

| ROUTE NO.         | SECTION        | COUNTY   | TOTAL SHEETS           | SHEET NO. |
|-------------------|----------------|----------|------------------------|-----------|
| FAS 316           | 12-00229-01-SP | IROQUOIS | 12                     | 1         |
| JOB # C-93-048-12 |                |          | PROJECT HSIP-0316<111> |           |
| CONTRACT 87518    |                |          |                        |           |

INDEX OF SHEETS

| SHEET NUMBER  | DESCRIPTION  |
|---------------|--|
| 1             | COVER SHEET  |
| 2             | SUMMARY OF QUANTITIES, GENERAL NOTES, & SCHEDULE OF QUANTITIES   |
| 3             | POST SPACINGS @ BRIDGE DETAIL AND GUARDRAIL REMOVAL DETAIL       |
| 4             | PLAN VIEW  |
| 5             | STEEL BRIDGE RAIL DETAILS  |
| 6             | EXISTING STRUCTURE PLANS   |
| 7             | EXISTING STRUCTURE PLANS   |
| 8, 9, 10 & 11 | TRAFFIC BARRIER TERMINAL 6A SPECIAL DETAILS                      |
| 12            | TRAFFIC BARRIER TERMINAL TYPE 1 (SPECIAL) FLARE (SPECIAL) DETAIL |

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

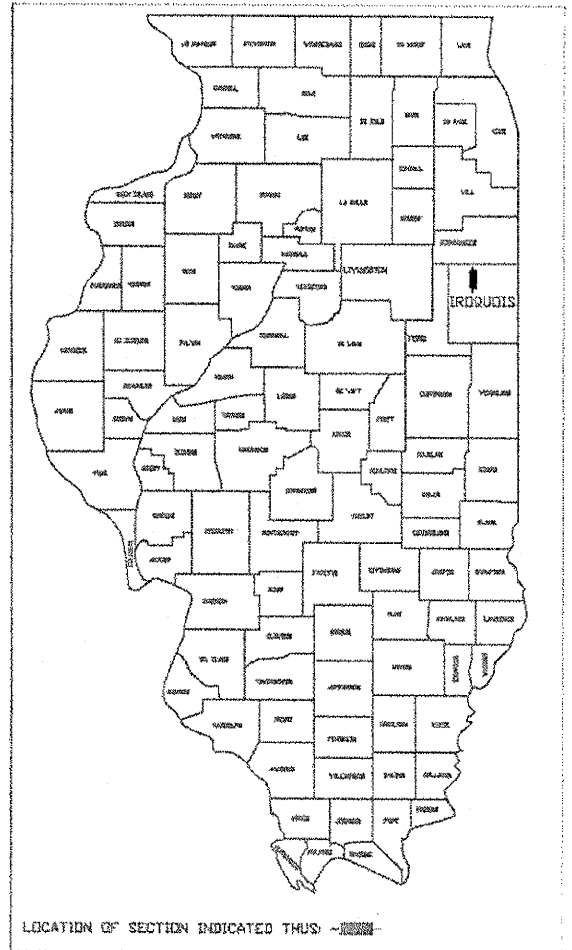
**GUARDRAIL PROJECT**

IROQUOIS COUNTY  
PLANS FOR PROPOSED FEDERAL AID PROJECT

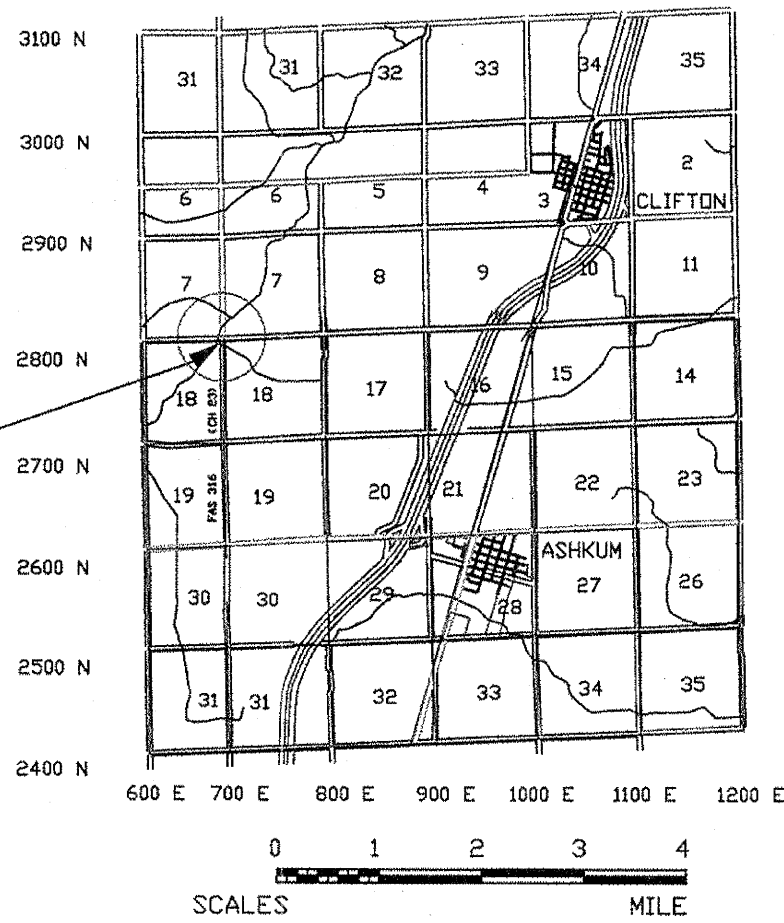
ROUTE: FAS 316, CH 23  
SECTION: 12-00229-01-SP  
PROJECT: HSIP-0316<111>  
JOB No.: C-93-048-12

STANDARDS

- 000001-06 SYMBOLS AND ABBREVIATIONS
- 630301-05 SHOULDER WIDENING FOR TYPE 1 (SPECIAL) GUARDRAIL TERMINALS
- 635001-01 DELINEATORS
- 635006-03 REFLECTOR AND TERMINAL MARKER PLACEMENT
- 635011-02 REFLECTOR MARKER AND MOUNTING DETAILS
- 701901-02 TRAFFIC CONTROL DEVICES
- BLR 21-9 TYPICAL APPLICATION OF TRAFFIC CONTROL DEVICES FOR CONSTRUCTION ON RURAL LOCAL HIGHWAYS
- BLR 26-3 STEEL PLATE BEAM GUARDRAIL HEIGHT



PROJECT LOCATION  
IMPROVEMENT BEGINS STA. 11+48.61  
IMPROVEMENT ENDS STA. 14+93.96  
STRUCTURE # 038-3203



| TRAFFIC DATA                               |
|--|
| FUNCTIONAL CLASSIFICATION: MINOR COLLECTOR |
| ADT = 350                                  |
| SPEED LIMIT = 40 M. P. H.                  |

JULIE  
JOINT UTILITY LOCATION INFORMATION FOR EXCAVATION  
1-800-892-0123

CONTRACT NO. 87518

GROSS LENGTH OF IMPROVEMENT = 345.35 FT. = 0.065 MI.  
NET LENGTH OF IMPROVEMENT = 345.35 FT. = 0.065 MI.

\* THESE PLAN WERE PREPARED BY ME OR BY A FULL TIME MEMBER OF MY STAFF WORKING UNDER MY DIRECT SUPERVISION \*



*JVM*  
JOEL V. MOORE, COUNTY ENGINEER  
ILL. REG. PROF. ENG. #62056831  
DATE EXPIRES: 11/30/13

STATE OF ILLINOIS  
DEPARTMENT OF TRANSPORTATION

Approved Feb 14, 2012

*JVM*  
County Engineer

Passed 02-22, 2012

*[Signature]*  
District Three Implementation Engineer

Released for Bid Based On Limited Review 02-22, 2012

*[Signature]*  
Deputy Director of Highways, Region Two Engineer

| STEEL RAILING, TYPE 2399 (SPL) |                      |       |
|--------------------------------|----------------------|-------|
| SIDE                           | STATION TO STATION   | FOOT  |
| RIGHT                          | 13+03.96 TO 14+00.21 | 96.25 |
| LEFT                           | 12+92.36 TO 13+88.61 | 96.25 |
| TOTAL                          |                      | 192.5 |

| TRAFFIC BARRIER TERMINAL, TYPE 6A (SPL) |                      |      |
|---|----------------------|------|
| SIDE                                    | STATION TO STATION   | EACH |
| RIGHT                                   | 12+85.21 TO 13+03.96 | 1    |
| RIGHT                                   | 14+00.21 TO 14+43.96 | 1    |
| LEFT                                    | 13+88.61 TO 14+07.36 | 1    |
| LEFT                                    | 12+48.61 TO 12+92.36 | 1    |
| TOTAL                                   |                      | 4    |

| TRAFFIC BARRIER TERMINAL, TYPE 1 (SPL) FLARED |                      |      |
|---|----------------------|------|
| SIDE  | STATION TO STATION   | EACH |
| RIGHT   | 12+47.71 TO 12+85.21 | 1    |
| TOTAL   |                      | 1    |

| STEEL PLATE BEAM GUARDRAIL TYPE A, 6 FOOT POSTS |                      |       |
|---|----------------------|-------|
| SIDE  | STATION TO STATION   | FOOT  |
| LEFT  | 11+98.61 TO 12+48.61 | 50    |
| LEFT  | 14+07.36 TO 14+69.86 | 62.5  |
| TOTAL   |                      | 112.5 |

| TRAFFIC BARRIER TERMINAL TYPE 1 (SPECIAL) TANGENT |                      |      |
|---|----------------------|------|
| SIDE  | STATION TO STATION   | EACH |
| LEFT  | 11+48.61 TO 11+98.61 | 1    |
| LEFT  | 14+69.86 TO 15+19.86 | 1    |
| RIGHT   | 14+43.96 TO 14+93.96 | 1    |
| TOTAL   |                      | 3    |

| GUARDRAIL MARKERS |                    |      |
|-------------------|--------------------|------|
| SIDE              | STATION TO STATION | EACH |
| LEFT              | 11+98 TO 14+69     | 8    |
| RIGHT             | 12+85 TO 14+43     | 4    |
| TOTAL             |                    | 12   |

| SUMMARY OF QUANTITIES |          |  |       | CONSTRUCTION CODE |
|-----------------------|----------|--|-------|-------------------|
|                       |          |  |       | 0021              |
| ITEM #                | CODE #   | ITEM   | UNIT  | QUANTITY          |
| * 1                   | 63000001 | STEEL PLATE BEAM GUARDRAIL, TYPE A 6 FOOT POSTS    | FOOT  | 112.5             |
| * 2                   | 63100167 | TRAFFIC BARRIER TERMINAL, TYPE 1 (SPECIAL) TANGENT | EACH  | 3                 |
| * 3                   | 63200310 | GUARDRAIL REMOVAL                                  | FOOT  | 237               |
| * 4                   | 67100100 | MOBILIZATION                                       | L SUM | 1                 |
| * 5                   | 70101830 | TRAFFIC CONTROL AND PROTECTION, STANDARD BLR 21    | L SUM | 1                 |
| * 6                   | 78200410 | GUARDRAIL MARKERS, TYPE A                          | EACH  | 8                 |
| * 7                   | 78200430 | GUARDRAIL MARKERS, TYPE C                          | EACH  | 4                 |
| * 8                   | 78201000 | TERMINAL MARKER-DIRECT APPLIED                     | EACH  | 4                 |
| * 9                   | XX008080 | STEEL RAILING, TYPE 2399 (SPECIAL)                 | FOOT  | 192.5             |
| * 10                  | X6310088 | TRAFFIC BARRIER TERMINAL, TYPE 6A (SPECIAL)        | EACH  | 4                 |
| * 11                  | 63100169 | TRAFFIC BARRIER TERMINAL, TYPE 1 (SPECIAL) FLARED  | EACH  | 1                 |

\* SEE SPECIAL PROVISIONS

### GENERAL NOTES

REMOVAL OF MATERIALS WILL INCLUDE DISMANTLING, LOADING, HAULING AND DISPOSAL. THE WORK SITE WILL BE LEFT IN A SAFE AND ORDERLY CONDITION.

NO MATERIAL SHOULD BE LEFT ON OR NEAR THE ROADWAY DURING NON-WORKING HOURS.

ANY NECESSARY TRAFFIC CONTROL WILL BE PROVIDED BY THE CONTRACTOR; APPROPRIATE STANDARDS ARE HEREWITH ATTACHED.

### SECTION NOTES

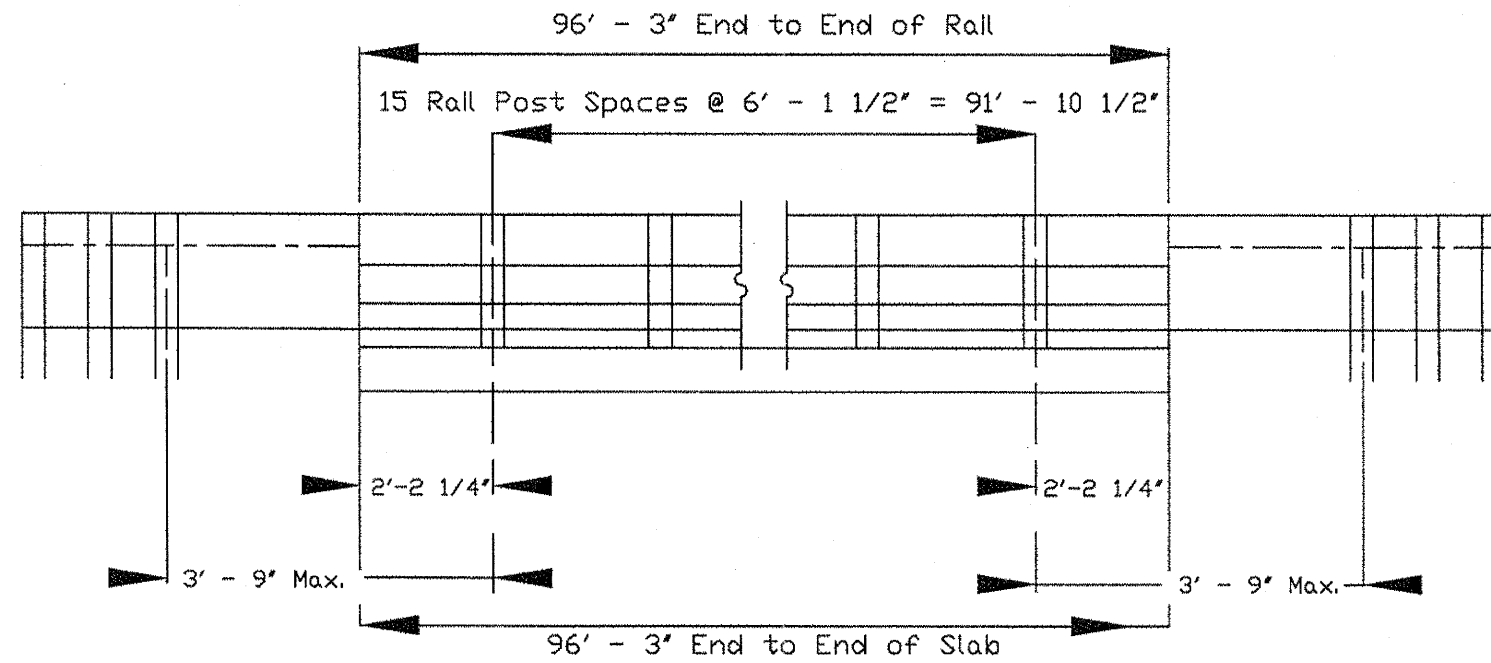
THE PROPOSED IMPROVEMENT CONSISTS OF REMOVAL AND REPLACEMENT OF THE EXISTING BRIDGE RAIL ON STRUCTURE # 038-3203 AND NEW APPROACH GUARDRAIL AND ALL WORK NECESSARY TO COMPLETE THE PROJECT ACCORDING TO THE PLANS AND SPECIFICATIONS.

STRUCTURE # 038-3203 AND APPROACHES ON COUNTY HIGHWAY 23 WERE CONSTRUCTED UNDER SECTION (229B-MFT IN 1973).

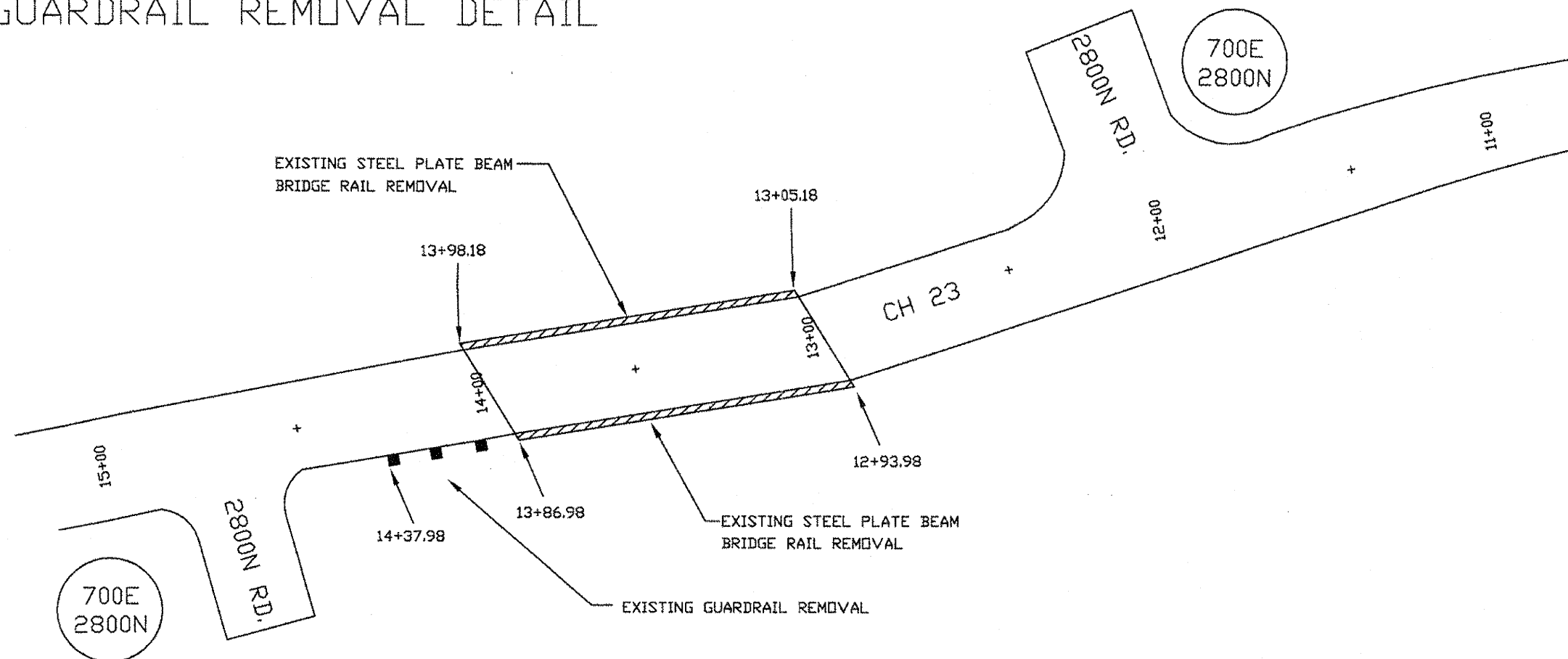
| GUARDRAIL REMOVAL |                      |      |
|-------------------|----------------------|------|
| SIDE              | STATION TO STATION   | EACH |
| LEFT              | 12+93.98 TO 13+86.98 | 93   |
| RIGHT             | 13+05.18 TO 13+98.18 | 93   |
| LEFT              | 13+86.98 TO 14+37.98 | 51   |
| TOTAL             |                      | 237  |

# PROPOSED POST SPACING AND RAIL LENGTH @ BRIDGE

|                      |                           |                     |                        |                |
|----------------------|---------------------------|---------------------|------------------------|----------------|
| ROUTE NO.<br>FAS 316 | SECTION<br>12-00229-01-SP | COUNTY<br>IRROQUOIS | TOTAL SHEETS<br>12     | SHEET NO.<br>3 |
| JOB # C-93-048-12    |                           |                     | PROJECT HSIP-0316(111) |                |
| CONTRACT 87518       |                           |                     |                        |                |

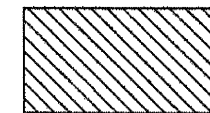
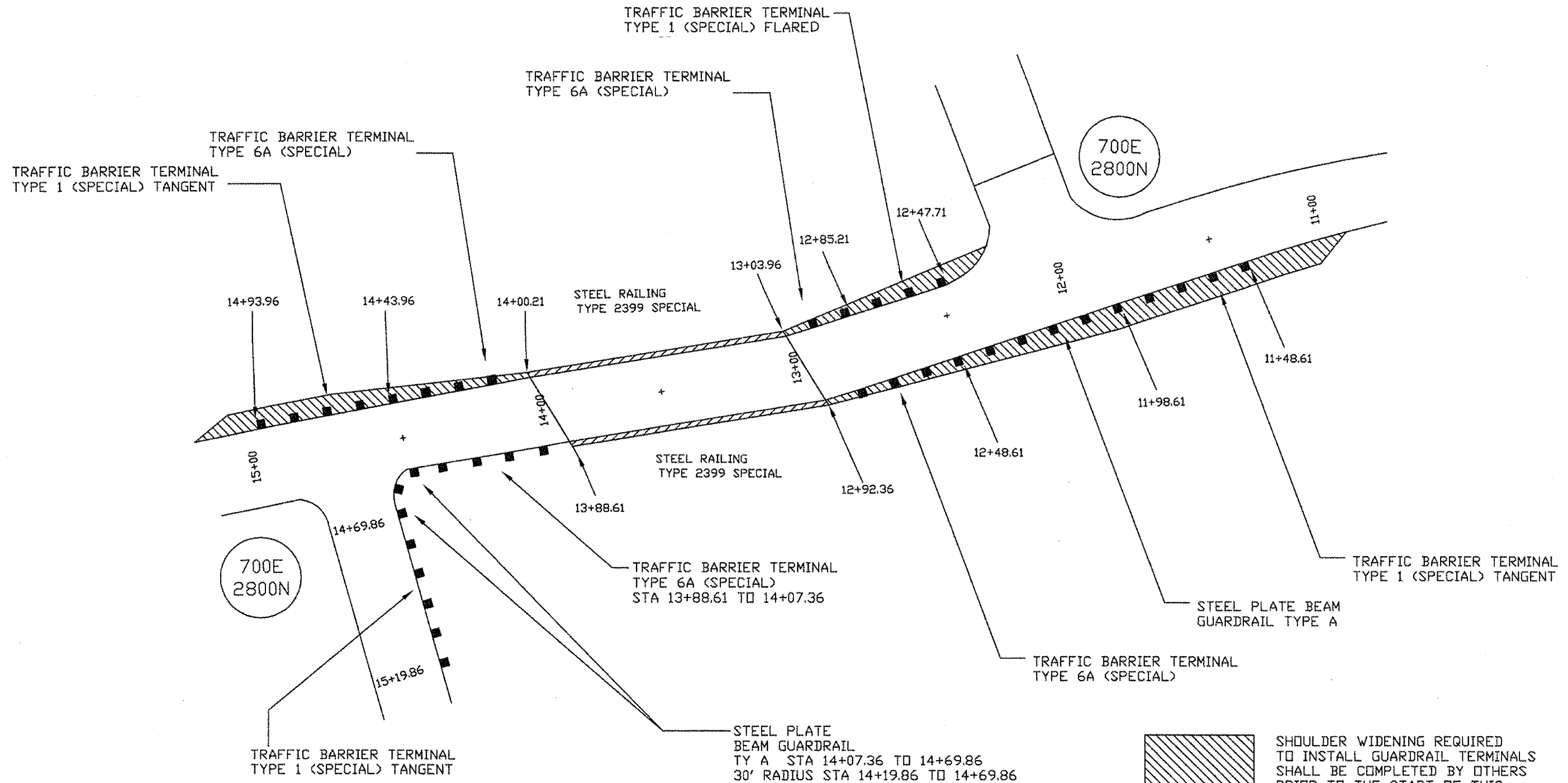
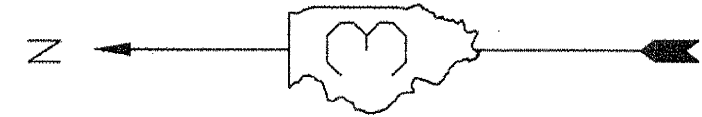


# GUARDRAIL REMOVAL DETAIL

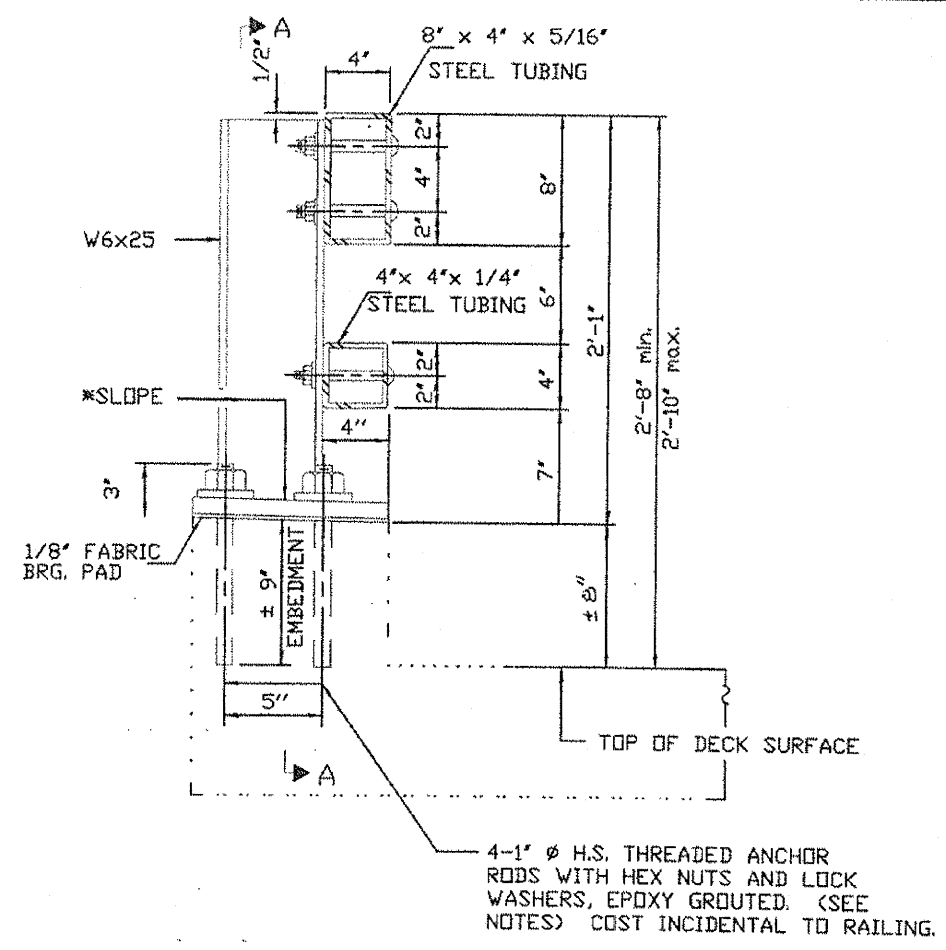


|                   |                |           |                        |           |
|-------------------|----------------|-----------|------------------------|-----------|
| ROUTE NO.         | SECTION        | COUNTY    | TOTAL SHEETS           | SHEET NO. |
| FAS 316           | 12-00229-01-SP | IRROQUOIS | 12                     | 4         |
| JOB # C-93-048-12 |                |           | PROJECT HSIP-0316(110) |           |
| CONTRACT 87518    |                |           |                        |           |

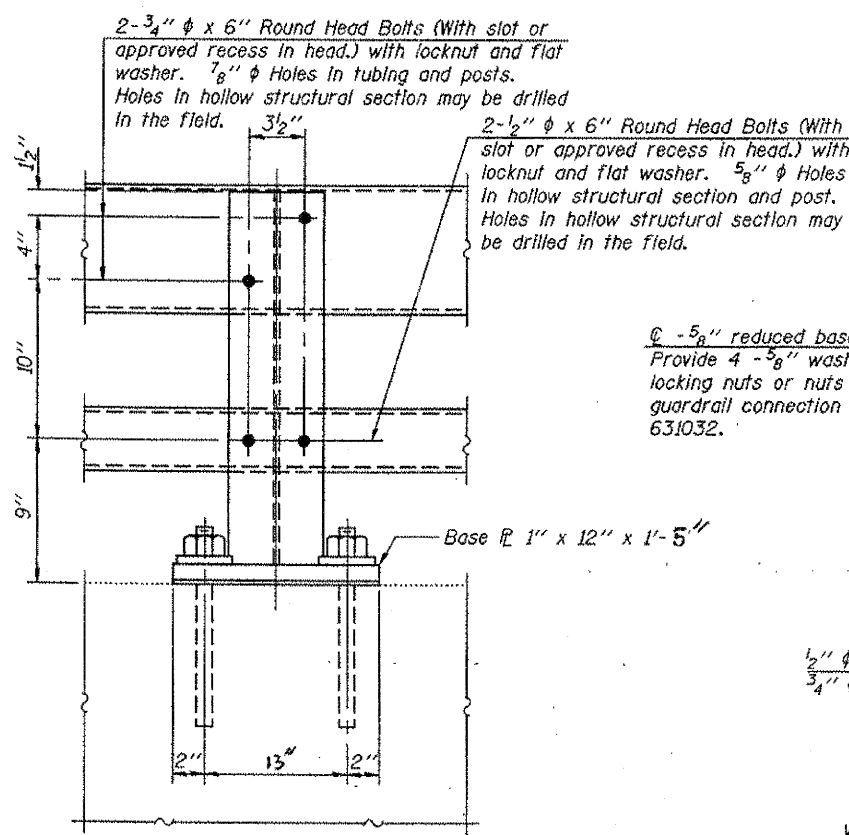
# PLAN VIEW



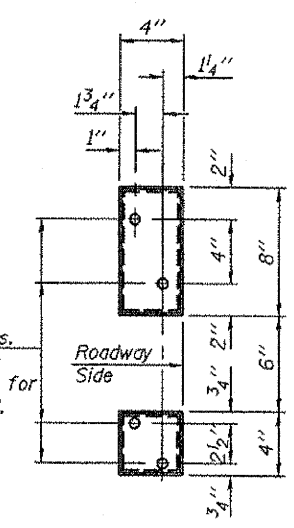
SHOULDER WIDENING REQUIRED TO INSTALL GUARDRAIL TERMINALS SHALL BE COMPLETED BY OTHERS PRIOR TO THE START OF THIS CONTRACT AT NO COST TO THIS SECTION.



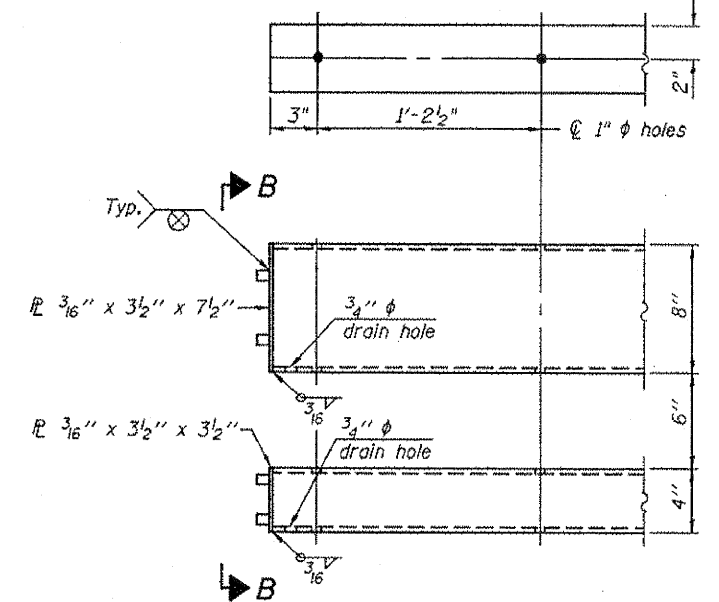
SECTION AT RAIL POST



SECTION A-A

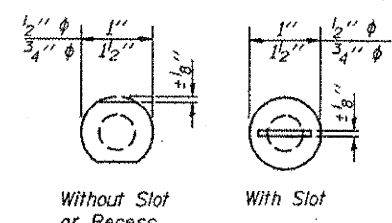


VIEW B-B

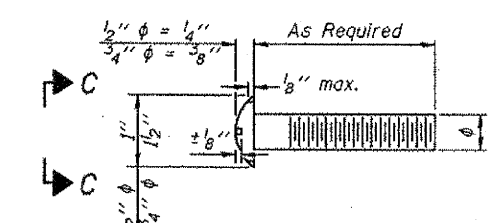


END OF RAIL DETAILS

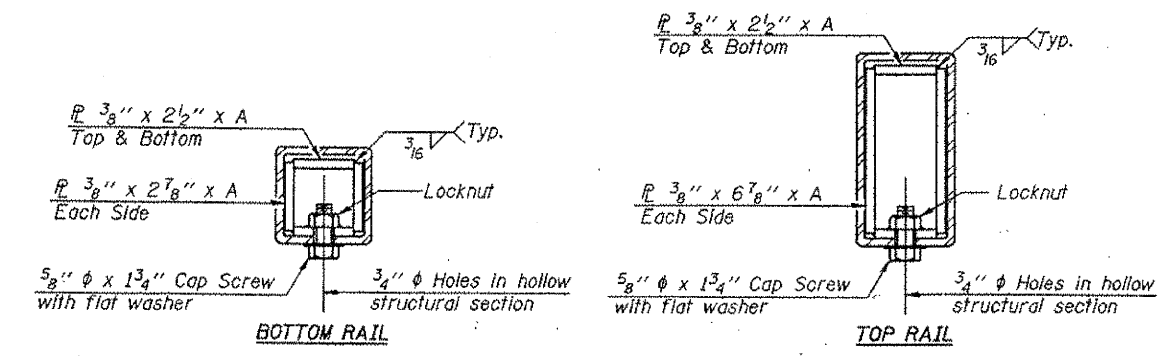
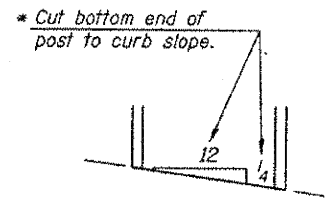
Ø - 5/8" reduced base welded studs. Provide 4 - 5/8" washers and self-locking nuts or nuts and jam nuts for guardrail connection shown on Std. 631032.



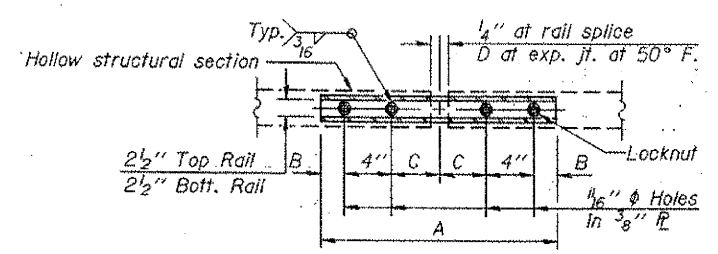
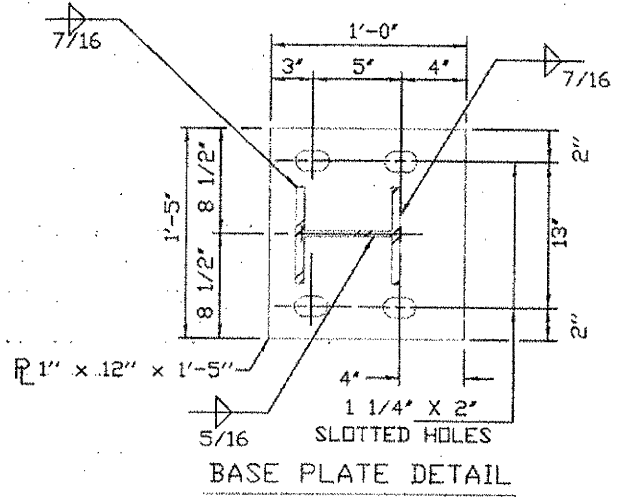
VIEW C-C



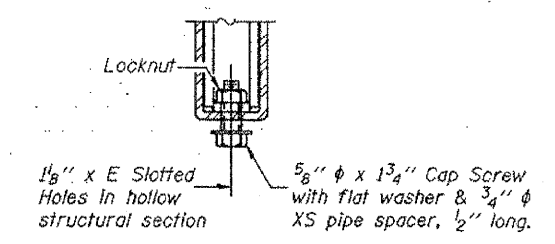
DETAIL OF 1/2' Ø & 3/4' Ø ROUND HEAD BOLTS



SECTIONS AT RAIL SPLICE



PLAN-BOTT. SPLICE R TYPICAL



RAIL SPLICE CONNECTION AT EXPANSION JT.

Notes:  
 All field drilled holes shall be coated with an approved zinc rich paint before erection.  
 Posts shall not be located closer than 1'-3" to an existing bridge expansion joint or end of bridge.  
 Steel Bridge Rail expansion joint shall be provided between any two (2) posts which span a bridge expansion joint. Bolts located at expansion joint shall be provided with locknuts and shall be tightened only to a point that will allow railing movement.  
 Provide one 1/8" and two 1/16" steel shims for 25% of the posts. Shims shall be similar to base plates in size and holes.  
 All steel rail elements shall be galvanized according to Article 509.05 of the Standard Specifications.

SPLICE DIMENSIONS

| T           | D      | A      | B      | C      | E      |
|-------------|--------|--------|--------|--------|--------|
| ≤4"         | 2 1/2" | 1'-8"  | 2"     | 4"     | 2 1/2" |
| >4" ≤6 1/2" | 3 3/4" | 2'-0"  | 2 1/2" | 5 1/2" | 3 1/2" |
| >6 1/2" ≤9" | 5"     | 2'-4"  | 3 1/2" | 6 1/2" | 9"     |
| >9" ≤13"    | 7"     | 2'-10" | 4 1/2" | 8 1/2" | 11"    |
| Rail Splice | 1/4"   | 1'-8"  | 2"     | 4"     | —      |

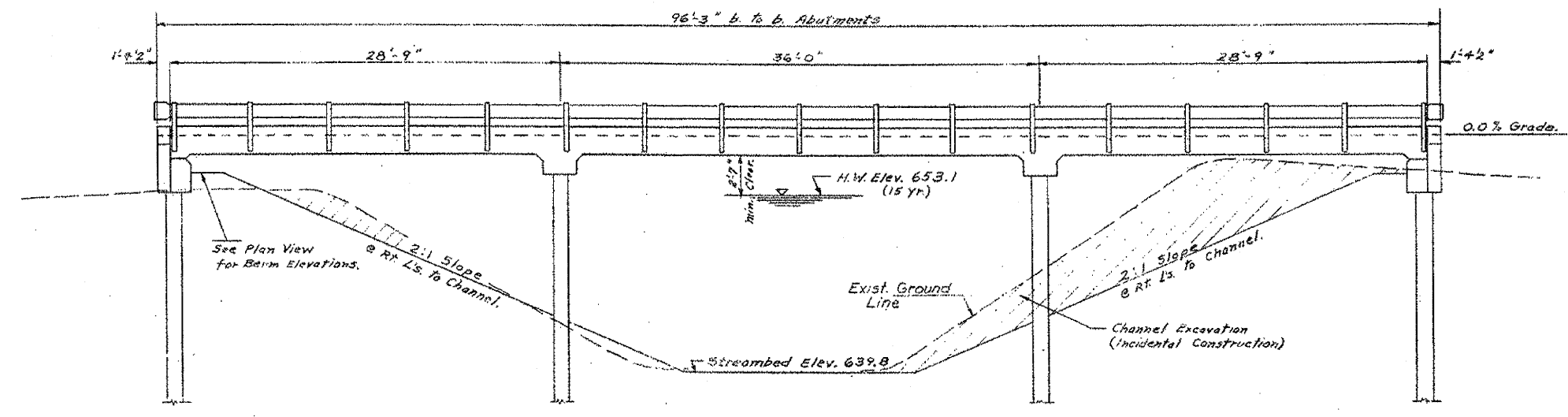
T = Total movement at expansion joint as shown on the design plans.

BILL OF MATERIAL

| Item                     | Unit | Quantity |
|--------------------------|------|----------|
| Steel Railing, Type 2399 | Foot | 192.5    |

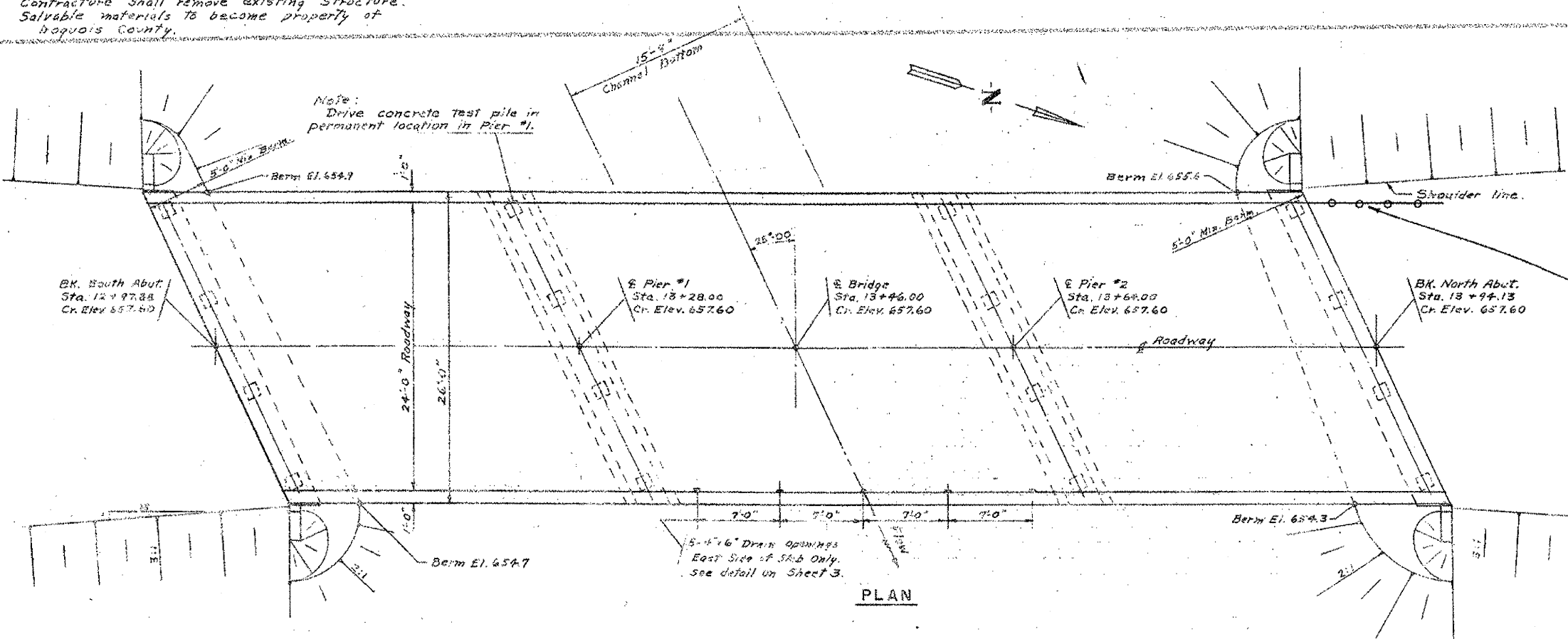
**GENERAL NOTES**

Class X Concrete shall be used throughout.  
 The concrete floor slab shall be finished in accordance with Article 503.15 of the specifications.  
 The Standard Specifications adopted by the Dept of Transportation July 2, 1973 shall apply to this work.  
 Curbs shall be poured monolithically with the slab.  
 For items Metal Plate Bridge Rail and Name Plates see Special Provisions.  
 All rebar shall be lapped a minimum of 24 diameters unless otherwise shown.  
 Pier piles shall be driven a minimum of 15' below streambed. Abutment piles shall be driven a minimum of 10 feet into undisturbed earth.  
 One concrete test pile shall be driven in a permanent location in Pier #1 before ordering the remainder of the piles.

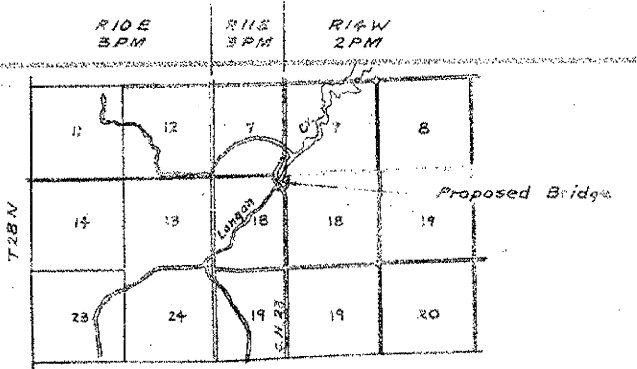


**ELEVATION**

BM - Top Iron Pipe West End Concrete Wall at South East Corner Existing Bridge Elev. 653.76  
 Existing Structure - Steel Truss, 1-Span @ 64'-0"; 15" Roadway, timber plank floor.  
 Substructure - Closed Stone Masonry Abutments.  
 Contracture shall remove existing structure.  
 Salvable materials to become property of Iroquois County.



**PLAN**



**LOCATION PLAN**

**TOTAL BILL OF MATERIAL**

| ITEM   | SUPER    | SUB   | TOTAL |
|--|----------|-------|-------|
| Pavement Removal                                 | Sq. Yds. | -     | 333   |
| Removal of Existing Structures                   | Each     | -     | 1     |
| Class X Concrete                                 | Cu. Yd.  | 125.2 | 14.8  |
| Reinforcement Bars                               | Lbs.     | 28350 | 1510  |
| Furnishing Precast Concrete Piles 14"            | Lin. Ft. | -     | 560   |
| Driving Precast Concrete Piles                   | Lin. Ft. | -     | 560   |
| Test Piles, Precast Concrete                     | Each     | -     | 1     |
| Nameplates                                       | Each     | 1     | -     |
| Metal Plate Bridge Rail (Cl. A, Ty. 1)           | Lin. Ft. | 187   | -     |
| Earth Excavation                                 | Cu. Yds. | -     | 6608  |
| Borrow Excavation                                | Cu. Yds. | -     | 1704  |
| Aggregate Surface Course, Type B                 | Tons     | -     | 2743  |
| Pipe Culvert, Type 2, 15"                        | Lin. Ft. | -     | 48    |
| Pipe Culvert, Type 3, 15"                        | Lin. Ft. | -     | 70    |
| STEEL PIPE BEAM Guard Rail, Single Rail Lin. Ft. | 200      | -     | 300   |
| Terminal End Section Single Rail                 | Each     | 4     | -     |

**GENERAL PLAN & ELEVATION**

STATION 13+46  
 BUILT 1874 BY  
 IROQUOIS COUNTY  
 SEC. 229-B-MFT  
 CORNING GAS CO.  
 NO. 038-3203

**LETTERING FOR NAME PLATE**  
 Locate Nameplate at Southeast corner of Bridge. See Special Provisions.

**DESIGN STRESSES**

$f_c = 20,000$  p.s.i. (reinf.)  
 $f_s = 1,300$  p.s.i.  
 $n = 10$

**WATERWAY DATA**

Drainage Area 12,300 Acres  
 Present Opening 487 Sq. Ft.  
 Req'd. Opening (15 yr) 524 Sq. Ft.  
 Proposed Opening 524 Sq. Ft.  
 Design Discharge (Est.) 2306 c.f.s.

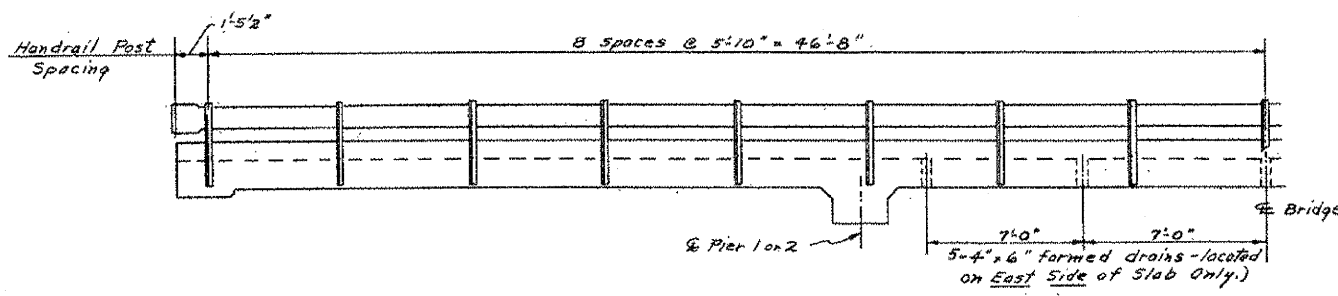
Carl G. G. G.  
 Illinois Structural  
 #2695



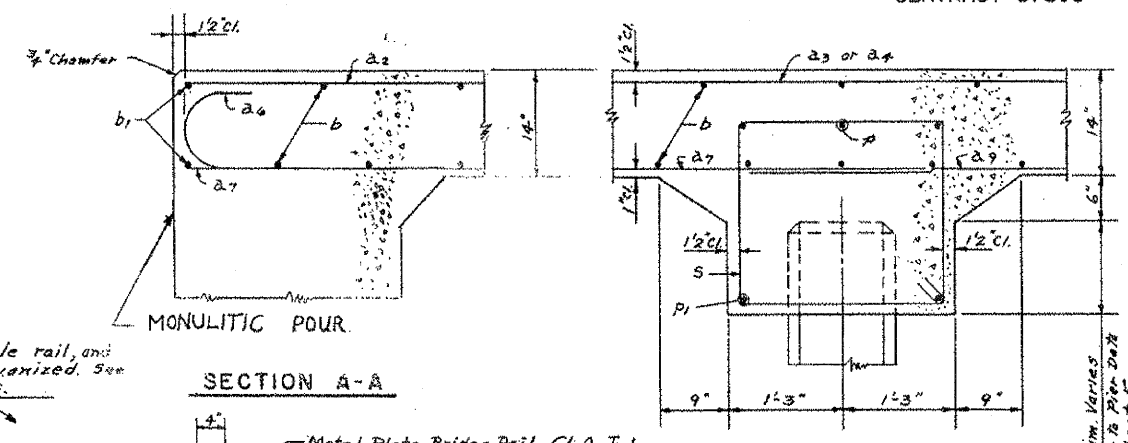
BRIDGE NO 3203  
 SECTION-229-B-MFT  
 IROQUOIS COUNTY  
 STATION 13+46

Anby, Oglesby, Bohm and Burdett  
 Consulting Civil and Structural Engineers  
 Lead Engineers

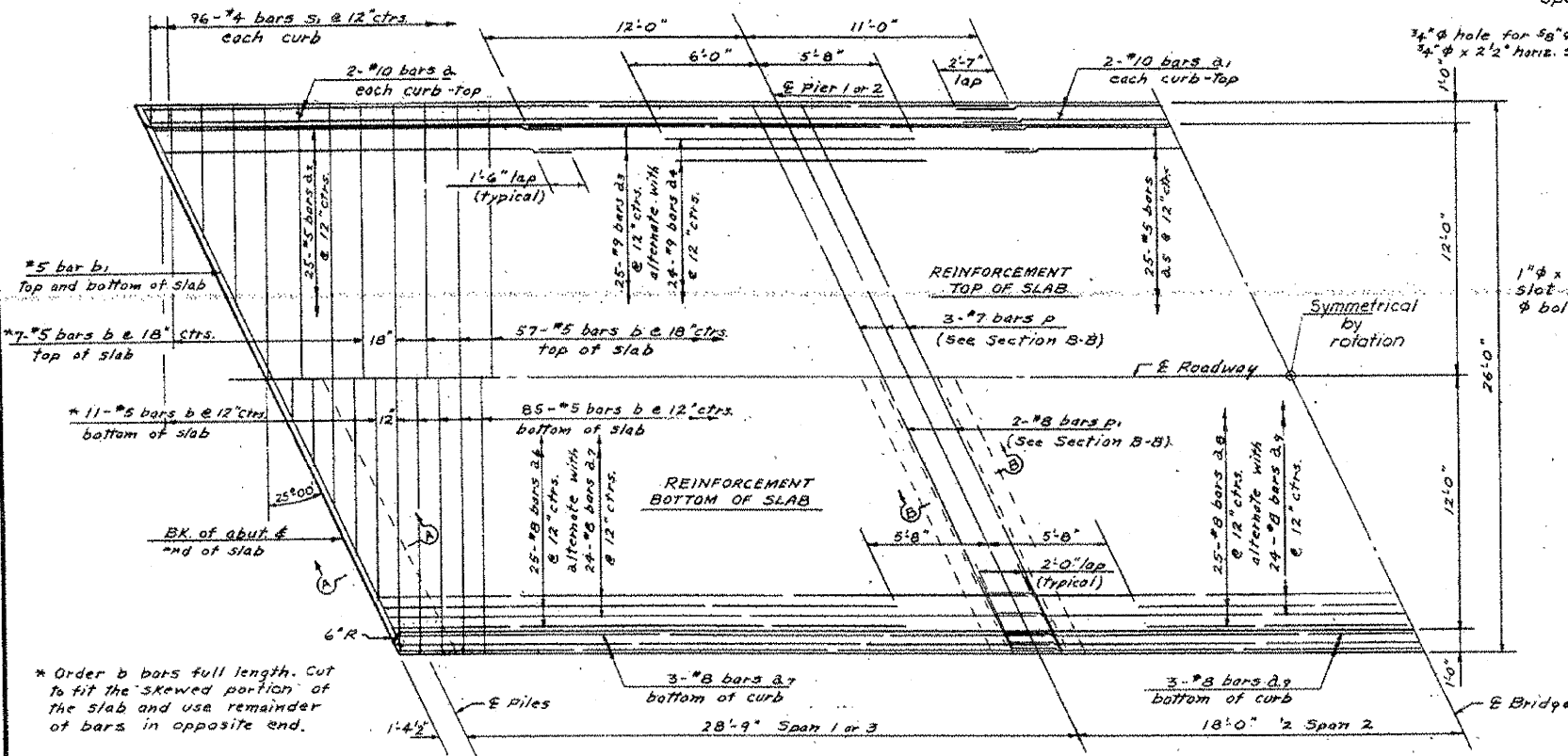
|              |              |               |                  |
|--------------|--------------|---------------|------------------|
| DRAWN C.S.T. | DATE 9-15-73 | JOB NO. 72-66 | SHEET NO. 1 of 8 |
| CHECKED C.E. |              |               |                  |



HALF ELEVATION

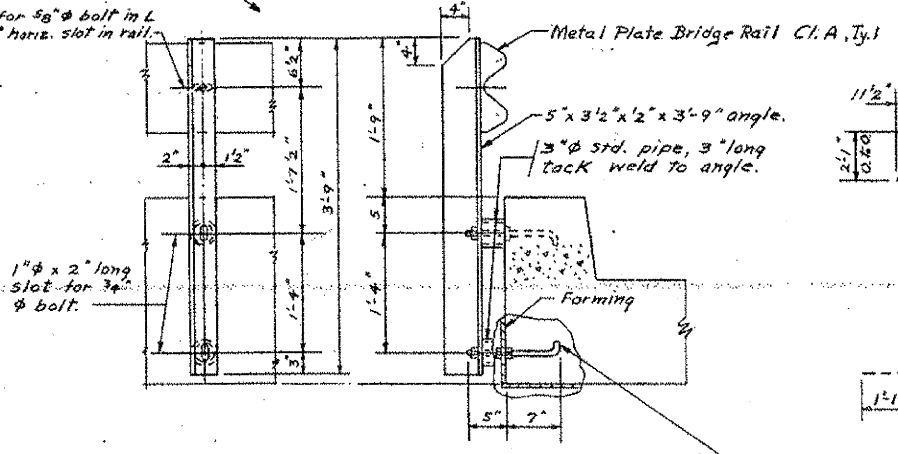


Note: Metal rail, angle rail, and hardware to be galvanized. See Special Provisions.



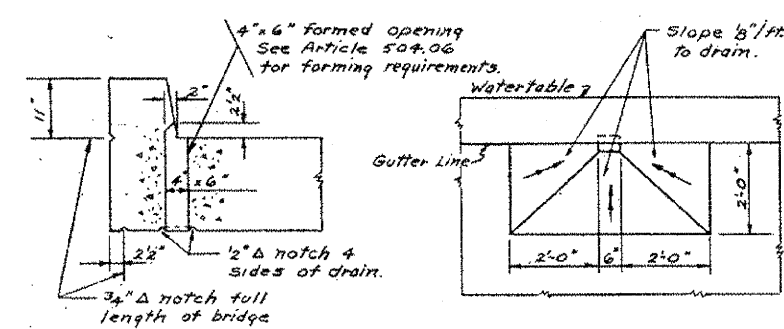
HALF PLAN

\* Order b bars full length. Cut to fit the skewed portion of the slab and use remainder of bars in opposite end.



RAIL POST DETAILS

3/4" x 1'-0" galvanized anchor bolt. Project thru form and double nut as shown leaving one nut in place after pulling forms. Alternate of bolt with 3" washer or a cast iron insert type connection may be used with the approval of the Engineer.

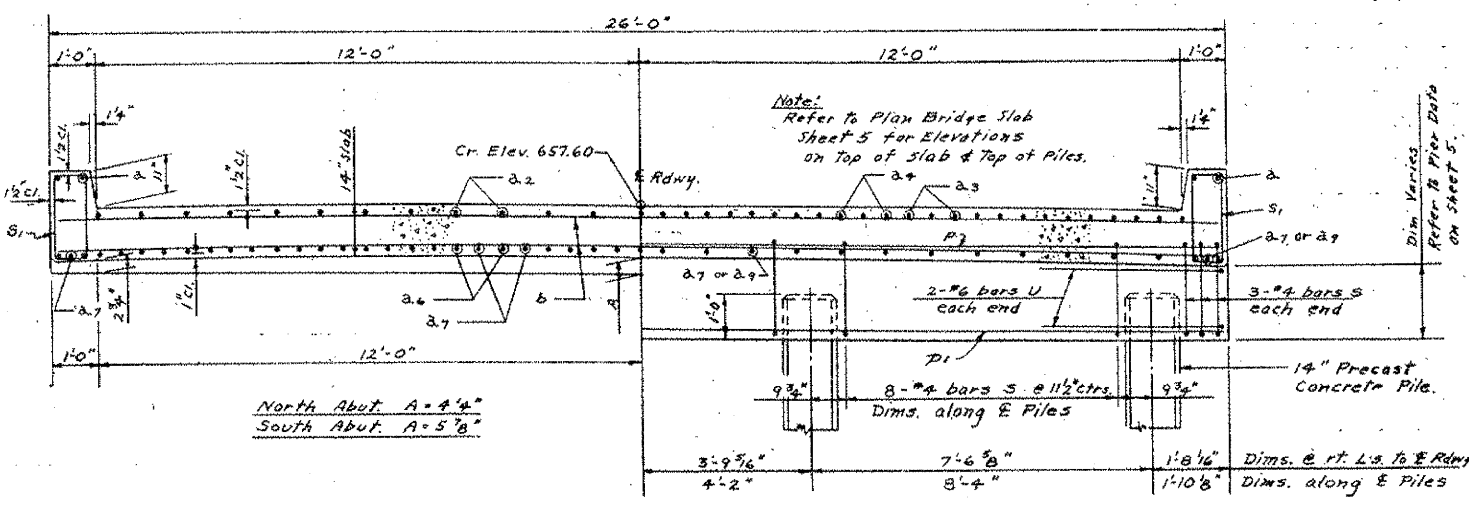


SECTION

PLAN

DRAIN DETAILS

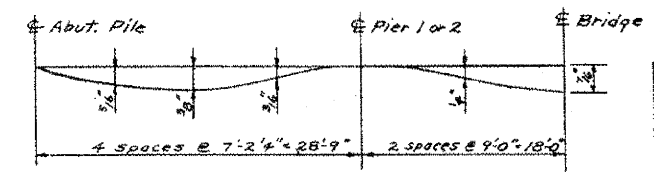
| BILL OF MATERIAL                 |     |      |        |        |
|----------------------------------|-----|------|--------|--------|
| BAR                              | NO  | SIZE | LENGTH | SHAPE  |
| a                                | 8   | #10  | 41'-0" | —      |
| a <sub>1</sub>                   | 4   | #10  | 19'-2" | —      |
| a <sub>2</sub>                   | 50  | #5   | 19'-6" | —      |
| a <sub>3</sub>                   | 50  | #9   | 23'-0" | —      |
| a <sub>4</sub>                   | 48  | #9   | 11'-8" | —      |
| a <sub>5</sub>                   | 25  | #5   | 17'-0" | —      |
| a <sub>6</sub>                   | 50  | #8   | 25'-5" | C      |
| a <sub>7</sub>                   | 60  | #8   | 31'-0" | —      |
| a <sub>8</sub>                   | 25  | #8   | 24'-8" | —      |
| a <sub>9</sub>                   | 30  | #8   | 38'-0" | —      |
| b                                | 160 | #5   | 25'-8" | —      |
| b <sub>1</sub>                   | 4   | #5   | 28'-5" | —      |
| p                                | 6   | #7   | 28'-5" | —      |
| p <sub>1</sub>                   | 4   | #8   | 28'-5" | —      |
| s                                | 60  | #4   | 9'-3"  | □      |
| s <sub>1</sub>                   | 192 | #4   | 5'-9"  | □      |
| u                                | 8   | #6   | 10'-4" | C      |
| Class X Concrete Cu Yds.         |     |      |        | 125.2  |
| Reinforcement Bars Lbs.          |     |      |        | 28,350 |
| Metal Plate Bridge Rail Lin. Ft. |     |      |        | 187    |



HALF SECTION NEAR ABUTMENTS

HALF SECTION NEAR PIERS

CROSS SECTION

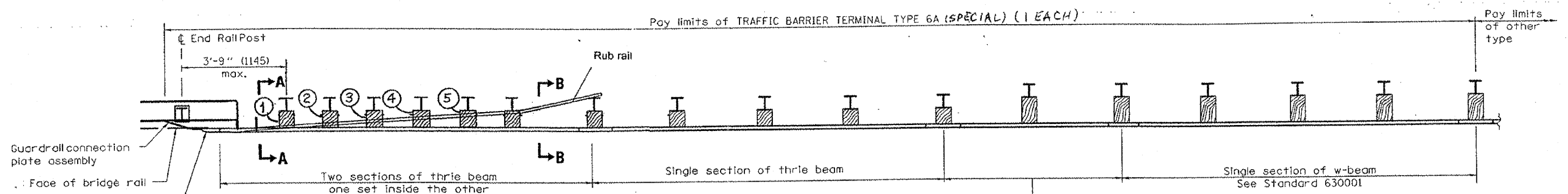


D.L. DEFLECTION DIAGRAM

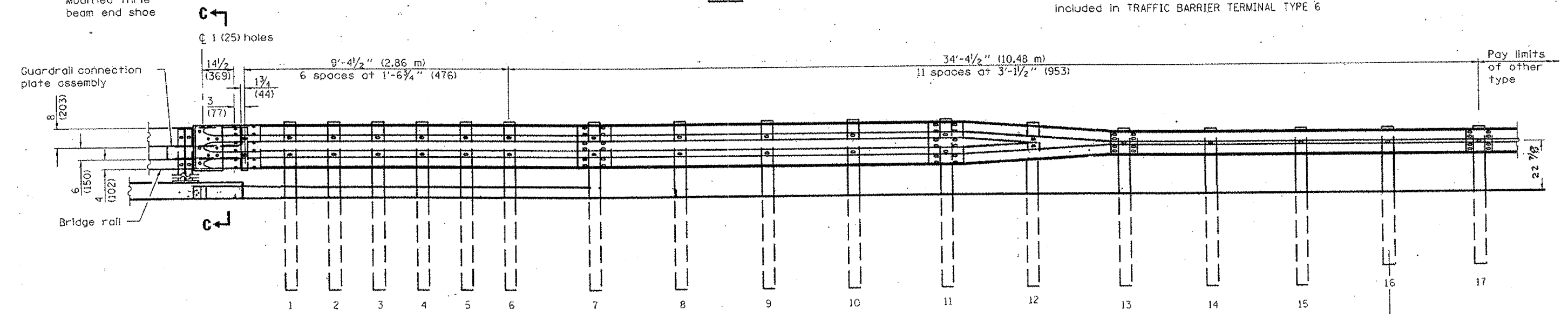
Note: In addition to the D.L. Deflection the Contractor shall make allowance for shrinkage and settlement of the falsework.

SUPERSTRUCTURE  
BRIDGE NO 3203  
SECTION - 229-B-MFT  
IROQUOIS COUNTY  
STATION 13+46

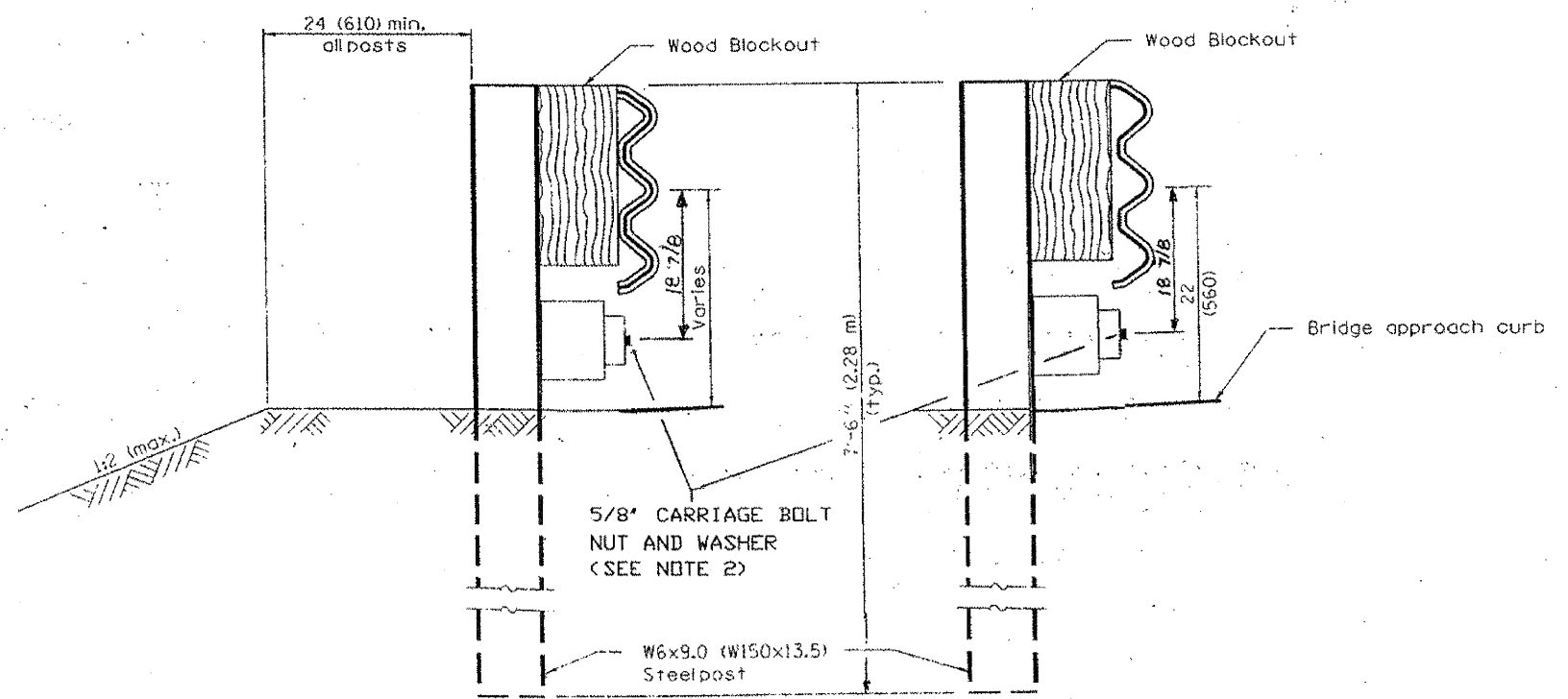
|                   |                |         |                        |           |
|-------------------|----------------|---------|------------------------|-----------|
| ROUTE NO.         | SECTION        | COUNTY  | TOTAL SHEETS           | SHEET NO. |
| FAS 316           | 12-00229-01-SP | INDIANA | 12                     | 8         |
| JOB # C-93-048-12 |                |         | PROJECT HSIP-0316(111) |           |
| CONTRACT 87518    |                |         |                        |           |



**PLAN**



**ELEVATION**



**SECTION A-A**

**SECTION B-B**

**GENERAL NOTES**

This standard shows attachment to curb mounted bridge rail. Attachment to side mounted bridge rail is similar.

See Standard 630001 for details of guardrail not shown.

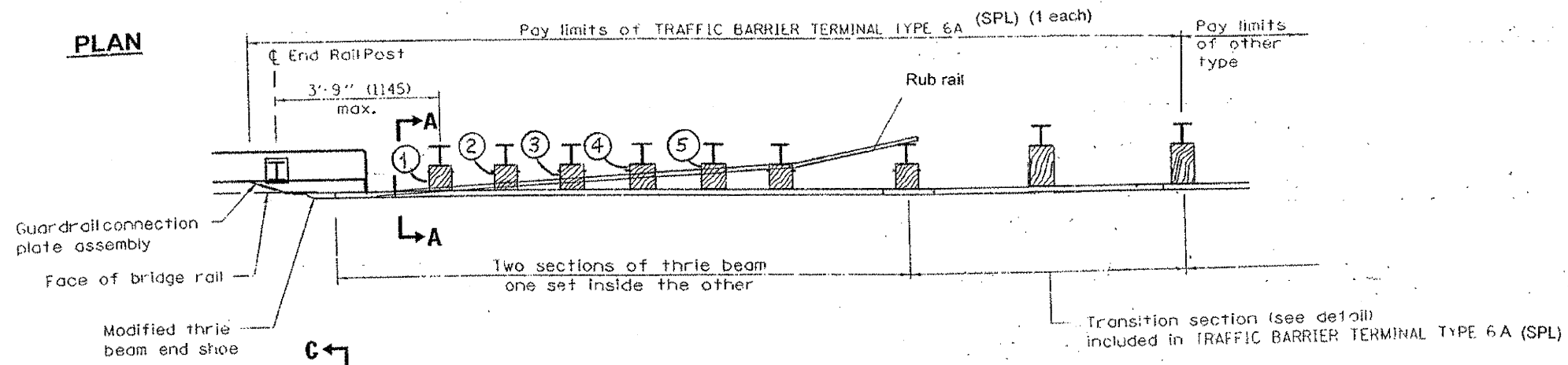
Thrie beam rail shall be bolted to block-out at all posts.

All slope ratios are expressed as units of vertical displacement to units of horizontal displacement (V:H).

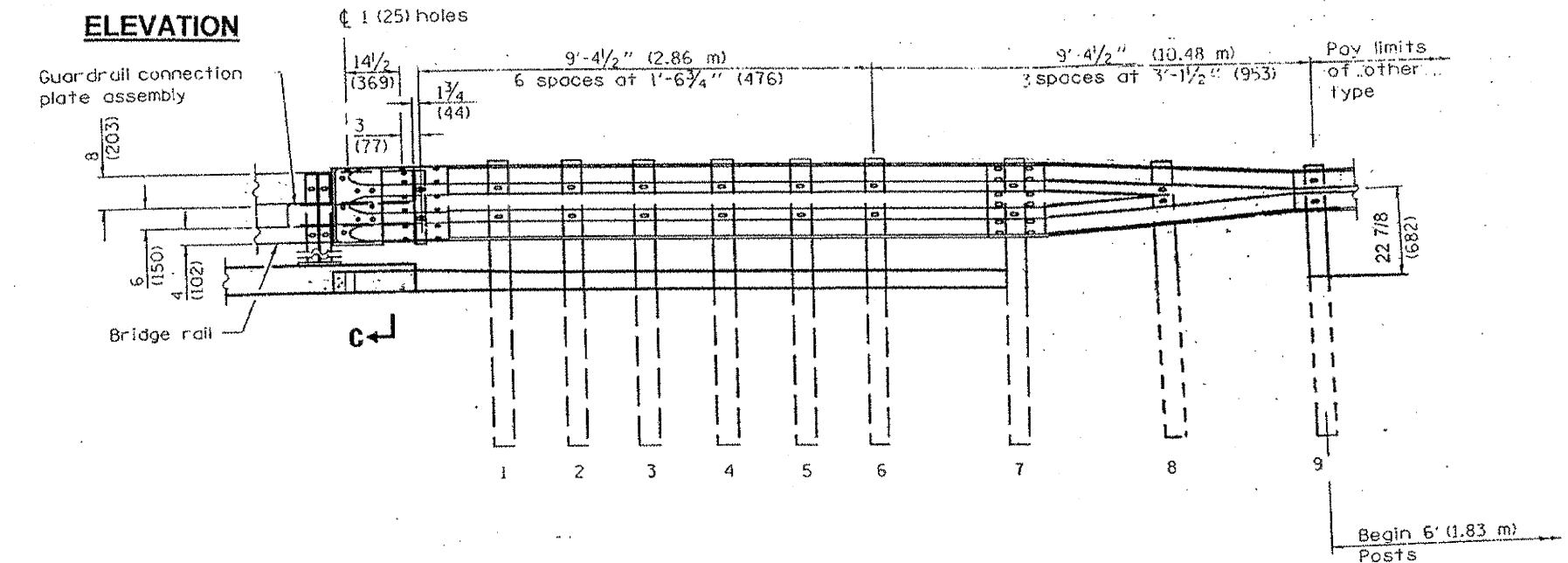
All dimensions are in inches (millimeters) unless otherwise shown.



**PLAN**

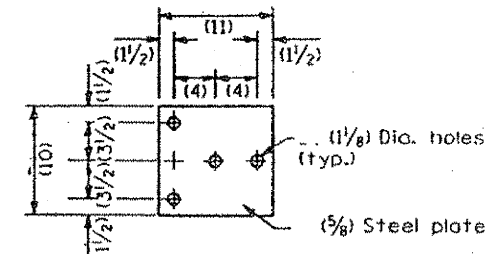


**ELEVATION**

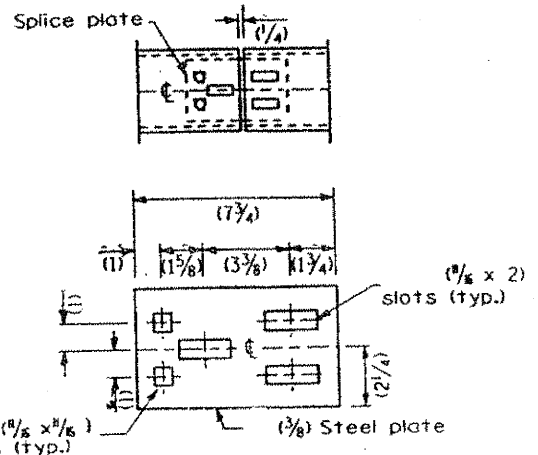


| RUB RAIL WOOD BLOCKS 7" X 4" |           |
|------------------------------|-----------|
| POST                         | THICKNESS |
| ①                            | 6 11/16"  |
| ②                            | 5 5/16"   |
| ③                            | 4"        |
| ④                            | 2 5/8"    |
| ⑤                            | 1 5/16"   |

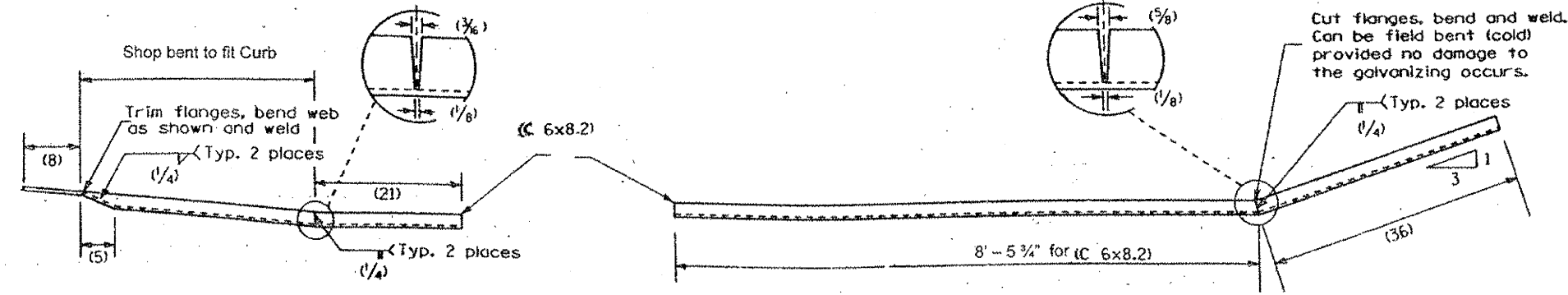
- NOTES:
- Posts 1-7 require an additional hole to attach lower block and/or rubrail.
  - Rubrail wood blocks located on posts 1 through 5 are offset drilled and secured with 5/8" carriage bolts to rubrail and post at posts 1-5.
  - Rubrail end must be attached flush with curb. Installation can be greatly simplified by fabricating or shop twisting the rubrail.
  - The rubrail and attachment to the curb requires three closely drilled holes. Appropriate epoxy bolt anchors should be used to reduce the risk of splitting the concrete.



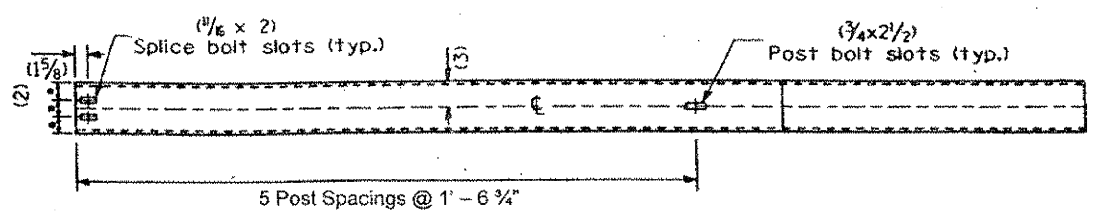
**BEARING PLATE**



**SPLICE PLATE**

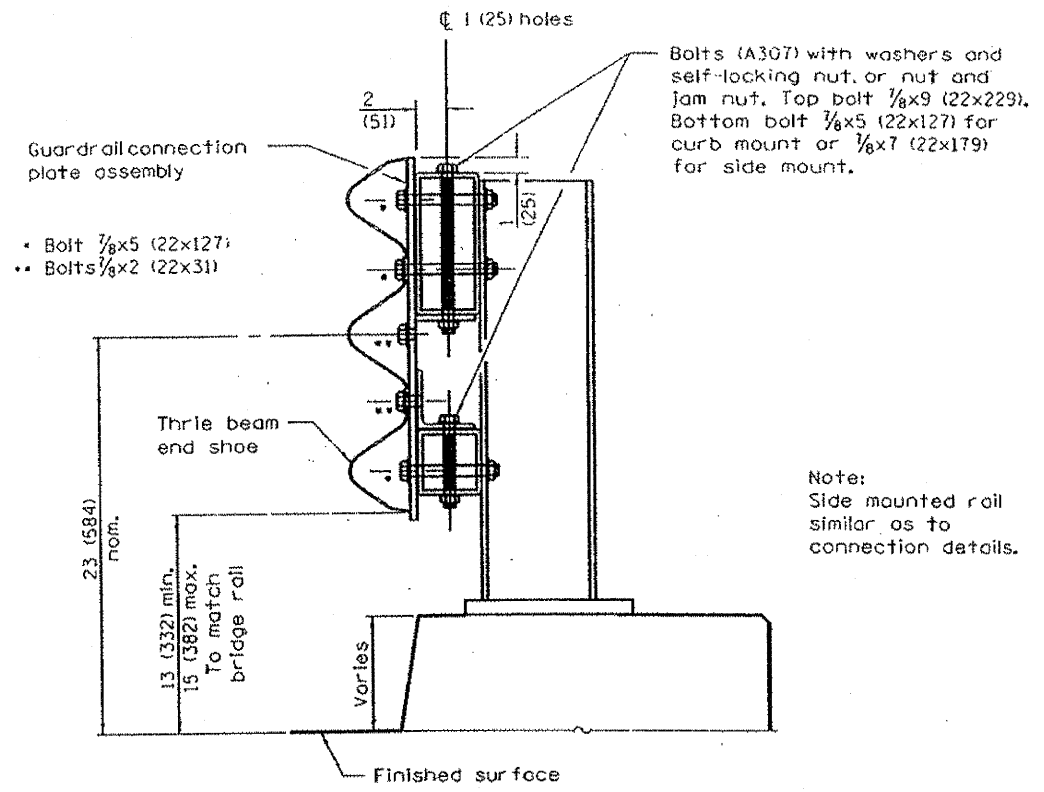


**RUBRAIL SECTION 1**  
(C 6x8.2)

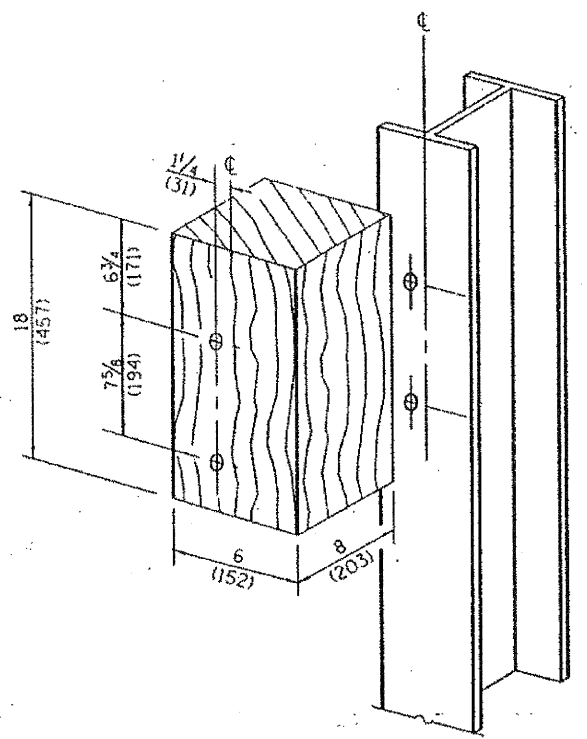


**RUBRAIL SECTION 2**  
(C 6x8.2)

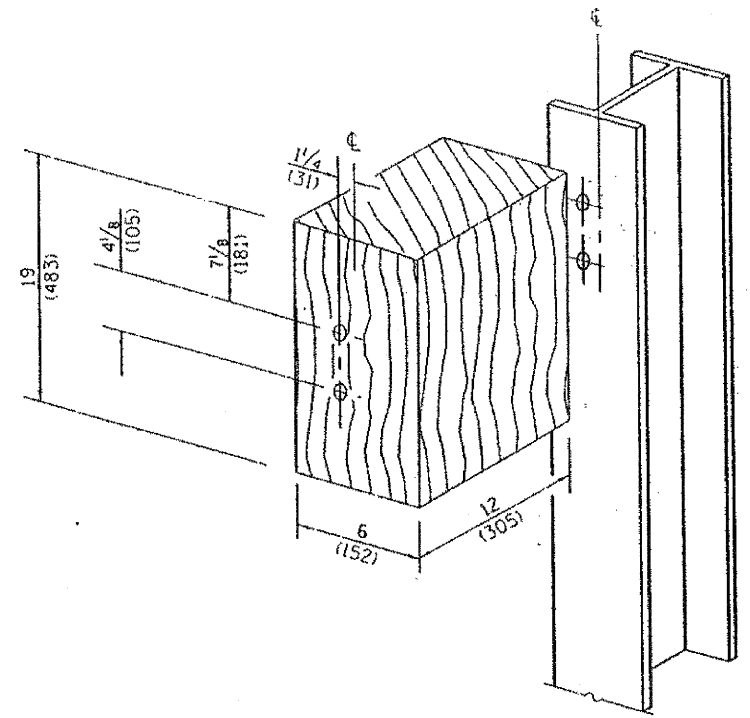
|                   |                |          |                        |           |
|-------------------|----------------|----------|------------------------|-----------|
| ROUTE NO.         | SECTION        | COUNTY   | TOTAL SHEETS           | SHEET NO. |
| FAS 316           | 12-00229-01-SP | TROQUOIS | 12                     | 10        |
| JOB # C-93-048-12 |                |          | PROJECT HSIP-0316(111) |           |
| CONTRACT 87518    |                |          |                        |           |



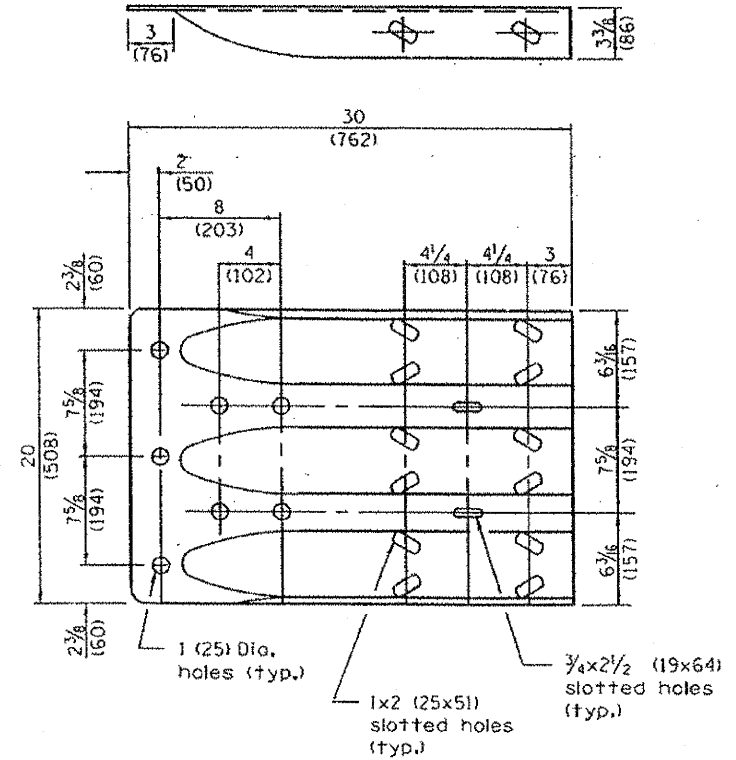
**SECTION C-C**



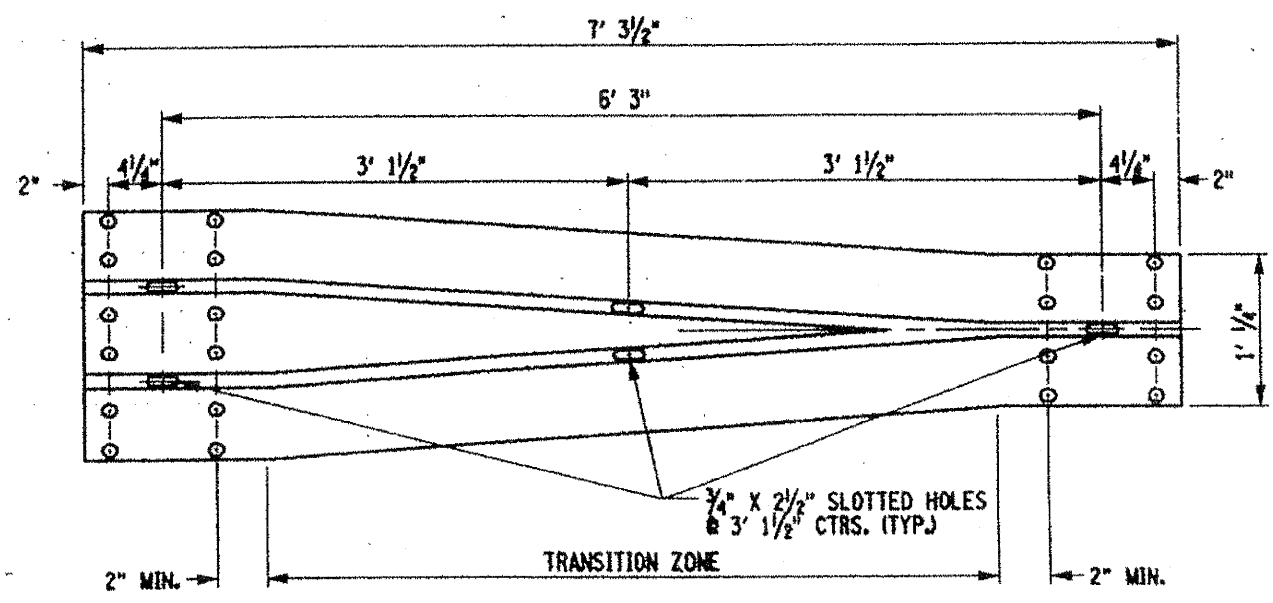
**POSTS 1-11 WOOD BLOCKOUT DETAIL**



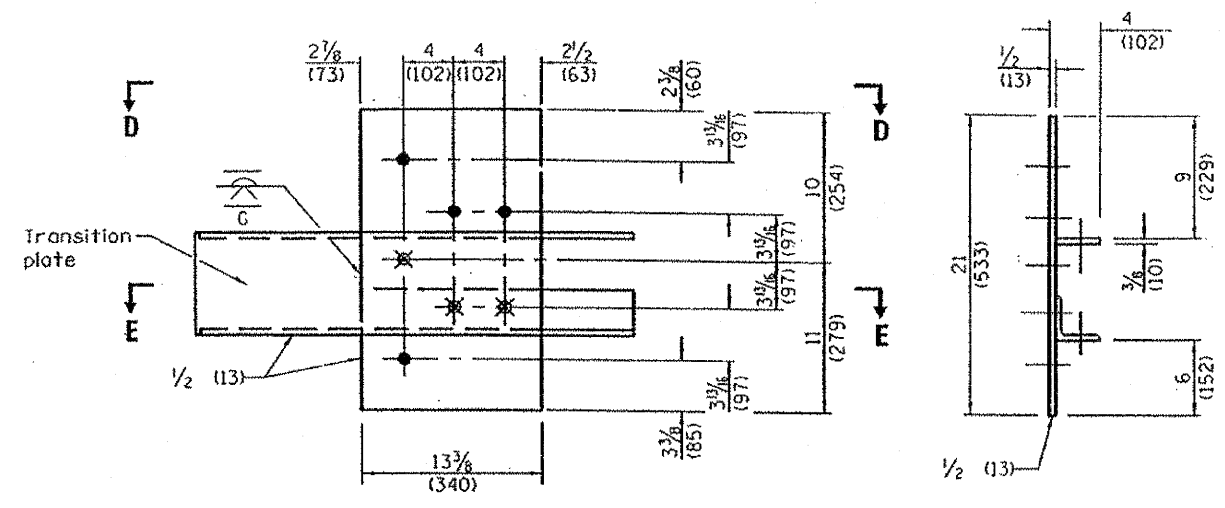
**POST 12 WOOD BLOCKOUT DETAIL**  
(See Standard 630001 for post 13-17 blockouts.)



**MODIFIED THRIE BEAM END SHOE DETAIL**



**TRANSITION SECTION**

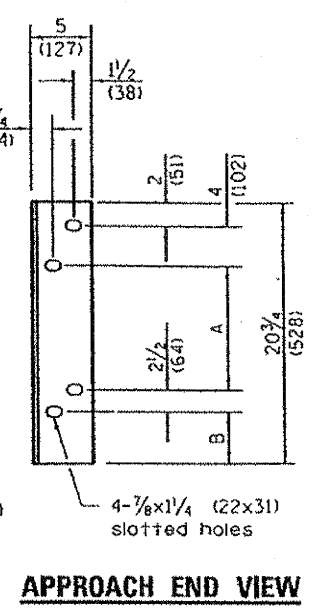
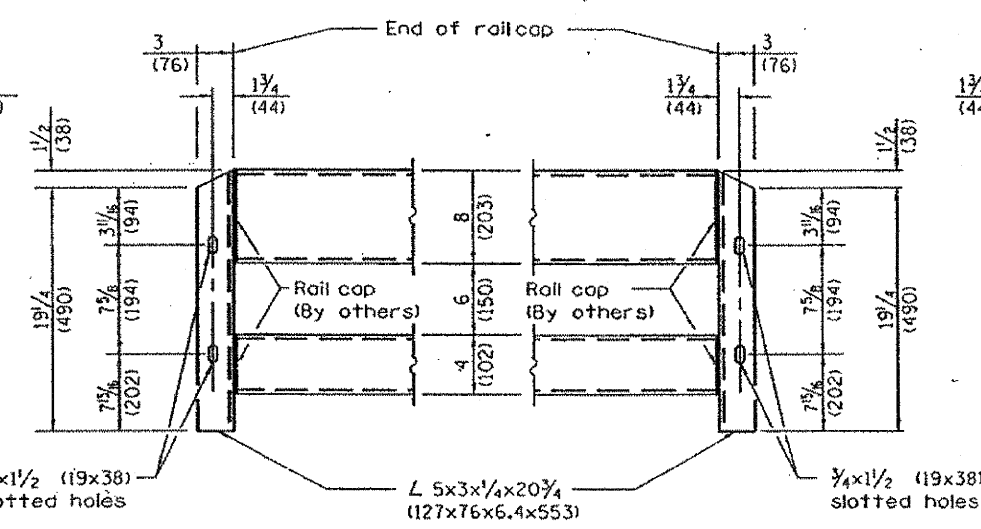
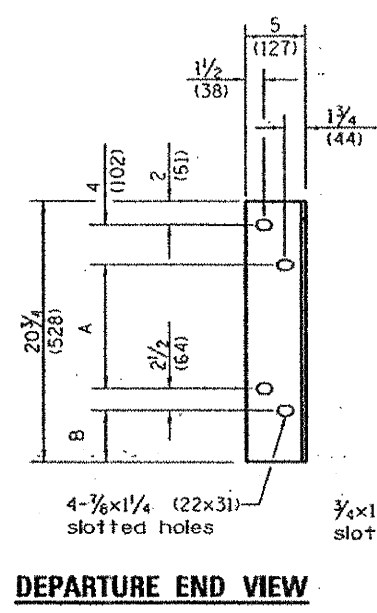
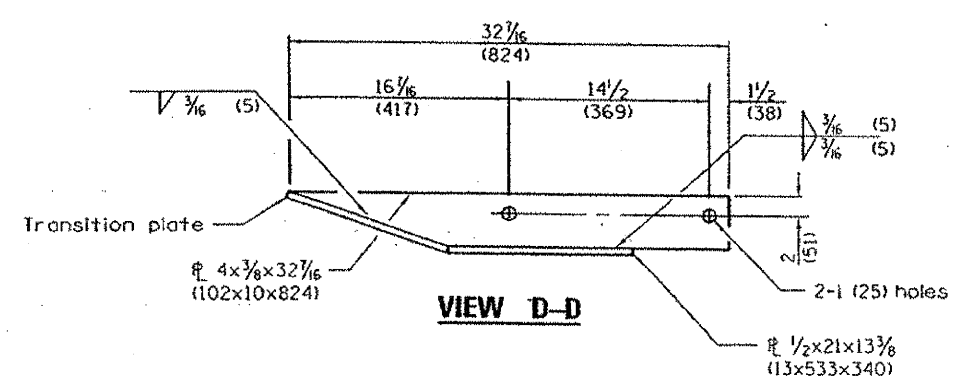


**LEGEND**

- 4-1 (25) holes for 3/8 (22) H.S. bolts and nuts
- ⊗ Drill and tap 3 holes for 3/8 (22) H.S. bolts.

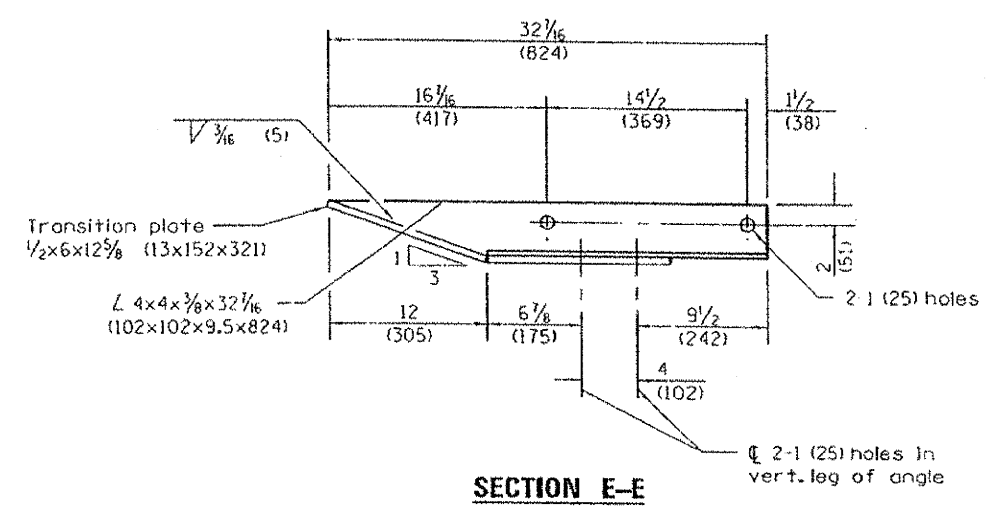
| Dimensions            | A           | B          |
|-----------------------|-------------|------------|
| For Curb Mounted Rail | 8 3/4 (222) | 3 1/2 (89) |
| For Side Mounted Rail | 9 3/4 (247) | 2 1/2 (64) |

**GUARDRAIL CONNECTION PLATE ASSEMBLY DETAILS**  
(Mirror for opposite end)

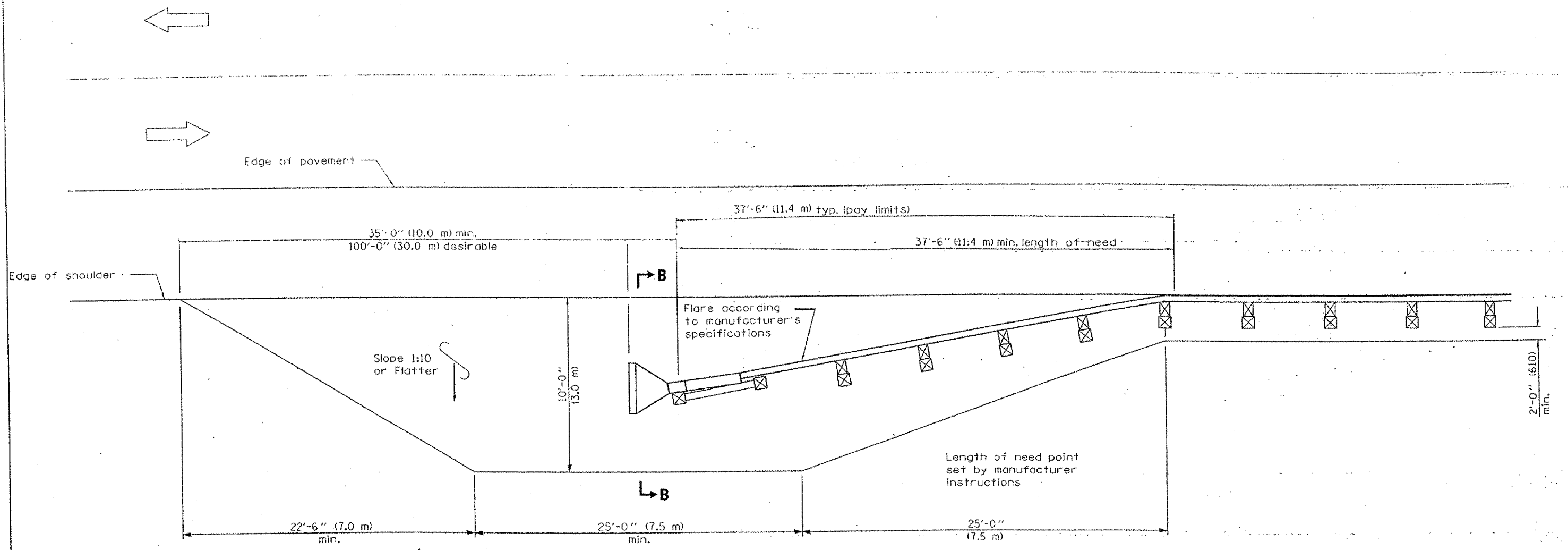


**CONNECTION ANGLES**

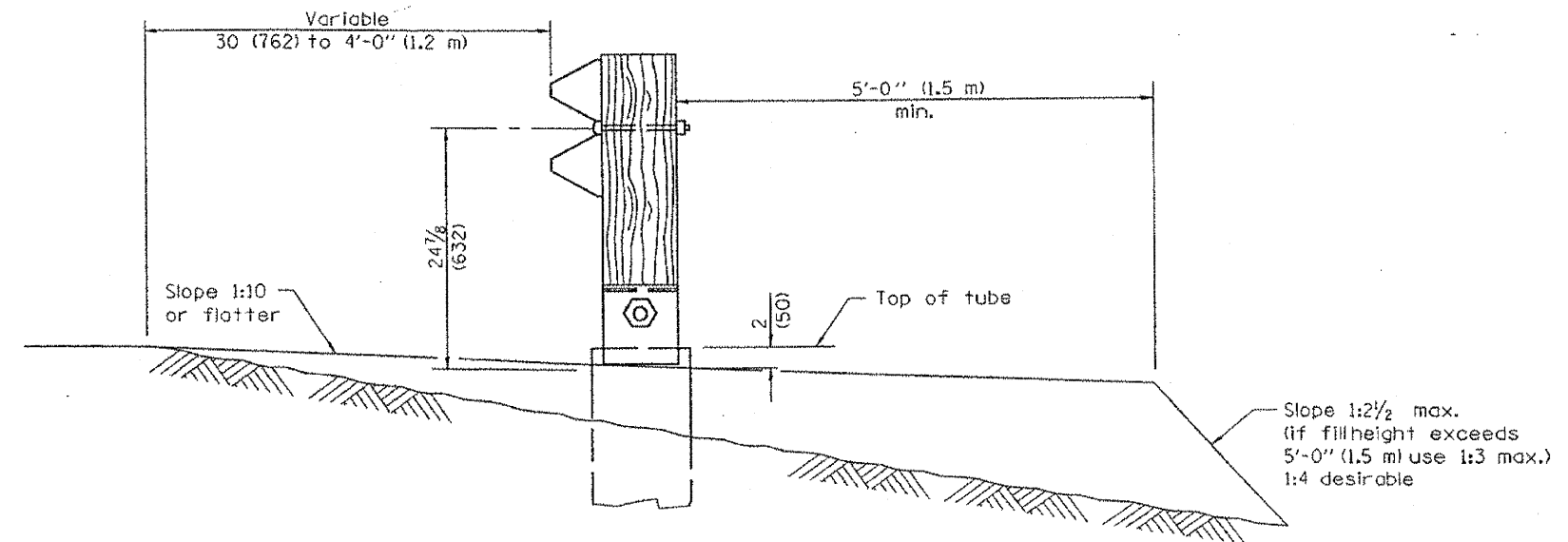
(Install angles to rail caps using 3/8 (19) washers and self-locking nuts or nuts and jam nuts, to be provided by others)



|                   |                |           |                        |           |
|-------------------|----------------|-----------|------------------------|-----------|
| ROUTE NO.         | SECTION        | COUNTY    | TOTAL SHEETS           | SHEET NO. |
| FAS 316           | 12-00229-01-SP | IRROQUOIS | 12                     | 12        |
| JOB # C-93-048-12 |                |           | PROJECT HSIP-0316(111) |           |
| CONTRACT 87518    |                |           |                        |           |



**SHOULDER WIDENING TRANSITION  
FOR FLARED TERMINAL**



**SECTION B-B**  
(Impact Head omitted for clarity.)