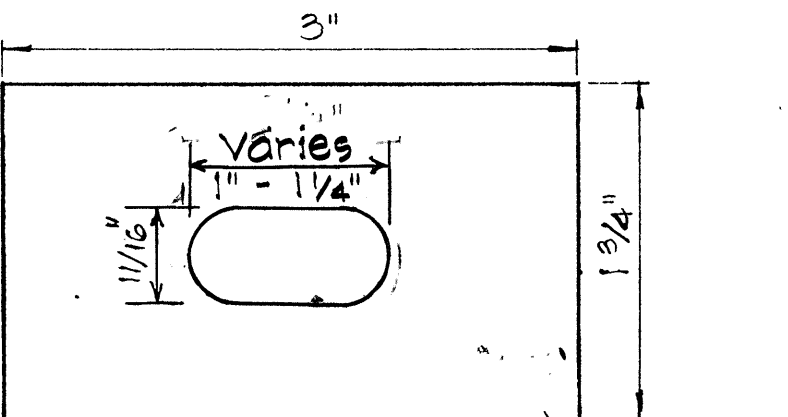
Scale: Full Size



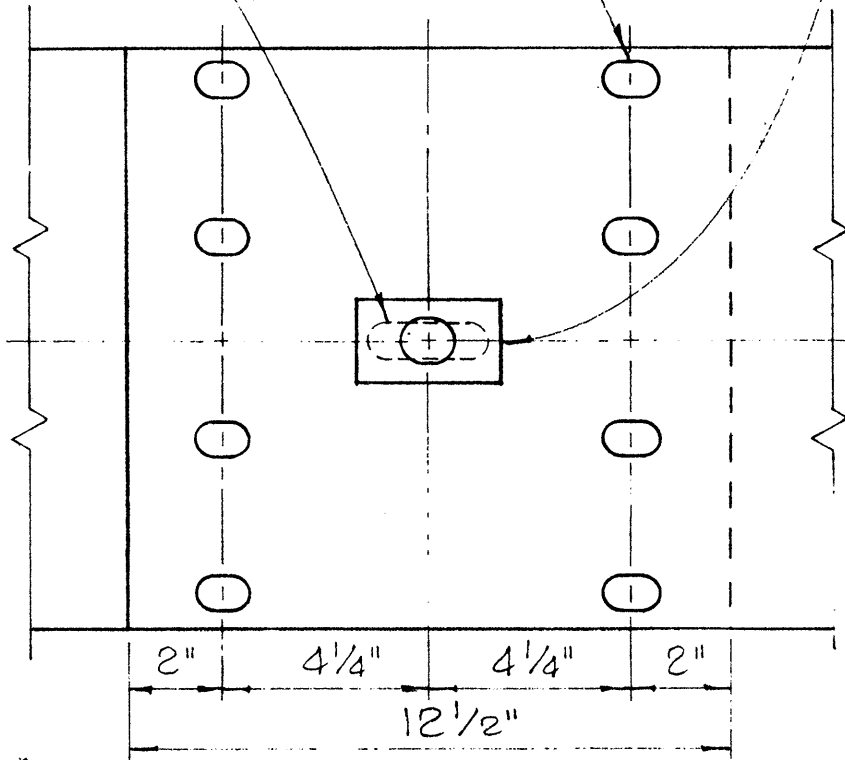
SPlice BOLT SLOT FOR SPECIAL END SHOE



POST BOLT SLOT



RAIL WASHER



RAIL SPlice

Scale: 3" = 1'-0"

NOTES:

- H.S. Bolts shall conform to the requirements of ASTM A 325.
- Special End Shoe shall be fabricated from 10 Gage steel conforming to the requirements of AASHTO 180.

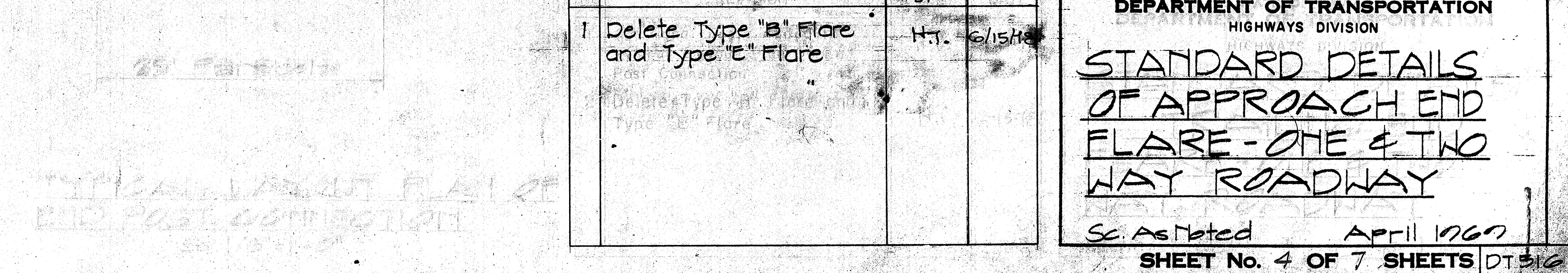
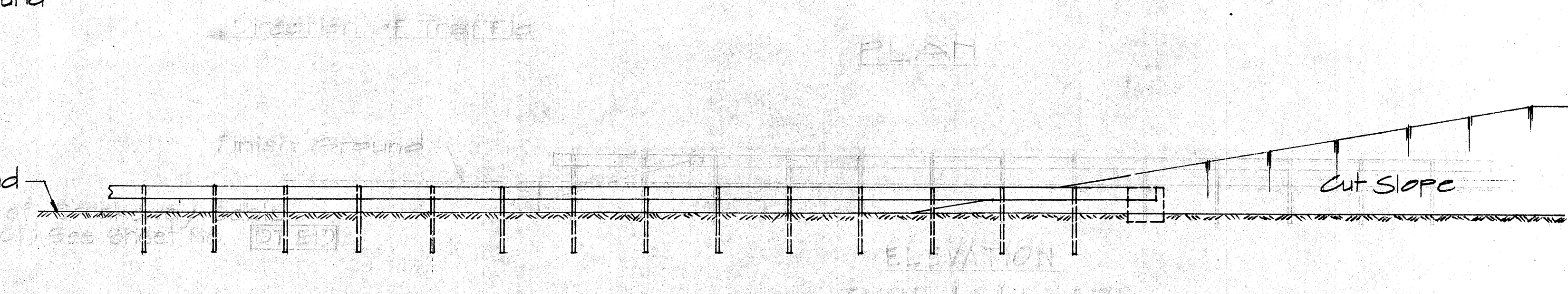
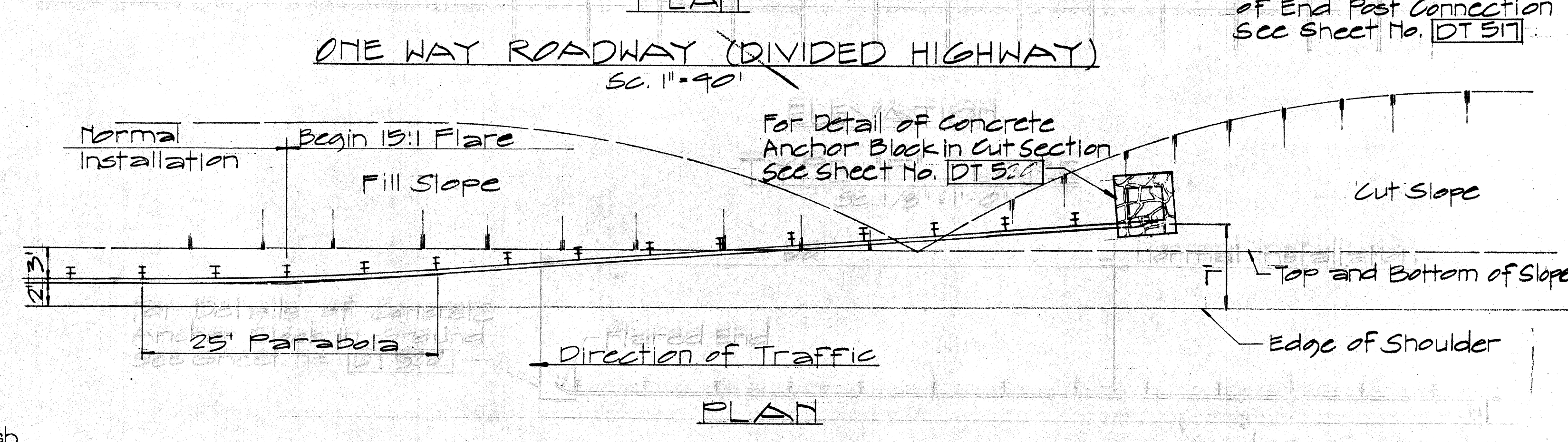
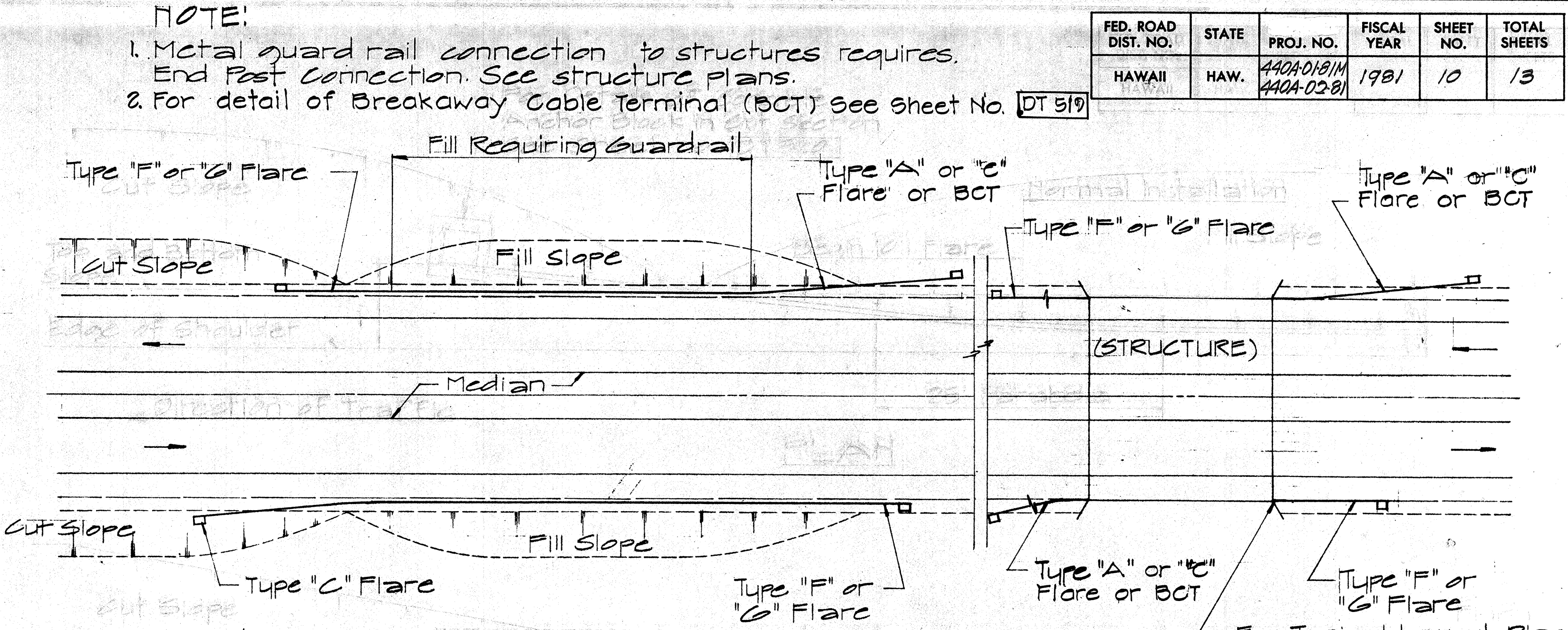
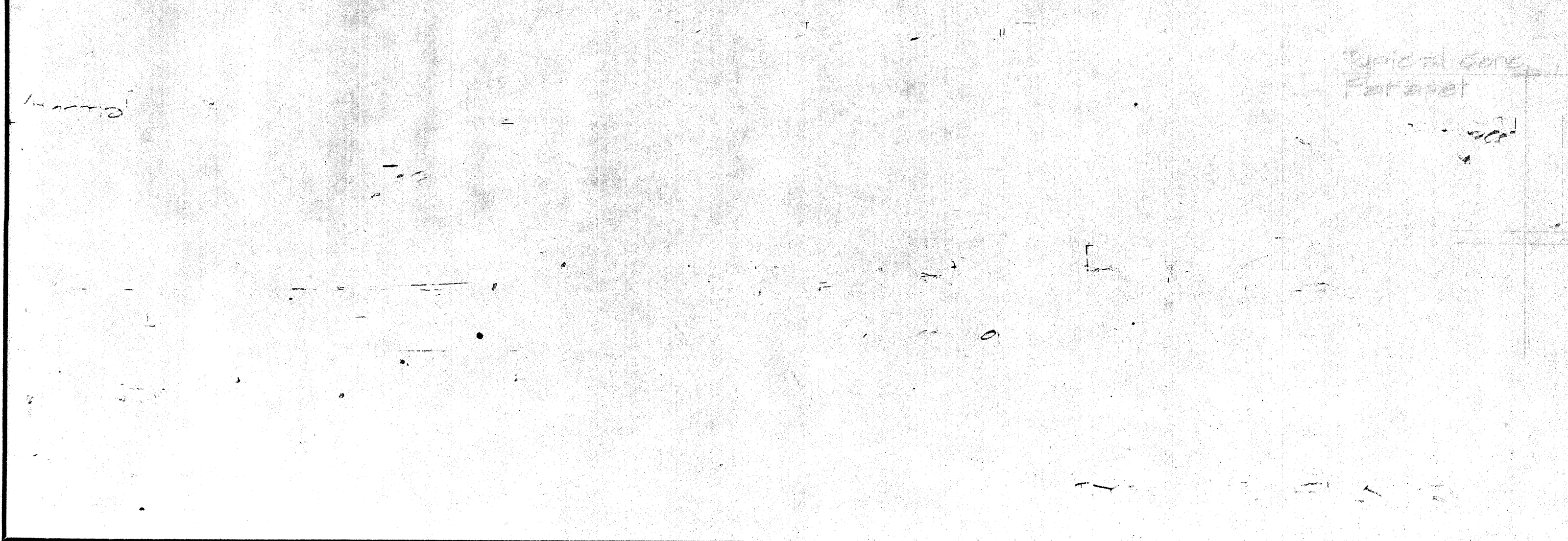
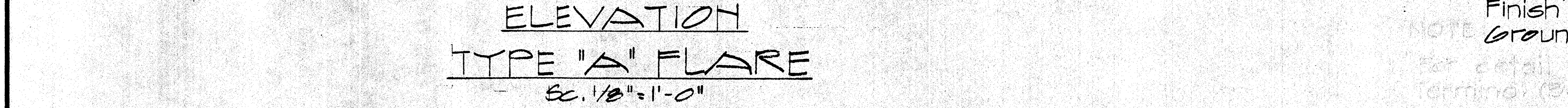
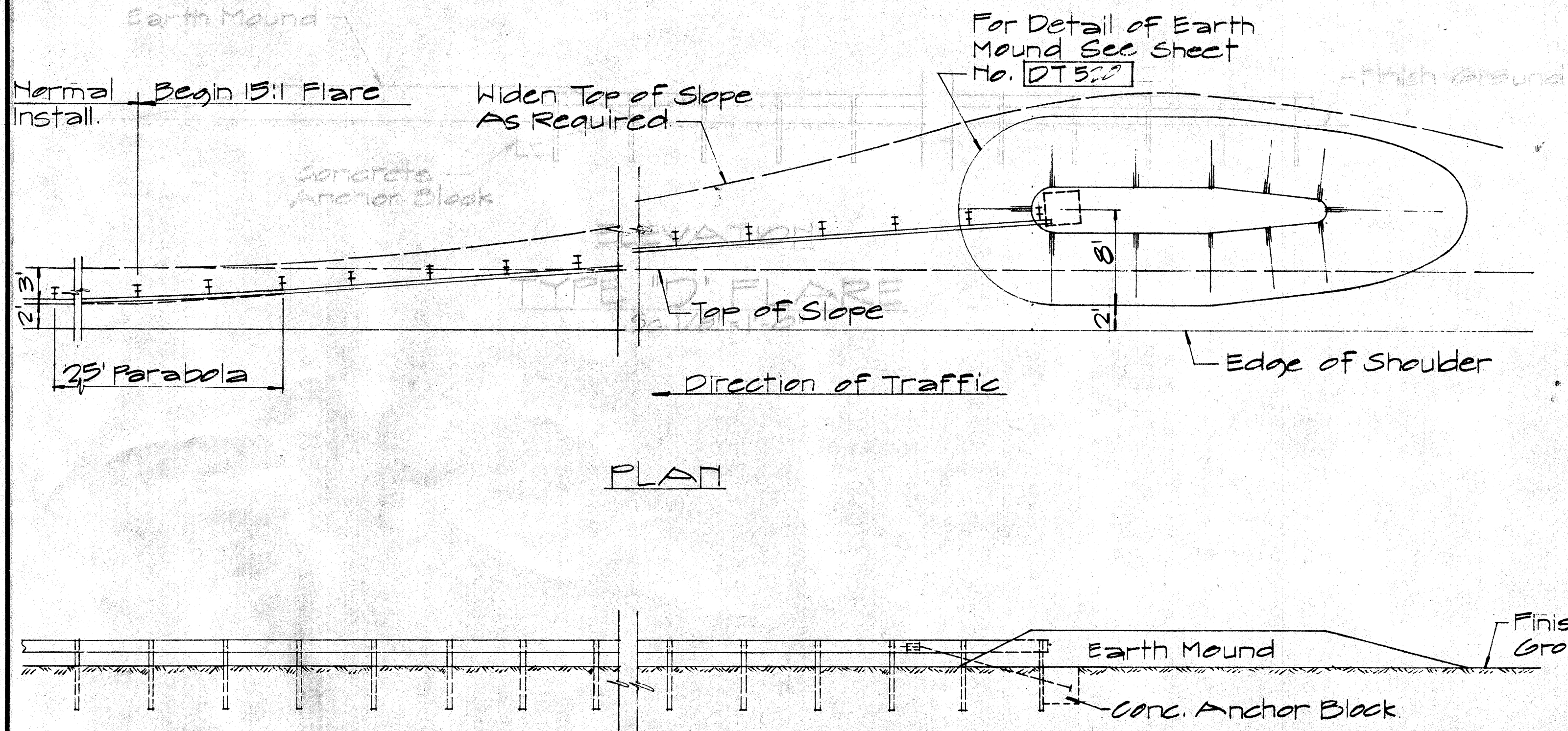
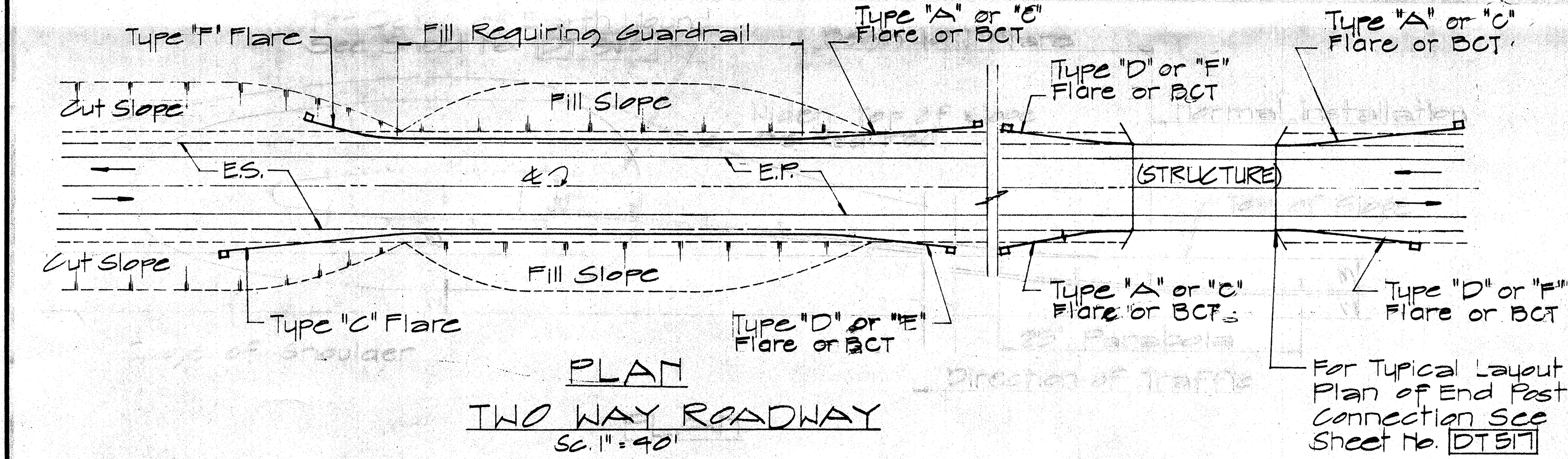
MEDIAN END DIMENSIONS		
TYPE OF POST AND BLOCK	W	R
Double Metal Guard Rail on Concrete Post with Wood Blocks	29 3/4"	14 7/8"
Double Metal Guard Rail on Concrete Post with Metal Blocks (BJG)	26 1/2"	13 1/4"
Double Metal Guard Rail on Metal Post with Metal Blocks (BJG)	24 3/8"	12 3/16"

NO.	REVISION	APPROVED BY	DATE
1	Revised Hole Size for Rectangular Rail Washer	H.T.	8/10/68

DATE	12/29/69
DESIGNED BY	W. J. Tanaka
CHECKED BY	W. J. Tanaka
NOTED BY	W. J. Tanaka
NO.	1

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	440A-0181M 440A-0281	1981	10	13

- NOTE:
1. Metal guard rail connection to structures requires End Post Connection. See structure plans.
 2. For detail of Breakaway Cable Terminal (BCT) see Sheet No. DT 519



APPROVAL RECOMMENDED:
Euske Tanaka 12/29/62
 TRAFFIC ENGINEER DATE

APPROVED:
W. J. [Signature] 12-30-69
 ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
1	Delete Type 'B' Flare and Type 'E' Flare	H.T.	6/15/68
	Delete Type 'A' Flare		
	Delete Type 'C' Flare		

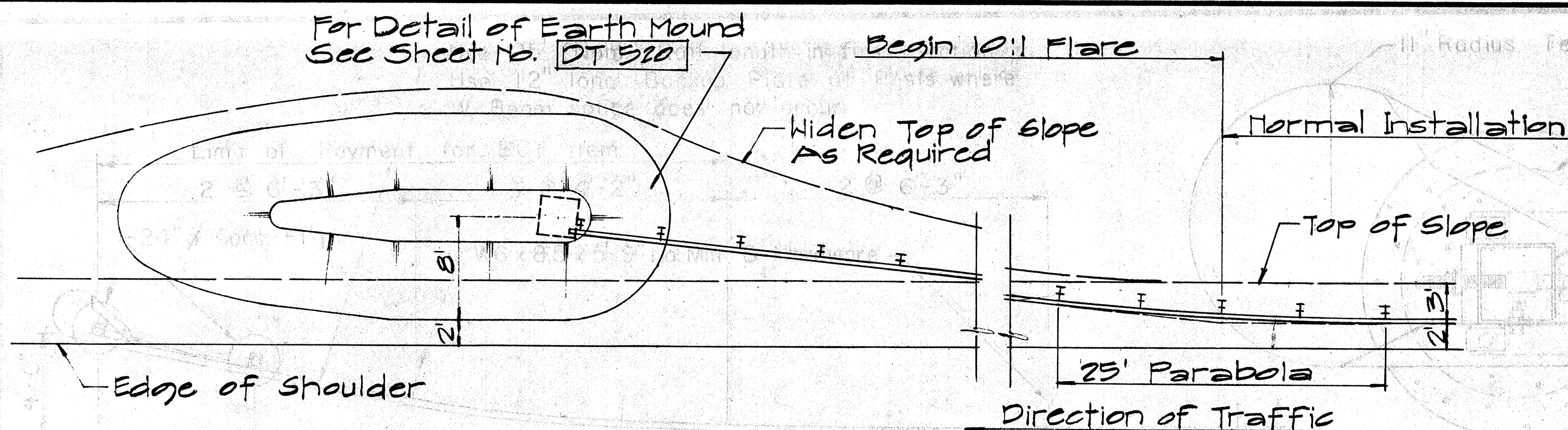
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

**STANDARD DETAILS
 OF APPROACH END
 FLARE - ONE & TWO
 WAY ROADWAY**

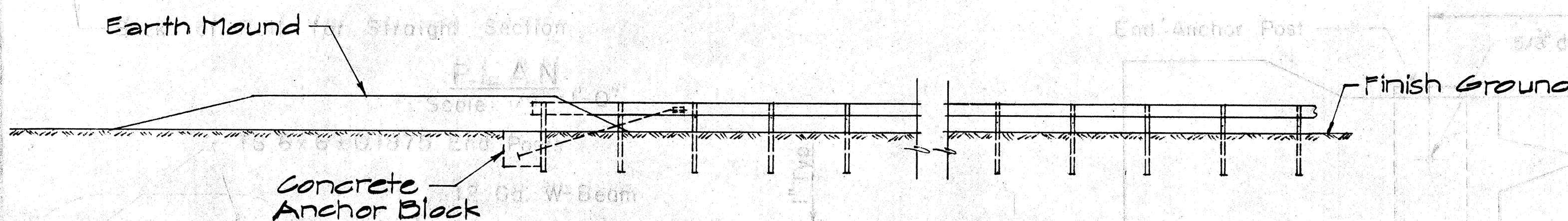
Sc. As Noted April 1969
 SHEET No. 4 OF 7 SHEETS DT 516

DATE	12/29/62
SURVEY PLOTTED BY	
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

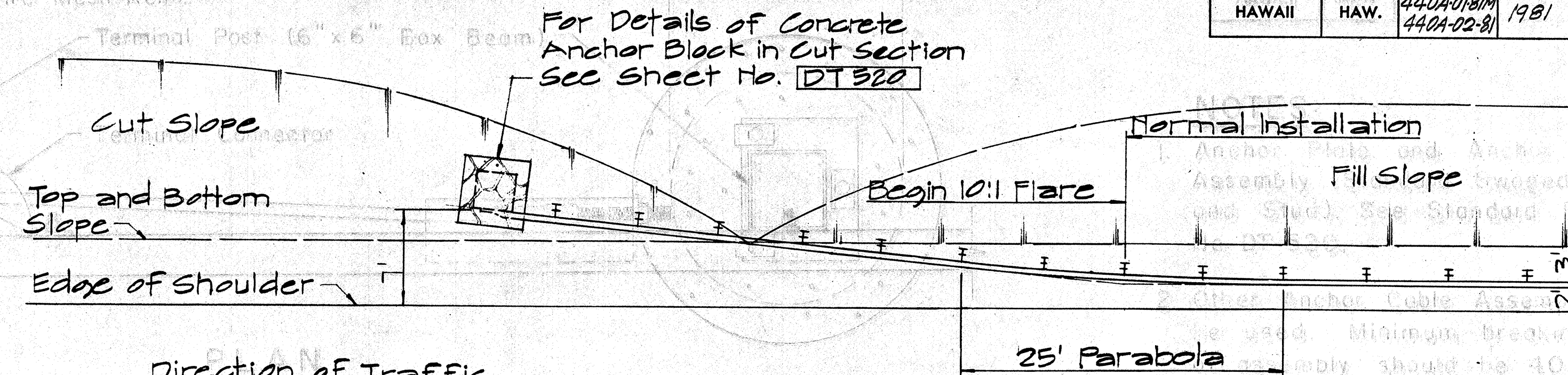
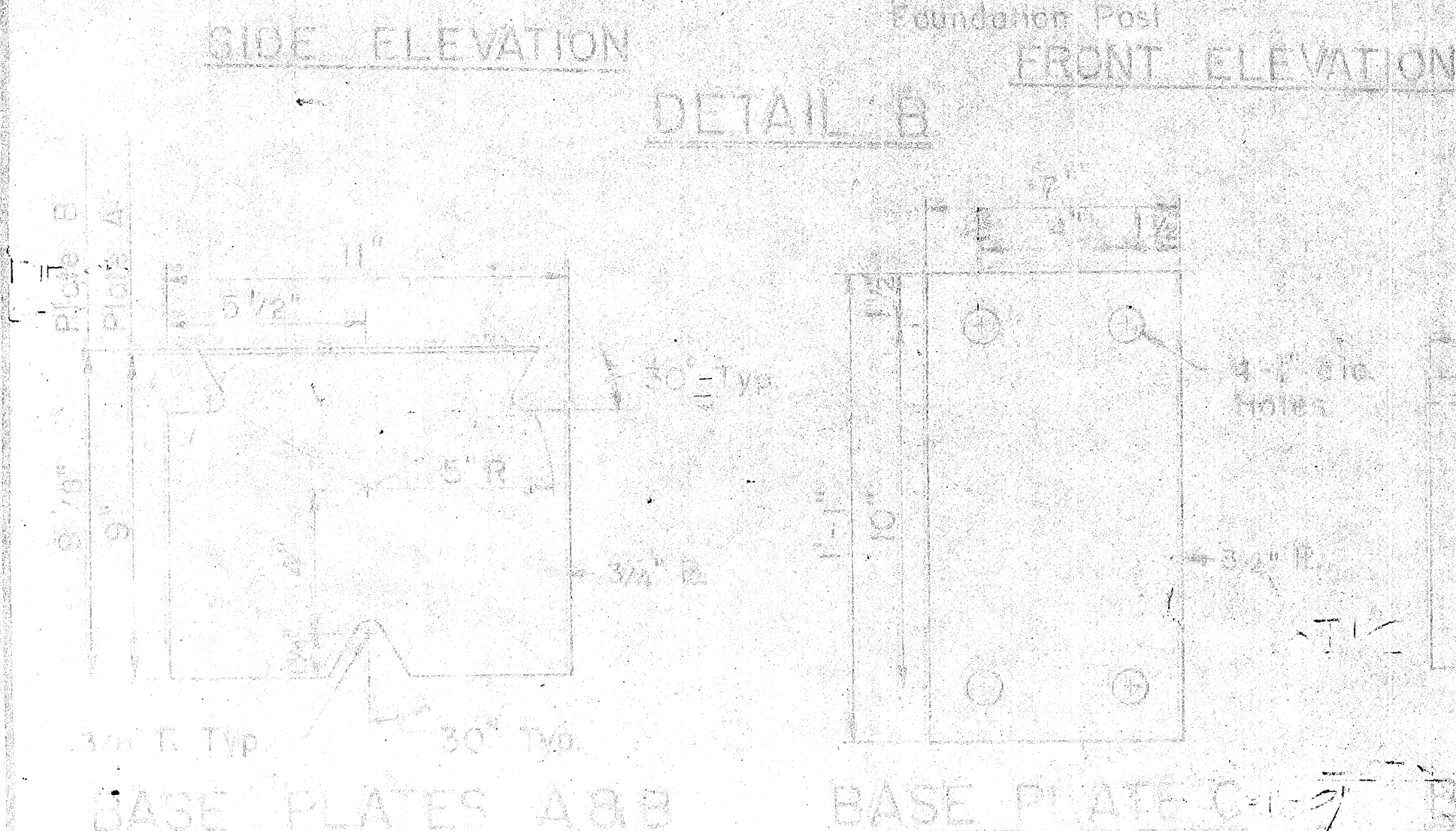
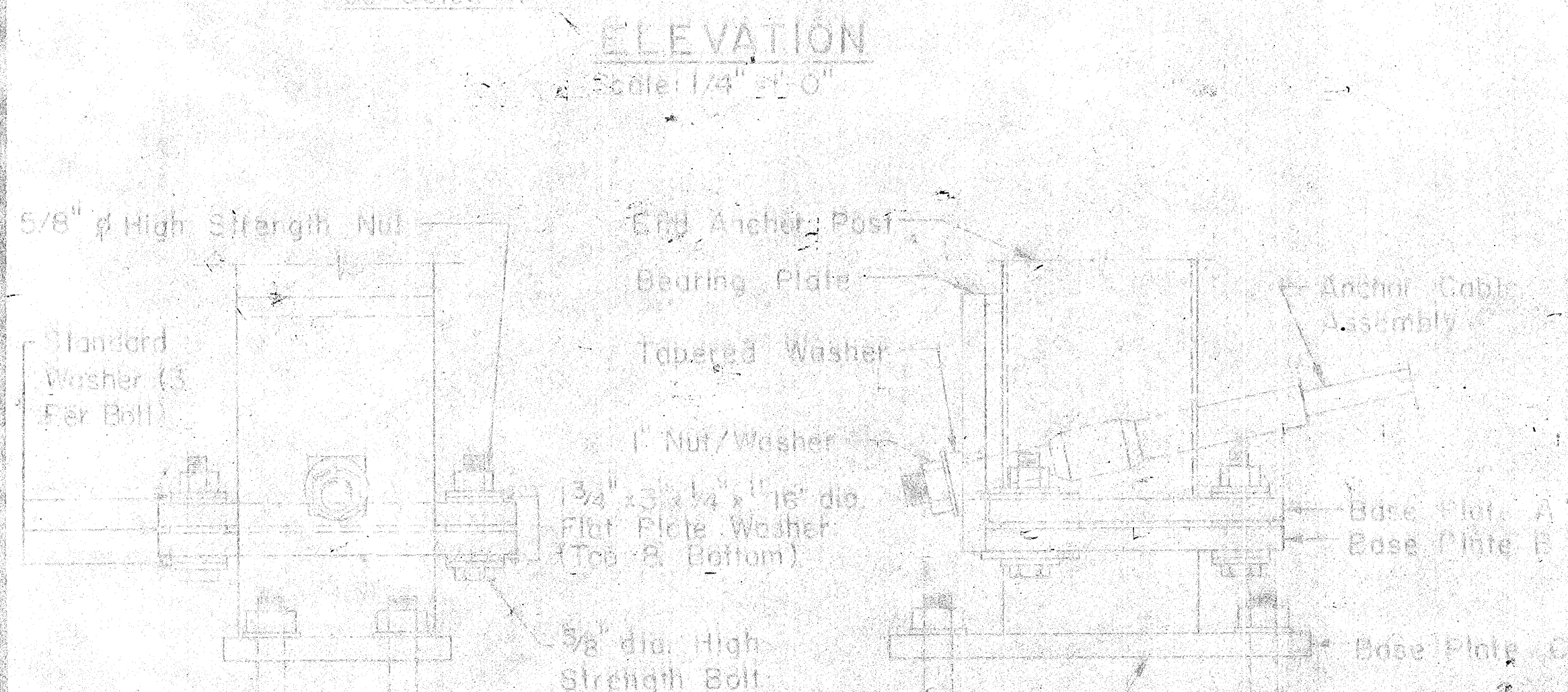
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	4404018M 4404-02-81	1981	11	13



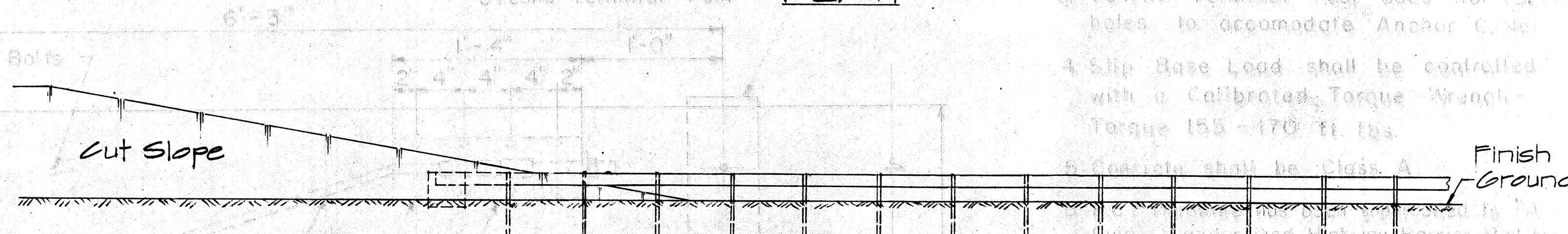
PLAN



ELEVATION
TYPE "D" FLARE
Sc. 1/8" = 1'-0"

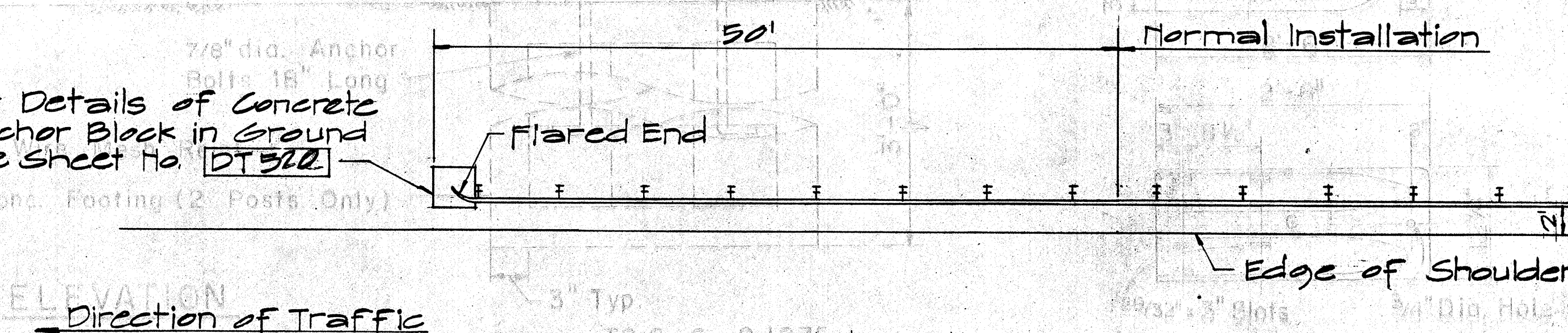


PLAN

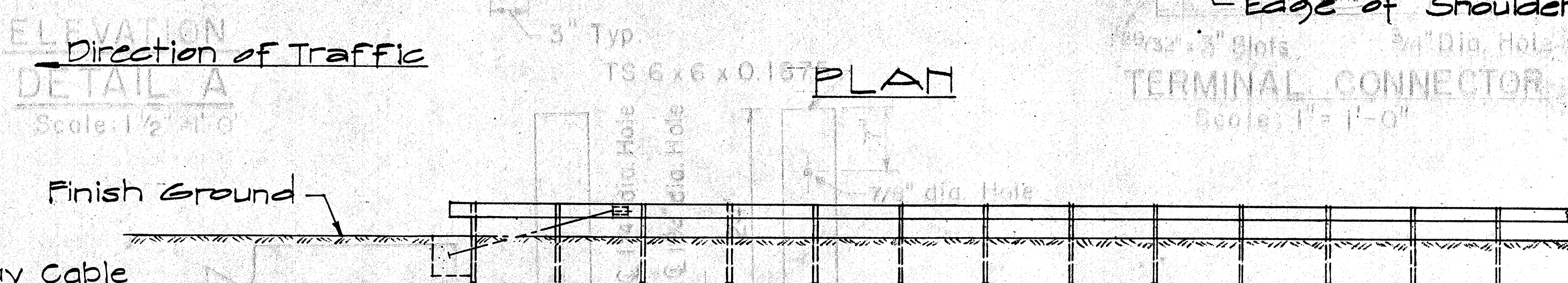


ELEVATION
TYPE "F" FLARE
Sc. 1/8" = 1'-0"

For Details of Concrete Anchor Block in Ground See Sheet No. DT 510

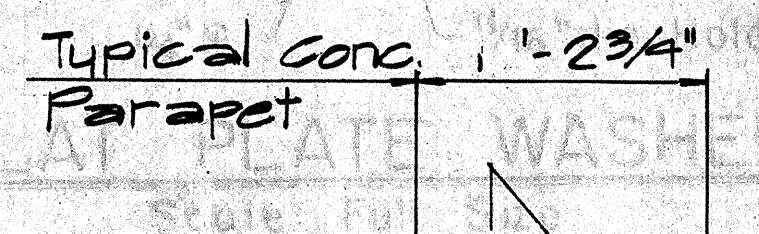


PLAN



ELEVATION
TYPE "G" FLARE
Sc. 1/8" = 1'-0"

NOTE:
For detail of Breakaway Cable Terminal (BCT) See Sheet No. DT 510



Begin Type "A", "C", "D" or "F" Flare or BCT

TYPICAL LAYOUT PLAN OF
END POST CONNECTION
Sc. 1/8" = 1'-0"

NO.	REVISION	APPROVED BY	DATE
1	Additional Posts Added to Typical Layout Plan of End Post Connection	H.C.	4-12-72
2	Delete Type "B" Flare and Type "E" Flare	H.C.	6-15-78

APPROVAL RECOMMENDED:
TRAFFIC ENGINEER
APPROVED:
ASSISTANT CHIEF, ENGINEERING

12/29/69
DATE

12-29-69
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
TRAILING END
FLARE - ONE & TWO
WAY ROADWAY

Scale: As Noted April 1969

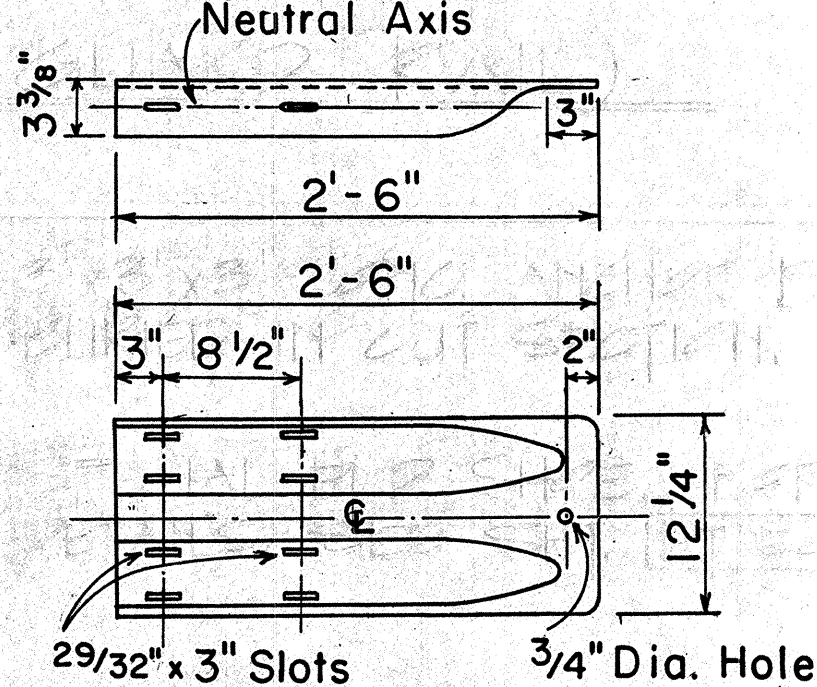
SHEET No. 5 OF 7 SHEETS DT 511

DATE	_____
DESIGNED BY	_____
DRAWN BY	_____
CHECKED BY	_____
ORIGINAL PLAN	_____
NOTE BOOK	_____
QUANTITIES BY	_____
CHECKED BY	_____

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	440AD181M 440A02B1	1981	12	13

NOTES:

1. Anchor Plate and Anchor Cable Assembly (Standard Swaged Fitting and Stud). See Standard Detail Sheet No. DT 520.
2. Other Anchor Cable Assemblies may be used. Minimum breaking strength of assembly should be 40,000 lbs.
3. Second Terminal Post does not require holes to accomodate Anchor Cable.
4. Slip Base Load shall be controlled with a Calibrated Torque Wrench - Torque 155 - 170 ft. lbs.
5. Concrete shall be Class A.
6. B.C.T. Hardware has been supersceded by "A Guide Standardized Highway Barrier Rail Hardware," A report prepared and approved by the AASHTO-AGC-ARTBA joint cooperation committee. All hardware shall conform to above mentioned publication and as revised from time to time.



TERMINAL CONNECTOR
Scale: 1" = 1'-0"

APPROVAL RECOMMENDED:

Erich Tanaka
TRAFFIC ENGINEER
6/14/78
DATE

APPROVED:

Harbor Zafiris
ASSISTANT CHIEF, ENGINEERING
6/15/78
DATE

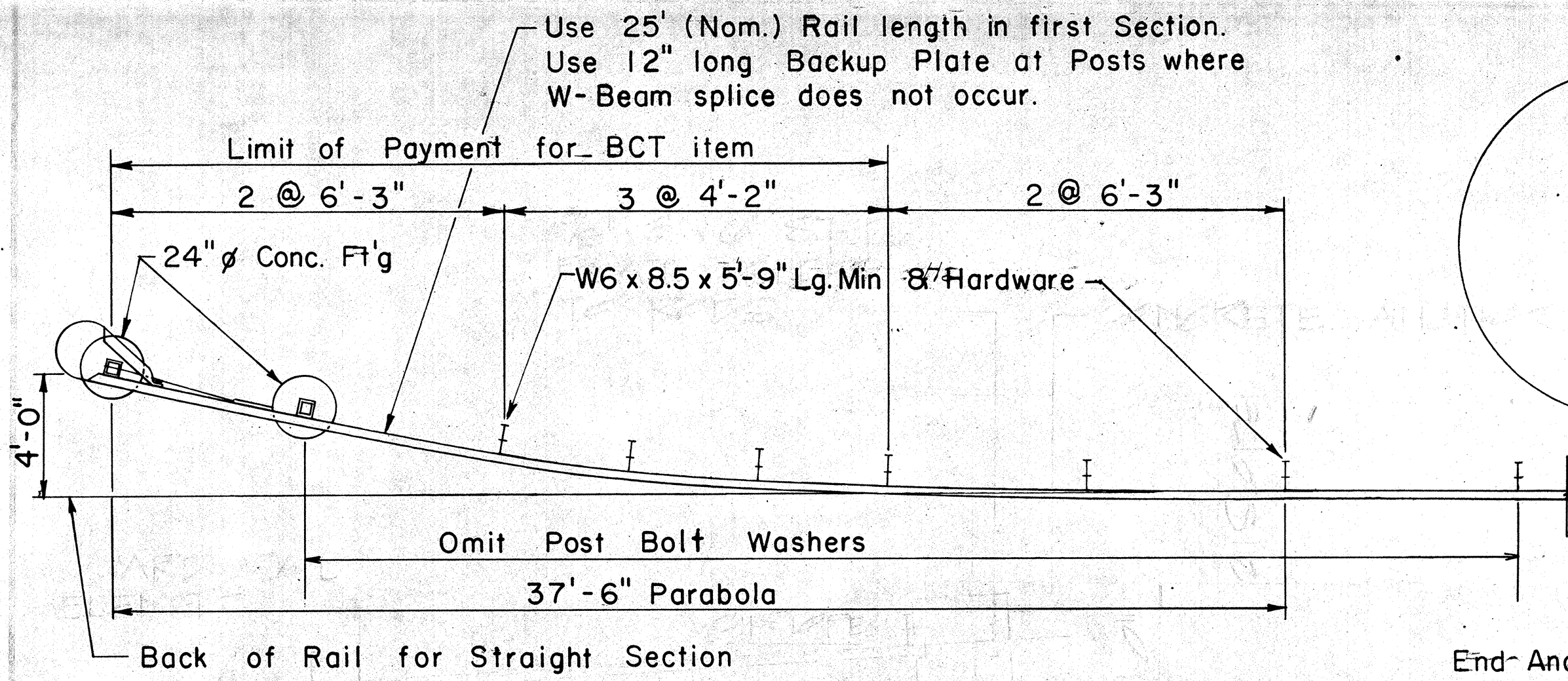
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAIL

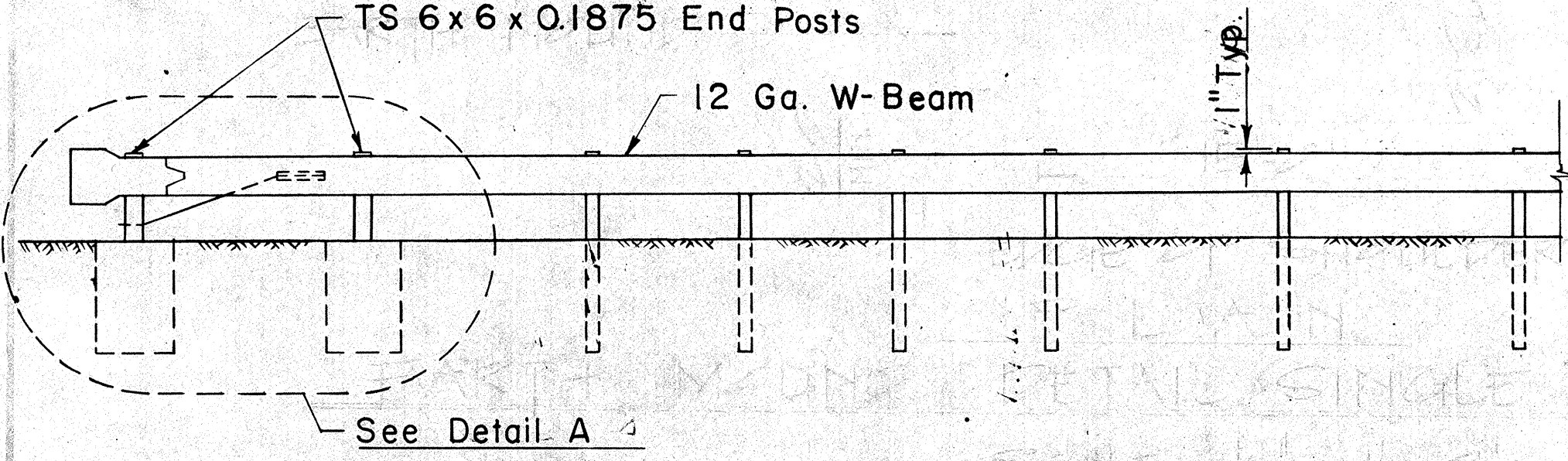
BREAKAWAY CABLE TERMINAL (BCT)

Scale: As Shown Date: June 1978

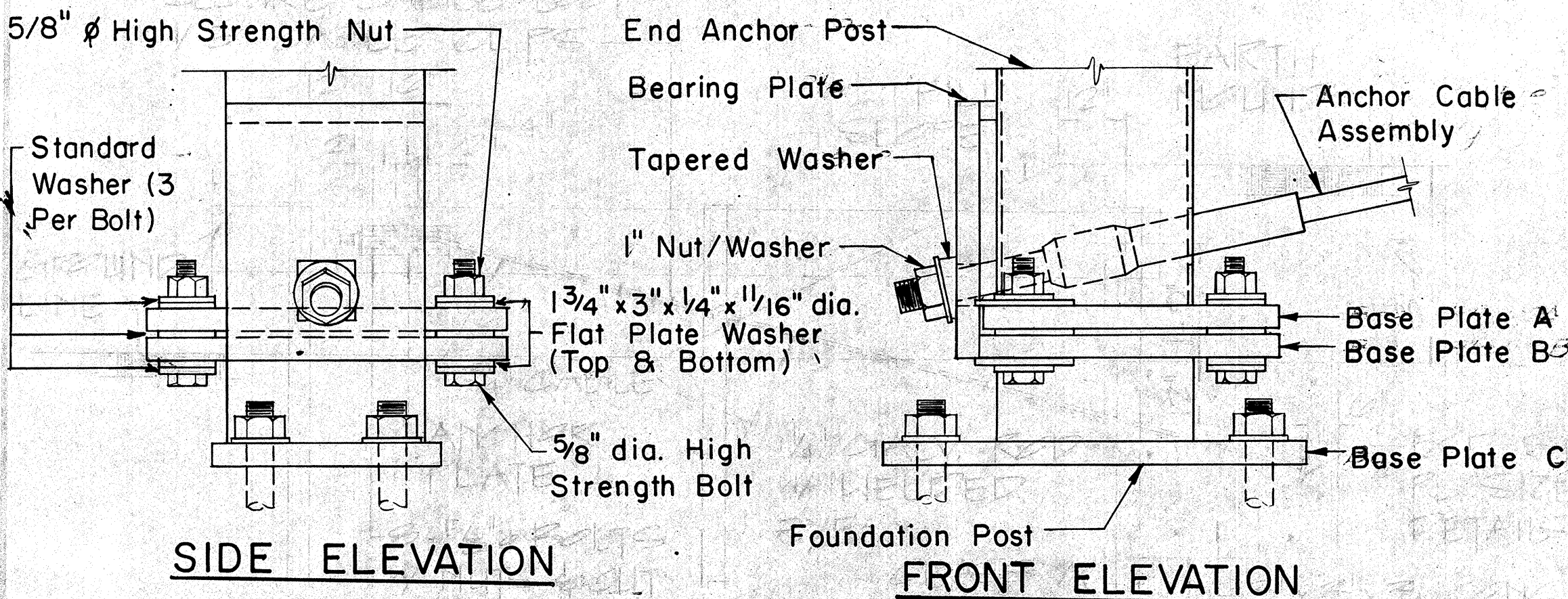
SHEET No. 6 OF 7 SHEETS DT 519



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



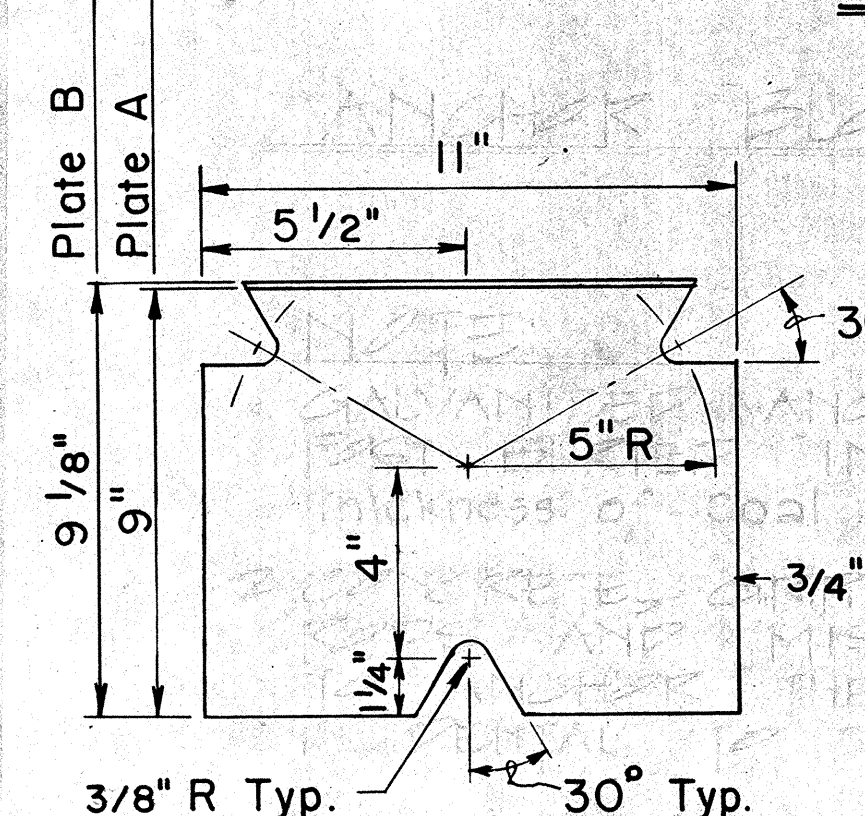
ELEVATION
Scale: 1/4" = 1'-0"



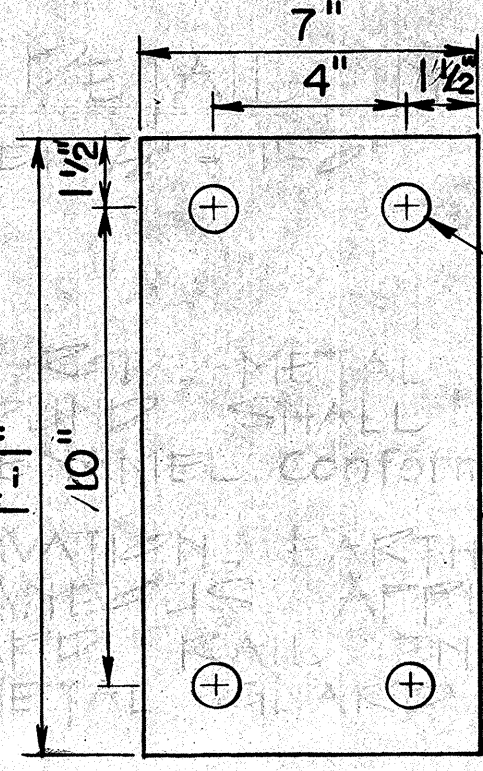
SIDE ELEVATION

FRONT ELEVATION

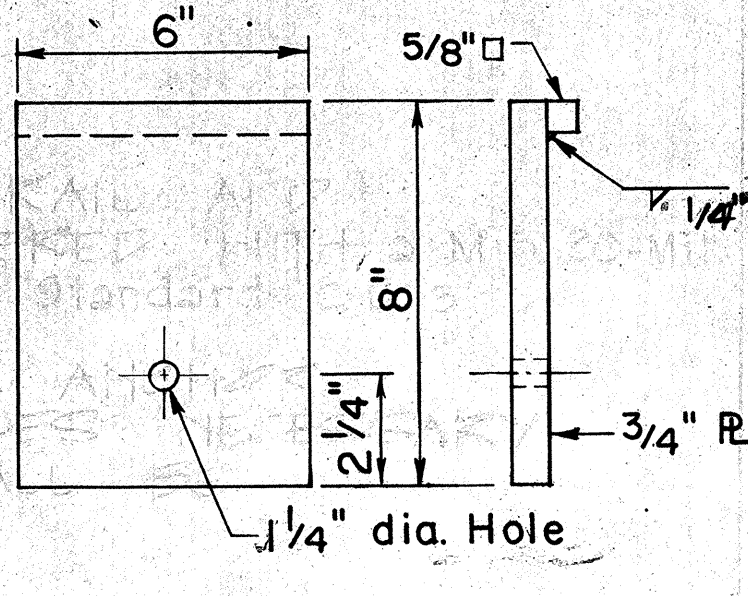
DETAIL B



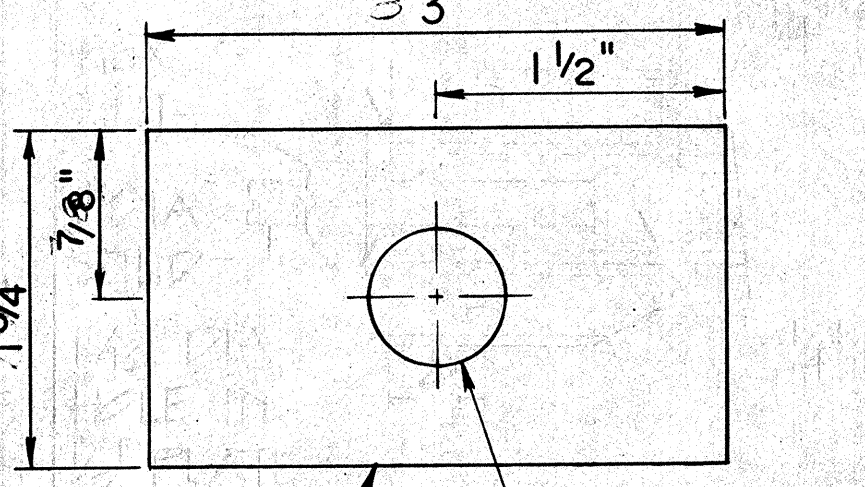
BASE PLATES A & B
Scale: 3" = 1'-0"



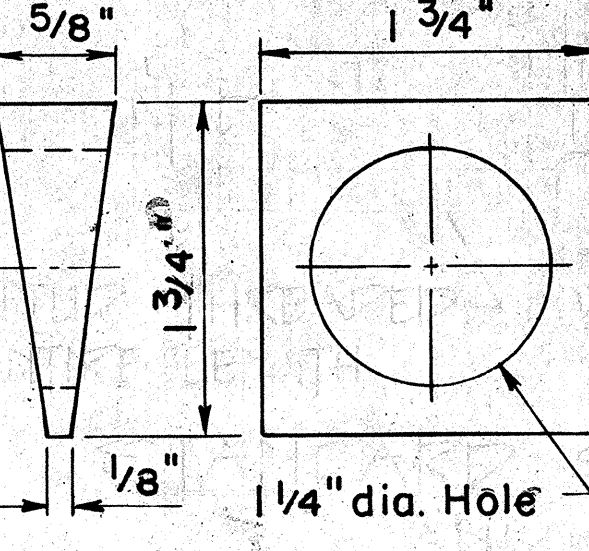
BASE PLATE C
Scale: 3" = 1'-0"



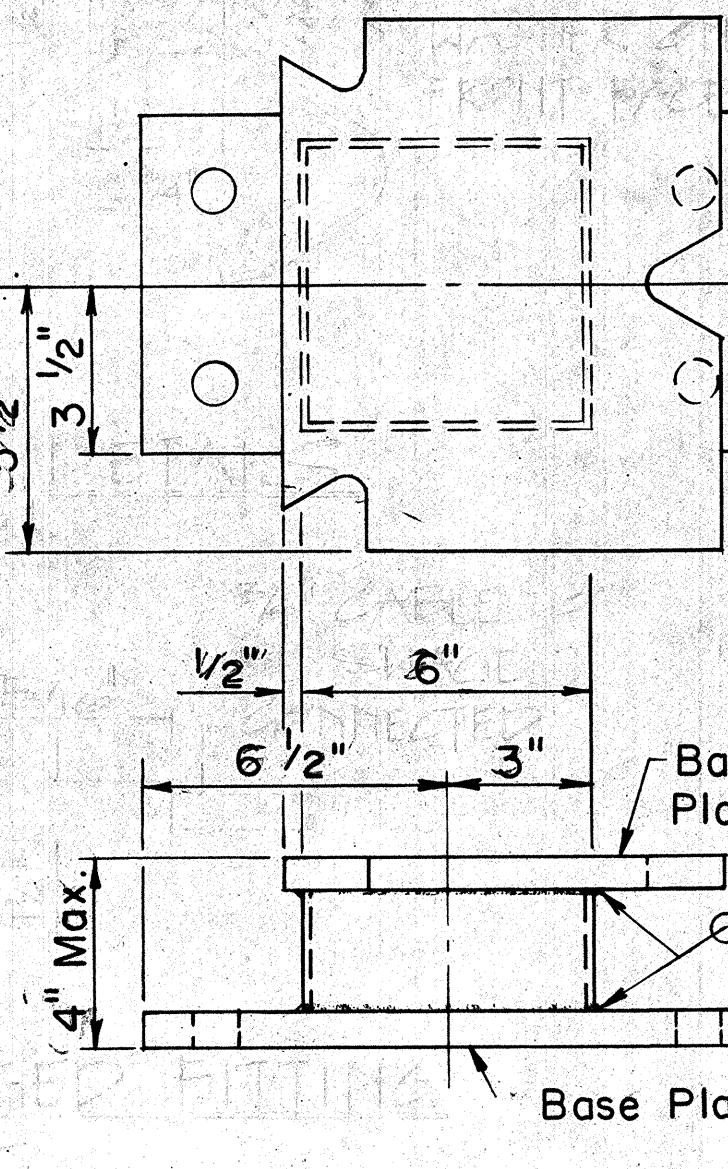
BEARING PLATE
Scale: 3" = 1'-0"



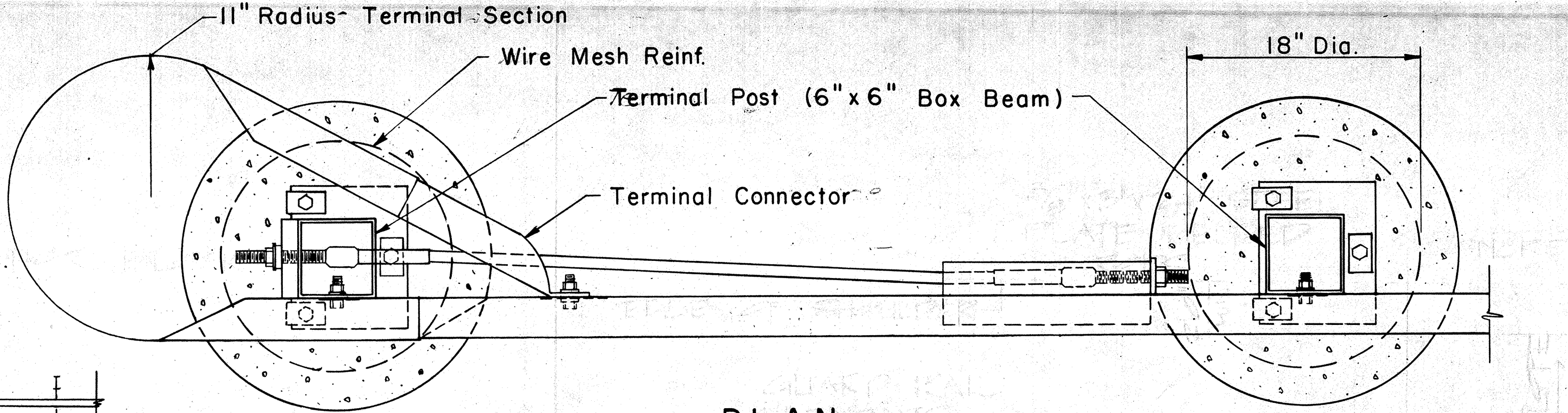
FLAT PLATE WASHER
Scale: Full Size



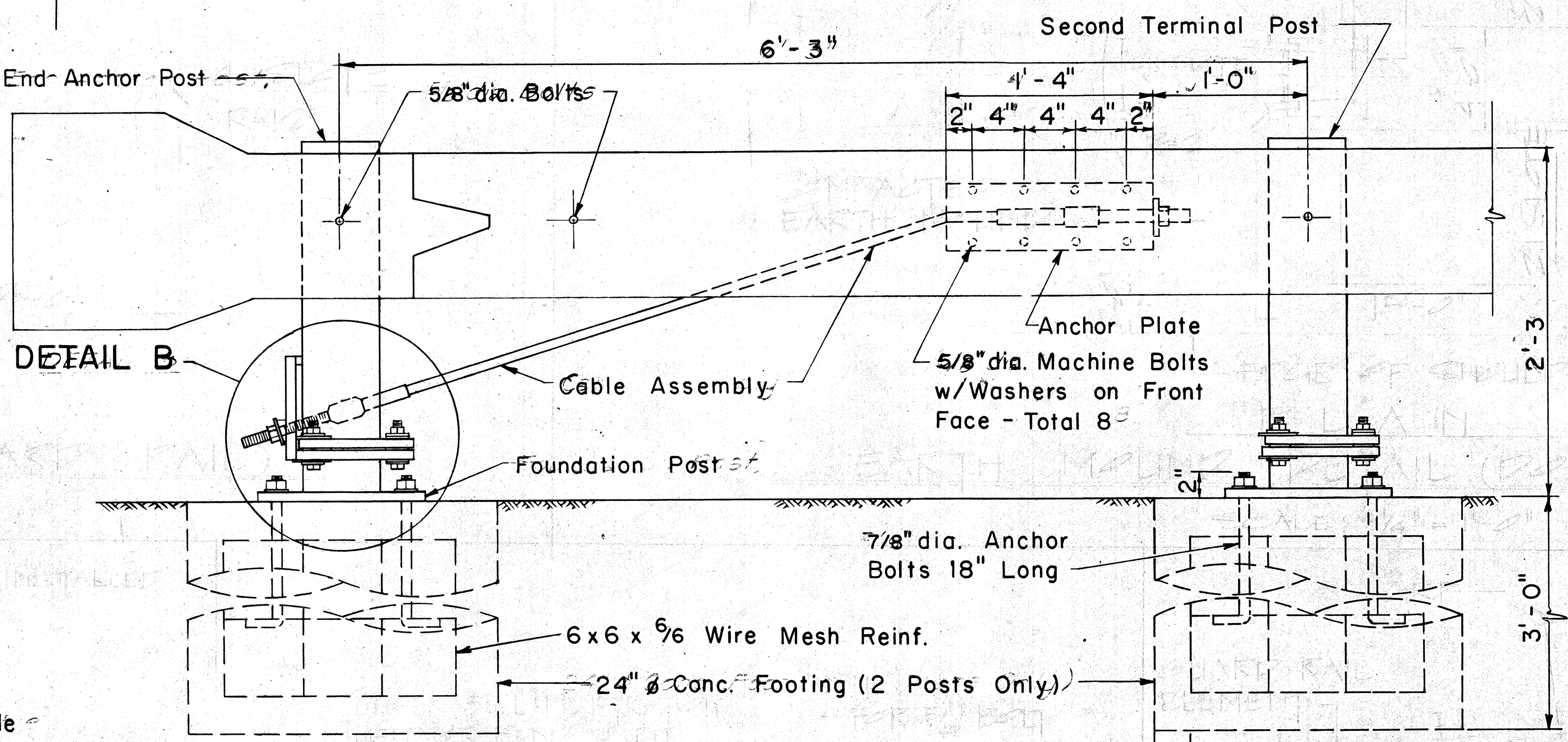
TAPERED WASHER
Scale: Full Size



FOUNDATION POST
Scale: 3" = 1'-0"



PLAN



ELEVATION
DETAIL A
Scale: 1 1/2" = 1'-0"

TERMINAL POST
Scale: 1" = 1'-0"

NO.	REVISION	APPROVED BY	DATE
1	Supersedes Sht. DT 519 Approved 12/30/69	H.I.	6/15/78
2	Added Note 6	H.I.	12/1/80

