

|                                                                                    |          |          |
|------------------------------------------------------------------------------------|----------|----------|
| DESIGN NO. 1162 T-83N R-23W STA. 573+83.63 ON I-35                                 |          |          |
| SECTIONS 7 & 18 STA. 1365+21.62 ON U.S. #30                                        |          |          |
| 1-35 OVER U.S. #30 (RELOC.) GRANT TOWNSHIP                                         |          |          |
| DUAL 232' - 1 X 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES 4° 50' 30" SKEW |          |          |
| ESTIMATE OF QUANTITIES                                                             |          |          |
| ITEM                                                                               | UNIT     | TOTAL    |
| Concrete                                                                           | Cu. Yds. | 990.6    |
| Reinforcing Steel                                                                  | Lbs.     | 238,756  |
| Pretensioned                                                                       | Only     | 18       |
| Prestressed                                                                        | Only     | 18       |
| Concrete Beams                                                                     | Only     | 36       |
| Concrete Slope Protection                                                          | Sq. Yds. | 1,080    |
| 4" $\phi$ Tile Subdrain                                                            | Lin. Ft. | 280      |
| Class 20 Excavation                                                                | Cu. Yds. | 771      |
| Granular Backfill                                                                  | Tons     | 437      |
| Creosoted Piling 234 at 30'                                                        | Lin. Ft. | 7,020    |
| OR Aluminum Handrail (Q - Q End Posts)                                             | Lin. Ft. | OR 896   |
| Steel Handrail (Q - Q End Posts)                                                   | Lin. Ft. | 896      |
| Creosoted Test Piling 4 at 30'                                                     | L.S.     | Lump Sum |
| 2" RIGID STEEL CONDUIT                                                             | LIN. FT. | 498      |

|                                                                  |          |        |
|------------------------------------------------------------------|----------|--------|
| DESIGN NO. 1262 T-83N R-23W STA. 1372+00                         |          |        |
| SECTION 18 ON RELOC. U.S. #30 GRANT TOWNSHIP                     |          |        |
| TWIN 10' X 10' X 173' REINFORCED CONCRETE BOX CULVERT - 10° SKEW |          |        |
| ESTIMATE OF QUANTITIES                                           |          |        |
| ITEM                                                             | UNIT     | TOTAL  |
| Concrete                                                         | Cu. Yds. | 575.7  |
| Reinforcing Steel                                                | Lbs.     | 77,824 |
| Class 20 Excavation                                              | Cu. Yds. | 1037   |

STATE OF IOWA  
STATE HIGHWAY COMMISSION  
DESIGN FOR  
**BRIDGES AND CULVERTS**  
INTERSTATE ROAD SYSTEM  
PROJECT NO. 1-35-4(9)110  
**STORY COUNTY**  
APRIL 1963

SPECIFICATIONS:

CONSTRUCTION: Standard Specifications of the Iowa State Highway Commission, Series of 1960, plus current Supplemental Specifications and Special Provisions.

DESIGN STRESSES for the following materials are in accordance with A.A.S.H.O. Standard Specifications, Series of 1961.

Reinforcing Steel in accordance with Section 1.4.12

"Reinforcement" for Intermediate, Hard, or Rail Steel Grade.

Concrete in accordance with Section 1.4.11  $f'_c = 3500$  p.s.i.

Prestressed Concrete in accordance with Section 1.13.7  $f'_c = 5000$  psi.

Prestressing Steel in accordance with Section 1.13.7  $f'_s = 250,000$  psi.

Corrected by Hamilton & McBurney

This bridge will require Bridge Sign Assemblies furnished and placed by others as specified in Traffic and Highway Planning Instruction No. 11, Revised October 1, 1961.

|                                                               |          |        |
|---------------------------------------------------------------|----------|--------|
| DESIGN NO. 1362 T-83N R-23W STA. 2571+50 (RAMP B)             |          |        |
| SECTION 18 GRANT TOWNSHIP                                     |          |        |
| TWIN 10' X 10' X 88' REINFORCED CONCRETE BOX CULVERT 45° SKEW |          |        |
| ESTIMATE OF QUANTITIES                                        |          |        |
| ITEM                                                          | UNIT     | TOTAL  |
| Concrete                                                      | Cu. Yds. | 376.4  |
| Reinforcing Steel                                             | Lbs.     | 48,258 |
| Class 20 Excavation                                           | Cu. Yds. | 1,645  |

|                                                                 |          |          |
|-----------------------------------------------------------------|----------|----------|
| DESIGN NO. 1462 T-83N R-23W STA. 4575+95 (RAMP D)               |          |          |
| SECTION 7 GRANT TOWNSHIP                                        |          |          |
| TWIN 10' X 10' X 79' REINFORCED CONCRETE BOX CULVERT - 30° SKEW |          |          |
| ESTIMATE OF QUANTITIES                                          |          |          |
| ITEM                                                            | UNIT     | TOTAL    |
| Concrete                                                        | Cu. Yds. | 317.9    |
| Reinforcing Steel                                               | Lbs.     | 41,846   |
| Class 20 Excavation                                             | Cu. Yds. | 376      |
| Removal of Existing Structure                                   | L.S.     | Lump Sum |

CONSTRUCTION PLANS SHOWING  
PROJECT AS BUILT

DATE 8-25-64 COPIES PREPARED 3

PREPARED BY *James E. Fudge*  
RESIDENT ENGINEER

IOWA STATE HIGHWAY COMMISSION  
STANDARDS REQUIRED:  
CBH-00

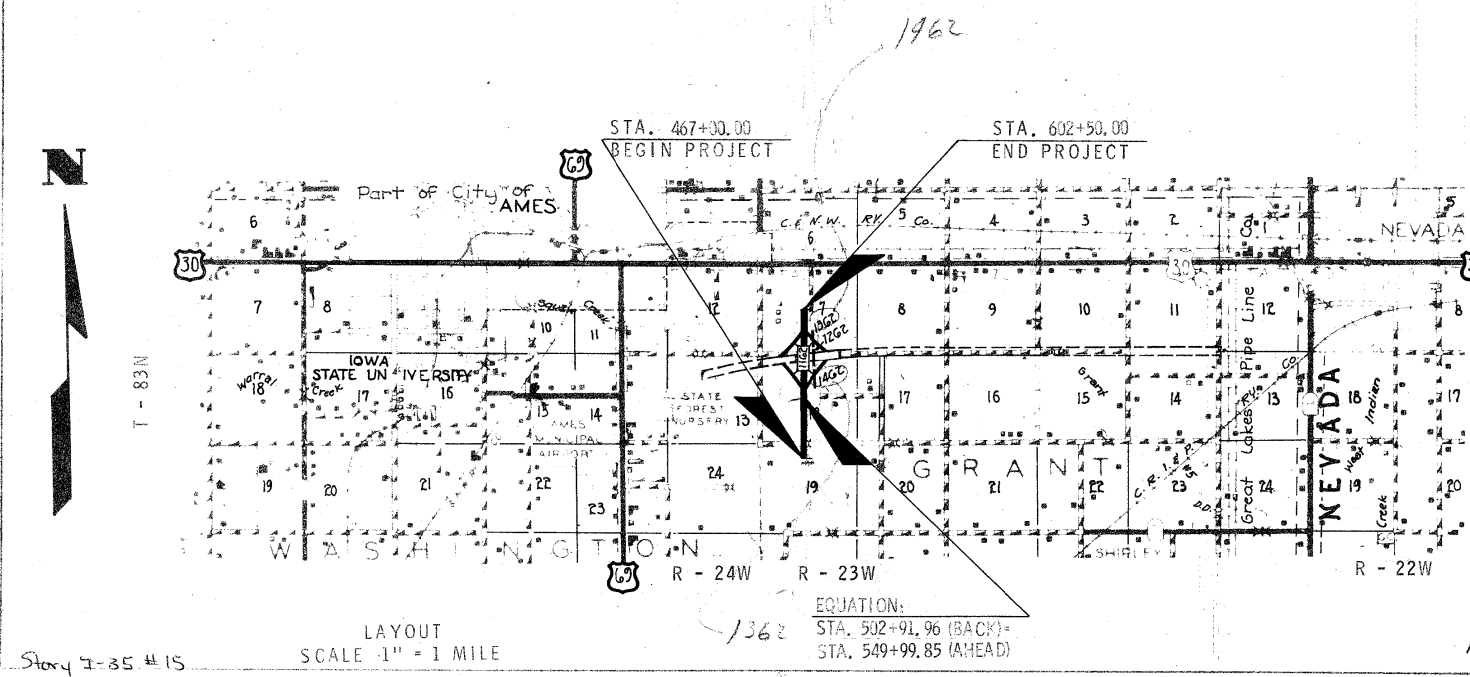
| MILEAGE SUMMARY          |          | 105-1 |
|--------------------------|----------|-------|
| LOCATION                 | LIN. FT. | MILES |
| BRIDGE AT STA. 573+83.63 | 234.917  | .044  |

APPROVED  
*R. M. Tuttle*  
DEPUTY CHIEF ENGINEER  
IOWA HIGHWAY COMMISSION

DEPARTMENT OF COMMERCE  
BUREAU OF PUBLIC ROADS  
APPROVED  
DIVISION ENGINEER  
DATE

June 25, 1963 Letting

Revised 8-15-63  
Title Sheet. Design No. 1262. Barrel Length and quantities corrected Sheet 18 of 25. Design 1262. Spacing and/or number of bars 6m5, 6m6, 8m7 8m8 and dimensions corrected.  
Sheet 17 of 25. Des. 1262. Spacing and/or number of bars 8K1, 8K2, 6K3 and 6K4 and dimensions corrected.  
Sheet 16 of 25 Design 1262 Inlet Flow line lowered; Barrel lengthened. Dimensions and quantities corrected accordingly. Bars 5' r added to Bar List  
REVISED 3-17-64 DES. NO. 1162 LIGHT POLE BASES & CONDUIT FOR SAME ADDED (SHEET 14 A ADDED). CONC. & REINF. STEEL QUANTITIES MODIFIED AND 2" STEEL CONDUIT ITEM ADDED TO SHEETS 1, 2 AND 10.  
Revised 7-3-63. Design No 1262 Sheets No 1 and 3, Bars 5a2 and 5a3 corrected to 4a2 and 4a3



LAYOUT  
SCALE 1" = 1 MILE

STORY COUNTY PROJECT NO. 1-35-4(9)110 FILE NO. 21522 90

GENERAL NOTES:

These bridges ~~are~~<sup>were</sup> designed for H2O-SIG-44 loading and alternate loading designated in BPR's PPM 20-4 Section 4c, plus an allowance of 19 lbs. per sq. ft. of roadway for future wearing surface.

The formed steel beam guardrails and creosoted guardrail posts ~~are to be~~<sup>were</sup> furnished and placed by others and are not a part of this estimate.

The Bridge Contractor ~~is to~~<sup>ed</sup> install the tile subdrain behind each abutment as noted or shown on sheet 2 & 3. The price bid for "Tile Subdrain" ~~is to~~<sup>ed</sup> included the excavation necessary for installation.

The approach fills ~~are~~<sup>were</sup> not a part of this estimate but ~~are to be~~<sup>were</sup> in place before abutment piles ~~are~~<sup>were</sup> driven. The Bridge Contractor ~~is to~~<sup>ed</sup> level off and shape the berms to the elevations shown.

Test piles ~~are~~<sup>were</sup> for determining pile lengths.

DESIGN STRESSES:

Design Stresses for the following materials ~~are~~<sup>were</sup> in accordance with AASHO Standard Specifications for Highway Bridges Series of 1961.

Reinforcing Steel in accordance with Section 14.12 "Reinforcement" for Intermediate, Hard, or Rail Steel Grade.

Concrete in accordance with Section 14.11 f = 3500 psi.

See Sheet 11 for design stresses for prestressed beams.

SPECIFICATIONS:

Design: AASHO Series of 1961.

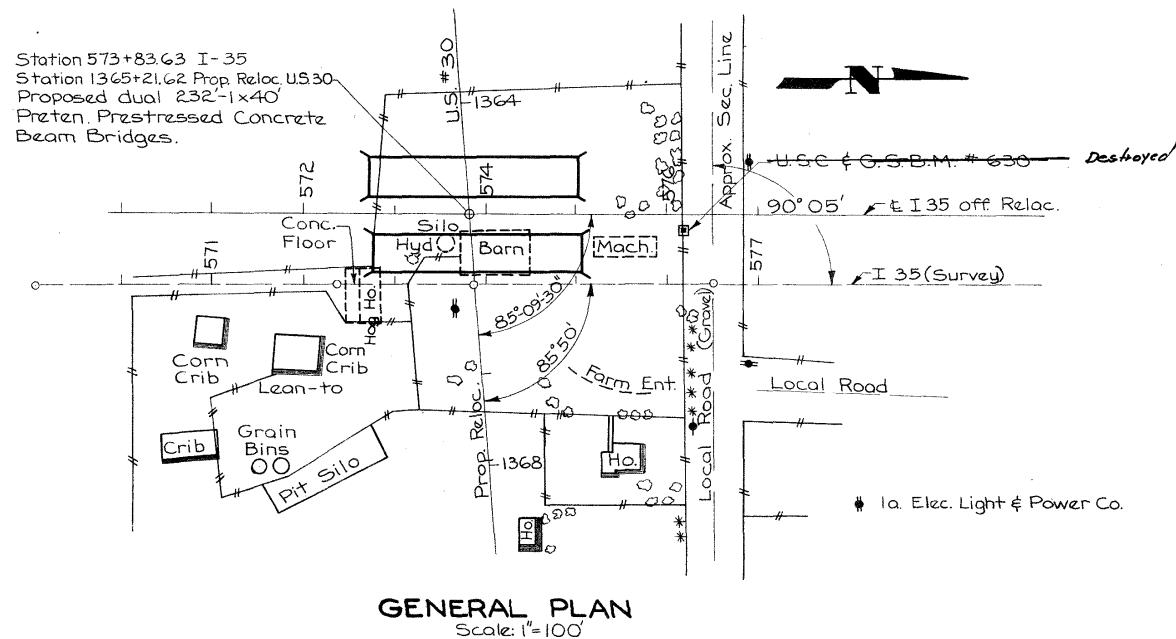
Construction: Standard Specifications of the Iowa State Highway Commission, Series of 1960, plus Current Supplemental Specifications and Special Provisions.

TEST PILE NOTE:

The lengths shown for Creosoted Piling ~~are~~<sup>were</sup> estimated lengths for bidding purposes only and four test piles ~~shall~~<sup>were</sup> be driven before ordering any additional piling. Before driving the Test Pile, the area at the test pile ~~is to be~~<sup>were</sup> excavated to the proposed footing elevation, or a hole larger than the pile top ~~may be~~<sup>were</sup> drilled to this elevation, providing the additional length of test pile required ~~is~~<sup>was</sup> supplied by the contractor at no additional cost. Pile lengths ~~will be~~<sup>were</sup> determined from test pile by using formula bearing.

~~Bench Mark No. 3 Sta. 573+21 (Survey Line) 28' R.R. Spk. in S.W. Root of Maple Elev. 921.45~~  
~~Bench Mark No. 30A, I.H.C. B.M. N.W. Wing Wall S.B. Bridge Elev. 914.05~~  
~~30B, I.H.C. B.M. S.E. Wing Wall N.B. Bridge Elev. 912.55~~

GRANT TWP  
T 83 N R 23 W  
SEC. 18 SEC. 7



| TOTAL ESTIMATED QUANTITIES                           |              |         |            |              |
|------------------------------------------------------|--------------|---------|------------|--------------|
| Item                                                 | 4 Abuts      | 6 Piers | 2 Supers   | Total        |
| Concrete                                             | 136.0        | 277.2   | 5174.576.2 | 990.6        |
| Reinforcing Steel                                    | 15,864       | 59,756  | 163,132    | 238,756      |
| Preten. Prest. Concrete Beam                         | B1 (42'-6")  |         | 18         | 18 only      |
|                                                      | B3 (50'-10") |         | 18         | 18 only      |
|                                                      | B7 (67'-6")  |         | 36         | 36 only      |
| Concrete Slope Protection                            |              |         |            | 1080 Sq. Yd. |
| 4" Tile Subdrain                                     |              |         |            | 280 L. Ft.   |
| Class 20 Excavation                                  | 381          | 390     |            | 771 C. Yd.   |
| Granular Backfill                                    | 437          |         |            | 437 Tons     |
| Creosoted Piling                                     | 64@30'       | 170@30' |            | 7020 L. Ft.  |
| Aluminum Handrail or Steel Handrail (E- & End Posts) |              |         |            | 896 L. Ft.   |
| Creosoted Test Piling                                |              | 4@30'   |            | Lump Sum     |
| 2" Rigid Steel Conduit                               |              |         |            | 498 L. Ft.   |

Revised 3-17-64 - Light Pole bases & conduit for same added (sheet 14A added showing details of Light Pole Bases). Concr. & Reinf. Steel Quantities modified & 2" Conduit item added.

DUAL 232' x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

43'-1/2 and 51'-5/2 End Spans 68'-9 Center Spans  
Concrete Floor & Substructure Tubular Rails

GENERAL PLAN

Station 573+83.63 on Interstate #35  
Station 1365+21.62 on US #30  
Proj. No. I-35-4(9) 110

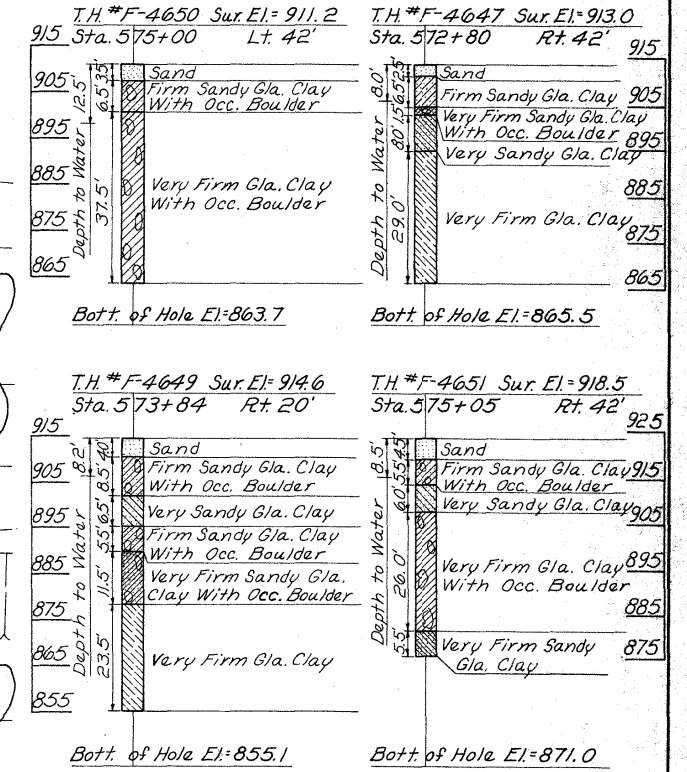
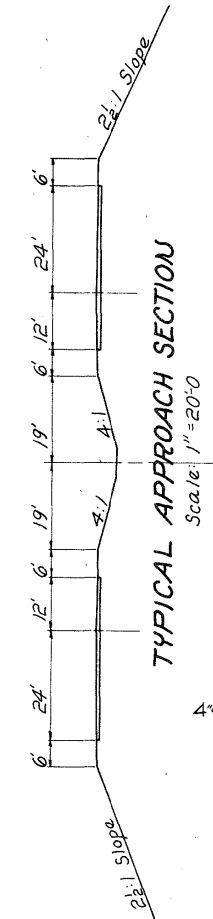
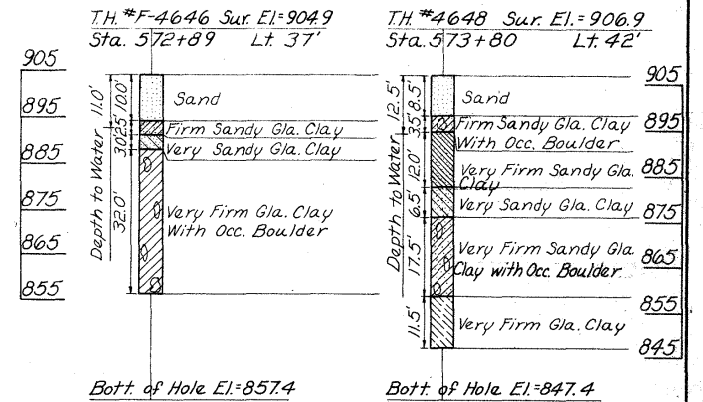
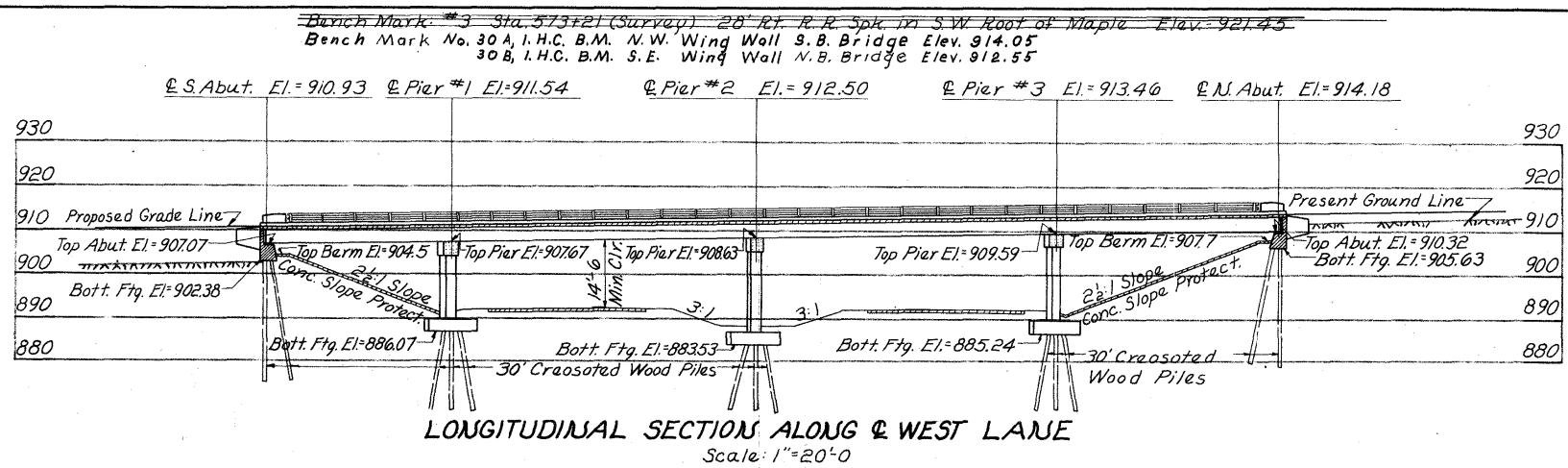
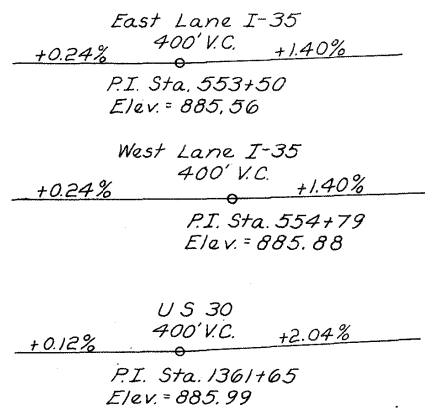
STORY COUNTY

Iowa State Highway Commission

November 1962 Sheet 1 of 14

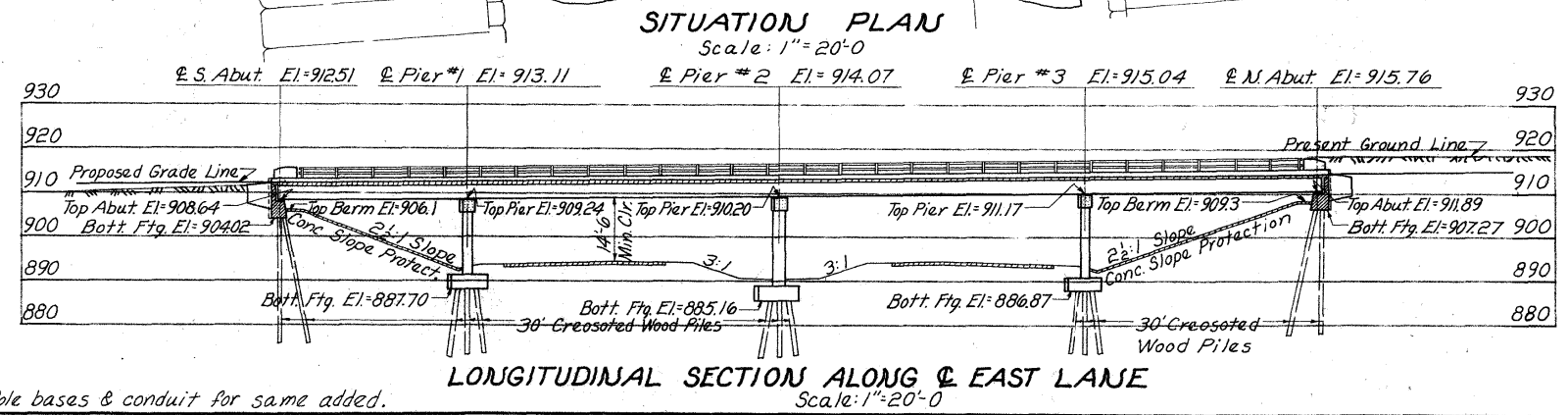
Design 1162 Story County File No. 21522

JRS



SOUNDING DATA  
Scale: 1" = 20'-0"  
Dated: 7-3-62

LOCATIONS:  
Section 7 & 18  
T-83N R-23W  
Grant TWP  
Story County  
On I-35  
over US #30

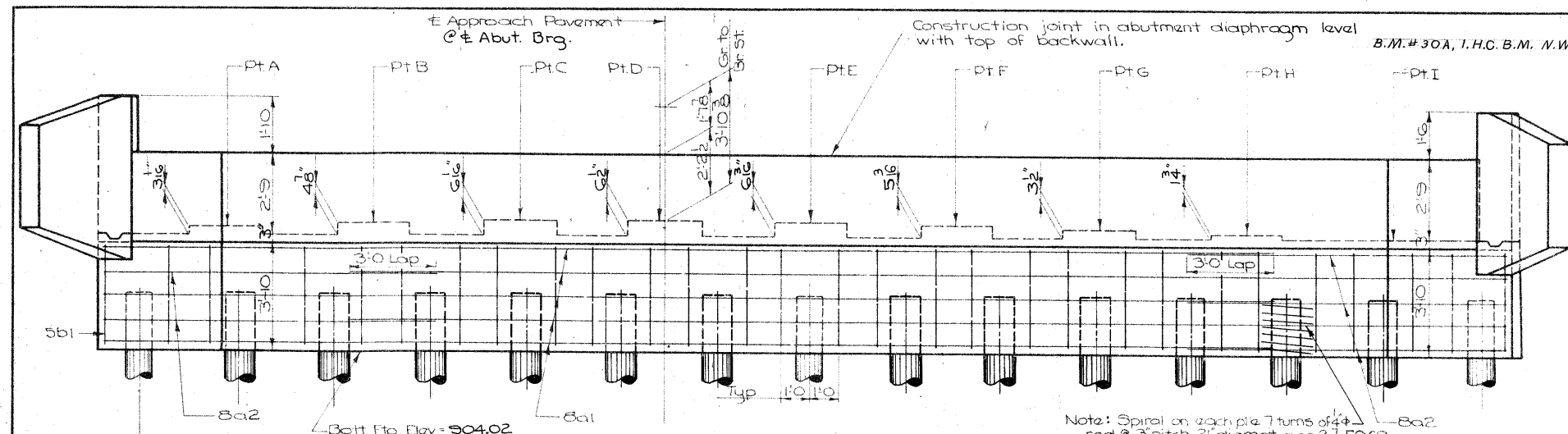


Design for 4° 50' 30" Skew  
**DUAL 232'-1x40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**  
43'-1 1/2" & 51'-5 1/2" End Spans 68'-9" Center Spans  
Concrete Floor & Substructure Tubular Rails

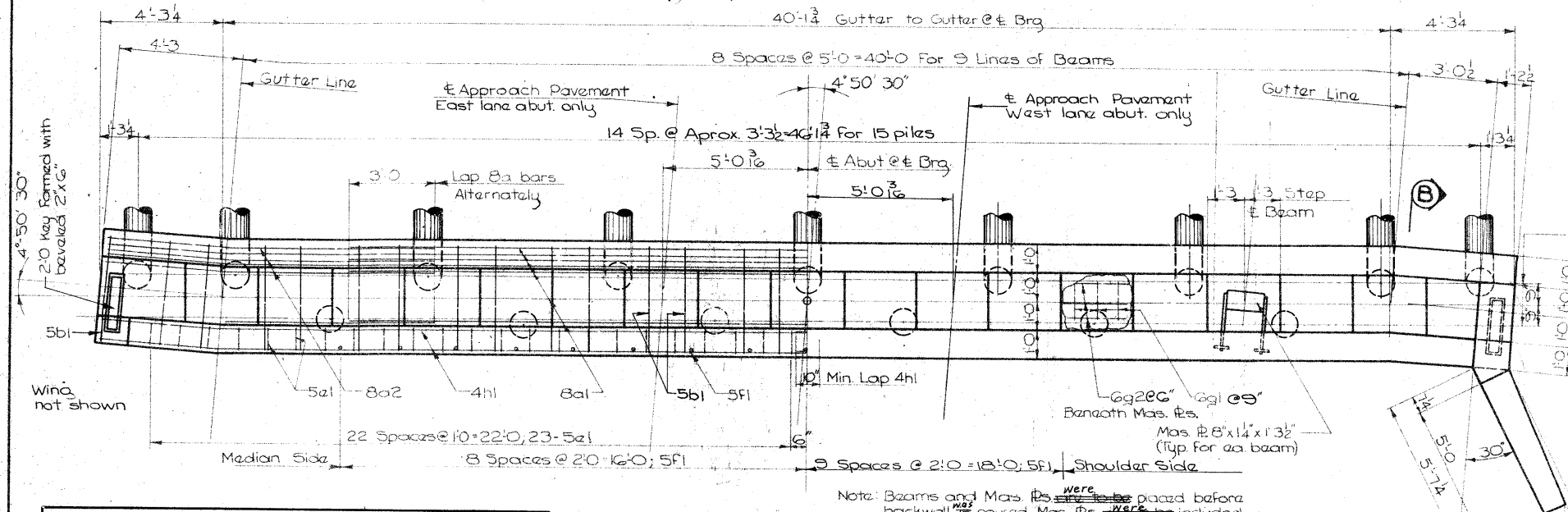
**SITUATION PLAN**  
Station: 573+83.63 on Interstate #35  
Station: 1365+21.62 on US #30  
Proj. No. I-35-4(9) 110

**STORY COUNTY**  
Iowa State Highway Commission  
November 1962  
Design No. 1162 Story County File No. 21522

Revised 3-17-64 Light Pole bases & conduit for same added.



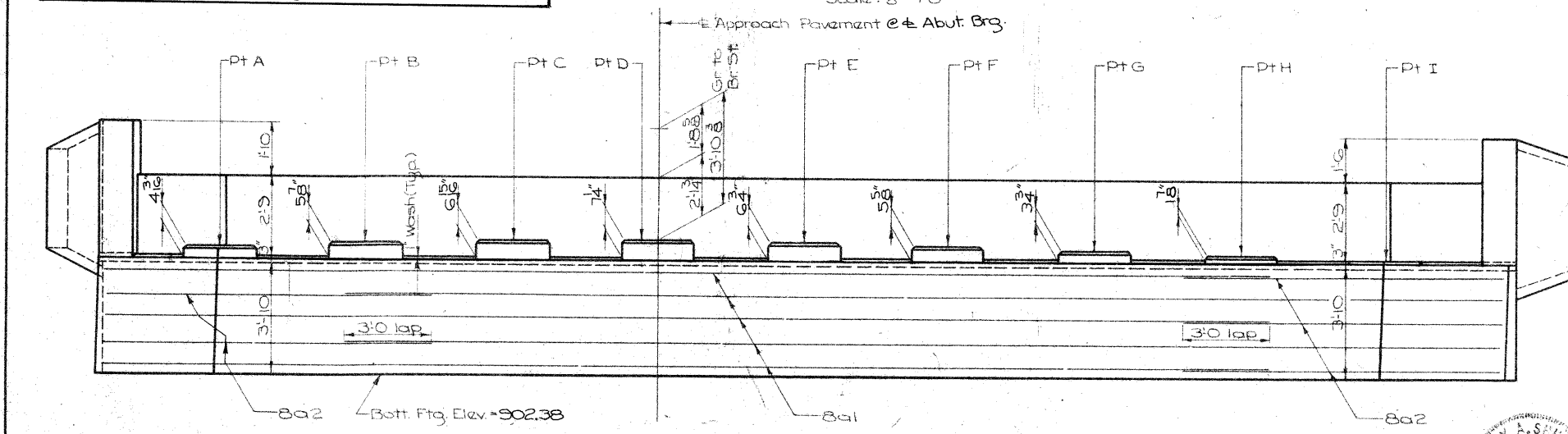
**REAR ELEVATION SOUTH ABUT. E. LANE**  
Showing steel in R.E. South Abut. East Lane



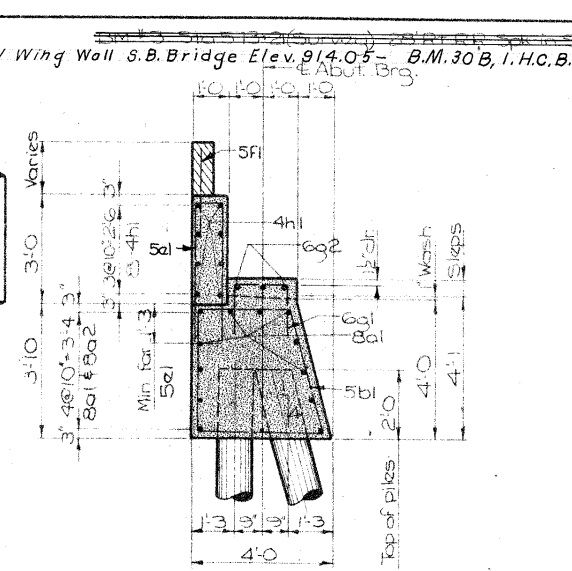
**PLAN VIEW SOUTH ABUT. S.**  
Scale: 1/8" = 1'-0"

**NOTE:**  
Abutment steps for East Lane are shown looking at Rear Elevation with low step on shoulder side of roadway. Abutment steps for West Lane are shown looking at Front Elevation with low step on shoulder side of roadway.

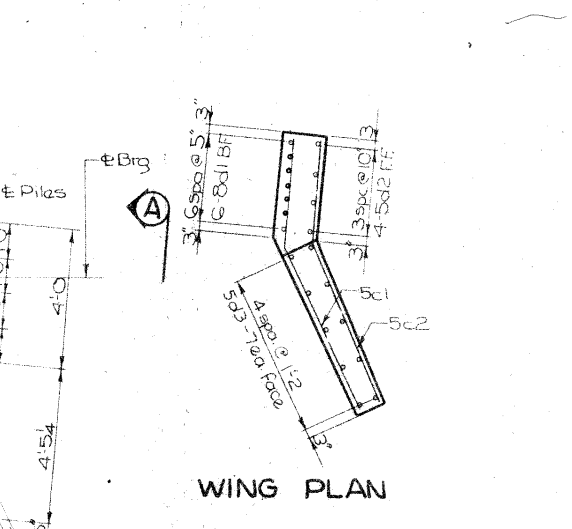
Dimensions for pile spacing given at bottom of footing.  
15 piles per South abutment 9 FF & 6 B.F.  
Front piles were battered 1:4 in directions shown.



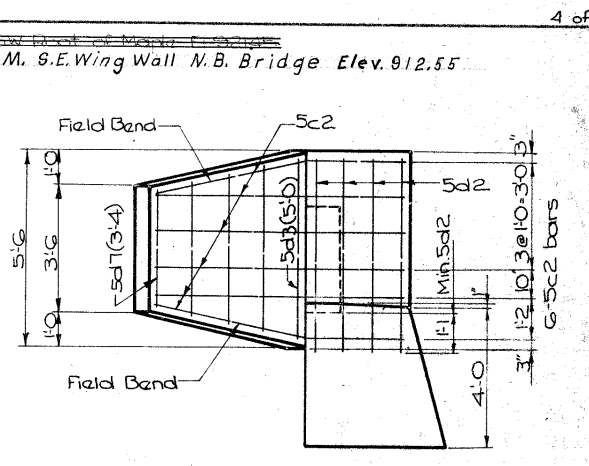
**FRONT ELEVATION SOUTH ABUT. W. LANE**  
Showing horizontal steel in F.F. South Abut. West Lane.



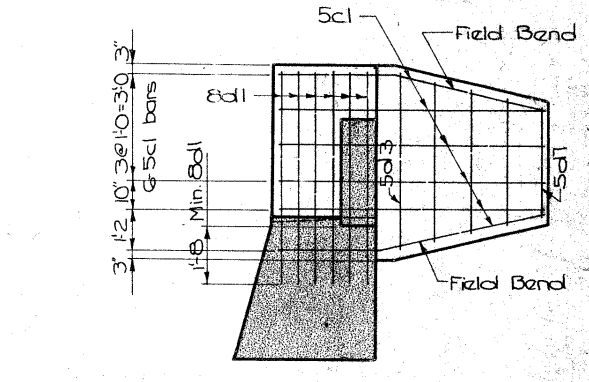
**SECTION ALONG E ABUTMENT**  
Note: Temporary paving block was placed as shown after bending down paving dowels, 5#1, and covering dowels with two layers of tar paper. Paved paving block after superstructure slab has been poured.



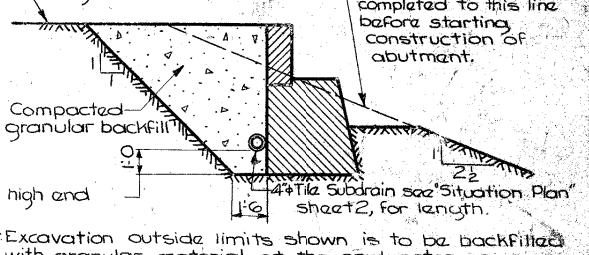
**WING PLAN**



**VIEW A-A**



**SECTION B-B**

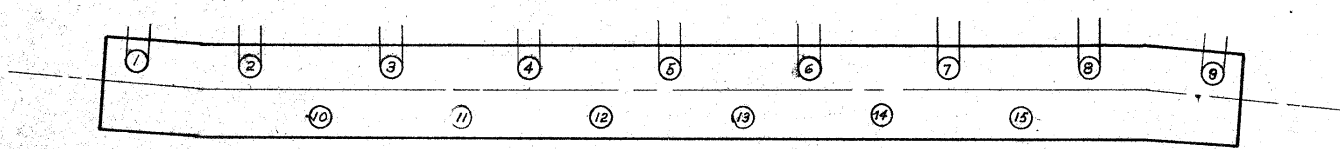


**BACKFILL DETAILS AT E ABUTMENT**

**ABUTMENT NOTES:**  
Minimum clear distance from face of concrete to near reinforcing bar was 2" unless otherwise noted or shown.  
Reinforcing steel was securely wired in place before concrete was poured.  
All exposed corners of 90° or sharper were to be filleted with a 2" dressed and beveled strip.  
Piling was driven to full penetration, if practicable but not to less than 21 tons nor more than 40 tons bearing capacity.  
Bridge contractor backfill abutments between wings to subgrade elevation with granular backfill material complying with Sec 4133 of the Iowa State Highway Commission Specifications and as shown on this sheet. Wingwall details this sheet are also applicable to following sheet.  
See following sheet for bar list and bent bar details.

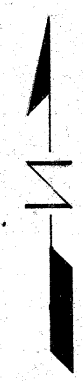
| ABUT. BRG. ELEV. |        |        |
|------------------|--------|--------|
| South Abut.      |        |        |
| Pt               | E Lane | W Lane |
| A                | 908.35 | 906.82 |
| B                | 908.51 | 906.96 |
| C                | 908.61 | 907.04 |
| D                | 908.64 | 907.07 |
| E                | 908.62 | 907.03 |
| F                | 908.53 | 906.93 |
| G                | 908.39 | 906.78 |
| H                | 908.25 | 906.62 |
| I                | 908.10 | 906.47 |

Design for 4°50'30" Skew  
**DUAL 232'1 x 40' PRESTRESSED CONCRETE BEAM BRIDGES**  
43'-12 and 51'-5 1/2' End Spans 68'-9" Center Spans  
Concrete Floor & Substructure Tubular Rails  
**SOUTH ABUTMENT DETAILS**  
Station 573+83.63 on Interstate #35  
Station 1365+21.62 on US #30  
Proj. No. I-35-4(S)110  
**STORY COUNTY**  
Iowa State Highway Commission  
November 1962  
Design 1162  
Sheet 3 of 14  
File No. 21522



West Lane South Abutment

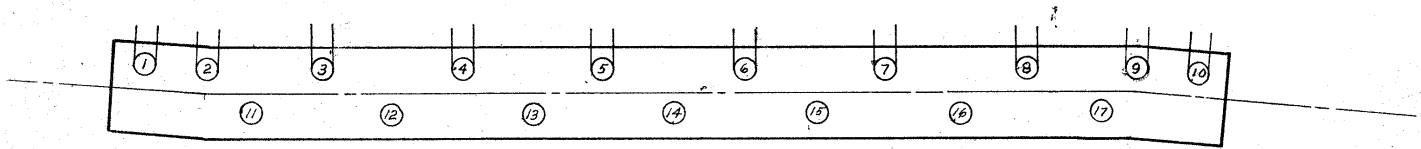
| Pile No. | Date Driven | Length in Leads No. Ft. | Length Cut Off | Average Pen. Last 10 Blows | Length in struct. | Bearing in Tons |
|----------|-------------|-------------------------|----------------|----------------------------|-------------------|-----------------|
| B 1      | 63 10-5     | 16                      | 0.8            | .80                        | 15.2              | 21.8            |
| B 2      | 10-5        | 16                      | 0.8            | .50                        | 15.2              | 32.7            |
| B 3      | 10-5        | 16                      | 0.6            | .55                        | 15.4              | 30.2            |
| B 4      | 10-5        | 16                      | 0.9            | .55                        | 15.1              | 30.2            |
| B 5      | 10-5        | 16                      | 0.8            | .40                        | 15.2              | 39.2            |
| B 6      | 10-5        | 16                      | 0.6            | .475                       | 15.4              | 34.1            |
| B 7      | 10-5        | 16                      | 0.8            | .65                        | 15.2              | 26.1            |
| B 8      | 10-5        | 16                      | 0.8            | .60                        | 15.2              | 28.0            |
| B 9      | 10-5        | 16                      | 0.8            | .45                        | 15.2              | 35.6            |
| 10       | 10-5        | 16                      | 0.8            | .80                        | 15.2              | 21.8            |
| 11       | 10-5        | 16                      | 0.8            | .475                       | 15.2              | 39.0            |
| 12       | 10-5        | 16                      | 0.9            | .575                       | 15.1              | 29.0            |
| 13       | 10-5        | 16                      | 0.8            | .85                        | 15.2              | 20.6            |
| 14       | 10-5        | 16                      | 0.7            | .675                       | 15.3              | 25.3            |
| 15       | 10-5        | 16                      | 0.9            | .55                        | 15.1              | 30.2            |



East Lane South Abutment

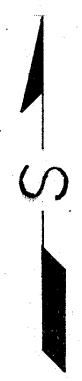
| Pile No. | Date Driven | Length in Leads No. Ft. | Length Cut Off | Average Pen. Last 10 Blows | Length in struct. | Bearing in Tons |
|----------|-------------|-------------------------|----------------|----------------------------|-------------------|-----------------|
| B 1      | 63 11-15    | 16                      | 1.4            | .40                        | 14.6              | 39.2            |
| B 2      | 11-15       | 16                      | 1.5            | .575                       | 14.5              | 29.0            |
| B 3      | 11-15       | 16                      | 1.8            | .45                        | 14.2              | 35.6            |
| B 4      | 11-15       | 16                      | 1.3            | .35                        | 14.7              | 43.6            |
| B 5      | 11-15       | 16                      | 2.8            | .425                       | 13.2              | 37.3            |
| B 6      | 11-15       | 16                      | 2.0            | .40                        | 14.0              | 39.2            |
| B 7      | 11-15       | 16                      | 7.8            | Refusal                    | 8.2               | —               |
| B 8      | 11-15       | 16                      | 2.5            | .40                        | 13.5              | 39.2            |
| B 9      | 11-15       | 16                      | 1.0            | .65                        | 15.0              | 26.1            |
| 10       | 11-15       | 16                      | 1.6            | .60                        | 14.4              | 28.0            |
| 11       | 11-15       | 16                      | 1.2            | .575                       | 14.8              | 29.0            |
| 12       | 11-15       | 16                      | 1.0            | .625                       | 15.0              | 27.0            |
| 13       | 11-15       | 16                      | 0.8            | .45                        | 15.2              | 35.6            |
| 14       | 11-15       | 16                      | 1.1            | .50                        | 14.9              | 32.7            |
| 15       | 11-15       | 16                      | 2.6            | .375                       | 13.4              | 41.3            |

B=Botter 1:4



West Lane North Abutment

| Pile No. | Date Driven | Length in Leads No. Ft. | Length Cut Off | Average Pen. Last 10 Blows | Length in struct. | Bearing in Tons |
|----------|-------------|-------------------------|----------------|----------------------------|-------------------|-----------------|
| B 1      | 63 11-4     | 16                      | .8             | .725                       | 15.2              | 23.7            |
| B 2      | 11-4        | 16                      | 1.1            | .675                       | 14.9              | 25.3            |
| B 3      | 11-4        | 16                      | .9             | .45                        | 15.1              | 35.6            |
| B 4      | 11-4        | 16                      | 1.2            | .40                        | 14.8              | 39.2            |
| B 5      | 11-4        | 16                      | 2.9            | .35                        | 13.1              | 43.6            |
| B 6      | 11-4        | 16                      | 3.3            | .275                       | 12.7              | 52.7            |
| B 7      | 11-4        | 16                      | 6.7            | .20                        | 9.3               | 65.4            |
| B 8      | 11-4        | 16                      | .6             | .80                        | 15.4              | 21.8            |
| B 9      | 11-4        | 16                      | .8             | .725                       | 15.2              | 23.7            |
| B 10     | 11-4        | 16                      | 1.1            | .60                        | 14.9              | 28.0            |
| 11       | 11-4        | 16                      | 1.3            | .40                        | 14.7              | 39.2            |
| 12       | 11-4        | 16                      | 1.4            | .60                        | 14.6              | 28.0            |
| 13       | 11-4        | 16                      | 1.3            | .625                       | 14.7              | 27.0            |
| 14       | 11-4        | 16                      | 2.6            | .40                        | 13.4              | 39.2            |
| 15       | 11-4        | 16                      | 1.6            | .525                       | 14.4              | 31.4            |
| 16       | 11-4        | 16                      | 1.6            | .45                        | 14.4              | 35.6            |
| 17       | 11-4        | 16                      | 3.2            | .275                       | 13.8              | 52.3            |

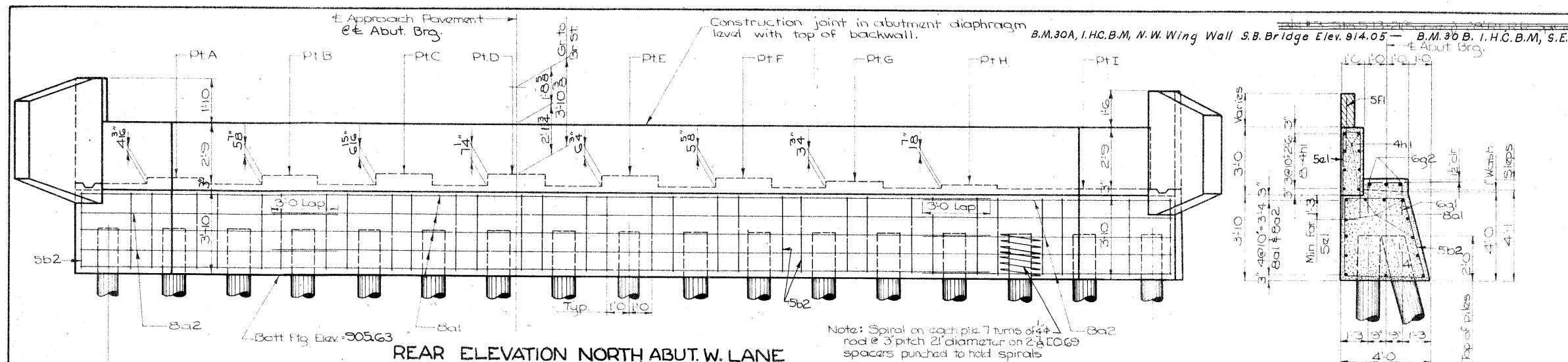


East Lane North Abutment

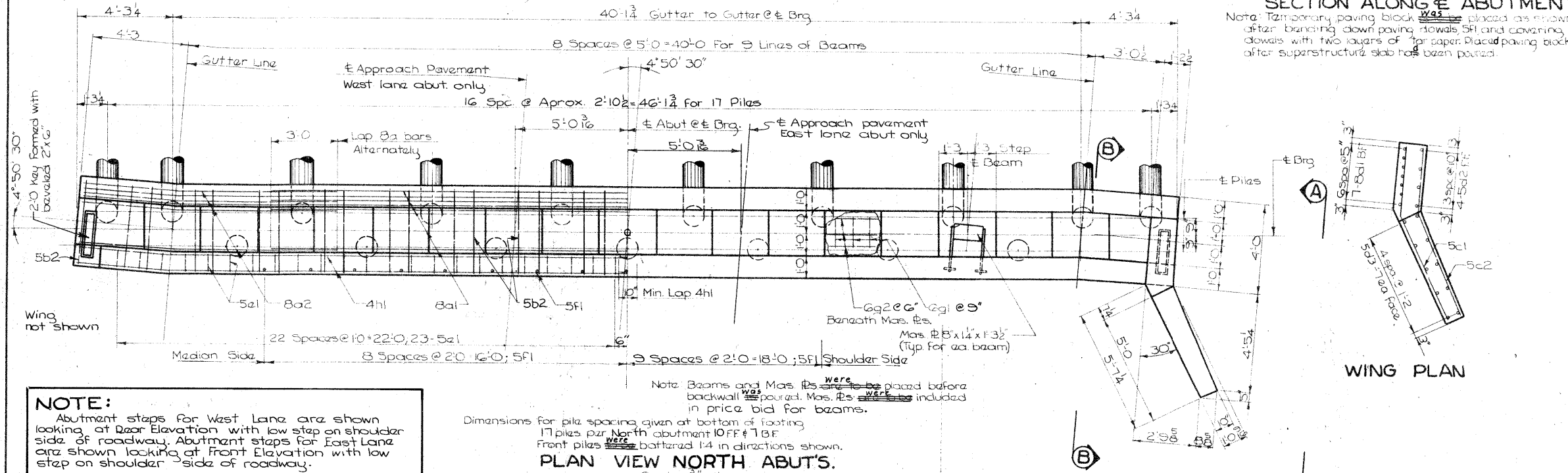
| Pile No. | Date Driven | Length in Leads No. Ft. | Length Cut Off | Average Pen. Last 10 Blows | Length in struct. | Bearing in Tons |
|----------|-------------|-------------------------|----------------|----------------------------|-------------------|-----------------|
| B 1      | 63 11-14    | 16                      | 0.7            | .45                        | 15.3              | 35.6            |
| B 2      | 11-14       | 16                      | 2.5            | .55                        | 13.5              | 30.2            |
| B 3      | 11-14       | 16                      | 0.7            | .45                        | 15.3              | 35.6            |
| B 4      | 11-14       | 16                      | 1.0            | .525                       | 14.9              | 37.4            |
| B 5      | 11-14       | 16                      | 1.1            | .375                       | 13.0              | 41.3            |
| B 6      | 11-14       | 16                      | 3.0            | .50                        | 14.9              | 32.7            |
| B 7      | 11-14       | 16                      | 1.1            | .70                        | 14.9              | 54.5            |
| B 8      | 11-14       | 16                      | 0.6            | .35                        | 15.4              | 43.6            |
| B 9      | 11-14       | 16                      | 0.6            | .45                        | 15.4              | 35.6            |
| B 10     | 11-14       | 16                      | 0.7            | .375                       | 15.3              | 41.3            |
| 11       | 11-14       | 16                      | 0.6            | .60                        | 15.4              | 28.0            |
| 12       | 11-14       | 16                      | 1.0            | .50                        | 15.0              | 32.7            |
| 13       | 11-14       | 16                      | 3.6            | .275                       | 12.4              | 52.3            |
| 14       | 11-14       | 16                      | 1.0            | .30                        | 15.0              | 49.0            |
| 15       | 11-14       | 16                      | 2.1            | .30                        | 13.8              | 49.0            |
| 16       | 11-14       | 16                      | 1.3            | .475                       | 14.7              | 34.1            |
| 17       | 11-14       | 16                      | 3.6            | .30                        | 12.4              | 49.0            |

B=Botter 1:4

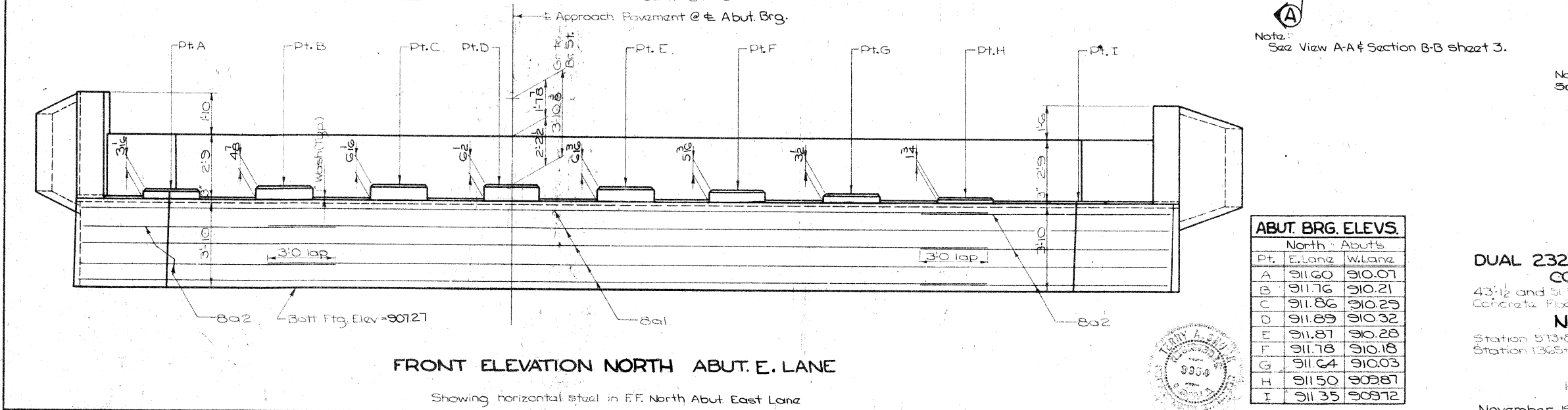
Dual 232'-1x40' Pretensioned Prestressed  
Concrete Beam Bridges  
Abutment Details  
Story County  
Proj. No. 1-35-4(9) 110



REAR ELEVATION NORTH ABUT. W. LANE  
Showing steel in B.F. North Abutment West Lane



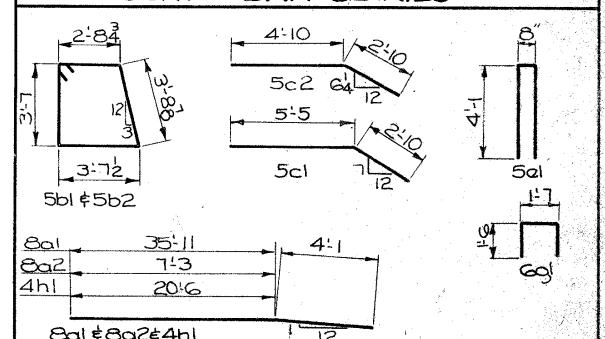
**NOTE:**  
Abutment steps for West Lane are shown looking at Rear Elevation with low step on shoulder side of roadway. Abutment steps for East Lane are shown looking at Front Elevation with low step on shoulder side of roadway.



FRONT ELEVATION NORTH ABUT. E. LANE  
Showing horizontal steel in E.F. North Abut East Lane

| REINFORCING BAR LIST-ONE ABUT. |                        |       |    |        |        |
|--------------------------------|------------------------|-------|----|--------|--------|
| Bar                            | Location               | Shape | No | Length | Weight |
| 8a1                            | Footing, longitudinal  |       | 13 | 40'-0" | 1386   |
| 8a2                            | " "                    |       | 13 | 11'-4" | 393    |
| 5b1                            | " Hoops South Abut     |       | 30 | 14'-5" | 451    |
| 5b2                            | " " North Abut         |       | 34 | 14'-5" | 511    |
| 5c1                            | Wingwall Horiz. @ B.F. |       | 12 | 8'-3"  | 103    |
| 5c2                            | " " @ F.F.             |       | 12 | 7'-8"  | 96     |
| 8d1                            | " Vert. @ B.F.         |       | 14 | 6'-4"  | 231    |
| 5d2                            | " " @ F.F.             |       | 8  | 5'-9"  | 48     |
| 5d3-7                          | " " Both Faces         |       | 20 | Varies | 81     |
| 5e1                            | Backwall Vert.         |       | 46 | 8'-8"  | 416    |
| * 5f1                          | Paving dowels          |       | 18 | 2'-2"  | 41     |
| 6g1                            | Beneath Bm. Brgs.      |       | 21 | 4'-5"  | 179    |
| 6g2                            | " "                    |       | 27 | 2'-3"  | 91     |
| 4h1                            | Backwall, Horizontal   |       | 16 | 24'-7" | 263    |
| Pile Spirals                   | 4" Rod South Abut      |       | 15 | 38'-6" | 96     |
| " "                            | " " North Abut         |       | 17 | 38'-6" | 109    |
| Spiral Spacers                 | 1/2" @ 3' S. Abut      |       | 30 | 1'-10" | 38     |
| " "                            | " " N. Abut            |       | 34 | 1'-10" | 43     |

|                             |      |
|-----------------------------|------|
| South Abutment ~ Total Lbs. | 3927 |
| North " ~ Total Lbs.        | 4005 |



\* Structural Grade.  
Note: All dimensions are out to out.

| CONCRETE PLACEMENT QUANT.-ONE ABUT. |           |
|-------------------------------------|-----------|
| Footing                             | 24.7 C.Y. |
| Backwall                            | 5.2 C.Y.  |
| Wingwalls                           | 2.7 C.Y.  |
| Paving Block                        | 1.4 C.Y.  |
| Total                               | 34.0 C.Y. |

| ESTIMATED QUANT. ~ FOUR ABUTMENTS |             |
|-----------------------------------|-------------|
| Item                              | Quantity    |
| Concrete                          | 136.0 C.Y.  |
| Reinforcing Steel                 | 15,864 Lbs. |
| Crested Piling 6" @ 30'           | 1920 L.Ft.  |
| Class 20 Excavation               | 381 C.Y.    |
| Granular Backfill                 | 437 Tons    |

Note: For wingwall details and backfill details and notes see preceding sheet.

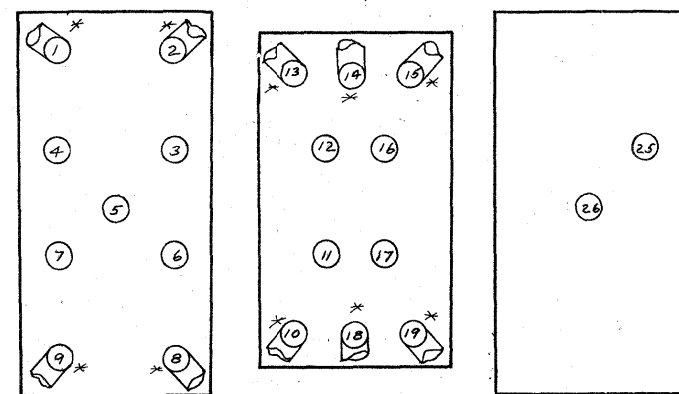
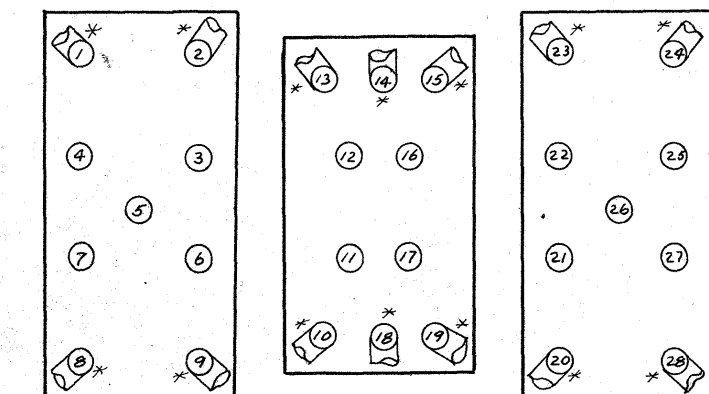
| ABUT. BRG. ELEV. |                 |
|------------------|-----------------|
| Pt.              | E. Lane W. Lane |
| A                | 911.60 910.07   |
| B                | 911.76 910.21   |
| C                | 911.86 910.29   |
| D                | 911.89 910.32   |
| E                | 911.87 910.28   |
| F                | 911.78 910.18   |
| G                | 911.64 910.03   |
| H                | 911.50 909.87   |
| I                | 911.35 909.72   |

Design for 4'-50' 30" Skew  
**DUAL 232'1 x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**  
43'-12" and 51'-52" End Spans  
Concrete Floor & Substructure  
68'-9" Center Spans  
Tubular Rails  
**NORTH ABUTMENT DETAILS**  
Station 513+83.63 on Interstate #35  
Station 1365+21.62 on US #30  
Proj. N° I-35-4(S)110  
**STORY COUNTY**  
Iowa State Highway Commission  
November 1962  
Design 1162  
Story County  
Sheet 4 of 14  
File N° 21522

# Pier No. 1 West Lane South Bound

# Pier No. 3 West Lane South Bound

A of 25  
4



\*Note:

Two Pile were ruined & Two Pile recorded had only 3 or 4 ft. Penetration and were driven to Refusal. Dense sand was encountered. Duke Hensing and Design Dept. decided to excavate to sand and pour Concrete. A steel mat was placed six inches from bottom of footing. Used no Pile.

\* Battered 1:4

\* Battered 1:4

| Pile No | Date    | Length Leads | Cut-Off Near Ft. | Ave. Pen. 5 Blows | Length in Struct. | Bearing in Tons |
|---------|---------|--------------|------------------|-------------------|-------------------|-----------------|
| 1       | 11-6-63 | 16           | 1.0              | .875              | 15.0              | 20.1            |
| 2       | 11-6-63 | 16           | 1.4              | .475              | 14.6              | 34.1            |
| 3       | 11-6-63 | 16           | 1.3              | .450              | 14.7              | 35.6            |
| 4       | 11-6-63 | 16           | 1.0              | .800              | 15.0              | 21.8            |
| 5       | 11-6-63 | 16           | 0.9              | .800              | 15.1              | 21.8            |
| 6       | 11-6-63 | 16           | 0.7              | .500              | 15.3              | 32.7            |
| 7       | 11-6-63 | 16           | 1.1              | .750              | 14.9              | 23.0            |
| 8       | 11-6-63 | 16           | 0.6              | .700              | 15.4              | 24.7            |
| 9       | 11-6-63 | 16           | 0.9              | .700              | 15.1              | 24.7            |
| 10      | 11-6-63 | 16           | 5.0              | .350              | 10.0              | 43.6            |
| 11      | 11-6-63 | 16           | 5.3              | .400              | 9.7               | 39.2            |
| 12      | 11-6-63 | 16           | 2.4              | .375              | 13.6              | 41.3            |
| 13      | 11-6-63 | 16           | 4.3              | .475              | 11.7              | 34.1            |
| 14      | 11-6-63 | 16           | 3.3              | .300              | 12.7              | 49.0            |
| 15      | 11-6-63 | 16           | 2.6              | .325              | 13.4              | 46.1            |
| 16      | 11-6-63 | 30           | 16.0             | Test              | Pile              | 41.7            |
| 17      | 11-6-63 | 16           | 3.0              | .400              | 13.0              | 39.2            |
| 18      | 11-6-63 | 16           | 3.7              | .300              | 12.3              | 49.0            |
| 19      | 11-6-63 | 16           | 4.4              | .375              | 11.6              | 41.3            |
| 20      | 11-6-63 | 16           | 3.4              | .325              | 12.6              | 46.1            |
| 21      | 11-6-63 | 16           | 3.2              | .300              | 12.8              | 49.0            |
| 22      | 11-6-63 | 16           | 7.1              | .400              | 8.9               | 39.2            |
| 23      | 11-6-63 | 16           | 6.7              | .400              | 9.3               | 39.2            |
| 24      | 11-6-63 | 16           | 3.5              | .425              | 12.5              | 37.3            |
| 25      | 11-5-63 | 16           | 6.5              | .550              | 9.5               | 30.2            |
| 26      | 11-5-63 | 16           | 4.9              | .325              | 11.1              | 46.1            |
| 27      | 11-5-63 | 16           | 6.0              | Refusal           |                   |                 |
| 28      | 11-5-63 | 16           | 4.4              | .275              | 11.6              | 60.3            |

| Pile No | Date     | Length Leads | Cut-Off Near Ft. | Ave. Pen. 5 Blows | Length in Struct. | Bearing in Tons |
|---------|----------|--------------|------------------|-------------------|-------------------|-----------------|
| 1       | 10-31-63 | 16           | 2.6              | .250              | 13.4              | 56.0            |
| 2       | 10-31-63 | 16           | 2.8              | .225              | 13.2              | 60.3            |
| 3       | 10-31-63 | 16           | 1.6              | .350              | 14.4              | 49.0            |
| 4       | 10-31-63 | 16           | 2.7              | .375              | 13.3              | 41.3            |
| 5       | 10-31-63 | 16           | 6.8              | .200              | 9.2               | 65.4            |
| 6       | 10-31-63 | 16           | 6.9              | Refusal           | 9.1               |                 |
| 7       | 10-31-63 | 16           | 2.0              | .225              | 14.0              | 60.3            |
| 8       | 10-31-63 | 16           | 2.8              | .375              | 13.2              | 41.3            |
| 9       | 10-31-63 | 16           | 3.6              | .300              | 12.4              | 49.0            |
| 10      | 11-1-63  | 16           | 1.8              | .175              | 14.2              | 71.0            |
| 11      | 11-1-63  | 16           | 1.2              | .350              | 14.8              | 43.6            |
| 12      | 11-1-63  | 16           | 2.8              | .200              | 13.2              | 65.4            |
| 13      | 11-1-63  | 16           | 2.6              | .300              | 13.4              | 49.0            |
| 14      | 11-1-63  | 16           | 2.8              | .175              | 13.2              | 71.0            |
| 15      | 11-1-63  | 16           | 2.0              | .225              | 14.0              | 60.3            |
| 16      | 11-1-63  | 16           | 3.6              | .300              | 12.4              | 49.0            |
| 17      | 11-1-63  | 16           | Test             | Pile              |                   | 40.5            |
| 18      | 11-1-63  | 16           | 2.1              | .225              | 13.9              | 60.3            |
| 19      | 11-1-63  | 16           | 1.9              | .225              | 14.1              | 60.3            |
| 20      | *        |              |                  |                   |                   |                 |
| 21      | *        |              |                  |                   |                   |                 |
| 22      | *        |              |                  |                   |                   |                 |
| 23      | *        |              |                  |                   |                   |                 |
| 24      | *        |              |                  |                   |                   |                 |
| 25      | *        |              |                  | .175              |                   | 71.0            |
| 26      | *        |              |                  | .200              |                   | 65.4            |
| 27      | *        |              |                  |                   |                   |                 |
| 28      | *        |              |                  |                   |                   |                 |

Dual 231-1 X40 Pretensioned Prestressed  
Concrete Beam Bridges  
Pier No 1 #3 Pile Detail  
Story County

Design For 4° 50'30" Skew

DUAL 232'1 x 40' PRETENSIONED PRESTRESSED  
CONCRETE BEAM BRIDGES

43'12" and 51'52" End Spans  
Concrete Floor & Substructure

68'9" Center Spans  
Tubular Rails

PIER No 1 DETAILS

Station 573+83.63 on Interstate #35  
Station 1365+21.62 on US #30

Proj No I-35-4 (3) 110

STORY COUNTY

Iowa State Highway Commission

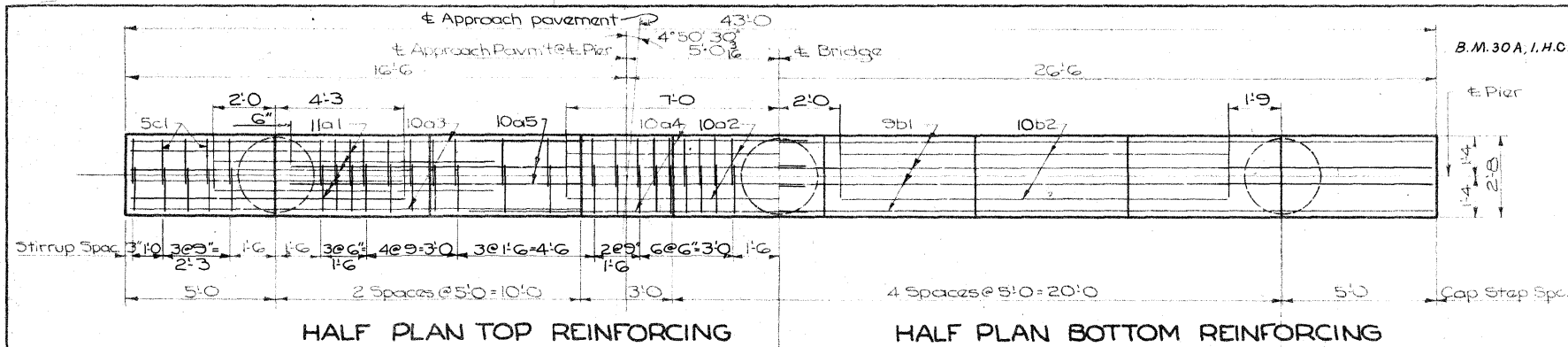
November 1962

Sheet 5 of 14

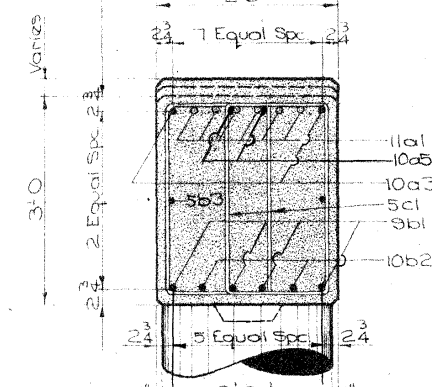
Design 1162

Story County

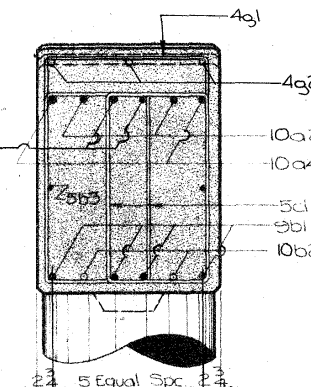
File No 21522



B.M. 30A, I.H.C. B.M. N.W. Wing Wall S.B. Bridge Elev. 914.05 — B.M. 30B, I.H.C. B.M. S.E. Wing Wall N.B. Bridge Elev. 912.55



SECTION C-C  
Scale 3/4" = 1'-0"  
Keyways not shown in top of cap.



SECTION D-D  
Scale 3/4" = 1'-0"  
Keyways not shown in top of cap.

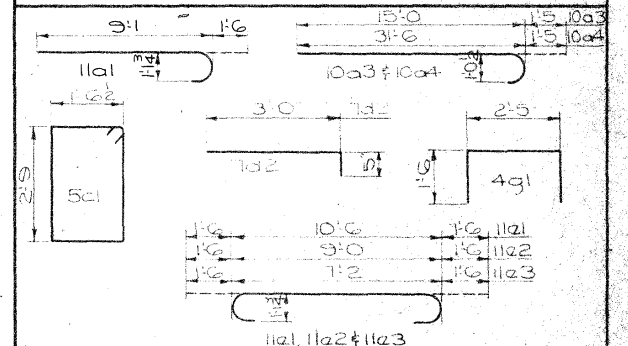
TYPICAL COLUMN SECTION  
Scale 3/4" = 1'-0"

PIER NOTES:

All exposed corners of 90° or sharper were formed with a 3" dressed & beveled fillet.  
Clear distance from face of concrete to near reinforcing bar was 1 1/2" unless otherwise noted or shown.  
Piles are driven to full penetration where practicable but in no case to less than 20 tons nor more than 40 tons bearing capacity.  
\*Spirals were made of plain structural grade reinforcing steel. The length of spiral shown did not include the lapped length for splices. The cost of laps at splices were included in the bid price for other reinforcement. Spirals may be spliced by lapping 12 turns.

| REINFORCING BAR LIST - ONE PIER |                        |       |     |           |        |
|---------------------------------|------------------------|-------|-----|-----------|--------|
| Bar                             | Location               | Shape | No. | Length    | Weight |
| 11a1                            | Top Pier Cap Long      | U     | 12  | 10'-7"    | 675    |
| 10a2                            | "                      | U     | 4   | 14'-0"    | 241    |
| 10a3                            | "                      | U     | 2   | 16'-5"    | 141    |
| 10a4                            | "                      | U     | 2   | 32'-11"   | 283    |
| 10a5                            | "                      | U     | 2   | 32'-0"    | 275    |
| 10b1                            | Bottom Pier Cap Long   | U     | 8   | 22'-4"    | 607    |
| 10b2                            | "                      | U     | 4   | 12'-9"    | 219    |
| 5b3                             | Sides Pier Cap Long    | U     | 4   | 22'-3"    | 93     |
| 5c1                             | Pier Cap Stirrups      | □     | 96  | 9'-4"     | 934    |
| 7d1                             | Column Verticals       | ⌋     | 36  | 21'-2"    | 1558   |
| 7d2                             | " Dowels               | ⌋     | 36  | 3'-4"     | 245    |
| 11a2                            | Center Footing Long    | U     | 12  | 13'-6"    | 861    |
| 11a3                            | Exterior Footings Long | U     | 20  | 12'-0"    | 1275   |
| 11a3                            | Both Footings Trans.   | U     | 29  | 10'-2"    | 1567   |
| 4g1                             | Beneath Beam Brge      | U     | 27  | 5'-3"     | 95     |
| 4g2                             | "                      | U     | 27  | 2'-0"     | 36     |
| 8s                              | * Column Spirals       | ⌀     | 3   | 508'-2"   | 1590   |
| 8s                              | Spiral Spacers         | —     | 12  | 18'-6"    | 153    |
|                                 |                        |       |     | Total-lbs | 10848  |

BENT BAR DETAILS



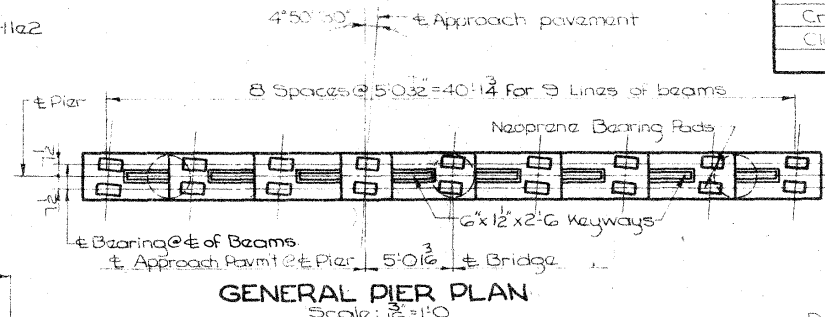
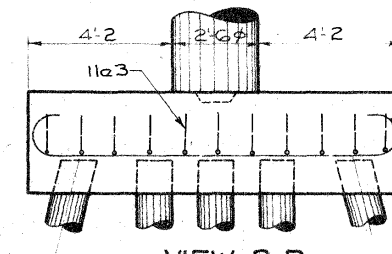
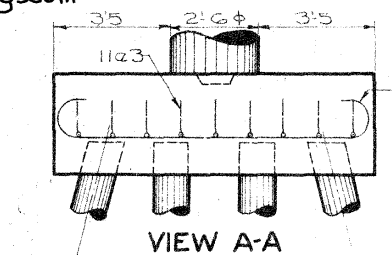
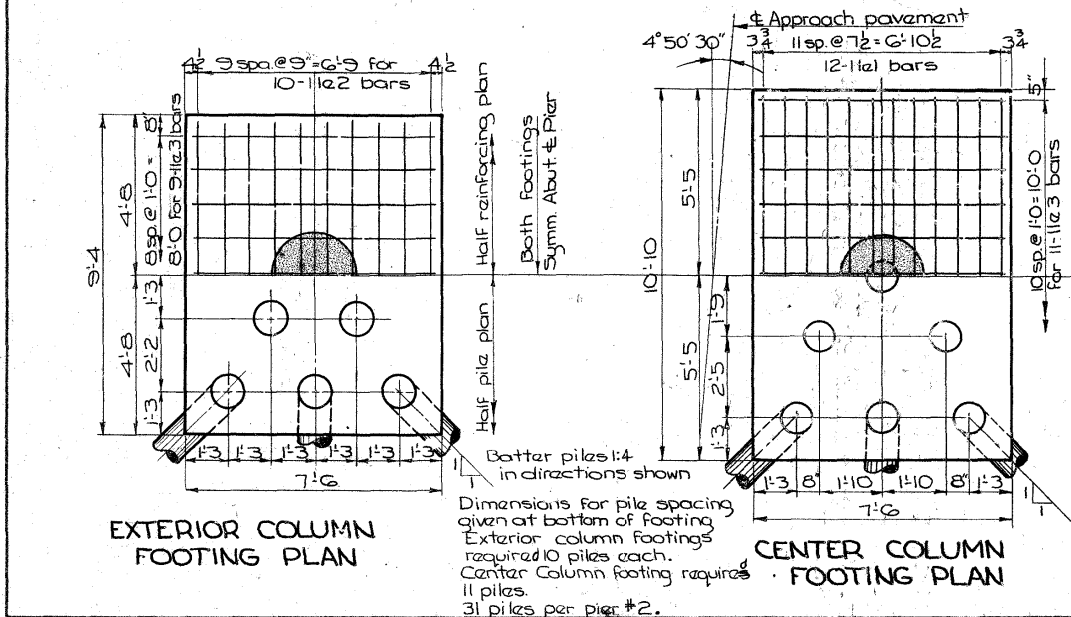
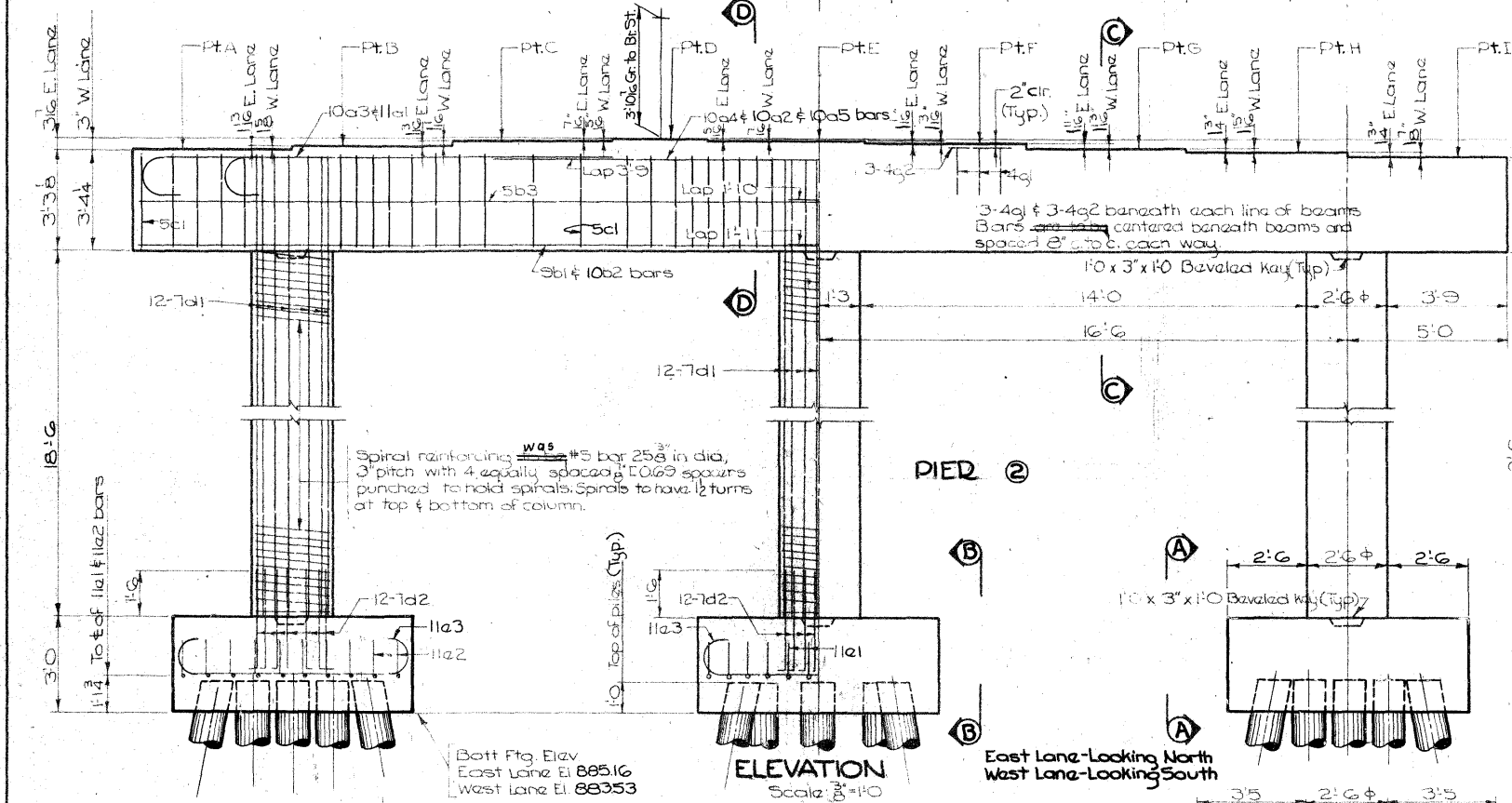
All dimensions are out to out.

CONCRETE PLACEMENT-ONE PIER

| Item     | E Lane Quant. | W Lane Quant. |
|----------|---------------|---------------|
| Footings | 23.7 cu.      | 23.7 cu.      |
| Columns  | 10.1 cu.      | 10.1 cu.      |
| Cap      | 14.2 cu.      | 14.4 cu.      |
| Total    | 48.0 cu.      | 48.2 cu.      |

TOTAL ESTIMATED QUANTITIES-TWO PIERS

| Item                     | Quantity    |
|--------------------------|-------------|
| Concrete                 | 96.2 cu.    |
| Reinforcing Steel        | 21,696 lbs. |
| Crushed Filling 62 @ 30' | 1860 L.Ft.  |
| Class 20 Excavation      | 122.0 cu.   |



PIER BRG. ELEV.

| Pt. | E. Lane | W. Lane |
|-----|---------|---------|
| A   | 909.92  | 908.38  |
| B   | 910.07  | 908.52  |
| C   | 910.17  | 908.61  |
| D   | 910.20  | 908.63  |
| E   | 910.18  | 908.59  |
| F   | 910.09  | 908.49  |
| G   | 909.95  | 908.34  |
| H   | 909.81  | 908.18  |
| I   | 909.66  | 908.03  |

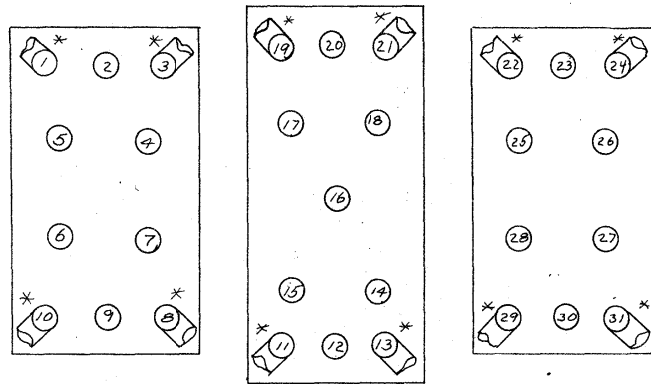
Design For 4° 50' 30" Skew  
DUAL 232' x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES  
43'-12" and 51'-52" End Spans  
Concrete Floor & Substructure  
83'-9" Center Spans  
Tubular Rails

PIER #2 DETAILS

Station 573+83.63 on Interstate #35  
Station 1365+21.62 on US #30  
November 1962  
Story County  
Iowa State Highway Commission  
Sheet 6 of 14

Design 1162  
Designed by: T.H.  
Story County  
Traced by: (S)  
File # 21522  
Checked by: M.L.F.

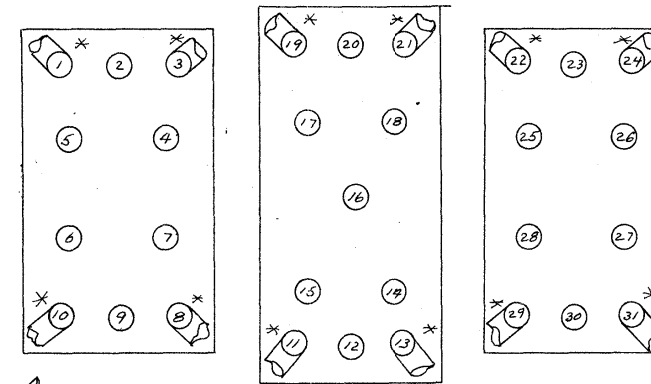
# Pier No.2 East Lane North Bound



\* 1:4 Batter

| Pile No. | Date     | Length Leads | Cut-Off Near Ft. | Ave. Pen. 10 Blows | Length in Struct. | Bearing in Tons |
|----------|----------|--------------|------------------|--------------------|-------------------|-----------------|
| 1        | 11-29-63 | 16'          | 1.5'             | .300               | 14.5'             | 49.8            |
| 2        | 11-29-63 | 16'          | 1.7'             | .325               | 14.2'             | 46.1            |
| 3        | 11-29-63 | 16'          | 1.4'             | .375               | 14.6'             | 41.3            |
| 4        | 11-29-63 | 16'          | 2.4'             | .350               | 13.6'             | 43.6            |
| 5        | 11-29-63 | 16'          | 2.1'             | .325               | 13.9'             | 46.1            |
| 6        | 11-29-63 | 16'          | 1.3'             | .325               | 14.7'             | 46.1            |
| 7        | 11-29-63 | 16'          | 1.4'             | .350               | 14.6'             | 43.6            |
| 8        | 11-29-63 | 16'          | 1.4'             | .375               | 14.6'             | 41.3            |
| 9        | 11-29-63 | 16'          | 0.9'             | .300               | 15.1'             | 49.8            |
| 10       | 11-29-63 | 17'          | 4.5'             | .275               | 11.5'             | 52.3            |
| 11       | 11-29-63 | 16'          | 2.7'             | .275               | 13.3'             | 52.3            |
| 12       | 11-29-63 | 16'          | 4.9'             | .275               | 11.1'             | 52.3            |
| 13       | 11-29-63 | 16'          | 3.5'             | Refusal            |                   |                 |
| 14       | 11-29-63 | 16'          | 1.4'             | .350               | 14.6'             | 43.6            |
| 15       | 11-29-63 | 16'          | 3.2'             | .300               | 12.8'             | 49.8            |
| 16       | 11-29-63 | 16'          | 1.4'             | .350               | 14.6'             | 43.6            |
| 17       | 11-29-63 | 16'          | 1.1'             | .350               | 14.9'             | 43.6            |
| 18       | 11-29-63 | 16'          | 1.3'             | .300               | 14.7'             | 49.8            |
| 19       | 11-29-63 | 16'          | 2.0'             | .275               | 14.0'             | 52.3            |
| 20       | 11-29-63 | 16'          | 5.0'             | .275               | 11.0'             | 52.3            |
| 21       | 11-29-63 | 16'          | 3.6'             | .300               | 12.4'             | 49.8            |
| 22       | 11-29-63 | 16'          | 3.6'             | .275               | 12.4'             | 52.3            |
| 23       | 11-29-63 | 16'          | 5.0'             | .275               | 11.0'             | 52.3            |
| 24       | 11-29-63 | 16'          | 3.9'             | .300               | 12.1'             | 49.8            |
| 25       | 11-29-63 | 16'          | 3.1'             | .325               | 12.9'             | 46.1            |
| 26       | 11-29-63 | 16'          | 1.9'             | .350               | 14.1'             | 43.6            |
| 27       | 11-29-63 | 16'          | 1.8'             | .275               | 14.2'             | 52.3            |
| 28       | 11-29-63 | 16'          | 2.7'             | .325               | 13.3'             | 46.1            |
| 29       | 11-29-63 | 16'          | 4.7'             | .375               | 11.3'             | 41.3            |
| 30       | 11-29-63 | 16'          | 6.0'             | .275               | 10.0'             | 52.3            |
| 31       | 11-29-63 | 16'          | 4.8'             | .275               | 11.2'             | 52.3            |

# Pier No.2 West Lane South Bound



\* 1:4 Batter

| Pile No. | Date     | Length Leads | Cut-Off Near Ft. | Ave. Pen. 5 Blows | Length in Struct. | Bearing in Tons |
|----------|----------|--------------|------------------|-------------------|-------------------|-----------------|
| 1        | 11-30-63 | 16'          | 1.9'             | .325              | 14.1'             | 46.1            |
| 2        | 11-30-63 | 16'          | 1.6'             | .400              | 14.4'             | 39.2            |
| 3        | 11-30-63 | 16'          | 1.7'             | .300              | 14.3'             | 49.8            |
| 4        | 11-30-63 | 16'          | 1.4'             | .275              | 14.6'             | 52.3            |
| 5        | 11-30-63 | 16'          | 1.4'             | .400              | 14.6'             | 39.2            |
| 6        | 11-30-63 | 16'          | 1.4'             | .500              | 14.6'             | 32.7            |
| 7        | 11-30-63 | 16'          | 1.3'             | .700              | 14.7'             | 24.5            |
| 8        | 11-30-63 | 16'          | 2.8'             | .350              | 13.2'             | 43.6            |
| 9        | 11-30-63 | 16'          | 1.7'             | .300              | 14.3'             | 49.8            |
| 10       | 11-30-63 | 16'          | 2.2'             | .325              | 13.8'             | 46.1            |
| 11       | 11-30-63 | 16'          | 2.00'            | .400              | 14.0'             | 39.2            |
| 12       | 11-30-63 | 16'          | 1.5'             | .450              | 14.5'             | 37.3            |
| 13       | 11-30-63 | 16'          | 1.6'             | .375              | 14.4'             | 34.1            |
| 14       | 11-30-63 | 16'          | 1.3'             | .375              | 14.7'             | 34.1            |
| 15       | 11-30-63 | 16'          | 1.1'             | .425              | 14.9'             | 27.3            |
| 16       | 11-30-63 | 16'          | 1.3'             | .400              | 14.3'             | 39.2            |
| 17       | 11-30-63 | 16'          | 2.6'             | .425              | 13.4'             | 37.3            |
| 18       | 11-30-63 | 16'          | 1.0'             | .450              | 15.0'             | 35.6            |
| 19       | 11-30-63 | 16'          | 3.0'             | .350              | 12.0'             | 43.6            |
| 20       | 11-30-63 | 16'          | 1.5'             | .400              | 14.5'             | 39.2            |
| 21       | 11-30-63 | 16'          | 1.3'             | .400              | 14.7'             | 39.2            |
| 22       | 11-30-63 | 16'          | 1.3'             | .300              | 14.7'             | 49.0            |
| 23       | 11-30-63 | 16'          | 1.3'             | .275              | 14.7'             | 52.3            |
| 24       | 11-30-63 | 16'          | 1.7'             | .375              | 14.3'             | 41.3            |
| 25       | 11-30-63 | 16'          | 2.3'             | .375              | 13.7'             | 41.3            |
| 26       | 11-30-63 | 16'          | 2.9'             | .400              | 13.1'             | 39.2            |
| 27       | 11-30-63 | 16'          | 1.8'             | .425              | 14.2'             | 37.3            |
| 28       | 11-30-63 | 16'          | 2.8'             | .375              | 13.2'             | 41.3            |
| 29       | 11-30-63 | 16'          | 2.6'             | .275              | 13.4'             | 52.3            |
| 30       | 11-30-63 | 16'          | 1.9'             | .300              | 14.1'             | 49.0            |
| 31       | 11-30-63 | 16'          | 1.9'             | .300              | 14.1'             | 49.0            |

6B of 25  
7A

Dual 231-1 Preten. Prestressed  
Concrete Beam Bridges  
Pier No 2 Pile Detail  
Story County

|  |            |        |
|--|------------|--------|
|  | Total-lbs. | 10,047 |
|--|------------|--------|

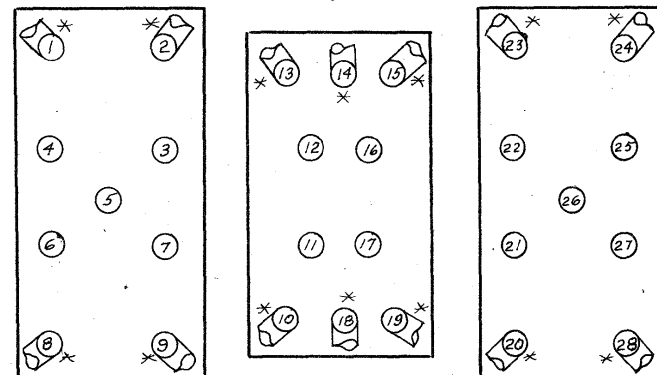
All dimensions are out to out.

| TOTAL ESTIMATED QUANTITIES-TWO PIERS |     |
|--------------------------------------|-----|
| 1                                    | 2   |
| 3                                    | 4   |
| 5                                    | 6   |
| 7                                    | 8   |
| 9                                    | 10  |
| 11                                   | 12  |
| 13                                   | 14  |
| 15                                   | 16  |
| 17                                   | 18  |
| 19                                   | 20  |
| 21                                   | 22  |
| 23                                   | 24  |
| 25                                   | 26  |
| 27                                   | 28  |
| 29                                   | 30  |
| 31                                   | 32  |
| 33                                   | 34  |
| 35                                   | 36  |
| 37                                   | 38  |
| 39                                   | 40  |
| 41                                   | 42  |
| 43                                   | 44  |
| 45                                   | 46  |
| 47                                   | 48  |
| 49                                   | 50  |
| 51                                   | 52  |
| 53                                   | 54  |
| 55                                   | 56  |
| 57                                   | 58  |
| 59                                   | 60  |
| 61                                   | 62  |
| 63                                   | 64  |
| 65                                   | 66  |
| 67                                   | 68  |
| 69                                   | 70  |
| 71                                   | 72  |
| 73                                   | 74  |
| 75                                   | 76  |
| 77                                   | 78  |
| 79                                   | 80  |
| 81                                   | 82  |
| 83                                   | 84  |
| 85                                   | 86  |
| 87                                   | 88  |
| 89                                   | 90  |
| 91                                   | 92  |
| 93                                   | 94  |
| 95                                   | 96  |
| 97                                   | 98  |
| 99                                   | 100 |

| Item                         | Quantity    |
|------------------------------|-------------|
| Concrete                     | 92.0 c.y.   |
| Reinforcing Steel            | 20,094 lbs. |
| Craosoted Piling 54@ 30'     | 1620 L.Ft   |
| Class 20 Excavation          | 134.0 c.y.  |
| Craosoted Test Piling 2@ 30' | lump sum    |

Design For 4" 50'30" Skew  
DUAL 232'1 x 40' PRETENSIONED PRESTRESSED  
CONCRETE BEAM BRIDGES  
43'12 and 51'52 End Spans  
Concrete Floor & Substructure  
68'9 Center Spans  
Tubular Rails  
PIER No 3 DETAILS  
Station 573+83.63 on Interstate # 35  
Station 1365+21.62 on US # 30  
Story County  
Iowa State Highway Commission  
November 1962  
Sheet For 14

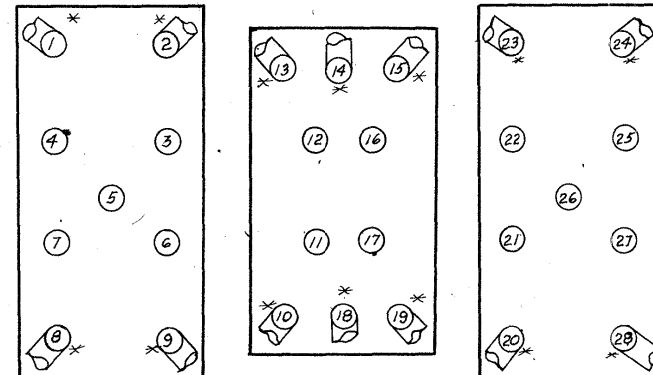
# Pier No. 1 East Lane North Bound



\* Battered 1:4

| Pile No. | Date     | Length Leads | Cut-Off Near Ft. | Ave. Pen. 10 Blows | Length in Struct. | Bearing in Tons |
|----------|----------|--------------|------------------|--------------------|-------------------|-----------------|
| 1        | 11-19-63 | 16'          | 4.1              | .325               | 11.9              | 46.1            |
| 2        | 11-19-63 | 16'          | 1.7              | .350               | 14.3              | 43.6            |
| 3        | 11-19-63 | 16'          | 1.5              | .325               | 14.5              | 46.1            |
| 4        | 11-19-63 | 16'          | 2.4              | .30                | 13.6              | 49.0            |
| 5        | 11-19-63 | 16'          | 6.7              | .45                | 9.3               | 35.6            |
| 6        | 11-19-63 | 16'          | 3.6              | .375               | 12.4              | 41.3            |
| 7        | 11-19-63 | 16'          | 4.9              | .35                | 11.1              | 43.6            |
| 8        | 11-19-63 | 16'          | 3.4              | .325               | 12.6              | 46.1            |
| 9        | 11-19-63 | 16'          | 4.8              | .35                | 11.2              | 43.6            |
| 10       | 11-19-63 | 16'          | 4.8              | .30                | 11.2              | 49.0            |
| 11       | 11-19-63 | 16'          | 3.5              | .325               | 12.5              | 46.1            |
| 12       | 11-19-63 | 16'          | 4.4              | .40                | 11.4              | 39.2            |
| 13       | 11-19-63 | 16'          | 6.0              | .375               | 9.0               | 41.3            |
| 14       | 11-19-63 | 16'          | 1.9              | .325               | 14.1              | 46.1            |
| 15       | 11-19-63 | 16'          | 4.9              | .30                | 11.1              | 49.0            |
| 16       | 11-19-63 | 16'          | 2.9              | .30                | 13.1              | 49.0            |
| 17       | 11-19-63 | 16'          | —                | Test               | —                 | 41.7            |
| 18       | 11-19-63 | 16'          | 3.6              | .275               | 12.4              | 52.3            |
| 19       | 11-19-63 | 16'          | 4.6              | .30                | 11.4              | 49.0            |
| 20       | 11-19-63 | 16'          | 3.0              | .35                | 13.0              | 43.6            |
| 21       | 11-19-63 | 16'          | 1.8              | .40                | 14.2              | 39.2            |
| 22       | 11-19-63 | 16'          | 5.0              | .30                | 11.0              | 49.0            |
| 23       | 11-19-63 | 16'          | 4.1              | .325               | 11.9              | 46.1            |
| 24       | 11-19-63 | 16'          | 3.7              | .35                | 12.3              | 43.6            |
| 25       | 11-19-63 | 16'          | 5.6              | .35                | 10.4              | 43.6            |
| 26       | 11-19-63 | 16'          | 2.2              | .35                | 13.8              | 43.6            |
| 27       | 11-18-63 | 16'          | 4.1              | .275               | 11.9              | 52.3            |
| 28       | 11-19-63 | 16'          | 3.5              | .30                | 12.5              | 49.0            |

# Pier #3 East Lane North Bound



\* Battered 1:4

| Pile No. | Date     | Length Leads | Cut-Off Near Ft. | Ave. Pen. 5 Blows | Length in Struct. | Bearing in Tons |
|----------|----------|--------------|------------------|-------------------|-------------------|-----------------|
| 1        | 11-11-63 | 16'          | 2.5              | .85               | 13.5              | 20.6            |
| 2        | 11-11-63 | 16'          | 1.1              | .675              | 14.9              | 25.3            |
| 3        | 11-11-63 | 16'          | 4.4              | .275              | 11.6              | 52.3            |
| 4        | 11-11-63 | 16'          | 1.0              | .70               | 15.0              | 24.5            |
| 5        | 11-11-63 | 16'          | 1.1              | .85               | 14.9              | 20.6            |
| 6        | 11-11-63 | 16'          | 1.5              | .825              | 14.5              | 21.2            |
| 7        | 11-11-63 | 16'          | 4.0              | .70               | 12.0              | 24.5            |
| 8        | 11-11-63 | 16'          | 2.5              | .650              | 13.5              | 26.1            |
| 9        | 11-11-63 | 16'          | 2.4              | .60               | 13.6              | 28.0            |
| 10       | 11-11-63 | 16'          | 2.1              | .45               | 13.9              | 35.6            |
| 11       | 11-11-63 | 16'          | 2.3              | .375              | 13.7              | 41.3            |
| 12       | 11-11-63 | 16'          | 2.2              | .60               | 13.8              | 28.0            |
| 13       | 11-11-63 | 16'          | 1.9              | .40               | 14.1              | 39.2            |
| 14       | 11-11-63 | 16'          | 2.4              | .40               | 13.6              | 39.2            |
| 15       | 11-11-63 | 16'          | 2.6              | .650              | 13.4              | 26.1            |
| 16       | 11-11-63 | 16'          | 3.8              | .650              | 12.2              | 26.1            |
| 17       | 11-11-63 | 30'          | 16.6             | Test Pile         | 13.4              | 43.0            |
| 18       | 11-11-63 | 16'          | 2.2              | .35               | 13.8              | 43.6            |
| 19       | 11-11-63 | 16'          | 2.6              | .40               | 13.4              | 39.2            |
| 20       | 11-11-63 | 16'          | 2.2              | .35               | 13.8              | 43.6            |
| 21       | 11-11-63 | 16'          | 2.1              | .50               | 13.9              | 32.7            |
| 22       | 11-8-63  | 16'          | 6.1              | .25               | 9.9               | 56.0            |
| 23       | 11-11-63 | 16'          | 3.8              | .275              | 12.2              | 52.3            |
| 24       | 11-11-63 | 16'          | 2.7              | .375              | 13.3              | 41.3            |
| 25       | 11-8-63  | 16'          | 6.9              | .275              | 9.1               | 52.3            |
| 26       | 11-11-63 | 16'          | 2.3              | .275              | 13.7              | 52.3            |
| 27       | 11-11-63 | 16'          | 2.3              | .525              | 13.7              | 31.4            |
| 28       | 11-11-63 | 16'          | 3.1              | .375              | 12.9              | 41.3            |

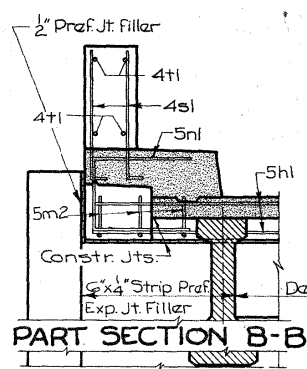
Dual 232'-1 Pretensioned Prestressed  
Concrete Beam Bridges  
Story County  
1-35-4(9) 110



Scale:  $\frac{1}{2}'' = 1'-0''$



Scale:  $2'' = 1'-0''$



DETAIL 2

Scale:  $1\frac{1}{2}'' = 1'-0$

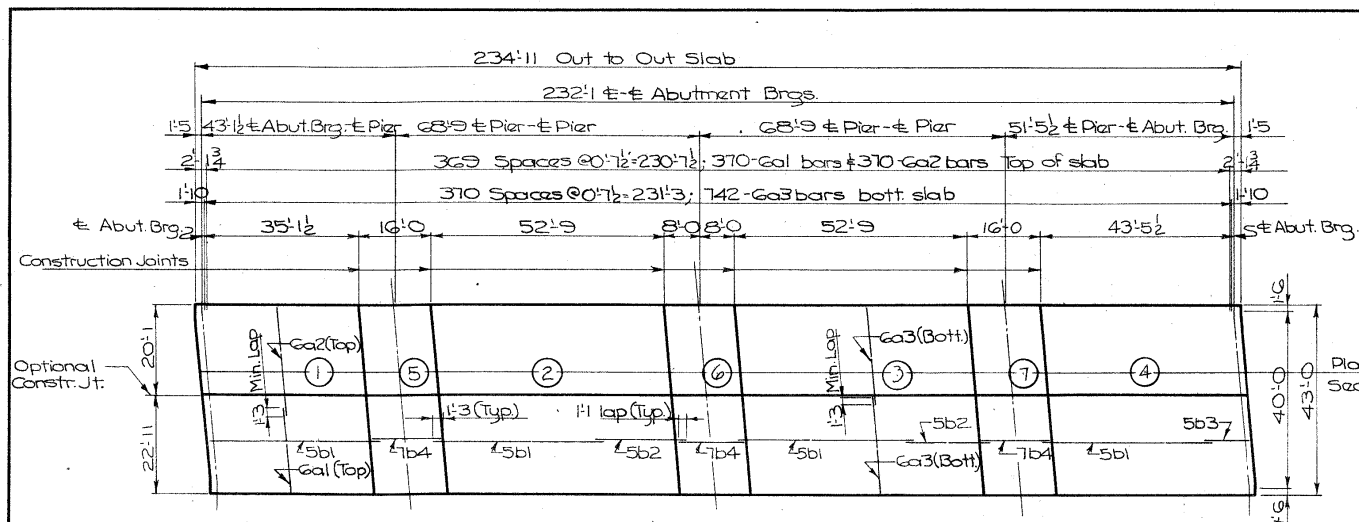
|         |       |
|---------|-------|
| * Total | 8,446 |
|---------|-------|

Note: All dimensions are out to out. Radii to  $\frac{1}{2}$  of bar

\* Total shown for aluminum railing. For reinforcing steel changes due to use of steel railing see Steel Handrail Detail Sheet 13.

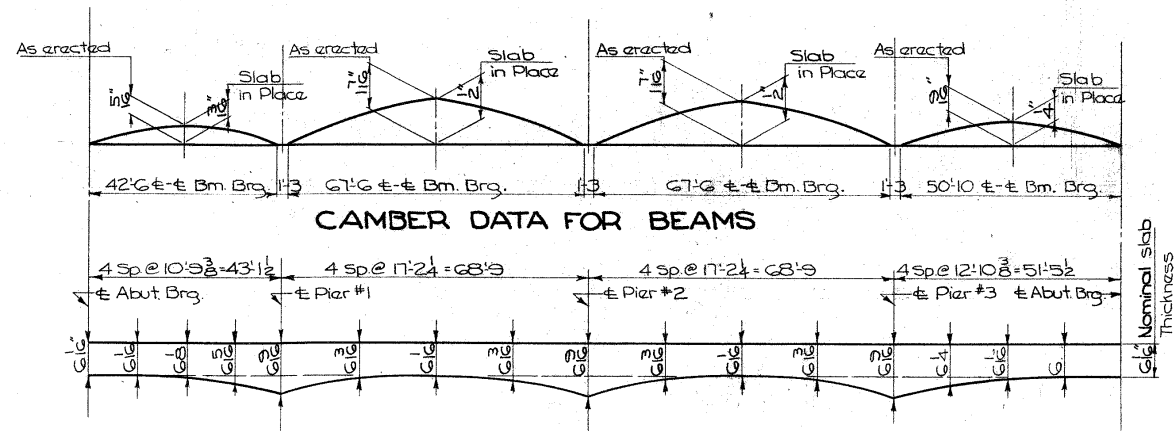
Design 1162      Story County      File N<sup>o</sup> 21522





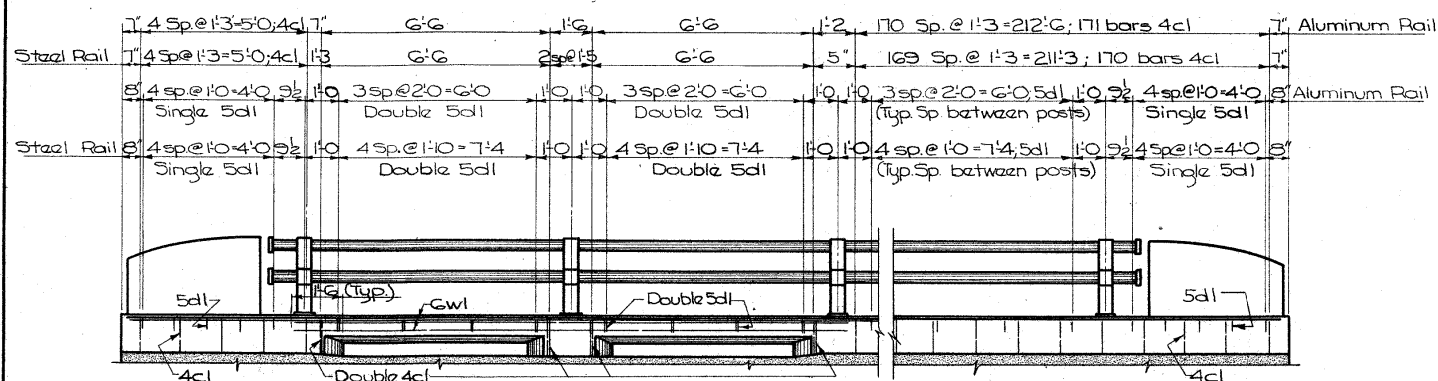
Note: Transverse construction joints parallel to  $\pm$  Brgs.  
Transverse bars laid parallel to  $\pm$  Brgs.  
Roadway slab shall be placed <sup>was</sup> ~~in~~ <sup>continuously</sup> in sequence indicated and preferably at intervals not exceeding 24 hours. Alternate procedures for placing slab concrete may be submitted for approval, together with statement of the proposed method and evidence that the contractor possesses the necessary equipment and facilities to accomplish the required result. Curbis may be placed continuously.

CONCRETE PLACEMENT DIAGRAM SHOWING SLAB REINFORCING



### SLAB THICKNESS DIAGRAM

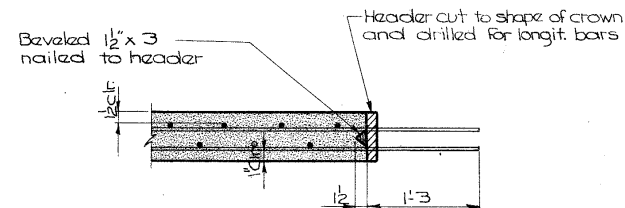
The slab thicknesses shown ~~was~~<sup>was</sup> based on the anticipated beam camber remaining after placing the slab and ~~was~~<sup>was</sup> not guaranteed for construction. To meet final grade, slab ~~was~~<sup>was</sup> thickened to compensate for deficient beam camber & thinned a maximum of 1/2" for excess beam camber.



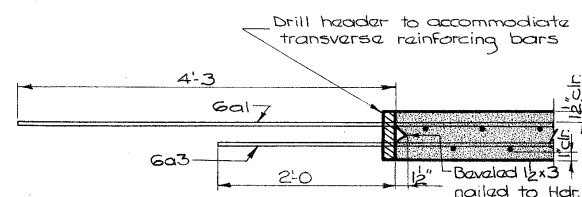
PART LONGITUDINAL SECTION SHOWING SHOULDER SIDE DRAINS

Note: Drawn for Aluminum Rail

See "SITUATION PLAN" Sheet 2 for drain location.



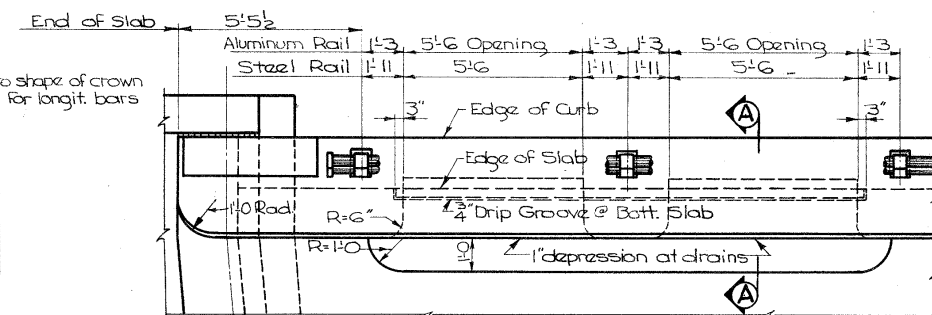
## TRANSVERSE FLOOR CONSTRUCTION JOINT



OPTIONAL LONGITUDINAL CONSTR. JT.

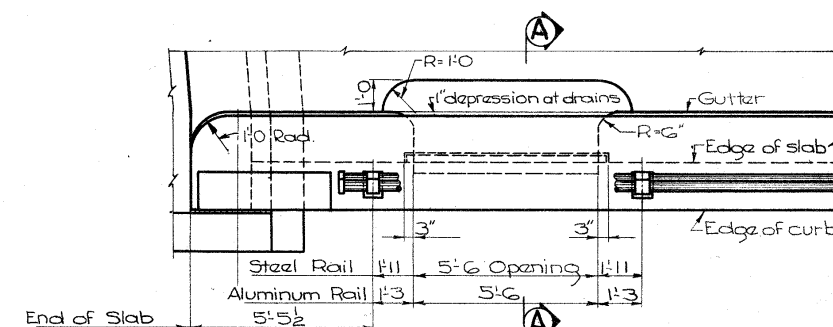
| CONCRETE PLACEMENT QUANTITIES |          |            |
|-------------------------------|----------|------------|
| Section 1                     |          | 36.8 c.y.  |
| Sections 2 & 3                | 2 @ 47.1 | 94.2 c.y.  |
| Section 4                     |          | 45.8 c.y.  |
| Sections 5, 6 & 7             | 3 @ 21.1 | 63.3 c.y.  |
| Curbs                         |          | 46.5 c.y.  |
| End Posts                     |          | 1.5 c.y.   |
| Light pole base               |          | 0.6 c.y.   |
|                               | Total    | 288.1 c.y. |

| ESTIMATED QUANTITIES ~TWO SUPERSTR.     |          |
|-----------------------------------------|----------|
| Item                                    | Quantity |
| Concrete                                | 577.4    |
| Reinforcing Steel                       | 163.136  |
| B1 (42" G) Preten. Prest'r. Conc. Beams | 18 Only  |
| B3 (50"-10) " " " "                     | 18 Only  |
| B7 (67" G) " " " "                      | 36 Only  |



PART PLAN FLOOR DRAIN DETAILS SHOULDER SD.

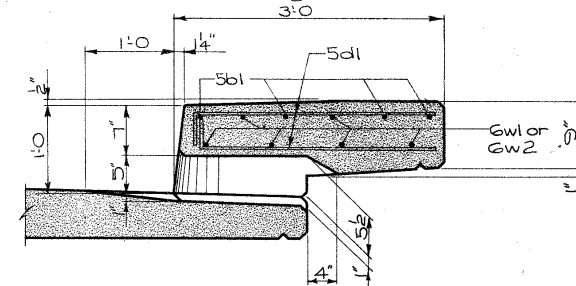
Two - 5'6 openings required on Shoulder side at the low end of bridge.



PART PLAN FLOOR DRAIN DETAILS MEDIAN SD.

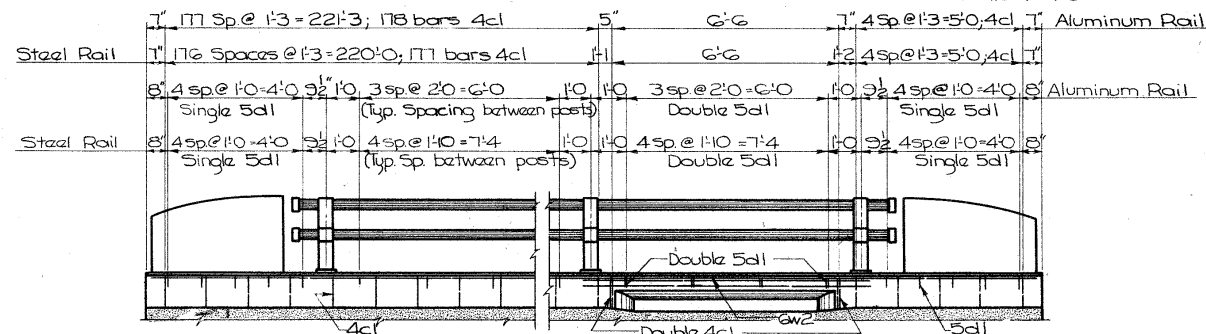
One 5'-6" Opening required on Median side @ low end of bridge

Scale  $\frac{3}{8}'' = 1'-0''$



SECTION A-A

Scale : 1" = 1'-0"



PART LONGITUDINAL SECTION SHOWING  
MEDIAN SIDE DRAINS

Note: Drawn For Aluminum Rails

Design For 4° 50' 30" Skew  
DUAL 232'1 x 40' PRETENSIONED PRESTRESSED  
CONCRETE BEAM BRIDGES.

|                               |                     |
|-------------------------------|---------------------|
| 43'-12" and 51'-52" End Spans | 68'-9" Center Spans |
| Concrete Floor & Substructure | Tubular Rails       |

**SUPERSTRUCTURE DETAILS**

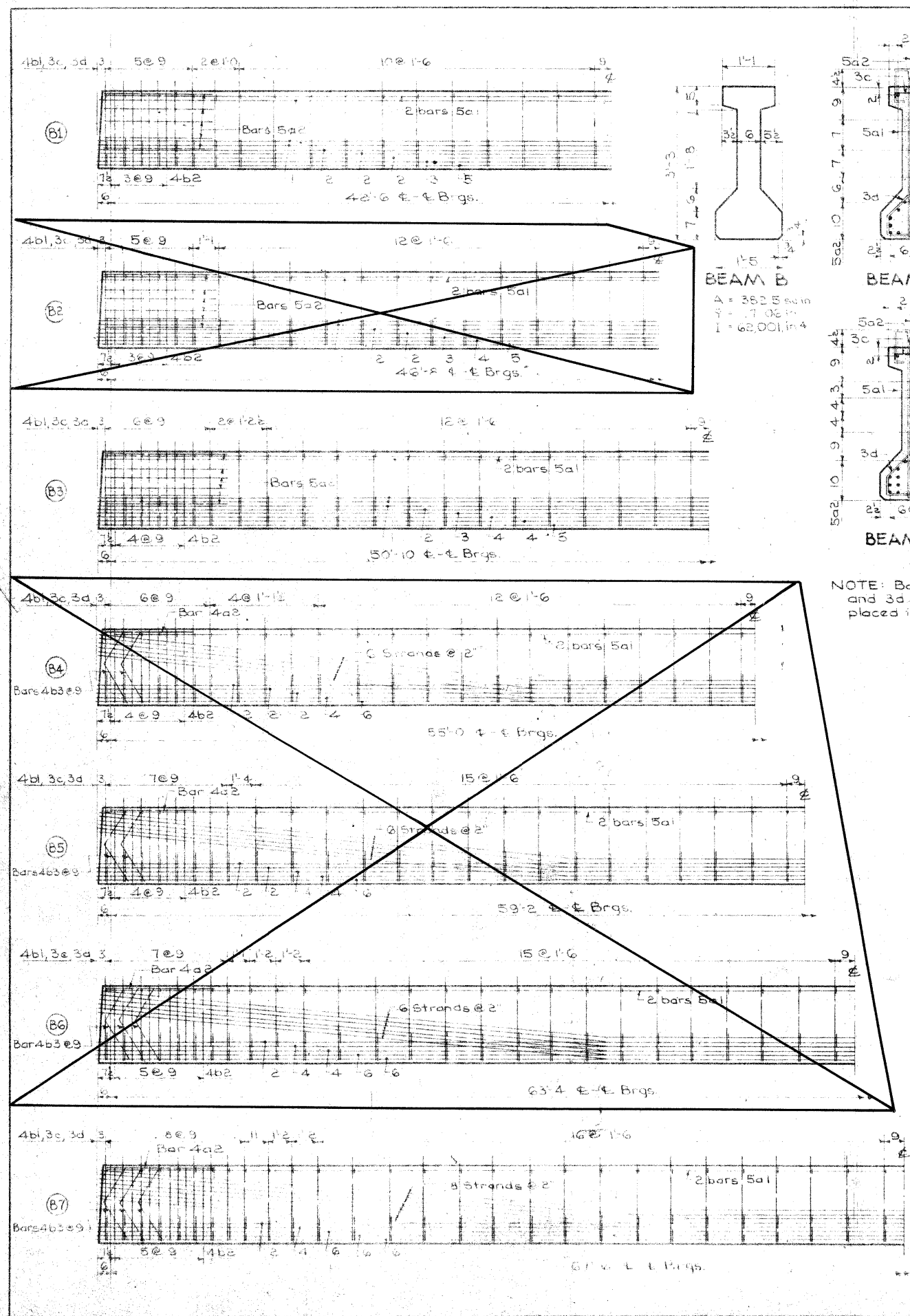
Station 573+83.63 on Interstate #35  
 Station 1335+21.62 on US #30

Proj. No. I-35-4 (S) 110

STORY COUNTY  
Iowa State Highway Commission

|               |                           |
|---------------|---------------------------|
| December 1962 | Sheet 10 of 14            |
| Design 1162   | File N <sup>o</sup> 21522 |

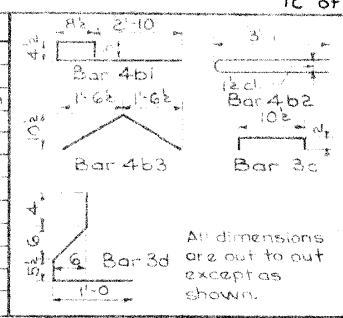
Designed by: TH Traced by: (\$) Checked by: M.L.F.



BEAM B  
A = 382.5 sq in  
I = 7.02 in<sup>4</sup>  
I = 62,001 in<sup>4</sup>

NOTE: Bars 4b1, 4b3 and 3d are to be placed in pairs.

| REINFORCING BAR LIST |        |        |         |        |        |        |        |     |        |
|----------------------|--------|--------|---------|--------|--------|--------|--------|-----|--------|
| Beam                 | B1     | B2     | B3      | B4     | B5     | B6     | B7     |     |        |
| Span                 | 12'-6" | 46'-8" | 50'-10" | 55'-0" | 59'-2" | 63'-4" | 67'-6" |     |        |
| Bar                  | Shape  | No     | Length  | No     | Length | No     | Length | No  | Length |
| 5a1                  | ---    | 4      | 22'-6"  | 4      | 24'-7" | 4      | 26'-8" | 4   | 30'-0" |
| 4a2                  | ---    | ---    | ---     | ---    | ---    | ---    | ---    | --- | ---    |
| 5a2                  | ---    | 10     | 5'-0"   | 12     | 5'-3"  | 12     | 5'-6"  | 92  | 4'-8"  |
| 4b1                  | ---    | 12     | 4'-8"   | 76     | 4'-8"  | 84     | 4'-8"  | 92  | 4'-8"  |
| 4b2                  | ---    | 8      | 6'-2"   | 8      | 6'-2"  | 10     | 6'-2"  | 10  | 6'-2"  |
| 4b3                  | ---    | ---    | ---     | ---    | ---    | ---    | ---    | --- | ---    |
| 3c                   | ---    | 36     | 1'-2"   | 36     | 1'-2"  | 42     | 1'-2"  | 46  | 1'-2"  |
| 3d                   | ---    | 72     | 2'-4"   | 76     | 2'-4"  | 84     | 2'-4"  | 92  | 2'-4"  |

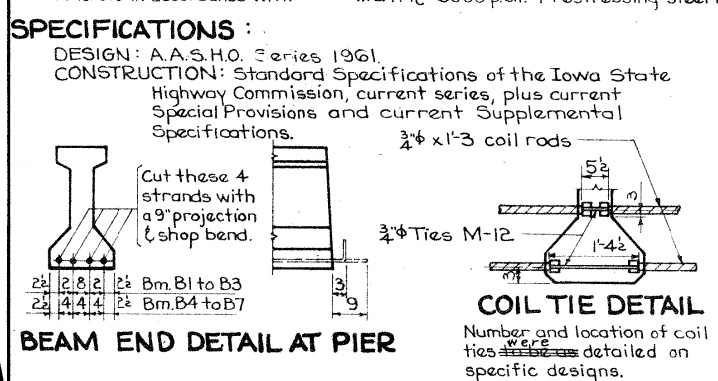


| BEAM DATA                    |        |        |         |        |        |        |        |
|------------------------------|--------|--------|---------|--------|--------|--------|--------|
| Beam                         | B1     | B2     | B3      | B4     | B5     | B6     | B7     |
| Span                         | 42'-6" | 46'-8" | 50'-10" | 55'-0" | 59'-2" | 63'-4" | 67'-6" |
| Initial Prestress            | Kips   | 32.1   | 35.9    | 41.6   | 45.4   | 52.9   | 60.5   |
| Strand Size                  |        | 7/16   | 7/16    | 7/16   | 7/16   | 7/16   | 7/16   |
| Straight Strands             |        | 17     | 19      | 22     | 26     | 32     | 24     |
| Deflected Strands            |        | ---    | ---     | ---    | ---    | ---    | ---    |
| Hold Down Stress             | Kips   | ---    | ---     | 13.2   | 15.3   | 15     | 12.2   |
| Camber                       | in.    | .34    | .46     | .57    | .73    | .93    | 1.46   |
| DL Deflection in (5'-0" Spc) |        | .15    | .23     | .32    | .44    | .52    | .75    |
| DL Deflection in (6'-6" Spc) |        | .20    | .29     | .41    | .55    | .73    | 1.22   |
| Reinforcing Steel            | lb     | 481    | 521     | 576    | 572    | 598    | 699    |
| Concrete                     | cy     | 4.28   | 4.69    | 5.10   | 5.51   | 5.92   | 6.74   |

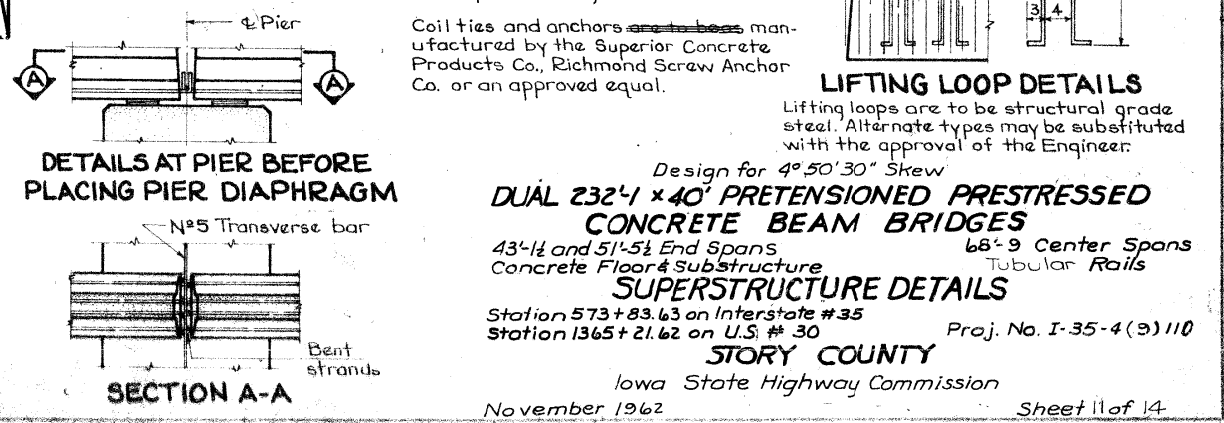
① Increase 5% if artificial curing is to be used. ② Due to weight of slab.

**NOTES:**  
Unless otherwise specified an allowance of .0005 L <sup>was</sup> made on all beams for shrinkage and elastic shortening. All deflected strands ~~are to be~~ held down at the third points of the beams except that the hold down point ~~was~~ moved toward the center of the beam a distance not to exceed .05 span at the producer's option. Tops of beams ~~are to be~~ scored transversely at about 3' centers with a pointed tool. Scores ~~are to be~~ 1" deep. Hold down devices and procedure for tensioning and detensioning ~~are to be~~ approved by the Engineer. Bearing details ~~are to be~~ as detailed on specific designs. Unless otherwise noted the cost of bearing details, including masonry plates and/or neoprene pads, coil ties, coil rods and lifting loops ~~are to be~~ included in the price bid for prestressed concrete beams. Strand ends ~~are to be~~ enclosed in the finished structure ~~and were~~ cut with a 1" projection with the exception of four strands at the pier end of the beam which ~~are to be~~ cut with a 9" projection and bent as detailed. Strand ends ~~are to be~~ exposed in the finished structure ~~and were~~ cut flush and painted with 2 coats of red lead at plant.

**DESIGN STRESSES:** Design stresses for the following materials ~~are to be~~ in accordance with A.A.S.H.O. Standard Specifications for Highway Bridges, Series of 1961:  
Reinforcing steel in accordance with Section 1.4.12, "Reinforcement" for Intermediate, Hard or Rail Steel Grade.  
Concrete in accordance with 1137.  $f'_c = 5000$  p.s.i. Prestressing steel in accordance with 1137.  $f'_s = 250,000$  p.s.i.

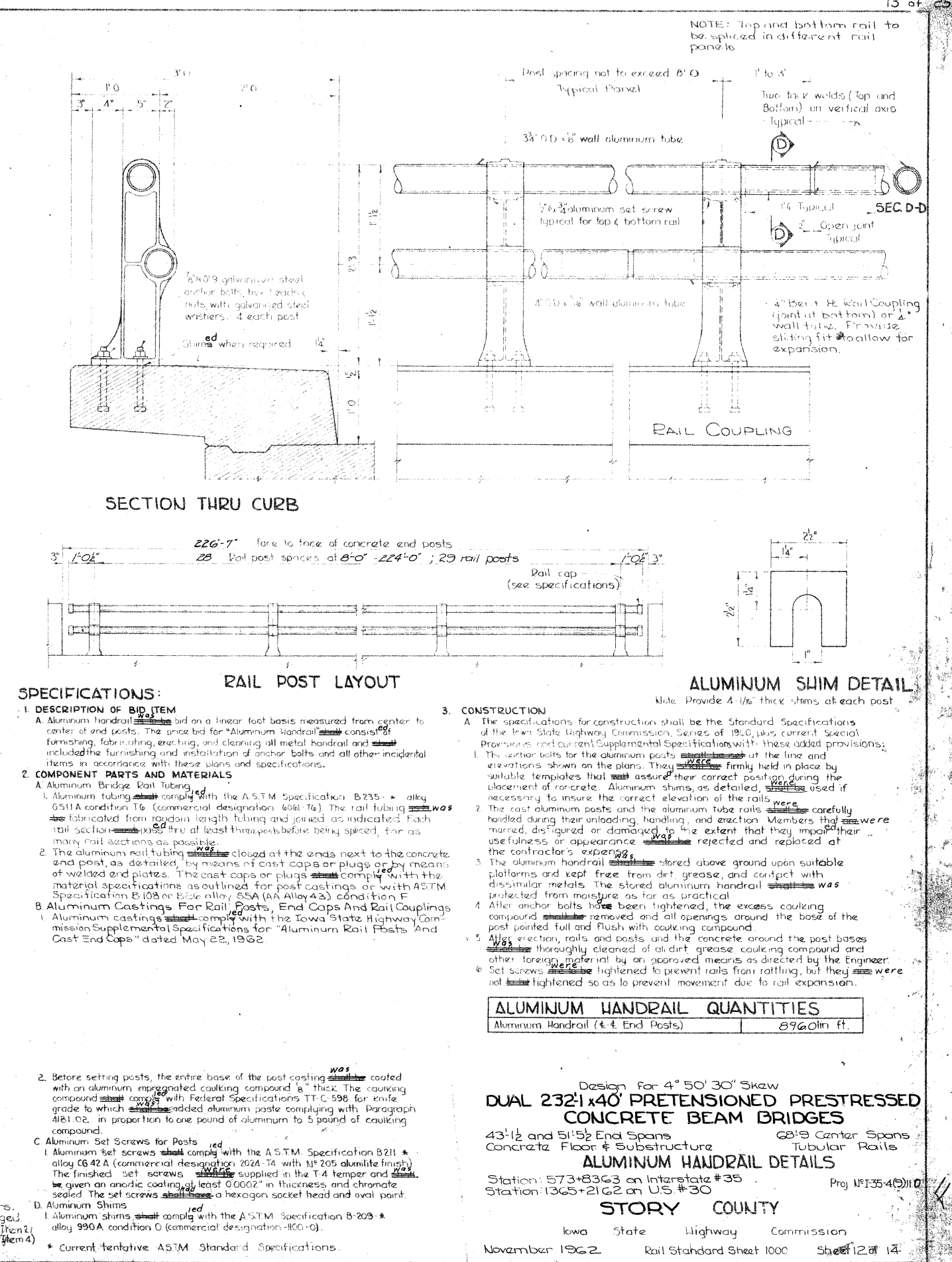
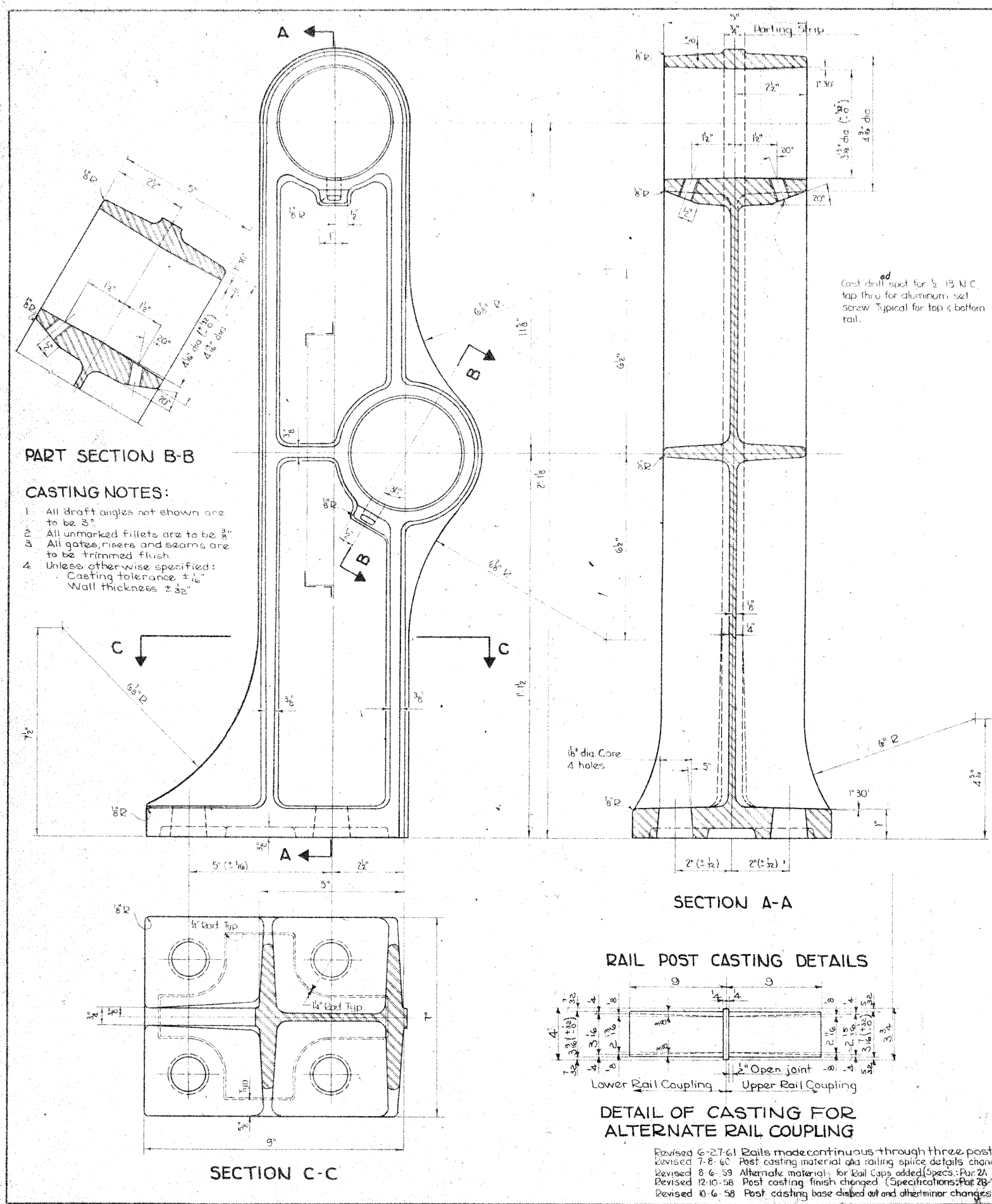


| MAXIMUM SPACING OF BEAMS FOR SPANS SHOWN |             |                 |
|------------------------------------------|-------------|-----------------|
| Loading                                  | Future W.S. | Maximum Spacing |
| H-20-516 (Primary)                       | 19'-6"      | 5'-0"           |
| H-20 (Primary)                           | 19'-6"      | 6'-0"           |
| H-20 (Secondary)                         | 19'-6"      | 6'-6"           |
| H-15 (Secondary)                         | ---         | 7'-3"           |

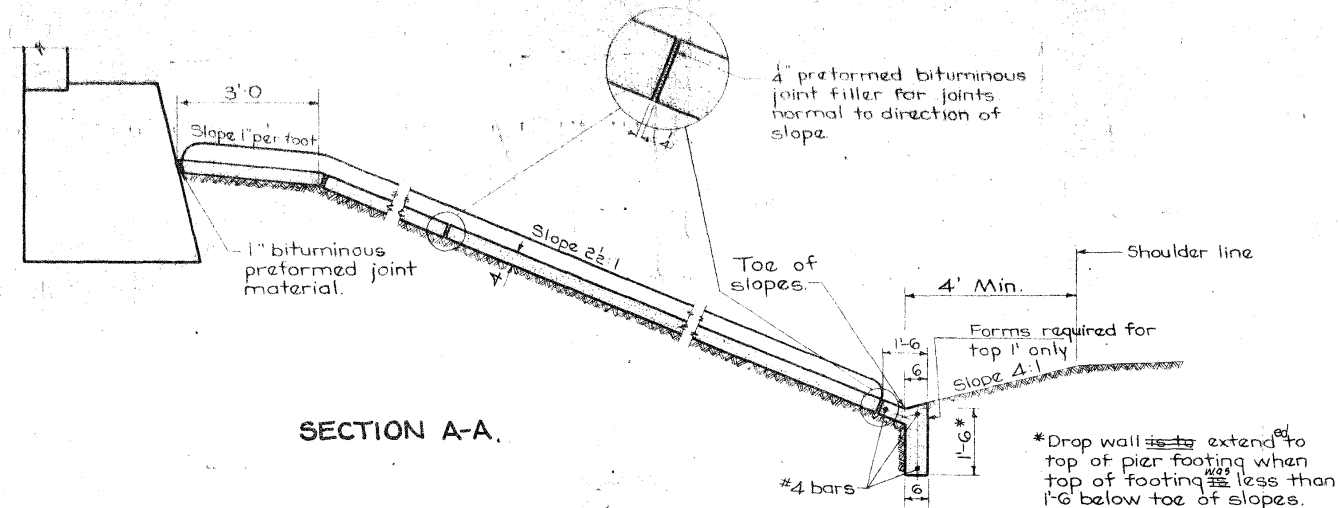


Design for 4° 50' 30" Skew  
**DUAL 232'1" x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**  
43'-1/2" and 51'-5 1/2" End Spans  
68'-9" Center Spans  
Concrete Floor & Substructure  
**SUPERSTRUCTURE DETAILS**  
Station 573+83.63 on Interstate #35  
Station 1365+21.62 on U.S. # 30  
Iowa State Highway Commission  
November 1962  
Design 1162 Storv Co.  
Proj. No. I-35-4(9)110  
Sheet 11 of 14  
File No. 21522

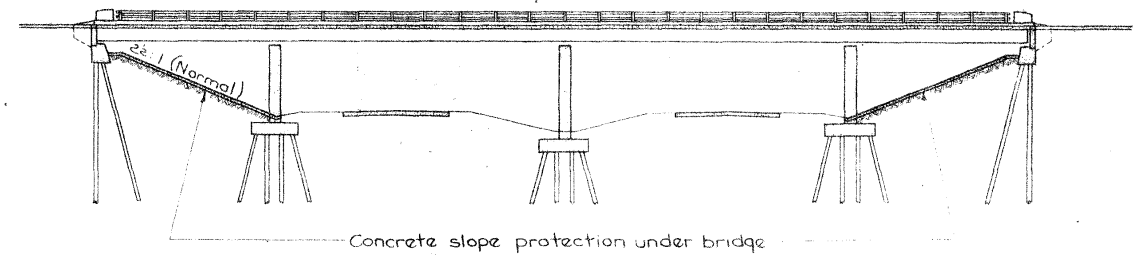
Revised 12-8-60. Minor mistakes corrected.  
Revised 1-3-62. Score note changed; Specifications changed.



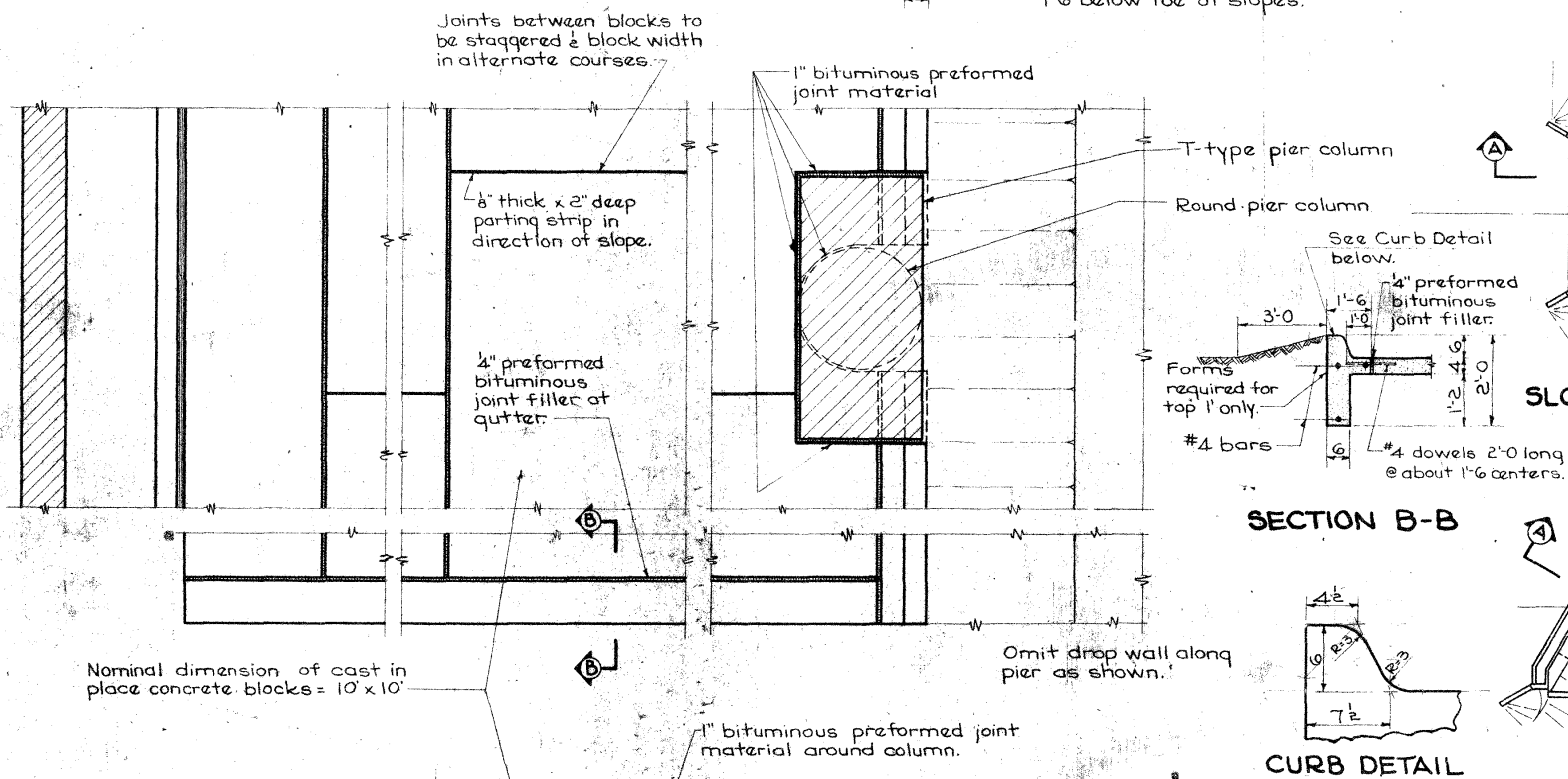
Revised 1-3-62: Specifications changed.  
Revised 5-4-62: Cast coupling added and location of couplings changed.



SECTION A-A.

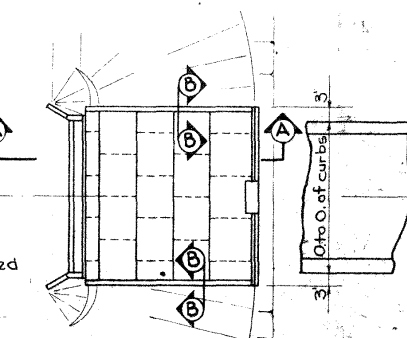


LONGITUDINAL SECTION ALONG C OF ROADWAY

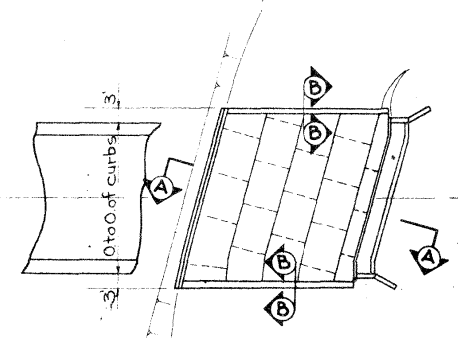


SECTION B-B

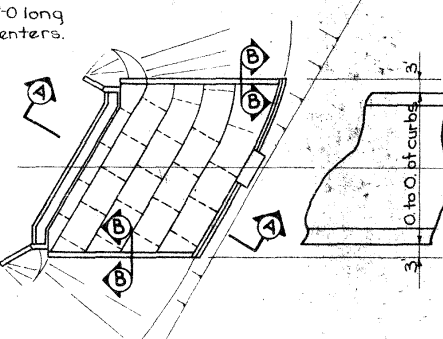
CURB DETAIL



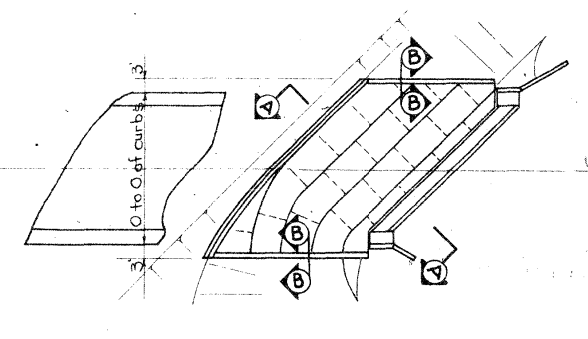
SLOPE PROTECTION LAYOUT 0° SKEW



SLOPE PROTECTION LAYOUT 15° SKEW



SLOPE PROTECTION LAYOUT 30° SKEW



SLOPE PROTECTION LAYOUT 45° SKEW

**GENERAL NOTES:**

This sheet shows details for placing portland cement concrete slope protection under overhead structures.

The current specifications of the Iowa Highway Commission shall apply with modifications or additions listed below:

Concrete - Class S Structural.

Finish - Class 1, Floated Surface Finish.

Cure - No cure necessary.

Subgrade Preparation - The subgrade ~~is to be~~ shaped and compacted so that finished slope protection will be similar to examples shown on this sheet. The subgrade ~~shall be~~ firm when concrete is placed. Sprinkling ~~shall be~~ done early enough so that concrete ~~is not~~ placed on a muddy subgrade. No subgrade paper ~~shall be~~ required.

The cast in place concrete ~~is to be~~ poured in approximately 10' wide courses, but all courses on one slope ~~shall be~~ have approximately equal widths. Adjacent courses ~~shall not be~~ poured within 15 hours of one

another. The joints in the direction of the slope ~~are to be~~ staggered about 1/2 block width.

Basis of payment: Payment ~~will be~~ made on a square yard basis for slope protection constructed. The unit price bid per square yard ~~is to include~~ costs of all materials and labor required to construct this protection as shown or intended by these plans. The subgrade preparation including any necessary excavation or filling required to shape the slope to the lines shown on the plans and disposal of excess earth excavated as directed by the Engineer, ~~was~~ considered incidental to placing the concrete slope protection.

Where erosion control work ~~was~~ completed the Contractor ~~was~~ responsible for any plant materials destroyed adjacent to slope protection area. The Contractor ~~shall~~ replant, seed and mulch all areas disturbed adjacent to slope protection areas in accordance with section 2601 of Standard Specifications, Series of 1960, at his expense.

| SLOPE PROTECTION QUANTITIES |         |               |
|-----------------------------|---------|---------------|
| South Slope                 | 2 @ 245 | 490 sq. yds.  |
| North Slope                 | 2 @ 295 | 590 sq. yds.  |
| Total                       |         | 1080 sq. yds. |

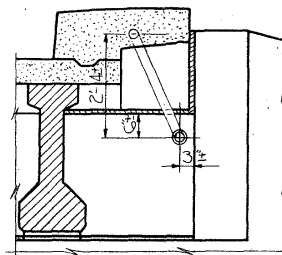
Design For  
**CONCRETE SLOPE PROTECTION**  
**STORY COUNTY**

Project No I-35-4(9)110  
IOWA STATE HIGHWAY COMMISSION  
November 1962  
Sheet 14 of 14

PART SLOPE PROTECTION PLAN (0° SKEW)  
FOR COLUMNS IN SLOPE

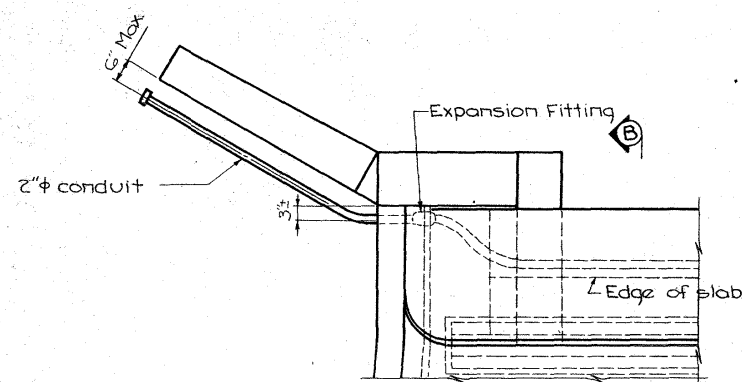
Scale: 1/2" = 1'-0"

Revised 1-19-61 Curb dowel bars added.  
Revised 7-21-60 Corrected for 1960 Standard Specifications.  
Revised 2-15-60 Pre-cast block construction deleted. Curb added to sides.  
Revised 9-15-59 Statement concerning erosion control added.  
Revised 9-4-59 Statement concerning disposal of excess earth added.

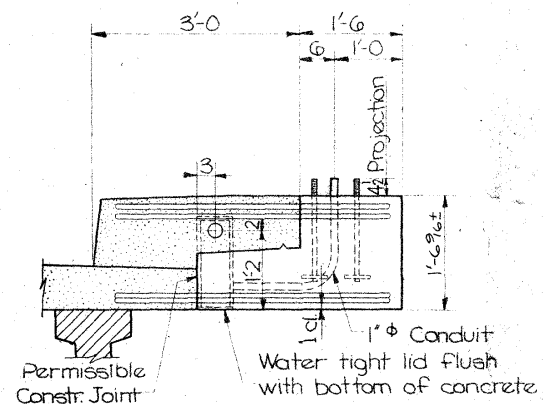


SECTION B-B

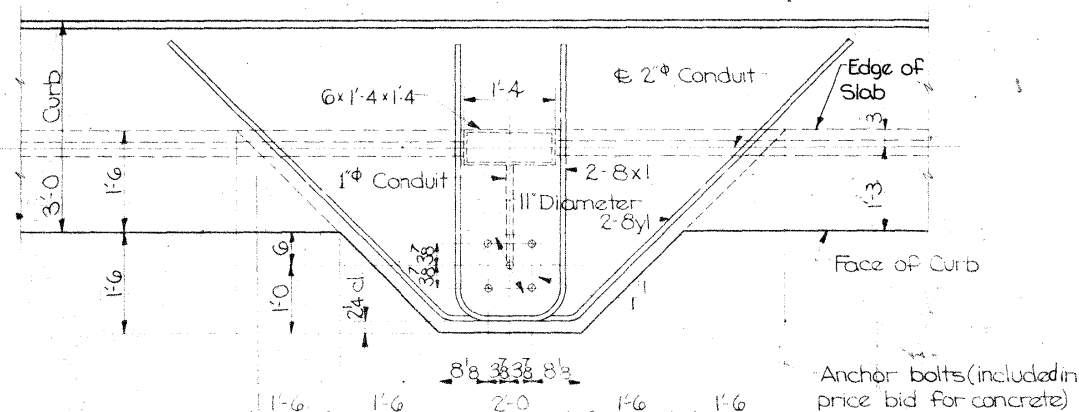
Note: Extend 2" conduit along abutment wing a sufficient amount to clear the shoulder line. End of conduit is 1'-6" below ground surface.



PART PLAN  
(End Post Removed)

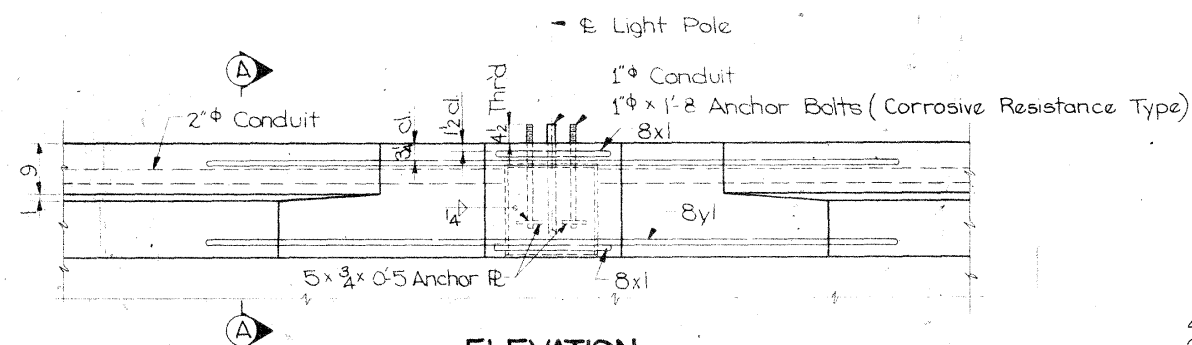


SECTION A-A



PLAN

See "Situation Plan" sheet 2 for location of bases (only 2 required)



ELEVATION

| REINFORCING BAR LIST - ONE BASE |              |       |     |        |         |
|---------------------------------|--------------|-------|-----|--------|---------|
| Bar                             | Location     | Shape | No. | Length | Weight  |
| 8xl                             | Pole Anchors |       | 2   | 9'-2"  | 49 lbs  |
| 8yl                             | Curb Anchors |       | 2   | 13'-8" | 73 lbs  |
|                                 |              |       |     | Total  | 122 lbs |



NOTE: Dimensions are out to out of bar. Radii to E. of bar.

### LIGHTING NOTES:

Construction ~~was~~ conform with the Iowa State Highway Commission Standard Specifications, Series of 1960 plus current Special Provisions and Supplemental Specifications for Highway Lighting (dated January 14, 1964).

All expansion fittings ~~shall be~~ <sup>were</sup> Expansion Fitting, Type AX200 or an approved equivalent.

All exposed conduit ends ~~shall be~~ <sup>were</sup> capped to exclude dirt and moisture.

The contract unit price per linear foot of conduit ~~was~~ <sup>was</sup> Full compensation for furnishing all material (including junction boxes and fittings) labor and any work incidental to the installation. The concrete and weight of reinforcing steel ~~was~~ <sup>was</sup> included in the Superstructure Estimated Quantities. The length of conduit installed ~~shall be~~ <sup>was</sup> measured in feet by the Engineer.

Cost of furnishing and installing poles, lights and lighting conductor ~~was~~ <sup>was</sup> not a part of this estimate.

Corrosive resistance type of anchor bolts ~~shall be~~ <sup>was</sup> as stated in the Supplemental Specifications for Highway Lighting. If the bi-metallic type of bolt ~~was~~ <sup>was</sup> used the stainless steel shank ~~shall be~~ <sup>was</sup> 6 1/2 inches long (min).

### ESTIMATED QUANT. 2 BRIDGES

| Item                   | Amount   |
|------------------------|----------|
| 2" Rigid Steel Conduit | 498 L.F. |

### Design for 4°50'30" Skew DUAL 232'-1x 40' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

43'-1/2 and 51'-5/2 End Spans  
Concrete Floor & Substructure

68'-9 Center Spans  
Tubular Rails

### LIGHTING DETAILS

Station: 573+83.63 on Interstate #35  
Station: 1365+21.62 on U.S. #30

Project No. I-35-4(9)110

### STORY COUNTY

Iowa State Highway Commission  
November 1962

Sheet 14A of 14

Design No. 1162

Story County

File No. 21522

Revised 10/10/02: Anchor bolt length, projection & thread length changed.  
Revised 1/6/64: Type of anchor bolt corrected.