IOWA DOT
Highway Division

J30S-25 Single Span Concrete Slab Bridge Standards

Index for J30S-25 Standards

General Notes:

The J30S-25 Bridge Standards, if properly used, provide the structural plans necessary to construct 30'-0" roadway single span concrete slab bridges with lengths of 20'-0", 30'-0", 40'-0" or 50'-0".

These bridges may be built on a 0, 15, 30 or 45 degree skew (integral abutments) and 0 or 15 degree skew (high abutments). These plans show the bridges skewed in one direction, but all dimensions and details would be the same for the opposite skew.

These standards with 30'-0" roadway are detailed with the option of concrete open rail (MASH TL-4), single slope rail (MASH TL-4), or side-mounted W-Beam guardrail (MASH TL-3).

These bridges are designed for HL93 loading plus 20 lb per sq ft of roadway for future wearing surface or gravel. Control of cracking by distribution of reinforcement for slab design based on Class 2 exposure (severe) for top bars and Class 1 exposure (normal) for bottom bars.

The slab as shown includes ½ inch integral wearing surface.

The abutments for these bridges are built integral with the superstructure. Therefore, it is important that a proper joint for expansion be provided between the bridge and approach paving, when approach paving is needed.

The abutment design utilized on these bridges restricts their use in the following manner:

1. These bridges are not to be used when point bearing for the abutment steel piling would be obtained on rock at a distance less than 27ft from the bottom of footing without special analysis.
2. For high abutments, the sheet pile shall be driven to full penetration (minimum embedment depth) as shown in the abutment details. Special analysis is required if lesser embedment is achieved due to stiff soils or rock.

It is recommended that the epoxy-coated reinforcing option be used if it is anticipated that the bridge deck and/or the bridge approaches will be chemically treated for the removal of ice or snow. Additionally, the Designer should consider using single slope rail if heavy quantities of de-icing chemicals are anticipated (e.g. higher volume road or urban area).

If epoxy-coated bars are used in the deck, then all bars used in the abutment and barrier rails shall be epoxy coated.

Keyway dimensions shown on the plans are based on nominal dimensions unless stated otherwise. In addition, the bevel used on the keyway shall be limited to a maximum of 10 degrees from vertical.

These bridge plans label all reinforcing steel with English notation (5a1 is ⅝ inch diameter bar). English reinforcing steel received in the field may display the following "bar designation". The "bar designation" is the stamped impression on the reinforcing bars, and is equivalent to the bar diameter in millimeters.

English Size	3	4	5	6	7	8	9	10	11
Bar Designation	10	13	16	19	22	25	29	32	36

All reinforcing bars and bars noted as dowels supplied for this structure shall be deformed reinforcement unless otherwise noted or shown.

Specifications:

Design: AASHTO LRFD, 9th Ed., Series of 2020, except as noted in the current Iowa Bridge Design Manual.

Construction: Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2023, plus applicable General Supplemental Specifications, Developmental Specifications, Supplemental Specifications and Special Provisions shall apply to construction work on this project.

Design Stresses:

Design stresses for the following materials are in accordance with the AASHTO LRFD Bridge Design Specifications, 9th Ed., Series of 2020, except as noted in the current Iowa Bridge Design Manual.

Reinforcing steel in accordance with LRFD AASHTO Section 5, Grade 60 for epoxy and non-coated, and Grade 60 or 75 for stainless.

Concrete in accordance with LRFD AASHTO Section 5, f'c = 4.0 ksi.

Structural steel in accordance with LRFD AASHTO Section 6. ASTM A709 Grade 36 or Grade 50 (AASHTO M270 Grade 36 or Grade 50).

Shop Drawing Submittals

Shop drawings shall be submitted for the following items shown in the table below. (Note additional shop drawings may be required in accordance with Article 1105.03 of the Standard Specifications.)

Submittal requirements for shop drawings should be in accordance with 1105.03 of the Standard Specifications for Highway and Bridge Construction of the Iowa Department of Transportation.

1	Sheet piling, ties, walers, as per steel sheet piling notes (if applicable)
2	W-Beam guardrail posts (if applicable)

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Index and General Notes

J30S-01-25

Notes to Designer:

These standards give most of the information necessary to build these bridges. However, the following additional information is required to be part of the contract plans:

1. Title sheet with Engineer(s) seal
2. Estimated quantities totals including bid item "Class 20 Excavation" for bridge
3. Situation plan layout of bridge
4. Top of slab elevations layout
5. Bottom of abutment footing elevations
6. Elevations at top of wing (e.g. Elev. "A" and "B")
7. Piling design information
8. Slope protection layout (if needed)
9. Guardrail design
10. Approach details (if needed)

These standards have been developed utilizing epoxy-coated reinforcing. Non-coated or stainless steel bars may be substituted without modification of development or lap lengths. The designer shall specify the appropriate bid item for the selected reinforcing.

The abutments for these standards have been designed for the use of both friction and point bearing piles. The pile length shall be determined by the Designer using Iowa DOT Bridge Design Manual (BDM) Article 6.2 based on site conditions.

Two options are provided for abutments to be used with these standards:

1. Integral abutments: HP10x42 piles at Bridge Design Manual (BDM) Article 6.2.6.1 Structural Resistance Level-1 (SRL-1). Water and ice loading not included.
2. High Abutments (0 and 15 degree skew only): HP10x42 piles at SRL-1 with PZ27 steel sheet pile backwall and wings. Maximum height from grade to top of berm/streambed of 14'-0". Water and ice loading not included.

The Bridge Designer shall obtain adequate soil borings to evaluate depth to rock and ability to achieve pile embedment as described in the General Notes, and perform the pile design.

Additionally, the Designer shall verify the soil properties obtained from the soil borings for the actual bridge site will not increase the embedment lengths required for the steel sheet piling, if applicable.

The following soil conditions were assumed in the design of the steel sheet piling:

Backfill Material
- Shall consist of well drained granular material with less than 8% fines.
- Material shall consist of gradation as noted on Abutment Backfill Details Sheet.
- Backfill shall be placed as noted on Abutment Backfill Details Sheet.
- Unit weight of granular backfill assumed to be 130 pcf.
- ϕ', internal friction angle = 34 degrees.
- Subdrain to be of type specified on Subdrain Details Sheet.

Foundation Soils
- Consists of either alluvium, loess or glacial till, all of which will be comprised of clay soils.
- Unit weight of 125 pcf.
- Strength was conservatively modeled assuming a long term effective strength ϕ', equal to 21 degrees.
- The strength and unit weight are considered conservative and applicable if loose alluvial sand comprises the soils.
- Berm slope shall not be steeper than 2:1.

Designer will need to determine the pile construction control method, contract length, and target driving resistance and include in the plan notes and estimated quantities. Bridge Design Manual CADD notes E818, and E819 are appropriate for that purpose. The notes, as well as design examples and spreadsheets, are available on the Bridges and Structures Bureau website.

Examples of Bridge Elevation Calculations:

The Designer shall show on the plans the three bottom of footing elevations required for each abutment. The Designer shall also show on the plans the required top of wing elevations as shown in the plans at each corner of the bridge.

The boxed details in the following examples show how the abutment elevations should be indicated on the plans.

Example No. 1

Bridge located on a constant grade. For this example, the grade is -3.00% with the P.I. station of 199+00.00 and a P.I. elevation of 600.00. The bridge length is 50'-0" ℄ to ℄ of abutment bearings with 30° right hand ahead skew.

Stations

℄ Bridge Station	= 200+25.00
℄ Abut. No. 1 Brg.	= 200+00.00
℄ Abut. No. 2 Brg.	= 200+50.00

Elevations Along Profile Grade

℄ Abut. No. 1 Brg. = 600.00 + (20000.00 - 19900.00)(-0.0300)
= 597.00

℄ Abut. No. 2 Brg. = 600.00 + (20050.00 - 19900.00)(-0.0300)
= 595.50

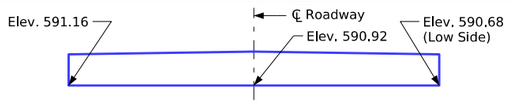
Skew angle correction

(Offset to end of abut.) (tan skew angle) (Grade)
= (13.58')(tan 30°)(0.0300)
= 0.24'

Abutment No. 1

Location	Left End	℄ Roadway	Right End
PGL Elevation	597.00	597.00	597.00
Skew Angle Corr.	+ 0.24	0.00	- 0.24
-"X" ▲	- 6.08	- 6.08	- 6.08
Bottom of Abut. Elev.	591.16	590.92	590.68

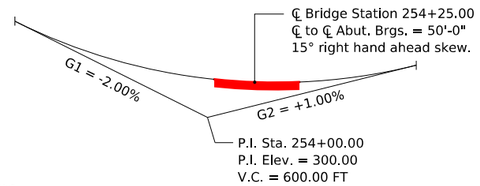
Note: X dimension is shown for integral abutment for example purposes.



Abutment No. 1 Bottom of Footing Elevations Diagram
Looking Up Stationing

Example No. 2

Bridge located on a parabolic vertical curve. For this example, the vertical curve is as shown below.



Stations

℄ Bridge Station	= 254+25.00
℄ Abut. No. 1 Brg.	= 254+00.00
℄ Abut. No. 2 Brg.	= 254+50.00

Elevations along Profile Grade

℄ Abut. No. 1 Brg. = 302.25
℄ Abut. No. 2 Brg. = 302.06

Bridge Grade

Grade = $\frac{(302.06-302.25)(100)}{50.00}$ = -0.38%

(Establish grade along ℄ Roadway and use this grade for bridge geometrics.)

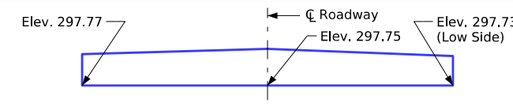
Skew Angle Correction

(Offset to end of abut.) (tan skew angle) (Grade)
= (17.5')(tan 15°)(0.0038)
= 0.02'

Abutment No. 1

Location	Left End	℄ Roadway	Right End
PGL Elevation	302.25	302.25	302.25
Skew Angle Corr.	+ 0.02	0.00	- 0.02
-"X" ▲	- 4.50	- 4.50	- 4.50
Bottom of Abut. Elev.	297.77	297.75	297.73

Note: X dimension is shown for sheet pile abutment for example purposes.



Abutment No. 1 Bottom of Footing Elevations Diagram
Looking Up Stationing

▲ Slab depth plus diaphragm and cap height.
See Abutment Details Sheets for "X" dimensions.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

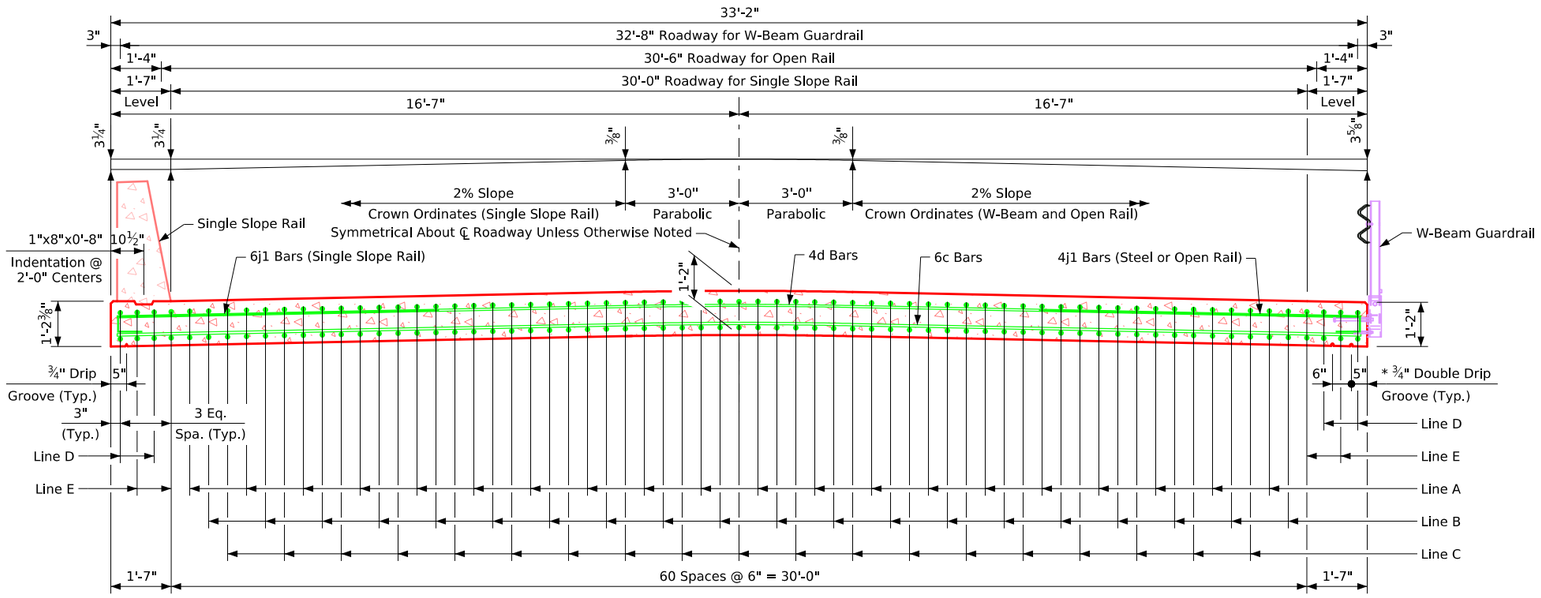
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Designer Information

J30S-02-25

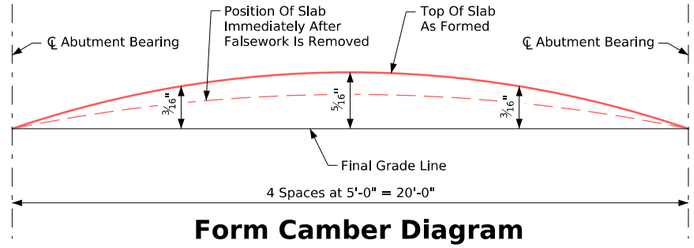


Slab Cross-Section Area for Barrier Rail = 38.74 sq ft

Transverse Section

Slab Cross-Section Area for Open Rail and W-Beam Guardrail = 38.69 sq ft

*Note: Double Drip Grooves For Open Rail And W-beam Guardrail Options Only.



Form Camber Diagram

This diagram shows the form camber required to compensate for the anticipated ultimate dead load deflection. The above dimensions do not include any allowance for form deflection or falsework settlement.

Camber values were computed for 0 degree skew. Other skews will result in slightly smaller deflection. Adjustments in camber may be considered if a wearing surface will not be placed.

Notes:

Top longitudinal reinforcing steel is to be parallel to and 2½ inches clear below top of slab. Bottom longitudinal reinforcing steel is to be parallel to and 1½ inch clear above bottom of slab. Reinforcing steel is to be securely wired in place and adequately supported on bar chairs before concrete is poured.

I.M. 451.01 requirements shall apply for bar chairs.

See Slab Reinforcing Plan Details for the top and bottom transverse slab reinforcing steel.

Placement for Longitudinal Reinforcement

Alternate Rail Option With Concrete Sealer

Concrete sealer shall be applied to both sides of bridge slab on the top, edge of slab, and under the slab. The concrete sealer shall also be applied to the open rail on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.

The concrete sealer limits are shown in the detail and shall apply to the full length of bridge. Concrete sealer shall be applied in accordance with Article 2403.03, P, 3 of the Standard Specifications.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Superstructure Details
20'-0" Bridge

J30S-03-25

Bill of Reinforcing Steel for Superstructure - 20' Bridge

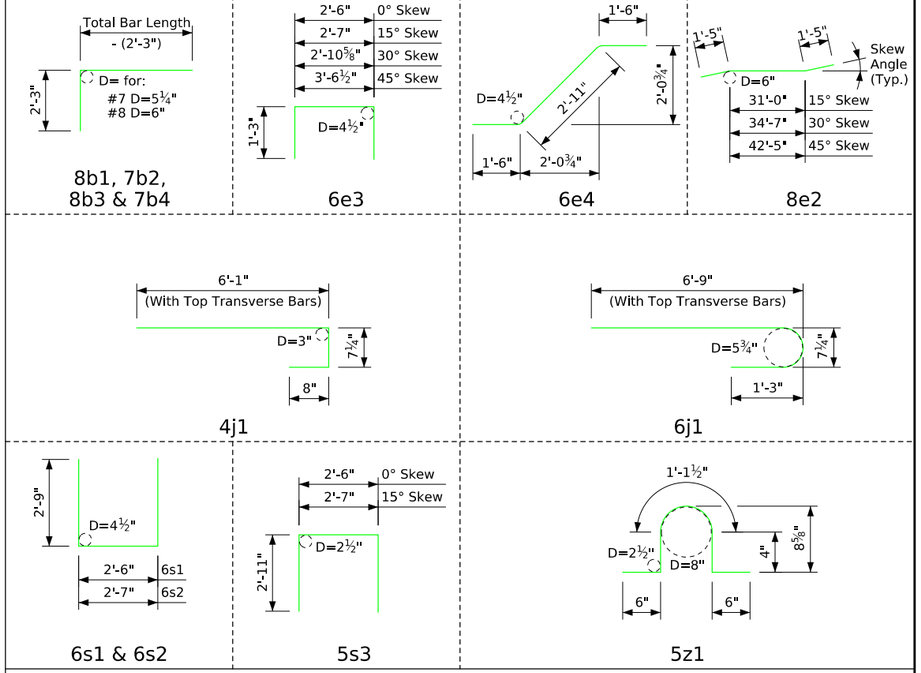
Location	Skew Shape	0 Degree Bar	0 Degree No.	0 Degree Length	0 Degree Weight	15 Degree No.	15 Degree Length	15 Degree Weight	30 Degree No.	30 Degree Length	30 Degree Weight	45 Degree No.	45 Degree Length	45 Degree Weight
Slab Longitudinal Bottom		8a1	39	20'-6"	2135	39	20'-6"	2135	39	20'-6"	2135	39	20'-6"	2135
Slab Longitudinal Bottom		7a2	20	13'-0"	531	20	13'-0"	531	20	13'-0"	531	20	13'-0"	531
Slab Longitudinal Bottom, at Rail		7a3	4	20'-6"	168	4	20'-6"	168	4	20'-6"	168	4	20'-6"	168
Slab Longitudinal Bottom, at Rail		8a4	4	20'-6"	219	4	20'-6"	219	4	20'-6"	219	4	20'-6"	219
Slab Longitudinal Top		8b1	40	15'-0"	1602	40	15'-0"	1602	40	15'-0"	1602	40	15'-0"	1602
Slab Longitudinal Top		7b2	78	14'-8"	2338	78	14'-8"	2338	78	14'-8"	2338	78	14'-8"	2338
Slab Longitudinal Top, at Rail		8b3	8	15'-0"	320	8	15'-0"	320	8	15'-0"	320	8	15'-0"	320
Slab Longitudinal Top, at Rail		7b4	8	14'-8"	240	8	14'-8"	240	8	14'-8"	240	8	14'-8"	240
Slab Transverse Bottom		6c1	17	32'-10"	838	17	34'-0"	868	3	32'-10"	148	10	20'-8"	310
Slab Transverse Ends, Bottom		6c3	-	-	-	-	-	-	30	VARIES	802	36	VARIES	690
Slab Transverse, Top		4d1	17	32'-10"	373	17	34'-0"	386	3	32'-10"	66	10	20'-8"	138
Slab Transverse Ends, Top		4d3	-	-	-	-	-	-	30	VARIES	356	36	VARIES	307
Top of Slab, Transverse, at W-Beam/Open Rail		4j1	32	7'-5"	159	32	7'-5"	159	32	7'-5"	159	30	7'-5"	149
Top of Slab, Transverse, at Single Slope Rail		6j1	32	8'-7"	413	32	8'-7"	413	32	8'-7"	413	30	8'-7"	387
Paving Block Lifting Hoops		5z1	10	2'-10"	30	10	2'-10"	30	10	2'-10"	30	10	2'-10"	30
Epoxy-Coated Sub Total - W-Beam/Open Rail - LBS.					8,953			8,996			9,114			9,177
Epoxy-Coated Sub Total - Single Slope Rail - LBS.					9,207			9,250			9,368			9,415
Integral Abutment Bars														
Slab, Transverse at Abutment		8e1	14	32'-10"	1227	-	-	-	-	-	-	-	-	-
Slab, Transverse at Abutment		8e2	-	-	-	14	33'-10"	1265	14	37'-5"	1399	14	45'-3"	1691
Slab, Hairpins, at Abutment		6e3	72	5'-0"	541	72	5'-1"	550	72	5'-5"	586	72	6'-1"	658
Slab, Diagonal, at Abutment		6e4	72	5'-11"	640	72	5'-11"	640	72	5'-11"	640	72	5'-11"	640
Wing, Vertical		5m1	40	4'-5"	184	40	4'-5"	184	40	4'-5"	184	40	4'-5"	184
Wing, Horizontal		5n1	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334
Epoxy-Coated Sub Total - Integral Abutment - LBS.					2,926			2,973			3,143			3,507
High Abutment Bars														
Slab, Diagonal, at Abutment		6e4	68	5'-11"	604	68	5'-11"	604	-	-	-	-	-	-
Slab, Transverse at Abutment		8e5	18	40'-8"	1954	18	42'-1"	2023	-	-	-	-	-	-
Slab, Transverse at Abutment, Cap Ends		8e6	4	5'-2"	55	4	5'-4"	57	-	-	-	-	-	-
Abutment Hairpins		6s1	176	8'-0"	2115	160	8'-0"	1923	-	-	-	-	-	-
Abutment Hairpins, Cap Ends		6s2	-	-	-	16	8'-1"	194	-	-	-	-	-	-
Abutment Hairpins, Cap Ends		5s3	24	8'-4"	209	24	8'-5"	211	-	-	-	-	-	-
Spiral		#2	12	38'-6"	77	12	38'-6"	77	-	-	-	-	-	-
Spiral Spacers, L 7/8x7/8x1/8x 0.7			36	1'-10"	46	36	1'-10"	46	-	-	-	-	-	-
Epoxy-Coated Sub Total - High Abutment - LBS.					4,937			5,012						
Non-Coated Sub Total - High Abutment - LBS.					123			123						
Open Rail - Integral Abutment - See Sheets J30S-33-25					2,802			2,802			2,802			2,802
Open Rail - High Abutment - See Sheets J30S-35-25					2,190			2,190			-			-
Single Slope Rail - Integral Abutment - See Sheets J30S-27-25 & J30S-31-25					2,728			2,730			2,763			2,805
Single Slope Rail - High Abutment - See Sheets J30S-29-25 & J30S-31-25					2,244			2,239			-			-
Integral Abutment Total - Epoxy Coated - LBS	With Open Rail				14,681			14,771			15,059			15,486
	With W-Beam Guardrail				11,879			11,969			12,257			12,684
	With Single Slope Rail				14,861			14,953			15,274			15,727
High Abutment Total - Epoxy Coated - LBS	With Open Rail				16,080			16,198			-			-
	With W-Beam Guardrail				13,890			14,008			-			-
	With Single Slope Rail				16,388			16,501			-			-
High Abutment Total - Non Coated - LBS					123			123			-			-

Estimated Quantities for Superstructure - 20' Bridge

Item	Skew	Integral Abutment 0°	Integral Abutment 15°	Integral Abutment 30°	Integral Abutment 45°	High Abutment 0°	High Abutment 15°
* Structural Concrete (Bridge)	C.Y.	49.7	50.2	51.8	55.4	62.4	63.2
Reinf. Steel Epoxy Coated With Open Rail	LBS.	14,681	14,771	15,059	15,486	16,080	16,198
Reinf. Steel Epoxy Coated With W-Beam Guardrail	LBS.	11,879	11,969	12,257	12,684	13,890	14,008
Reinf. Steel Epoxy Coated With Single Slope Rail	LBS.	14,861	14,953	15,274	15,727	16,388	16,501
Reinf. Steel Non-Coated	LBS.	-	-	-	-	123	123

* Includes 4 wings for integral abutment at 1.18 CY each and temporary paving blocks; excludes rail concrete.

20' Bridge - Bent Bar Details



Note: All Dimensions Are Out To Out. D = Pin Diameter.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

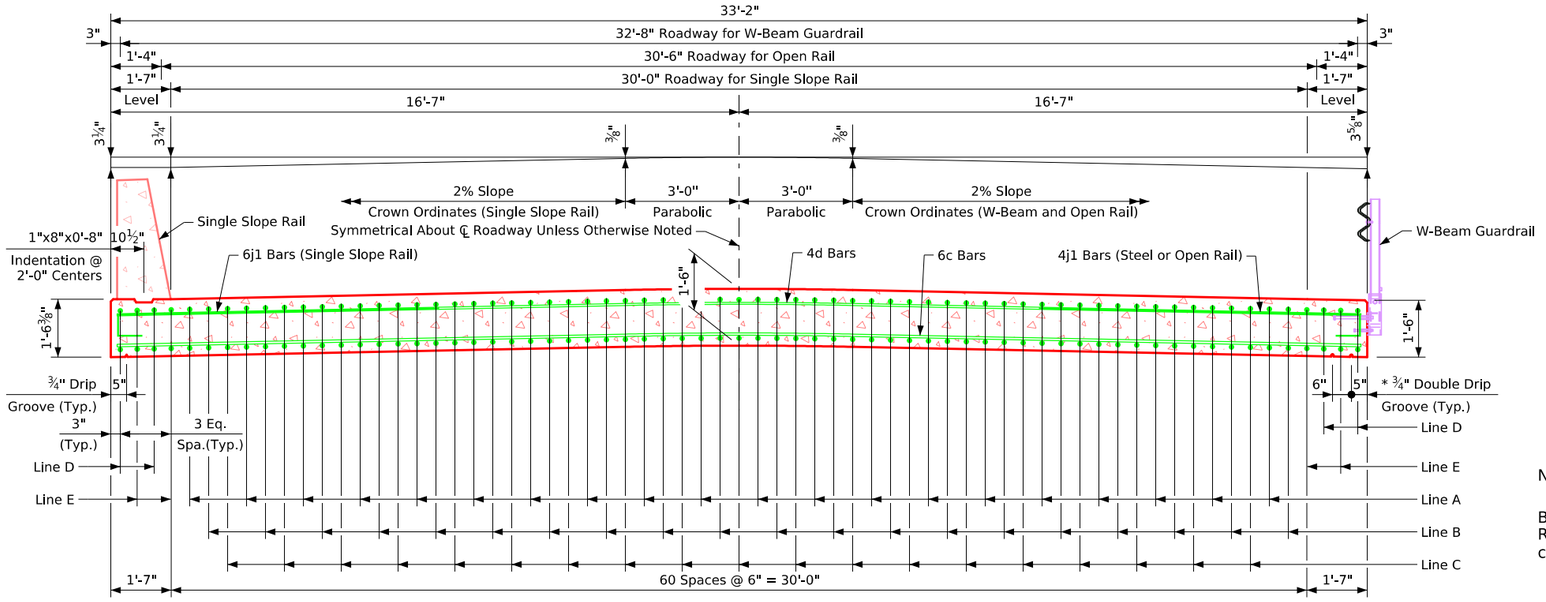
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Superstructure Details
20'-0" Bridge

J30S-04-25

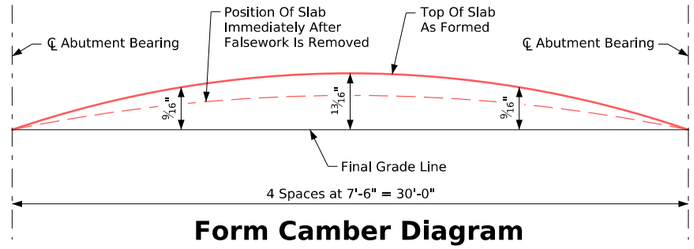


Transverse Section

Slab Cross-Section Area for Barrier Rail = 49.80 sq ft

Slab Cross-Section Area for Open Rail and W-Beam Guardrail = 49.75 sq ft

*Note: Double Drip Grooves For Open Rail And W-beam Guardrail Options Only.



Form Camber Diagram

This diagram shows the form camber required to compensate for the anticipated ultimate dead load deflection. The above dimensions do not include any allowance for form deflection or falsework settlement.

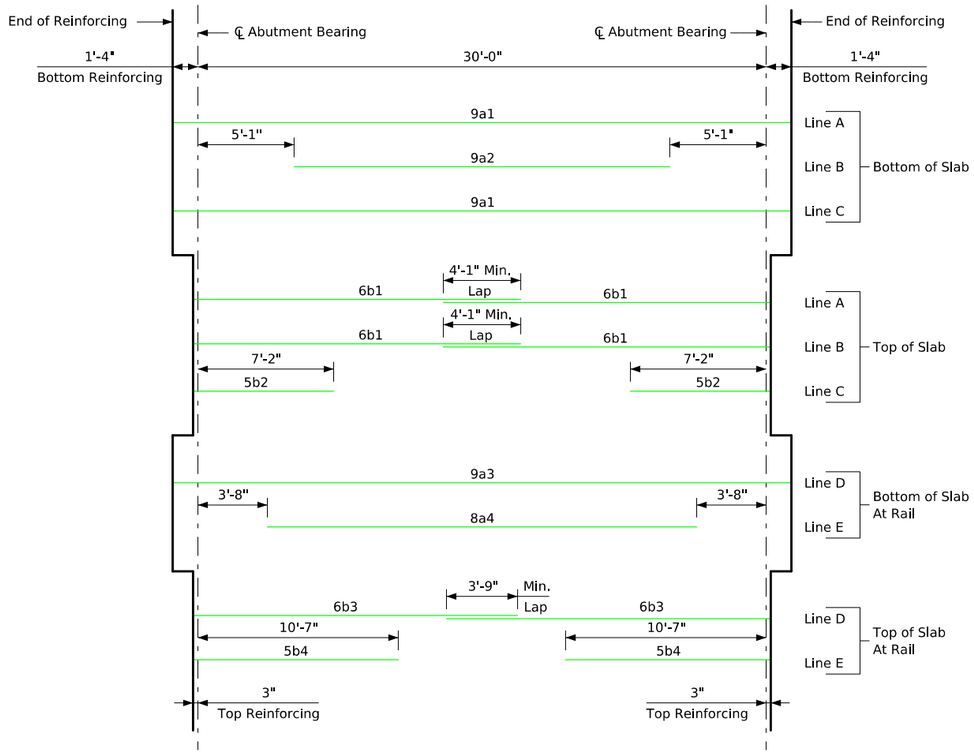
Camber values were computed for 0 degree skew. Other skews will result in slightly smaller deflection. Adjustments in camber may be considered if a wearing surface will not be placed.

Notes:

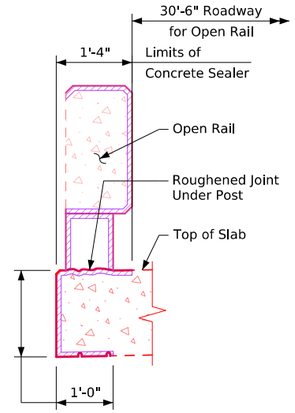
Top longitudinal reinforcing steel is to be parallel to and 2½ inches clear below top of slab. Bottom longitudinal reinforcing steel is to be parallel to and 1½ inch clear above bottom of slab. Reinforcing steel is to be securely wired in place and adequately supported on bar chairs before concrete is poured.

I.M. 451.01 requirements shall apply for bar chairs.

See Slab Reinforcing Plan Details for the top and bottom transverse slab reinforcing steel.



Placement for Longitudinal Reinforcement



Alternate Rail Option With Concrete Sealer

Concrete sealer shall be applied to both sides of bridge slab on the top, edge of slab, and under the slab. The concrete sealer shall also be applied to the open rail on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.

The concrete sealer limits are shown in the detail and shall apply to the full length of bridge. Concrete sealer shall be applied in accordance with Article 2403.03, P, 3 of the Standard Specifications.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Superstructure Details
30'-0" Bridge

J30S-05-25

Bill of Reinforcing Steel for Superstructure - 30' Bridge

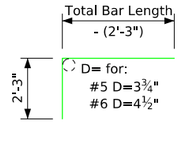
Location	Skew Shape	0 Degree Bar	0 Degree No.	0 Degree Length	0 Degree Weight	15 Degree No.	15 Degree Length	15 Degree Weight	30 Degree No.	30 Degree Length	30 Degree Weight	45 Degree No.	45 Degree Length	45 Degree Weight
Slab Longitudinal Bottom		9a1	39	32'-8"	4332	39	32'-8"	4332	39	32'-8"	4332	39	32'-8"	4332
Slab Longitudinal Bottom		9a2	20	19'-10"	1349	20	19'-10"	1349	20	19'-10"	1349	20	19'-10"	1349
Slab Longitudinal Bottom, at Rail		9a3	4	32'-8"	444	4	32'-8"	444	4	32'-8"	444	4	32'-8"	444
Slab Longitudinal Bottom, at Rail		8a4	4	22'-8"	242	4	22'-8"	242	4	22'-8"	242	4	22'-8"	242
Slab Longitudinal Top		6b1	80	19'-8"	2358	80	19'-8"	2358	80	19'-8"	2358	80	19'-8"	2358
Slab Longitudinal Top		5b2	38	9'-8"	383	38	9'-8"	383	38	9'-8"	383	38	9'-8"	383
Slab Longitudinal Top, at Rail		6b3	8	19'-6"	234	8	19'-6"	234	8	19'-6"	234	8	19'-6"	234
Slab Longitudinal Top, at Rail		5b4	8	13'-1"	109	8	13'-1"	109	8	13'-1"	109	8	13'-1"	109
Slab Transverse Bottom		6c1	27	32'-10"	1332	27	34'-0"	1379	13	32'-10"	641	-	-	-
Slab Transverse Bottom Ends, Bottom		6c3	-	-	-	-	-	-	30	VARIES	802	56	VARIES	1074
Slab Transverse, Top		4d1	27	32'-10"	592	27	34'-0"	613	13	32'-10"	285	-	-	-
Slab Transverse Ends, Top		4d3	-	-	-	-	-	-	30	VARIES	356	56	VARIES	478
Top of Slab, Transverse, at W-Beam/Open Rail		4j1	52	7'-5"	258	52	7'-5"	258	52	7'-5"	258	50	7'-5"	248
Top of Slab, Transverse, at Single Slope Rail		6j1	52	8'-7"	670	52	8'-7"	670	52	8'-7"	670	50	8'-7"	645
Paving Block Lifting Hoops		5z1	10	2'-10"	30	10	2'-10"	30	10	2'-10"	30	10	2'-10"	30
Epoxy-Coated Sub Total - W-Beam/Open Rail - LBS.					11,663			11,731			11,823			11,281
Epoxy-Coated Sub Total - Single Slope Rail - LBS.					12,075			12,143			12,235			11,678
Integral Abutment Bars														
Slab, Transverse at Abutment		8e1	14	32'-10"	1227	-	-	-	-	-	-	-	-	-
Slab, Transverse at Abutment		8e2	-	-	-	14	33'-10"	1265	14	37'-5"	1399	14	45'-3"	1691
Slab, Hairpins, at Abutment		6e3	72	5'-0"	541	72	5'-1"	550	72	5'-5"	586	72	6'-1"	658
Slab, Diagonal, at Abutment		6e4	72	5'-11"	640	72	5'-11"	640	72	5'-11"	640	72	5'-11"	640
Wing, Vertical		5m1	40	4'-5"	184	40	4'-5"	184	40	4'-5"	184	40	4'-5"	184
Wing, Horizontal		5n1	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334
Epoxy-Coated Sub Total - Integral Abutment - LBS.					2,926			2,973			3,143			3,507
High Abutment Bars														
Slab, Diagonal, at Abutment		6e4	68	5'-11"	604	68	5'-11"	604	-	-	-	-	-	-
Slab, Transverse at Abutment		8e5	18	40'-8"	1954	18	42'-1"	2023	-	-	-	-	-	-
Slab, Transverse at Abutment, Cap Ends		8e6	4	5'-2"	55	4	5'-4"	57	-	-	-	-	-	-
Abutment Hairpins		6s1	176	8'-0"	2115	160	8'-0"	1923	-	-	-	-	-	-
Abutment Hairpins, Cap Ends		6s2	-	-	-	16	8'-1"	194	-	-	-	-	-	-
Abutment Hairpins, Cap Ends		5s3	24	8'-4"	209	24	8'-5"	211	-	-	-	-	-	-
Spiral		#2	12	38'-6"	77	12	38'-6"	77	-	-	-	-	-	-
Spiral Spacers, L 7/8x7/8x1/8x 0.7			36	1'-10"	46	36	1'-10"	46	-	-	-	-	-	-
Epoxy-Coated Sub Total - High Abutment - LBS.					4,937			5,012						
Non-Coated Sub Total - High Abutment - LBS.					123			123						
Open Rail - Integral Abutment - See Sheets J30S-33-25					3,364			3,364			3,364			3,364
Open Rail - High Abutment - See Sheets J30S-35-25					2,752			2,752			-			-
Single Slope Rail - Integral Abutment - See Sheets J30S-27-25 & J30S-31-25					3,241			3,243			3,279			3,322
Single Slope Rail - High Abutment - See Sheets J30S-29-25 & J30S-31-25					2,751			2,745			-			-
Integral Abutment — Total - Epoxy Coated - LBS	With Open Rail				17,953			18,068			18,330			18,152
	With W-Beam Guardrail				14,589			14,704			14,966			14,788
	With Single Slope Rail				18,242			18,359			18,657			18,507
High Abutment — Total - Epoxy Coated - LBS	With Open Rail				19,352			19,495			-			-
	With W-Beam Guardrail				16,600			16,743			-			-
	With Single Slope Rail				19,763			19,900			-			-
High Abutment Total - Non Coated - LBS					123			123			-			-

Estimated Quantities for Superstructure - 30' Bridge

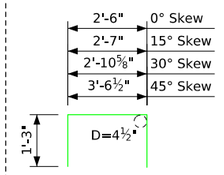
Item	Skew	Integral Abutment 0°	Integral Abutment 15°	Integral Abutment 30°	Integral Abutment 45°	High Abutment 0°	High Abutment 15°
* Structural Concrete (Bridge)	C.Y.	75.1	75.5	77.0	80.2	87.8	88.5
Reinf. Steel Epoxy Coated With Open Rail	LBS.	17,953	18,068	18,330	18,152	19,352	19,495
Reinf. Steel Epoxy Coated With W-Beam Guardrail	LBS.	14,589	14,704	14,966	14,788	16,600	16,743
Reinf. Steel Epoxy Coated With Single Slope Rail	LBS.	18,242	18,359	18,657	18,507	19,763	19,900
Reinf. Steel Non-Coated	LBS.	-	-	-	-	123	123

* Includes 4 wings for integral abutment at 1.18 CY each and temporary paving blocks; excludes rail concrete.

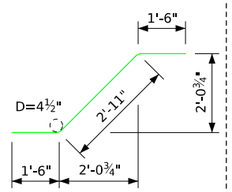
30' Bridge - Bent Bar Details



6b1, 5b2, 6b3 & 5b4



6e3



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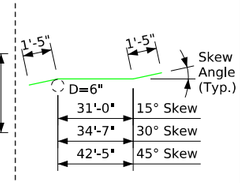
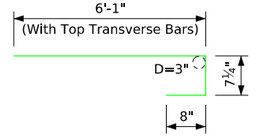
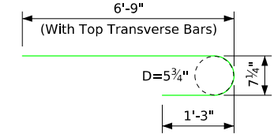


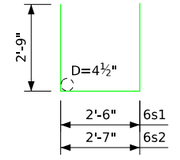
8e2



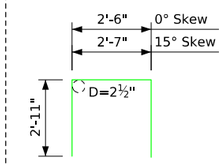
4j1



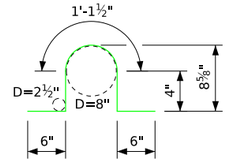
6j1



6s1 & 6s2



5s3



5z1

Note: All Dimensions Are Out To Out. D = Pin Diameter.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

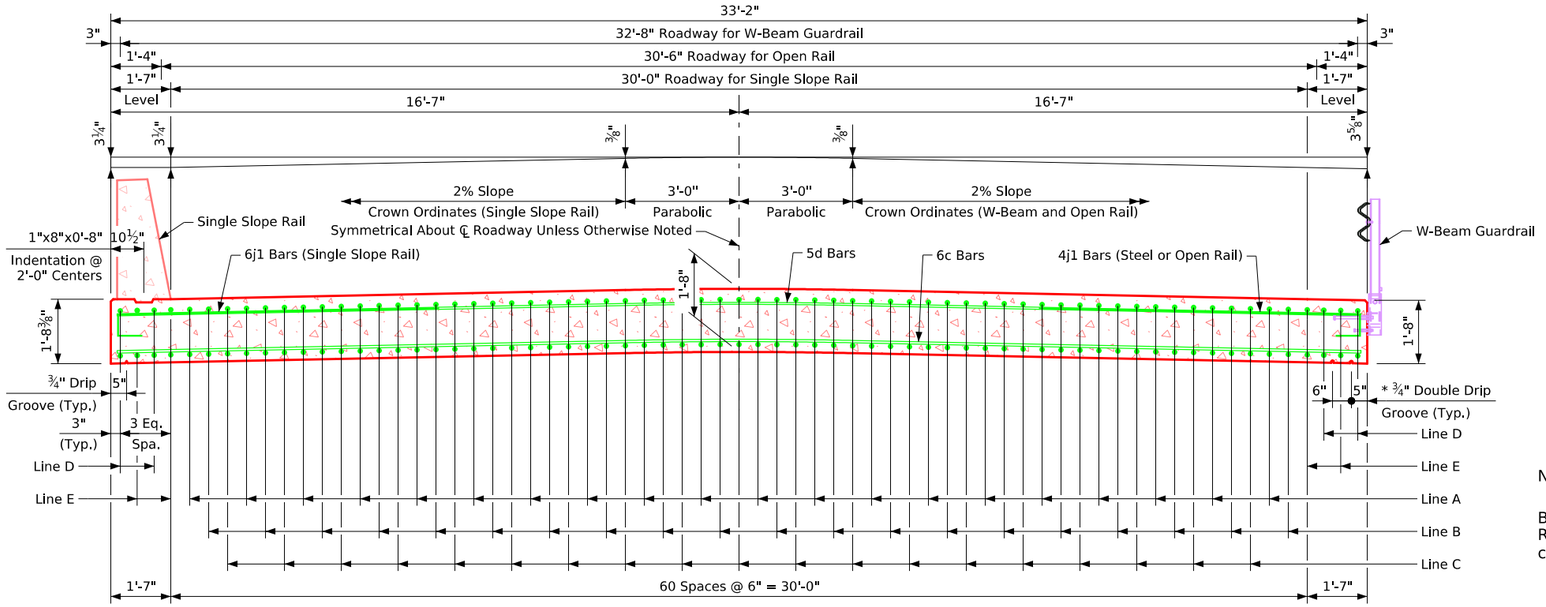
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Superstructure Details
30'-0" Bridge

J30S-06-25

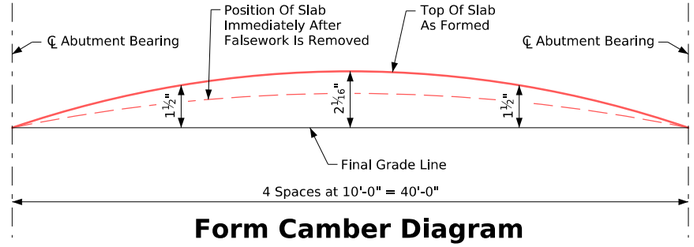


Slab Cross-Section Area for Barrier Rail = 55.33 sq ft

Transverse Section

Slab Cross-Section Area for Open Rail and W-Beam Guardrail = 55.28 sq ft

*Note: Double Drip Grooves For Open Rail And W-beam Guardrail Options Only.



Form Camber Diagram

This diagram shows the form camber required to compensate for the anticipated ultimate dead load deflection. The above dimensions do not include any allowance for form deflection or falsework settlement.

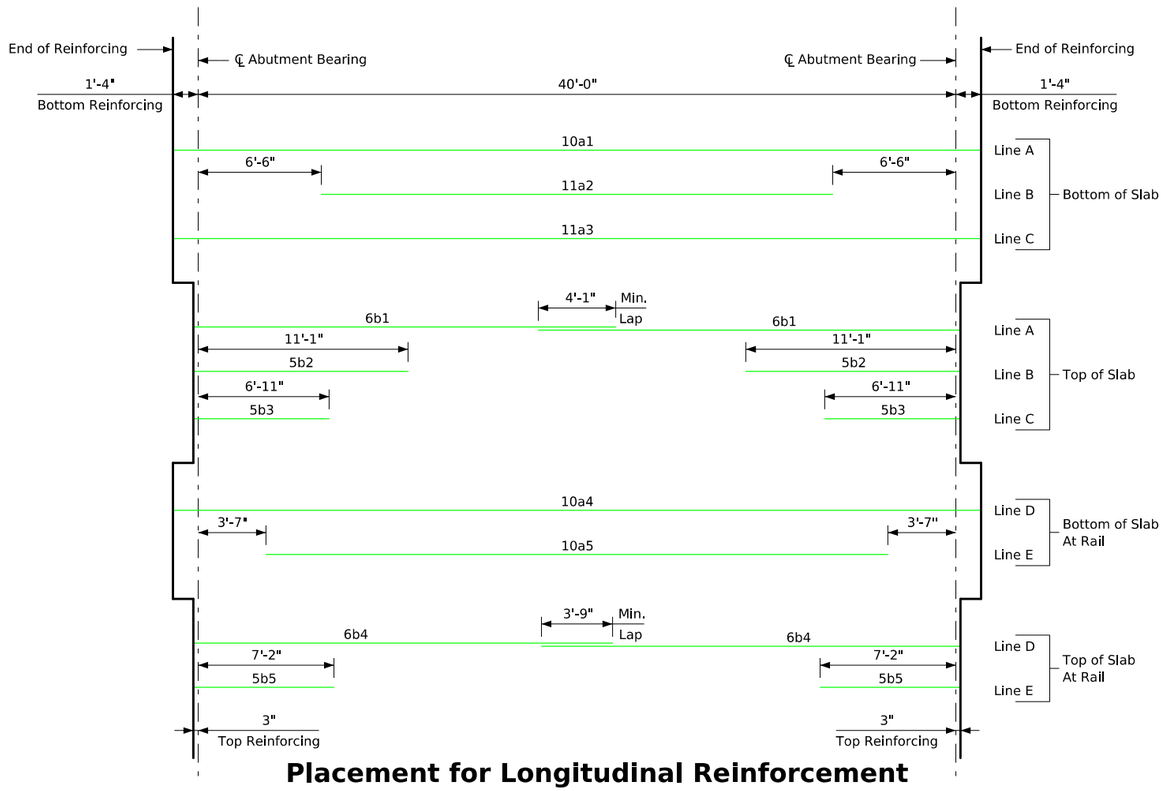
Camber values were computed for 0 degree skew. Other skews will result in slightly smaller deflection. Adjustments in camber may be considered if a wearing surface will not be placed.

Notes:

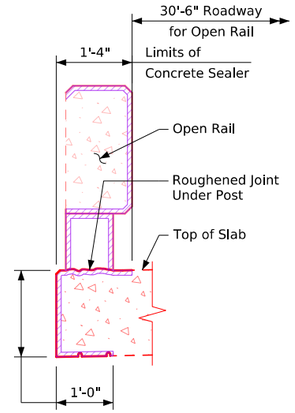
Top longitudinal reinforcing steel is to be parallel to and 2½ inches clear below top of slab. Bottom longitudinal reinforcing steel is to be parallel to and 1½ inch clear above bottom of slab. Reinforcing steel is to be securely wired in place and adequately supported on bar chairs before concrete is poured.

I.M. 451.01 requirements shall apply for bar chairs.

See Slab Reinforcing Plan Details for the top and bottom transverse slab reinforcing steel.



Placement for Longitudinal Reinforcement



Alternate Rail Option With Concrete Sealer

Concrete sealer shall be applied to both sides of bridge slab on the top, edge of slab, and under the slab. The concrete sealer shall also be applied to the open rail on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.

The concrete sealer limits are shown in the detail and shall apply to the full length of bridge. Concrete sealer shall be applied in accordance with Article 2403.03, P, 3 of the Standard Specifications.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Superstructure Details
40'-0" Bridge

J30S-07-25

Bill of Reinforcing Steel for Superstructure - 40' Bridge

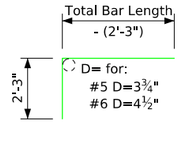
Location	Skew Shape	Bar	0 Degree No.	0 Degree Length	0 Degree Weight	15 Degree No.	15 Degree Length	15 Degree Weight	30 Degree No.	30 Degree Length	30 Degree Weight	45 Degree No.	45 Degree Length	45 Degree Weight
Slab Longitudinal Bottom		10a1	20	42'-8"	3672	20	42'-8"	3672	20	42'-8"	3672	20	42'-8"	3672
Slab Longitudinal Bottom		11a2	20	27'-0"	2869	20	27'-0"	2869	20	27'-0"	2869	20	27'-0"	2869
Slab Longitudinal Bottom		11a3	19	42'-8"	4307	19	42'-8"	4307	19	42'-8"	4307	19	42'-8"	4307
Slab Longitudinal Bottom, at Rail		10a4	4	42'-8"	734	4	42'-8"	734	4	42'-8"	734	4	42'-8"	734
Slab Longitudinal Bottom, at Rail		10a5	4	32'-10"	565	4	32'-10"	565	4	32'-10"	565	4	32'-10"	565
Slab Longitudinal Top		6b1	40	24'-8"	1479	40	24'-8"	1479	40	24'-8"	1479	40	24'-8"	1479
Slab Longitudinal Top		5b2	40	13'-7"	567	40	13'-7"	567	40	13'-7"	567	40	13'-7"	567
Slab Longitudinal Top		5b3	38	9'-5"	373	38	9'-5"	373	38	9'-5"	373	38	9'-5"	373
Slab Longitudinal Top, at Rail		6b4	8	24'-6"	294	8	24'-6"	294	8	24'-6"	294	8	24'-6"	294
Slab Longitudinal Top, at Rail		5b5	8	9'-8"	81	8	9'-8"	81	8	9'-8"	81	8	9'-8"	81
Slab Transverse Bottom		6c1	37	32'-10"	1825	37	34'-0"	1890	23	32'-10"	1134	10	32'-10"	493
Slab Transverse Ends, Bottom		6c3	-	-	-	-	-	-	30	VARIES	802	56	VARIES	1074
Slab Transverse, Top		5d2	37	32'-10"	1267	37	34'-0"	1312	23	32'-10"	788	10	32'-10"	342
Slab Transverse Ends, Top		5d4	-	-	-	-	-	-	30	VARIES	557	56	VARIES	746
Top of Slab, Transverse, at W-Beam/Open Rail		4j1	72	7'-5"	357	72	7'-5"	357	72	7'-5"	357	70	7'-5"	347
Top of Slab, Transverse, at Single Slope Rail		6j1	72	8'-7"	928	72	8'-7"	928	72	8'-7"	928	70	8'-7"	902
Paving Block Lifting Hoops		5z1	10	2'-10"	30	10	2'-10"	30	10	2'-10"	30	10	2'-10"	30
Epoxy-Coated Sub Total - W-Beam/Open Rail - LBS.					18,420			18,530			18,609			17,973
Epoxy-Coated Sub Total - Single Slope Rail - LBS.					18,991			19,101			19,180			18,528
Integral Abutment Bars														
Slab, Transverse at Abutment		8e1	14	32'-10"	1227	-	-	-	-	-	-	-	-	-
Slab, Transverse at Abutment		8e2	-	-	-	14	33'-10"	1265	14	37'-5"	1399	14	45'-3"	1691
Slab, Hairpins, at Abutment		6e3	72	5'-0"	541	72	5'-1"	550	72	5'-5"	586	72	6'-1"	658
Slab, Diagonal, at Abutment		6e4	72	5'-11"	640	72	5'-11"	640	72	5'-11"	640	72	5'-11"	640
Wing, Vertical		5m1	40	4'-5"	184	40	4'-5"	184	40	4'-5"	184	40	4'-5"	184
Wing, Horizontal		5n1	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334
Epoxy-Coated Sub Total - Integral Abutment - LBS.					2,926			2,973			3,143			3,507
High Abutment Bars														
Slab, Diagonal, at Abutment		6e4	72	5'-11"	640	72	5'-11"	640	-	-	-	-	-	-
Slab, Transverse at Abutment		8e5	18	40'-8"	1954	18	42'-1"	2023	-	-	-	-	-	-
Slab, Transverse at Abutment, Cap Ends		8e6	4	5'-2"	55	4	5'-4"	57	-	-	-	-	-	-
Abutment Hairpins		6s1	184	8'-0"	2211	168	8'-0"	2019	-	-	-	-	-	-
Abutment Hairpins, Cap Ends		6s2	-	-	-	16	8'-1"	194	-	-	-	-	-	-
Abutment Hairpins, Cap Ends		5s3	24	8'-4"	209	24	8'-5"	211	-	-	-	-	-	-
Spiral		#2	14	38'-6"	89	14	38'-6"	89	-	-	-	-	-	-
Spiral Spacers, L 7/8x7/8x1/8x 0.7			42	1'-10"	54	42	1'-10"	54	-	-	-	-	-	-
Epoxy-Coated Sub Total - High Abutment - LBS.					5,069			5,144						
Non-Coated Sub Total - High Abutment - LBS.					143			143						
Open Rail - Integral Abutment - See Sheets J30S-33-25					3,918			3,918			3,918			3,918
Open Rail - High Abutment - See Sheets J30S-35-25					3,323			3,323			-			-
Single Slope Rail - Integral Abutment - See Sheets J30S-27-25 & J30S-31-25					3,745			3,747			3,783			3,889
Single Slope Rail - High Abutment - See Sheets J30S-29-25 & J30S-31-25					3,253			3,247			-			-
Integral Abutment Total - Epoxy Coated - LBS	With Open Rail				25,264			25,421			25,670			25,398
	With W-Beam Guardrail				21,346			21,503			21,752			21,480
	With Single Slope Rail				25,662			25,821			26,106			25,924
High Abutment Total - Epoxy Coated - LBS	With Open Rail				26,812			26,997			-			-
	With W-Beam Guardrail				23,489			23,674			-			-
	With Single Slope Rail				27,313			27,492			-			-
High Abutment Total - Non Coated - LBS					143			143			-			-

Estimated Quantities for Superstructure - 40' Bridge

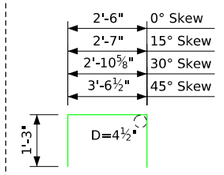
Item	Skew	Integral Abutment 0°	Integral Abutment 15°	Integral Abutment 30°	Integral Abutment 45°	High Abutment 0°	High Abutment 15°
* Structural Concrete (Bridge)	C.Y.	101.1	101.5	102.9	105.9	113.8	114.5
Reinf. Steel Epoxy Coated With Open Rail	LBS.	25,264	25,421	25,670	25,398	26,812	26,997
Reinf. Steel Epoxy Coated With W-Beam Guardrail	LBS.	21,346	21,503	21,752	21,480	23,489	23,674
Reinf. Steel Epoxy Coated With Single Slope Rail	LBS.	25,662	25,821	26,106	25,924	27,313	27,492
Reinf. Steel Non-Coated	LBS.	-	-	-	-	143	143

* Includes 4 wings for integral abutment at 1.18 CY each and temporary paving blocks; excludes rail concrete.

40' Bridge - Bent Bar Details



6b1, 5b2, 5b3, 6b4 & 5b5



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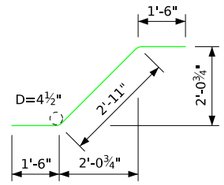

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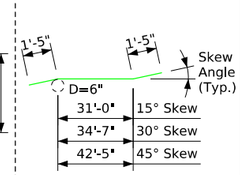
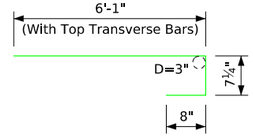
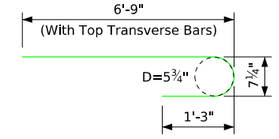


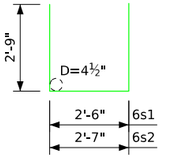
8e2



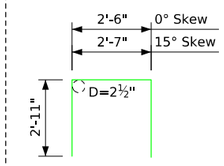
4j1



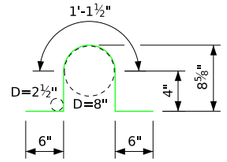
6j1



6s1 & 6s2



5s3



5z1

Note: All Dimensions Are Out To Out. D = Pin Diameter.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

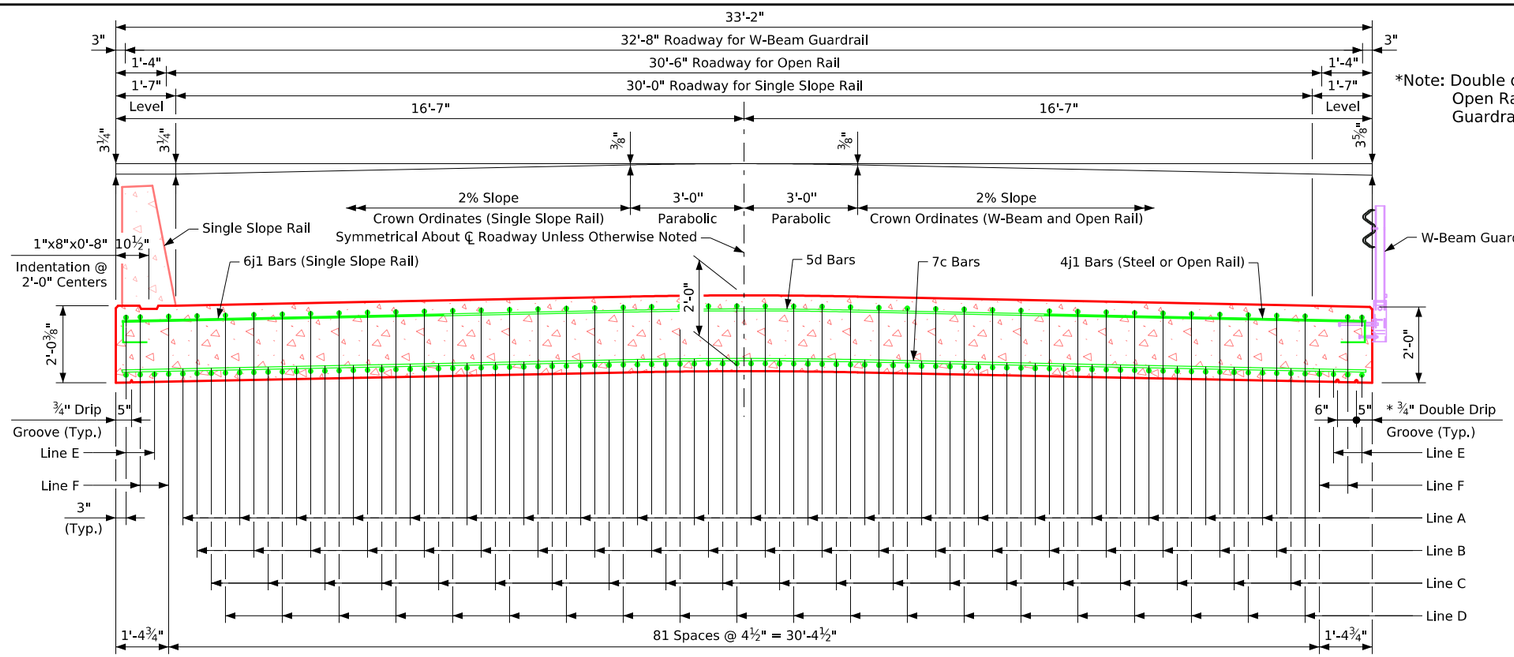
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

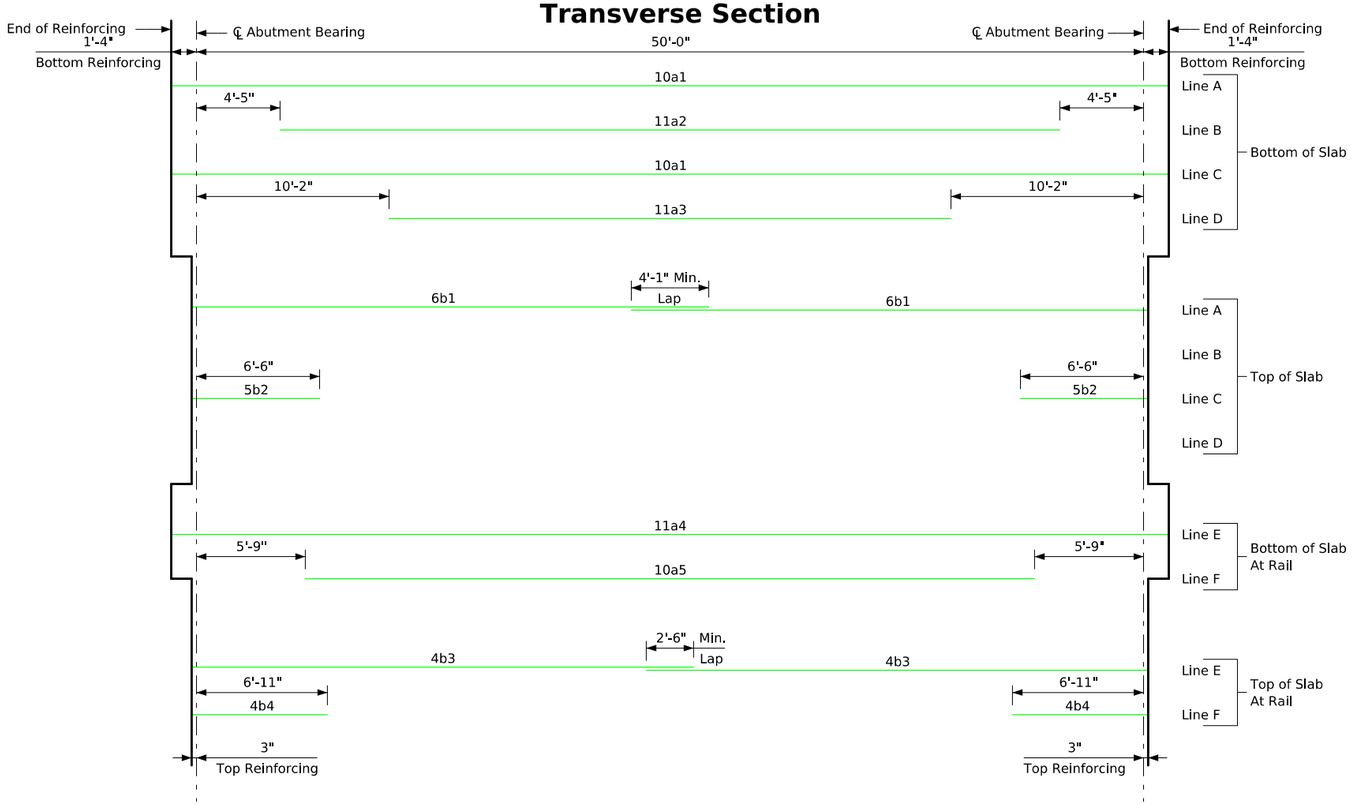
July, 2025

Superstructure Details
40'-0" Bridge

J30S-08-25

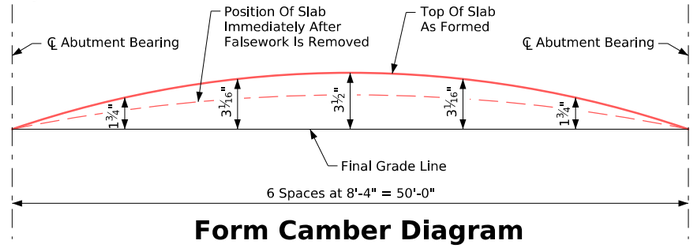


Transverse Section



Placement for Longitudinal Reinforcement

*Note: Double drip grooves for Open Rail and W-Beam Guardrail options only.



Form Camber Diagram

This diagram shows the form camber required to compensate for the anticipated ultimate dead load deflection. The above dimensions do not include any allowance for form deflection or falsework settlement.

Camber values were computed for 0 degree skew. Other skews will result in slightly smaller deflection. Adjustments in camber may be considered if a wearing surface will not be placed.

Notes:

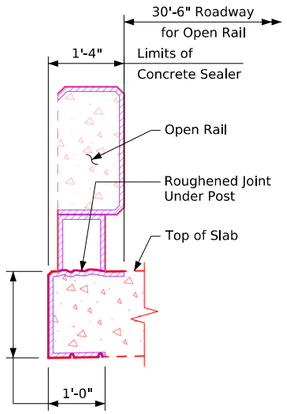
Top longitudinal reinforcing steel is to be parallel to and 2½ inches clear below top of slab. Bottom longitudinal reinforcing steel is to be parallel to and 1½ inch clear above bottom of slab. Reinforcing steel is to be securely wired in place and adequately supported on bar chairs before concrete is poured.

I.M. 451.01 requirements shall apply for bar chairs.

See Slab Reinforcing Plan Details for the top and bottom transverse slab reinforcing steel.

Slab Cross-Section Area for Open Rail and W-Beam Guardrail = 66.33 sq ft

Slab Cross-Section Area for Barrier Rail = 66.38 sq ft



Alternate Rail Option With Concrete Sealer

Concrete sealer shall be applied to both sides of bridge slab on the top, edge of slab, and under the slab. The concrete sealer shall also be applied to the open rail on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.

The concrete sealer limits are shown in the detail and shall apply to the full length of bridge. Concrete sealer shall be applied in accordance with Article 2403.03, P, 3 of the Standard Specifications.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Superstructure Details
50'-0" Bridge

J30S-09-25

Bill of Reinforcing Steel for Superstructure - 50' Bridge

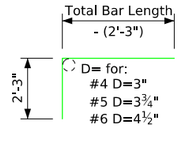
Location	Skew Shape	Bar	0 Degree No.	0 Degree Length	0 Degree Weight	15 Degree No.	15 Degree Length	15 Degree Weight	30 Degree No.	30 Degree Length	30 Degree Weight	45 Degree No.	45 Degree Length	45 Degree Weight
Slab Longitudinal Bottom		10a1	40	52'-8"	9065	40	52'-8"	9065	40	52'-8"	9065	40	52'-8"	9065
Slab Longitudinal Bottom		11a2	20	41'-2"	4374	20	41'-2"	4374	20	41'-2"	4374	20	41'-2"	4374
Slab Longitudinal Bottom		11a3	20	29'-8"	3152	20	29'-8"	3152	20	29'-8"	3152	20	29'-8"	3152
Slab Longitudinal Bottom, at Rail		11a4	4	52'-8"	1119	4	52'-8"	1119	4	52'-8"	1119	4	52'-8"	1119
Slab Longitudinal Bottom, at Rail		10a5	4	38'-6"	663	4	38'-6"	663	4	38'-6"	663	4	38'-6"	663
Slab Longitudinal Top		6b1	40	29'-8"	1780	40	29'-8"	1780	40	29'-8"	1780	40	29'-8"	1780
Slab Longitudinal Top		5b2	40	9'-0"	375	40	9'-0"	375	40	9'-0"	375	40	9'-0"	375
Slab Longitudinal Top		4b3	8	28'-10"	154	8	28'-10"	154	8	28'-10"	154	8	28'-10"	154
Slab Longitudinal Top, at Rail		4b4	8	9'-5"	50	8	9'-5"	50	8	9'-5"	50	8	9'-5"	50
Slab Transverse Bottom		7c2	47	32'-10"	3154	47	34'-0"	3267	33	32'-10"	2215	20	32'-10"	1342
Slab Transverse Ends, Bottom		7c4	-	-	-	-	-	-	30	VARIES	1091	56	VARIES	1462
Slab Transverse, Top		5d2	47	32'-10"	1610	47	34'-0"	1667	33	32'-10"	1130	20	32'-10"	685
Slab Transverse Ends, Top		5d4	-	-	-	-	-	-	30	VARIES	557	56	VARIES	746
Top of Slab, Transverse, at W-Beam/Open Rail		4j1	92	7'-5"	456	92	7'-5"	456	92	7'-5"	456	90	7'-5"	446
Top of Slab, Transverse, at Single Slope Rail		6j1	92	8'-7"	1186	92	8'-7"	1186	92	8'-7"	1186	90	8'-7"	1160
Paving Block Lifting Hoops		5z1	10	2'-10"	30	10	2'-10"	30	10	2'-10"	30	10	2'-10"	30
Epoxy-Coated Sub Total - W-Beam/Open Rail - LBS.					25,982			26,152			26,211			25,443
Epoxy-Coated Sub Total - Single Slope Rail - LBS.					26,712			26,882			26,941			26,157
Integral Abutment Bars														
Slab, Tansverse at Abutment		8e1	14	32'-10"	1227	-	-	-	-	-	-	-	-	-
Slab, Tansverse at Abutment		8e2	-	-	-	14	33'-10"	1265	14	37'-5"	1399	14	45'-3"	1691
Slab, Hairpins, at Abutment		6e3	72	5'-0"	541	72	5'-1"	550	72	5'-5"	586	72	6'-1"	658
Slab, Diagonal, at Abutment		6e4	72	5'-11"	640	72	5'-11"	640	72	5'-11"	640	72	5'-11"	640
Wing, Vertical		5m1	40	4'-5"	184	40	4'-5"	184	40	4'-5"	184	40	4'-5"	184
Wing, Horizontal		5n1	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334	48	6'-8"	334
Epoxy-Coated Sub Total - Integral Abutment - LBS.					2,926			2,973			3,143			3,507
High Abutment Bars														
Slab, Diagonal, at Abutment		6e4	72	5'-11"	640	72	5'-11"	640	-	-	-	-	-	-
Slab, Transverse at Abutment		8e5	18	40'-8"	1954	18	42'-1"	2023	-	-	-	-	-	-
Slab, Transverse at Abutment, Cap Ends		8e6	4	5'-2"	55	4	5'-4"	57	-	-	-	-	-	-
Abutment Hairpins		6s1	184	8'-0"	2211	168	8'-0"	2019	-	-	-	-	-	-
Abutment Hairpins, Cap Ends		6s2	-	-	-	16	8'-1"	194	-	-	-	-	-	-
Abutment Hairpins, Cap Ends		5s3	24	8'-4"	209	24	8'-5"	211	-	-	-	-	-	-
Spiral		#2	16	38'-6"	102	16	38'-6"	102	-	-	-	-	-	-
Spiral Spacers, L 7/8x7/8x1/8x 0.7			48	1'-10"	62	48	1'-10"	62	-	-	-	-	-	-
Epoxy-Coated Sub Total - High Abutment - LBS.					5,069			5,144						
Non-Coated Sub Total - High Abutment - LBS.					164			164						
Open Rail - Integral Abutment - See Sheets J30S-33-25					4,462			4,462			4,462			4,462
Open Rail - High Abutment - See Sheets J30S-35-25					3,920			3,920			-			-
Single Slope Rail - Integral Abutment - See Sheets J30S-27-25 & J30S-31-25					4,367			4,369			4,407			4,455
Single Slope Rail - High Abutment - See Sheets J30S-29-25 & J30S-31-25					3,868			3,862			-			-
Integral Abutment Total - Epoxy Coated - LBS	With Open Rail				33,370			33,587			33,816			33,412
	With W-Beam Guardrail				28,908			29,125			29,354			28,950
	With Single Slope Rail				34,005			34,224			34,491			34,119
High Abutment Total - Epoxy Coated - LBS	With Open Rail				34,971			35,216			-			-
	With W-Beam Guardrail				31,051			31,296			-			-
	With Single Slope Rail				35,649			35,888			-			-
High Abutment Total - Non Coated - LBS					164			164			-			-

Estimated Quantities for Superstructure - 50' Bridge

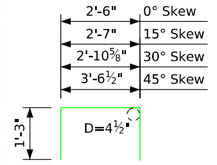
Item	Skew	Integral Abutment 0°	Integral Abutment 15°	Integral Abutment 30°	Integral Abutment 45°	High Abutment 0°	High Abutment 15°
* Structural Concrete (Bridge)	C.Y.	140.8	141.2	142.4	145.0	153.5	154.2
Reinf. Steel Epoxy Coated With Open Rail	LBS.	33,370	33,587	33,816	33,412	34,971	35,216
Reinf. Steel Epoxy Coated With W-Beam Guardrail	LBS.	28,908	29,125	29,354	28,950	31,051	31,296
Reinf. Steel Epoxy Coated With Single Slope Rail	LBS.	34,005	34,224	34,491	34,119	35,590	35,888
Reinf. Steel Non-Coated	LBS.	-	-	-	-	164	164

* Includes 4 wings for integral abutment at 1.18 CY each and temporary paving blocks; excludes rail concrete.

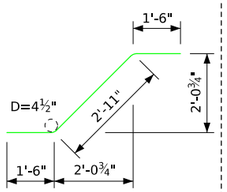
50' Bridge - Bent Bar Details



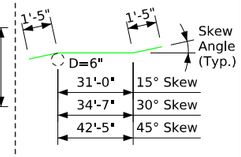
6b1, 5b2, 4b3 & 4b4



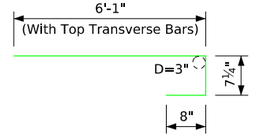
6e3



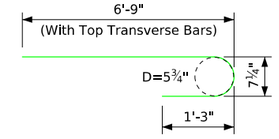
6e4



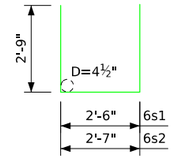
8e2



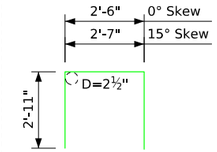
4j1



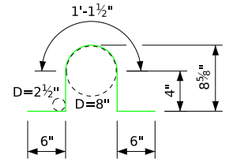
6j1



6s1 & 6s2



5s3



5z1

Note: All Dimensions Are Out To Out. D = Pin Diameter.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

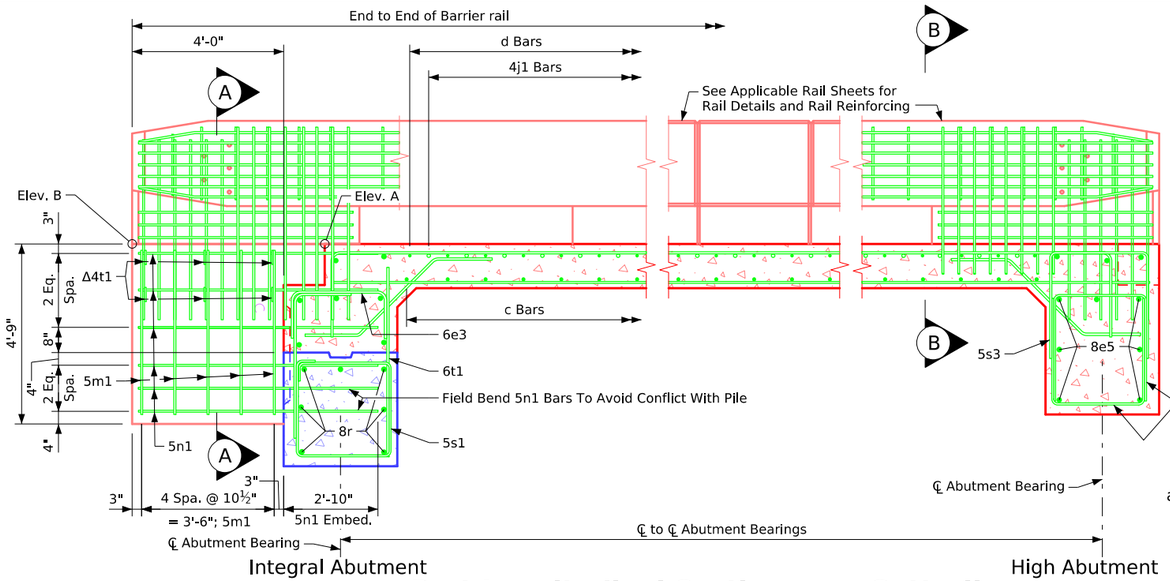
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

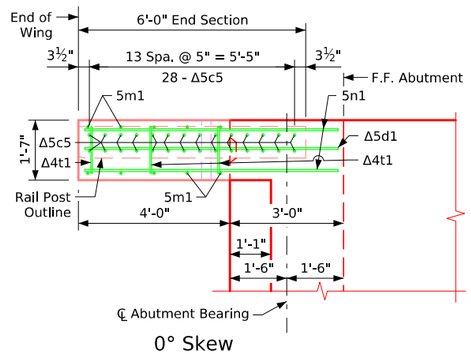
July, 2025

Superstructure Details
50'-0" Bridge

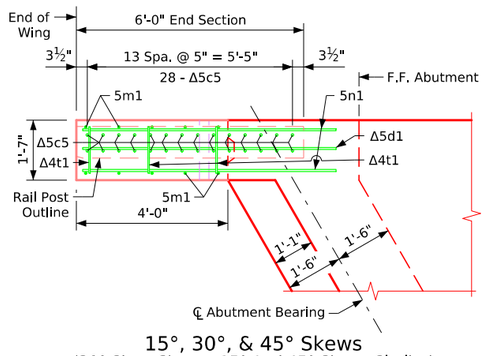
J30S-10-25



Part Longitudinal Section near Gutterline

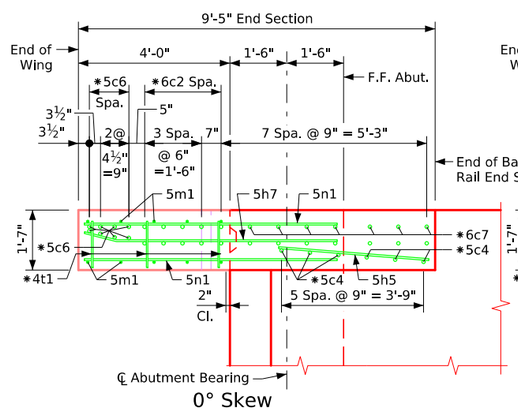


0° Skew

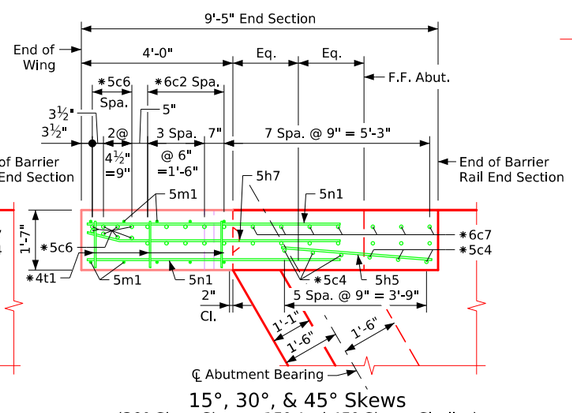


15°, 30°, & 45° Skews
(30° Skew Shown, 15° And 45° Skews Similar)

Part Plan View at Top of Wing - Integral Abutment with Open Rail

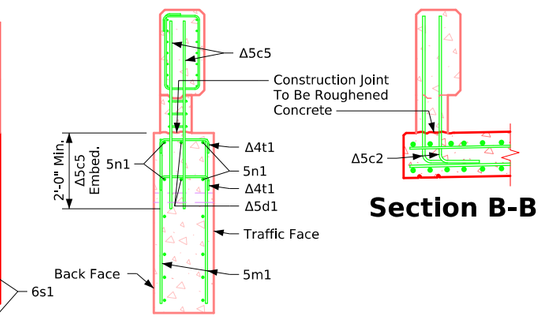


0° Skew



15°, 30°, & 45° Skews
(30° Skew Shown, 15° And 45° Skews Similar)

Part Plan View at Top of Wing - Integral Abutment with Single Slope Rail

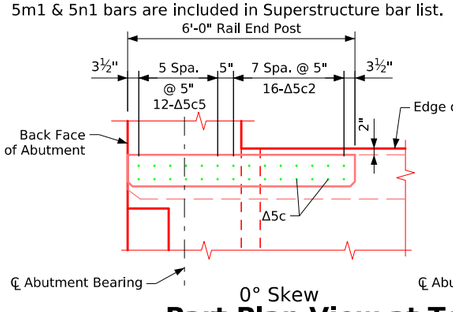


Section B-B

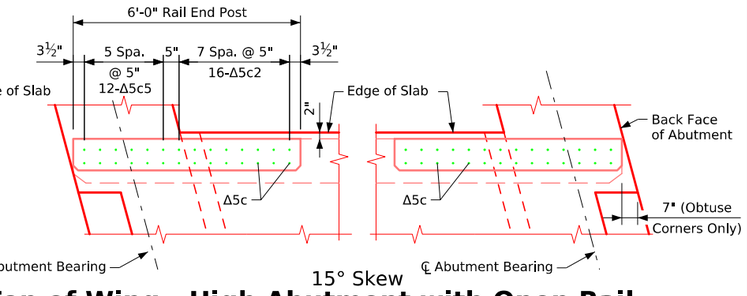
Section A-A

Δ Note:
See Open Barrier Rail Details in these plans for bars 5c5, 5d1, and 4t1 placed with the abutment or wing.

Note:
5m1 & 5n1 bars are included in Superstructure bar list.



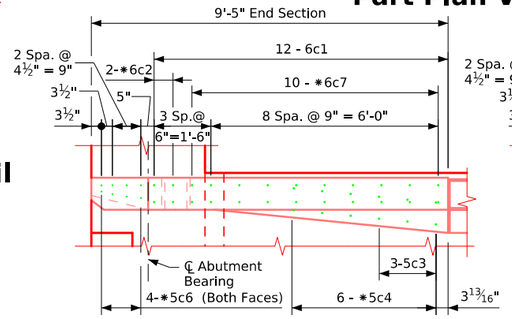
0° Skew



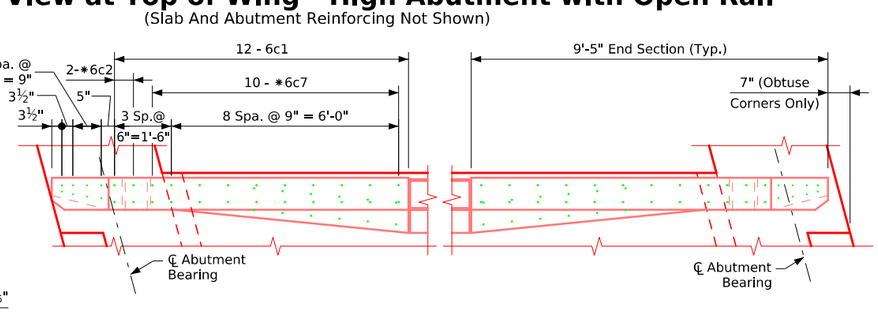
15° Skew

Part Plan View at Top of Wing - High Abutment with Open Rail

(Slab And Abutment Reinforcing Not Shown)



0° Skew



15° Skew

Part Plan View at Top of Wing - High Abutment with Single Slope Rail

(Slab And Abutment Reinforcing Not Shown)

✱ Note:
See Single Slope Rail End Section Details in these plans for bars placed with the abutment or wing.

Superstructure Notes:

This bridge is designed for HL-93 loading plus an allowance of 20 pounds per square foot of roadway for future wearing surface.

The slab as shown includes a ½ inch integral wearing surface.

The minimum clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted or shown. All reinforcing steel is to be securely wired in place. See "Bar Chair Note".

All reinforcing shall be Grade 60.

The concrete slab is to be placed with a minimum of construction joints. Procedures for placing slab concrete shall be submitted for approval together with a statement of the proposed method and evidence that the Contractor possesses the necessary equipment and facilities to accomplish the required result. Slab falsework shall be removed prior to construction of the barrier rails, unless slab construction is staged.

Note that when portland cement approach pavement is placed, compressible joint material must be used between pavement and end of bridge.

W-Beam guardrails are alternate railing types not shown on this sheet.
For W-Beam guardrail details, see Sheets J30S-36-25 and J30S-37-25.
For Single Slope barrier rail details, see Sheets J30S-26-25 through J30S-31-25.

Bar Chair Note:

Top mat of reinforcing steel is to be supported by individual bar chairs spaced at not more than 3'-0" centers longitudinally and transversely.
The bottom mat of reinforcing steel is to be supported by individual bar chairs spaced at not more than 3'-0" centers longitudinally and transversely, or by continuous rows of bar high chairs or slab bolsters spaced 4'-0" apart.
I.M. 451.01 requirements shall apply for bar chairs, bar high chairs, and slab bolsters.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

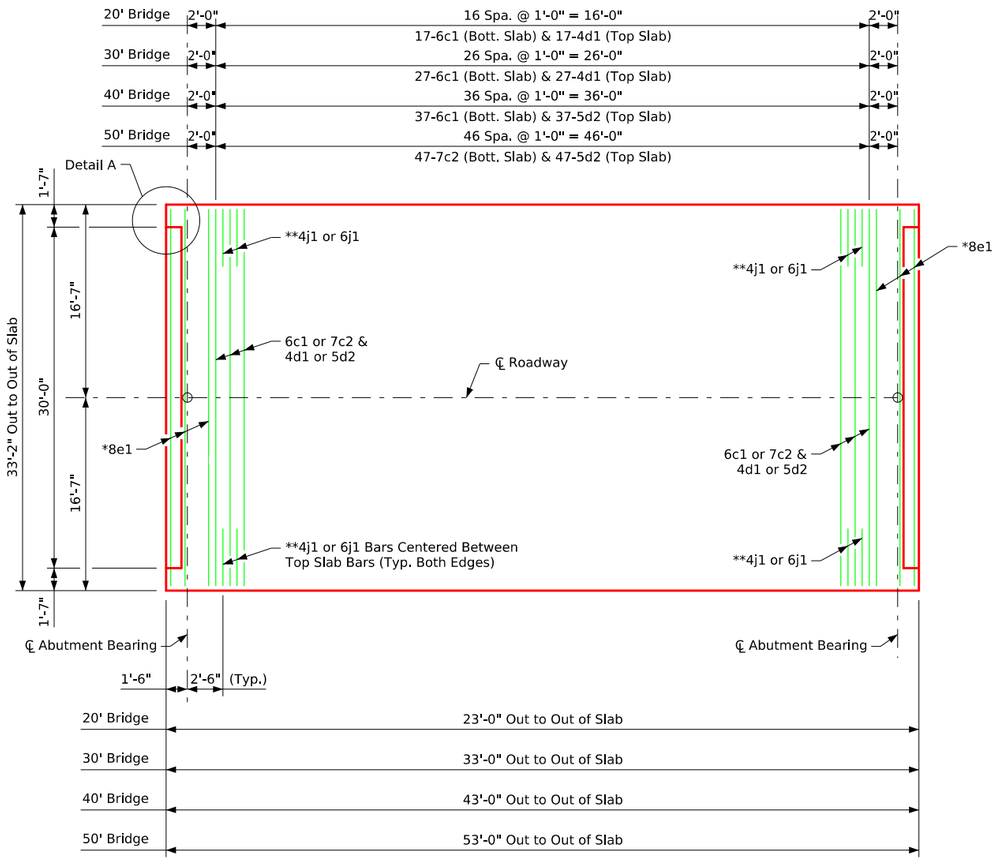
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

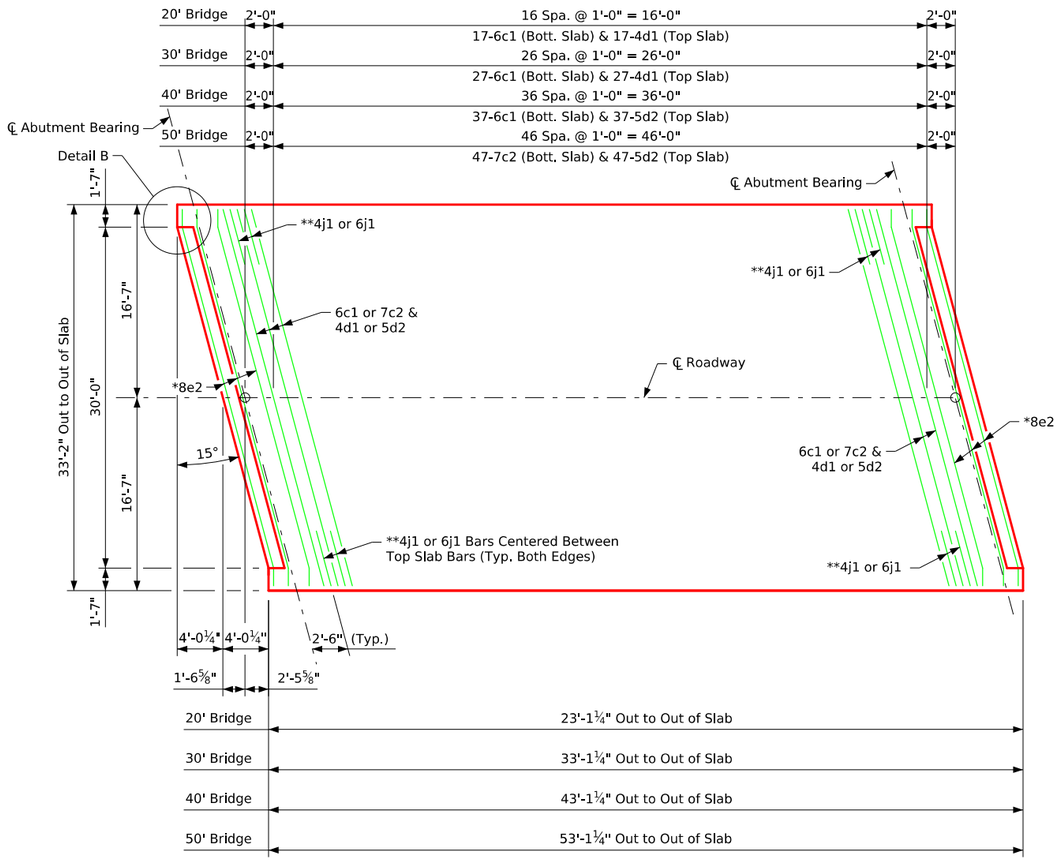
July, 2025

Superstructure Details-All Bridges

J30S-11-25



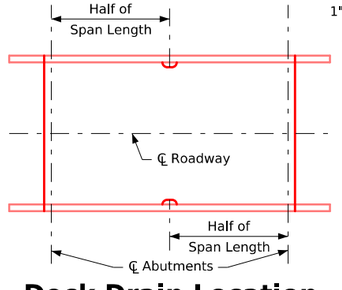
0° Skew



15° Skew

Weight of One Deck Drain

Span	Weight (lbs.)
20'-0"	32
30'-0"	38
40'-0"	41
50'-0"	48



Deck Drain Location

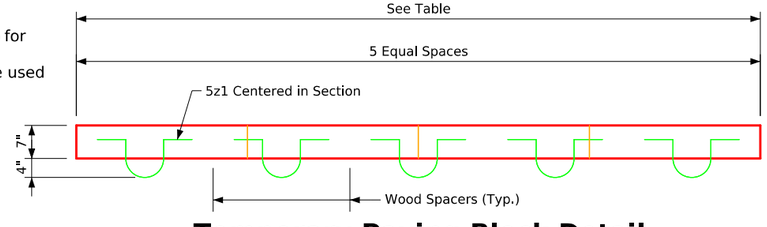
Note:
4" x 8" outside dimension rolled tube with ¼" wall thickness may be substituted for the welded drain shown.

Transverse Reinforcing Steel Layout

Notes:
* Plan views are shown for spans that utilize an integral abutment. For details in the pile cap for the high abutments, see Sheet J30S-20-25 or J30S-21-25.
** 4j1 bars shall be used with open concrete rails or W-beam guardrails, and 6j1 bars shall be used with single slope concrete rails.

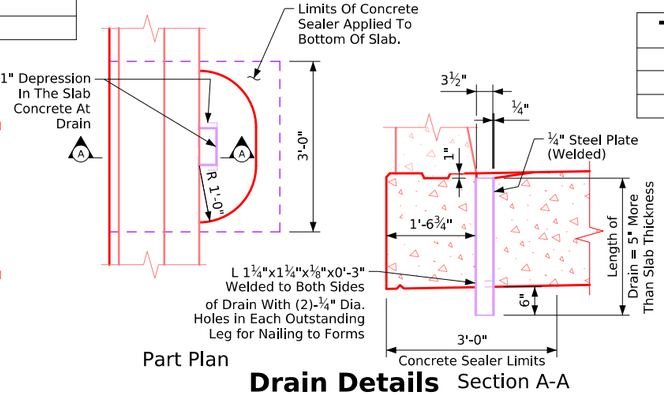
Temporary Paving Block

Skew	Length	Concrete
0°	28'-0"	0.7 C.Y.
15°	29'-0"	0.7 C.Y.



Temporary Paving Block Detail

Note:
Temporary Paving Block to be used with paved approaches only.
Line Paving Notch with tar paper before placing Temporary Paving Block.

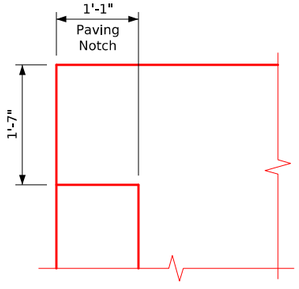


Part Plan

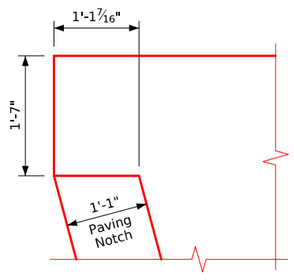
Section A-A

Drain Details

(Use for Single-Slope Rail Only, not required for Open Rail or W-Beam Guardrail)
Note: Drains are to be galvanized. Include cost of drains in price for "Structural Concrete". (2 Drains Reqired)



Detail A



Detail B

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

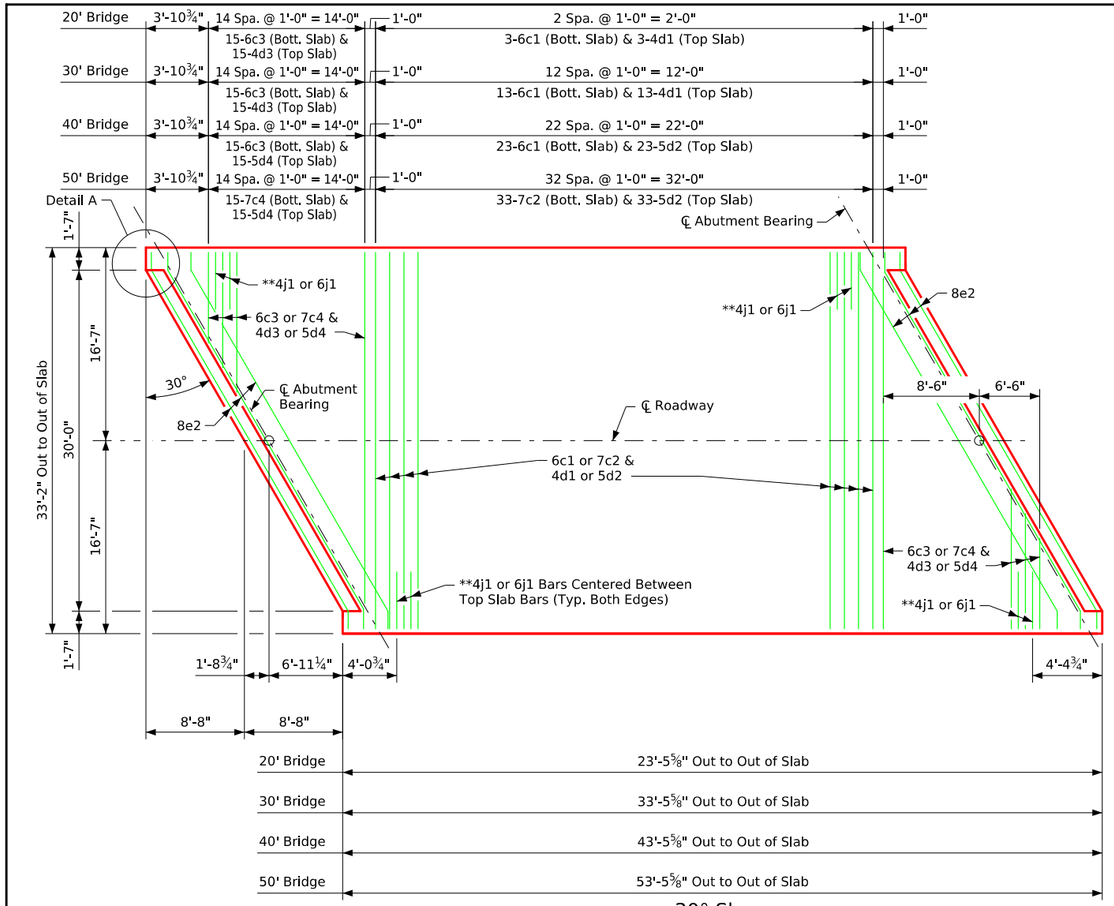
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

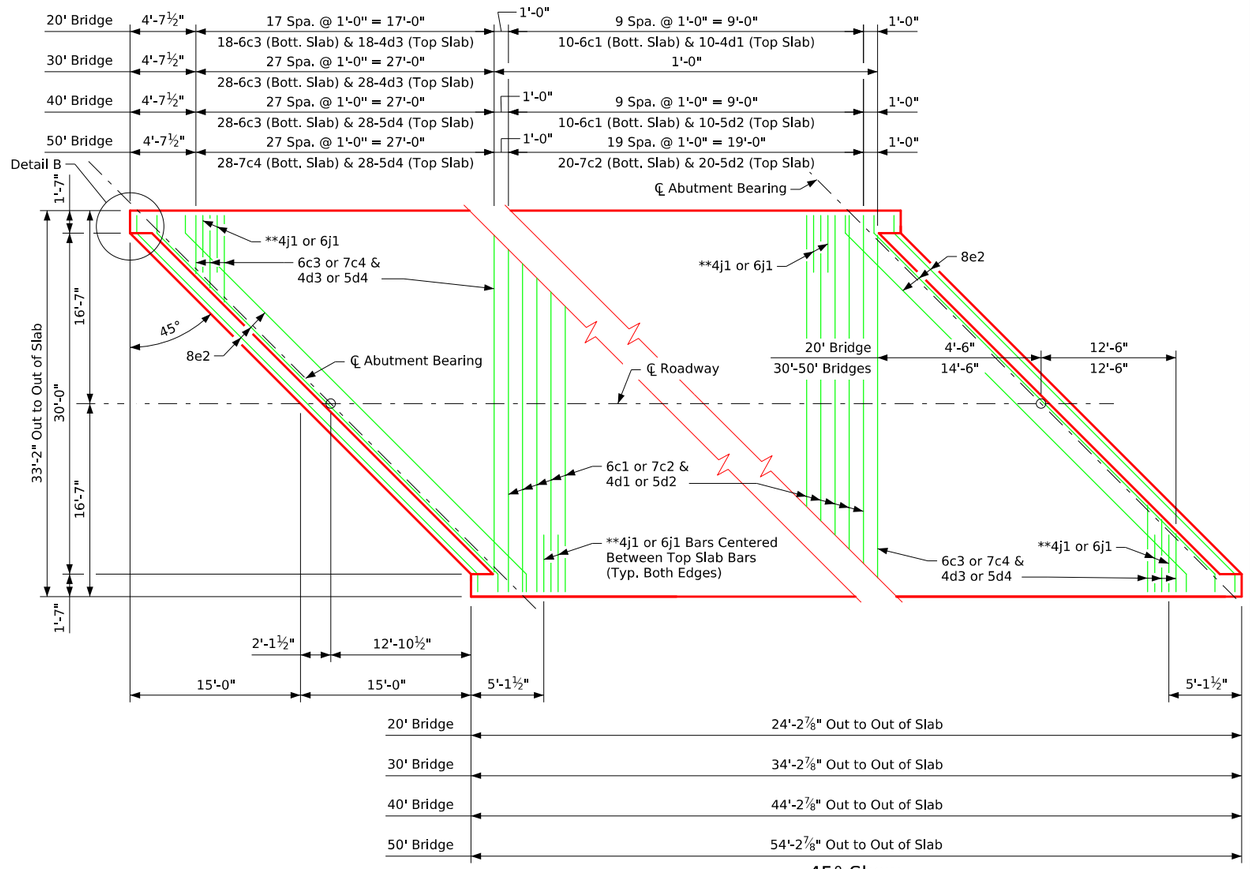
July, 2025

Slab Reinforcing Plan
Details-0° & 15°
Skew

J30S-12-25



30° Skew



45° Skew

Transverse Reinforcing Steel Layout

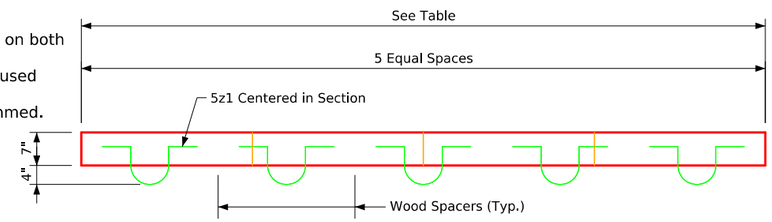
Notes:
4d or 5d bars are to pass under 8e2 bars in conflict areas on 30° & 45° skew bridges.
Bar size and spacing for variable top (6c3 and 7c4) and bottom (4d3 and 5d4) bars are similar on both ends of the span.
** 4j1 bars shall be used with open concrete rails or W-beam guardrails, and 6j1 bars shall be used with single slope concrete rails.
Rotate or field bend 4j1 or 6j1 bars to fit in acute corners. The 4j1 or 6j1 bars shall not be trimmed.

Weight of One Deck Drain

Span	Weight (lbs.)
20'-0"	32
30'-0"	38
40'-0"	41
50'-0"	48

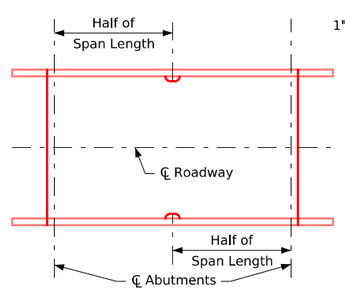
Temporary Paving Block

Skew	Length	Concrete
30°	32'-7"	0.8 C.Y.
45°	40'-5"	0.9 C.Y.



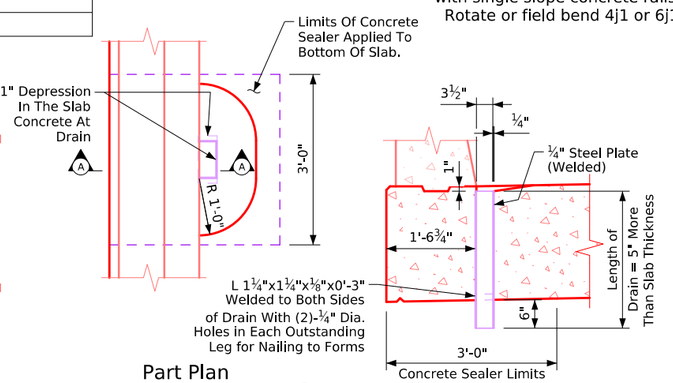
Temporary Paving Block Detail

Note:
Temporary Paving Block to be used with paved approaches only.
Line Paving Notch with tar paper before placing Temporary Paving Block.



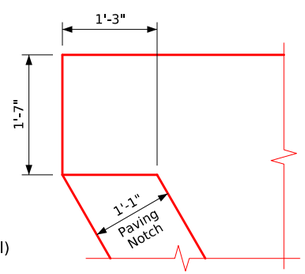
Deck Drain Location

Note:
4" x 8" Outside dimension rolled tube with ¼" wall thickness may be substituted for the welded drain shown.

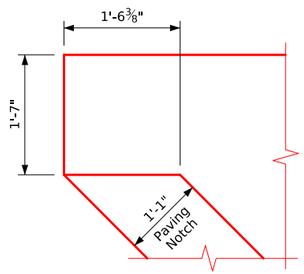


Drain Details

(Use for Single-Slope Rail Only, not required for Open Rail or W-Beam Guardrail)
Note: Drains are to be galvanized. Include cost of drains in price for "Structural Concrete". (2 Drains Reqired)



Detail A



Detail B

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

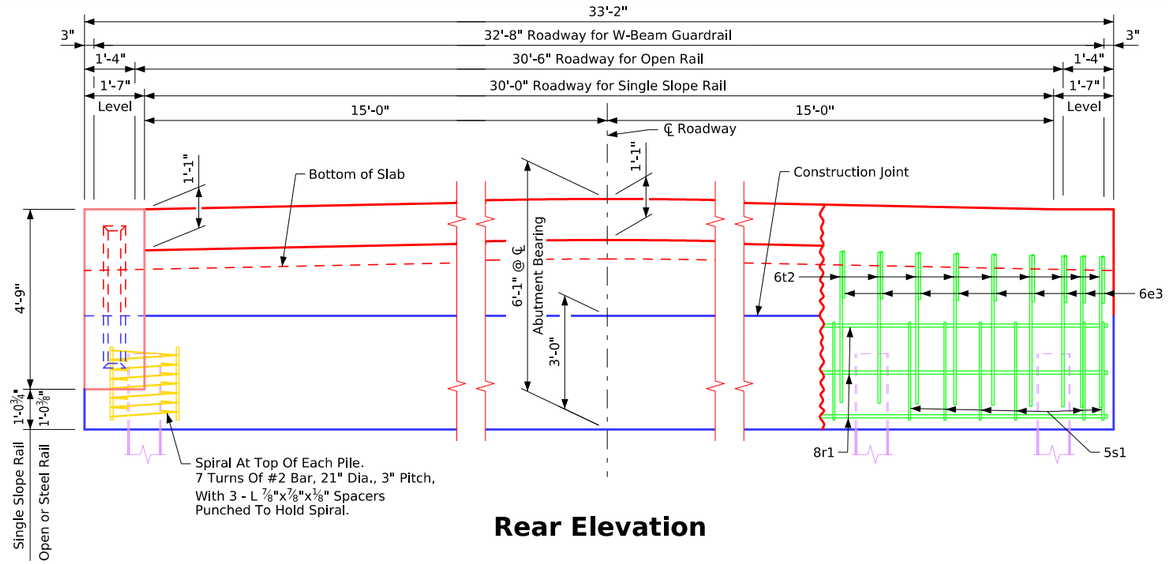
July, 2025

Slab Reinforcing Plan
Details-30° & 45° Skew

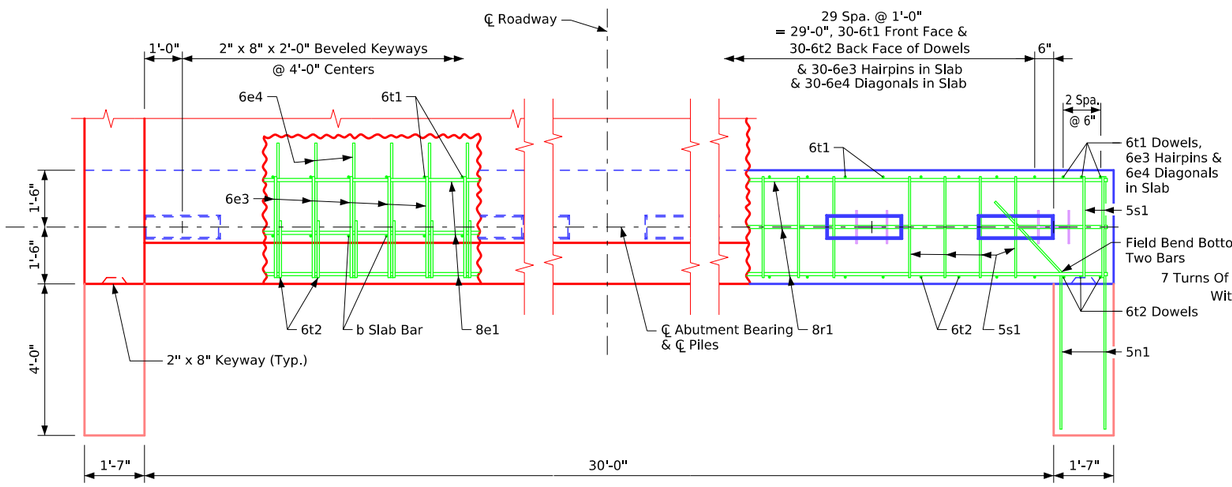
J30S-13-25

Latest Revision Date

Approved by Bridge Engineer

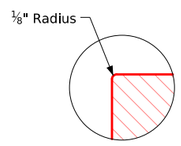


Rear Elevation

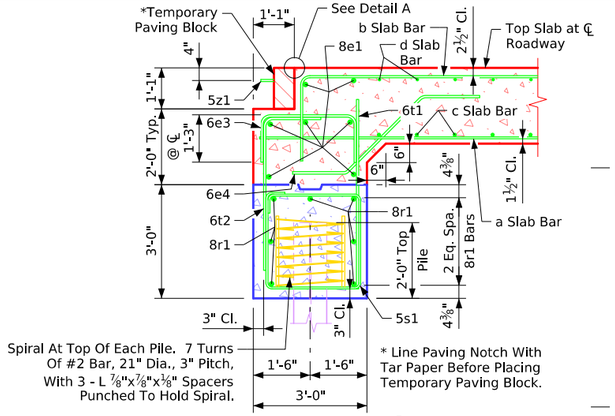


Plan View

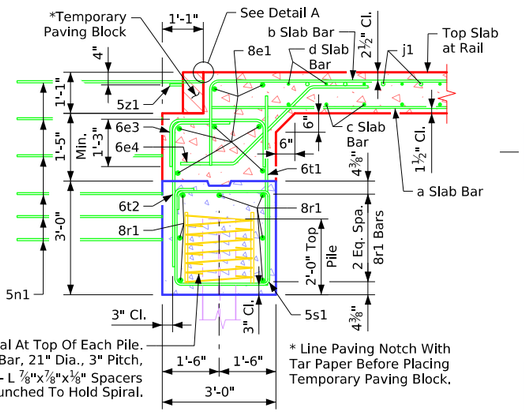
Note:
Rails not shown.
5n1 wing reinforcement shall be placed in the abutment footing before the footing is poured. Refer to Sheet J30S-11-25 for additional details.
6e3, 6e4 and 8e1 bars are included with superstructure quantities.



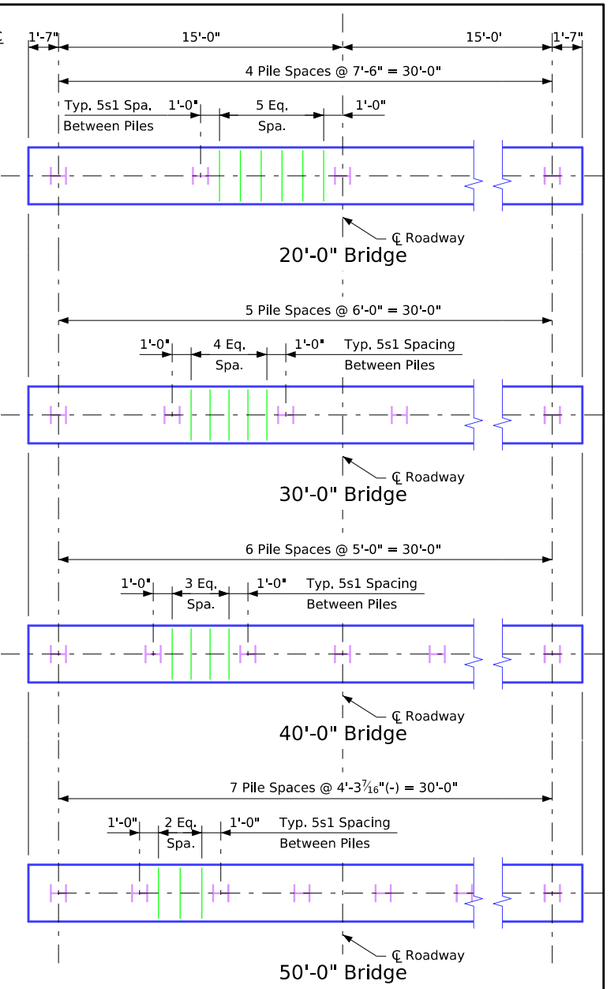
Detail A



Section Normal to Abutment at ℄



Section Normal to Abutment at Gutterline



Pile Plan - 0° Skew Steel Piling

Number of Piles and Abutment Design Loads				
Bridge Length	20'-0"	30'-0"	40'-0"	50'-0"
Number of Piles	5	6	7	8
Pu, strength I design load for each abutment (kips)	471	566	669	801

Note: Pu, strength I design load for each abutment (kips) is not the value used in the field for driving piles.

Abutment Notes:

All piling HP 10x42.
The concrete and reinforcing steel for the wings is included with the superstructure.
The minimum clear distance from the face of the concrete to near reinforcing bar is to be 2 inches unless otherwise noted or shown.
Steel abutment piles shall be driven to full penetration if practicable but in no case to a bearing value less than specified in the design plans.
All reinforcing steel is to be Grade 60.
Abutment piling was designed for HL-93 loading with an allowance for 20 lbs. per sq. ft. future wearing surface.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

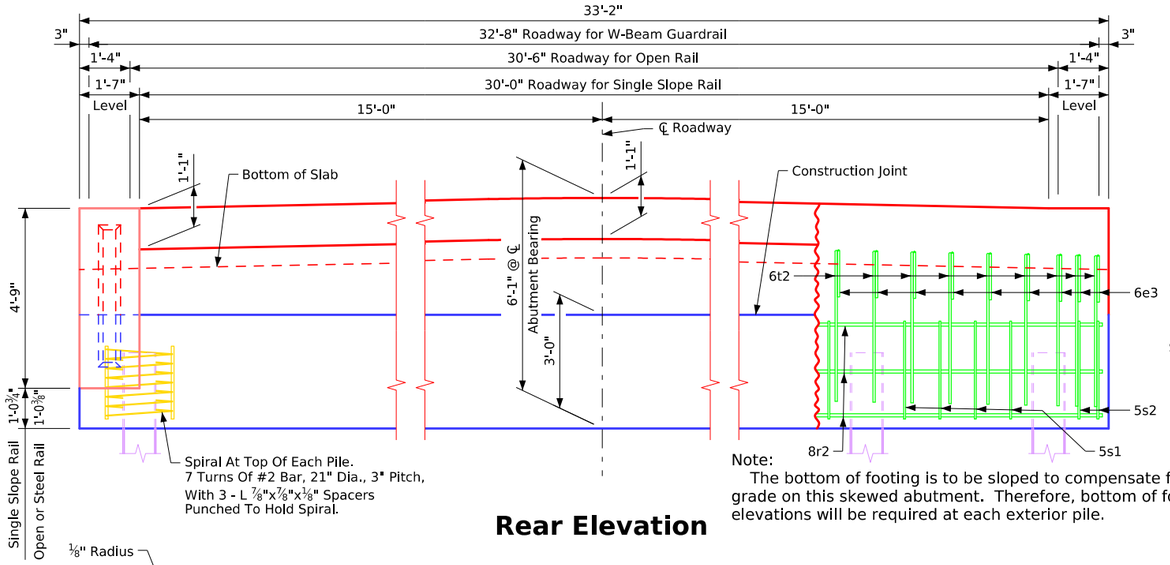
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

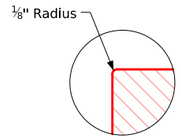
Integral Abutment Details
0° Skew

J30S-14-25

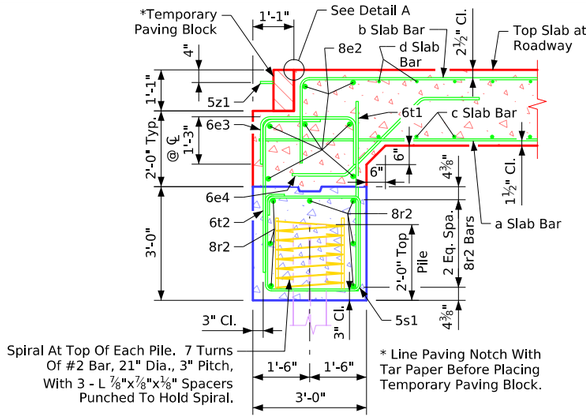


Rear Elevation

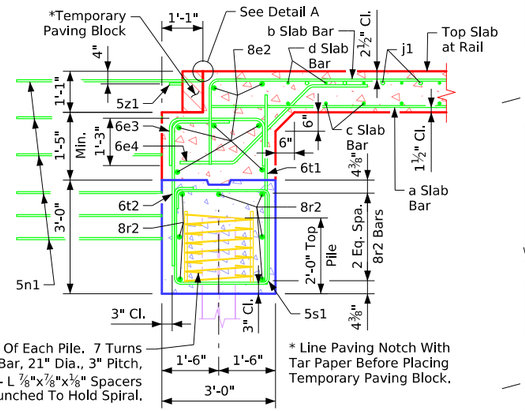
Note:
The bottom of footing is to be sloped to compensate for grade on this skewed abutment. Therefore, bottom of footing elevations will be required at each exterior pile.



Detail A



Section Normal to Abutment at ℄



Section Normal to Abutment at Gutterline

Plan View

Notes:
Rails not shown.
5n1 wing reinforcement shall be placed in the abutment footing before the footing is poured. Refer to Sheet J30S-11-25 for additional details.
6e3, 6e4 and 8e2 bars are included with superstructure quantities.

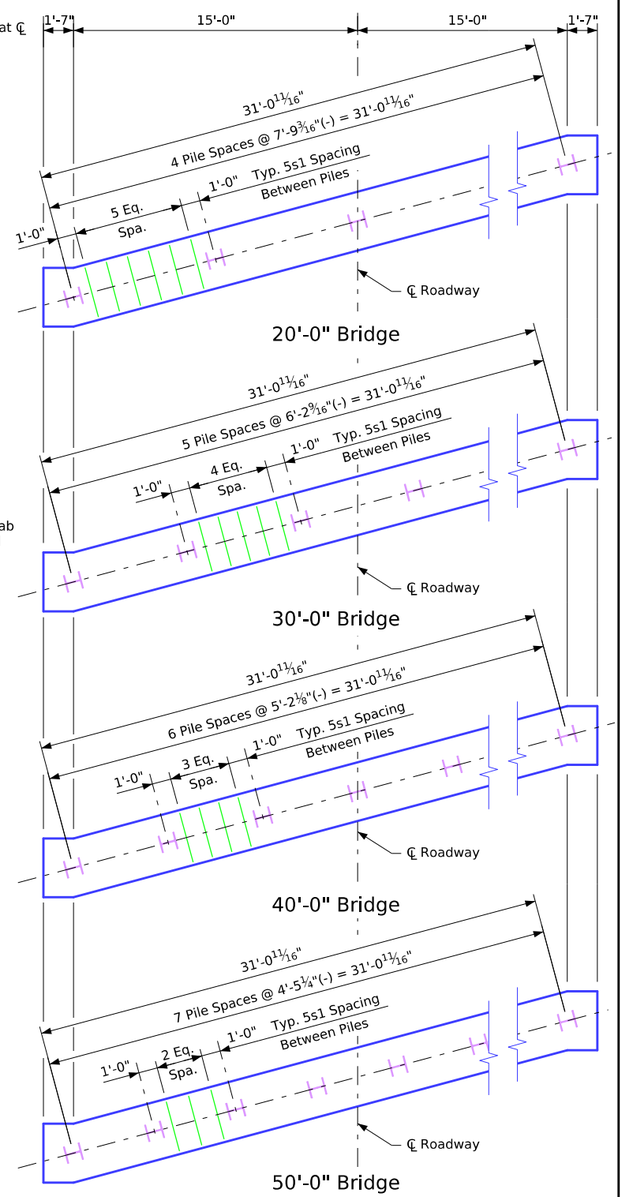
Number of Piles and Abutment Design Loads

Bridge Length	20'-0"	30'-0"	40'-0"	50'-0"
Number of Piles	5	6	7	8
Pu, strength I design load for each abutment (kips)	474	569	673	804

Note: Pu, strength I design load for each abutment (kips) is not the value used in the field for driving piles.

Abutment Notes:

All piling HP 10x42.
The concrete and reinforcing steel for the wings is included with the superstructure.
The minimum clear distance from the face of the concrete to near reinforcing bar is to be 2 inches unless otherwise noted or shown.
Steel abutment piles shall be driven to full penetration if practicable but in no case to a bearing value less than specified in the design plans.
All reinforcing steel is to be Grade 60.
Abutment piling was designed for HL-93 loading with an allowance for 20 lbs. per sq. ft. future wearing surface.



Pile Plan - 15° Skew Steel Piling

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

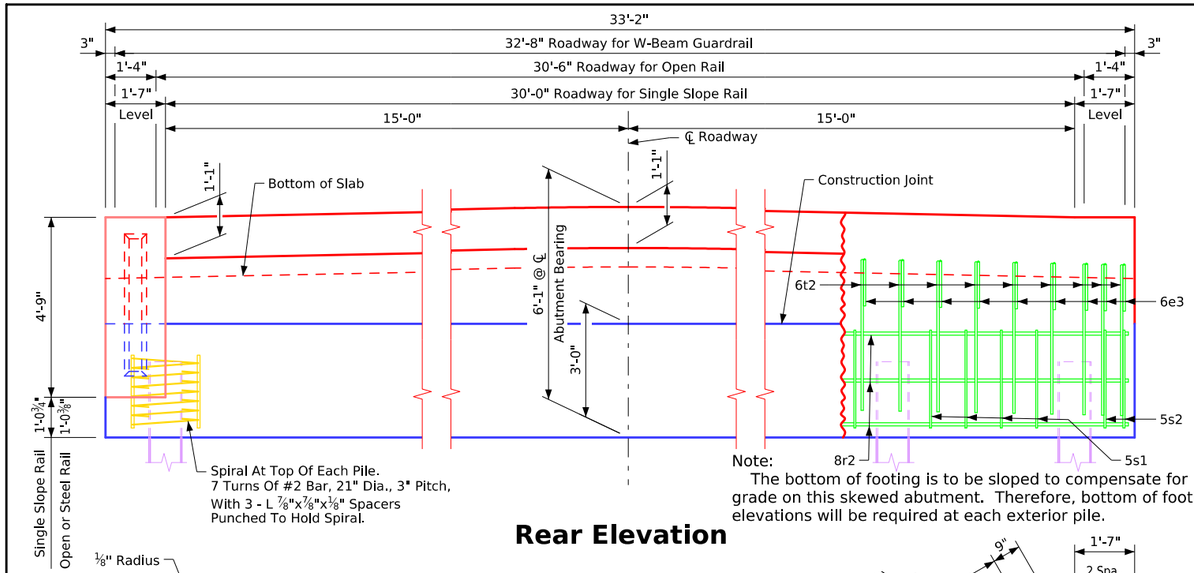
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

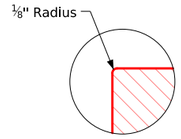
Integral Abutment Details
15° Skew

J30S-15-25

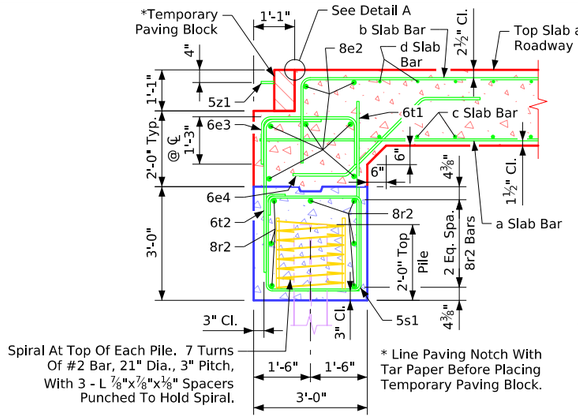


Rear Elevation

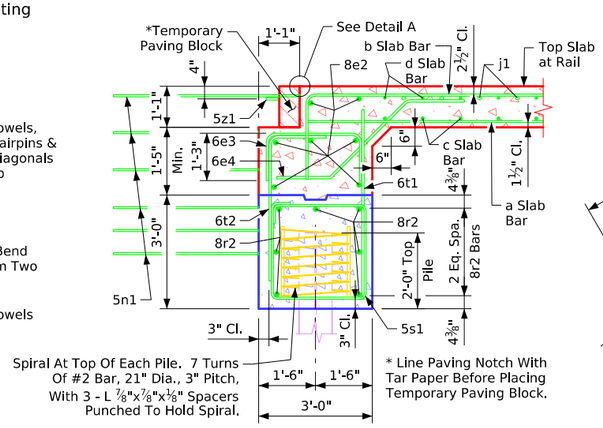
Note:
The bottom of footing is to be sloped to compensate for grade on this skewed abutment. Therefore, bottom of footing elevations will be required at each exterior pile.



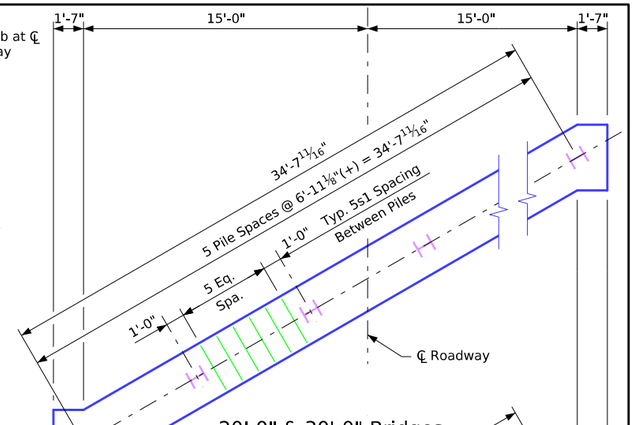
Detail A



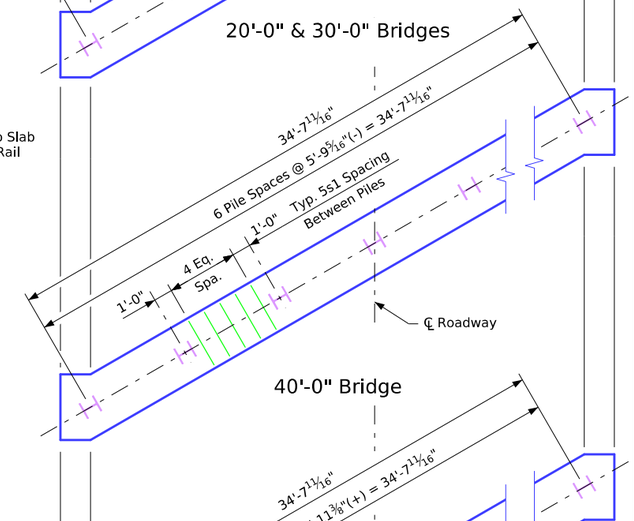
Section Normal to Abutment at ℄



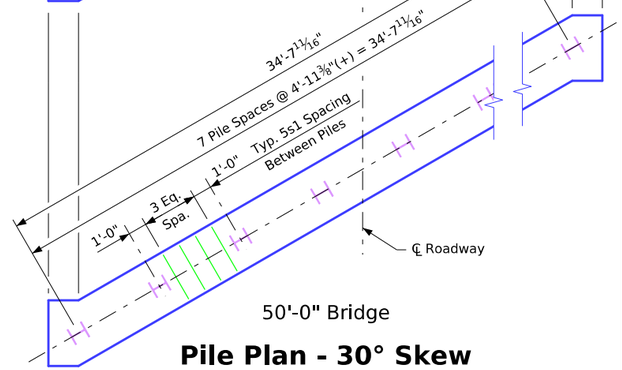
Section Normal to Abutment at Gutterline



20'-0" & 30'-0" Bridges



40'-0" Bridge



50'-0" Bridge

Pile Plan - 30° Skew Steel Piling

Plan View

Notes:
Rails not shown.
5n1 wing reinforcement shall be placed in the abutment footing before the footing is poured. Refer to Sheet J30S-11-25 for additional details.
6e3, 6e4 and 8e2 bars are included with superstructure quantities.

Number of Piles and Abutment Design Loads

Bridge Length	20'-0"	30'-0"	40'-0"	50'-0"
Number of Piles	6	6	7	8
Pu, strength I design load for each abutment (kips)	487	581	685	816

Note: Pu, strength I design load for each abutment (kips) is not the value used in the field for driving piles.

Abutment Notes:

All piling HP 10x42.
The concrete and reinforcing steel for the wings is included with the superstructure.
The minimum clear distance from the face of the concrete to near reinforcing bar is to be 2 inches unless otherwise noted or shown.
Steel abutment piles shall be driven to full penetration if practicable but in no case to a bearing value less than specified in the design plans.
All reinforcing steel is to be Grade 60.
Abutment piling was designed for HL-93 loading with an allowance for 20 lbs. per sq. ft. future wearing surface.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

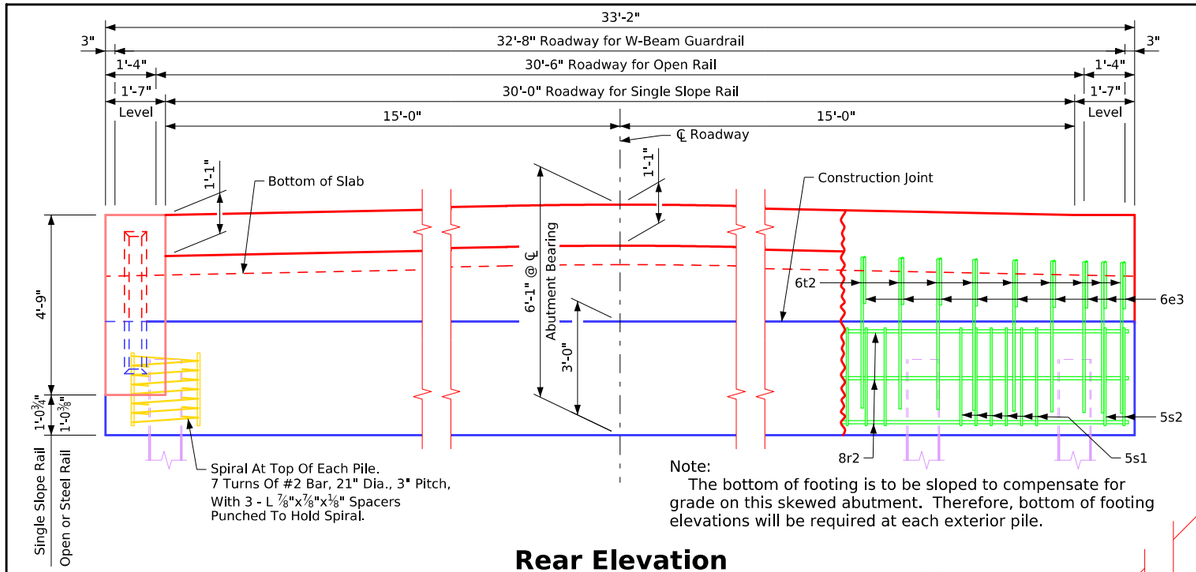
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

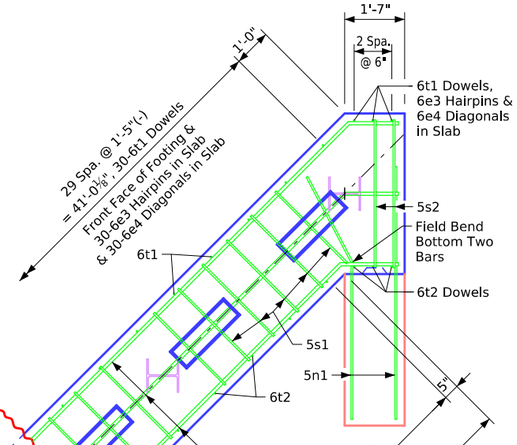
Integral Abutment Details
30° Skew

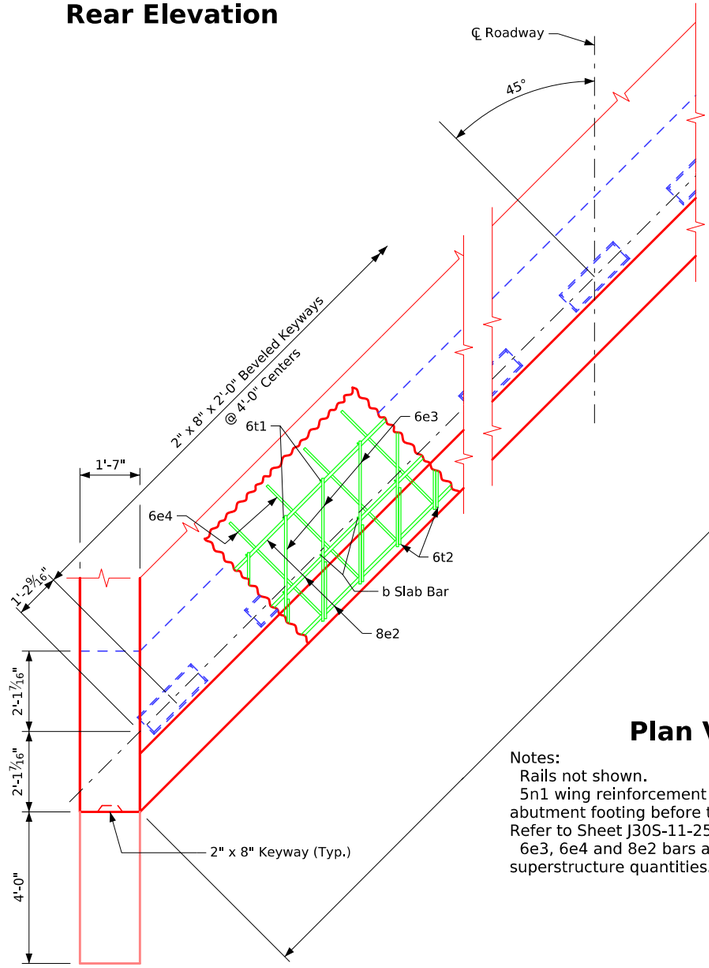
J30S-16-25



Rear Elevation

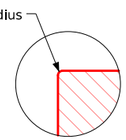
Note:
The bottom of footing is to be sloped to compensate for grade on this skewed abutment. Therefore, bottom of footing elevations will be required at each exterior pile.



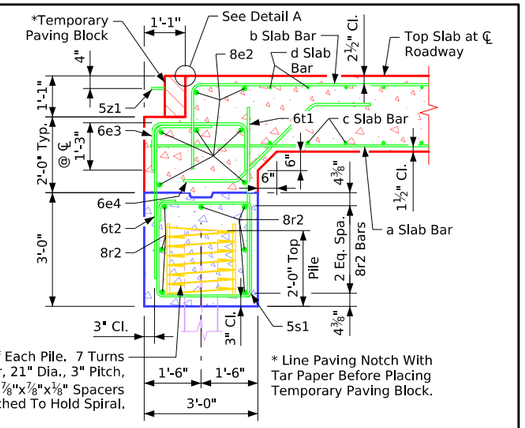


Plan View

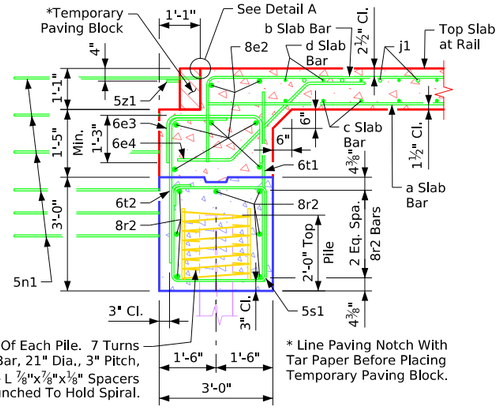
Notes:
Rails not shown.
5n1 wing reinforcement shall be placed in the abutment footing before the footing is poured. Refer to Sheet J30S-11-25 for additional details.
6e3, 6e4 and 8e2 bars are included with superstructure quantities.



Detail A



Section Normal to Abutment at ℄



Section Normal to Abutment at Gutterline

Abutment Notes:

All piling HP 10x42.
The concrete and reinforcing steel for the wings is included with the superstructure.
The minimum clear distance from the face of the concrete to near reinforcing bar is to be 2 inches unless otherwise noted or shown.
Steel abutment piles shall be driven to full penetration if practicable but in no case to a bearing value less than specified in the design plans.
All reinforcing steel is to be Grade 60.
Abutment piling was designed for HL-93 loading with an allowance for 20 lbs. per sq. ft. future wearing surface.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

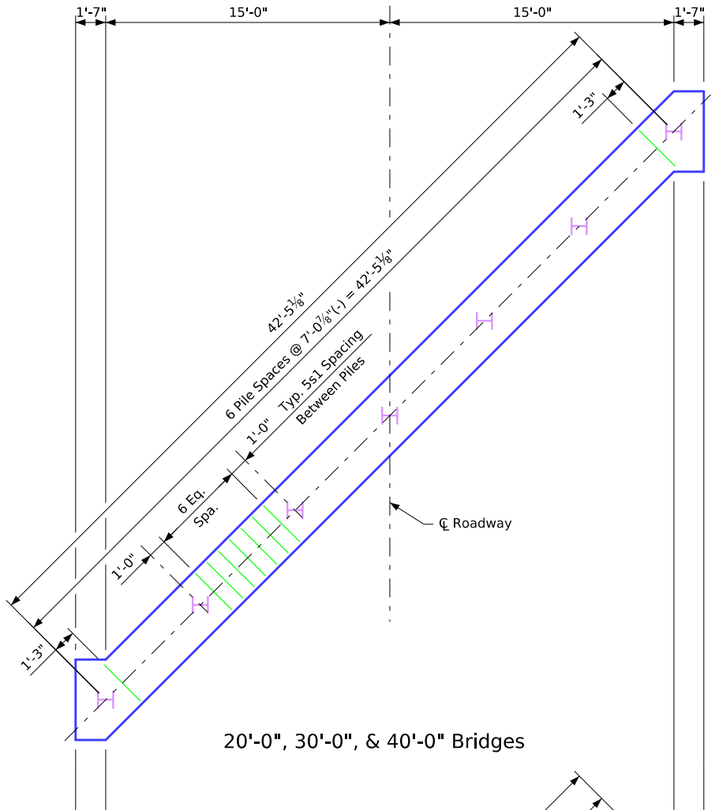
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

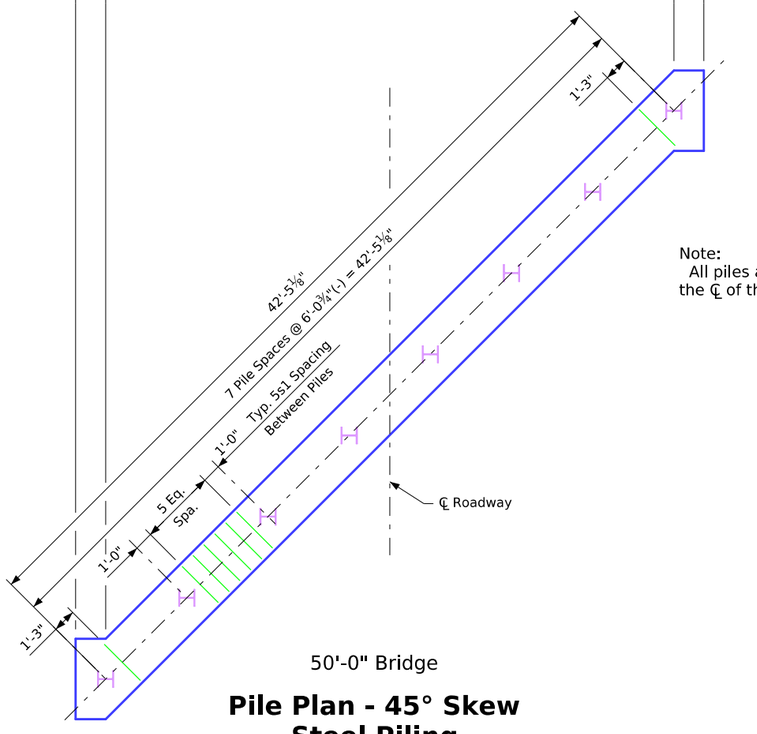
July, 2025

Integral Abutment Details
45° Skew

J30S-17-25



20'-0", 30'-0", & 40'-0" Bridges



50'-0" Bridge

Pile Plan - 45° Skew Steel Piling

Note:
All piles are to be oriented with webs perpendicular to the ℄ of the roadway as shown.

Number of Piles and Abutment Design Loads

Bridge Length	20'-0"	30'-0"	40'-0"	50'-0"
Number of Piles	7	7	7	8
Pu, strength I design load for each abutment (kips)	514	608	710	841

Note: Pu, strength I design load for each abutment (kips) is not the value used in the field for driving piles.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Integral Abutment Details
45° Skew

J30S-18-25

Bill of Reinforcing Steel - One Abutment - 0 Deg. Skew

Bridge Length				20'-0"		30'-0"		40'-0"		50'-0"	
Bar	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r1	Abutment Footing Longitudinal		32'-10"	7	614	7	614	7	614	7	614
5s1	Abutment Footing Hoops		11'-0"	28	321	29	333	28	321	25	287
6t1	Footing to Slab Dowels		5'-0"	36	270	36	270	36	270	36	270
6t2	Footing to Slab Dowels		5'-7"	36	302	36	302	36	302	36	302
#2	Pile Spiral		38'-6"	5	32	6	39	7	45	8	51
	Spiral Spacers, L 7/8x7/8x1/8x 0.70		1'-10"	15	19	18	23	21	27	24	31
	Epoxy Coated Reinforcing Steel - Total (lbs.)			1,507		1,519		1,507		1,473	
	Non-Coated Reinforcing Steel - Total (lbs.)			51		62		72		82	

Bill of Reinforcing Steel - One Abutment - 15 Deg. Skew

Bridge Length				20'-0"		30'-0"		40'-0"		50'-0"	
Bar	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r2	Abutment Footing Longitudinal		33'-11"	7	634	7	634	7	634	7	634
5s1	Abutment Footing Hoops		11'-0"	24	275	25	287	24	275	24	275
5s2	Abutment Footing Hoops		11'-3"	4	47	4	47	4	47	4	47
6t1	Footing to Slab Dowels		5'-0"	36	270	36	270	36	270	36	270
6t2	Footing to Slab Dowels		5'-7"	36	302	36	302	36	302	36	302
#2	Pile Spiral		38'-6"	5	32	6	39	7	45	8	51
	Spiral Spacers, L 7/8x7/8x1/8x 0.70		1'-10"	15	19	18	23	21	27	24	31
	Epoxy Coated Reinforcing Steel - Total (lbs.)			1,528		1,540		1,528		1,528	
	Non-Coated Reinforcing Steel - Total (lbs.)			51		62		72		82	

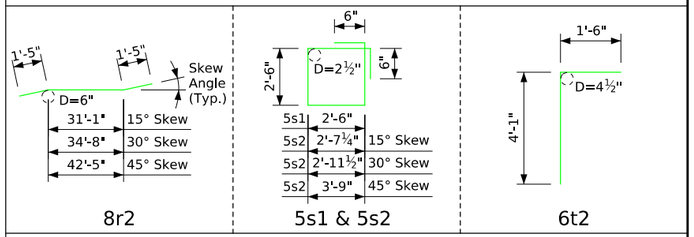
Bill of Reinforcing Steel - One Abutment - 30 Deg. Skew

Bridge Length				20'-0"		30'-0"		40'-0"		50'-0"	
Bar	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r2	Abutment Footing Longitudinal		37'-6"	7	701	7	701	7	701	7	701
5s1	Abutment Footing Hoops		11'-0"	30	344	30	344	30	344	28	321
5s2	Abutment Footing Hoops		11'-11"	4	50	4	50	4	50	4	50
6t1	Footing to Slab Dowels		5'-0"	36	270	36	270	36	270	36	270
6t2	Footing to Slab Dowels		5'-7"	36	302	36	302	36	302	36	302
#2	Pile Spiral		38'-6"	6	39	6	39	7	45	8	51
	Spiral Spacers, L 7/8x7/8x1/8x 0.70		1'-10"	18	23	18	23	21	27	24	31
	Epoxy Coated Reinforcing Steel -Total (lbs.)			1,667		1,667		1,667		1,644	
	Non-Coated Reinforcing Steel -Total (lbs.)			62		62		72		82	

Bill of Reinforcing Steel - One Abutment - 45 Deg. Skew

Bridge Length				20'-0"		30'-0"		40'-0"		50'-0"	
Bar	Location	Shape	Length	No.	Weight	No.	Weight	No.	Weight	No.	Weight
8r2	Abutment Footing Longitudinal		45'-3"	7	846	7	846	7	846	7	846
5s1	Abutment Footing Hoops		11'-0"	42	482	42	482	42	482	42	482
5s2	Abutment Footing Hoops		13'-6"	4	56	4	56	4	56	4	56
6t1	Footing to Slab Dowels		5'-0"	36	270	36	270	36	270	36	270
6t2	Footing to Slab Dowels		5'-7"	36	302	36	302	36	302	36	302
#2	Pile Spiral		38'-6"	7	45	7	45	7	45	8	51
	Spiral Spacers, L 7/8x7/8x1/8x 0.70		1'-10"	21	27	21	27	21	27	24	31
	Epoxy Coated Reinforcing Steel -Total (lbs.)			1,956		1,956		1,956		1,956	
	Non-Coated Reinforcing Steel -Total (lbs.)			72		72		72		82	

Abutment - Bent Bar Details



Note: All Dimensions Are Out To Out. D = Pin Diameter.

Estimated Quantities - One Abutment - 0 Deg. Skew

Location	Quantity				
Bridge Length	Unit	20'-0"	30'-0"	40'-0"	50'-0"
Structural Concrete (Bridge)	c.y.	11.1	11.1	11.1	11.1
Reinforcing Steel (Epoxy Coated)	lbs.	1,507	1,519	1,507	1,473
Reinforcing Steel (Non-Coated)	lbs.	51	62	72	82
Steel Piling HP 10x42	no.	5	6	7	8

Estimated Quantities - One Abutment - 15 Deg. Skew

Location	Quantity				
Bridge Length	Unit	20'-0"	30'-0"	40'-0"	50'-0"
Structural Concrete (Bridge)	c.y.	11.5	11.5	11.5	11.5
Reinforcing Steel (Epoxy Coated)	lbs.	1,528	1,540	1,528	1,528
Reinforcing Steel (Non-Coated)	lbs.	51	62	72	82
Steel Piling HP 10x42	no.	5	6	7	8

Estimated Quantities - One Abutment - 30 Deg. Skew

Location	Quantity				
Bridge Length	Unit	20'-0"	30'-0"	40'-0"	50'-0"
Structural Concrete (Bridge)	c.y.	12.8	12.8	12.8	12.8
Reinforcing Steel (Epoxy Coated)	lbs.	1,667	1,667	1,667	1,644
Reinforcing Steel (Non-Coated)	lbs.	62	62	72	82
Steel Piling HP 10x42	no.	6	6	7	8

Estimated Quantities - One Abutment - 45 Deg. Skew

Location	Quantity				
Bridge Length	Unit	20'-0"	30'-0"	40'-0"	50'-0"
Structural Concrete (Bridge)	c.y.	15.7	15.7	15.7	15.7
Reinforcing Steel (Epoxy Coated)	lbs.	1,956	1,956	1,956	1,956
Reinforcing Steel (Non-Coated)	lbs.	72	72	72	82
Steel Piling HP 10x42	no.	7	7	7	8

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

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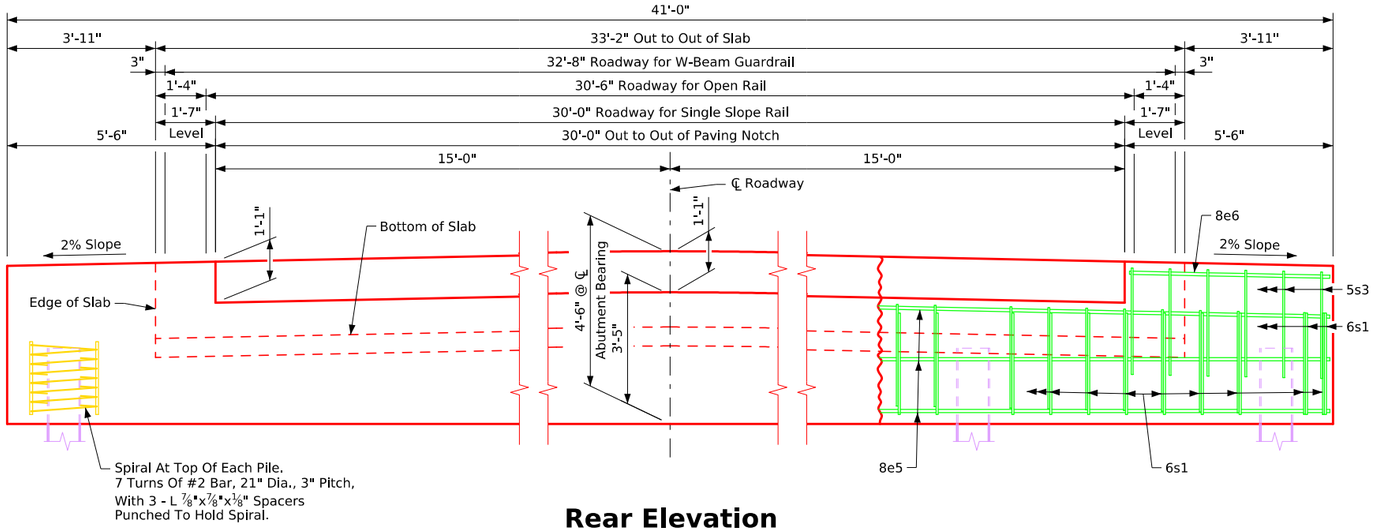
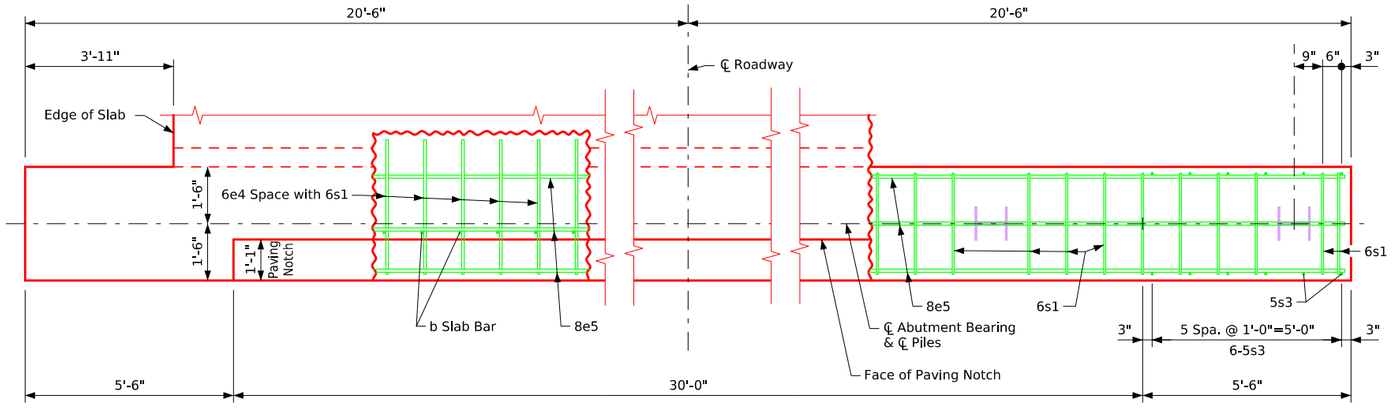
Integral Abutment Details

J30S-19-25

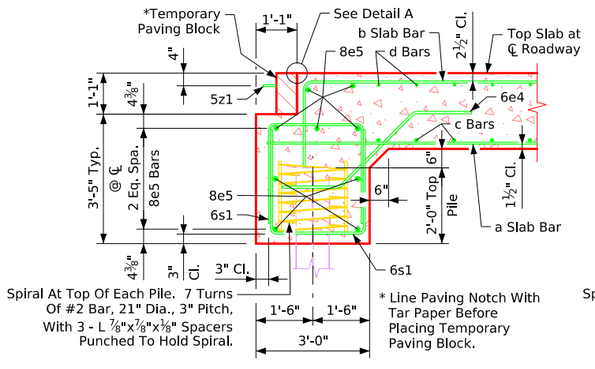


Rear Elevation

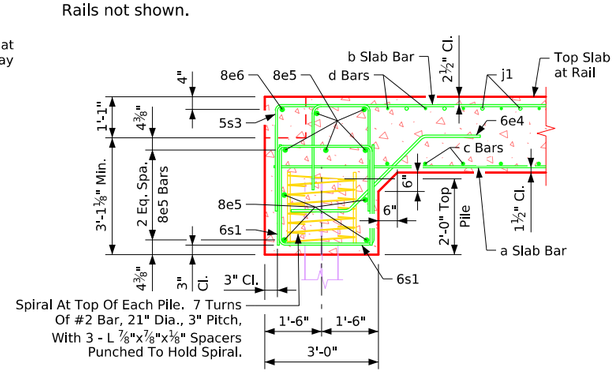


Plan View

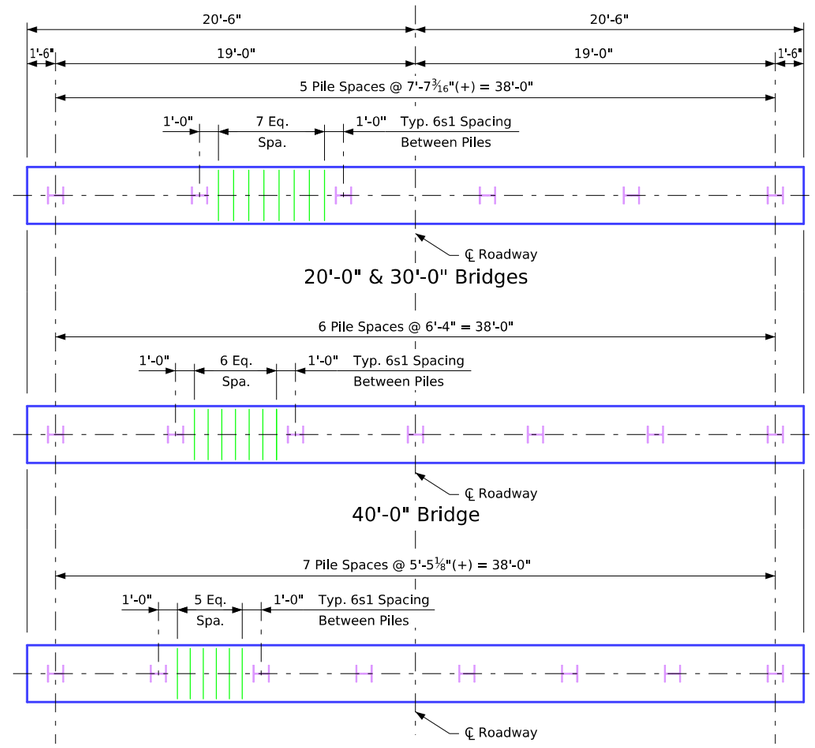
Note:
Rails not shown.



Section Normal to Abutment at ℄



Section Normal to Abutment at Gutterline



Pile Plan - 0° Skew
Steel Piling

Number of Piles and Abutment Design Loads				
Bridge Length	20'-0"	30'-0"	40'-0"	50'-0"
Number of Piles	6	6	7	8
Pu, strength I design load for each abutment (kips)	489	596	710	850

Note: Pu, strength I design load for each abutment (kips) is not the value used in the field for driving piles.

Abutment Notes:

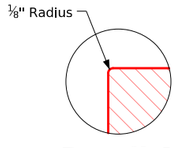
All piling HP 10x42.

The minimum clear distance from the face of the concrete to near reinforcing bar is to be 2 inches unless otherwise noted or shown.

Steel abutment piles shall be driven to full penetration if practicable but in no case to a bearing value less than specified in the design plans.

Abutment piling was designed for HL-93 loading with an allowance for 20 lbs. per sq. ft. future wearing surface.

All reinforcing bars are included with the superstructure quantities.



Detail A

Latest Revision Date

Approved by Bridge Engineer

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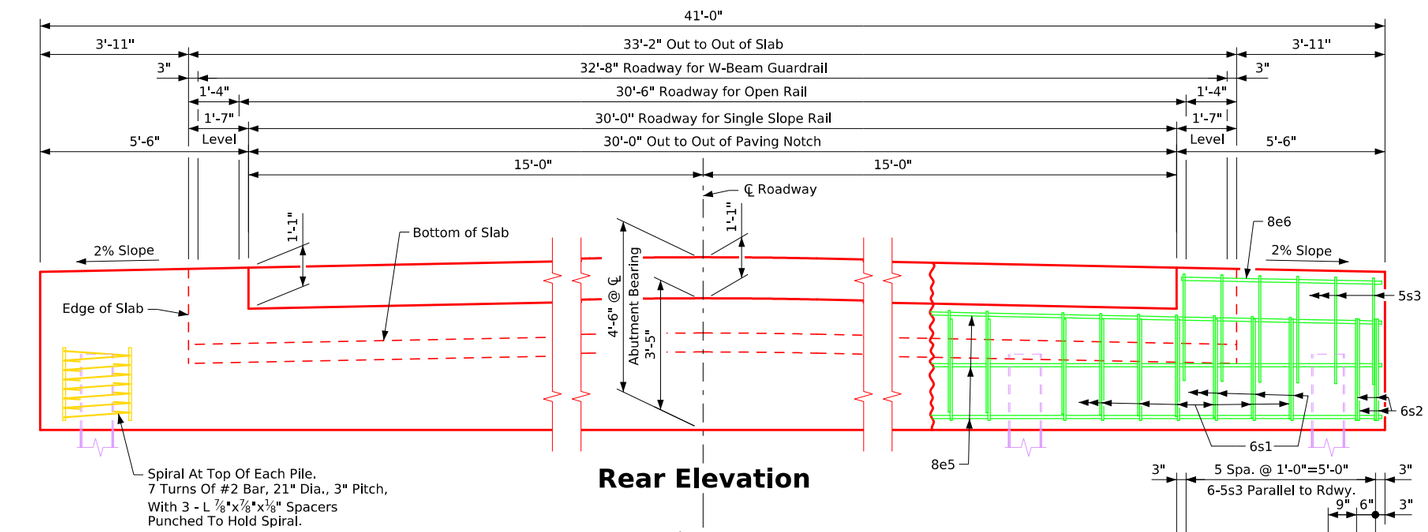
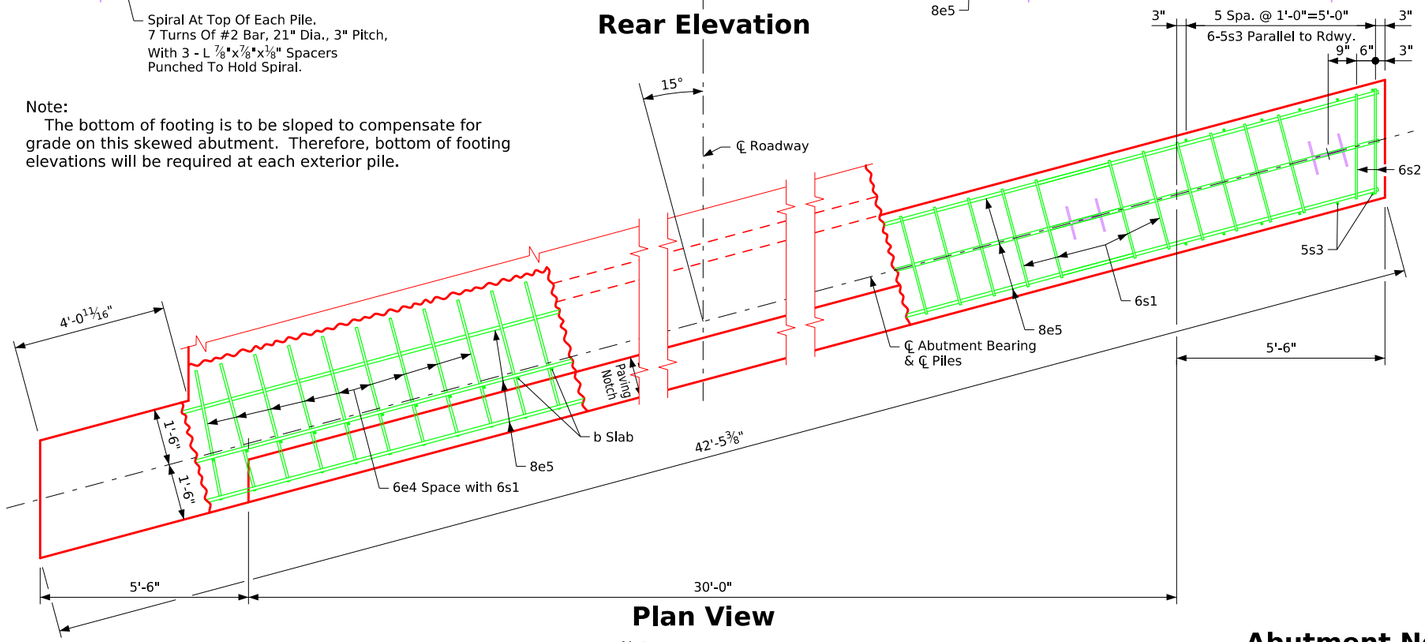
High Abutment Details
0° Skew

J30S-20-25

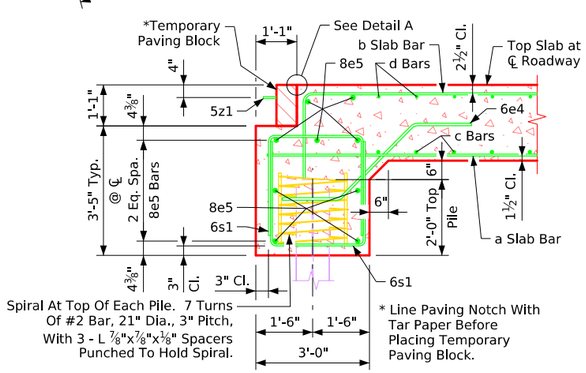


Rear Elevation

Note:
The bottom of footing is to be sloped to compensate for grade on this skewed abutment. Therefore, bottom of footing elevations will be required at each exterior pile.

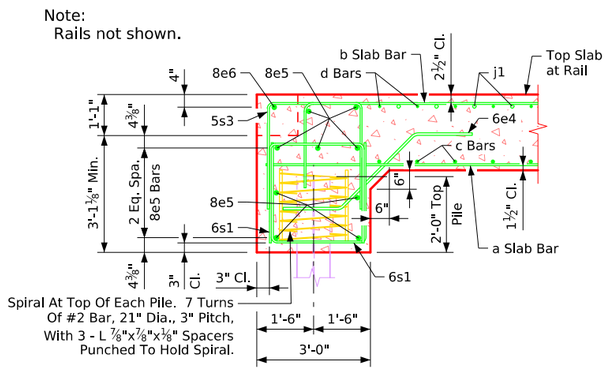


Plan View

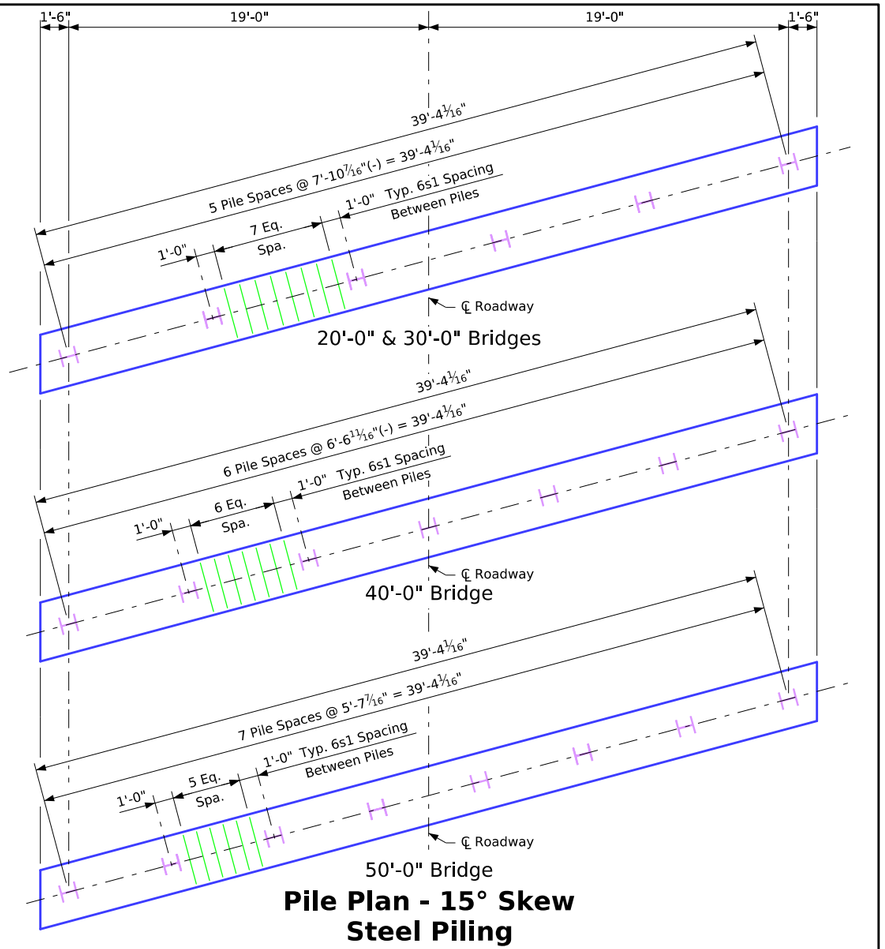


Section Normal to Abutment at ℄

Note:
Rails not shown.



Section Normal to Abutment at Gutterline



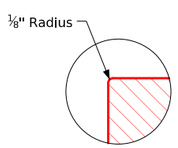
Pile Plan - 15° Skew
Steel Piling

Number of Piles and Abutment Design Loads				
Bridge Length	20'-0"	30'-0"	40'-0"	50'-0"
Number of Piles	6	6	7	8
Pu, strength I design load for each abutment (kips)	491	598	712	851

Note: Pu, strength I design load for each abutment (kips) is not the value used in the field for driving piles.

Abutment Notes:

All piling HP 10x42.
The minimum clear distance from the face of the concrete to near reinforcing bar is to be 2 inches unless otherwise noted or shown.
Steel abutment piles shall be driven to full penetration if practicable but in no case to a bearing value less than specified in the design plans.
Abutment piling was designed for HL-93 loading with an allowance for 20 lbs. per sq. ft. future wearing surface.
All reinforcing bars are included with the superstructure quantities.



Detail A

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

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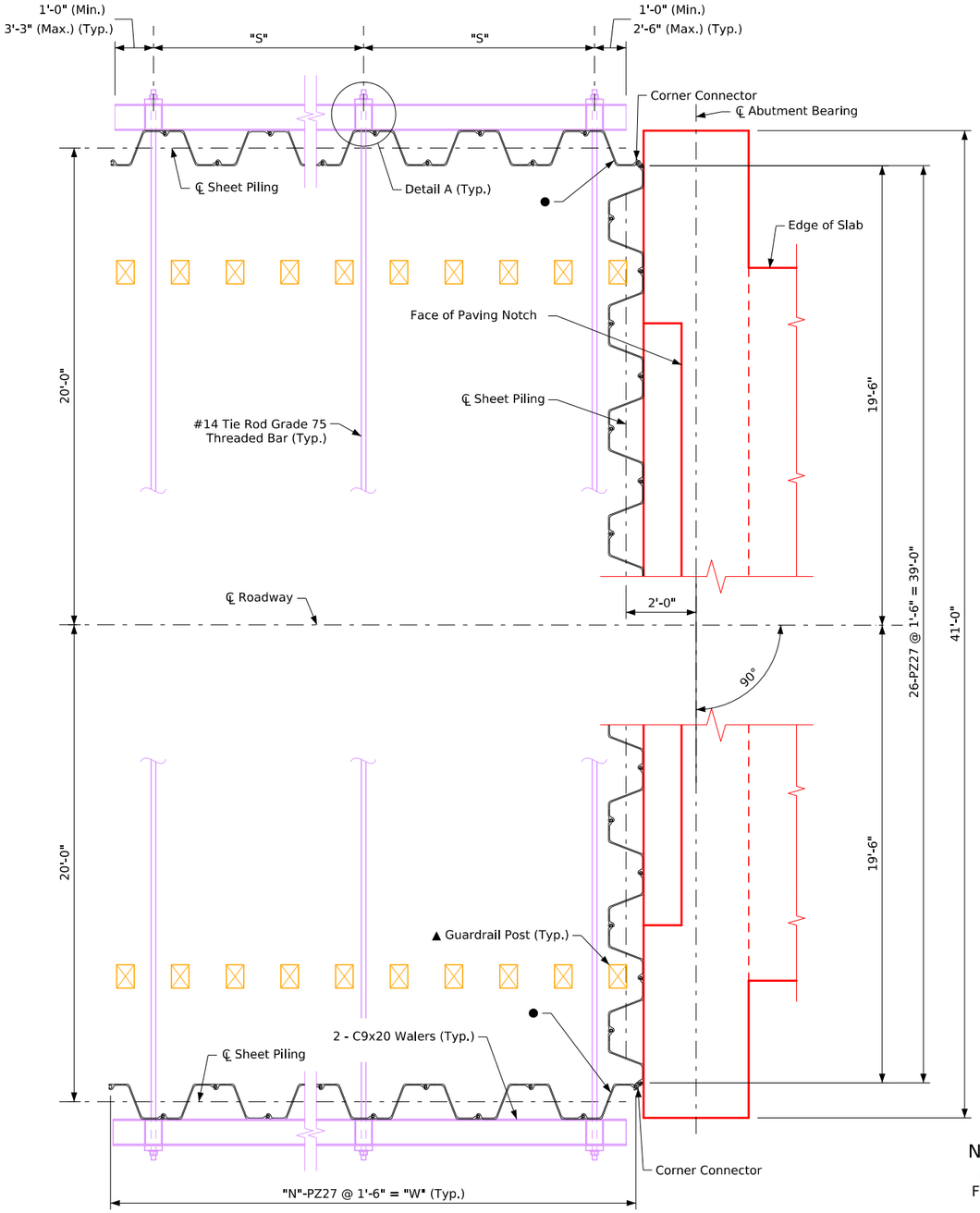
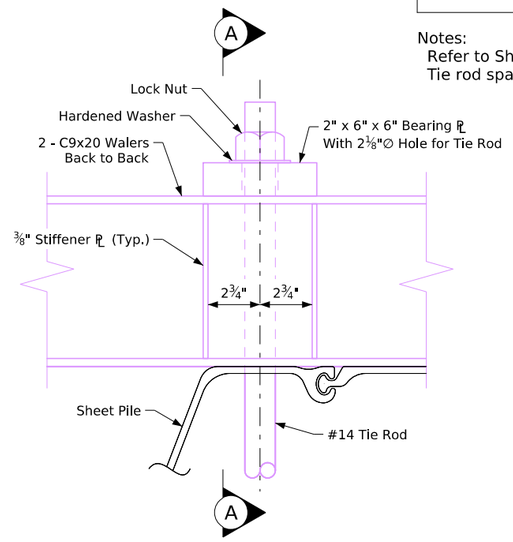
High Abutment Details
15° Skew

J30S-21-25

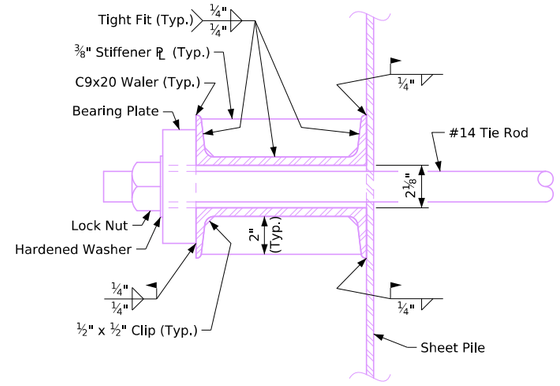


Steel Sheet Piling Plan View

(Cover Plates Not Shown For Clarity)



Detail A



Section A-A

Sheet Pile Backwall and Wing Wall Quantities

Number of Sheet Piles	Per Wing	*N = W / 1.5'	Total = 2 x N + 26
	Backwall	26	
Sheet Pile Area		(D1 + D2 + L) x W + 26 x 1.5' x (L - 2')	
Number of Tie Rods		*T = W / S + 1	

Notes:
All units are in feet.
Wing length "W" is to be calculated by the Engineer based on height from grade to top of berm "H" and wing slope.
* Number of wing wall sheet piles and tie rods shall be calculated as shown and rounded up to a whole number.
See Sheet J30S-24-25 for "D1" + "D2" values required (minimum embedment depths).

Table of Required Tie Rod Spacing

Abutment Height "H"	6'-0"	8'-0"	10'-0"	12'-0"	14'-0"
Maximum Tie Rod Spacing "S"	9'-2"	8'-4"	7'-3"	5'-11"	4'-11"

Notes:
Refer to Sheet J30S-24-25 for sheet pile height ("H") details.
Tie rod spacing ("S") shall be selected to avoid conflicts with the guardrail posts.

Notes:
● Top of sheet piling at wings to match top of abutment elevation. For sheet pile cover plate details, see Sheets J30S-24-25 and J30S-25-25.
▲ The guardrail post #15 (open & single slope concrete rails only) may require adjustment to ensure adequate clearance from the backwall sheeting and backwall cover plate.
See Sheet J30S-25-25 and roadway sheets for post locations.
The Bridge Contractor shall verify clearances for guardrail post installation, and make any necessary adjustments. Post #15 blockout lengths may be field adjusted to facilitate guardrail installation.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

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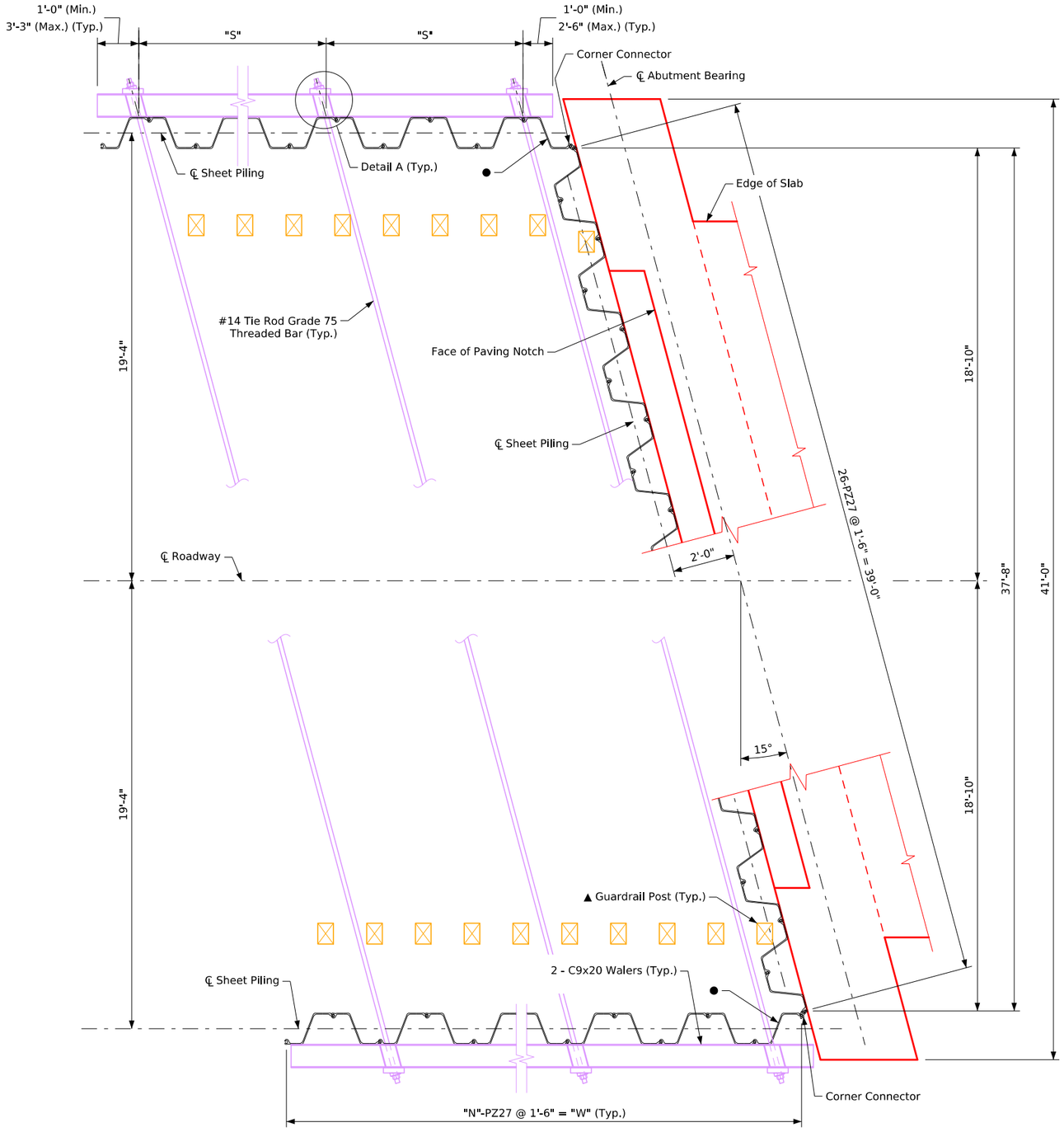
Steel Sheet Piling Details
0° Skew

J30S-22-25



Steel Sheet Piling Plan View

(Cover Plates Not Shown For Clarity)

Sheet Pile Backwall and Wing Wall Quantities

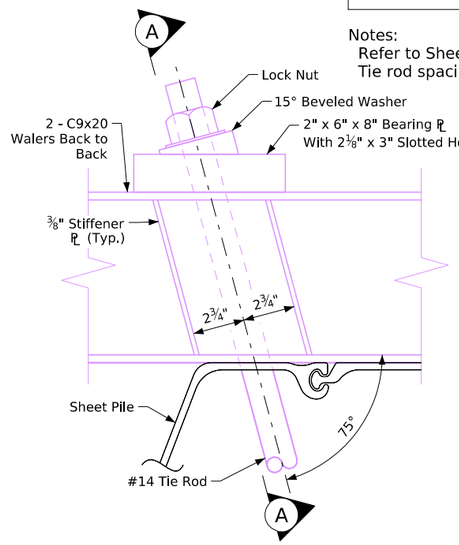
Number of Sheet Piles	Per Wing	*N = W / 1.5'	Total = 2 x N + 26
	Backwall	26	
Sheet Pile Area		(D1 + D2 + L) x W + 26 x 1.5' x (L - 2')	
Number of Tie Rods		*T = W / S + 1	

Notes:
All units are in feet.
Wing length "W" is to be calculated by the Engineer based on height from grade to top of berm "H" and wing slope.
* Number of wing wall sheet piles and tie rods shall be calculated as shown and rounded up to a whole number.
See Sheet J30S-24-25 for "D1" + "D2" values required (minimum embedment depths).

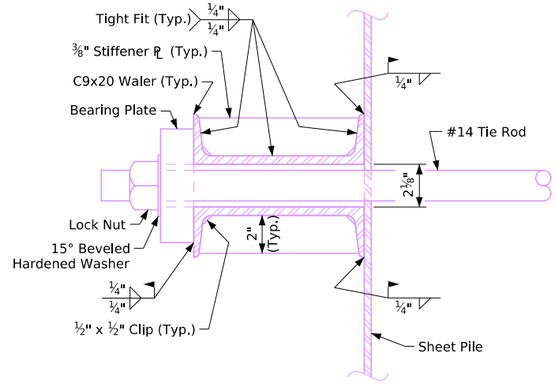
Table of Required Tie Rod Spacing

Abutment Height "H"	6'-0"	8'-0"	10'-0"	12'-0"	14'-0"
Maximum Tie Rod Spacing "S"	9'-2"	8'-4"	7'-0"	5'-9"	4'-9"

Notes:
Refer to Sheet J30S-24-25 for sheet pile height ("H") details.
Tie rod spacing ("S") shall be selected to avoid conflicts with the guardrail posts.



Detail A



Section A-A

Notes:
● Top of sheet piling at wings to match top of abutment elevation. For sheet pile cover plate details, see Sheets J30S-24-25 and J30S-25-25.
▲ The guardrail post #15 (open & single slope concrete rails only) may require adjustment to ensure adequate clearance from the backwall sheeting and backwall cover plate.
See Sheet J30S-25-25 and roadway sheets for post locations.
The Bridge Contractor shall verify clearances for guardrail post installation, and make any necessary adjustments. Post #15 blockout lengths may be field adjusted to facilitate guardrail installation.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

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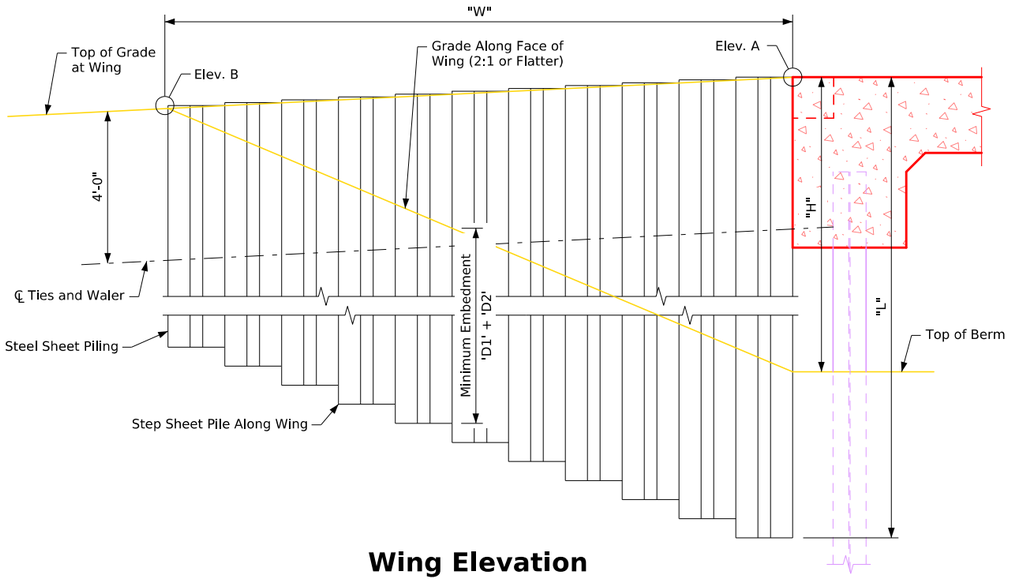
Steel Sheet Piling Details
15° Skew

J30S-23-25



Wing Elevation

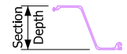
If very stiff or dense materials are present, installation of the sheet piles may be difficult with a vibratory hammer and consideration should be given to using an impact hammer.

If lesser embedment of the sheet pile occurs due to the presence of stiffer or denser foundation soils, the engineer shall be notified immediately.

Steel Sheet Piling Notes:

As a minimum, all steel sheet piling shall be PZ27 and shall conform to ASTM A328 steel and shall meet the following requirements:

Section Length:	See this sheet to calculate "L"
Maximum Section Depth	12 in.
Minimum Section Thickness	0.375 in.
Elastic Section Modulus	30.2 in³/ft



The Contractor shall submit for review a shop plan of the sheet pile layout, including the ties and walers, showing all pertinent dimensions, details, and section properties. The Contractor shall not proceed with installation of steel sheet piling and steel bearing piling prior to approval of the submittal by the Engineer.

Tie rods shall be ASTM A615 Grade 75 and galvanized in accordance with ASTM A123.

Lock nuts and washers shall be galvanized and provided by the tie rod manufacturer.

Steel channels, bearing plates and other miscellaneous plates shall conform to ASTM A709, Grade 50.

Field welding shall meet the requirements of Materials I.M. 558.

The steel walers shall bear uniformly against the sheet piles at each contact point as shown prior to tightening the tie rod nuts. 6" x 6" shim plates shall be used to provide uniform bearing.

Nuts shall be tightened snug tight prior to placing backfill above the elevation of the tie rod.

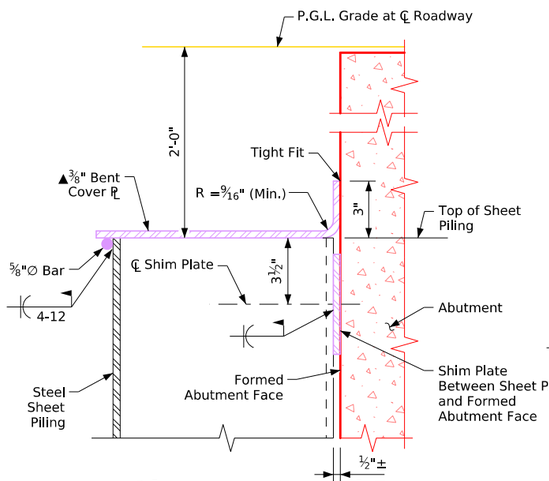
Lock nuts or jam nuts shall be utilized on all tie rods, or as specified by the tie rod manufacturer.

The cost of furnishing and installing the walers, tie rods, bearing plates, lock nuts, washers, stiffener plates, cover plates, corner connectors, and shim plates shall be included in the price bid for "Piles, Steel Sheet".

The pay quantity will be based on the sheet pile wall dimensions shown.

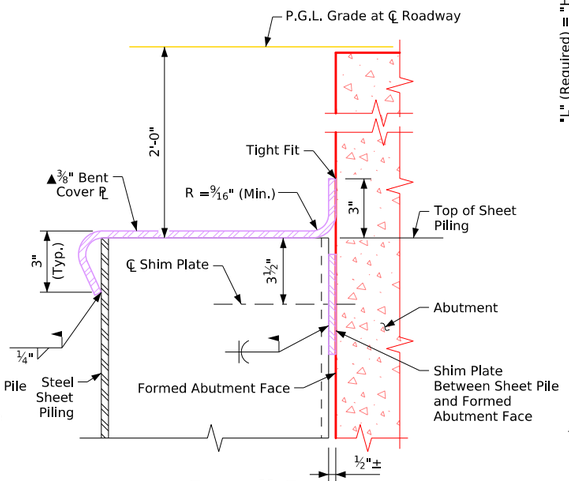
The table for minimum sheet pile embedment depths shall not be used if the values of "H" or "D1" exceed the limits provided. For intermediate values of "H" and "D1", interpolation is allowed.

Sheet pile embedment shall consider scour. The design and sheet pile embedment depths shown are based on the design scour.



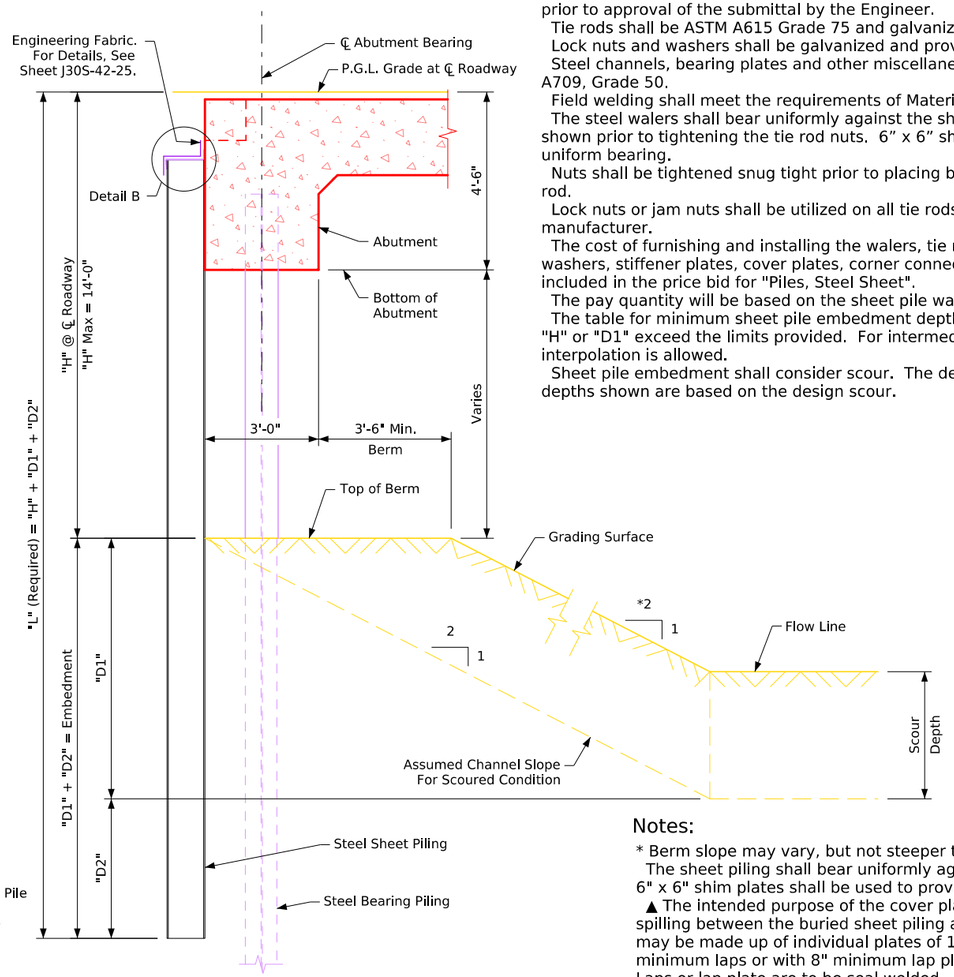
Alternate Detail B

(Engineering Fabric Not Shown)



Detail B

(Engineering Fabric Not Shown)



Typical Section thru Abutment

Notes:

* Berm slope may vary, but not steeper than 2:1.

The sheet piling shall bear uniformly against the abutment prior to back filling. 6" x 6" shim plates shall be used to provide uniform bearing.

▲ The intended purpose of the cover plates is to prevent the backfill from spilling between the buried sheet piling and the abutment. The cover plate may be made up of individual plates of 10'-0" minimum length with 4" minimum laps or with 8" minimum lap plates (4" min. each side). Laps or lap plate are to be seal welded.

For additional cover plate details, see Sheet J30S-25-25.

Minimum Sheet Pile Embedment Depth (D1+D2)

Height from Berm to Grade (H)		14'-0"	12'-0"	10'-0"	8'-0"	6'-0"
Height from Bottom of Scour Depth (If Any) or Flow Line to Top of Berm (D1)	10'-0"	37'-0"	34'-0''	31'-6"	28'-6"	25'-6''
	8'-0"	34'-0"	31'-6''	28'-6"	26'-0"	23'-0''
	6'-0"	31'-0"	28'-6''	25'-6"	23'-0"	20'-0''
	4'-0"	27'-6"	25'-0''	22'-6"	20'-0"	17'-0''
	2'-0"	24'-0"	21'-6''	19'-0"	16'-6"	14'-0''
	0'-0"	20'-0"	17'-6''	15'-0"	13'-0"	11'-0''

Latest Revision Date

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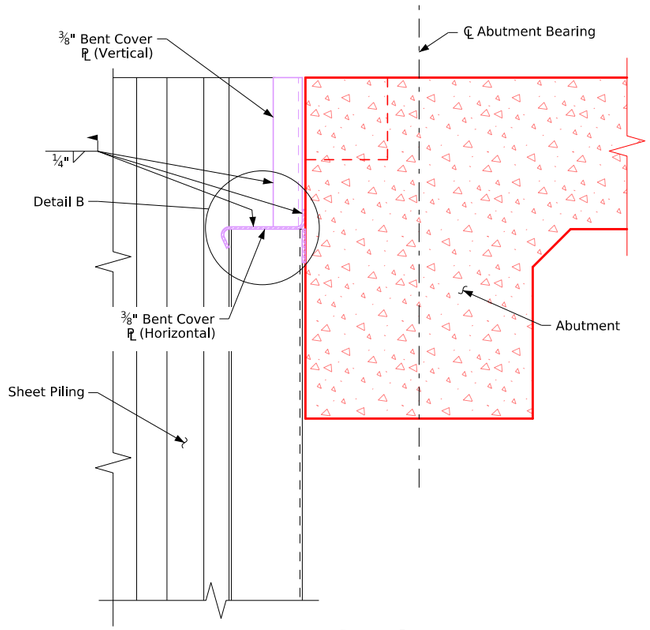
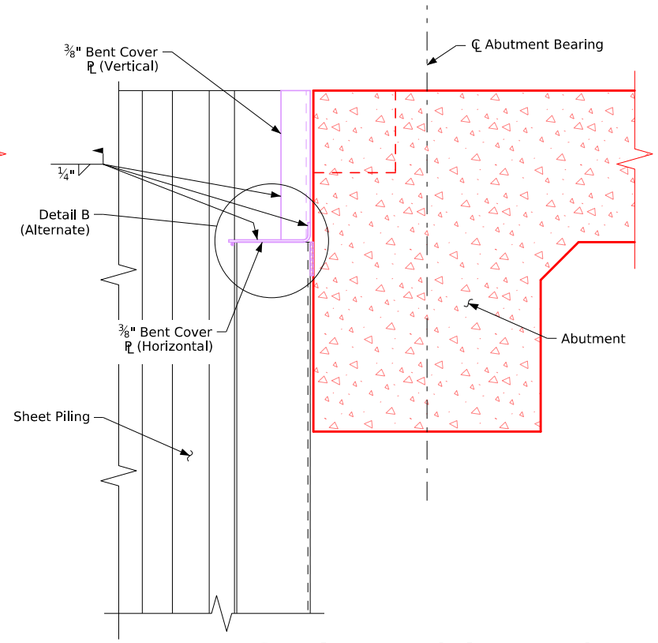
Steel Sheet Piling Details

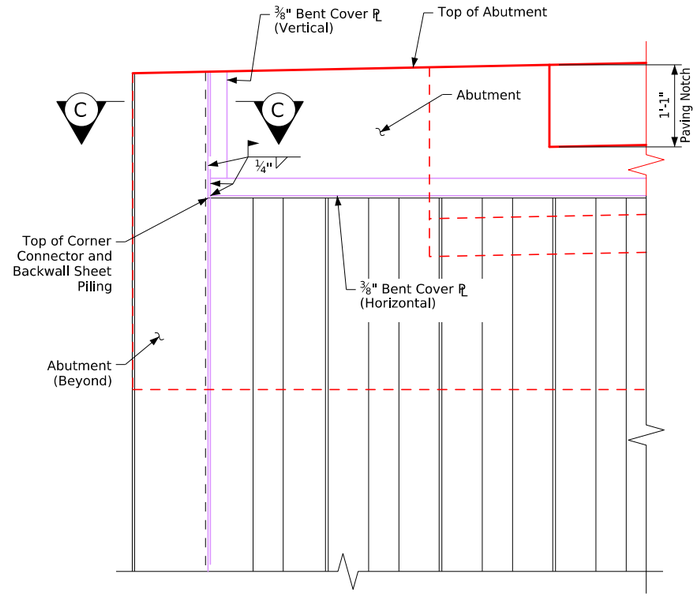
J30S-24-25



Section A-A



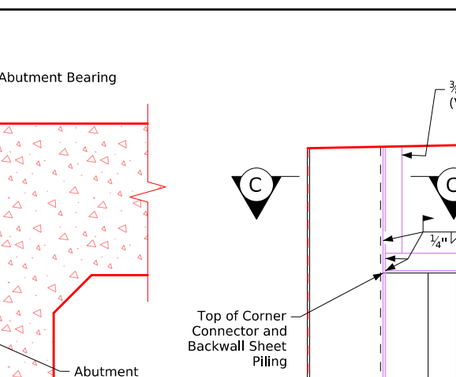
Section A-A (Alternate)



View B-B

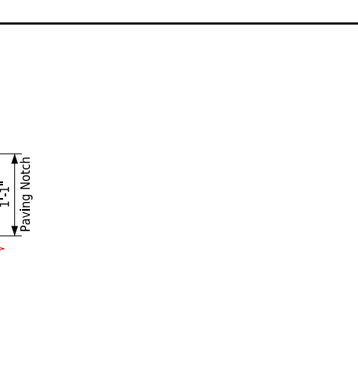
Partial Plan View at End of Abutment (0° Skew)

Partial Plan View at End of Abutment (15° Skew)



Section C-C (0° Skew)

Section C-C (15° Skew-Obtuse Side)



Section C-C (15° Skew-Acute Side)

Notes:

For Detail B, see Sheet J30S-24-25.

● Top of sheet piling at wings to match top of backwall elevation.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

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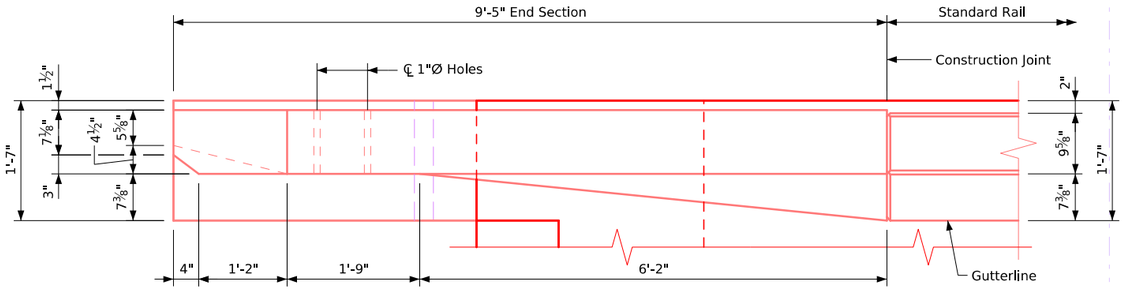
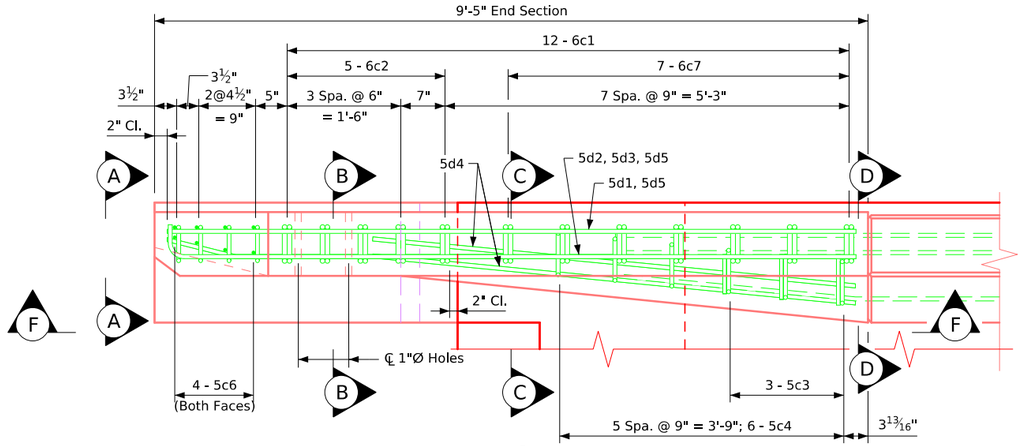
Steel Sheet Piling Details

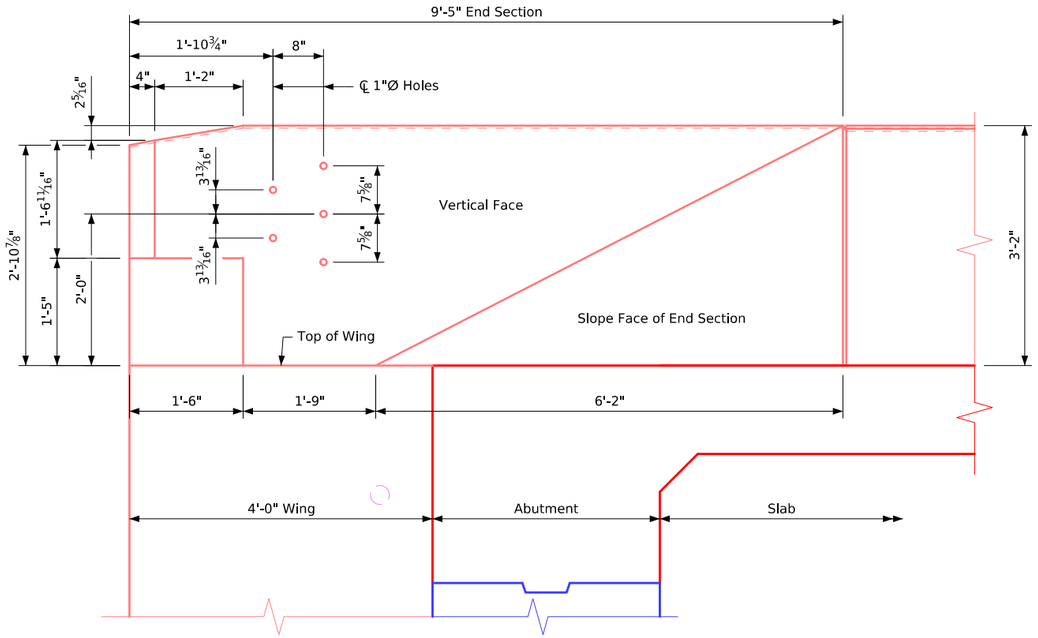
J30S-25-25



Part Plan View

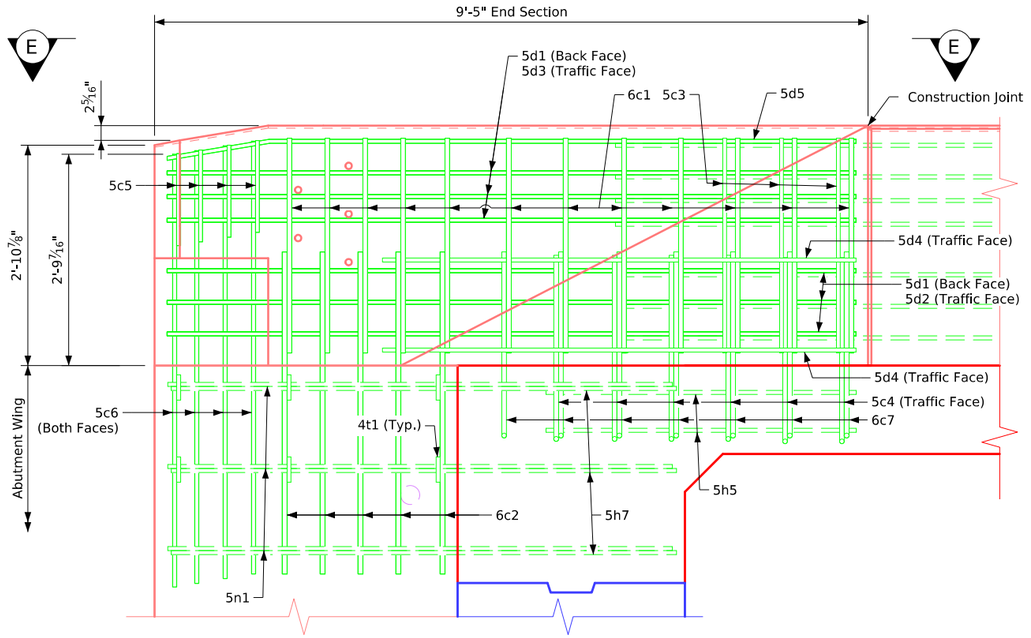


Part View E-E



Part Elevation View

Provide 5 holes formed with 1"Ø plastic conduit.
Cost to be included in price of bid for Concrete Barrier Railing.



Part View F-F

Note:
0° skew shown, other skew angles are similar.
Slab and abutment bars are not shown for clarity.
4t1 placement - 3 bars each at top two rows of 5n1/5h7 bars in abutment wing and abutment cap.
Construction joint between top of abutment wing/slab and barrier rail is roughened concrete.
The 6c2, 5c4, 5c6, 6c7, and 4t1 bars are to be placed with the abutment wing and abutment cap.
Dashed lines below the top of wing are the abutment wing reinforcing steel.
For Bar List, Bent Bar Details, Sections A-A, B-B. C-C, and D-D see Sheet J30S-27-25.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Single Slope Rail End Section Details for Integral Abutments

J30S-26-25

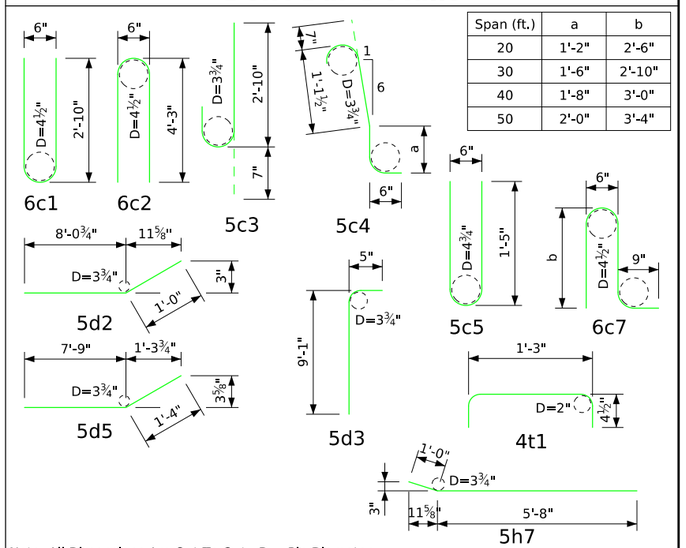
Epoxy Coated Reinforcing Steel - One End Section - Integral Abut.

			20'-0" Span			30'-0" Span			40'-0" Span			50'-0" Span		
Bar	Location	Shape	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight
6c1	Rail, Vertical		12	5'-11"	107	12	5'-11"	107	12	5'-11"	107	12	5'-11"	107
6c2	Rail, Vertical		5	8'-9"	66	5	8'-9"	66	5	8'-9"	66	5	8'-9"	66
5c3	Rail, Vertical (Traffic Face)		3	3'-5"	11	3	3'-5"	11	3	3'-5"	11	3	3'-5"	11
5c4	Rail, Vertical (Traffic Face)		6	3'-4"	21	6	3'-8"	23	6	3'-10"	24	6	4'-2"	26
5c5	Rail, Vertical		4	3'-3"	14	4	3'-3"	14	4	3'-3"	14	4	3'-3"	14
5c6	Rail, Vertical		8	5'-8"	47	8	5'-8"	47	8	5'-8"	47	8	5'-8"	47
6c7	Rail, Vertical		7	5'-11"	62	7	6'-3"	66	7	6'-5"	67	7	6'-9"	71
5d1	Rail, Horizontal (Back Face)		6	9'-1"	57	6	9'-1"	57	6	9'-1"	57	6	9'-1"	57
5d2	Rail, Horizontal (Traffic Face)		3	9'-1"	28	3	9'-1"	28	3	9'-1"	28	3	9'-1"	28
5d3	Rail, Horizontal (Traffic Face)		3	9'-6"	30	3	9'-6"	30	3	9'-6"	30	3	9'-6"	30
5d4	Rail, Horizontal (Traffic Face)		2	6'-3"	13	2	6'-3"	13	2	6'-3"	13	2	6'-3"	13
5d5	Rail, Horizontal (Top)		2	9'-1"	19	2	9'-1"	19	2	9'-1"	19	2	9'-1"	19
5h5	Rail, Abutment Wing Horizontal		2	4'-0"	8	2	4'-0"	8	2	4'-0"	8	2	4'-0"	8
5h7	Rail, Abutment Wing Horizontal		3	6'-8"	21	3	6'-8"	21	3	6'-8"	21	3	6'-8"	21
4t1	Rail, Abutment Wing Tie Bars		6	2'-0"	8	6	2'-0"	8	6	2'-0"	8	6	2'-0"	8
Integral Abut. Epoxy-Coated Sub Total - LBS.					512			518			520			526

Concrete Placement Summary

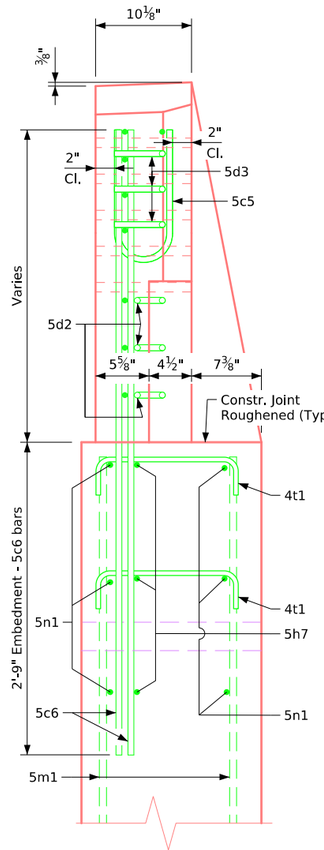
Section	Total
Barrier Rail, One End Section	1.0 cu. yd.

Bent Bar Details

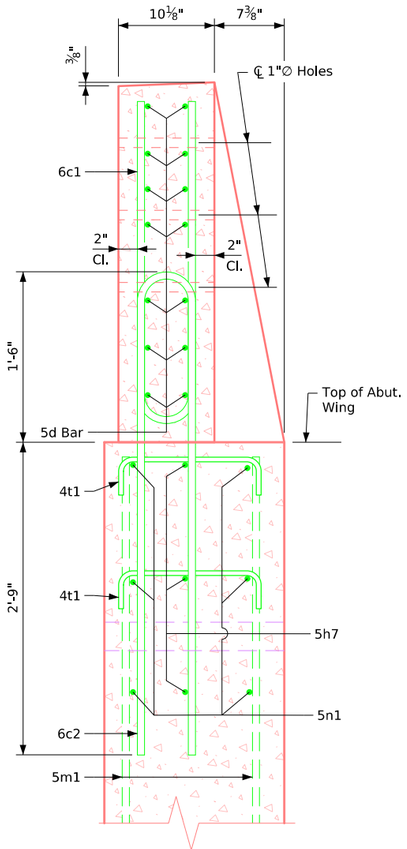


Span (ft.)	a	b
20	1'-2"	2'-6"
30	1'-6"	2'-10"
40	1'-8"	3'-0"
50	2'-0"	3'-4"

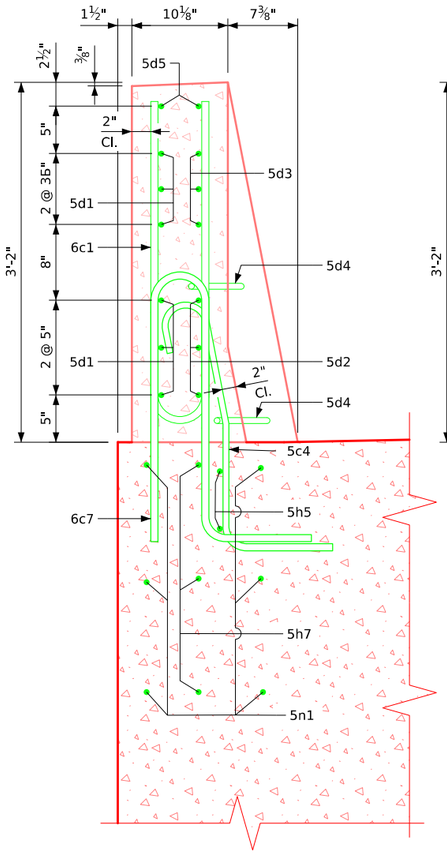
Note: All Dimensions Are Out To Out. D = Pin Diameter.



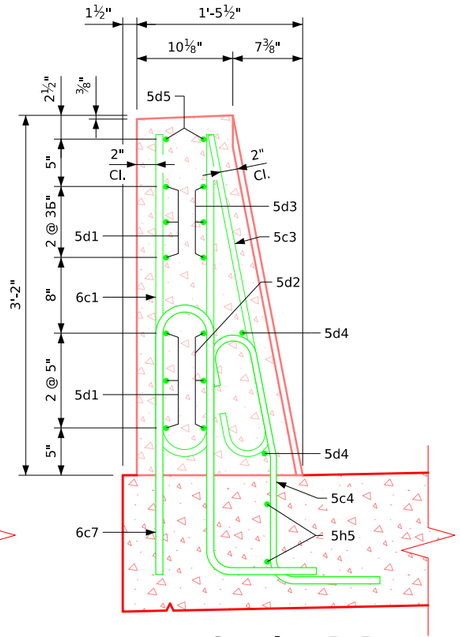
View A-A



Section B-B



Section C-C



Section D-D

(Longitudinal reinforcing extending from standard barrier rail into barrier end section not shown for clarity.)

Note:

Slab and abutment bars are not shown for clarity.

4t1 placement - 3 bars each at top two rows of 5n1/5h7 bars in abutment wing and abutment cap.

Construction joint between top of abutment wing/slab and barrier rail is roughened concrete.

The 6c2, 5c4, 5c6, 6c7, 5h5, 5h7, and 4t1 bars are to be placed with the abutment wing, abutment cap, and slab.

Dashed lines below the top of wing are the abutment wing reinforcing steel.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

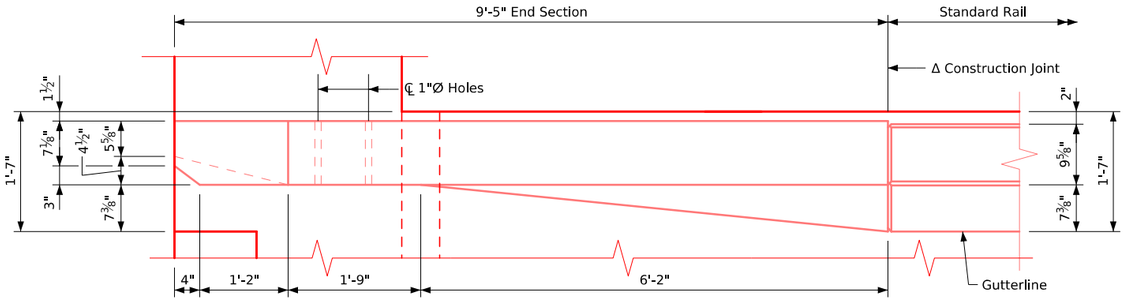
Single Span Concrete Slab Bridges

July, 2025

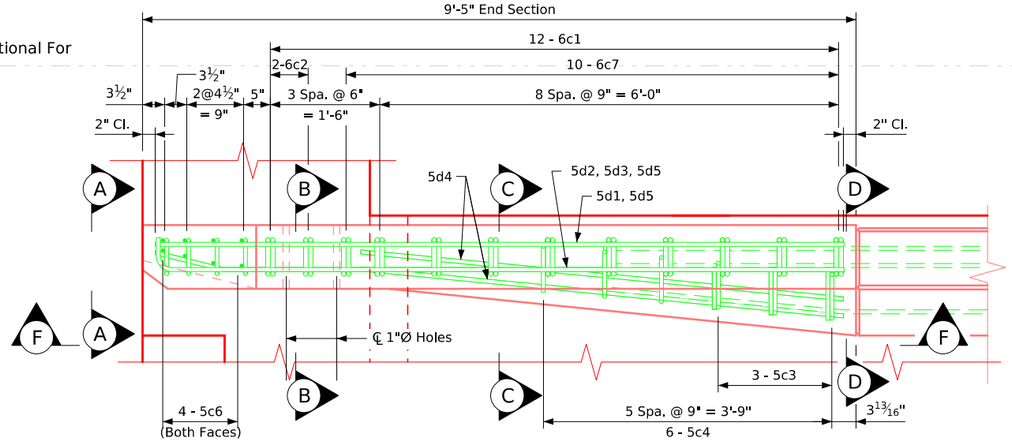
Single Slope Rail End Section Details for Integral Abutments

J30S-27-25

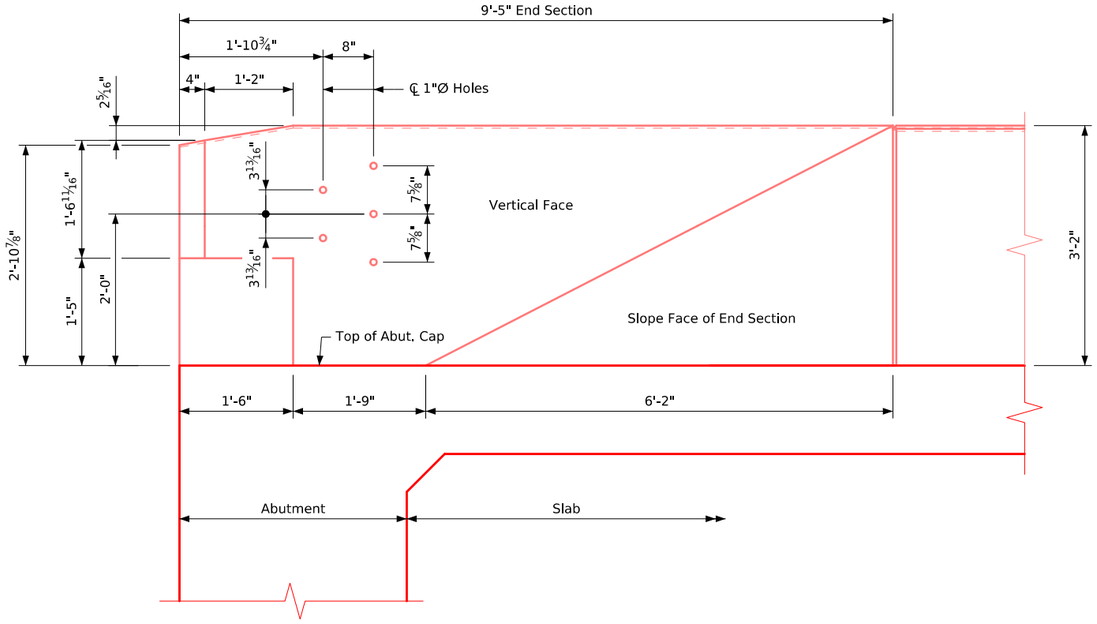
Δ Note:
The Construction Joint Is Optional For
The 20'-0" Span.



Part Plan View

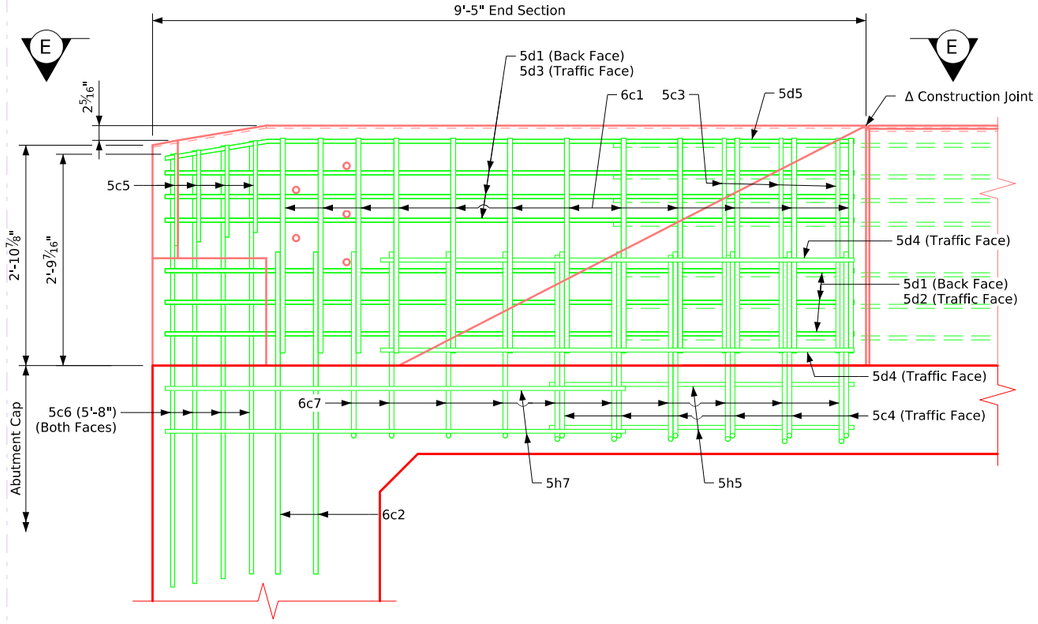


Part View E-E



Part Elevation View

Provide 5 holes formed with 1"Ø plastic conduit.
Cost to be included in price of bid for Concrete Barrier Railing.



Part View F-F

Note:
0° skew shown, 15° skew similar.
Slab and abutment bars are not shown for clarity.
Construction joint between top of abutment wing/slab and barrier rail is roughened concrete.
The 6c2, 5c4, 5c6, 6c7, 5h5, and 5h7 bars are to be placed with the abutment cap and slab.
For Bar List, Bent Bar Details, Sections A-A, B-B. C-C, and D-D see Sheet J30S-29-25.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Single Slope Rail End Section Details for High Abutments

J30S-28-25

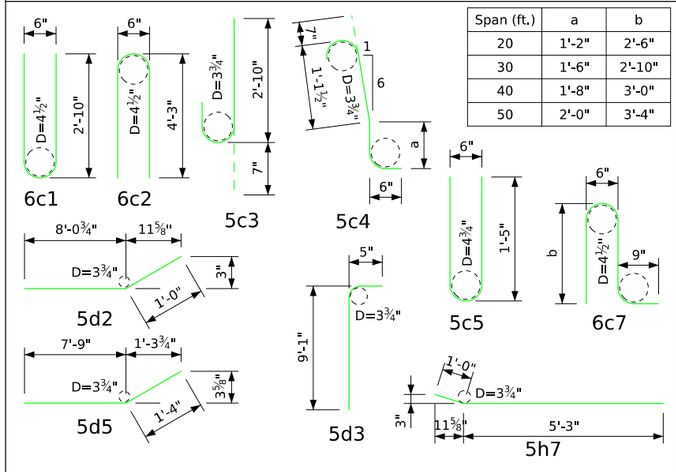
Epoxy Coated Reinforcing Steel - One End Section - High Abut.

			20'-0" Span			30'-0" Span			40'-0" Span			50'-0" Span		
Bar	Location	Shape	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight
6c1	Rail, Vertical		12	5'-11"	107	12	5'-11"	107	12	5'-11"	107	12	5'-11"	107
6c2	Rail, Vertical		2	8'-9"	26	2	8'-9"	26	2	8'-9"	26	2	8'-9"	26
5c3	Rail, Vertical (Traffic Face)		3	3'-5"	11	3	3'-5"	11	3	3'-5"	11	3	3'-5"	11
5c4	Rail, Vertical (Traffic Face)		6	3'-4"	21	6	3'-8"	23	6	3'-10"	24	6	4'-2"	26
5c5	Rail, Vertical		4	3'-3"	14	4	3'-3"	14	4	3'-3"	14	4	3'-3"	14
5c6	Rail, Vertical		8	5'-8"	47	8	5'-8"	47	8	5'-8"	47	8	5'-8"	47
6c7	Rail, Vertical		10	5'-11"	89	10	6'-3"	94	10	6'-5"	96	10	6'-9"	101
5d1	Rail, Horizontal (Back Face)		6	9'-1"	57	6	9'-1"	57	6	9'-1"	57	6	9'-1"	57
5d2	Rail, Horizontal (Traffic Face)		3	9'-1"	28	3	9'-1"	28	3	9'-1"	28	3	9'-1"	28
5d3	Rail, Horizontal (Traffic Face)		3	9'-6"	30	3	9'-6"	30	3	9'-6"	30	3	9'-6"	30
5d4	Rail, Horizontal (Traffic Face)		2	6'-3"	13	2	6'-3"	13	2	6'-3"	13	2	6'-3"	13
5d5	Rail, Horizontal (Top)		2	9'-1"	19	2	9'-1"	19	2	9'-1"	19	2	9'-1"	19
5h5	Rail, Abutment and Slab Horizontal		2	4'-0"	8	2	4'-0"	8	2	4'-0"	8	2	4'-0"	8
5h7	Rail, Abutment and Slab Horizontal		2	6'-3"	13	2	6'-3"	13	2	6'-3"	13	2	6'-3"	13
High Abut. Epoxy-Coated Sub Total - LBS.					483			490			493			500

Concrete Placement Summary

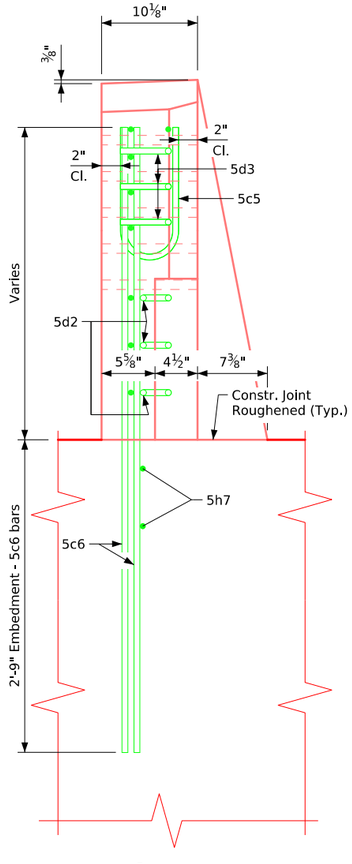
Section	Total
Barrier Rail, One End Section	1.0 cu. yd.

Bent Bar Details

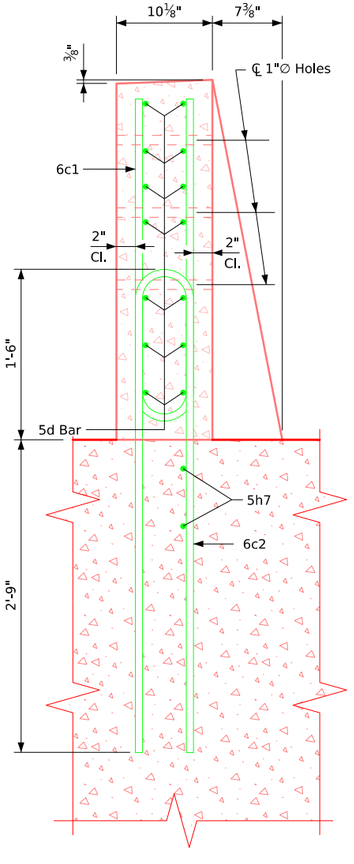


Span (ft.)	a	b
20	1'-2"	2'-6"
30	1'-6"	2'-10"
40	1'-8"	3'-0"
50	2'-0"	3'-4"

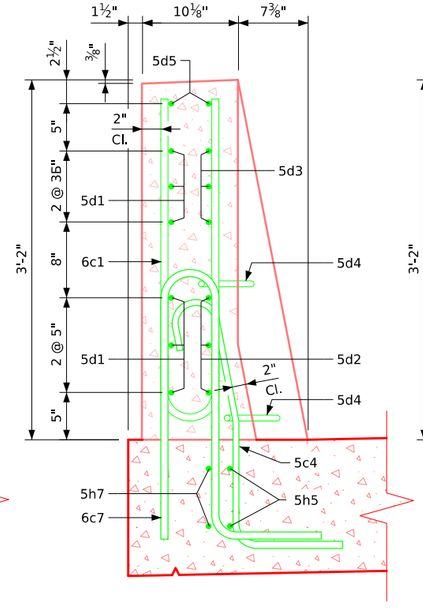
Note: All Dimensions Are Out To Out. D = Pin Diameter.



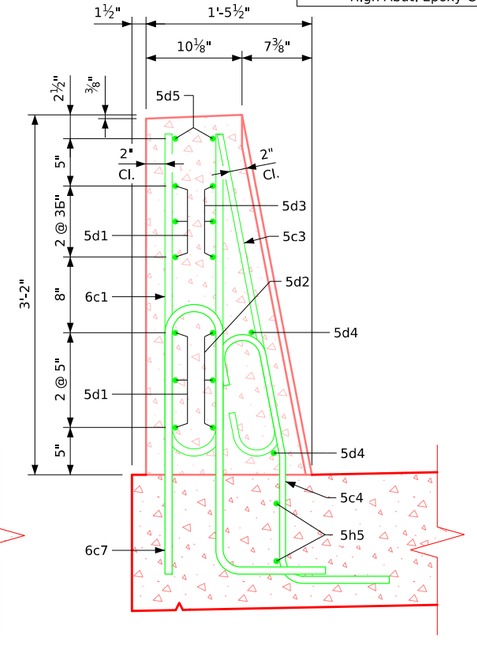
View A-A



Section B-B



Section C-C



Section D-D

(Longitudinal reinforcing extending from standard barrier rail into barrier end section not shown for clarity.)

Note:
Slab and abutment bars are not shown for clarity.
Construction joint between top of abutment wing/slab and barrier rail is roughened concrete.
The 6c2, 5c4, 5c6, 6c7, 5h5, and 5h7 bars are to be placed with the abutment cap and slab.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

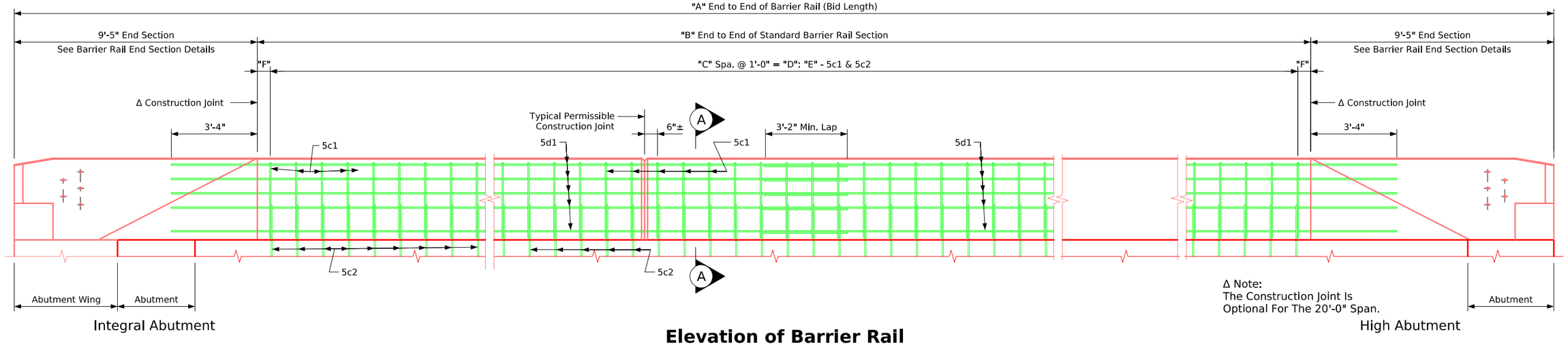
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Single Slope Rail End Section Details for High Abutments

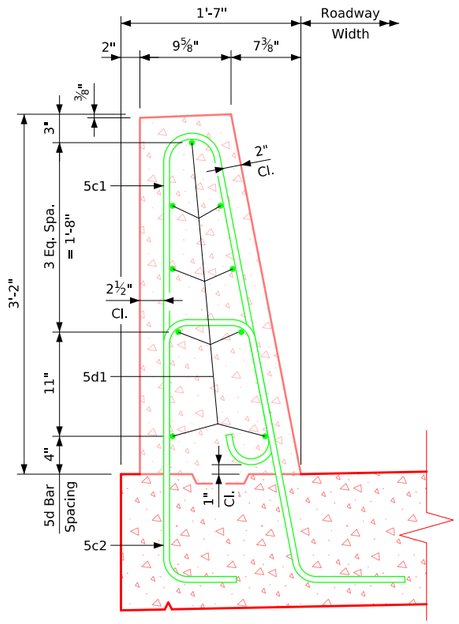
J30S-29-25



Elevation of Barrier Rail

Table of Single Slope Rail Dimensions and Numbers

Span			20'-0"				30'-0"				40'-0"				50'-0"			
Skew			0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°
Integral Abut.	Dimensions or Number	A	31'-0"	31'-1 1/4"	31'-5 9/16"	32'-2 15/16"	41'-0"	41'-1 1/4"	41'-5 9/16"	42'-2 15/16"	51'-0"	51'-1 1/4"	51'-5 9/16"	52'-2 15/16"	61'-0"	61'-1 1/4"	61'-5 9/16"	62'-2 15/16"
		B	12'-2"	12'-3 1/4"	12'-7 9/16"	13'-4 15/16"	22'-2"	22'-3 1/4"	22'-7 9/16"	23'-4 15/16"	32'-2"	32'-3 1/4"	32'-7 9/16"	33'-4 15/16"	42'-2"	42'-3 1/4"	42'-7 9/16"	43'-4 15/16"
		C	11	11	12	13	21	21	22	23	31	31	32	33	41	41	42	43
		D	11'-0"	11'-0"	12'-0"	13'-0"	21'-0"	21'-0"	22'-0"	23'-0"	31'-0"	31'-0"	32'-0"	33'-0"	41'-0"	41'-0"	42'-0"	43'-0"
		E	12	12	13	14	22	22	23	24	32	32	33	34	42	42	43	44
		F	7"	7 5/8"	3 13/16"	2 7/16"	7"	7 5/8"	3 13/16"	2 7/16"	7"	7 5/8"	3 13/16"	2 7/16"	7"	7 5/8"	3 13/16"	2 7/16"
High Abutment	Dimensions or Number	A	23'-0"	22'-8 1/4"	-	-	33'-0"	32'-8 1/4"	-	-	43'-0"	42'-8 1/4"	-	-	53'-0"	52'-8 1/4"	-	-
		B	4'-2"	3'-10 1/4"	-	-	14'-2"	13'-10 1/4"	-	-	24'-2"	23'-10 1/4"	-	-	34'-2"	33'-10 1/4"	-	-
		C	3	3	-	-	13	13	-	-	23	23	-	-	33	33	-	-
		D	3'-0"	3'-0"	-	-	13'-0"	13'-0"	-	-	23'-0"	23'-0"	-	-	33'-0"	33'-0"	-	-
		E	4	4	-	-	14	14	-	-	24	24	-	-	34	34	-	-
		F	7"	5 1/8"	-	-	7"	5 1/8"	-	-	7"	5 1/8"	-	-	7"	5 1/8"	-	-



Part Section A-A

Note:
See Barrier Rail Details on Sheet J30S-31-25 for notes, reinforcing steel details, and quantities.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Single Slope Rail Details

J30S-30-25

Epoxy Coated Reinf. Steel - Two Standard Section Rails - Integral Abut.

Skew (°)	Bar	Location	Shape	20'-0" Span			30'-0" Span			40'-0" Span			50'-0" Span		
				No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight
0°	5c1	Rail, Vertical		24	6'-8"	167	44	6'-8"	306	64	6'-8"	445	84	6'-8"	584
	5c2	Rail, Vertical		24	6'-4"	159	44	7'-0"	322	64	7'-4"	491	84	8'-0"	703
	5d1	Rail, Longitudinal		18	18'-10"	354	18	28'-10"	541	18	38'-10"	729	36	26'-0"	976
	0° Skew Epoxy-Coated Total - LBS.					680			1,169			1,665			2,263
15°	5c1	Rail, Vertical		24	6'-8"	167	44	6'-8"	306	64	6'-8"	445	84	6'-8"	584
	5c2	Rail, Vertical		24	6'-4"	159	44	7'-0"	322	64	7'-4"	491	84	8'-0"	703
	5d1	Rail, Longitudinal		18	18'-11"	356	18	28'-11"	543	18	38'-11"	731	36	26'-1"	978
	15° Skew Epoxy-Coated Total - LBS.					682			1,171			1,667			2,265
30°	5c1	Rail, Vertical		26	6'-8"	181	46	6'-8"	320	66	6'-8"	459	86	6'-8"	598
	5c2	Rail, Vertical		26	6'-4"	172	46	7'-0"	337	66	7'-4"	506	86	8'-0"	720
	5d1	Rail, Longitudinal		18	19'-4"	362	18	29'-4"	550	18	39'-4"	738	36	26'-3"	985
	30° Skew Epoxy-Coated Total - LBS.					715			1,207			1,703			2,303
45°	5c1	Rail, Vertical		28	6'-8"	195	48	6'-8"	334	68	6'-8"	473	88	6'-8"	612
	5c2	Rail, Vertical		28	6'-4"	185	48	7'-0"	351	68	7'-4"	521	88	8'-0"	736
	5d1	Rail, Longitudinal		18	20'-1"	377	18	30'-1"	565	36	21'-8"	815	36	26'-8"	1003
	45° Skew Epoxy-Coated Total - LBS.					757			1,250			1,809			2,351

Epoxy Coated Reinf. Steel - Two Standard Section Rails - High Abut.

Skew (°)	Bar	Location	Shape	20'-0" Span			30'-0" Span			40'-0" Span			50'-0" Span		
				No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight
0°	5c1	Rail, Vertical		8	6'-8"	56	28	6'-8"	195	48	6'-8"	334	68	6'-8"	473
	5c2	Rail, Vertical		8	6'-4"	53	28	7'-0"	205	48	7'-4"	368	68	8'-0"	569
	5d1	Rail, Longitudinal		18	10'-10"	203	18	20'-10"	391	18	30'-10"	579	36	22'-0"	826
	0° Skew Epoxy-Coated Total - LBS.					312			791			1,281			1,868
15°	5c1	Rail, Vertical		8	6'-8"	56	28	6'-8"	195	48	6'-8"	334	68	6'-8"	473
	5c2	Rail, Vertical		8	6'-4"	53	28	7'-0"	205	48	7'-4"	368	68	8'-0"	569
	5d1	Rail, Longitudinal		18	10'-6"	198	18	20'-6"	385	18	30'-6"	573	36	21'-10"	820
	15° Skew Epoxy-Coated Total - LBS.					307			785			1,275			1,862

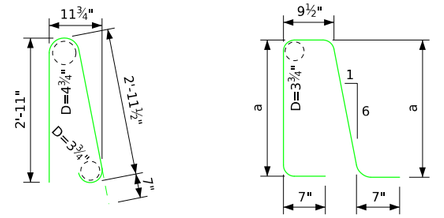
Concrete Placement Summary

Skew (°)		Abutment Type	Integral Abutment				High Abutment			
	Section	Span	20'-0"	30'-0"	40'-0"	50'-0"	20'-0"	30'-0"	40'-0"	50'-0"
0°	Standard Section (Cu. Yds.)		3.2	5.7	8.3	10.9	1.1	3.7	6.3	8.9
	End Section 4 @ 0.96 Cu. Yds.		3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	0° Total Cu. Yds.		7.0	9.5	12.1	14.7	4.9	7.5	10.1	12.7
15°	Standard Section (Cu. Yds.)		3.2	5.8	8.4	11.0	1.0	3.6	6.2	8.8
	End Section 4 @ 0.96 Cu. Yds.		3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	15° Total Cu. Yds.		7.0	9.6	12.2	14.8	4.8	7.4	10.0	12.6
30°	Standard Section (Cu. Yds.)		3.3	5.9	8.5	11.1	-	-	-	-
	End Section 4 @ 0.96 Cu. Yds.		3.8	3.8	3.8	3.8	-	-	-	-
	30° Total Cu. Yds.		7.1	9.7	12.3	14.9	-	-	-	-
45°	Standard Section (Cu. Yds.)		3.5	6.1	8.7	11.3	-	-	-	-
	End Section 4 @ 0.96 Cu. Yds.		3.8	3.8	3.8	3.8	-	-	-	-
	45° Total Cu. Yds.		7.3	9.9	12.5	15.1	-	-	-	-

Concrete Barrier Rail Quantities

Skew (°)		Abutment Type	Integral Abutment				High Abutment			
	Item	Unit\Span	20'-0"	30'-0"	40'-0"	50'-0"	20'-0"	30'-0"	40'-0"	50'-0"
0°	Concrete Barrier Rail	L.F.	62.0	82.0	102.0	122.0	46.0	66.0	86.0	106.0
15°	Concrete Barrier Rail	L.F.	62.2	82.2	102.2	122.2	45.4	65.4	85.4	105.4
30°	Concrete Barrier Rail	L.F.	62.9	82.9	102.9	122.9	-	-	-	-
45°	Concrete Barrier Rail	L.F.	64.5	84.5	104.5	124.5	-	-	-	-

Bent Bar Details



5c1 5c2

Span (ft.)	a
20	2'-4"
30	2'-8"
40	2'-10"
50	3'-2"

Note: All Dimensions Are Out To Out. D = Pin Diameter.

Barrier Rail Notes:

Minimum clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown.

The permissible construction joints are to be placed between vertical bars at a minimum spacing of 20 feet. Construction joint contact surfaces are to be coated with an approved bond breaker.

Cost of the joint sealer and bond breaker shall be considered incidental to other construction.

All barrier rail reinforcing steel is to be epoxy coated as shown. Stainless steel bars may be substituted at the designer's discretion. Lap and development lengths were determined from epoxy-coated steel.

The concrete barrier rail is to be bid on a lineal foot basis. The number of linear feet of barrier rail installed will be paid for at the contract price per lineal foot based on plan quantities. Price bid for concrete barrier railing shall be full compensation for furnishing all material, excluding reinforcing steel, and all of the equipment and labor required to erect the rail in accordance with these plans and current specifications.

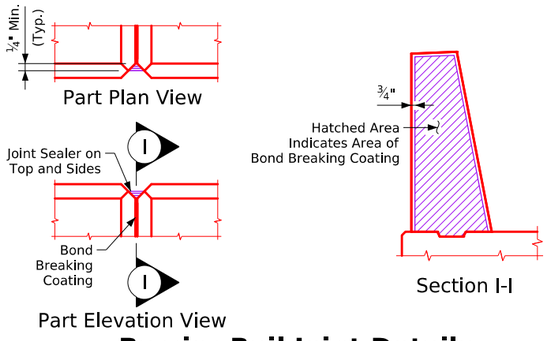
If conduit is required in this plan the rigid steel conduit, junction boxes and fittings including labor and any additional work to do the installation is considered incidental to the cost of the railing.

The joint sealer shall be light gray nonsag latex caulking sealer marketed for outdoor use. No testing or certification is required.

Top of the barrier rail is to be parallel to the theoretical ℄ grade.

All exposed corners 90° or sharper are to be filleted with a ¾" dressed and beveled strip.

Cross sectional area of the Standard Sections of the barrier rail = 3.50 square feet.



Barrier Rail Joint Details

Note:
See Barrier Rail Details on Sheet J30S-30-25 for details and sections.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

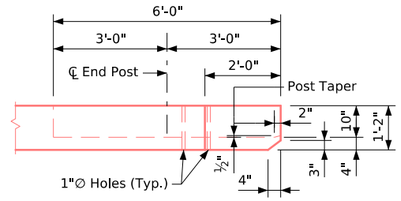
July, 2025

Single Slope Rail Details

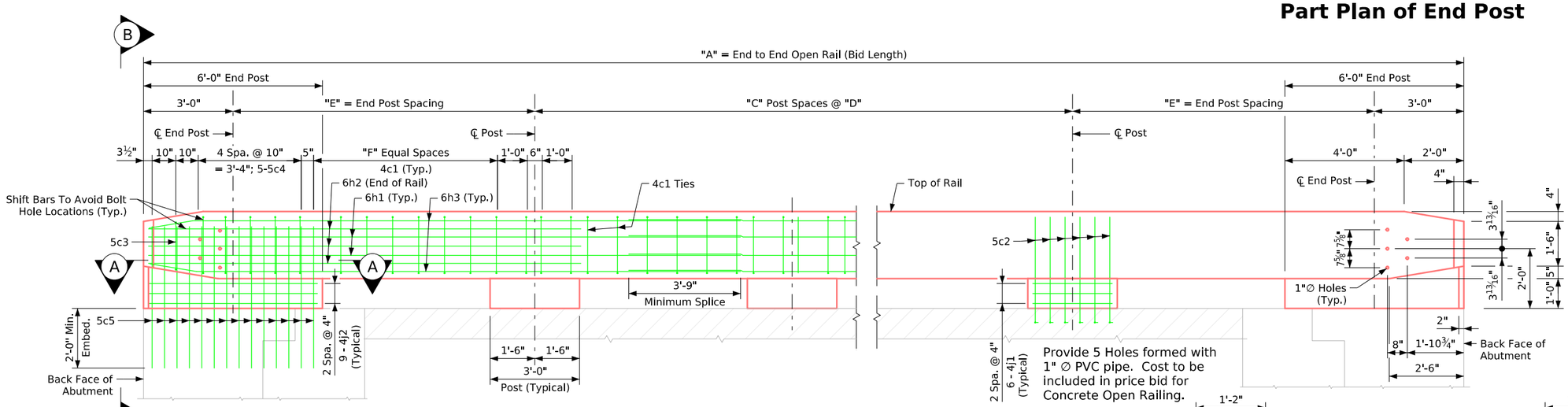
J30S-31-25

Table of Open Rail Dimensions and Numbers

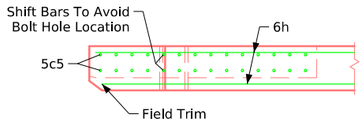
Span		20'-0"				30'-0"				40'-0"				50'-0"			
Skew		0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°
Dimensions or Number	A	31'-0"	31'-1 1/4"	31'-5 9/16"	32'-2 15/16"	41'-0"	41'-1 1/4"	41'-5 9/16"	42'-2 15/16"	51'-0"	51'-1 1/4"	51'-5 9/16"	52'-2 15/16"	61'-0"	61'-1 1/4"	61'-5 9/16"	62'-2 15/16"
	C	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4
	D	7'-4"	7'-4 7/16"	7'-5 7/8"	7'-9"	8'-0"	8'-0 5/16"	8'-1 3/8"	8'-3 3/4"	8'-4 13/16"	8'-5 1/16"	8'-5 15/16"	8'-7 13/16"	8'-8"	8'-8 3/16"	8'-8 15/16"	8'-10 1/2"
	E	8'-10"	8'-10 7/16"	8'-11 7/8"	9'-3"	9'-6"	9'-6 5/16"	9'-7 3/8"	9'-9 3/4"	9'-10 13/16"	9'-11 1/16"	9'-11 15/16"	10'-1 13/16"	10'-2"	10'-2 3/16"	10'-2 15/16"	10'-4 1/2"
	F	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7



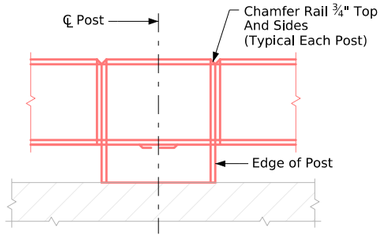
Part Plan of End Post



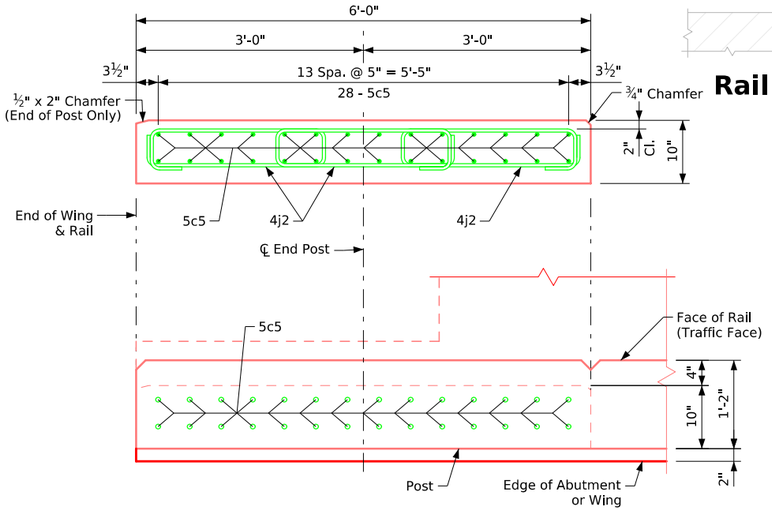
Elevation of Open Rail Layout



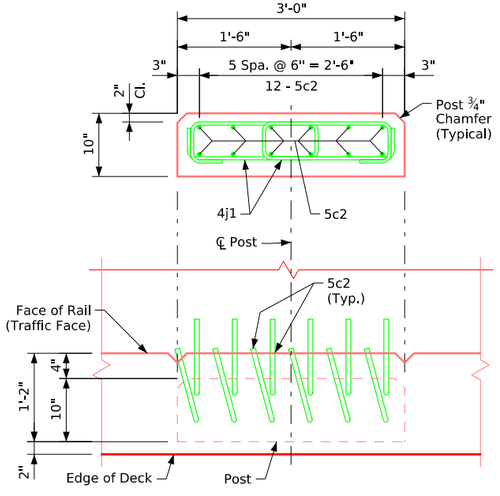
Section A-A



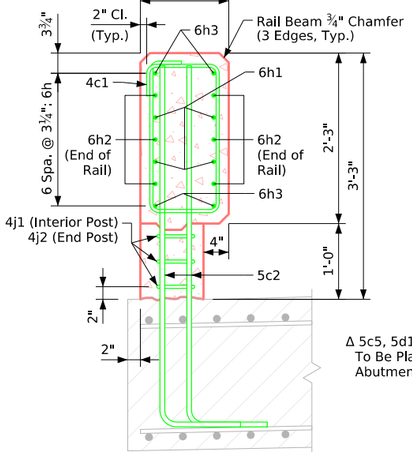
Rail Chamfer Detail



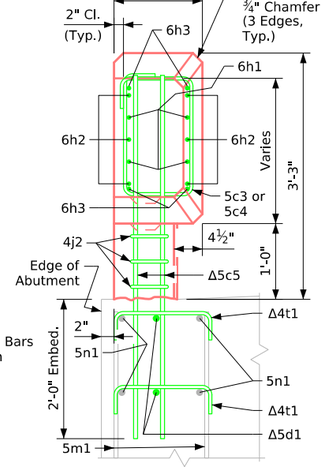
End Post Details



Interior Post Details



Typical Rail Section



View B-B

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Open Barrier Rail Details for Integral Abutments

J30S-32-25

Epoxy Coated Reinforcing Steel - Two Open Rails

Bridge Length			20'-0"			30'-0"			40'-0"			50'-0"		
Bar	Location	Shape	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight
4c1	Rail, Ties		46	6'-3	192	64	6'-3	267	92	6'-3	384	112	6'-3	468
5c2	Posts, Vertical		48	4'-10	242	72	5'-1	382	96	5'-3	526	120	5'-7	699
5c3	End Post, Tie		4	6'-2	26	4	6'-2	26	4	6'-2	26	4	6'-2	26
5c4	End Post, Tie		20	6'-6	136	20	6'-6	136	20	6'-6	136	20	6'-6	136
5c5	Vertical, End Section		112	5'-1	594	112	5'-1	594	112	5'-1	594	112	5'-1	594
5d1	Wing, Longitudinal, Tie Bar		8	5'-8	47	8	5'-8	47	8	5'-8	47	8	5'-8	47
6h1	Rail, Horizontal		8	31'-11	384	16	22'-10	549	16	27'-10	669	16	32'-10	789
6h2	Rail, Horizontal, Ends		24	13'-7	490	24	14'-2	511	24	14'-6	523	24	14'-8	529
6h3	Rail, Horizontal, Ends		16	17'-10	429	16	22'-10	549	16	27'-10	669	16	32'-10	789
4j1	Interior Post, Tie		24	5'-1	81	36	5'-1	122	48	5'-1	163	60	5'-1	204
4j2	End Post, Tie		36	6'-3	150	36	6'-3	150	36	6'-3	150	36	6'-3	150
4t1	Wing Tie Bars		24	2'-0	32	24	2'-0	32	24	2'-0	32	24	2'-0	32
(Include with Superstructure Reinforcing)				Total (Lbs.)	2802			3364			3918			4462

Reinforcing quantities shown are based on 45° skew bid lengths.

Concrete Placement Quantities

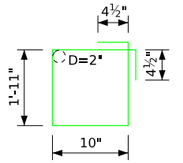
Bridge Length	20'-0"	30'-0"	40'-0"	50'-0"
**Standard Section (Cu. Yds.)	7.3	9.4	11.5	13.6

**Concrete quantities shown are based on 45° skew bid lengths. These values shall be used for all skews.

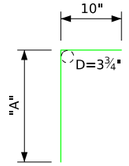
Concrete Open Rail Quantities

Bridge Length		Unit	20'-0"	30'-0"	40'-0"	50'-0"
Concrete Open Railing, TL-4	0° Skew	L.F.	62.0	82.0	102.0	122.0
Concrete Open Railing, TL-4	15° Skew	L.F.	62.2	82.2	102.2	122.2
Concrete Open Railing, TL-4	30° Skew	L.F.	63.0	83.0	103.0	123.0
Concrete Open Railing, TL-4	45° Skew	L.F.	64.4	84.4	104.4	124.4

Open Barrier Rail - Bent Bar Details

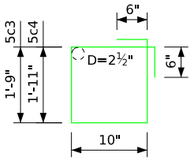


4c1

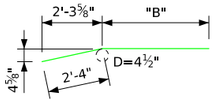


5c2

Span	Dimension "A"
20'-0"	4'-0"
30'-0"	4'-3"
40'-0"	4'-5"
50'-0"	4'-9"

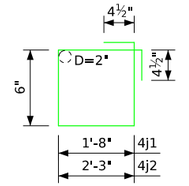


5c3 & 5c4

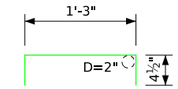


6h3

Span	Dimension "B"
20'-0"	10'-9"
30'-0"	15'-9"
40'-0"	20'-9"
50'-0"	25'-9"



4j1 & 4j2



4t1

Note: All Dimensions Are Out To Out. D = Pin Diameter.

Open Rail Notes:

Open rail system meets Test Level 4 (TL-4) according to the Manual for Assessing Safety Hardware (MASH) and includes provision for a 3" future wearing surface height.

All reinforcing shall be Grade 60, Epoxy Coated.

Stainless steel reinforcing may be substituted for 5c2 and 6c3 bars at the Designer's discretion. Lap and development lengths shown are based on epoxy coated reinforcing and need not be modified.

Minimum clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown.

The concrete open rail is to be bid on a lineal foot basis measured from end to end of rail. The number of lineal feet of open rail installed will be paid for at the contract price per lineal foot. Price bid for "Concrete Open Railing, TL-4" shall be full compensation for furnishing all material, excluding reinforcing steel, and all of the equipment and labor required to construct the rail in accordance with these plans and current specifications.

All open rail concrete is to be Class C.

Top of the open rail is to be parallel to theoretical ℄ grade.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

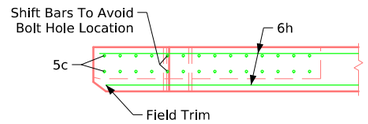
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Open Barrier Rail Details for Integral Abutments

J30S-33-25

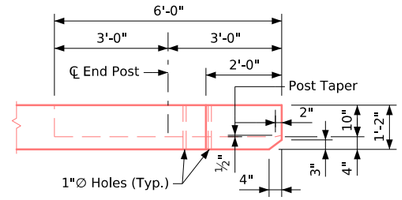


Section C-C

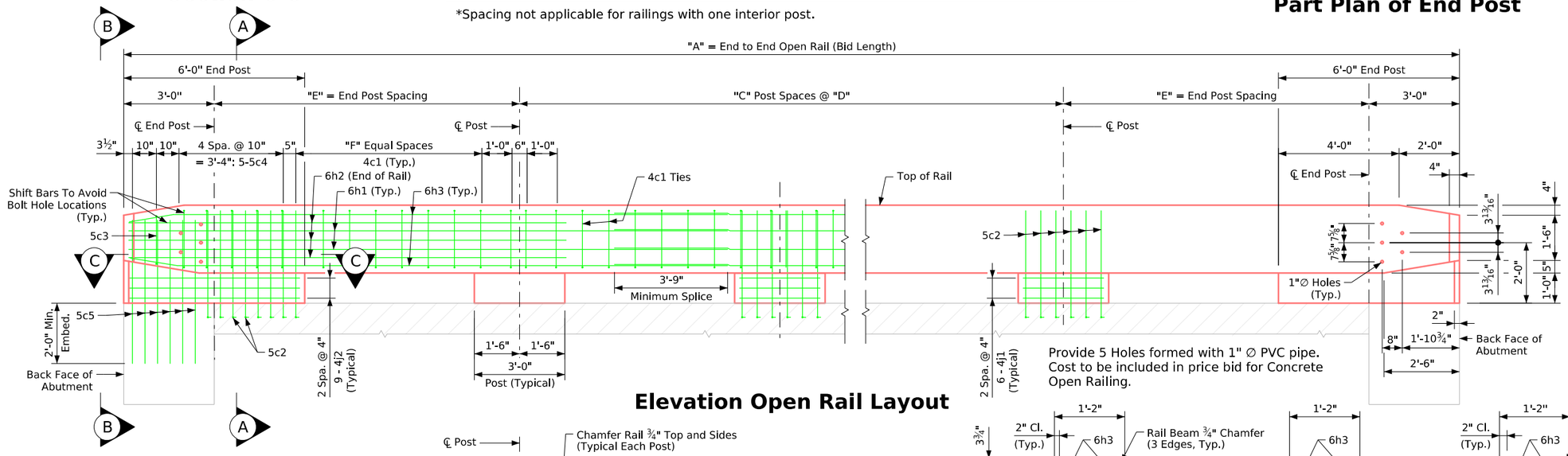
Table of Open Rail Dimensions and Numbers

Span		20'-0"		30'-0"		40'-0"		50'-0"	
Skew		0°	15°	0°	15°	0°	15°	0°	15°
Dimensions or Number	A	23'-0"	22'-8 1/4"	33'-0"	32'-8 1/4"	43'-0"	42'-8 1/4"	53'-0"	52'-8 1/4"
	C	*	*	1	1	2	2	3	3
	D	*	*	8'-0"	7'-10 3/4"	8'-6"	8'-5 1/16"	8'-9 5/8"	8'-8 7/8"
	E	8'-6"	8'-4 1/8"	9'-6"	9'-4 3/4"	10'-0"	9'-11 1/16"	10'-3 5/8"	10'-2 7/8"
	F	5	5	6	6	6	6	7	7

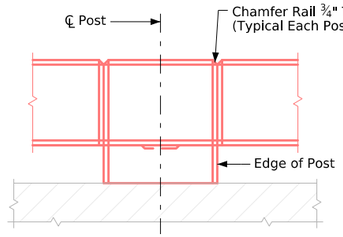
*Spacing not applicable for railings with one interior post.



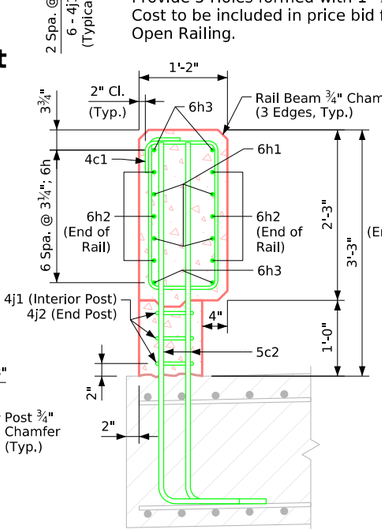
Part Plan of End Post



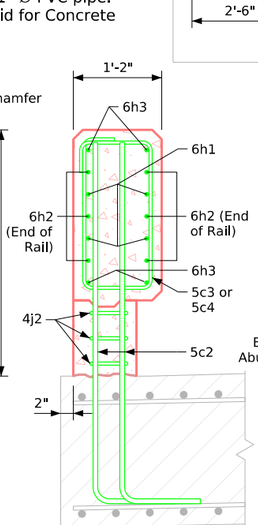
Elevation Open Rail Layout



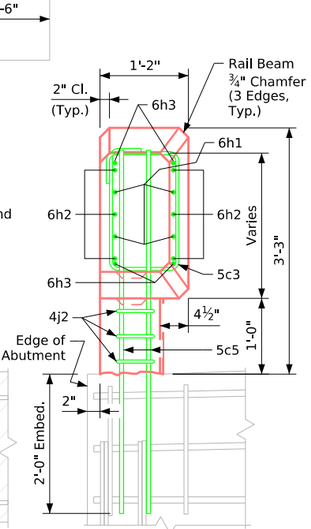
Rail Chamfer Detail



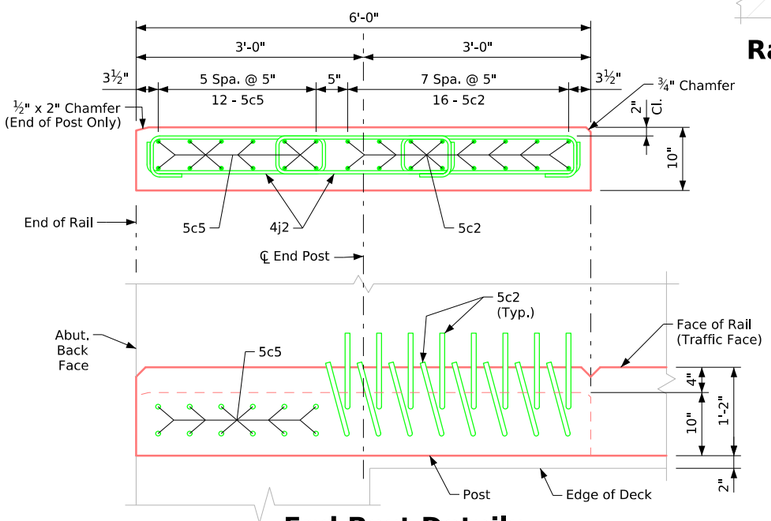
Typical Rail Section



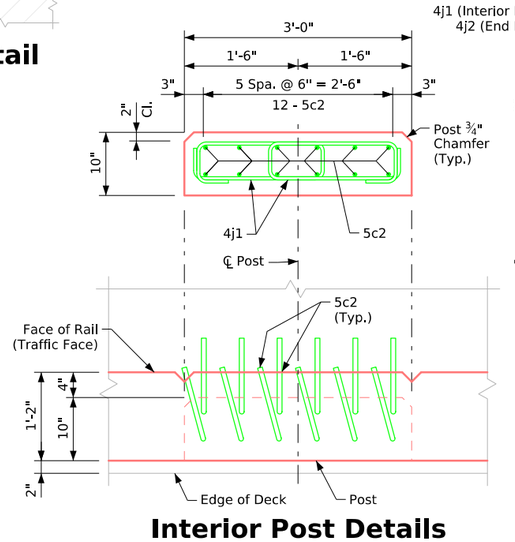
Section A-A
(At End Post)



View B-B



End Post Details
(0° Skew Shown - See J30S-11-25 for Detail Showing 15° Skew)



Interior Post Details

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Open Barrier Rail Details for High Abutments

J30S-34-25

Epoxy Coated Reinforcing Steel - Two Open Rails

Bridge Length			20'-0"			30'-0"			40'-0"			50'-0"		
Bar	Location	Shape	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight	No.	Length	Weight
4c1	Rail, Ties		24	6'-3	100	46	6'-3	192	64	6'-3	267	92	6'-3	384
5c2	Posts, Vertical		88	4'-10	444	112	5'-1	594	136	5'-3	745	160	5'-7	932
5c3	End Post, Tie		4	6'-2	26	4	6'-2	26	4	6'-2	26	4	6'-2	26
5c4	End Post, Tie		20	6'-6	136	20	6'-6	136	20	6'-6	136	20	6'-6	136
5c5	Vertical, End Section		48	5'-1	254	48	5'-1	254	48	5'-1	254	48	5'-1	254
6h1	Rail, Horizontal		8	22'-4	268	8	32'-4	389	16	23'-1	555	16	28'-1	675
6h2	Rail, Horizontal, Ends		24	12'-8	457	24	13'-9	496	24	14'-3	514	24	14'-7	526
6h3	Rail, Horizontal, Ends		16	13'-1	314	16	18'-1	435	16	23'-1	555	16	28'-1	675
4j1	Interior Post, Tie		12	5'-1	41	24	5'-1	81	36	5'-1	122	48	5'-1	163
4j2	End Post, Tie		36	6'-3	150	36	6'-3	150	36	6'-3	150	36	6'-3	150
(Include with Superstructure Reinforcing)				Total (Lbs.)	2190			2752			3323			3920

Reinforcing quantities shown are based on 15° skew bid lengths.

Concrete Placement Quantities

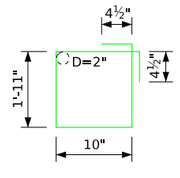
Bridge Length	20'-0"	30'-0"	40'-0"	50'-0"
**Standard Section (Cu. Yds.)	5.2	7.4	9.5	11.6

**Concrete quantities shown are based on 15° skew bid lengths. These values shall be used for all skews.

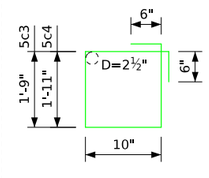
Concrete Open Rail Quantities

Bridge Length		Unit	20'-0"	30'-0"	40'-0"	50'-0"
Concrete Open Railing, TL-4	0° Skew	L.F.	46	66	86	106
Concrete Open Railing, TL-4	15° Skew	L.F.	45.4	65.4	85.4	105.4

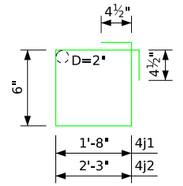
Open Barrier Rail - Bent Bar Details



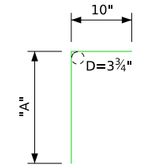
4c1



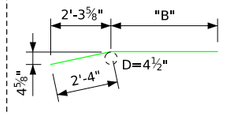
5c3 & 5c4



4j1 & 4j2



5c2



6h3

Span	Dimension "A"	Dimension "B"
20'-0"	4'-0"	10'-9"
30'-0"	4'-3"	15'-9"
40'-0"	4'-5"	20'-9"
50'-0"	4'-9"	25'-9"

Note: All Dimensions Are Out To Out. D = Pin Diameter.

Open Rail Notes:

Open rail system meets Test Level 4 (TL-4) according to the Manual for Assessing Safety Hardware (MASH) and includes provision for a 3" future wearing surface height.

All reinforcing shall be Grade 60, Epoxy Coated.

Stainless steel reinforcing may be substituted for 5c2 and 5c5 bars at the Designer's discretion. Lap and development lengths shown are based on epoxy coated reinforcing and need not be modified.

Minimum clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown.

The concrete open rail is to be bid on a lineal foot basis measured from end to end of rail. The number of lineal feet of open rail installed will be paid for at the contract price per lineal foot. Price bid for "Concrete Open Railing, TL-4" shall be full compensation for furnishing all material, excluding reinforcing steel, and all of the equipment and labor required to construct the rail in accordance with these plans and current specifications.

All open rail concrete is to be Class C.

Top of the open rail is to be parallel to theoretical ℄ grade.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

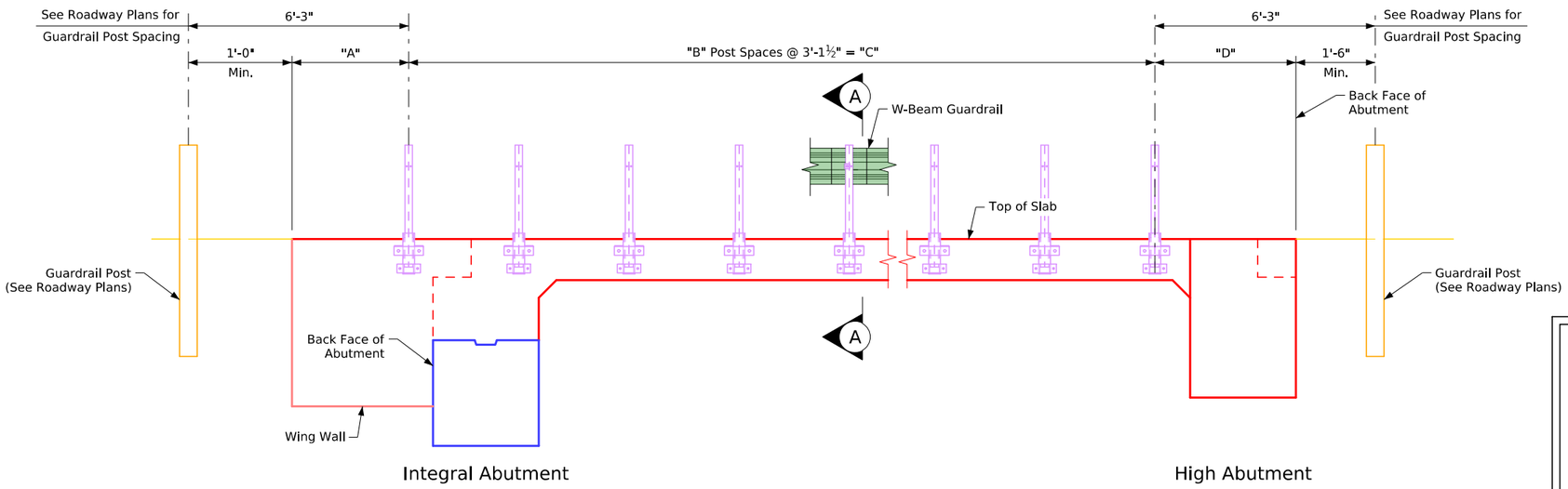
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Open Barrier Rail Details for High Abutments

J30S-35-25



Exterior Slab Elevation

(Showing Post Spacing)

Anchor Rod Notes:

Post socket anchor details shown in these plans assume use of cast-in-place anchors. Contractor is permitted to substitute drilled anchors at no additional cost to the Contracting Authority. The embedded nuts are to be omitted. Minimum hole depth shall be equal to "T" shown in these plans.

Use a polymer grout system in accordance with Materials I.M. 491.11. Anchors shall be installed in accordance with the manufacturer's recommendations. Any additional cost of drilling holes and adhesive will be considered incidental and no additional payment will be made.

Guardrail Designer Note:

Designer shall evaluate need for a crashworthy TL-3 guardrail end terminal at each end of the bridge. If provided, the following recommended guidelines should be considered in addition to guardrail length-of-need requirements:

1) Minimum 12'-6" length standard guardrail between the first bridge post and the interior end of guardrail end terminal.

2) Minimum barrier length of 50 ft. before the first bridge post (including standard guardrail section and end terminal).

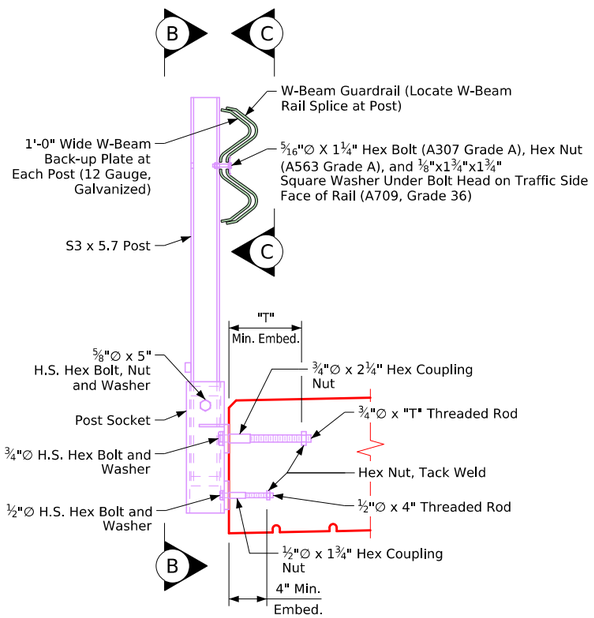
3) For flared guardrail applications, a minimum length of 25 ft. between the first bridge post and the start of the flared section.

Post Spacing Data Table (Integral Abutments)

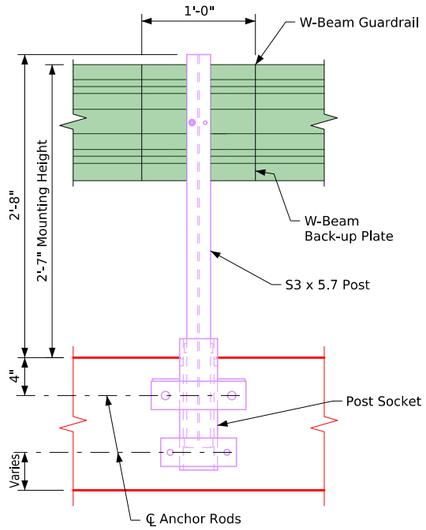
Span	"A" Dimension				"B" Post Spaces at 3'-1 1/2"	"C"	Total Number of Posts on Bridge
	0° Skew	15° Skew	30° Skew	45° Skew			
20'-0"	3'-0"	3'-0 5/8"	3'-2 13/16"	3'-7 7/16"	8	25'-0"	18
30'-0"	3'-3 3/4"	3'-4 3/8"	3'-6 9/16"	3'-11 3/16"	11	34'-4 1/2"	24
40'-0"	3'-7 1/2"	3'-8 1/8"	3'-10 5/16"	4'-2 15/16"	14	43'-9"	30
50'-0"	3'-11 1/4"	3'-11 7/8"	4'-2 1/16"	4'-6 11/16"	17	53'-1 1/2"	36

Post Spacing Data Table (High Abut.)

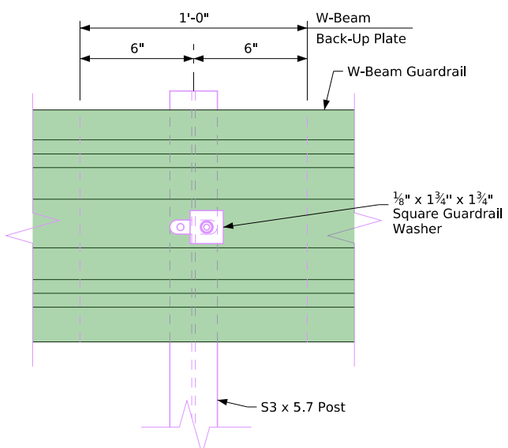
Span	"D" Dimension		"B" Post Spaces at 3'-1 1/2"	"C"	Total Number of Posts on Bridge
	0° Skew	15° Skew			
20'-0"	3'-8 1/4"	3'-8 7/8"	5	15'-7 1/2"	12
30'-0"	4'-0"	4'-0 5/8"	8	25'-0"	18
40'-0"	4'-3 3/4"	4'-4 3/8"	11	34'-4 1/2"	24
50'-0"	4'-7 1/2"	4'-8 1/8"	14	43'-9"	30



Section A-A



View B-B



View C-C

Bridge Rail Notes:

All material including bolts, rods, nuts and washers shall be galvanized per Article 4100.07 and/or 4153.06 of the Standard Specifications.

Structural steel shall conform to ASTM A709 Grade 50, unless otherwise noted or shown.

Post sockets shall conform to ASTM A500 Grade B.

All bolts and threaded rod shall be ASTM A449 unless otherwise noted or shown.

Nuts shall be ASTM A563, Grade DH, unless otherwise noted or shown.

Washers shall be ASTM F436 unless otherwise noted or shown.

Shop drawings of the steel posts showing layout and details shall be submitted for review.

Cost of furnishing and installing the steel posts and 1'-0" W-Beam back-up plates, excluding the cost of W-Beam guardrail, shall be included in the price bid for Structural Steel. Cost of W-Beam guardrail should be included in the bid item "Steel Beam Guardrail".

Refer to Sheet J30S-37-25 for dimension "T".

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

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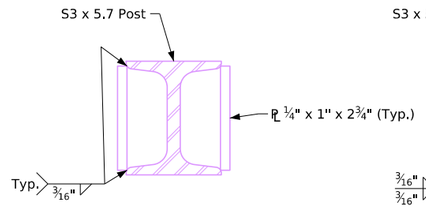
Bridge W-Beam Guardrail Details

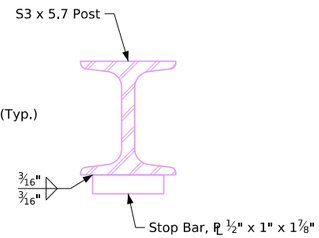
J30S-36-25

Structural Steel - Rail Post & Socket Assembly

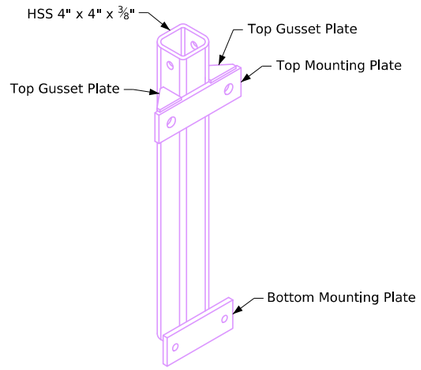
		Span			
		20'-0"	30'-0"	40'-0"	50'-0"
One Post Assembly	Post S3x5.7 (Lbs.)	21.1	22.5	22.5	22.5
	Post Socket Assembly (Lbs.)	29.6	34.6	34.6	34.6
	Bolts, All-Thread Rod, Nuts, Washers (Lbs.): (1) $\frac{5}{16}$"∅ x 1¼" Bolt w/ Nut and Washer (1) $\frac{5}{8}$"∅ x 5" Bolt w/ Nut & Washer (2) ¾"∅ x ("T" + 2") All-Thread Rod w/ Nuts and Washers (2) ½"∅ x 6" All-Thread Rod w/ Nuts and Washers	5.9	4.9	4.9	4.9
	Weight per Assembly (Lbs.)	56.6	62.0	62.0	62.0
Integral Abut.	Number of Posts	18	24	30	36
	Total Weight (Lbs.)	1018	1488	1860	2232
High Abut.	Number of Posts	12	18	24	30
	Total Weight (Lbs.)	679	1116	1488	1860



Section D-D



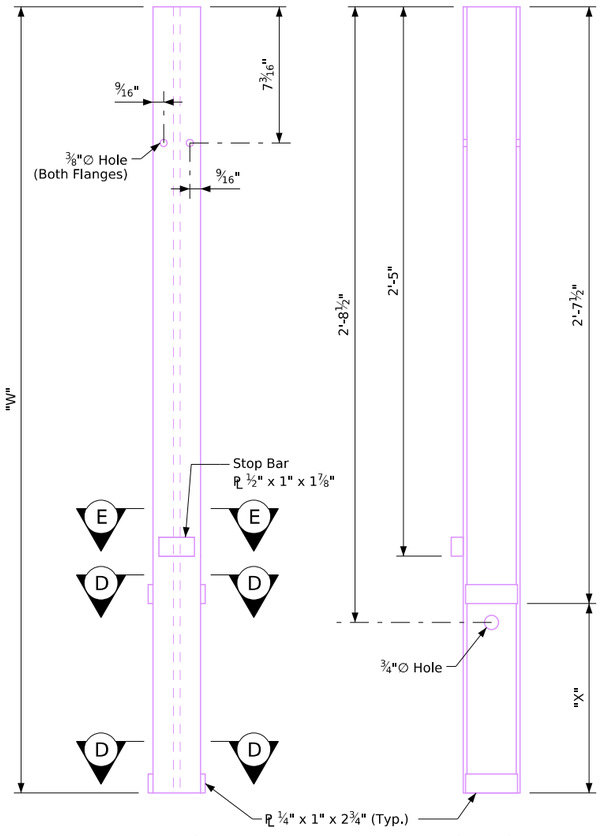
Section E-E



Post Socket
Isometric View

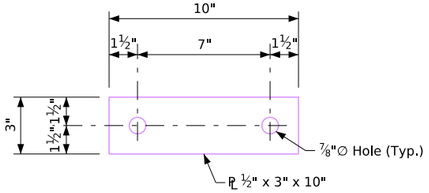
Post & Socket Dimension Table

Span	Anchor Bolt	Post Socket		Post	
	"T"	"U"	"V"	"W"	"X"
20'-0"	1'-0"	1'-2⅜"	6½"	3'-6"	10½"
30'-0"	8"	1'-5⅞"	10"	3'-9"	1'-1½"
40'-0"	8"	1'-5⅞"	10"	3'-9"	1'-1½"
50'-0"	8"	1'-5⅞"	10"	3'-9"	1'-1½"

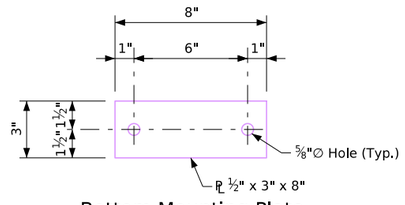


Back View Side View

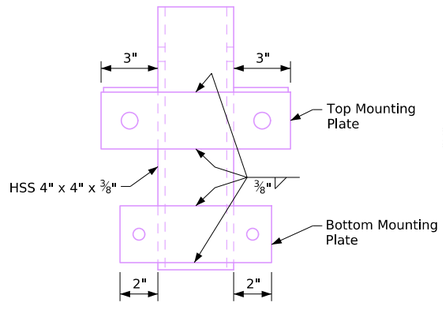
S3x5.7 Post Details



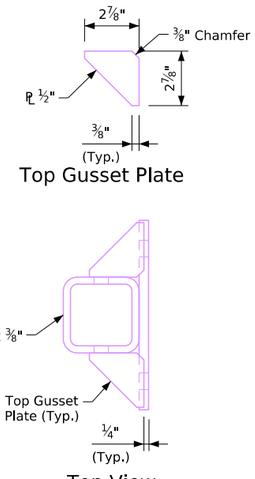
Top Mounting Plate



Bottom Mounting Plate

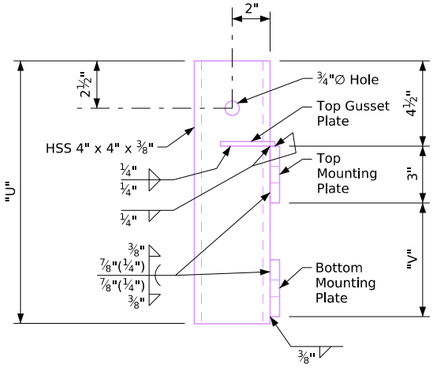


Front View



Top Gusset Plate

Top View



Side View

Post Socket Details

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

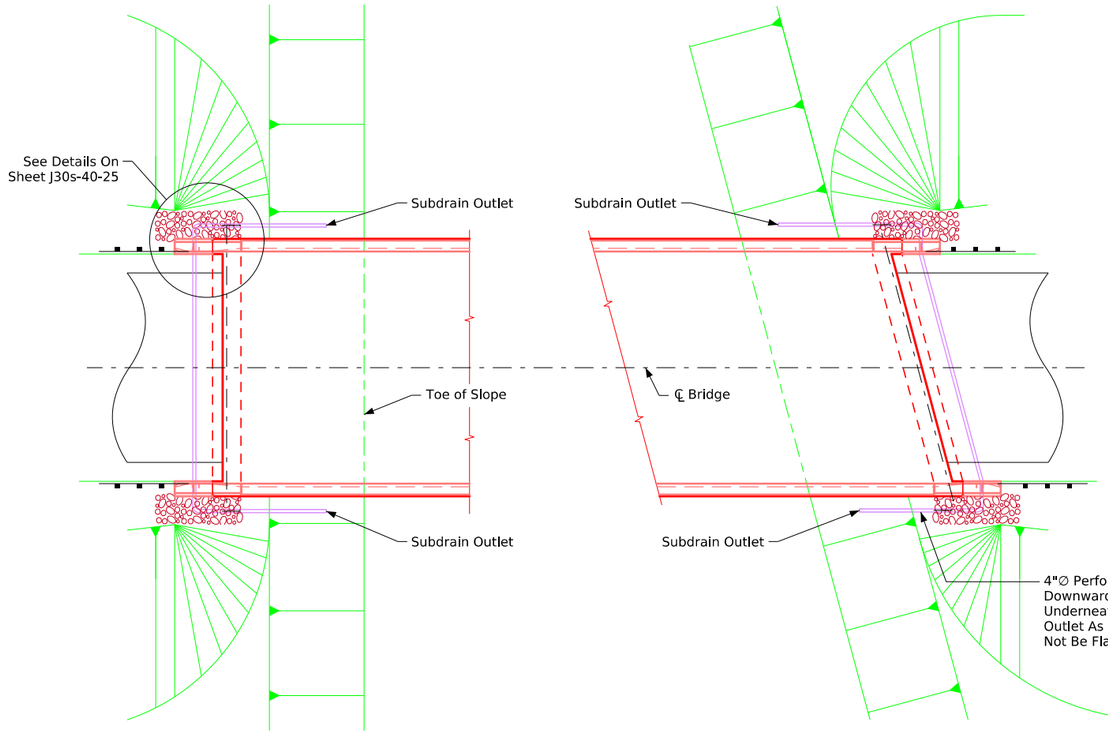
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Bridge W-Beam Guardrail Details

J30S-37-25

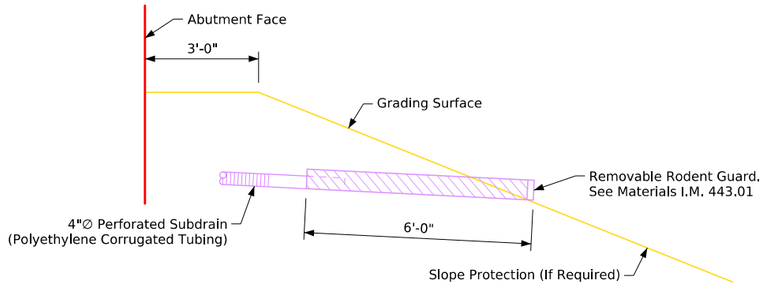


Protection Layout 0° Skew

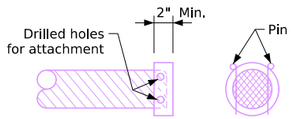
Protection Layout Skewed

Situation Plan

Refer to Situation Plan for North Arrow



Typical Section of
Subdrain Outlet



Top View Front View

Removable Rodent Guard Details

Outlet Details

Subdrain Notes:

See Situation Plan and Abutment Backfill Details for additional details of placement not shown on this sheet.

The subdrains shall be 4"Ø and shall be in accordance with Article 4143.01, B, of the Standard Specifications.

The subdrain outlet shall consist of a length of pipe with a removable rodent guard as detailed on this sheet. The length of the outlet pipe shall be determined by the revetment and it's placement location. The Contractor is to insure the outlet pipe is adequately strong enough and will not be damaged when revetment is placed. A check will be made at the subdrain outlet to insure that the subdrain is not damaged and is draining properly during the backfill flooding process. If a metal outlet pipe is used, it shall be 6"Ø and coupled to the 4"Ø subdrain in one of the two following ways.

-Use an inside fit reducer coupler (coupler must be inserted a minimum of 1'-0" into the metal outlet pipe).

-Insert 1'-0" of the 4"Ø subdrain into the 6"Ø metal outlet pipe, then fully seal the entire opening with grout.

The cost of furnishing and placing subdrain (including excavation), granular backfill, porous backfill, and subdrain outlet is to be included in the price bid for "Structural Concrete (Bridge)". No extra payment will be made.

The dimensions shown for the proposed subdrains are based on the proposed grading layout of bridge berms. The dimensions shown are for estimating only. Required lengths and general locations of subdrains are subject to change due to field adjustments of the grading layout.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

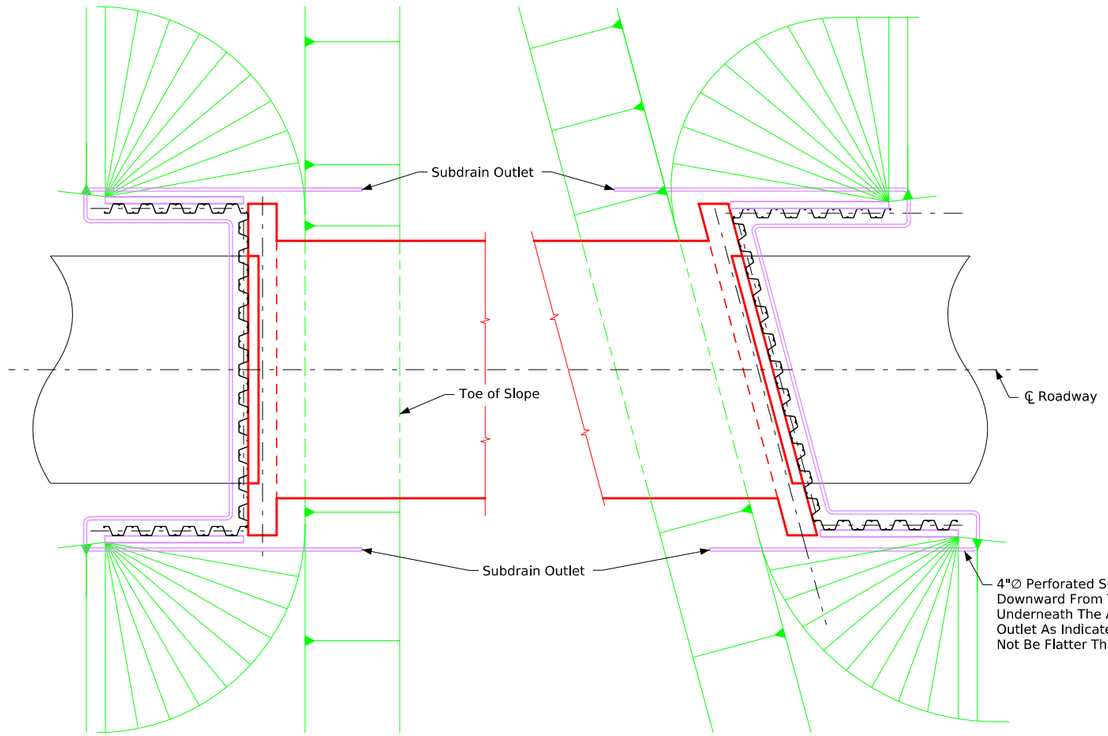
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Subdrain Details
Integral Abutments

J30S-38-25

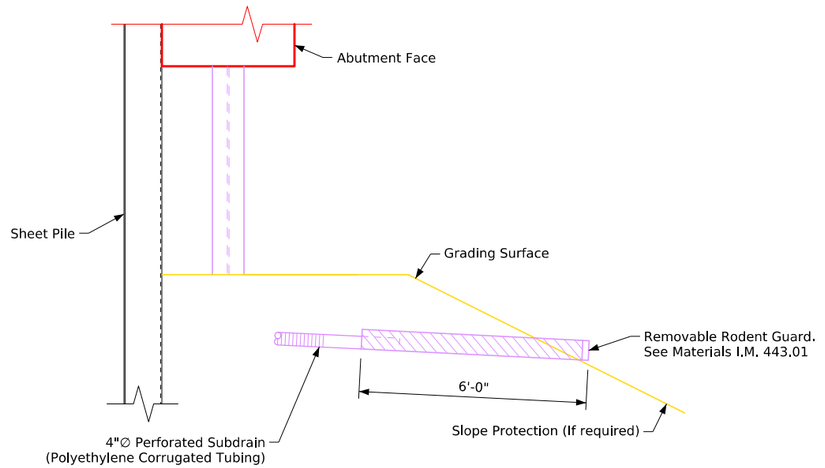


Protection Layout 0° Skew

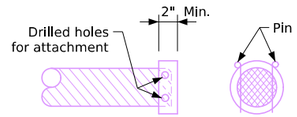
Protection Layout Skewed

Situation Plan

Refer to Situation Plan for North Arrow



Typical Section of
Subdrain Outlet



Top View Front View

Removable Rodent Guard Details

Outlet Details

Subdrain Notes:

See Situation Plan and Abutment Backfill Details for additional details of placement not shown on this sheet.

The subdrains shall be 4"Ø and shall be in accordance with Article 4143.01, B, of the Standard Specifications.

The subdrain outlet shall consist of a length of pipe with a removable rodent guard as detailed on this sheet. The length of the outlet pipe shall be determined by the revetment and it's placement location. The Contractor is to insure the outlet pipe is adequately strong enough and will not be damaged when revetment is placed. A check will be made at the subdrain outlet to insure that the subdrain is not damaged and is draining properly during the backfill flooding process. If a metal outlet pipe is used, it shall be 6"Ø and coupled to the 4"Ø subdrain in one of the two following ways.

-Use an inside fit reducer coupler (coupler must be inserted a minimum of 1'-0" into the metal outlet pipe).

-Insert 1'-0" of the 4"Ø subdrain into the 6"Ø metal outlet pipe, then fully seal the entire opening with grout.

The cost of furnishing and placing subdrain (including excavation), and subdrain outlet is to be included in the price bid for "Granular Backfill". No extra payment will be made.

The dimensions shown for the proposed subdrains are based on the proposed grading layout of bridge berms. The dimensions shown are for estimating only. Required lengths and general locations of subdrains are subject to change due to field adjustments of the grading layout.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

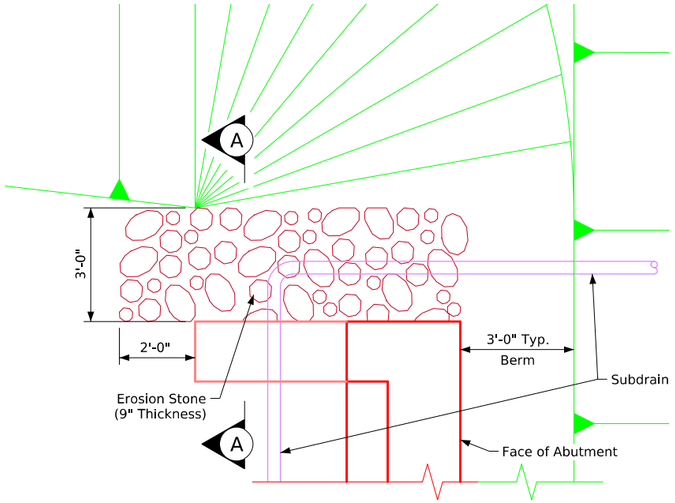
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

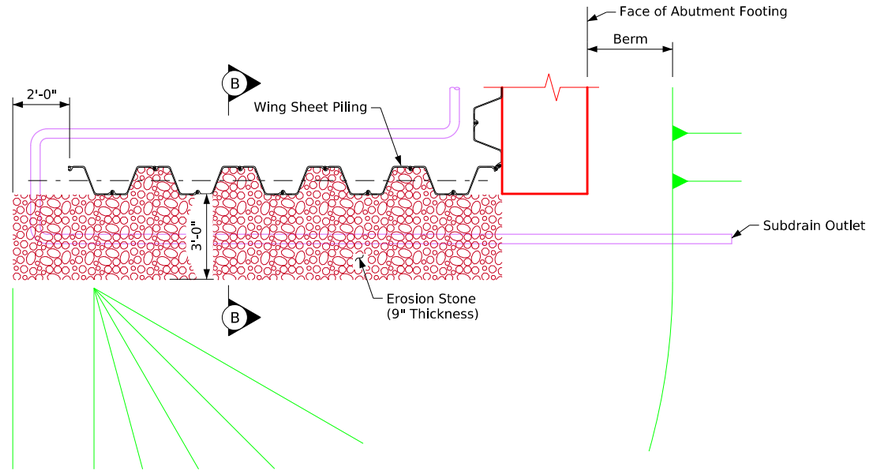
July, 2025

Subdrain Details
High Abutments

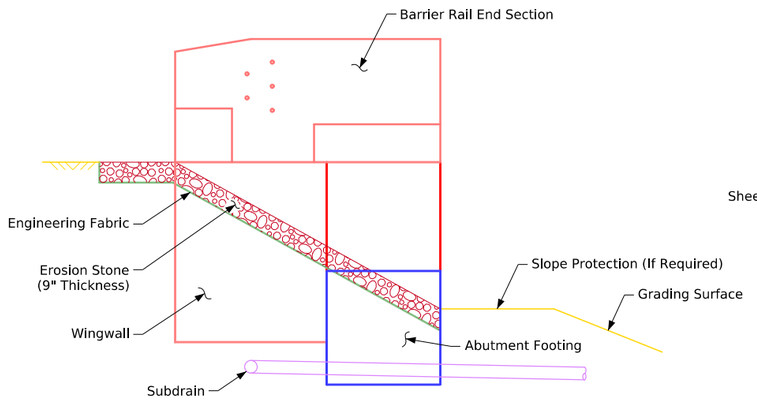
J30S-39-25



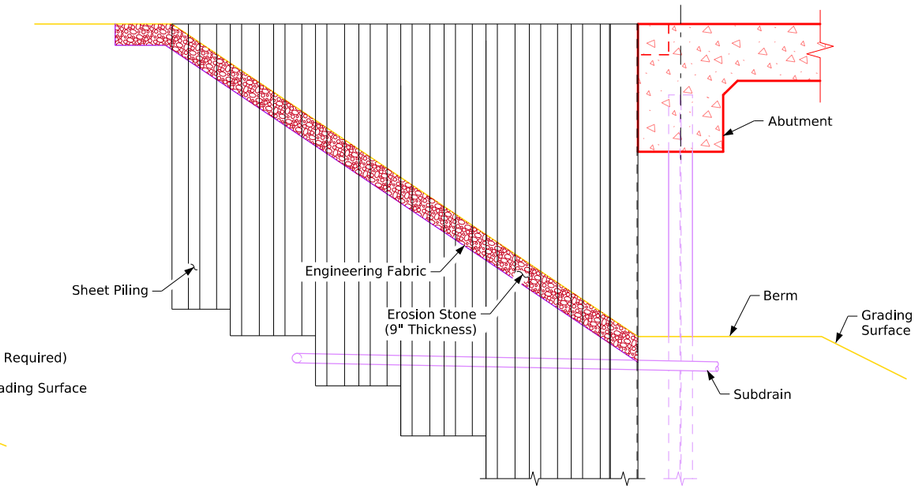
Top View of Wing Armoring



Top View of Wing Armoring



Profile View of Wing Armoring



Profile View of Wing Armoring

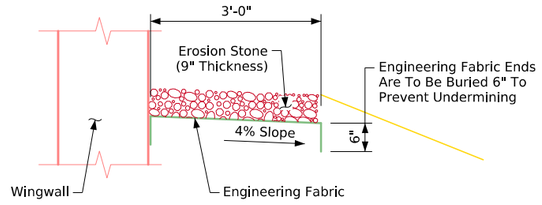
Erosion Stone Wing Armoring Note:

Erosion stone shall be placed along the sides of the wings as shown. This is typical at each corner of the bridge unless otherwise noted in the plans. The erosion stone at these locations shall be underlayed with engineering fabric in accordance with Article 4196.01, B, 3, of the Standard Specifications.

The erosion stone shall be in accordance with Section 4130 of the Standard Specifications. Material passing the 3 inch screen but 100% retained on a 1 inch screen may be used as choke stone.

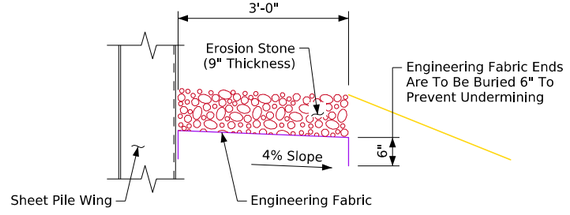
The erosion stone shall be deposited, spread, consolidated and shaped by mechanical or hand methods that will provide uniform 9" depth and density and provide uniform surface appearance.

Payment for the Bridge Wing Armoring will be bid per square yard. Cost will include engineering fabric, erosion stone, excavation, shaping, and compaction to dimensions shown in these plans. Bid item shall be "Bridge Wing Armoring - Erosion Stone".



Section A-A

Integral Abutment



Section B-B

High Abutment

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

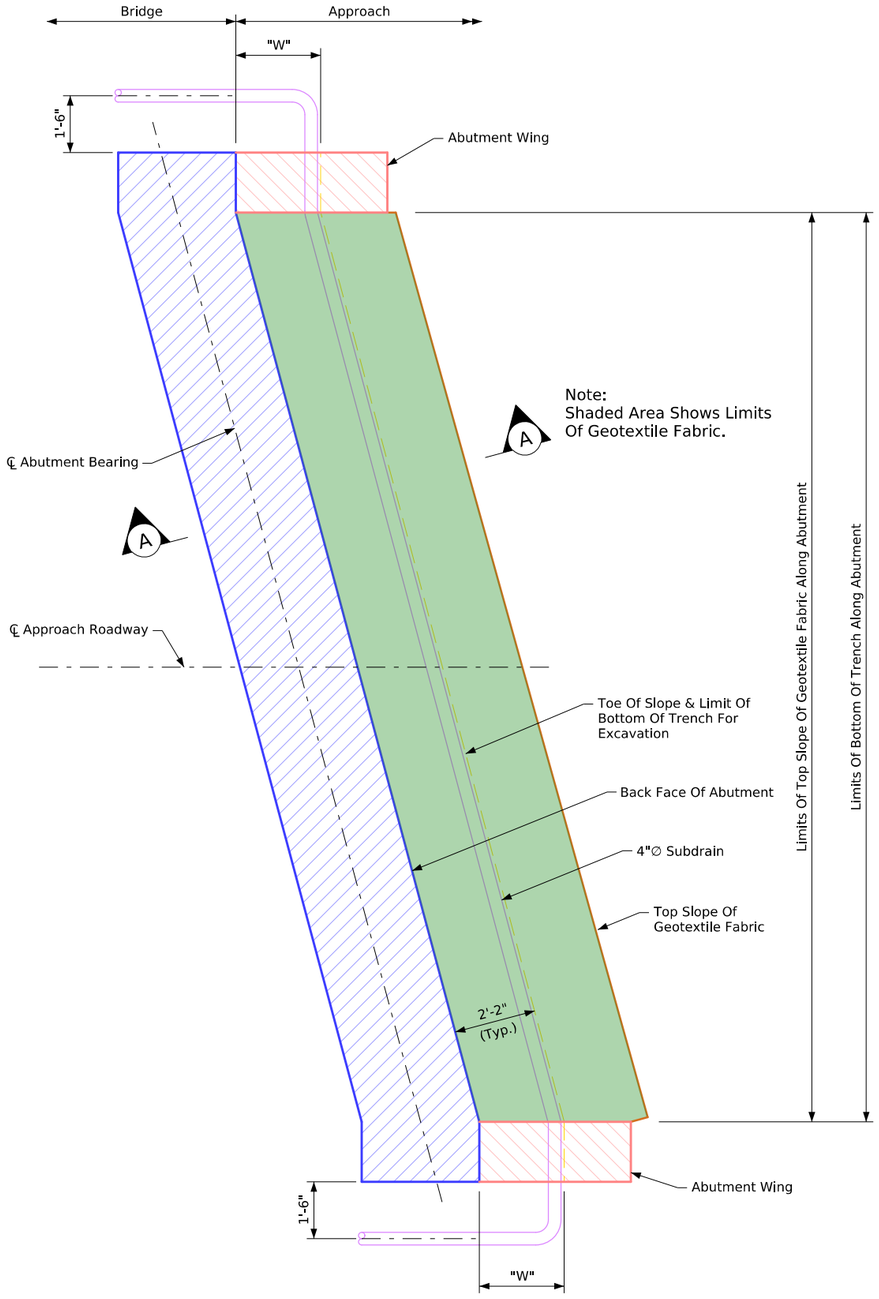
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Bridge Wing Armoring

J30S-40-25



Abutment Plan

(Right Ahead Skew Shown; Left Ahead And 0° Degree Skew Similar)

Abutment Backfill Process:

The base of the excavation subgrade behind the abutment is to be graded with a 4% slope away from the abutment footing and a 2% cross slope in the direction of the subdrain outlet. This excavation shaping is to be done prior to beginning installation of the geotextile and backfill material.

After the subgrade has been shaped, the geotextile fabric shall be installed in accordance with the details shown. The fabric is intended to be installed in the base of the excavation and extended vertically up the abutment backwall, abutment wing walls, and excavation face to a height that will be approximately 1 to 2 foot higher than the height of the porous backfill placement as shown in the "Backfill Details" on this sheet. The strips of the fabric placed shall overlap approximately 1 foot and shall be pinned in place. The fabric shall be attached to the abutment by using lath folded in the fabric and secured to the concrete with shallow concrete nails. The fabric placed against the excavation face shall be pinned.

When the fabric is in place, the subdrain shall be installed directly on the fabric at the toe of the rear excavation slope. A slot will need to be cut in the fabric at the point where the subdrain exits the fabric near the end of the abutment wing wall.

Porous backfill is then placed and leveled, no compaction is required.

The remaining work involves backfilling with floodable backfill, surface flooding, and vibratory compaction. The floodable backfill material shall be in accordance with the Standard Specifications. The floodable backfill shall be placed in individual lifts, surface flooded, and compacted with vibratory compaction to ensure full consolidation. Limit the loose lifts to no more than 2 feet of thickness.

Start surface flooding for each floodable backfill lift at the high point of the subdrain and progress to the low point where the subdrain exits the fabric. To ensure uniform surface flooding, water running full in a 2-inch diameter hose should be sprayed in successive 6-foot to 8-foot increments for 5 minutes within each increment.

Floodable backfill lift placement, flooding, and compaction shall progress until the required full thickness of the abutment backfill has been completed.

Water required for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments will not be measured separately for payment.

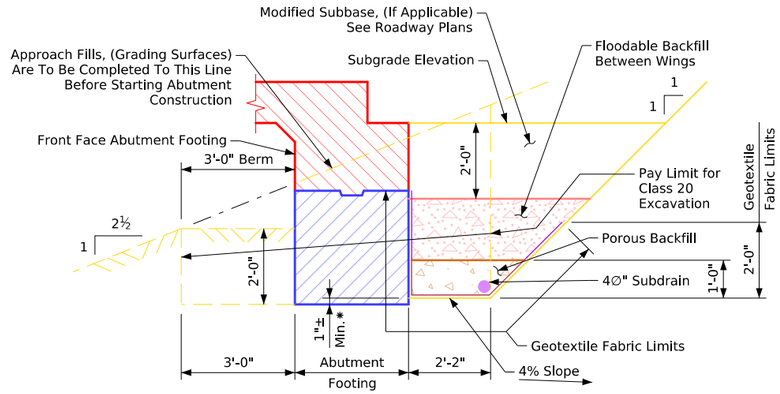
The cost of water required for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments shall be included in the contract unit price bid for "Structural Concrete".

Note:

Subdrain shall slope downward 2% from ℄ approach roadway when outletting both sides of the abutment.

Subdrain shall slope downward 2% from high end when outletting at one end of the abutment.

The geotextile fabric shall be in accordance with Article 4196.01, B, 6 of the Standard Specifications. If the engineering fabric is lapped the laps shall be a minimum of one foot in length, shingle fashion with up slope lap piece on top and stapled for continuity.



Section A-A

Backfill Details

"W" Dimension	
Skew	Dimension
0°	2'-2"
15°	2'-3"
30°	2'-6"
45°	3'-1"

Note:
See Subdrain Details sheet for details not shown on this sheet which are pertinent to this structure.

Note:
Geotextile Fabric will be attached to face of abutment footing and wings.
* Dimension varies due to 2% subdrain slope.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

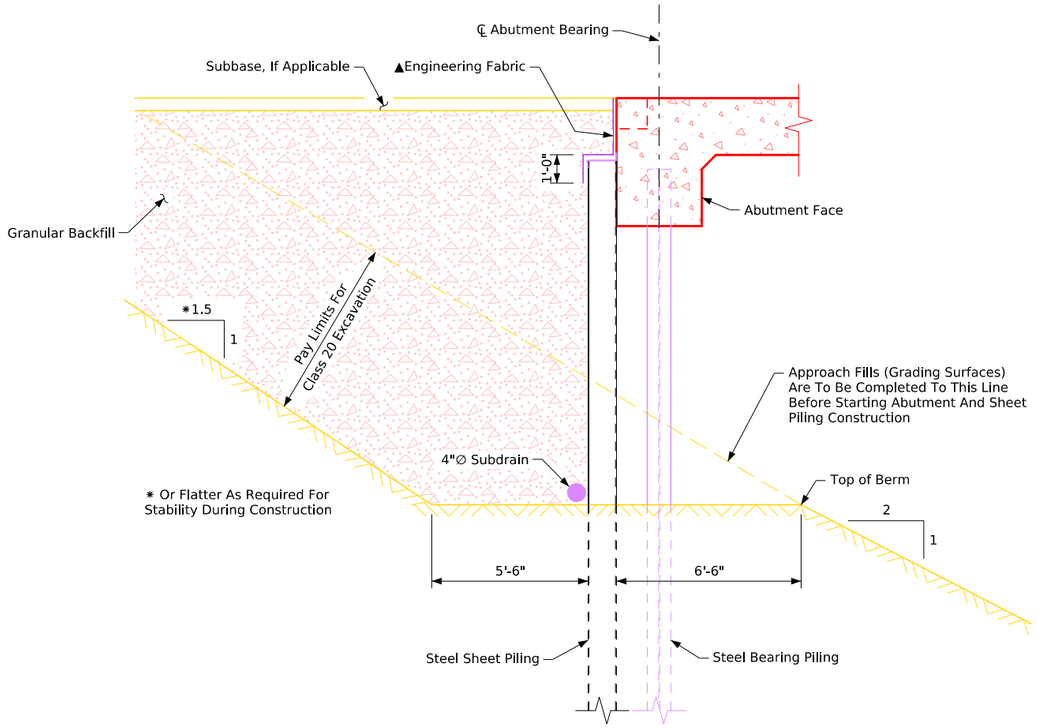
Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

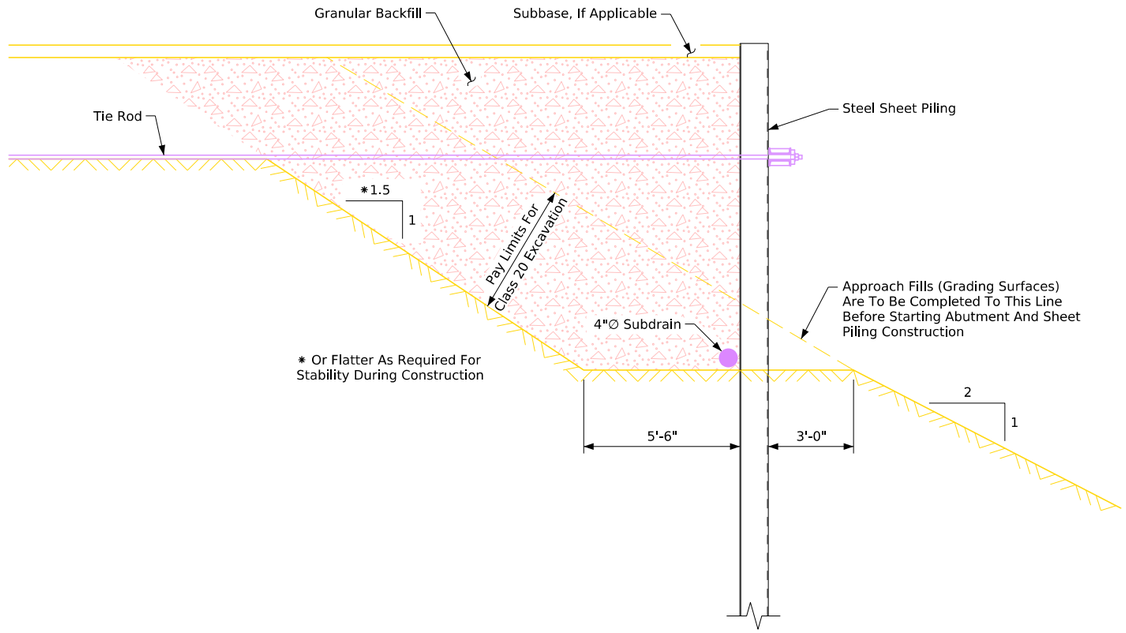
Abutment Backfill Details - Integral Abutments

J30S-41-25



Backfill Details
(Section Thru Abutment)

Notes:
Subdrain Shall Slope Downward 2% From ℄ Approach Roadway.



Backfill Details
(Section Thru Wing)

Notes:
Subdrain Shall Slope Downward 2% From ℄ Approach Roadway.

Notes:
▲ Engineering fabric is to be placed full width of sheet piling and extend 2'-0" minimum past vertical cover plates.
The engineering fabric shall be in accordance with Article 4196.01,B,6 of the Standard Specifications. If the engineering fabric is lapped, the laps shall be a minimum of one foot in length, shingle fashion and stapled for continuity.
The intended purpose of the engineering fabric is to prevent the backfill from spilling between sheet piling and abutment. The Contractor shall ensure all gaps are sealed to retain the backfill to the satisfaction of the Engineer.

Abutment Backfill Notes:
Abutment backfill operations shall proceed following the complete construction of the bridge abutments and slab.
Provide granular backfill meeting the requirements of Section 4133, except that the percent passing the No. 200 sieve shall not exceed 5.0%. Place and compact backfill according to the requirements of Article 2432.03, G, 3 of the Standard Specifications.
Place backfill behind both abutments simultaneously so that the two fills are kept at approximately the same depth at all times.
The cost of furnishing and placing subdrains (including excavation), subdrain outlets, and engineering fabric shall be included in the contract unit price bid for "Granular Backfill". No extra payment will be made.

Note:
Construction and installation of slab and abutment cap shall be completed prior to beginning installation of backfill.

Note:
See Subdrain Details sheet for details not shown on this sheet which are pertinent to this structure.

Latest Revision Date

Approved by Bridge Engineer

IOWA DOT

Standard Design - 30'-0" Roadway, Single Span Bridge

Single Span Concrete Slab Bridges

July, 2025

Abutment Backfill Details - High Abutments

J30S-42-25