

DEPARTMENT OF PUBLIC WORKS

BUREAU OF ENGINEERING

CITY OF LOS ANGELES

METAL - BEAM GUARDRAIL

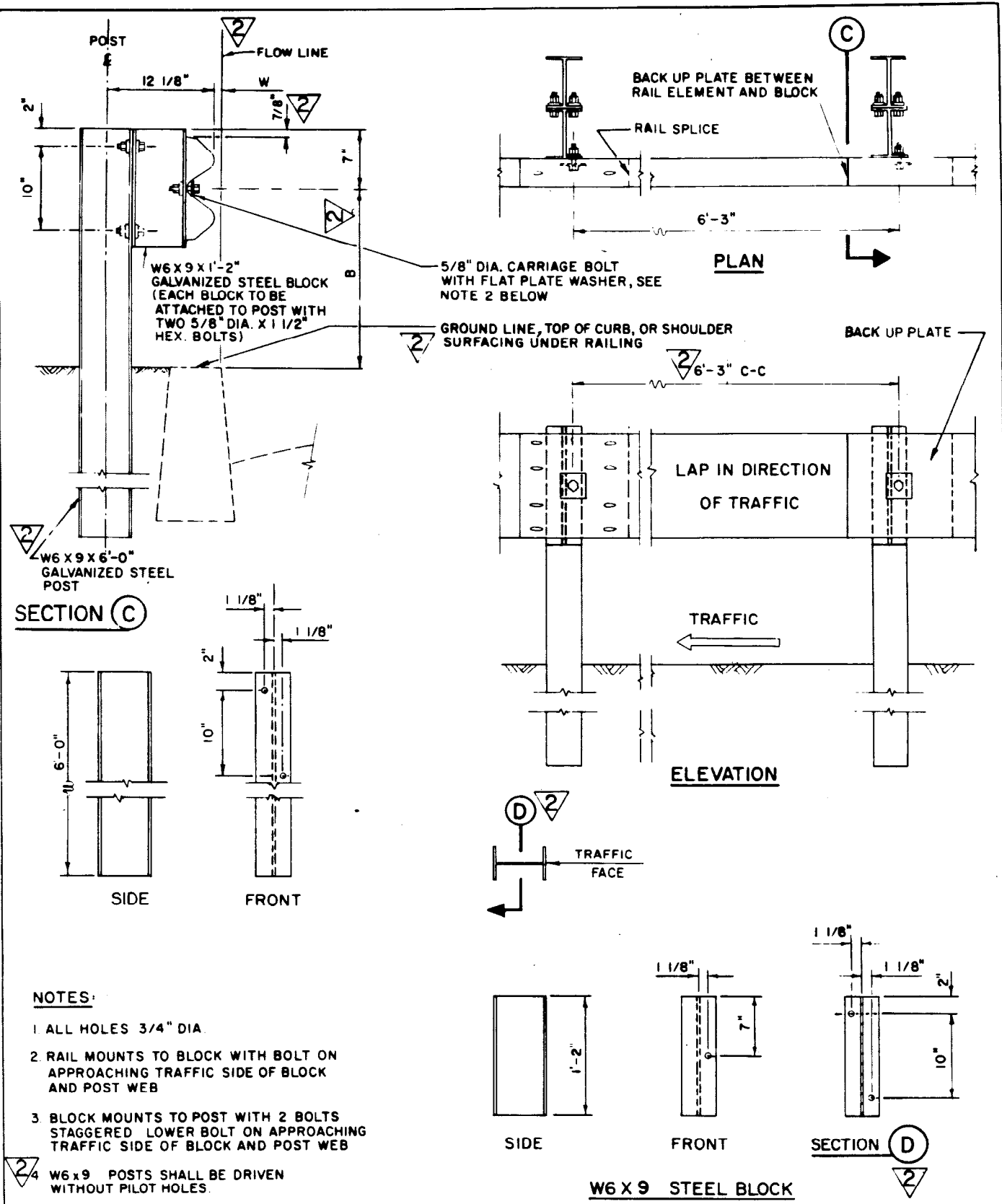
STANDARD PLAN
S-462-2

SUBMITTED *Jan 10* 1990
[Signature]
 ENGINEER OF DESIGN
[Signature]
 DEPUTY ENGINEER
 APPROVED *Jan 17* 1990
[Signature]
 CITY ENGINEER
 DESIGNED BY RGC DRAWN BY RGM CHECKED BY RGS

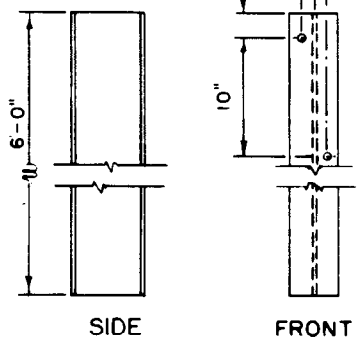


REVISIONS		SUPERSEDES	REFERENCES
NO	DESCRIPTION		
2	CHANGED DIMENSION LEADER OF "W"; ADDED DIMENSION "B"; DELETED HEIGHT CALLOUT OF GUARDRAIL; CHANGED CONCRETE CALLOUT; CHANGED STEEL POST CALLOUT; CLARIFIED DETAIL B; CHANGED DIAMETER OF CONCRETE EMBEDMENT, DETAIL 16; REVISED NOTES 1, 9, 4A, AND 12. ADDED NOTES 6, 7 AND 14. RENUMBERED NOTES, ADDED SHEETS 5 AND 6, ADDED DETAILS 17 AND 19. REVISED SOME DETAIL TITLES.	B-3993	
			Vault Index Number B-4107

SHEET 1 OF 9 SHEETS



SECTION C

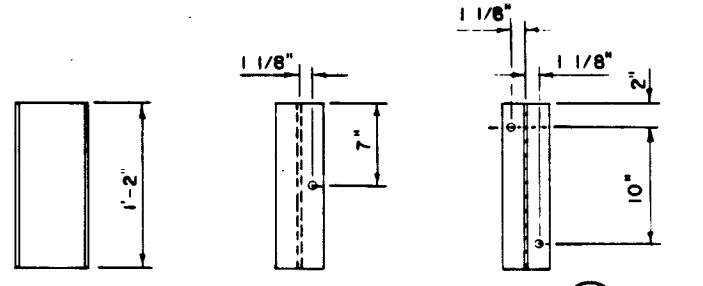


SIDE FRONT

ELEVATION



SECTION D



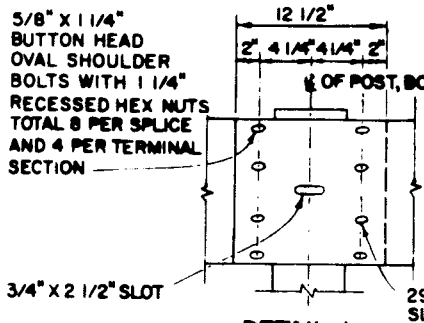
SIDE FRONT SECTION D

W6 X 9 STEEL BLOCK

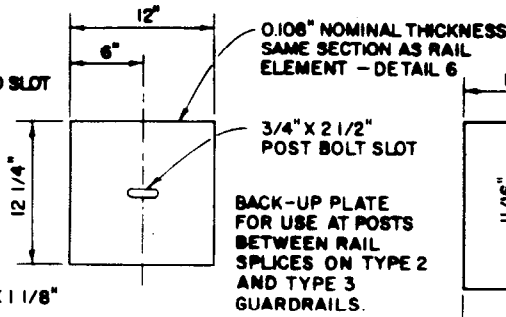
NOTES:

- 1 ALL HOLES 3/4" DIA.
- 2 RAIL MOUNTS TO BLOCK WITH BOLT ON APPROACHING TRAFFIC SIDE OF BLOCK AND POST WEB
- 3 BLOCK MOUNTS TO POST WITH 2 BOLTS STAGGERED LOWER BOLT ON APPROACHING TRAFFIC SIDE OF BLOCK AND POST WEB
- 2/4 W6 x 9 POSTS SHALL BE DRIVEN WITHOUT PILOT HOLES.

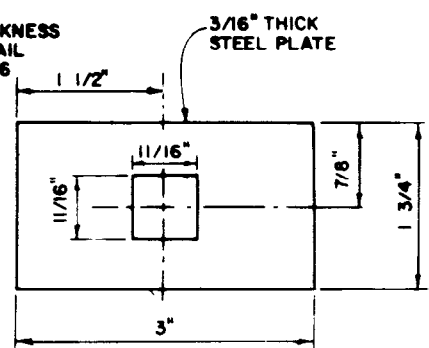
TYPE 3
W6 X 9 POST



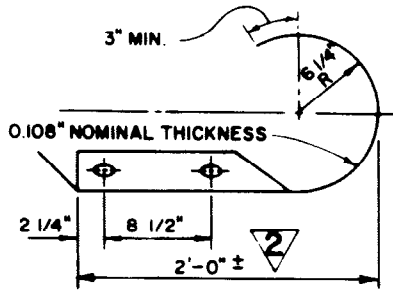
DETAIL 1
RAIL SPLICE



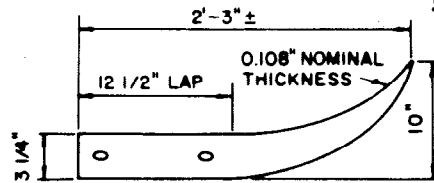
DETAIL 2
BACK UP PLATE



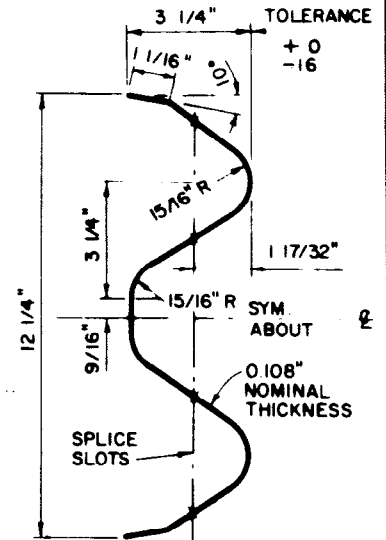
DETAIL 3
FLAT PLATE WASHER



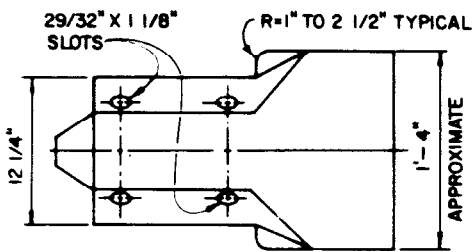
PLAN



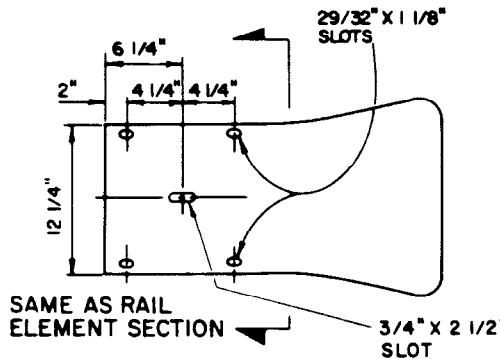
PLAN



DETAIL 6
SECTION THRU RAIL ELEMENT

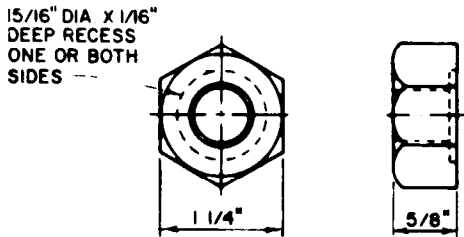


ELEVATION
TYPE "A"

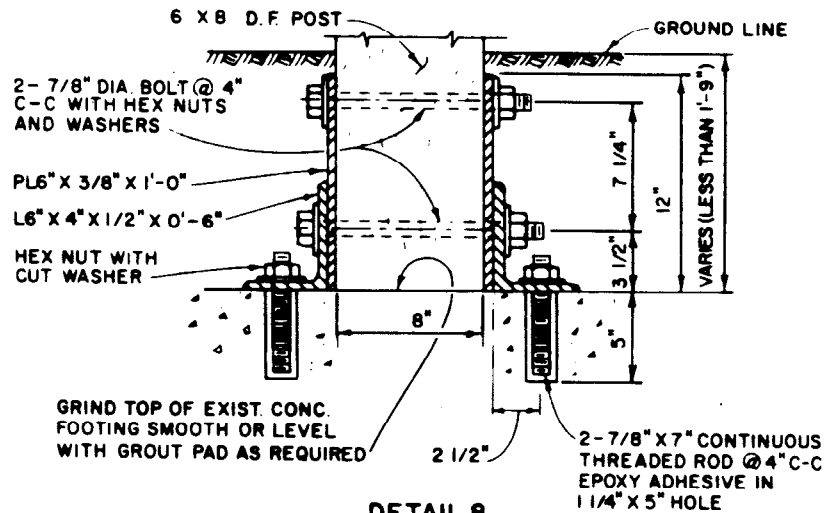


ELEVATION
TYPE "B"

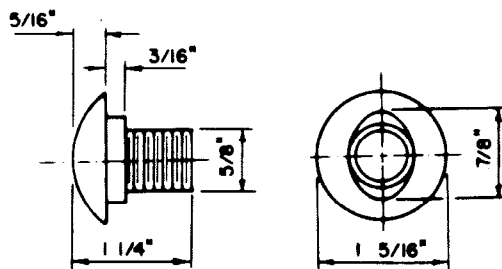
DETAIL 4
TERMINAL SECTIONS



DETAIL 5
5/8\" DIA. RECESSED NUT

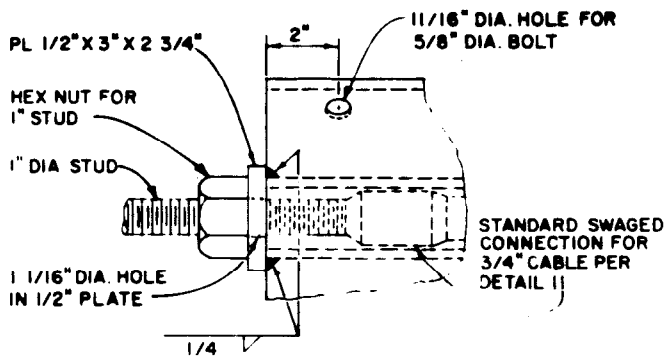


DETAIL 8
WOOD POST-FOOTING CONNECTION TO EXISTING CONCRETE SLAB

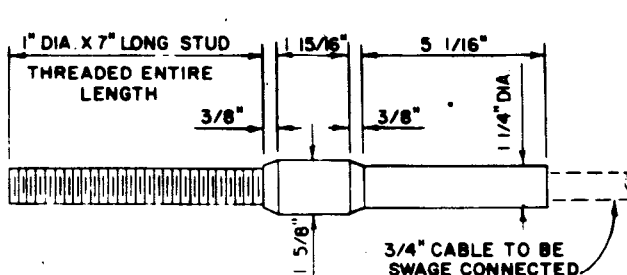


DETAIL 7
5/8\" DIA. BUTTON HEAD BOLT

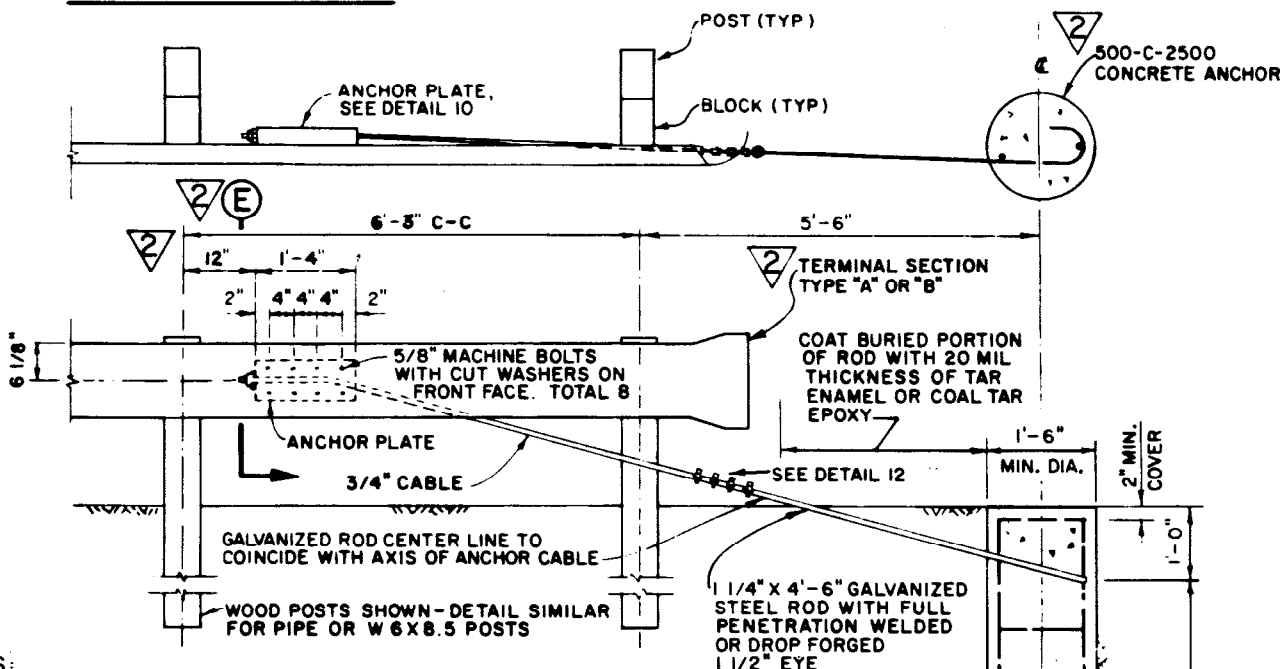
MISCELLANEOUS DETAILS



DETAIL 10
ANCHOR PLATE DETAILS



DETAIL 11
SWAGED FITTING AND STUD

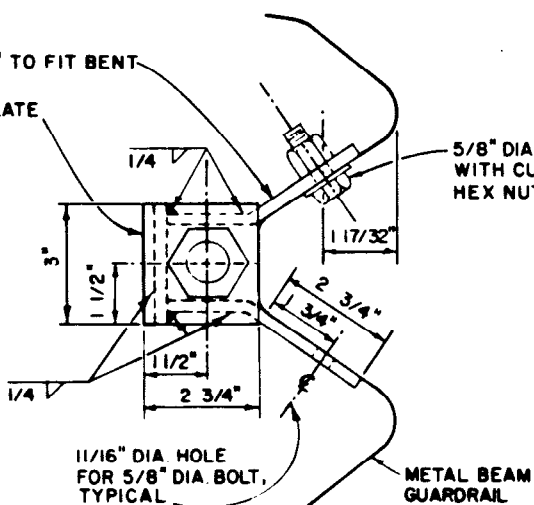


DETAIL 9
CABLE ANCHOR-FIXED

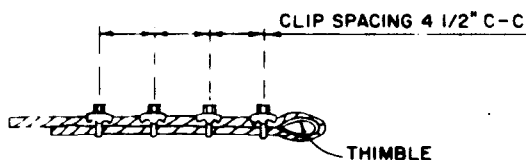
NOTES:

CABLE TO BE PARALLEL TO GUARD RAIL FOR STRAIGHT RUNS OF RAIL. IF GUARD IS CURVED, CABLE MAY HAVE ANGLE POINT AT ANCHOR PLATE

PL 1/4" TO FIT BENT
1/4" PLATE

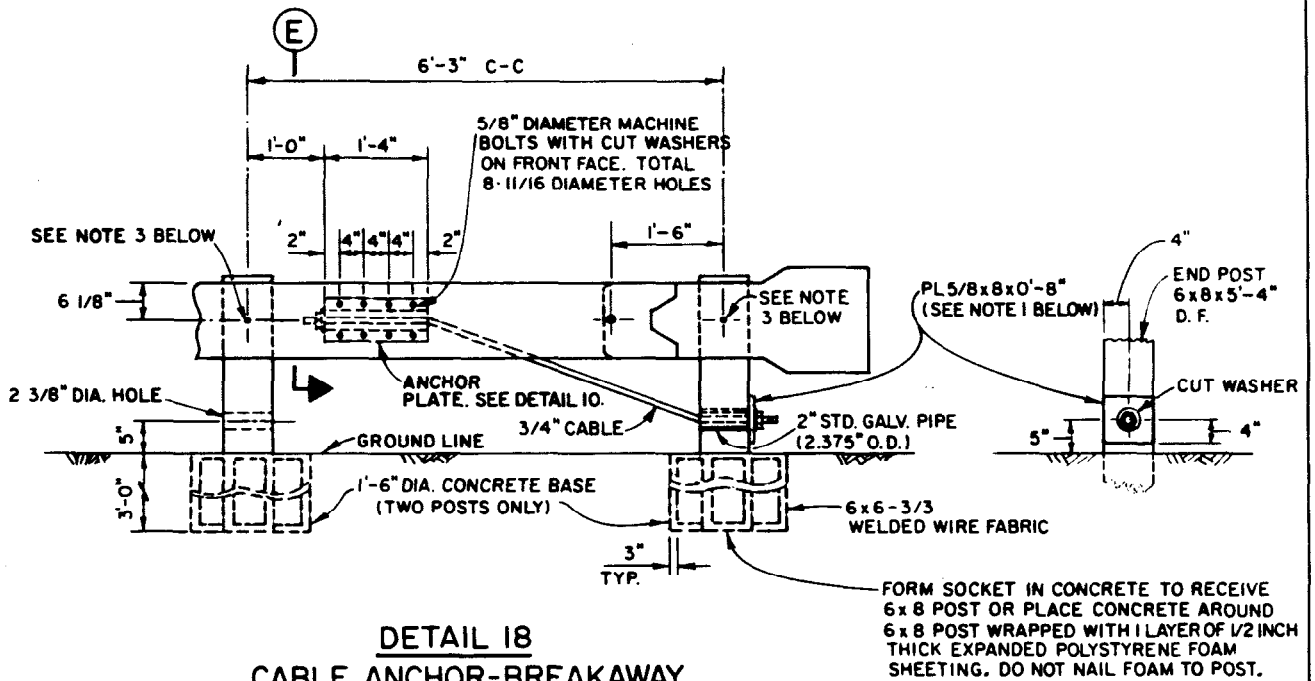
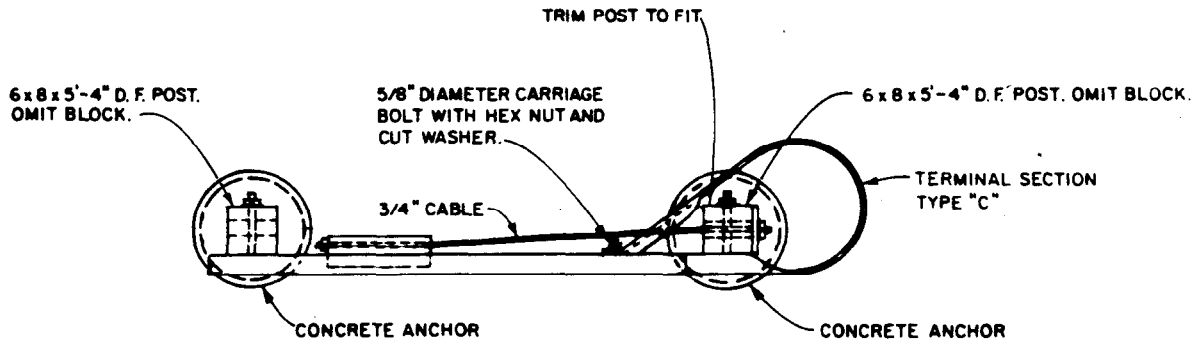


SECTION E



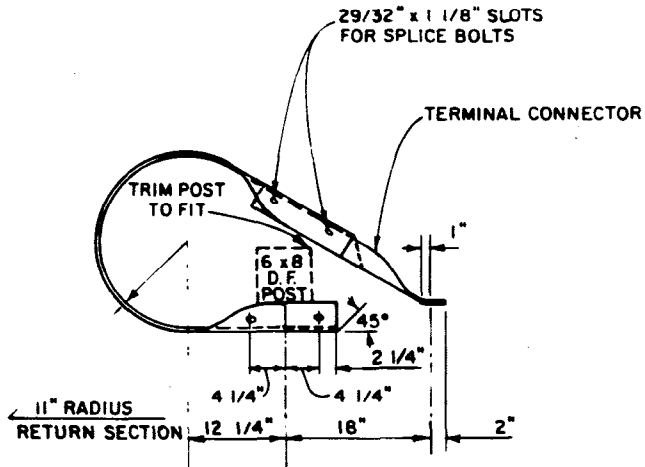
DETAIL 12
CABLE CLIP INSTALLATION

GUARDRAIL ANCHORS

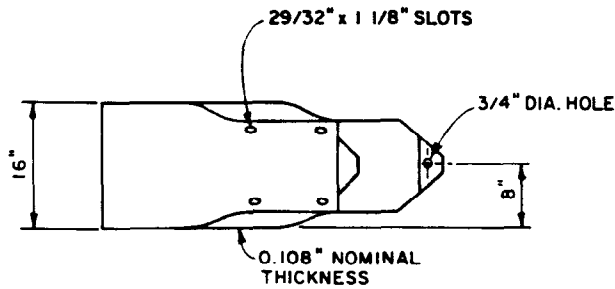


NOTES:

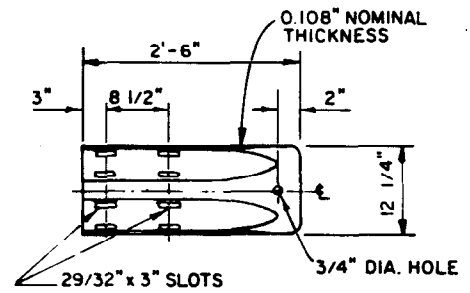
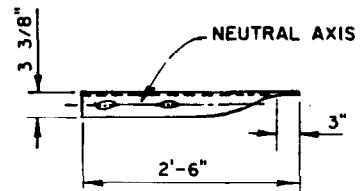
1. 6 x 8 D.F. POSTS SHOWN. W6 x 15 ALTERNATE SIMILAR, EXCEPT THAT 2-INCH STANDARD PIPE SLEEVE IS NOT USED AND A PL 5/8 x 4 x 0'-4" SHALL BE USED AT THE 3/4 INCH CABLE END.
2. POSTS SHALL BE CENTERED IN CONCRETE BASE.
3. OMIT WASHER UNDER HEAD OF RAIL MOUNTING BOLT FOR END POST AND NEXT TO LAST POST.



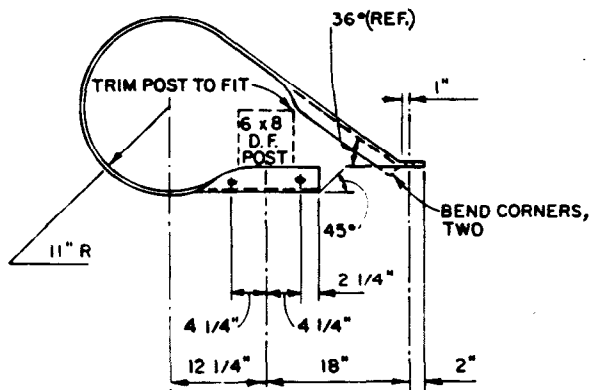
OPTIONAL DESIGN TERMINAL SECTION ▽
TYPE "C"



ELEVATION ▽



TERMINAL CONNECTOR ▽



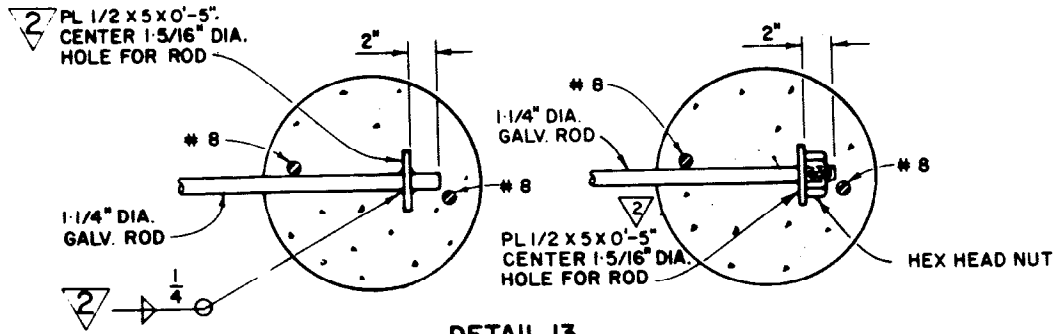
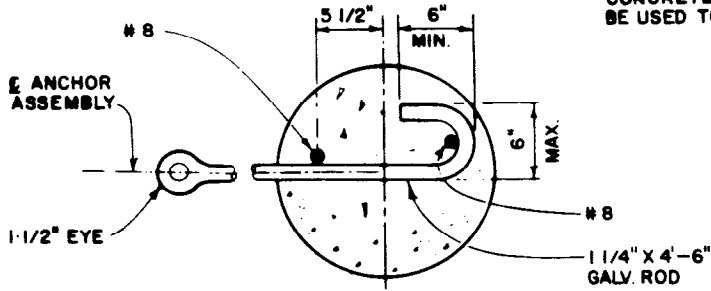
PLAN

TERMINAL SECTION TYPE "C" ▽

GUARDRAIL ANCHORS ▽

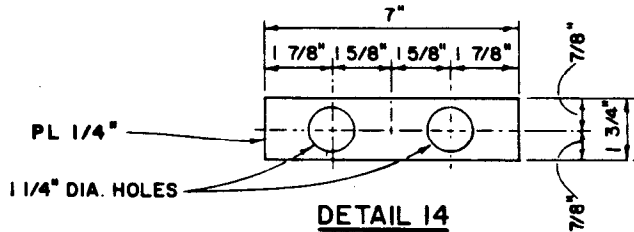
NOTE

ANCHOR ROD HOOKS TO BE IN CONTACT WITH ANCHOR REINFORCEMENT WHEN CONCRETE IS PLACED. WIRE TIES MAY BE USED TO POSITION ANCHOR ROD.



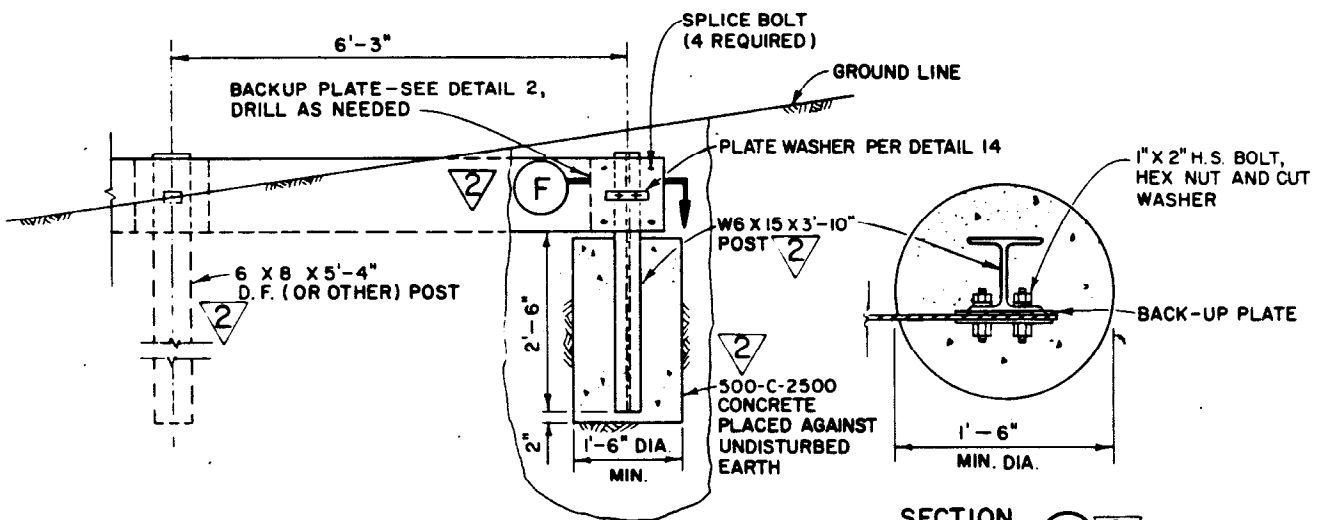
DETAIL 13

OPTIONAL ANCHOR ROD END DETAILS



DETAIL 14

PLATE WASHER



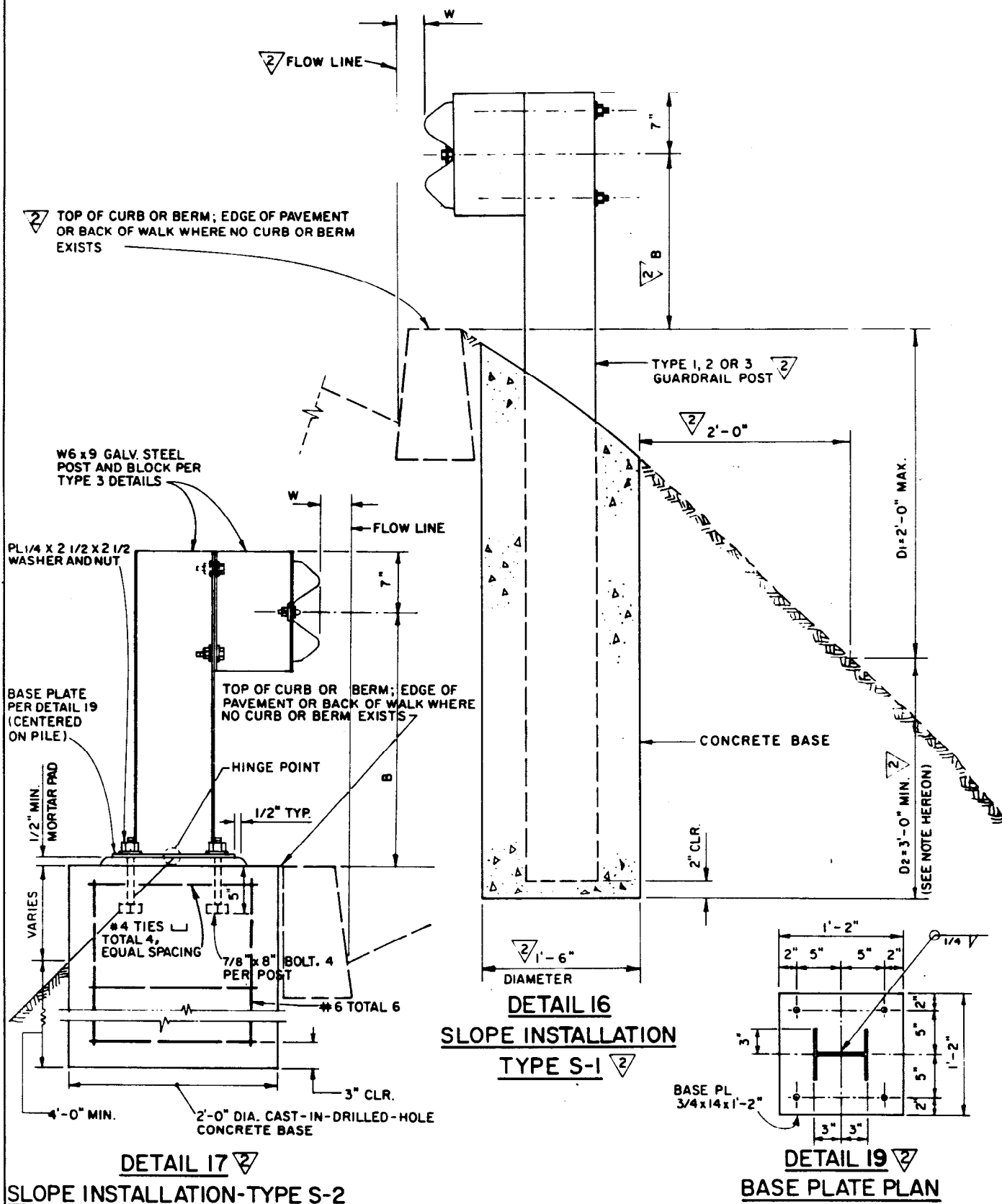
DETAIL 15

BURIED POST ANCHOR

GUARDRAIL ANCHORS

SECTION F

NOTE
 SEE PROJECT PLANS FOR D₂ DIMENSION WHEN SLOPE CONDITIONS ARE SUCH THAT D₁ IS GREATER THAN 2'-0".



DETAIL 17
 SLOPE INSTALLATION-TYPE S-2

DETAIL 16
 SLOPE INSTALLATION
 TYPE S-1

DETAIL 19
 BASE PLATE PLAN

NOTES

- 2 1. UNLESS OTHERWISE NOTED IN THE PROJECT PLANS: DIMENSION W SHALL BE 2"; B=1'-9" MINUS CURB FACE HEIGHT, OR B=1'-9" IF NO CURB OR IF W > 3'-0".
2. THE ENDS OF ALL GUARDRAIL INSTALLATIONS SHALL BE ANCHORED AT BOTH ENDS.
3. TYPE 1 GUARDRAIL POSTS AND BLOCKS:
 - A. WOOD POSTS AND BLOCKS SHALL BE ROUGH SAWN DOUGLAS FIR NO. 1, FREE OF HEART CENTER, PRESSURE TREATED WITH AMMONIACAL COPPER ARSENATE.
 - B. BEFORE THE BOLTS ARE INSERTED IN WOOD POSTS AND BLOCKS THE HOLES SHALL BE FILLED WITH A GREASE, RECOMMENDED BY THE MANUFACTURER FOR CORROSION PROTECTION WHICH WILL NOT MELT OR RUN AT A TEMPERATURE OF 150°F.
4. TYPE 2 GUARDRAIL POSTS AND BLOCKS:
 - 2 A. POSTS SHALL BE GALVANIZED STANDARD STEEL PIPE CONFORMING TO ASTM DESIGNATION A 53.
 - B. BLOCKS SHALL BE GALVANIZED STEEL STRUCTURAL TUBING CONFORMING TO ASTM A 501.
5. TYPE 3 GUARDRAIL POSTS AND BLOCKS SHALL BE GALVANIZED STEEL CONFORMING TO ASTM DESIGNATION A 36.
- 2 6. GUARDRAILS SHALL BE TYPE 1 UNLESS OTHERWISE NOTED ON THE PLANS.
- 2 7. CABLE ANCHORS EXPOSED TO APPROACHING TRAFFIC SHALL BE THE BREAKAWAY TYPE PER DETAIL 18 UNLESS OTHERWISE NOTED ON THE PLANS.
 8. ALL PLATES SHALL BE GALVANIZED STEEL CONFORMING TO ASTM DESIGNATION A 36.
 9. A CABLE ANCHOR ASSEMBLY SHALL CONSIST OF A CABLE ASSEMBLY AND ANCHOR PLATE.
 - A. ANCHOR CABLE SHALL BE MADE OF PLOW STEEL WITH A MINIMUM BREAKING STRENGTH OF 23 TONS. IT SHALL BE 3/4-INCH PRE-FORMED, 6 X 19, WIRE STRAND CORE OR INDEPENDENT WIRE ROPE CORE (IWRC), GALVANIZED IN CONFORMANCE WITH FEDERAL SPECIFICATION RR-W-410C, RIGHT REGULAR LAY. TWO CERTIFIED COPIES OF MILL TEST REPORTS OF EACH MANUFACTURED CABLE LENGTH SHALL BE FURNISHED TO THE ENGINEER. THE OVERALL LENGTH OF EACH CABLE ANCHOR ASSEMBLY SHALL BE AS REQUIRED BY THE PLANS, BUT SHALL BE A MINIMUM OF 6 FEET-6 INCHES.
 - B. THE SWAGED FITTING SHALL BE MACHINED FROM HOT-ROLLED BAR STEEL CONFORMING TO AISI DESIGNATION C 1035 AND SHALL BE ANNEALED SUITABLE FOR COLD SWAGING. THE FITTING SHALL BE GALVANIZED BEFORE SWAGING. A LOCK PINHOLE ADEQUATE FOR A 1/4-INCH PLATED SPRING STEEL PIN SHALL BE DRILLED THROUGH THE HEAD OF THE FITTING TO RETAIN THE STUD IN PROPER POSITION. THE MANUFACTURER'S IDENTIFYING MARK SHALL BE STAMPED ON THE BODY OF THE FITTING.
 - C. THE ONE-INCH-DIAMETER STUD SHALL CONFORM TO ASTM DESIGNATION A 449 AFTER GALVANIZING. PRIOR TO GALVANIZING, A 3/8-INCH SLOT FOR THE LOCKING PIN SHALL BE MILLED IN THE STUD END. THREADS SHALL HAVE ANSI CLASS 2A FIT BEFORE GALVANIZING. STUD NUTS SHALL CONFORM TO ASTM DESIGNATION A 325. AFTER GALVANIZING, THE PITCH DIAMETER OF THE NUT AND THE HEAD OF THE SWAGED FITTING MAY BE TAPPED OVER ANSI B1.1 CLASS B TOLERANCE BY 0.023 INCH MAXIMUM OVERSIZE.
 - D. THE SWAGED FITTINGS, STUD AND NUT ASSEMBLY SHALL DEVELOP THE SPECIFIED BREAKING STRENGTH OF THE CABLE.
 - E. THE CABLE ASSEMBLIES SHALL BE SHIPPED AS A COMPLETE UNIT, INCLUDING STUD AND NUT.
 - F. ONE SAMPLE OF CABLE PROPERLY FITTED WITH SWAGED FITTING AND RIGHT-HAND THREAD STUD AT BOTH ENDS AS SPECIFIED ABOVE SHALL BE FURNISHED TO THE ENGINEER FOR TESTING (LENGTH = 6'-0").
 10. THE STEEL PLATES FOR THE ANCHOR PLATE SHALL CONFORM TO ASTM DESIGNATION A 36. BOLTS AND NUTS SHALL CONFORM TO ASTM DESIGNATION A 307. THE ANCHOR PLATE SHALL BE GALVANIZED AFTER FABRICATION.
 11. CABLE CLIPS SHALL BE COMMERCIAL QUALITY DROP FORGED GALVANIZED STEEL. THIMBLES SHALL BE COMMERCIAL QUALITY, GALVANIZED STEEL.
 - 2 12. THE ANCHOR RODS SHALL BE FABRICATED OF STEEL CONFORMING TO ASTM DESIGNATION A 36, A 441, A 572 OR A 576, GRADE 1018, 1019, 1021 OR 1026. THE EYES SHALL BE HOT FORGED OR FORMED WITH FULL PENETRATION WELDS. ANCHOR RODS WITH EYES THAT HAVE BEEN FORMED WITH ANY PART OF THE EYE BELOW 1600°F DURING FORMING OR WITH EYES THAT HAVE BEEN CLOSED BY WELDING SHALL BE THERMALLY STRESS RELIEVED PRIOR TO GALVANIZING. THE COMPLETED ANCHOR ROD, AFTER GALVANIZING, SHALL DEVELOP A TENSILE STRENGTH OF 50,000 POUNDS MINIMUM.
 13. COAL TAR ENAMEL SHALL CONFORM TO ANMA STANDARD C 203. COAL TAR EPOXY SHALL CONFORM TO MIL-P-23236, TYPE 1, CLASS 2.
 - 2 14. CONCRETE SHALL BE CLASS 500-C-2500.
 15. MATERIALS NOT SPECIFIED SHALL BE PER THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.