LETTING DATE
Aug. 20, 2024

Bridge Replacement - PPCB

IM-NHS-080-4(082)139--03-77

POLK COUNTY

Index of Sheets	
No.	Description
Sheets	Bridge Plan
A.1	Title Sheet
A.2	Location Map Sheet
V.1	Estimated Bridge Quantities - Design No. 624
V.2 - V.35	Design No. 624
SPS Sheets	Bridge Plan Soils Sheet
SPS.1 - SPS.2	Bridge Plan Soils Sheet
Road Sheets	Road Plan
A.3 - U.1	Road Plans
C.1	Estimated Quantities - Road
C.1	Standard Plans - Road

IOWA DOT

Revisions

TOTAL
44
PROJECT IDENTIFICATION NUMBER
10-77-035-010-05
CONTRACT ID NUMBER
PROJECT NUMBER
IM-NHS-080-4(082)139--03-77
R.O.W. PROJECT NUMBER
PROJECT DIRECTORY NUMBER
7703501010

PLANS OF PROPOSED IMPROVEMENT ON THE

INTERSTATE ROAD SYSTEM

POLK COUNTY

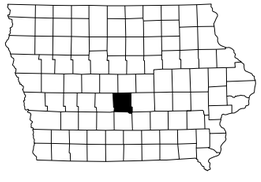
Bridge Replacement - PPCB

I-80 WB over Fourmile Creek - Stage 1
1.4 MI. E of NE I-35/235 Interchange (WB)

Refer to the Plan Sheets for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.14 of the Specifications.

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Standard Road Plans

Standard Road Plans are listed on Sheet Number C.1.

Design Data Urban

(I-80 W.B.)

2021 AADT	40,700	V.P.D.
2041 AADT	55,100	V.P.D.
2041 DHV	6,020	V.P.H.
TRUCKS	17	%
Total Design ESALs	-	

Index Of Seals

Sheet No.	Name	Type
A.1	Grant M. Schmitz	Structural Design
V.6	Brice E. Stafne	Hydraulic Design
SPS.1	Brian Havens	Geotechnical Design
A.3	Sean L. Ranney	Roadway Design

Structural Design

LICENSED PROFESSIONAL ENGINEER
GRANT M. SCHMITZ
25596
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature — Date: 05-31-2024

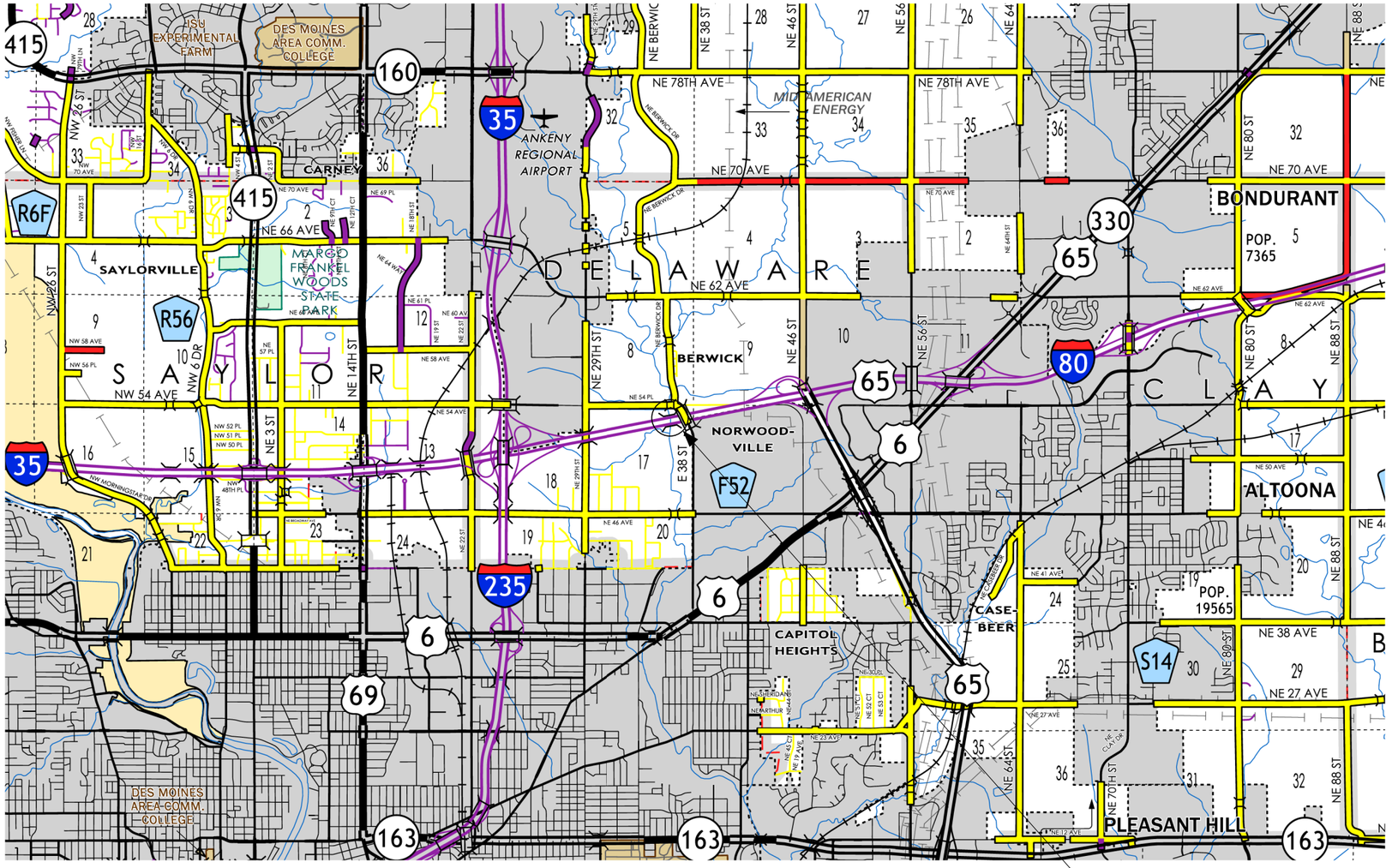
Grant M. Schmitz
Printed or Typed Name

My license renewal date is December 31, 2024

Pages or sheets covered by this seal: Sheets A.1, A.2, V.1 Thru V.35

R-23W

T-79N



LEGEND

- INTERSTATE HIGHWAY
- PRIMARY HIGHWAY-DIVIDED
- PRIMARY HIGHWAY
- PORTLAND CEMENT CONCRETE ROAD
- ASPHALT ROAD
- BITUMINOUS ROAD
- GRAVEL ROAD
- EARTHEN ROAD

- INTERSTATE HIGHWAY
- UNITED STATES HIGHWAY
- STATE HIGHWAY
- COUNTY HIGHWAY

- RAILROAD
- PIPELINE
- AIRPORT
- HYDROLOGY
- BRIDGE

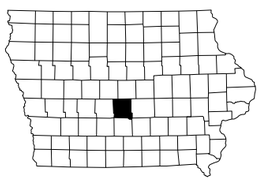
- STATE BOUNDARY
- COUNTY BOUNDARY
- CORPORATE BOUNDARY
- TOWNSHIP LINE
- SECTION LINE
- ROAD NAMES — ABBEY ROAD
- UNINCORPORATED PLACE — ELWOOD

- STATE PARKS
- STATE INSTITUTIONS
- FEDERAL LAND

Polk County Location Map

Not To Scale

Design No. 624
FHWA No. 041981



FILE NO. 32061	ENGLISH	DESIGN TEAM HDR	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER A.2

4:21:29 PM 4/19/2024 ESORENS pw:\\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5_Final_Bridge\6.0_CAD_BIM\6.2_WIP\Drafting\PPCB Design No. 624 - I-80WB over Four Mile Creek

Estimated Bridge Quantities

Item No.	Item Code	Item	Unit	Total	As Built Quantity
1	2104-2710020	Excavation, Class 10, Channel	CY	760	
2	2401-6750001	Removals, As Per Plan	LS	1.0	
3	2402-2720000	Excavation, Class 20	CY	170	
4	2403-0100010	Structural Concrete (Bridge)	CY	167.8	
5	2403-7000210	High Performance Structural Concrete	CY	416.0	
6	2404-7775000	Reinforcing Steel	LB	94509	
7	2404-7775005	Reinforcing Steel, Epoxy Coated	LB	104941	
8	2404-7775009	Reinforcing Steel, Stainless Steel	LB	8127	
9	2407-0562855	Beam, PPC, BTB55	EACH	7	
10	2407-0562865	Beam, PPC, BTB65	EACH	7	
11	2407-0562895	Beam, PPC, BTB95	EACH	7	
12	2408-7800000	Structural Steel	LB	7013	
13	2414-6424038	Concrete Barrier Rail, 3'-8"	LF	236.1	
14	2433-0001054	Conc Drilled Shaft, 54" Dia.	LF	318.0	
15	2433-0002000	Load Cell Test	EA	1	
16	2433-0003000	Demonstration Shaft	LF	49	
17	2501-0201057	Piles, Steel, HP 10 x 57	LF	640	
18	2501-6335010	Prebored Holes	LF	160	
19	2507-2638650	Bridge Wing Armoring - Erosion Stone	SY	9.1	
20	2507-3250005	Engineering Fabric	SY	1170.4	
21	2507-6800061	Revetment, Class E	TON	1176.1	
22	2507-8029000	Erosion Stone	TON	16.1	
23	2526-8285000	Construction Survey	LS	1.0	
24	2533-4980005	Mobilization	LS	1.0	
25	2599-9999010	Shoring	LS	1.0	

Estimate Reference Information

Item No. 1 Includes excavation below the grading surface for placement of engineering fabric, erosion stone and revetment. For details, see Design Sheet 6. All waste must be removed from the project site.

Item No. 2 Includes all work for removal and off-site disposal of portions of the deck, barrier, beams, and abutments of the existing 188'-4" x 56'-0" PPCB W.B. Bridge (Design No. 758) and widening plans (Design No. 1491) to the limits shown on Design Sheet No. 8. Removal of scheduled items shall be in accordance with Section 2401, of the Standard Specifications. Any damage to material not to be removed shall be the responsibility of the Contractor and repaired at no extra cost to the state. No portion of the piers may be removed unless prior written approval of the Engineer is obtained. Approval shall be obtained by submitting a written request to the Engineer. The request shall include the proposed limits of removal and a detailed plan describing how the elements are to be removed. Contractor to add the following information when submitting the Iowa DNR "Notification of Demolition" form:

Name of Asbestos Inspector: Brad Azeltine
Date Inspected: 5/19/2015
IA License Number: Iowa DOT
Inspector Phone: 515-239-1938

Item No. 4 All abutment footing and pier concrete is to be Class "C".

Item No. 5 This bid item includes the concrete for the deck, abutment diaphragms, pier diaphragms, wingwalls and portions of the maskwalls. Refer to the "Developmental Specifications for High Performance Concrete for Structures" for additional information. Includes all resilient joint filler required. Includes furnishing and placing subdrain (including excavation), floodable backfill, porous backfill, geotextile fabric, water flooding and subdrain outlet at abutments. Includes furnishing and placing 3 inch diameter PVC plastic pipe and expanding foam in the abutment wings. Includes cost for materials and labor to provide concrete rustication lines.

Item No. 6 Includes mechanical splicers at Pier Nos. 1 & 2.

Item No. 7 Includes mechanical splice systems at abutments for current and future stages of construction and stockpiling of mating parts for a future stage of construction. See Design Sheet 4 for Stockpile Notes.

Item No. 9-11 Includes pier and abutment bearing material and coil ties. See Materials IM 570 Appendix I for allowable bearing substitutes at integral abutments. Nonstandard stirrup lengths are used for these beams. Includes contractor filling out beam numbers by location and beam seat elevations in "PPC Beam Data Spreadsheet" and forwarding Electronic Spreadsheet to the Engineer.

Item No. 12 Includes 3 drains at 92 LB each.

Estimate Reference Information (Cont.)

Item No. 13 Includes material and labor associated with providing and installing the rigid steel conduit, junction boxes, and fittings. Includes 481 L.F. of 2" diameter rigid steel conduit. If placement of concrete is done by the slipforming method, Class BR concrete is required. Cast-in-place barrier rails shall use Class C mix. Price bid for this item shall include the cost of cast-in-place forms if required for placement of the concrete.

Item No. 14 Includes all necessary equipment, labor, and materials to construct the 54 inch diameter concrete drilled shafts in accordance with Article 2433 of the Standard Specifications. Includes furnishing and installing permanent steel casings.

Item No. 16 The demonstration shaft shall be located at approximately Sta. 5175+71, 135' Lt. as shown on Design Sheet No. 6 and constructed as specified in Section 2433.03 of the Standard Specifications. Demonstration shaft shall be as detailed on Design Sheet No. 35 and shall not be deleted. The demonstration shaft shall be used as the test shaft. Includes all costs of materials and labor for excavation, excavation incidentals (including casing), concrete, reinforcing steel and C.S.L. testing of demonstration shaft.

Item No. 17 Piling shall be Grade 50. Includes furnishing and installing steel pile points. For additional notes, see Design Sheet 12.

Item No. 19 Includes furnishing and placing engineering fabric, erosion stone, and all required excavating, shaping and compacting for wing armoring.

Item No. 20 Engineering fabric shall be material as specified for embankment erosion control in accordance with Article 4196.01, B, 3, of the Standard Specifications.

Item No. 21 & 22 Estimated at 1.6 Ton/CY and shall meet requirements of Article 4130 of the Standard Specifications. Broken concrete and granite is not allowed.

Item No. 25 The abutments require shoring to retain the adjacent roadway embankment. Shoring shall remain in place and will be removed in future stage of construction and become property of the future Contractor. See Design Sheets 5 and 7 for locations. See General Notes for shoring requirements. Shoring shall satisfy the Build America, Buy America requirements of Article 1107.06, B of the Standard Specifications. Includes all excavation and backfill required for installation of shoring.

Index Of Sheets

Sheet Descriptions	Sheet Number
Estimated Quantities	V.1
Summary Quantities	V.2
General Notes	V.3
Situation Plan	V.5
Staking Diagram	V.7
Construction Staging	V.8
Pier Details	V.9
Abutment Details	V.11
Superstructure Details	V.15
Beam Details	V.20
Steel Diaphragm Details	V.24
Top of Deck Elevations	V.26
Haunch Data Details	V.27
Conduit Details	V.28
North Barrier Rail Details	V.29
Bridge Wing Armoring	V.32
Subdrain Details	V.33
Abutment Backfill Details	V.34
Test Shaft Details	V.35
Soil Profile Sheets	SPS.1

Roadway quantities are shown elsewhere in these plans.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Estimated Quantities

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 1 of 35 — FHWA No. 041981

Summary of Concrete Quantities

Location	Structural Concrete	HPC Structural Concrete
West Abutment Ftg. **	26.7	-
East Abutment Ftg. **	27.0	-
Bridge Deck + Abut. & Pier Diaphagms + Abut. Wings ***	-	416.0
Pier No. 1	57.0	-
Pier No. 2	57.1	-
Total (Cu. Yds.)	167.8	416.0

** Includes Abutment Maskwalls Below Construction Joint
*** Includes Abutment Maskwalls Above Construction Joint

Summary of Reinforcing Steel

Location	Non-Coated Reinforcing Steel	Stainless Steel Reinforcing Steel	Epoxy Coated Reinforcing Steel
Bridge Deck + Abutment Footing *	167	6,354	97,599
Abutment Wings	-	-	396
Pier No. 1	43,287	-	-
Pier No. 2	43,287	-	-
North Barrier Rail	-	1,389	6,408
Barrier Rail - End Sections	-	384	538
Demonstration Shaft	7,768	-	-
Total (Lbs.)	94,509	8,127	104,941

* Includes Abutment Diaphragms & Maskwalls and Pier Diaphragms

Summary of Excavation

Location	Class 10 Excavation	Class 20 Excavation
West Abutment	479	85
East Abutment	281	85
Total (Cu. Yds.)	760	170

Summary of Foundations

Location	Substructure Type	Foundation Type	Number	Length (Lin. Ft.)	Total (Lin. Ft.)
West Abutment	Integral Abutment	HP 10x57	8	40	320
East Abutment	Integral Abutment	HP 10x57	8	40	320
Pier No. 1	Frame Pier	Conc. Drilled Shaft, 54" Dia.	3	53.0	159.0
Pier No. 2	Frame Pier	Conc. Drilled Shaft, 54" Dia.	3	53.0	159.0
		Total HP 10x57 (Lin. Ft.)			640
		Total Conc. Drilled Shaft, 54" Dia. (Lin. Ft.)			318.0

Summary of Prebored Holes

Location	Number	Length (Lin. Ft.)	Total
West Abutment	8	10	80
East Abutment	8	10	80
		Total (Lin. Ft.)	160

Summary of Structural Steel

Location	Total (Lbs.)
Diaphragms	6,737
Bridge Deck Drains	276
Total (Lbs.)	7,013

Summary of Bearings

Location	Bearing Type	Number	Associated Bid Item
West Abutment	3 x 3 Bar	7	PPC Beams
East Abutment	3 x 3 Bar	7	PPC Beams
Pier No. 1	Plain Neoprene 1"	7	PPC Beams
Pier No. 2	Plain Neoprene 1"	7	PPC Beams

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans 97'-0" Interior Span

Summary Quantities Sheet

STA. 5174+26.60 (℄ I-80 Ultimate) Turn-in Date: May, 2024

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 Design Sheet No. 2 of 35 FHWA No. 041981

HDR

Specifications:

Design: AASHTO LRFD 8th Ed, Series of 2017, 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, including the following shall apply to construction work on this project:

-Developmental Specifications for "High Performance Concrete for Structures"
-Special Provisions for "Concrete Drilled Shafts"

Design Stresses:

Design stresses for the following materials are in accordance with the AASHTO LRFD Bridge Design Specifications, 8th ed, Series of 2017, except as noted in the current Iowa Bridge Design Manual.

-Reinforcing steel in accordance with AASHTO LRFD Section 5, Grade 60 for Epoxy Coated and Non-Coated, and Grade 60 or 75 for stainless.
-Concrete in accordance with LRFD AASHTO Section 5, f'c = 4.0 ksi, except Prestressed Beam Concrete as noted.
-Prestressed Concrete Beams, see Design Sheet 20.
-Structural Steel in accordance with AASHTO LRFD Section 6, ASTM A709 Grade 50 (AASHTO M270 Grade 50), except as noted.

General Notes:

This design is for the partial replacement of the existing 188'-4" x 56'-0" PPCB W.B. Bridge, Design Nos. 758 & 1491. This design covers the first stage of the replacement bridge which will consist of a 219'-0" x 52'-10" PPCB bridge.

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

The City and utility companies whose facilities are shown on the plans or known to be within the construction limits shall be notified by the Bridge Contractor of the starting date.

Electronic copies of original design plans are available to the Contractor as part of the E-Files supplied with the contract documents. Dimensions shown on these plans are based on design plans (Original Design No. 758) and widening plans (Design No. 1491).

"Removals As Per Plan" include all costs associated with removing the deck, barrier, beams and abutments of the existing 188'-4" x 56'-0" PPCB W.B. Bridge (Design No. 758) and widening plans (Design No. 1491) to the limits shown on Design Sheet 8. Removals shall be in accordance with Section 2401, of the Standard Specifications. Any damage to other portions of the existing structure not noted for removal shall be the responsibility of the Bridge Contractor and shall be repaired at no extra cost to the State.

Faint lines on plans indicate the existing structure.

Roadway excavation will not be part of the project but it will be included in a tied project associated with this contract. Excavation quantities for the abutments are based on the assumption that abutment fills are in place prior to starting construction of the abutments.

It shall be the Bridge Contractor's responsibility to provide sites for excess excavated material. No payment for overhaul will be allowed for material hauled to these sites.

The Bridge Contractor shall prebore holes for abutment piles. Holes shall be bored to the elevations shown on the "Longitudinal Section along CL W.B. Roadway" on Design Sheet 5. Piles shall be driven through the holes to at least the specified design bearing.

The approach fills are not a part of this project, but it will be included in another tied project associated with this contract. The approach fill as shown are to be in place before abutment piles are driven.

Concrete barrier rails placed using the slipform method will require the use of a Class BR concrete in accordance with Article 2513.03, A, 2 of the Standard Specifications. Cast-in-place barrier rails shall use Class C mix. Class D concrete is not permitted for concrete barrier rails (cast-in-place or slipformed method).

Cast in-one-piece steel pile points are required for all abutment piles in accordance with Article 4167.02 of the current Standard Specifications and Materials IM 468.

Final drilled shaft lengths will be determined by the Engineer after review of the load cell test results.

All reinforcing is to be securely wired in place before concrete is poured.

All exposed concrete corners, 90 degress or sharper to be filleted with a ¾" dressed and beveled strip, unless noted otherwise.

Elevations of the existing I-80WB piers that remain under this stage of construction were developed based on the existing bridge plans. The Bridge Contractor shall field verify these elevations before starting construction to verify a conflict with the proposed beams does not exist.

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.

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.

During construction of this project the Bridge Contractor will be required to coordinate operations with those of other Contractors working within the same area. Other work in progress during the same period of time is shown in the tied roadway plans, Project No. IM-NHS-080-4(80)138--03-77.

The Contractor shall be responsible for ensuring stability of prestressed concrete beams during erection and construction up through the concrete bridge deck reaching its full 28-day strength. The Contractor shall provide sufficient temporary anchor bracing at beam ends and temporary intermediate bracing as needed to ensure prestressed beam stability. Partially or fully installed permanent bracing as shown in these design plans shall not be assumed sufficient to brace prestressed beams during erection and construction. Temporary bracing shall not be welded to prestressed beam stirrups.

Guardrail is to be placed under tied project IM-NHS-080-4(80)138--03-77.

Working Drawing and Calculation Submittals

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

Submittal Requirements for working drawings and calculations shall be in accordance with 1105.03 of the Standard Specifications for Highway and Bridge Construction of the Iowa Department of Transportation. The absence of a certification requirement for a submittal does not relieve the contractor of the responsibility to attain certification.

Calculation submittals in the table which are associated with working drawing submittals shall be submitted on the same day. Review time for calculation submittals shall be of the same duration as and run concurrently with review time for associated working drawings. The calculation submittals listed in the table are not meant to be an exhaustive list and do not relieve the Contractor from providing additional calculation submittals if requested by the Engineer.

No.	Working Drawing Description	Working Drawing File Name Convention for Submittal	Certified by Iowa P.E. (Yes/No)
1	Steel Diaphragms	(082)_Polk_Design624_SteelDiaphragms.pdf	No
2	Deck Drains	(082)_Polk_Design624_DeckDrains.pdf	No
3	Threaded Ends of Reinforcing Bars for Mechanical Couplers	(082)_Polk_Design624_RebarThreads.pdf	No
4	Shoring	(082)_Polk_Design624_Shoring.pdf	Yes
No.	Calculation Description	Calculation File Name Convention for Submittal	Certified by Iowa P.E. (Yes/No)
5	Shoring	(082)_Polk_Design624_ShoringCalcs.pdf	Yes

Bridge Deck Dimensions Table

	Item	Units	Quantity
1	Deck Length	L.F.	222.1
2	Minimum Deck Width	L.F.	54.4
3	Maximum Deck Width	L.F.	54.4
4	Deck Area	S.F.	12,082

1. Deck length is measured from face-to-face of paving notches along the centerline of the roadway.

2, 3. Deck widths are measured from out-to-out of deck perpendicular to the centerline of the roadway.

4. Deck area is to be based on the face-to-face paving notch distance and out-to-out deck dimensions.

A scrape sample was taken from an abutment bearing of this bridge to get an indication of the existence of and level of total lead and total chromium. Analysis of total lead on this sample was 580 Parts Per Million (PPM.) Analysis of total chromium on this sample was 10 PPM. These analysis show the existence of these two toxic constituents. Levels indicated by these tests could create conditions above regulatory limits for health and safety requirements. No other constituents were analyzed. The bidder should not rely on the Iowa DOT's testing and analysis for any purpose other than as an indication of the existence of these two toxic constituents.

Design History at this Site

(Includes this Design)

Des. No.	Type of Work
758	Original Design - PPCB
1491	Bridge Widening - PPCB
624	Bridge Replacement - PPCB

All plan dimensions are horizontal unless noted otherwise.

404 Permit information and the pollution prevention plan are included in the tied road plans, project No. IM-NHS-080-4(80)138--03-77

Traffic control plan:
The roadway will be open to thru traffic. Refer to the traffic control plan included in the tied road plans, Project No. IM-NHS-080-4(80)138--03-77.

HDR

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans 97'-0" Interior Span

General Notes

STA. 5174+26.60 (℄ I-80 Ultimate) Turn-in Date: May, 2024

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 Design Sheet No. 3 of 35 FHWA No. 041981

General Notes (Cont.):

Forms for pier caps on Pier Nos. 1 and 2 may be removed with the approval of the Engineer when the following two conditions have been met:

- Pier cap concrete has been in place for a minimum of 2 calendar days excluding days that the concrete surface is subjected to temperatures at or below 40°F and
- The pier cap concrete strength is at least 2500 psi.

Minimum concrete compressive strength of 2500 psi shall be verified by flexural strength according to Materials I.M. 316 with a minimum flexural strength of 450 psi or by the maturity method according to Materials I.M. 383. Curing of pier cap concrete shall be in accordance with the Standard Specifications. Pier cap concrete shall be subjected to exterior loads in accordance with Article 2403.03, N, 2, of the Standard Specifications.

Shoring (sheet pile or other) shall be required as necessary to prevent the earth under the traffic lane from sloughing during construction.

The Contractor shall submit a shoring plan for review. The shoring plan shall be designed and certified by a Professional Engineer licensed in the State of Iowa. When determining slope stability to support structures such as bridges, culverts and retaining walls, a global stability analysis shall be included in the design of the temporary shoring in accordance with Chapter 200F-1 in the Design Manual of the Iowa DOT, Design Bureau. The Contractor shall not proceed with installation of the shoring without notice to proceed from the Engineer.

The shoring submittal shall include:

- Design calculations (including a global stability analysis)
- Soil properties
- Shoring material properties
- Shoring plan layout (showing location of traffic)
- Shoring details
- Design parameters (including design loads, retained fill height and required bottom of shoring elevations to accommodate any abutment removals)

Shoring to remain in place and be removed by others in a future contract, and shall be paid for as a lump sum including all cost for designing, furnishing and installing. Shoring shall satisfy the requirements of Material I.M. 107 and Articles 1107.06, B and 1107.07, of the Standard Specifications. A copy of the as-built shoring plans shall be submitted to the RCE.

Stockpile Notes:

The Bridge Contractor shall stockpile the mating parts (material) of mechanical bar splice systems for use in the subsquent construction stage. The bridge Contractor shall transport these materials to the Iowa DOT Des Moines North Maintenance Garage at 1530 NE 53rd Ave. Des Moines, IA 50313. Contact Jacob Bennett, phone number (515) 520-7780, 48 hours prior to delivery. The Bridge Contractor shall unload and stockpile these materials upon delivery. Stockpiling entails delivering the material to a secure location as directed, protecting the material so that it is kept dry and off ground, and tagging the material with bridge identification and location in the construction it is to be used. All costs to stockpile these materials are included in the bid item "Reinforcing Steel, Epoxy Coated". At the discretion of the Engineer, any damaged material must be replaced at the cost to the Bridge Contractor.

General Notes for Concrete Rustication:

Strips and panels used as inserts within concrete forms to create the rustication features may be made of wood, steel, plastic or other nonporous material capable of withstanding anticipated concrete pour pressures without physical defects. Wood inserts, if used, shall be free of warp, twist, checks or cracks, and shall be presoaked prior to placement of concrete in the forms.

Rustication inserts shall easily attach to forms and shall not allow leakage of concrete between the form and the insert. When steel forms are used, rustication strips may be rigidly attached to the inside surfaces of the forms. When steel forms are not used, rustication strips and other inserts for small recesses on exposed concrete surfaces shall be fastened to the forms in a manner that will permit them to remain in place when the forms are removed. Leave inserts in place until they can be removed without damage to the surrounding concrete.

The inserts shall be designed to form surfaces and features conforming to the design intent including the shape, lines, depths and dimensions shown in the plans. Create inserts using a minimum number of splice joints in their length. Splices, if used, shall be tightly joined so as not to allow gaps or leaks, and shall not create any change in alignment or shape of the rustication feature. Do not locate form ties within concrete rustications.

For rustication features following the perimeter of rounded surfaces, it may be necessary to use multiple layers of insert material in order to achieve the radius curve. This is acceptable, provided that the final shape, line, depth, and dimension of the features are maintained in the final result.

During loading of forms with concrete, take extra care to ensure proper consolidation of concrete around all rustication inserts to preserve the shape, line and depth of all intended features in the final concrete surface. Following removal of forms, repair all defects to achieve the rustication features as specified in the plans. Patch voids, honeycomb areas, etc., in accordance with the Standared Specifications. If surfaces will not receive a colored sealer coating, add white cement to the patching mortar to lighten it in order to match or be slightly lighter than surrounding concrete when dry. Completed surface shall be free from blemishes, surface voids and conspicuous form marks to the satisfaction of the Engineer. The Contractor shall correct any surface defects to the satisfaction of the Engineer at no additional cost to the project.

All costs associated with concrete rustication are to be included in the bid item "High Performance Structural Concrete".

HDR

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans 97'-0" Interior Span

General Notes

STA. 5174+26.60 (℄ I-80 Ultimate) Turn-in Date: May, 2024

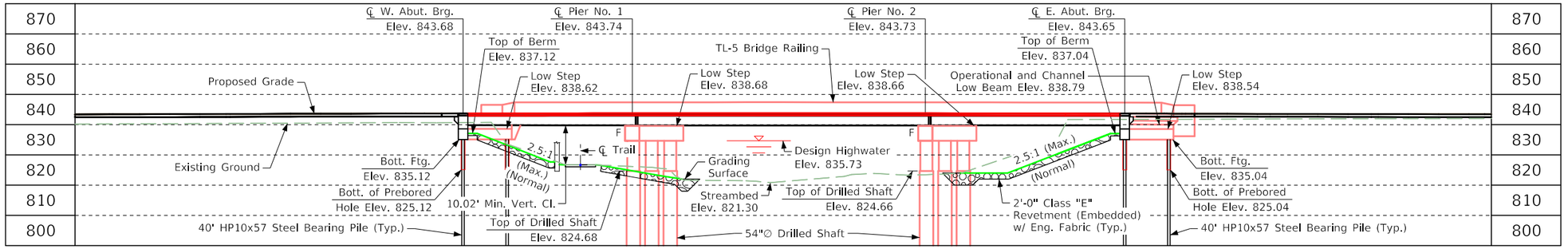
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 Design Sheet No. 4 of 35 FHWA No. 041981

Bench Mark No. Feno200, 1-Meter Rod Monument, Sta. 1183+18.58, 845.82' Rt., Elev. 851.56

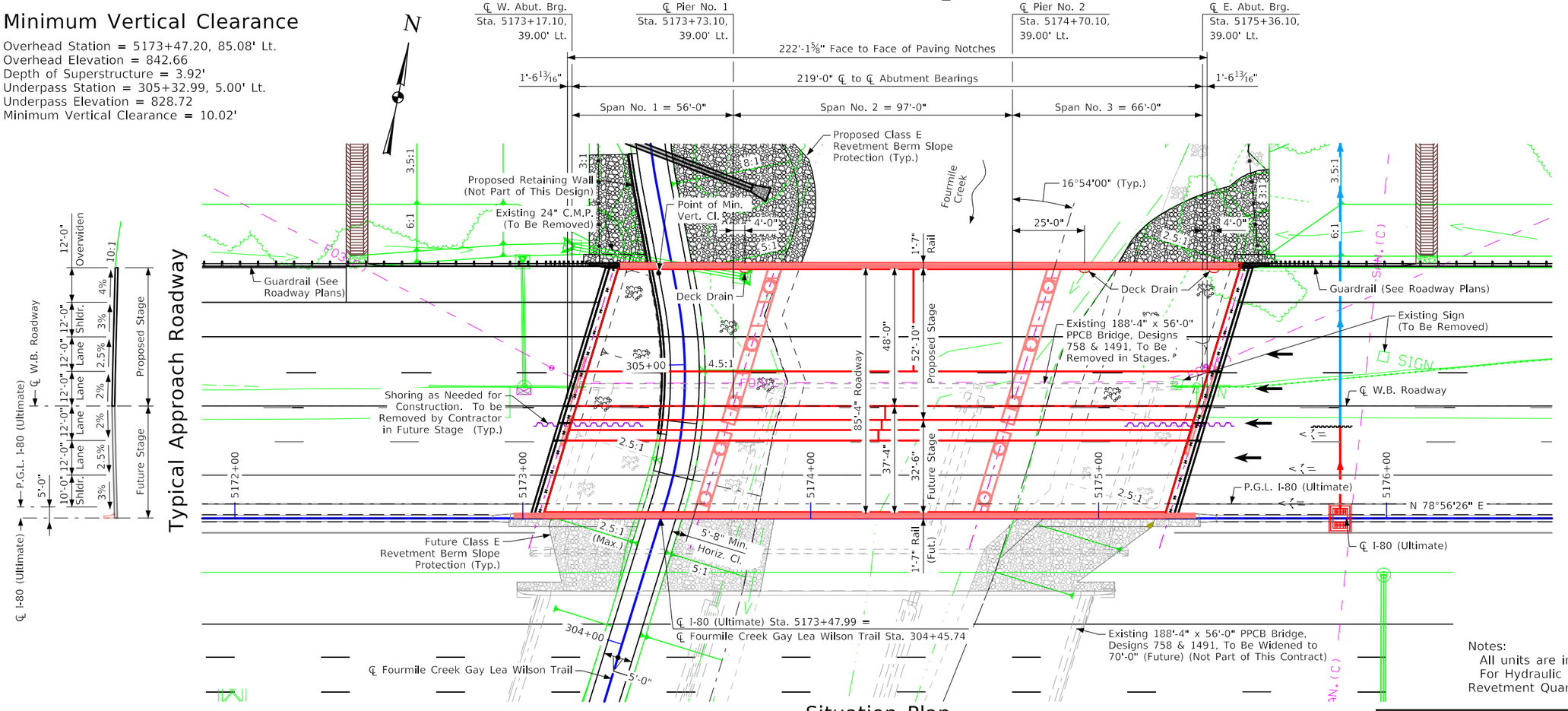
Note:
Top of bridge deck at ℄ W.B. Roadway is 0.81' above the profile grade to account for deck cross slope and parabolic crown.



Longitudinal Section Along ℄ W.B. Roadway

Minimum Vertical Clearance

Overhead Station = 5173+47.20, 85.08' Lt.
Overhead Elevation = 842.66
Depth of Superstructure = 3.92'
Underpass Station = 305+32.99, 5.00' Lt.
Underpass Elevation = 828.72
Minimum Vertical Clearance = 10.02'



Situation Plan

Location

I-80 W.B. over Fourmile Creek
T-79N R-23W
Section 17
Delaware Township
Polk County
FHWA No. 041981
Bridge Maint. No. 7739.4L080
Latitude 41.656652°
Longitude -93.545866°

Traffic Estimate

2021 AADT	40,700 V.P.D.
2041 AADT	55,100 V.P.D.
2041 DHV	6,020 V.P.H.
TRUCKS	17 %
Total Design ESALs	-

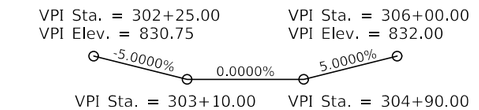
Notes:
All units are in feet unless noted otherwise.
For Hydraulic Data, Revetment Details and Revetment Quantities, see Design Sheet 6.

Utilities Note:

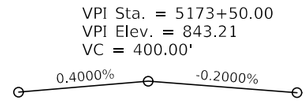
Utilities shown on this sheet are for information only.
See Road Design sheets for utility information.

General Utility Symbols:

E - Electric Line
G - Gas Line
SAN. - Sanitary Sewer
T - Telephone Line
W - Water Line
FO - Fiber Optic Line
GHP - Gas High Pressure
ST S - Storm Sewer
TV - TV
- Power Poles



Fourmile Creek Gay Lea Wilson Trail Proposed Profile Grade



I-80 (Ultimate) Proposed Profile Grade

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Situation Plan

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

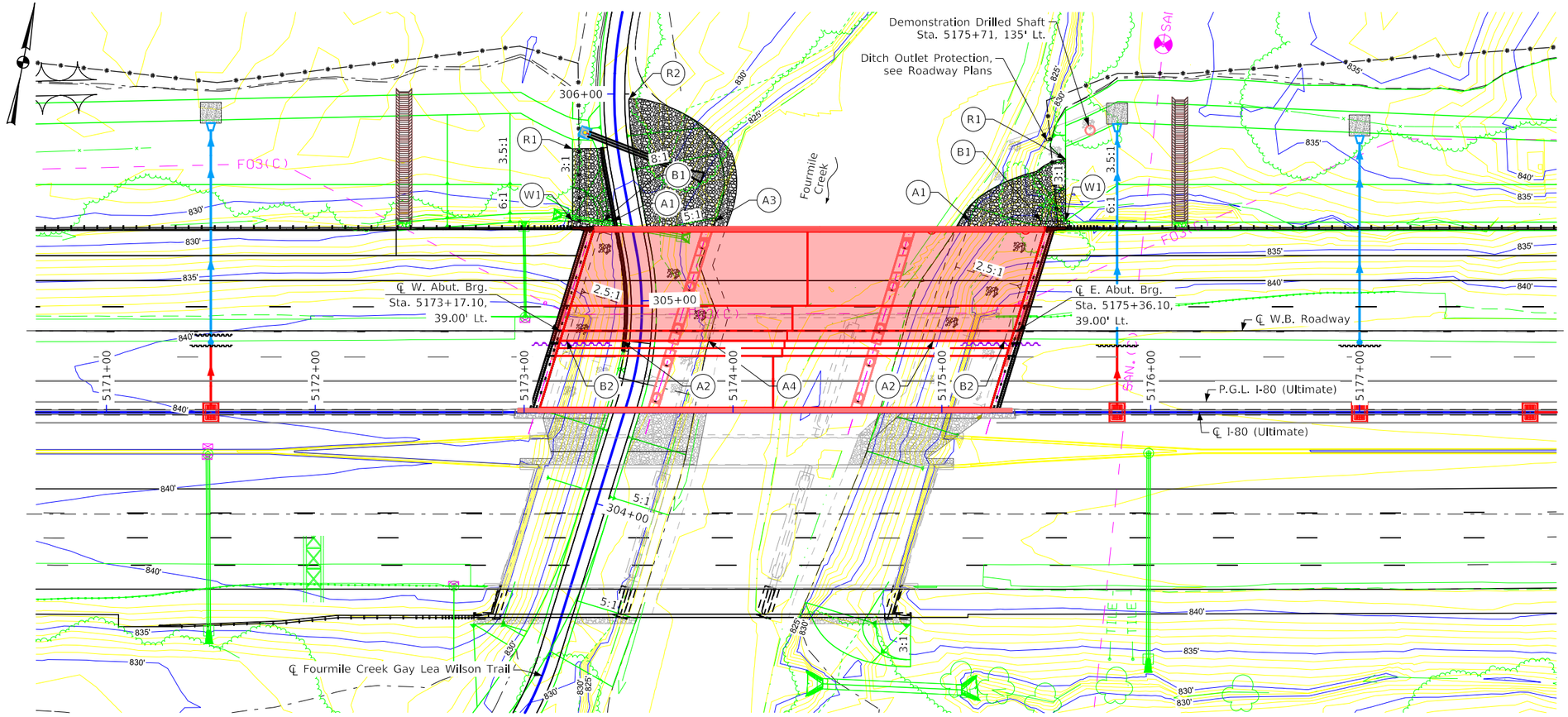
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 5 of 35 — FHWA No. 041981

FILE NO. 32061	ENGLISH	DESIGN TEAM HDR	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.5

11:30:45 AM 5/15/2024 ESORENS pw:\\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5_Final_Bridge\6.0_CAD_BIM\6.2_WIP\Drafting\PPCB Design No. 624 - I-80WB over Four Mile Creek

Bench Mark No. Feno200, 1-Meter Rod Monument, Sta. 1183+18.58, 845.82' Rt., Elev. 851.56



Site Plan

Fourmile Creek Hydraulic Data

RIDB: FourmileC_Polk_8.78
Drainage Area = 83.9 Sq. Mi.
Stream Slope (HGL) = 7.0 Ft./Mi.
Avg. Low Water Stage = 824.6

Operational Low Beam = 838.79
Channel Low Beam = 838.79

Q_{25} = 6,586 cfs
Stage = 834.33

Q_{50} = 8,220 cfs
Stage = 835.01
Operational Freeboard = 3.78 Ft.
Channel Velocity = 4.6 fps

Q_{100} = 10,189 cfs
Stage = 835.73
Operational Freeboard = 3.06 Ft.
Backwater = 0.61 Ft.
Channel Velocity = 5.3 fps

Q_{200} = 11,885 cfs
Stage = 836.33
Calculated Design Scour = 811.6

Q_{500} = 14,233 cfs
Stage = 838.44
Channel Freeboard = 0.35 Ft.
Avg. Bridge Velocity = 5.8 fps
Calculated Check Scour = 811.0

Roadway Overtop = 841.3
Sta. = 5168+25.00

Extreme HW Stage = 836.0 (Est.)
Date = 7/1/2018

Site is located within Polk County
F.I.S., Dated 2/1/2019.
F.I.S. Datum 0.0 Ft. Above Project Datum.
F.I.S. Base Flood = 10,189 cfs used for no-rise information.

Berm Slope Location Table

Points	West Abutment			East Abutment		
	Station	Offset	Elev.	Station	Offset	Elev.
A1	5173+42.41	91.58' Lt.	835.58	5175+13.30	91.58' Lt.	824.00
A2	5173+47.01	34.17' Lt.	827.33	5174+95.86	34.17' Lt.	824.00
A3	5173+91.49	91.58' Lt.	822.00	-	-	-
A4	5173+88.26	34.17' Lt.	822.00	-	-	-
B1	5173+37.78	91.58' Lt.	837.12	5175+47.37	91.58' Lt.	837.04
B2	5173+20.33	34.17' Lt.	837.12	5175+29.93	34.17' Lt.	837.04
W1	5173+23.12	91.58' Lt.	842.44	5175+59.25	91.58' Lt.	842.34
R1	5173+23.12	126.09' Lt.	830.94	5175+59.21	121.21' Lt.	832.45
R2	5173+50.15	150.00' Lt.	831.18	-	-	-

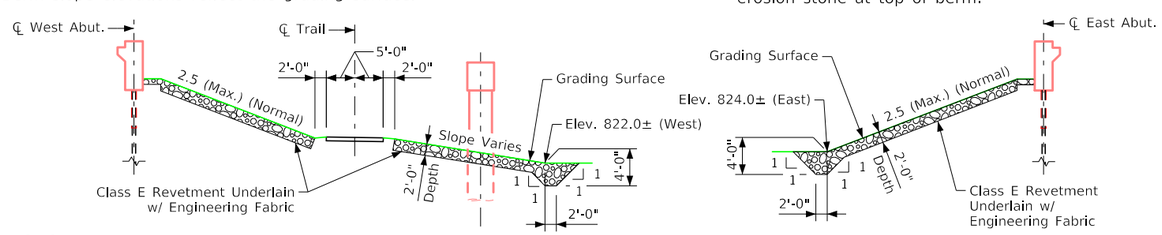
Berm slope elevations reflect the grading surface.

Note:
See Revetment Stone (Embedded) Outlet Details on Design Sheet 33 for limits of erosion stone at top of berm.

Estimated Berm Armoring Quantities

Location	Revetment Class E (Ton)	Erosion Stone (Ton)	Engineering Fabric (SY)	Class 10 Channel Excavation (CY)
West Abutment Berm	733.0	8.1	723.0	479
East Abutment Berm	443.1	8.0	447.4	281
Totals	1,176.1	16.1	1,170.4	760

Excavation quantity calculated from grading surface. Excavation quantity is for embedded revetment core out only, and does not include excavation to the grading surface. Excavation quantity to the grading surface is determined by Road Design and included in the tied Road Plans project IM-NHS-080-4(80)138--03-77.



Section Through Stone Toe and Berm Lining

Hydraulic Design

LICENSED PROFESSIONAL ENGINEER
Brice E. Stafne
22589
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature: Brice E Stafne — Date: 04-22-2024

Printed or Typed Name: Brice E. Stafne

My license renewal date is December 31, 2024

Pages or sheets covered by this seal: H&H Data & Scour Protection Details on V.6

Note:
For notes, see Design Sheet 5.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

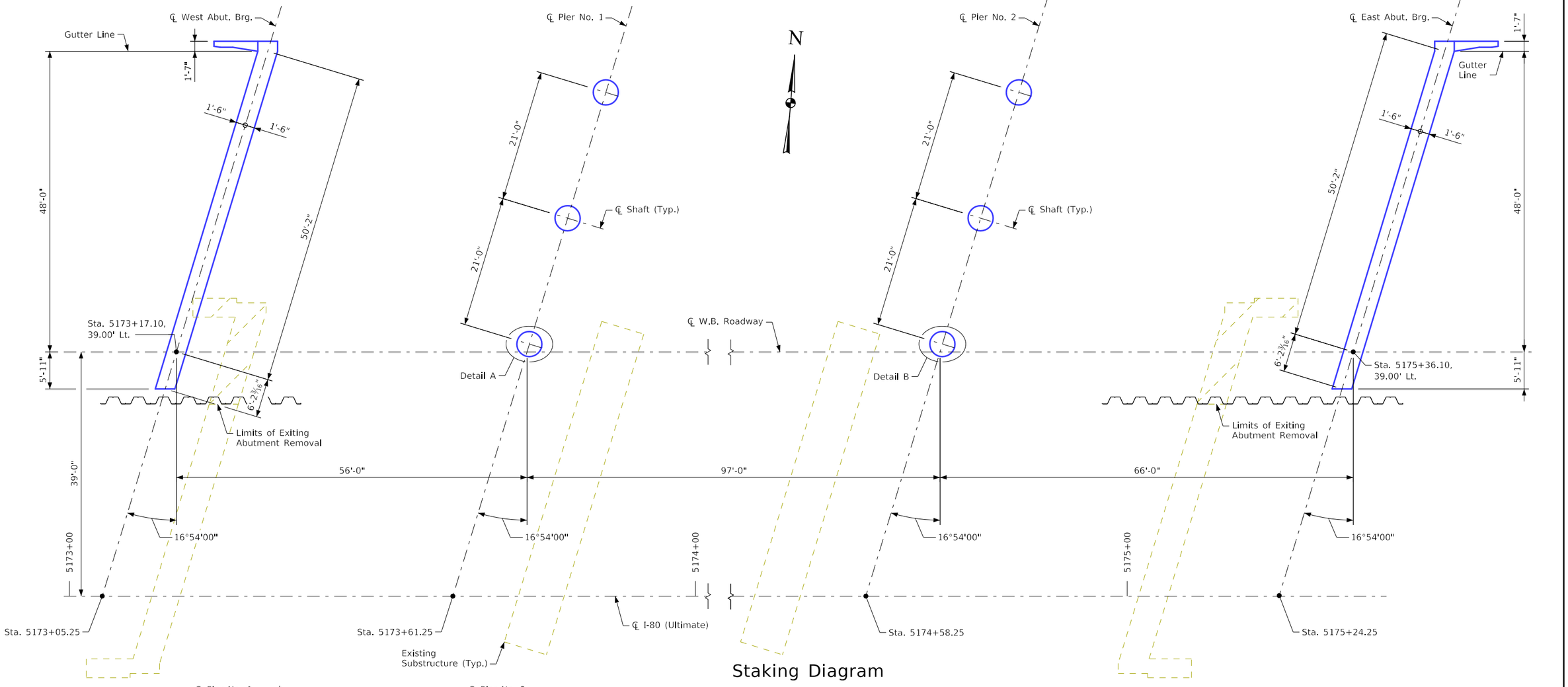
Situation Plan - Site

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

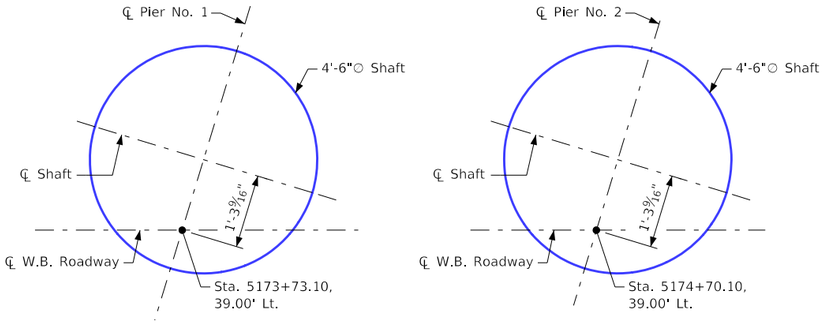
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 6 of 35 — FHWA No. 041981



Staking Diagram



Detail A

Detail B

Bridge Coordinates				
Location	℄ W. Abut. Brg.	℄ Pier No. 1	℄ Pier No. 2	℄ E. Abut. Brg.
Left Edge of Deck	E = 1627780.723 N = 603618.459	E = 1627835.683 N = 603629.201	E = 1627930.882 N = 603647.808	E = 1627995.656 N = 603660.469
℄ W.B. Roadway	E = 1627775.450 N = 603566.907	E = 1627830.410 N = 603577.649	E = 1627925.608 N = 603596.256	E = 1627990.383 N = 603608.916
Right Edge of Deck	E = 1627774.936 N = 603561.881	E = 1627829.896 N = 603572.624	E = 1627925.094 N = 603591.231	E = 1627989.869 N = 603603.891

Note:
An electronic file containing the bridge coordinate data is available as part of the e-files supplied with the contract documents. The Contractor shall verify these coordinates with the project horizontal control information provided in the Road Plans.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Staking Diagram

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

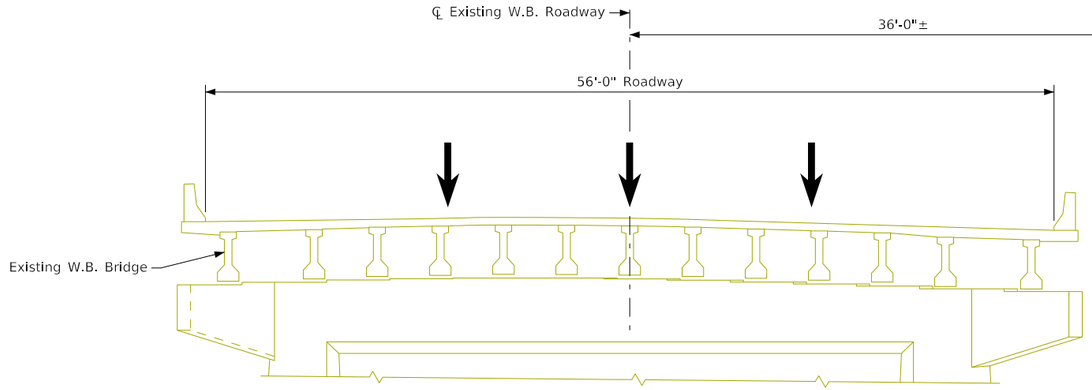
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

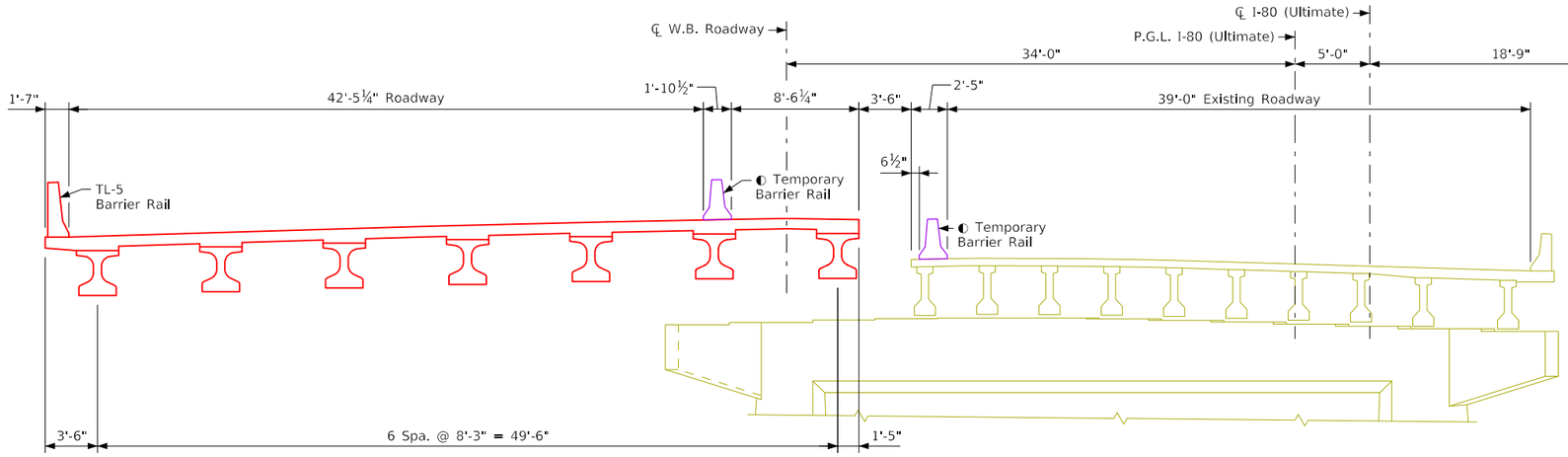
Design No. 624 — Design Sheet No. 7 of 35 — FHWA No. 041981

FILE NO. 32061	ENGLISH	DESIGN TEAM CJL/GMS/MJS	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.7

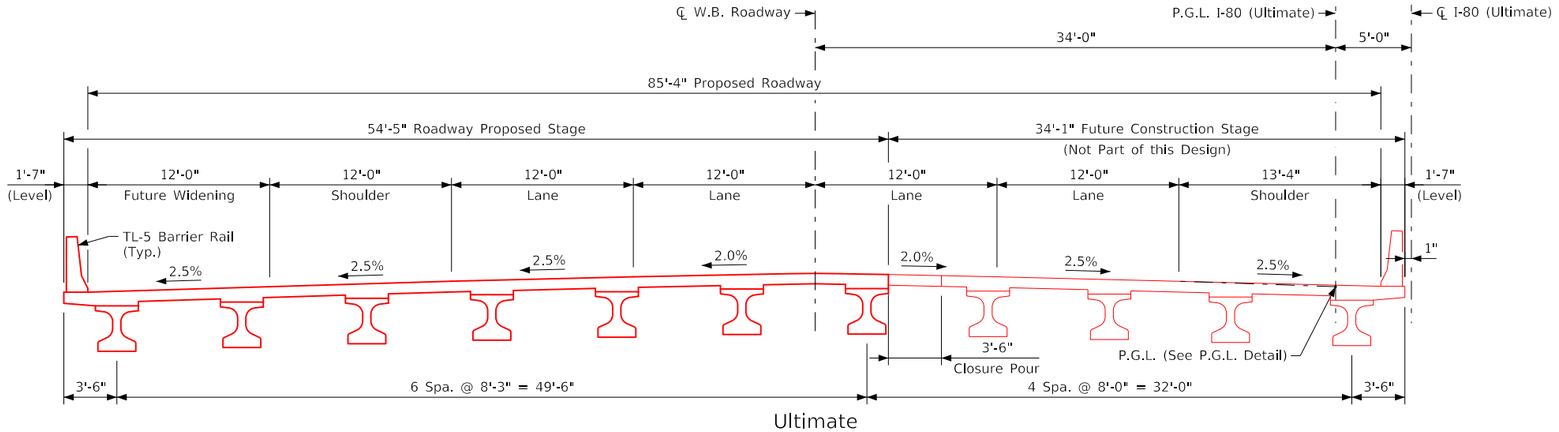
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Existing Condition



Roadway Proposed Stage



Ultimate
(For Information Only)

Construction Staging
(Looking Ahead Station)

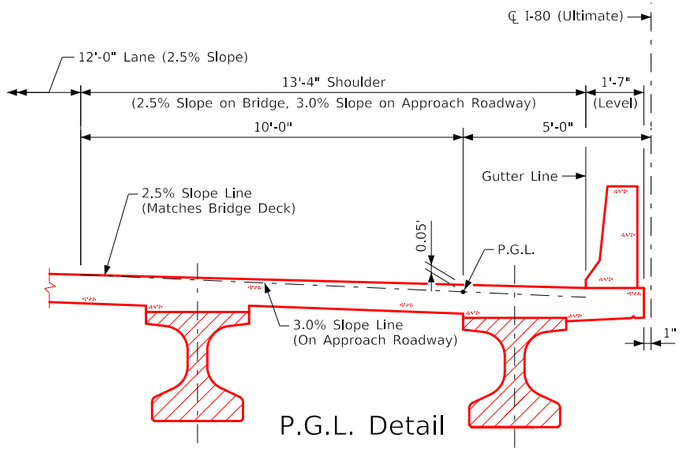
◐ Temporary Barrier Rail Notes:

Place Temporary Barrier Rail on existing W.B. bridge. Build 54'-5" wide segment of proposed W.B. bridge, Design No. 624. Place Temporary Barrier Rail on proposed W.B. bridge. Future stage of W.B. bridge is to be built by others.

Temporary Barrier Rail shall be anchored to deck as per Standard Road Plan BA-401.

The tied road plans, Project No. IM-NHS-080-4(80)138--03-77, contain the full traffic control plan, additional details and payment of the Temporary Barrier Rail. All Temporary Barrier Rail shown shall remain and become the property of the Iowa Department of Transportation.

Note:
The P.G.L. is located within the south shoulder of the I-80 westbound approach roadway. The shoulder transitions from a 3.0% cross slope on the west approach roadway to 2.5% on the bridge, and back to 3.0% on the east approach roadway. However, the P.G.L. location does not change and is always located on the 3.0% cross slope line. The result is that P.G.L. does not lie on the bridge deck, but is 0.05' below the bridge deck. See detail below.



P.G.L. Detail

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Construction Staging

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 8 of 35 — FHWA No. 041981

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/JAP/EES	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.8

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Bench Mark No. Feno200, 1-Meter Rod Monument, Sta. 1183+18.58, 845.82' Rt., Elev. 851.56

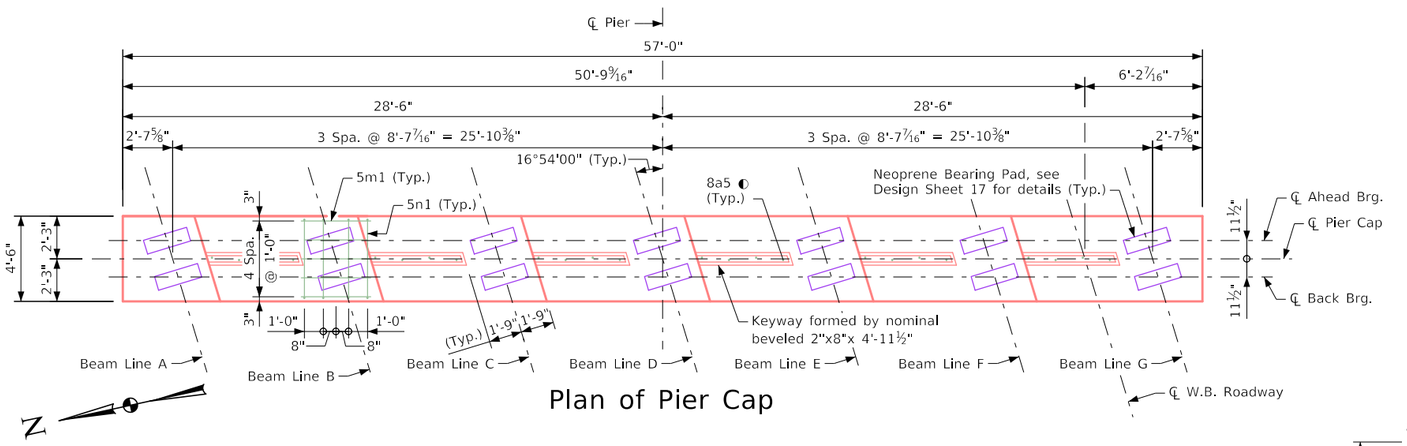
Table of Pier Steps

Step	Pier No. 1	Pier No. 2
a	2 7/16"	2 1/2"
b	2 7/16"	2 1/2"
c	2 7/16"	2 1/2"
d	2 7/16"	2 1/2"
e	2"	2 1/16"
f	1 1/16"	5/8"

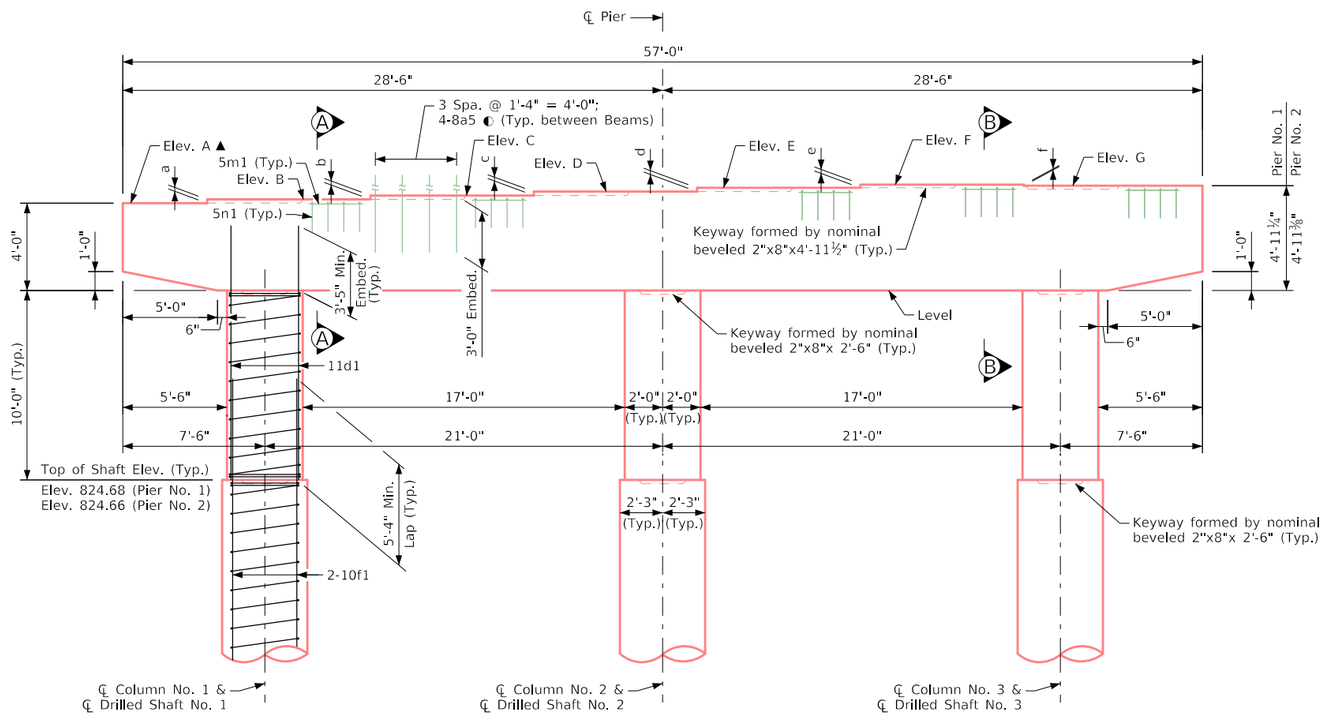
Table of Pier Elevations

Elevation	Pier No. 1	Pier No. 2
Elev. A	▲ 838.68	▲ 838.66
Elev. B	838.89	838.86
Elev. C	839.09	839.07
Elev. D	839.30	839.28
Elev. E	839.50	839.49
Elev. F	839.67	839.66
Elev. G	839.62	839.61
Bottom of Cap	834.68	834.66
Top of Drilled Shaft	824.68	824.66

▲ Low Step Elevation



Plan of Pier Cap



Pier Elevation

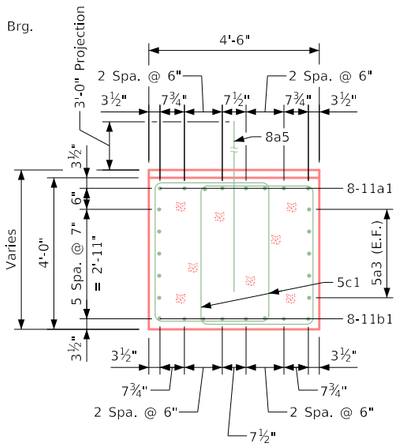
(Looking East)

Notes:

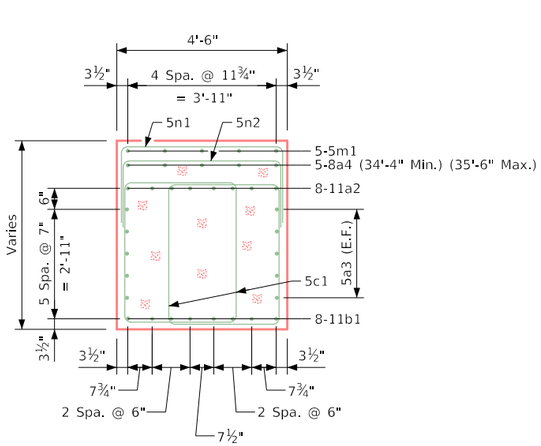
Place 5m1 and 5n1 bars under Beams B, C, E, F and G only.

For cap reinforcing, see Design Sheet 10.

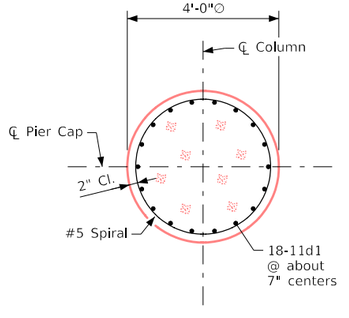
◐ Shift 8a5 bars as required to avoid longitudinal cap reinforcing and cap stirrups.



Section A-A



Section B-B



Typical Section Thru Column

Notes:

Column reinforcing cage shall be oriented with respect to ℄ Pier Cap and ℄ Column/ Drilled Shaft as shown to avoid conflict with longitudinal cap reinforcing and cap stirrups.

Column No. 1 and Drilled Shaft No. 1 reinforcing shown is typical for all columns and shafts.

Pier Notes:

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

Spiral reinforcing is to be No. 5 bar with 3'-8" outside diameter for column and 3'-6" outside diameter for shaft, 12" pitch with 4 equally spaced L⅞"x⅞"x⅛"spacers punched to hold spirals. Spirals are to have 1½ extra turns at top and bottom of columns and shafts.

The spiral reinforcing may be spliced by lapping 32". The length of the spiral shown does not include the lapped length of the splices. The cost of the laps at splices is to be included in the price bid for other reinforcement.

Column and shaft ties spaced at 12" centers may be substituted for the spiral reinforcement. Payment will be based on the weight of the spiral reinforcement. No adjustments in reinforcing steel pay weight will be allowed. See bent bar details for splice lap length.

All reinforcing steel is to be securely wired in place before concrete is poured.

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

For pier cap early form work removal notes, see General Notes on Design sheet 4.

HDR

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Pier Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

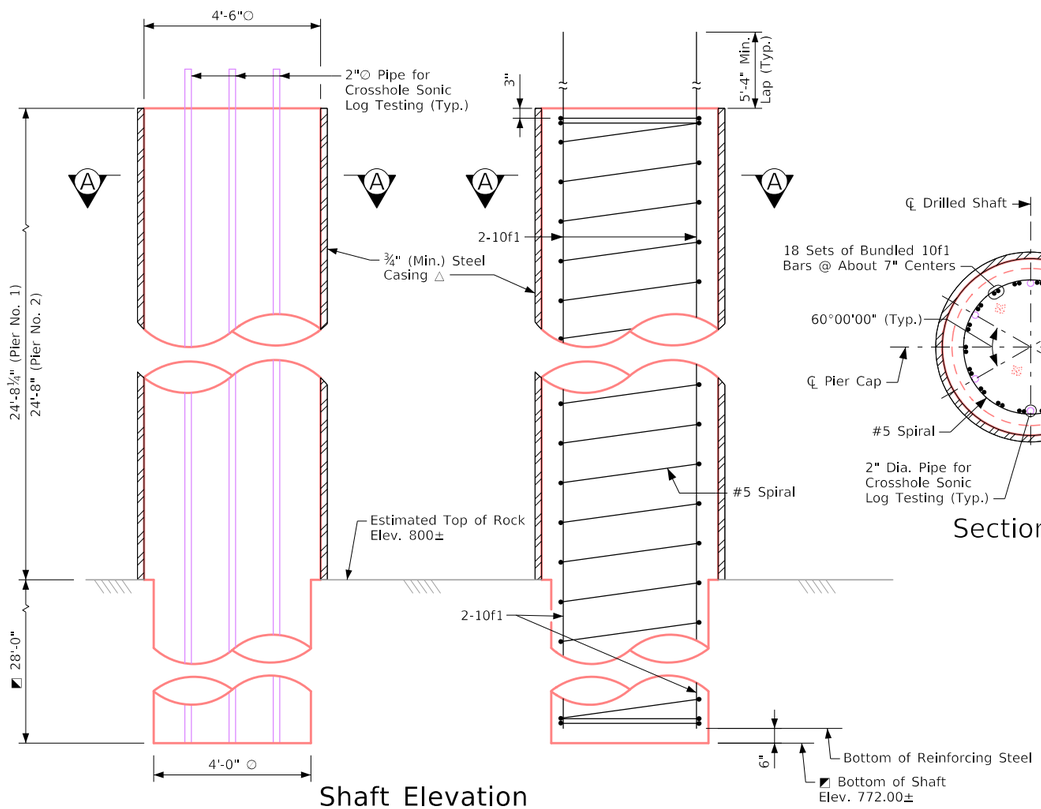
Polk County

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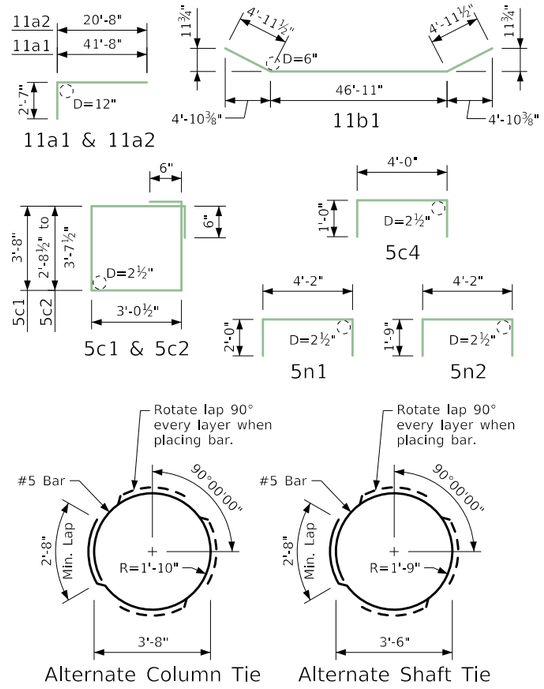
Design No. 624 — Design Sheet No. 9 of 35 — FHWA No. 041981

FILE NO. 32061	ENGLISH	DESIGN TEAM JAP/KD/MJS	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.9

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Bent Bar Details



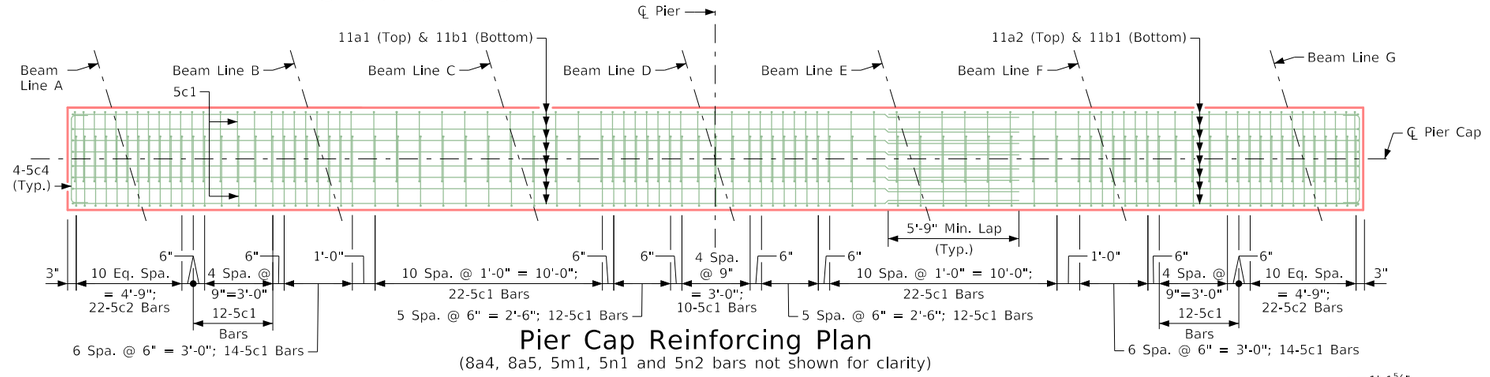
Note:
All dimensions are out to out.
D = pin diameter.

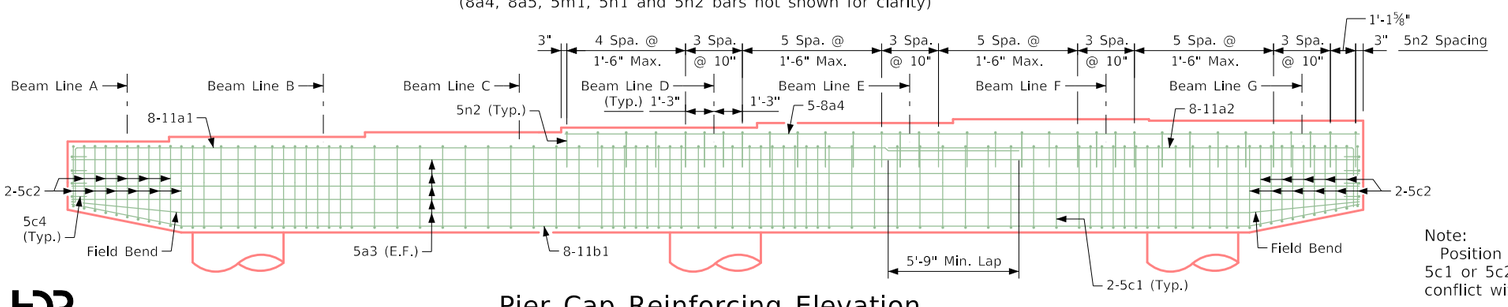
Reinforcing Bar List - One Pier

Bar	Location	Shape	No.	Length	Weight
11a1	Cap, Top, Longitudinal		8	44'-3"	1,881
11a2	Cap, Top, Longitudinal		8	23'-3"	998
5a3	Cap, Side, Longitudinal		10	56'-8"	591
8a4	Cap, Top, Longitudinal		5	Varies	466
8a5	Cap to Diaphragm Dowel		24	6'-0"	384
11b1	Cap, Bottom, Longitudinal		8	56'-10"	2,416
5c1	Cap, Hoops		130	14'-5"	1,955
5c2	Cap, Hoops, Ends		44	Varies	616
5c4	Cap, Ends		8	6'-0"	50
11d1	Column, Vertical		54	13'-5"	3,849
10f1	◩ Shaft, Vertical		108	57'-6"	26,722
5m1	Cap, Beam Seat, Longitudinal		25	3'-8"	96
5n1	Cap, Beam Seat, Transverse		20	8'-2"	170
5n2	Cap, Ties, Tranverse		33	7'-8"	264
#5	Column Spiral		3	144'-6"	452
	Column Spiral Spacers L⅞"x⅞"x⅛"		12	9'-8"	81
#5	◩ Shaft Spiral		3	597'-6"	1,870
	◩ Shaft Spiral Spacers L⅞"x⅞"x⅛"		12	51'-11"	436
		Reinforcing Steel - Total (LB)			43,287

Concrete Placement Quantities - One Pier

Location	Pier No. 1	Pier No. 2	Quantity
Cap	43.0	43.1	86.1
Columns	14.0	14.0	28.0
Total (CY)	57.0	57.1	114.1





Note:
Position 5n2 bars adjacent to 5c1 or 5c2 bars when 5n2 bars conflict with 5c1 or 5c2 bars.

Notes:

For Pier Notes, see Design Sheet 9.

The total required design bearing for each shaft is 636 tons.

Shaft construction shall be in accordance with the Special Provisions for Concrete Drilled Shafts.

Drilled shaft rock sockets shall be brushed but shall not be grooved.

The Contractor is responsible for the design of all Drilled Shaft temporary casing and permanent casing as needed for this project.

Permanent steel casing shall be according to ASTM A 252, Grade 3, produced by electric seam, butt or spiral welding. Inside diameter of casing shall be 4'-6".

After the C.S.L. testing is complete, cut C.S.L. pipes to the top of drilled shaft concrete surface before placing column reinforcement.

The contract length of the drilled shafts is based on an as-constructed shaft diameter not exceeding 4'-6". If the excavation diameter exceeds this value during construction, the Engineer must be contacted to determine if modifications to the drilled shaft design are necessary. The Contractor shall be responsible for all costs associated with modifying the drilled shaft design to account for shaft diameter exceeding the maximum value noted in the plans.

◩ Bottom of shaft elevations, shaft lengths and shaft quantities are based on 28'-0" embedment below rock elevations from the boring logs. Final bottom of shaft elevations, shaft lengths and shaft quantities are dependent on rock elevations determined in the field.

△ The permanent steel casing shall have a minimum wall thickness of ¾" and any additional thickness needed shall be determined by the Contractor depending on the selected methods of transporting, handling and installing the casing. No additional payment will be made for an increased casing thickness.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Pier Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

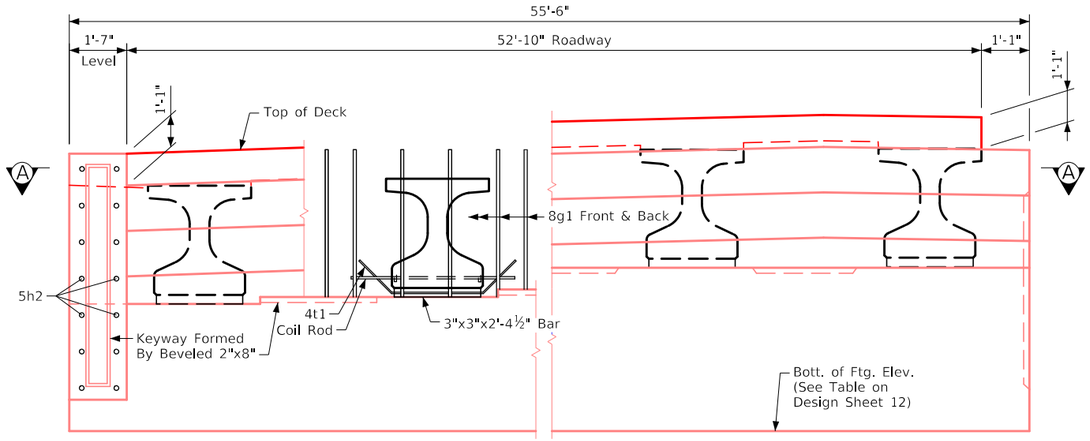
Polk County

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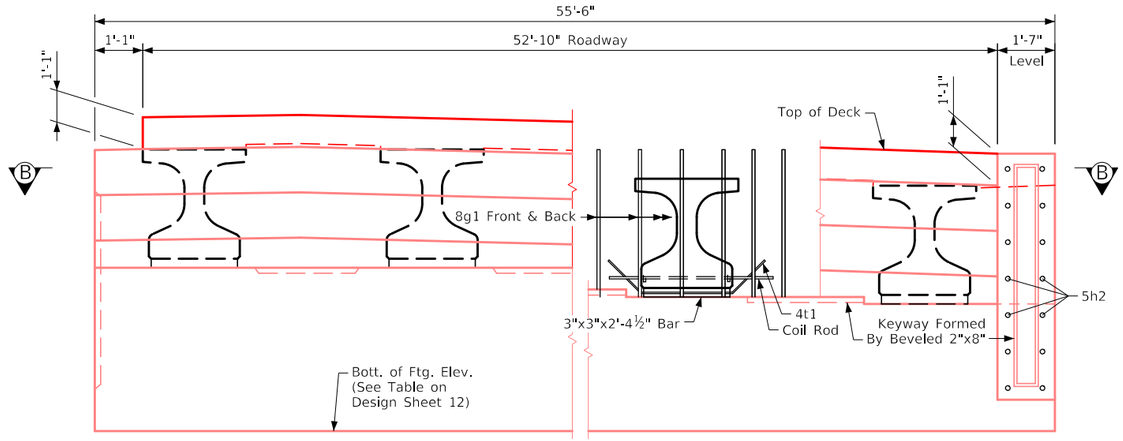
Design No. 624 — Design Sheet No. 10 of 35 — FHWA No. 041981

FILE NO. 32061	ENGLISH	DESIGN TEAM JAP/KD/MJS	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.10

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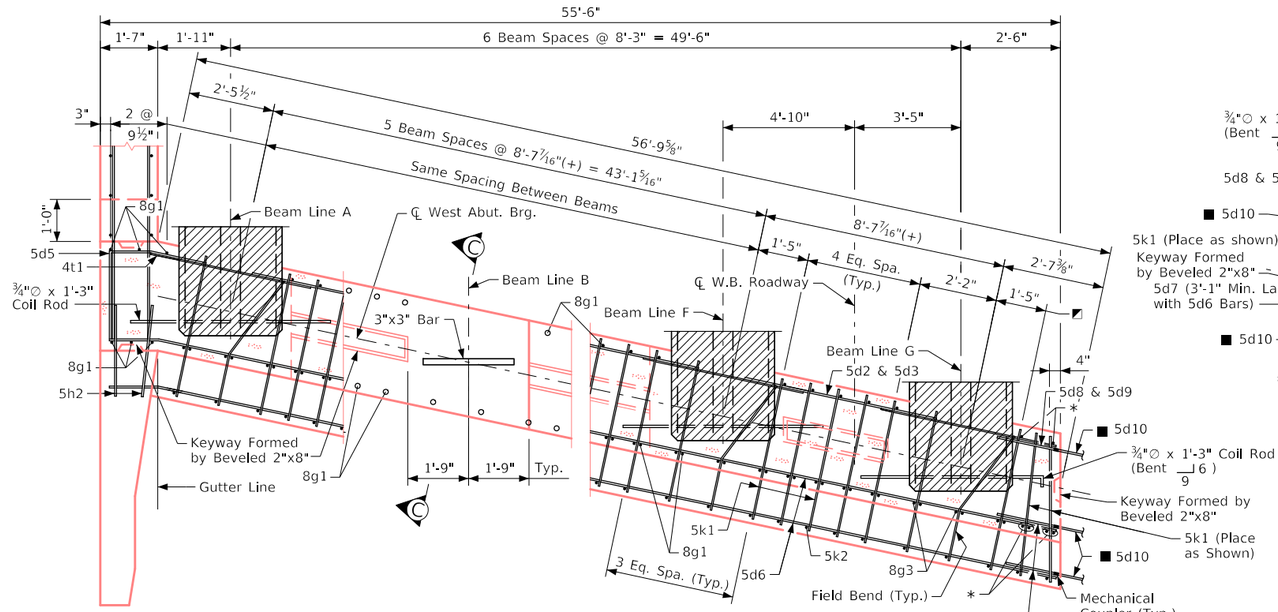


Part Rear Elevation At West Abutment

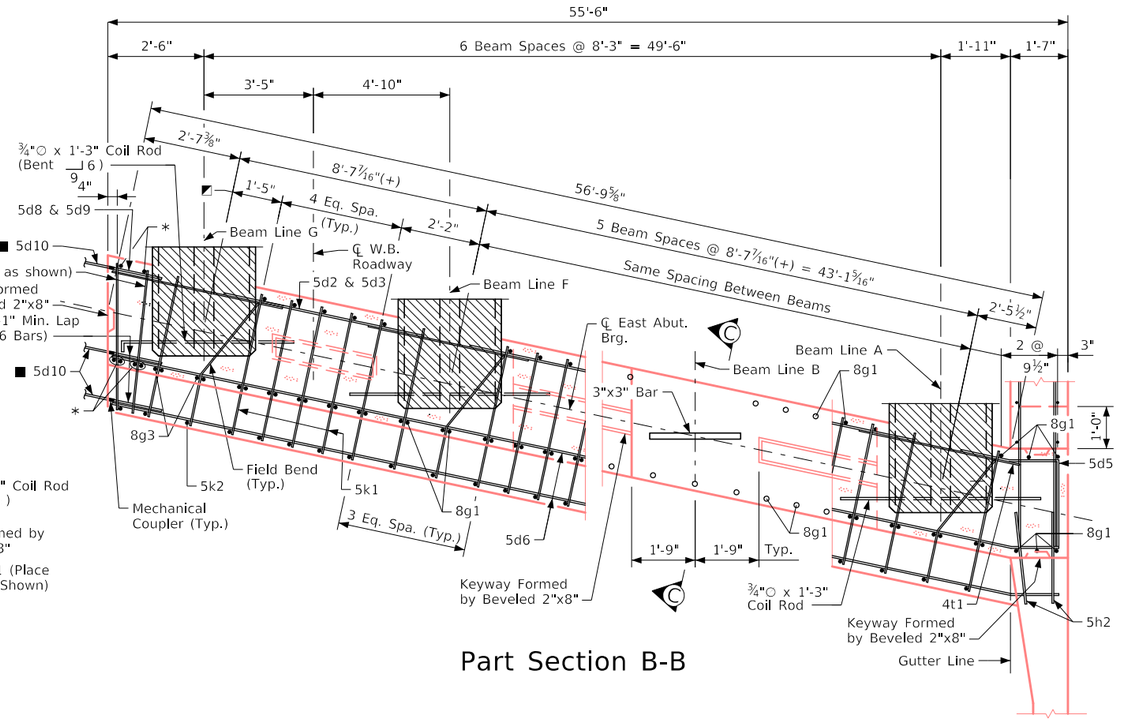


Part Rear Elevation At East Abutment

Note:
For maskwall details,
see Design Sheet 13.



Part Section A-A



Part Section B-B

Note:
■ Reinforcing bars are to be procured and stored for a future stage of construction. Threaded ends shall be compatible with the mechanical couplers installed in this stage of construction. For additional notes, see Mechanical Splice Assembly Notes on Design Sheet 12 and Stockpile Notes on Design Sheet 4. A total of 16-5d10 bars are to be coupled/spliced in a future stage of construction.

◩ Number of Bars per Abutment :
50 - 8g1 Back Face
35 - 8g1 Front Face
47 - 8g3 Back Face
47 - 5k1 & 5k2 Back Face

Notes:
For Abutment Notes and Part Section C-C, see Design Sheet 12.
Shift 8g1 bars in F.F. as necessary to miss beams. Place 8g3 bars parallel to longit. steel in the deck.
Place 5h2 bar at 1:6 slope to match traffic side of abutment wing face.
* 8g1 and 8g3 bars marked thus are to be stainless steel.
Barrier rail not shown in details.

HDR

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Abutment Details

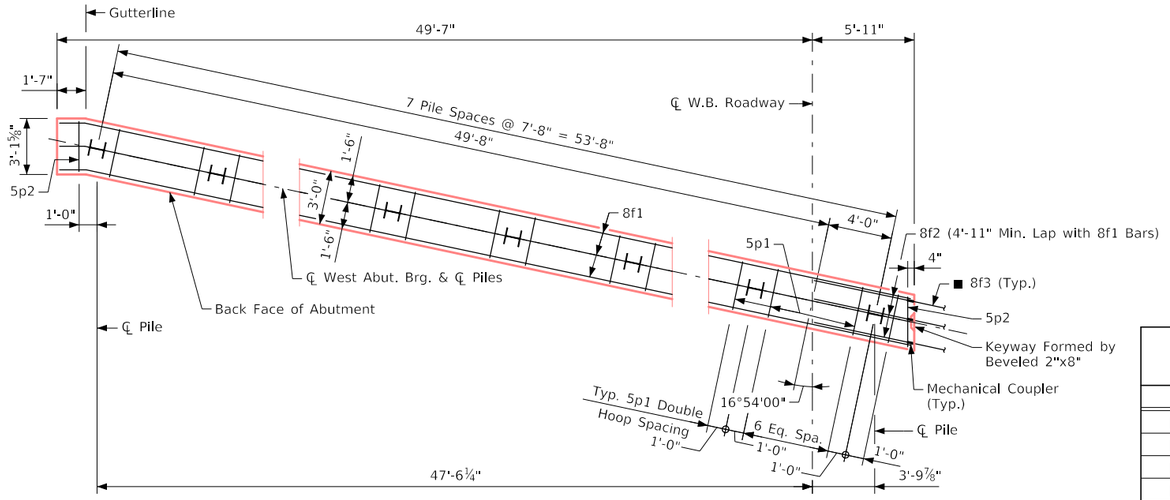
STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

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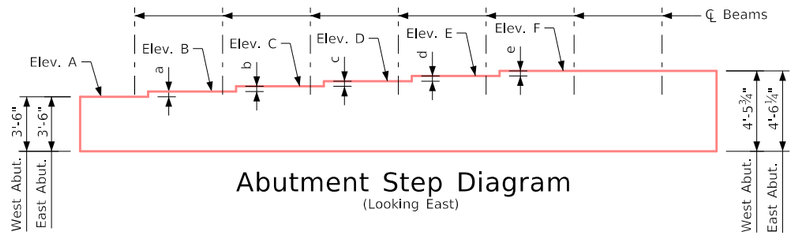
Design No. 624 — Design Sheet No. 11 of 35 — FHWA No. 041981

Bench Mark : Feno200, 1-Meter Road Monument, Sta. 1183+18.58, 845.82' Rt., Elev 851.56



West Abutment Pile Plan

Note:
8 - HP 10 x 57 steel bearing piling required at each abutment.



Abutment Step Diagram

(Looking East)

Table of Abutment Elevations

Point	West Abut.	East Abut.
Elev. A	▲ 838.62	▲ 838.54
Elev. B	838.82	838.75
Elev. C	839.02	838.96
Elev. D	839.22	839.17
Elev. E	839.43	839.38
Elev. F	839.59	839.56
Bott. Ftg. Elev.	835.12	835.04

▲ Low Step

Table of Abutment Steps

Step	West Abut.	East Abut.
a	2 7/16"	2 9/16"
b	2 7/16"	2 9/16"
c	2 7/16"	2 9/16"
d	2 7/16"	2½"
e	2"	2⅛"

Abutment Notes:

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

If necessary to prevent damage to the end of the bridge deck and backwall from construction equipment, an appropriate method of protection approved by the Engineer shall be provided by the Bridge Contractor at no extra cost to the State.

Abutment Pile Notes:

The contract length of 40 feet for the abutment piles is based on a total factored axial load per pile (Pu) of 174 kips, and a geotechnical resistance factor (phi) of 0.7 for rock end bearing. To account for soil consolidation under the new fill, the factored axial load includes a factored downdrag load of 5 kips.

The nominal axial bearing resistance for construction control was determined from a non-cohesive soil classification and a geotechnical resistance factor (phi) of 0.55 for soil and 0.7 for rock end bearing. Piles are assumed to be driven from a start elevation at the bottom of prebore.

The required nominal axial bearing resistance for abutment piles is 127 tons at end of drive or retap. The pile contract length shall be driven as per plan unless piles reach refusal. Construction control requires a WEAP analysis with bearing graph.

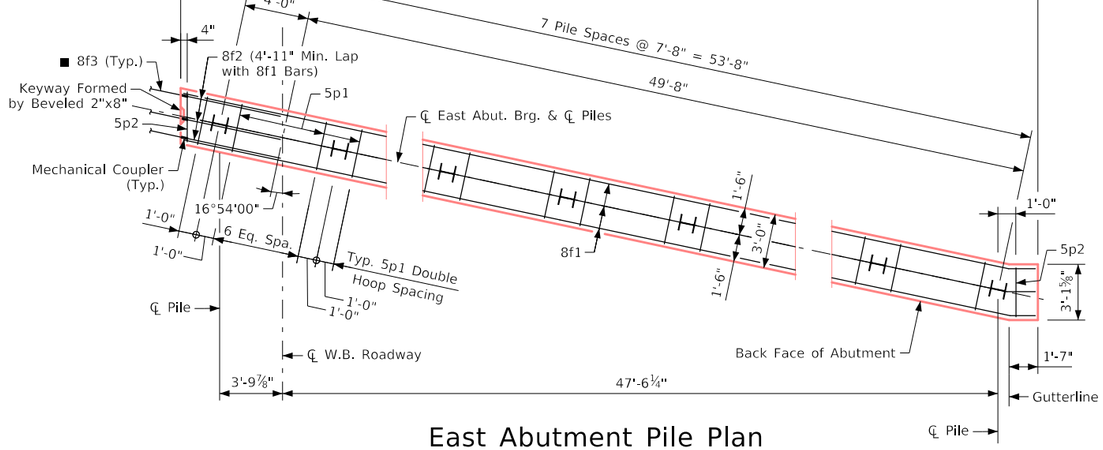
Abutment piles are designed to accommodate downdrag force due to soil consolidation under the new earth fill. Piles shall be driven to 127 tons based on theoretical driving resistance. This includes 3 tons of resistance in and above the compressible layers, 4 tons resistance for downdrag forces and 120 tons resistance for dead and live load bearing capacity.

Mechanical Splice Assembly Notes:

The 5d7, 5d8, 5d9 and 8f2 bars in the abutments shall have threaded type mechanical splice assemblies at the locations shown. Each shall be placed flush with the concrete face and capped to prevent material buildup between construction stages. Mechanical splice assemblies consist of mechanical splicers and reinforcing splice bars as required to facilitate the use of the mechanical splicer. The mechanical splice assembly used shall meet the requirements of Materials I.M. 451 Appendix E. Reinforcing splice bars shall have a diameter equal to or greater than the bar being spliced.

All mechanical splice assemblies to be used shall be epoxy coated.

The cost of all splice assemblies is to be included in the price bid for "Reinforcing Steel, Epoxy Coated" and no separate payment will be made. The weight of mechanical splice assemblies is not included in the quantity shown for "Reinforcing Steel, Epoxy Coated". A total of 34 epoxy coated splice assemblies will be required.



East Abutment Pile Plan

Abutment Concrete Quantity

Location	Quantity
West Abutment Footing	26.7
East Abutment Footing	27.0
Total (Cu. Yds.)	53.7

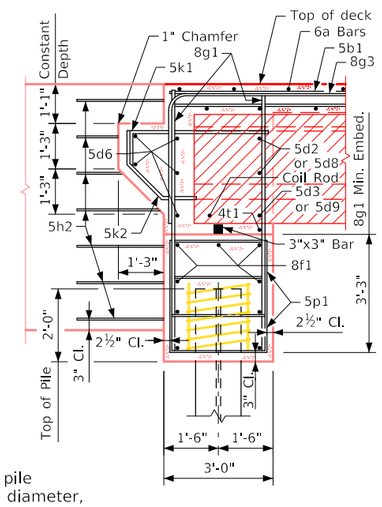
Note: Concrete quantities are included on the Summary Quantities sheet.

Notes:

■ Reinforcing bars are to be procured and stored for a future stage of construction.

Threaded ends shall be compatible with the mechanical couplers installed in this stage of construction. For additional notes, see Mechanical Splice Assembly Notes and Stockpile Notes on Design Sheet 4. A total of 18-8f3 bars are to be coupled/spliced in a future stage of construction.

Note:
The spiral at the top of each pile to be 7 turns of No. 2 bar, 21" diameter, 3" pitch with 3 - L⅞" x ⅞" x ⅛" spacers punched to hold spiral.



Part Section C-C

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

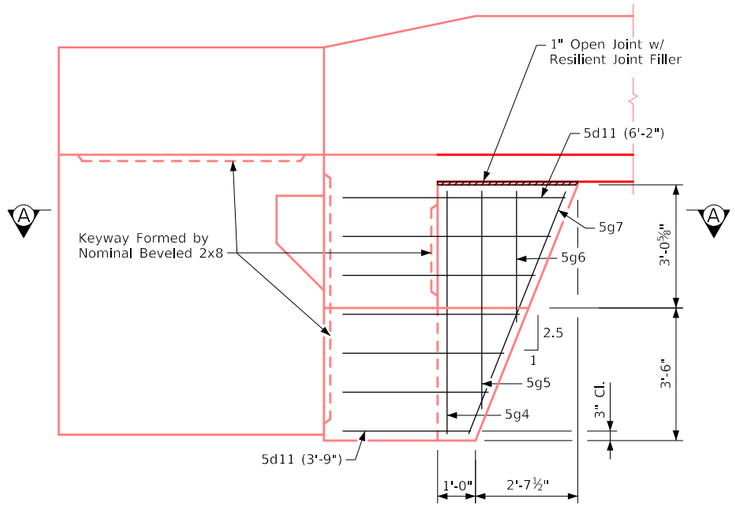
Abutment Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

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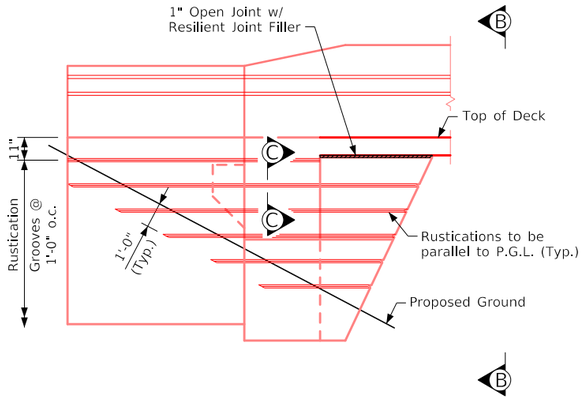
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Design No. 624 — Design Sheet No. 12 of 35 — FHWA No. 041981



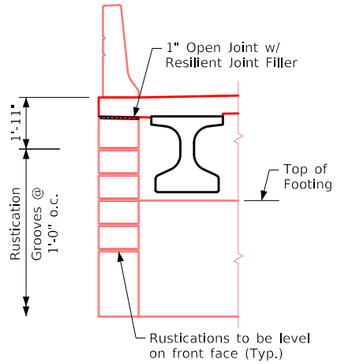
North Maskwall - West Abutment Shown

(East Abutment Similar)
(Other reinforcing not shown for clarity)

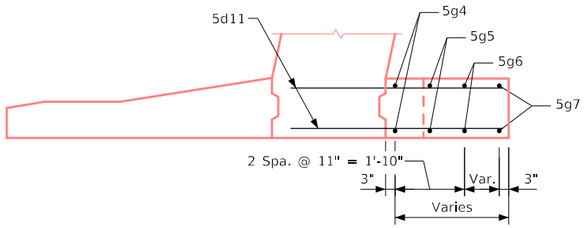


Abutment Rustication

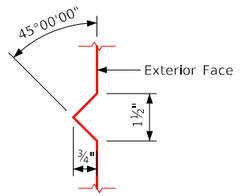
(East Abutment Looking South)
(West Abutment Similar)



Section B-B



Section A-A



Section C-C

Notes:
For barrier rail details, see Design Sheets 29-31.
For concrete rustication notes, see Design Sheet 4.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Abutment Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

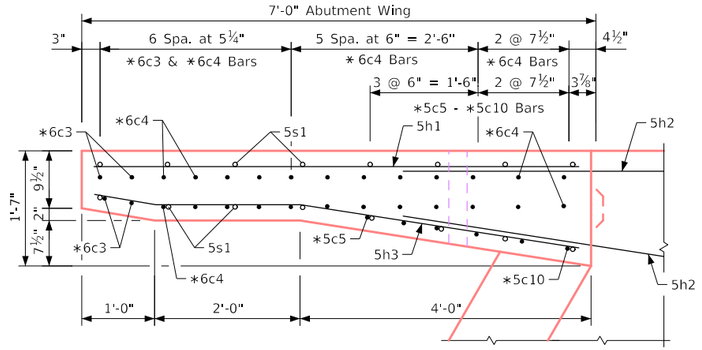
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Design No. 624 — Design Sheet No. 13 of 35 — FHWA No. 041981

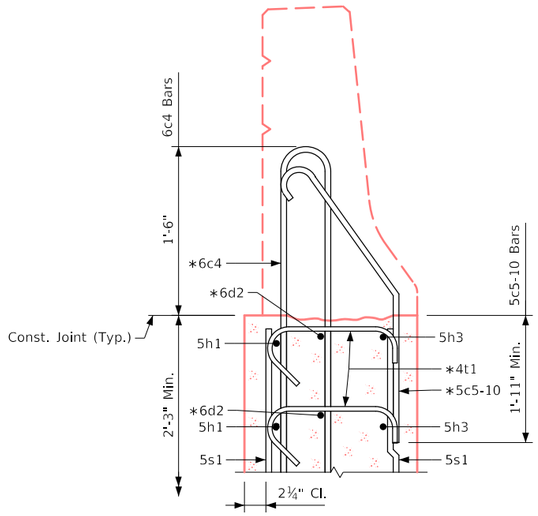
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View A-A

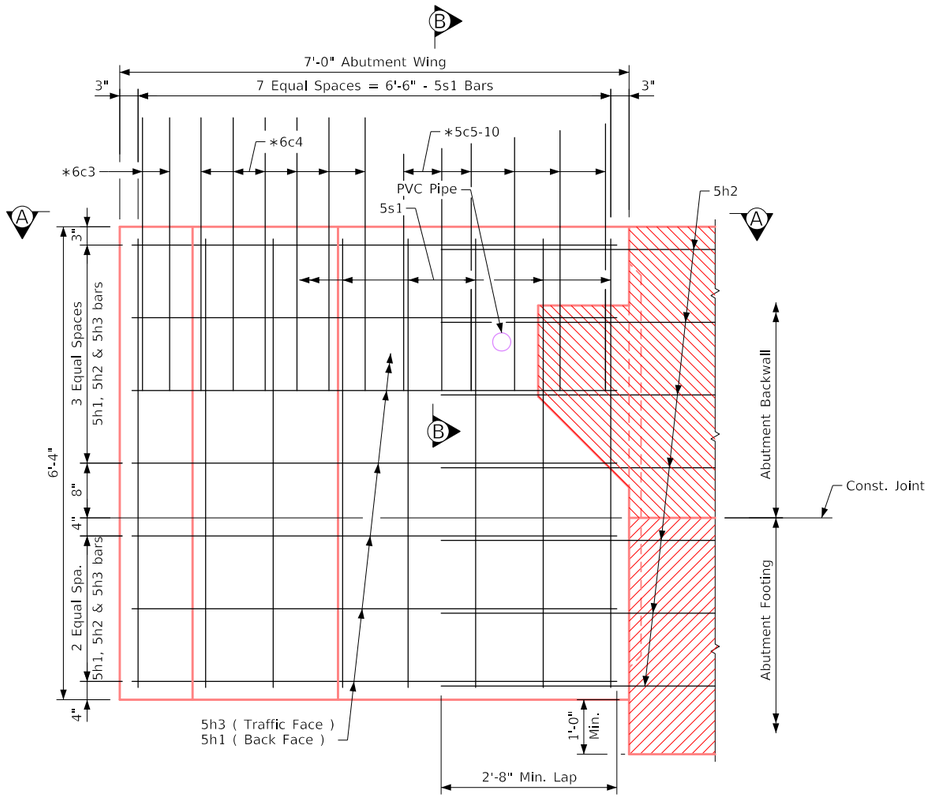
Note:
Plug 3"∅ PVC pipe with expanding foam prior to backfilling behind abutments.



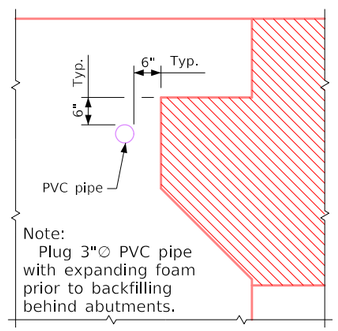
Section B-B

∗ Barrier rail end section bars to be placed with abutment wing.

See barrier rail end section sheet in these plans for details of reinforcing bars 6c3, 6c4, 5c5-10, 6d2 & 4t1.



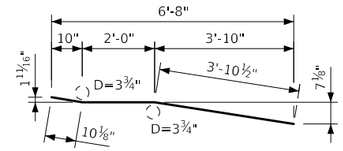
Abutment Wing - Elevation View



PVC Pipe Location

Reinforcing Bar List - One Abut. Wing

Bar	Location	Shape	No.	Length	Weight
5h1	Horizontal Back Face	——	7	6'-8	49
5h3	Horizontal Traffic Face	⌒	7	6'-9	49
5s1	Vertical Both Faces	——	16	6'-0	100
	Reinforcing Steel Epoxy Coated - Total (Lbs.)				198



5h3

Note: All dimensions are out to out. D = Pin diameter

Bent Bar Details

Concrete Placement Summary

Concrete	Total
One Abutment Wing	1.9
Total (Cu. Yds.)	1.9

Note:
Concrete and reinforcing steel quantities are included on the Summary Quantities sheet.

CORRECTION 04-14 - ADDED REFERRAL NOTE TO SUMMARY QUANTITIES SHEET.
ENGLISHMISCELLANEOUSBRIDGES.DGN - 2111 - THIS SHEET ISSUED 02-08.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Abutment Wing Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

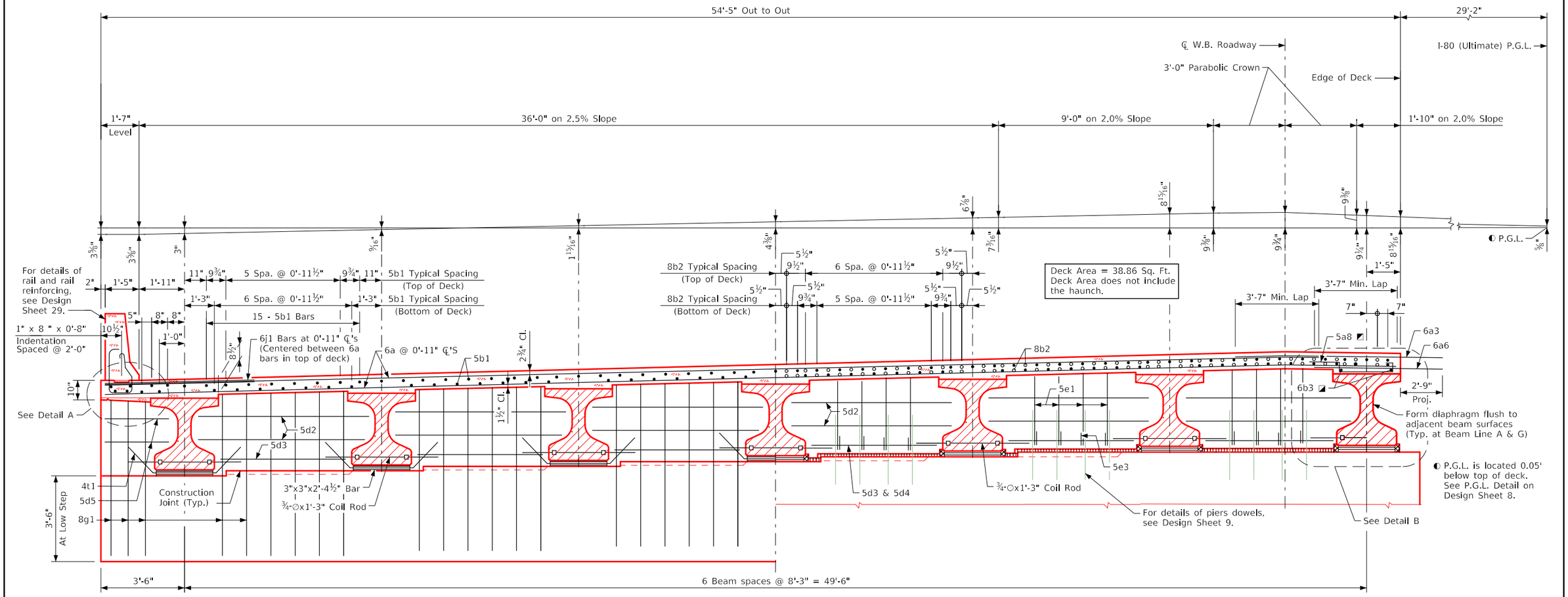
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Design No. 624 — Design Sheet No. 14 of 35 — FHWA No. 041981

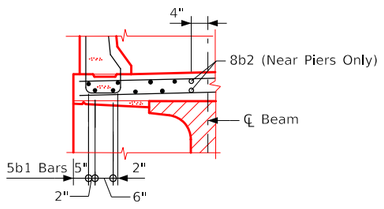
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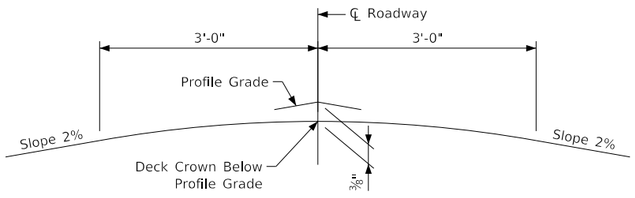


Half Section Near Abutment
(Looking ahead station)

Half Section Near Pier
(Looking ahead station)

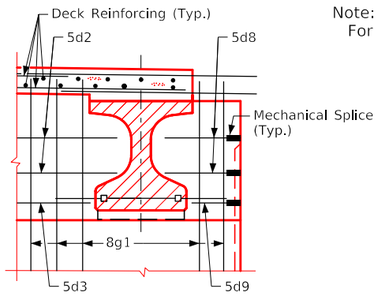


Detail A



Parabolic Crown Template

◩ For limits of haunch reinforcing, see Design Sheet 19.



Detail B
(Near Abutment)

Note:
For details of intermediate diaphragms, see Design Sheets 24 & 25.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Superstructure Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 15 of 35 — FHWA No. 041981

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/JAP/MJS	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.15

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Superstructure Notes:

The bridge deck as shown includes ¾" integral wearing surface.

The pier and abutment diaphragm concrete is to be placed monolithically with the bridge deck.

Cost of all resilient joint filler material is to be included in the price bid for "High Performance Structural Concrete".

All beams are to be set vertical.

Forms for the deck and barrier rail are to be supported by the prestressed concrete beams.

Clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted or shown.

All deck and diaphragm reinforcing is to be wired in place and adequately supported before concrete is placed.

Top transverse reinforcing steel is to be parallel to and 2¾" clear below top of deck. Bottom transverse reinforcing steel is to be parallel to and 1½" clear above bottom of deck. Top and bottom 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 deck bolsters spaced 4'-0" apart. I.M. 451.01 requirements shall apply for bar chairs, bar high chairs, and deck bolsters.

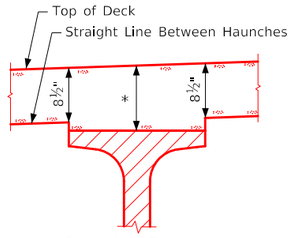
Cost of bearing material is to be included in the price bid for "Pretensioned Prestressed Concrete Beams".

Transverse deck reinforcing may be spliced with one lap located as follows:

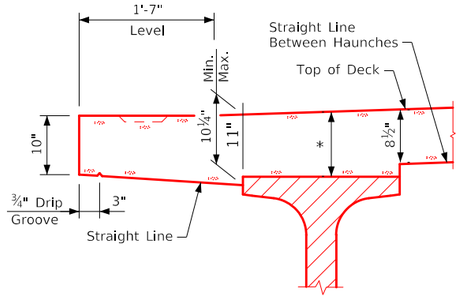
Top bar - lap midway between beams (Min. Lap = 2'-10").

Bottom bars - lap over beams (Min. Lap = 3'-7").

Payment for reinforcing bars shall be based on no splices, and no allowance shall be made for the additional length of bar required for the use of splices.



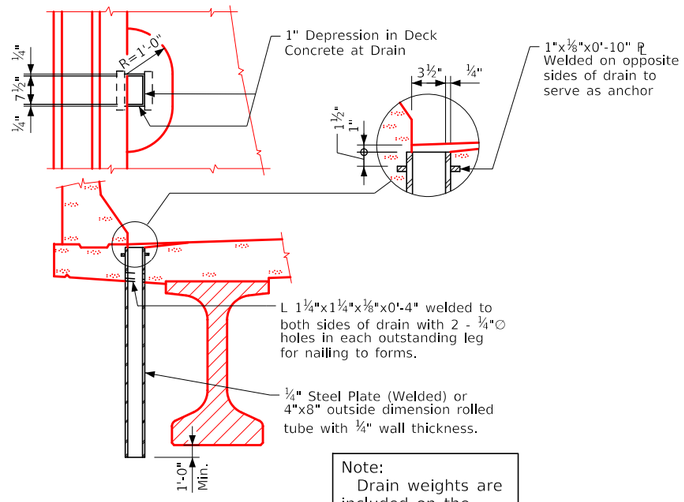
Interior Beams



Exterior Beams

Typical Deck And Haunch Detail

* For deck thickness over beams, see haunch and camber details on Design Sheet 19.



Drain Details

Note:
Drain weights are included on the Summary Quantities sheet.

Note :

Drains are to be galvanized. 3 drains required.

See "Situation Plan" for location. Weight of drains is included in the quantity for "Structural Steel".

Weight is based on rolled tube.

Data For One Drain	
Drain weight (Lbs.)	92
Drain Length (Ft.)	4'-9¾"

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans 97'-0" Interior Span

Superstructure Details

STA. 5174+26.60 (℄ I-80 Ultimate) Turn-in Date: May, 2024

Polk County

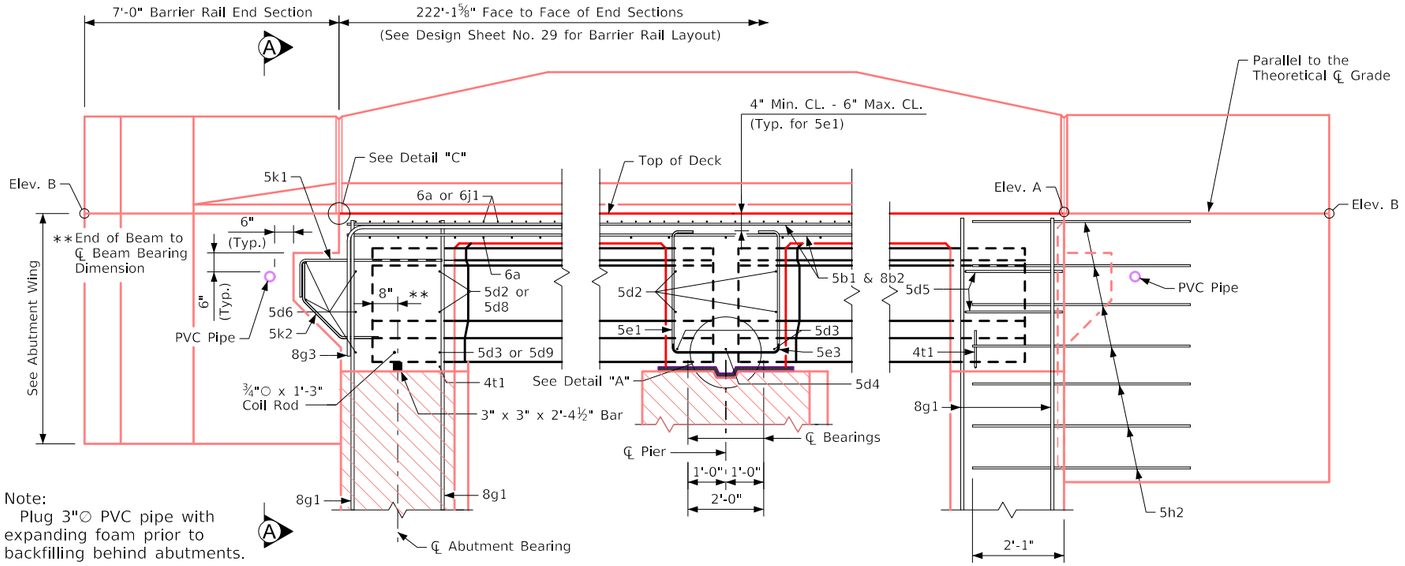
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Design No. 624 Design Sheet No. 16 of 35 FHWA No. 041981

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/JAP/MJS	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.16

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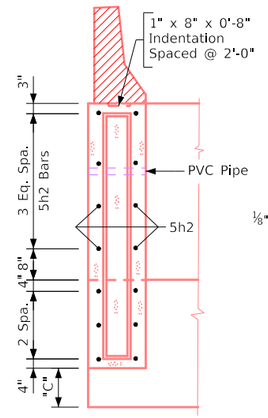
Bench Mark No. Feno200, 1-Meter Rod Monument, Sta. 1183+18.58, 845.82' Rt., Elev. 851.56



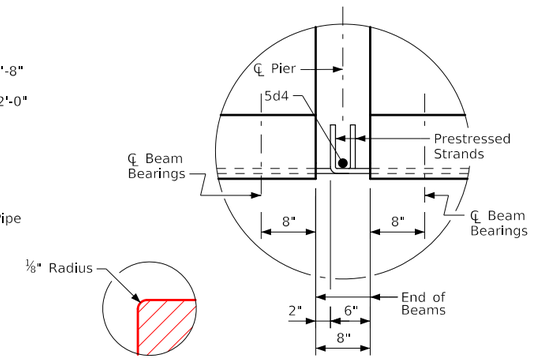
Part Longitudinal Section Near North Gutter

(For details of Intermediate Diaphragm see Design Sheet Nos. 24 & 25)

Part End View at Abutment

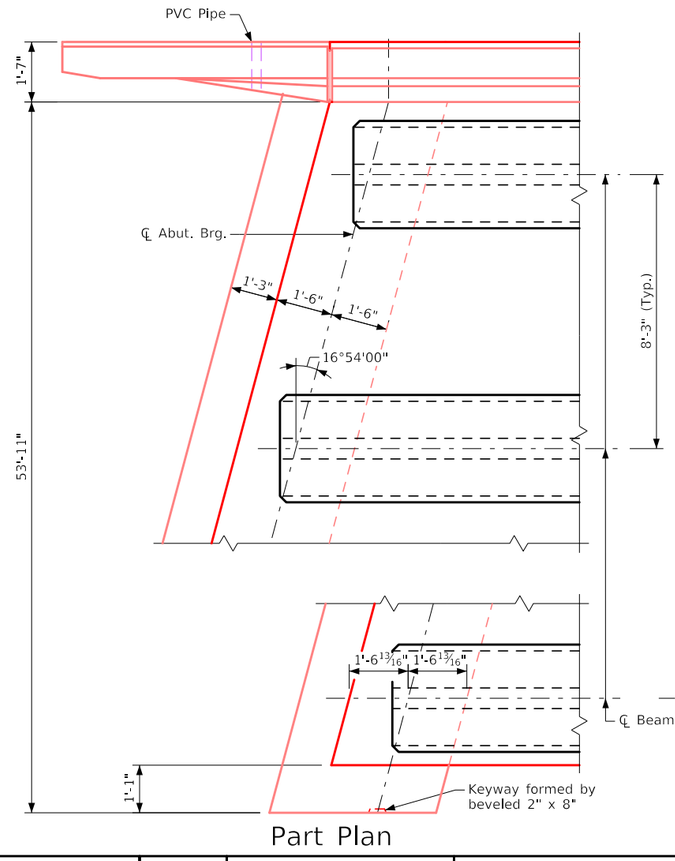


Section A-A

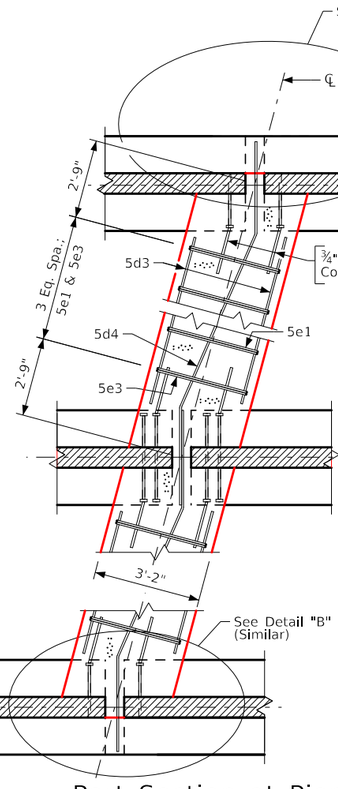


Detail "C"

Detail "A"

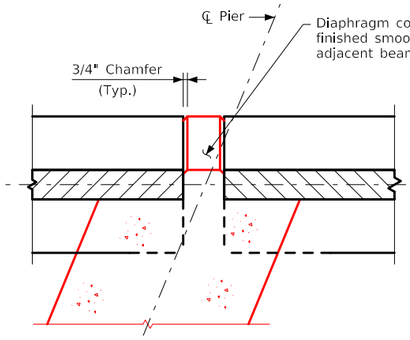


Part Plan



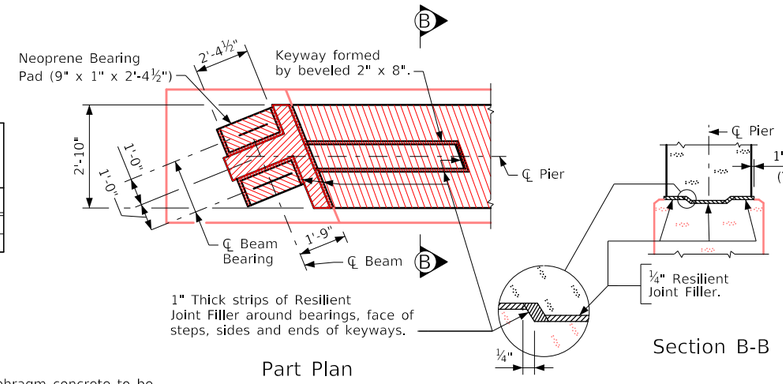
Part Section at Pier

Table of Wing Elevations			
Location	Dim "C"	Elev. A	Elev. B
N.W. Corner	1'-1½"	842.59	842.58
N.E. Corner	1'-1⅜"	842.51	842.49



Detail "B"

Part Plan at Ends of Pier Diaphragm



Part Plan

Section B-B

Top of Pier Details

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Abut. & Pier Diaphragm Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

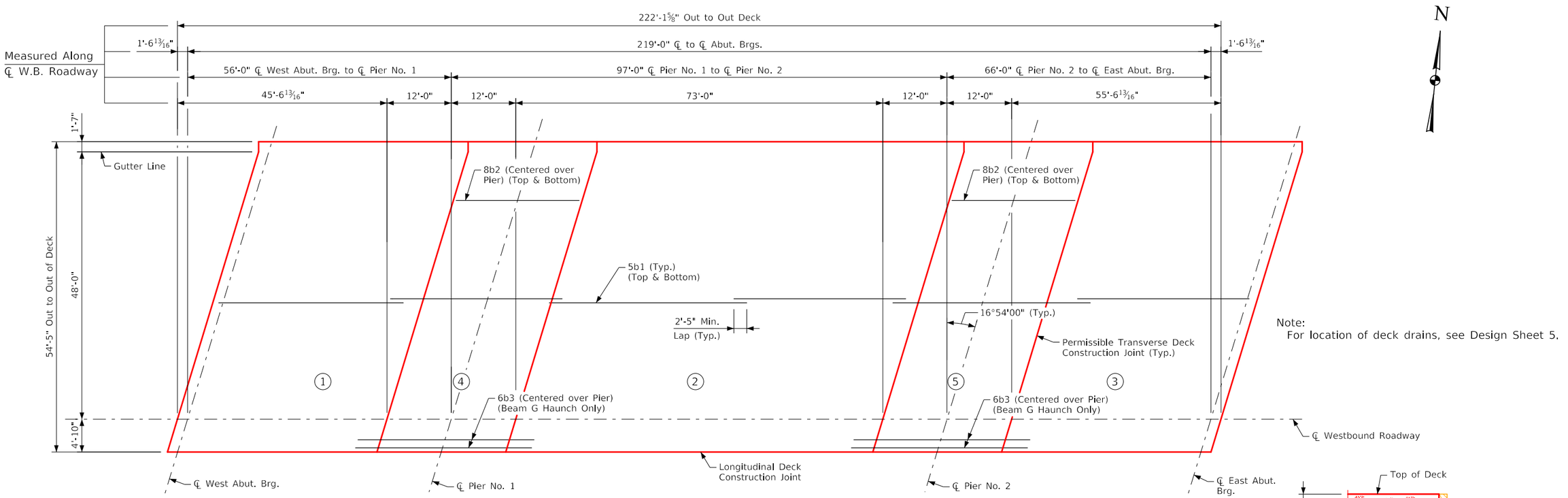
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 17 of 35 — FHWA No. 041981

Redrawn 09-08-88.
Revision 07-08: Distance from ℄ Beam to Step changed to 1'-3".
Revision 01-23: Sheet format update.
IntegralBridges.dgn - 4503 - This Sheet Re-Issued 09-2023.

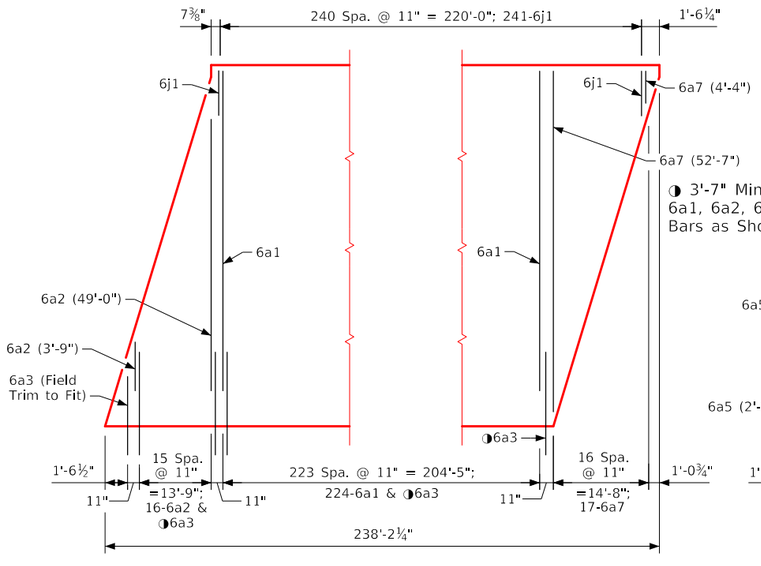
FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/JAP/MJS	"BTB" Beams - Part Plan & Longitudinal Section - (L.A.) 15°01 - 30° Skew	Standard Sheet 4503 - BTB (Modified)	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.17

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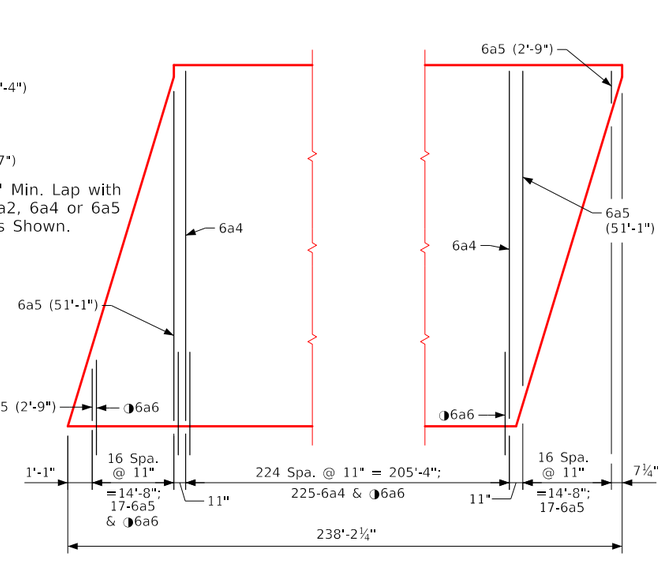


Note:
For location of deck drains, see Design Sheet 5.

Concrete Placement Diagram & Longitudinal Reinforcing Layout



Top Transverse Reinforcing Layout



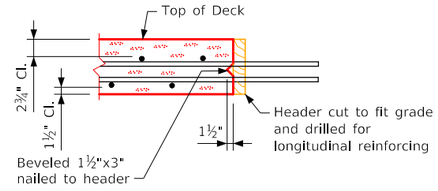
Bottom Transverse Reinforcing Layout

Notes:

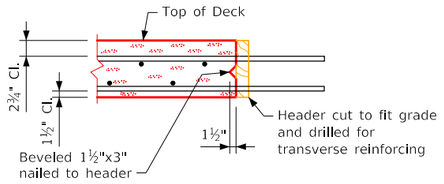
Concrete deck shall be placed in sections and sequences indicated. (An approved alternate procedure is to place the concrete deck in one continuous pour beginning at one end of the bridge.) Alternate procedures for placing deck concrete may be submitted for approval together with a statement of the proposed method and evidence that the Contractor possesses the necessary equipment and facilities to accomplish the required results. The Bridge Engineer shall review any alternate procedures. The cost of any additional analysis and plan modifications shall be paid for by the Contractor. The Engineer shall determine if a retarding admixture is required to maintain plasticity of the concrete deck during placement.

Deck concrete sections shall cure for a minimum of 48 hours and shall achieve a minimum strength of 75% of the 28 day deck concrete strength prior to removing deck headers and beginning an adjacent pour.

Bridge deck finishing machine screed rails shall not be placed on the decks of existing structures. Screed rails shall ordinarily be placed on a beam overhang formwork or, when necessary due to space limitations, directly over a beam. The contractor is responsible for the structural adequacy and functionality of the support system for the screed rail and finishing machine.



Permissible Transverse Deck Construction Joint



Longitudinal Deck Construction Joint

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Deck Plan & Reinforcing

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 18 of 35 — FHWA No. 041981

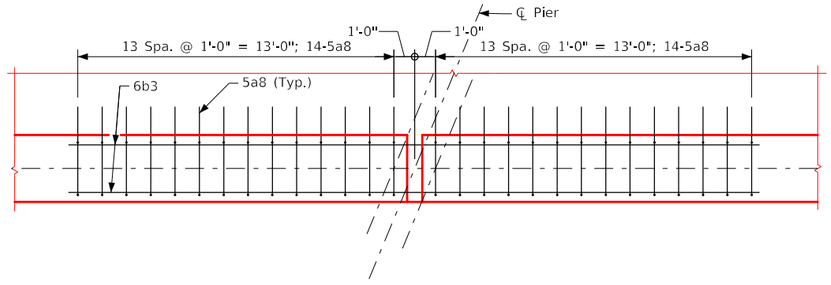
FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/JAP/MJS	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.18

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Concrete Placement Quantities

Location	Quantity
Section 1, Deck & Abut. Diaph.**	93.9
Section 2, Deck	108.2
Section 3, Deck & Abut. Diaph.**	109.0
Section 4, Deck & Pier Diaph.	50.6
Section 5, Deck & Pier Diaph.	50.5
Total (Cu. Yds.)	412.2

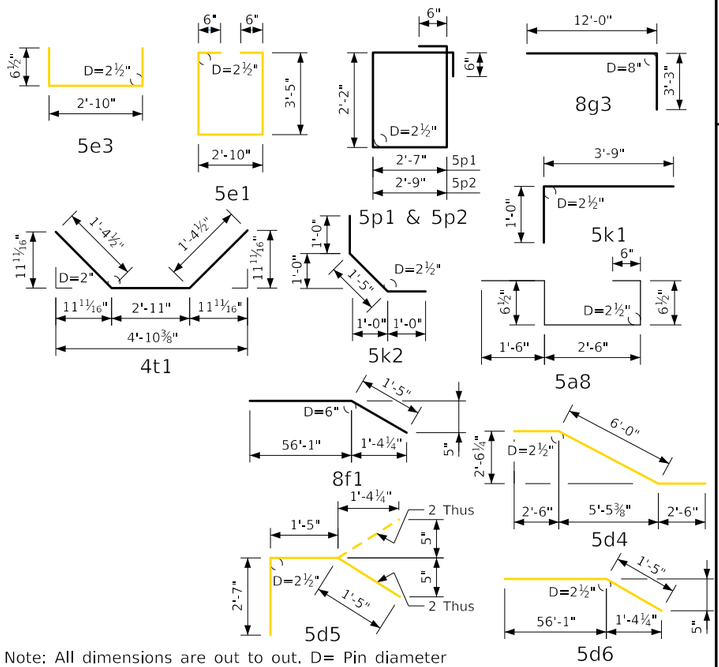
Note:
Concrete and reinforcing steel quantities are included on the Summary Quantities Sheet.
** Includes portion of maskwall above construction joint.



Haunch Reinforcing Detail

(Beam Line G Only)
(Typ. at Piers)

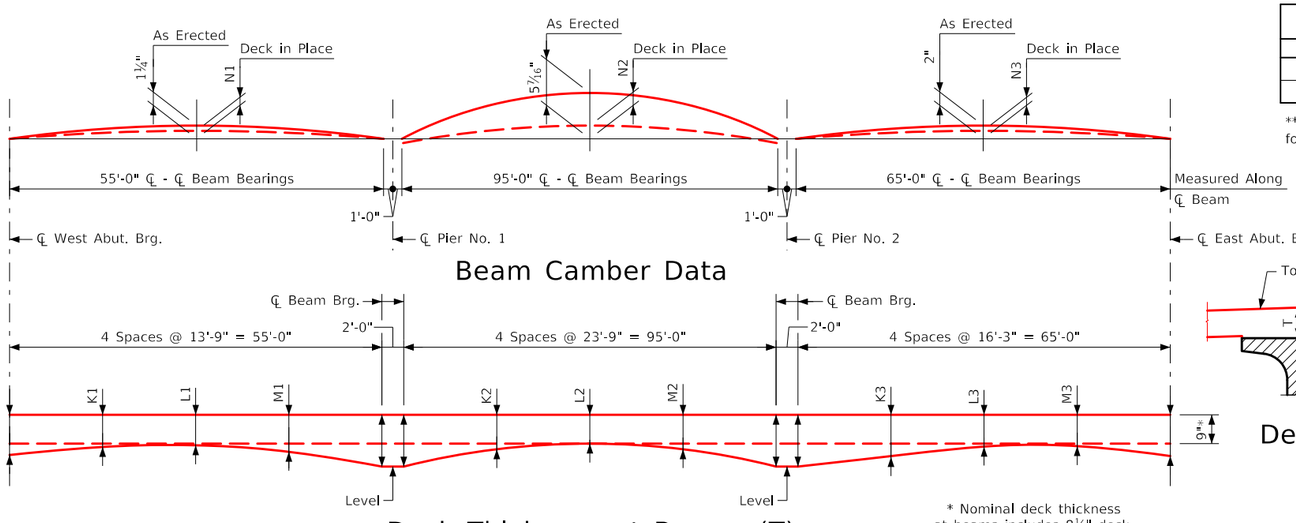
Bent Bar Details



Note: All dimensions are out to out. D= Pin diameter

Reinforcing Bar List

	Bar	Location	Shape	No.	Length	Weight
Stainless	6a3	Deck, Transv. Top	——	241	10'-1"	3,650
	6a6	Deck, Transv. Bottom	——	242	6'-7"	2,393
	8g1	Abut. Vert. Both F.	——	8	6'-11"	148
	8g3	Abut. Diaph. Vert. B.F.	⌐	4	15'-3"	163
		Reinforcing Steel Stainless - Total (Lbs.)				6,354
Epoxy Coated Reinforcing	6a1	Deck, Transv. Top	——	224	50'-6"	16,991
	6a2	Deck, Transv. Top	——	16	Varies	634
	6a4	Deck, Transv. Bottom	——	225	54'-1"	18,277
	6a5	Deck, Transv. Bottom	——	34	Varies	1,375
	6a7	Deck, Transv. Top	——	17	Varies	727
	5a8	Haunch Transv.	⌐⌙	56	5'-7"	326
	5b1	Deck Longit. Top & Bottom	——	642	39'-0"	26,115
	8b2	Deck Longit. Top & Bottom at Piers	——	236	23'-8"	14,913
	6b3	Haunch Longit. at Beam Line G	——	4	28'-4"	170
	5d2	Pier & Abut. Diaph. Longit.	——	72	7'-8"	576
	5d3	Pier & Abut. Diaph. Longit.	——	36	5'-8"	213
	5d4	Pier Diaph. Longit.	⟋	12	11'-0"	138
	5d5	Abut. Diaph. Ends	⟋	4	5'-5"	23
	5d6	Abut. Diaph. Longit. B.F.	⟋	10	57'-6"	600
	5d7	Abut. Diaph. Splice B.F.	——	10	3'-4"	35
	5d8	Abut. Diaph. Splice F.F.	——	4	2'-2"	9
	5d9	Abut. Diaph. Splice F.F.	——	2	1'-2"	2
	5d10	Abut. Diaph. Splice	——	16	3'-4"	56
	5d11	Maskwall Horiz.	——	28	Varies	145
	5e1	Pier Diaph. Hoops	□	48	10'-8"	534
	5e3	Pier Diaph. Ties	⌐⌙	48	3'-11"	196
	8f1	Abut. Footing Longit. Both F.	⟋	18	57'-6"	2,763
	8f2	Abut. Footing Longit. Splice	——	18	5'-2"	248
	8f3	Abut. Footing Longit. Splice	——	18	5'-2"	248
	8g1	Abut. Vert. Both F.	——	162	6'-11"	2,992
	8g3	Abut. Diaph. Vert. Back F.	⌐	90	15'-3"	3,665
	5g4	Maskwall Vertical Both F.	——	4	6'-1"	25
	5g5	Maskwall Vertical Both F.	——	4	5'-6"	23
	5g6	Maskwall Vertical Both F.	——	4	3'-2"	13
	5g7	Maskwall Vertical Both F.	——	4	6'-7"	27
	5h2	Abut. To Wing Anchor	——	28	4'-11"	144
	6j1	Top of Deck Transv. (At Rail)	——	241	6'-3"	2,262
	5k1	Paving Notch	⌐	94	4'-9"	466
	5k2	Paving Notch	⌡	94	3'-5"	335
	5p1	Abut. Hoops	□	200	10'-6"	2,190
	5p2	Abut. Hoops at Ends	□	8	10'-10"	90
	4t1	Under Beams At Abutments	◡	14	5'-8"	53
		Reinforcing Steel Epoxy Coated - Total (Lbs.)				97,599
Non-Coated	#2	Pile Spiral	⌀⌀⌀⌀	16	38'-6"	105
		Spiral Spacers, L 7/8" x 7/8" x 1/8" x 0.70	——	48	1'-10"	62
		Reinforcing Steel - Total (Lbs.)				167



Beam Camber Data

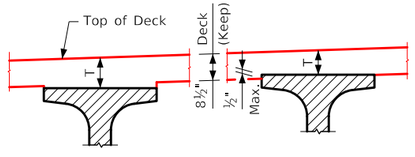
Deck Thickness at Beams (T)

* Nominal deck thickness at beams includes 8½" deck + ½" haunch

Beam Camber Data

Beam Line	N1	N2	N3
A-F	¾"	2¼"	1"
***G	15/16"	3¼"	1 15/16"

*** Deflections are based on tributary deck width for Stage 1.



Deck Thickness Details

Deck Thickness at Beams (T)

Beam Line	℄ West Abut. Brg.	K1	L1	M1	Pier No. 1 Bearings		K2	L2	M2	Pier No. 2 Bearings		K3	L3	M3	℄ East Abut. Brg.
A-F	9¼"	9 3/16"	9 7/16"	10 1/16"	11"	11"	9 7/16"	9"	9 7/16"	11"	11"	9 7/8"	9¼"	9"	9¼"
G	9 9/16"	9½"	9 15/16"	10¾"	12"	12"	9 11/16"	9"	9 11/16"	12"	12"	10½"	9 9/16"	9¼"	9 9/16"

Note:
The Deck Thickness (T) at beams is based on the anticipated beam camber and deflections. These values are used by the Designer to set beam elevations and estimate concrete quantities. Refer to the Haunch Data Details Sheet for additional information to aid the Contractor in setting the field haunches required for construction.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Superstructure Details

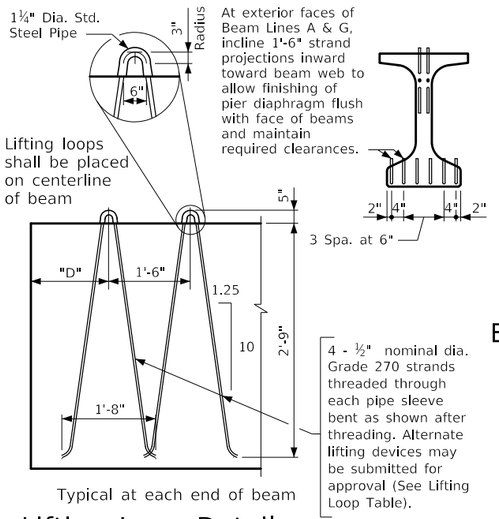
STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 19 of 35 — FHWA No. 041981

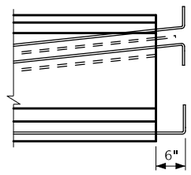
Redrawn 09-08-88.
Revision 07-15: Changed Concrete Placement Note to account for the possible addition of a retarding admixture to the concrete.
Revision 01-23: Sheet format update.
IntegralBridges.dgn - 4517 - This Sheet Re-Issued 09-2023.



Typical at each end of beam

Lifting Loop Detail

The top and bottom for 2 rows or the top and 3rd rows of deflected strands are to be cut with 1'-6" projections which are to be shop bent as shown. The remaining top deflected strands are to be cut with 5" projections and the remaining top deflected strands in rows 4 and below are to be cut flush with beam face. Six bottom strands are to be cut with 1'-6" projections which are to be shop bent as shown. The remaining bottom strands are to be cut off reasonably flush with the concrete.



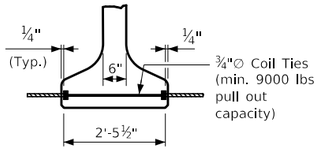
Typical at both beam ends

Strand Projection at Beam Ends when Embedded in Concrete End Diaphragms

Lifting Loop and Overhang Table				
Beams	Lifting Loops Each End	# of Strands per Loop	D	Beam Overhang (ft)
BTB55,BTB65	1	4	2'-0"	**
BTB95	2	4	2'-6"	11

** In accordance with Article 2407.03, K of the Standard Specifications.
Lifting loops shall carry loads equally.

Number and exact location of coil ties to be as detailed on Design Sheet 24.



Coil Tie Detail

Design Stresses:

Design stresses for the following materials are to be in accordance with AASHTO LRFD Bridge Design Specifications for Highway Bridges, Series of 2007.

Reinforcing steel in accordance with Section 5, Grade 60.
Concrete in accordance with Section 5.
Prestressing steel in accordance with Section 5, Grade 270.

Specifications:

Construction: Standard Specifications of the Iowa Department of Transportation, current series, with current applicable Special Provisions and Supplemental Specifications.

Design: AASHTO LRFD, Series of 2007, with minor modifications.

Note:
Exterior surfaces of exterior (fascia) beam ends over the piers shall not be roughened.

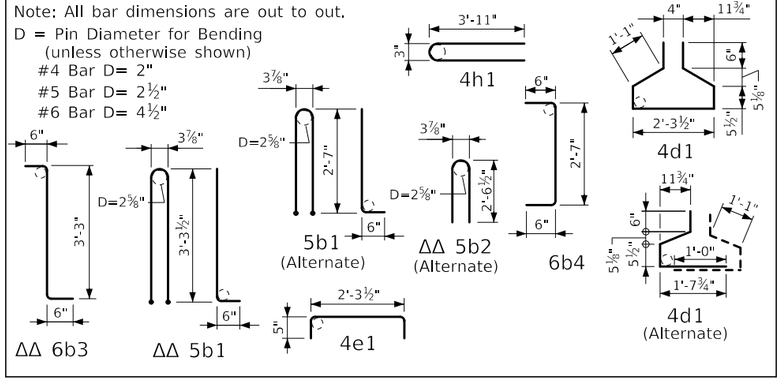
Note:
For modified stirrup extensions, see "Bent Bar Details" and beam details sheets for dimensions and locations.

Alternate Bar Note:

Alternate bars shown in bent bar details may be used in lieu of reinforcing bars shown in bar list. No additional payment shall be made for use of alternate bars.

Bent Bar Details

Note: All bar dimensions are out to out.
D = Pin Diameter for Bending (unless otherwise shown)
#4 Bar D= 2"
#5 Bar D= 2½"
#6 Bar D= 4½"



BTB Beam Data

BTB Beam	BTB Line	Span Length ℄-℄ Bearing	Overall Beam Length (L)	Concrete Strength f'ci (ksi)	Concrete Strength f'c (ksi)	Strand Size Dia. (in)	No. of Strand Straight	No. of Strand Deflected	③ Total Initial Prestress kips	Hold Down Force-kips	Camber (in) At Release	Camber (in) After Losses	Deflection (in) Δ_D Immediate① (Elastic) Δ_I Steel Diaphragm	Deflection (in) Δ_D Time ② (Plastic) Δ_T Steel Diaphragm	Permissible Maximum Spacing HL-93 Loading Steel Diaphragm	Weight (tons)	Concrete (cu yd.)	Reinforcing Steel (Weight-lbs)
BTB55	A-F	55'-0"	56'-4"	4.5	5.0	0.60	16	—	681	——	0.71	1.27	0.44	0.10	8'-3"	18.5	9.2	1379
	G	55'-0"	56'-4"	4.5	5.0	0.60	16	—	681	——	0.71	1.27	0.30 ◩	0.07 ◩	8'-3"	18.5	9.2	1379
BTB65	A-F	65'-0"	66'-4"	4.5	5.0	0.60	18	2	851	8.0	1.13	2.01	0.84	0.21	8'-3"	21.8	10.8	1586
	G	65'-0"	66'-4"	4.5	5.0	0.60	18	2	851	8.0	1.13	2.01	0.58 ◩	0.15 ◩	8'-3"	21.8	10.8	1586
BTB95	A-F	95'-0"	96'-4"	8.0	9.0	0.60	32	10	1786	20.1	3.07	5.42	2.81	0.70	8'-3"	31.7	15.7	2216
	G	95'-0"	96'-4"	8.0	9.0	0.60	32	10	1786	20.1	3.07	5.42	1.95 ◩	0.49 ◩	8'-3"	31.7	15.7	2216

Note:
◩ Deflections are based on tributary deck width without any closure pour weight added.

① Deflections at mid-span due to weight of slab and diaphragm. The deflections shown are for a slab (8.5 in) and haunch (1.5 in) weight of:
0.93 kips/ft for 8'-3" beam spacing at Beam Lines A-F and one steel diaphragm (0.500 kips) at ℄ of span.
0.64 kips/ft for Beam Line G (5'-6½" slab width) and one steel diaphragm (0.500 kips) at ℄ of Span.

② Deflections due to the combined effect of creep due to weight of slab and shrinkage of slab.
Total beam deflections at ℄ of span, Δ_D, due to weight of slab and diaphragms for detailing purpose:
(A) $\Delta_D=\Delta_I+\Delta_T$ for simple span.
(B) $\Delta_D=\Delta_I+\frac{3}{4}\Delta_T$ for end spans of continuous bridge.
(C) $\Delta_D=\Delta_I+\frac{1}{2}\Delta_T$ for interior spans of continuous bridge.

③ Total initial prestress is based on 72.6% f's, f's = 270 ksi. and As = 0.217 in^2.
Calculated design cambers have been reduced from their theoretical values by 15% to aid constructability.

Reinforcing Bar List

Beam Bar	Beam Shape	BTB55 No.	BTB55 Length	BTB65 No.	BTB65 Length	BTB95 No.	BTB95 Length	Beam Bar	
5a1	——	12	29'-2"	12	34'-2"	12	30'-3"	5a1	
5a2	——	—	——	—	——	6	40'-0"	5a2	
5b1	⟹	39	7'-9"	49	7'-9"	75	7'-9"	5b1	ΔΔ ◕
6b3	⌐	36	4'-3"	36	4'-3"	32	4'-3"	6b3	ΔΔ * ◕
6b4	⌐	4	3'-7"	4	3'-7"	16	3'-7"	6b4	*
4c1	——	71	2'-7"	83	2'-7"	115	2'-7"	4c1	
4d1	⌐	59	6'-5"	69	6'-5"	97	6'-5"	4d1	
4e1	⌐	24	3'-2"	24	3'-2"	26	3'-2"	4e1	
4h1	——	4	8'-0"	4	8'-0"	4	8'-0"	4h1	

ΔΔ 5b1 and 6b3 bars to be epoxy coated.
* 6b3 and 6b4 bars to be used in pairs.
◕ Standard bar length was increased to satisfy the required projection into the deck.

Beam Notes:

These beams are designed for AASHTO live loads as indicated in above table with an allowance of 20 lbs per square foot of roadway for future wearing surface.
All PPC beams shall use High Performance Concrete (HPC) in accordance with the Standard Specifications.
Hold down points for deflected strands may be moved toward ends of beam a distance of 0.05 L maximum at producer's option.
All prestressing strands except lifting loop strands shall be 0.60 in. nominal diameter (nominal steel area = 0.217 in^2) and conform to ASTM A416 Grade 270 low relaxation strands. Minimum strand breaking strength shall be 58.6 kips.
Tops of beams are to be struck off level and finished as per Materials I.M. 570.
Bearings shall be as detailed on other design sheets.
Beams to be used in bridges made continuous by the poured in place floor, are to be at least 28 days old before the floor is placed unless a shorter curing time is approved by the Bridge Engineer.
The portions of the prestressed beams that are to be embedded in the abutment and pier diaphragms shall be roughened for a distance of 10" from the beam end by sandblasting or other approved methods to provide suitable bond between the beam and the diaphragm in accordance with Article 2403.03, I, of the Standard Specifications.
All beams are to be increased in length to compensate for elastic shortening, creep and shrinkage.
For transporting, the allowable overhang is shown in the "Lifting Loop and Overhang Table".
Holes must be cast in the web to accommodate the steel diaphragm attachments as detailed on the steel diaphragm detail sheet.
Minimum concrete f'c (at 28 days) and mimimum f'ci at release are located in the BTB Beam Data table above.
Four 0.60 in. diameter strands stressed to not more than 5000 lbs. each may be used in lieu of bars 5al and 5a2 in the top flange.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans 97'-0" Interior Span

BTB Beam Details

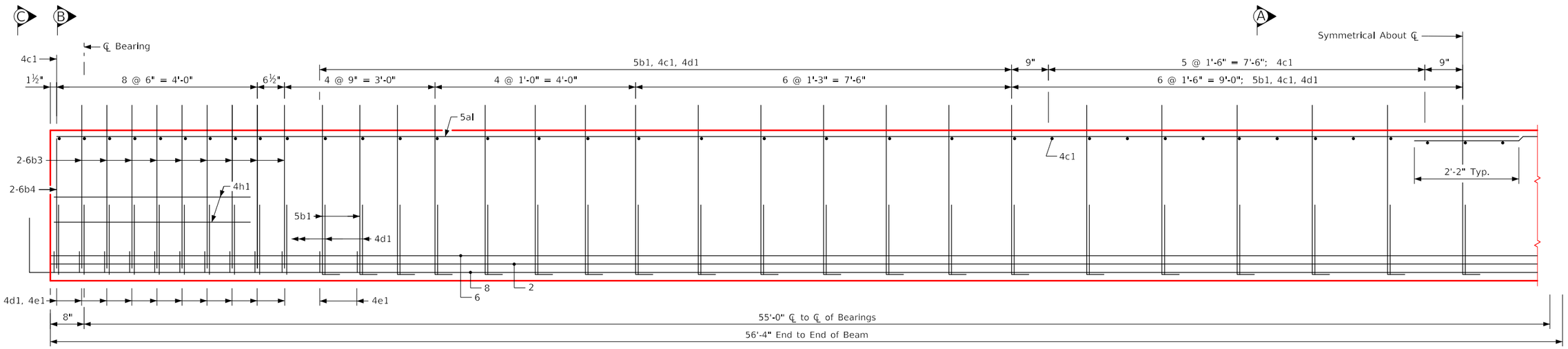
STA. 5174+26.60 (℄ I-80 Ultimate) Turn-in Date: May, 2024

Polk County

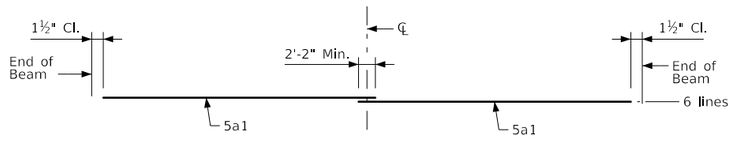
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 Design Sheet No. 20 of 35 FHWA No. 041981

CORRECTION 12-13 - COIL TIE DETAIL WAS CHANGED TO REFLECT THE DISTANCE BETWEEN COIL TIE ANCHORS EMBEDDED 5⁷⁄₆₄ INCH.
ENGLISHBEAMS.DGN - 4750 - THIS SHEET ISSUED 02-08.



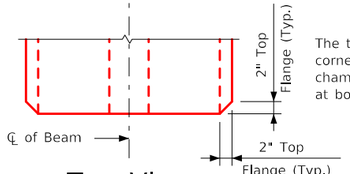
BTB55



Top Flange Longitudinal Bar Layout

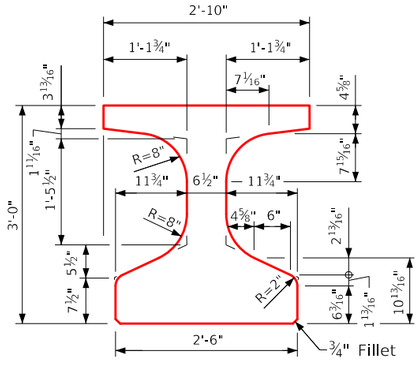
Note: Stirrup Extension

* The standard 5" projection has been increased.

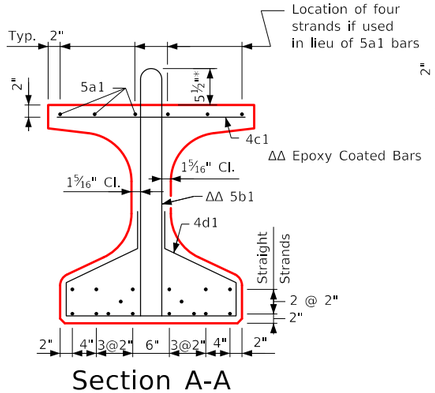


Top View

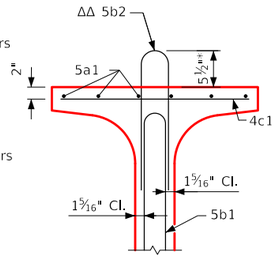
The top flange beam corners are to be chamfered 2" as shown at both ends of the beam.



BTB Beam Cross Section

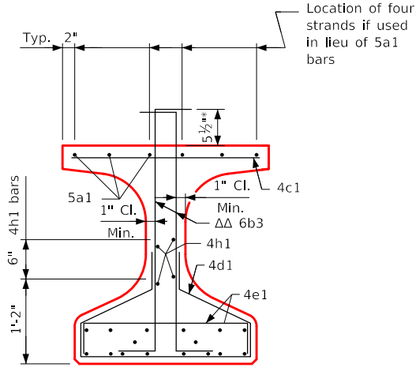


Section A-A

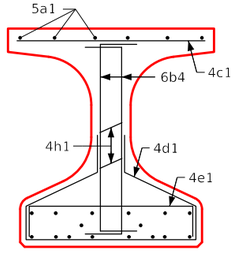


Section A-A (Alternate)

See Alternate Bar Note on Design Sheet 20.



Section B-B



Section C-C

Area = 631.7 in²
$\bar{y}_b$ = 17.14 in
I = 99,980 in⁴

Beam Section Properties

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

BTB55 Beam Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

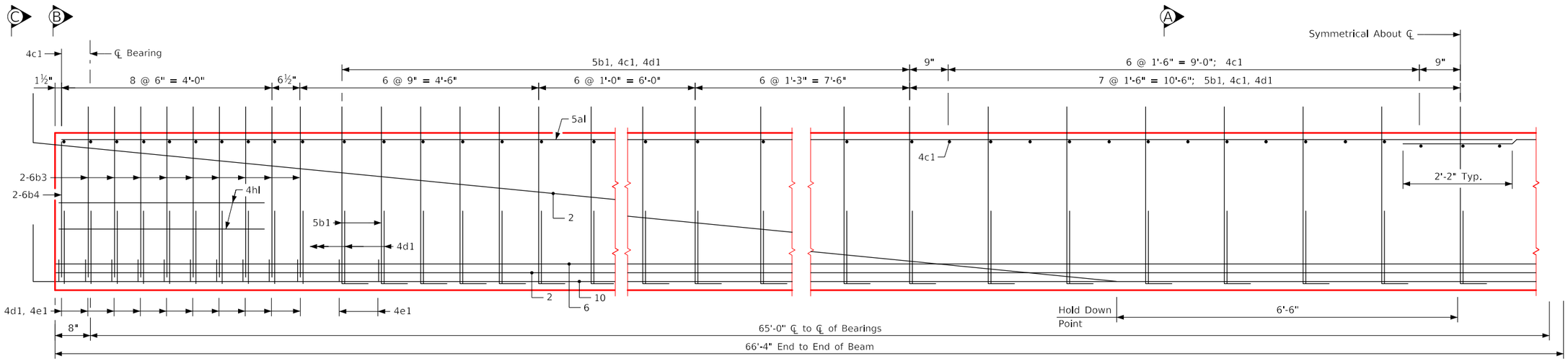
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 21 of 35 — FHWA No. 041981

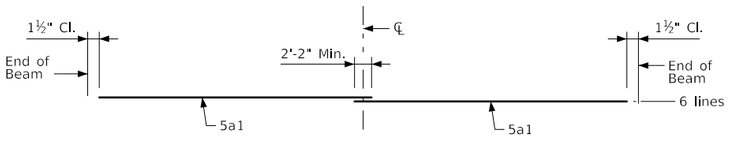
ENGLISHBEAMS.DGN - 4756 - THIS SHEET ISSUED 02-08.

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS\CJL\MJS	Bulb Tee "B" Beam - 55'-0" Span	Standard Sheet 4756 (Modified)	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.21	

4:24:22 PM 4/19/2024 ESORENS pw:\\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5_Final_Bridge\6.0_CAD_BIM\6.2_WIP\Drafting\PPCB Design No. 624 - I-80WB over Four Mile Creek



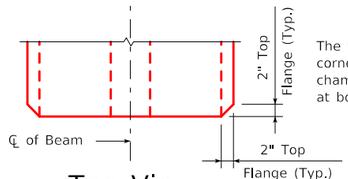
BTB65



Top Flange Longitudinal Bar Layout

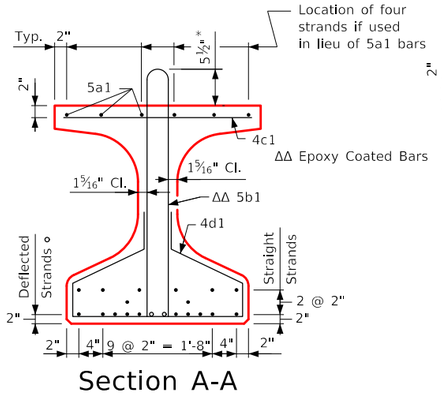
Note: Stirrup Extension

* The standard 5" projection has been increased.

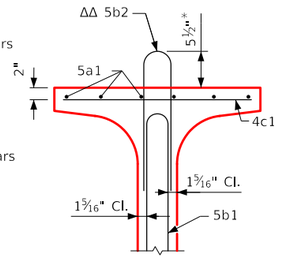


Top View

The top flange beam corners are to be chamfered 2" as shown at both ends of the beam.

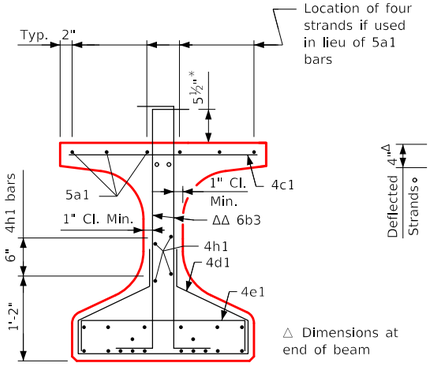


Section A-A



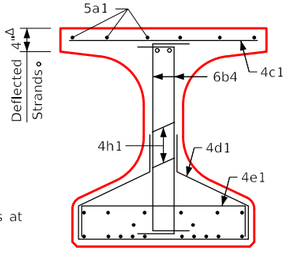
Section A-A (Alternate)

See Alternate Bar Note on Design Sheet 20



Section B-B

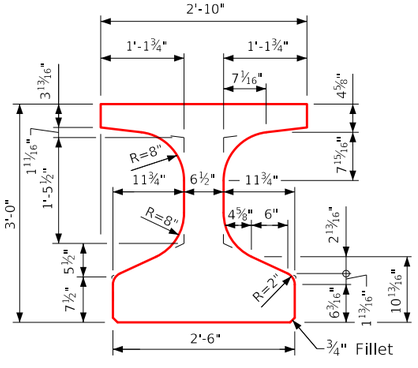
△ Dimensions at end of beam



Section C-C

Area = 631.7 in^2
$\bar{y}_b$ = 17.14 in
I = 99,980 in^4

Beam Section Properties



BTB Beam Cross Section

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

BTB65 Beam Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

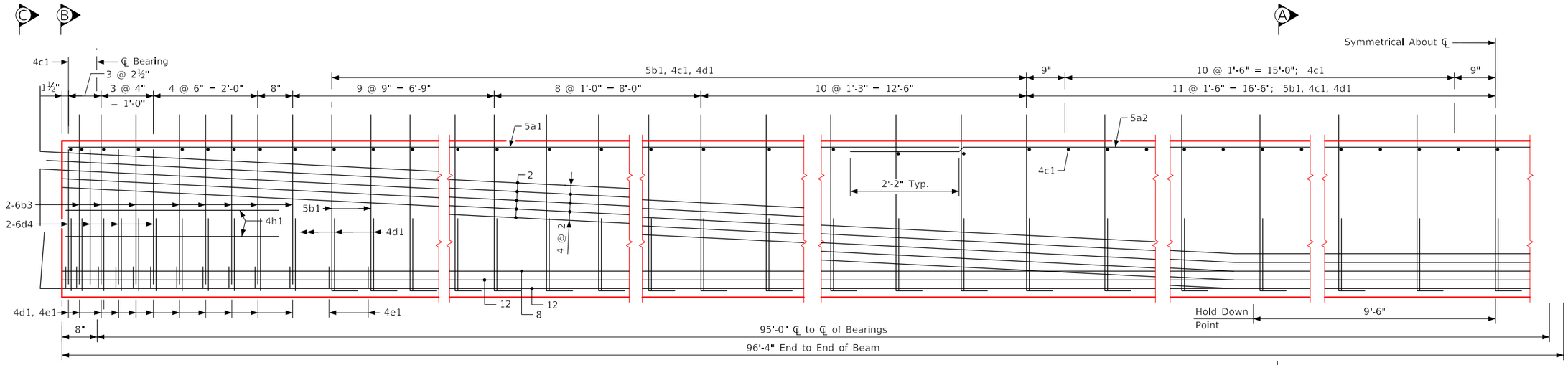
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 22 of 35 — FHWA No. 041981

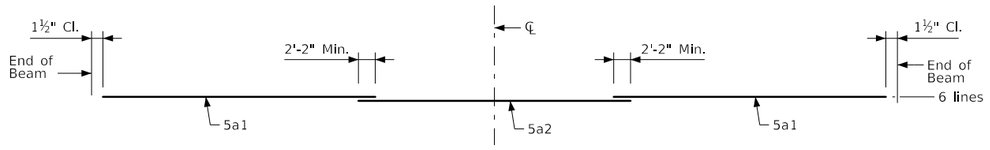
ENGLISHBEAMS.DGN - 4758 - THIS SHEET ISSUED 02-08.

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/CJL/MJS	Bulb Tee "B" Beam - 65'-0" Span	Standard Sheet 4758 (Modified)	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.22	

4:24:23 PM 4/19/2024 ESORENS pw:\\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5_Final_Bridge\6.0_CAD_BIM\6.2_WIP\Drafting\PPCB Design No. 624 - I-80WB over Four Mile Creek



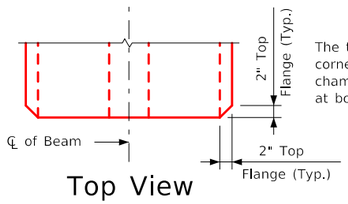
BTB95



Top Flange Longitudinal Bar Layout

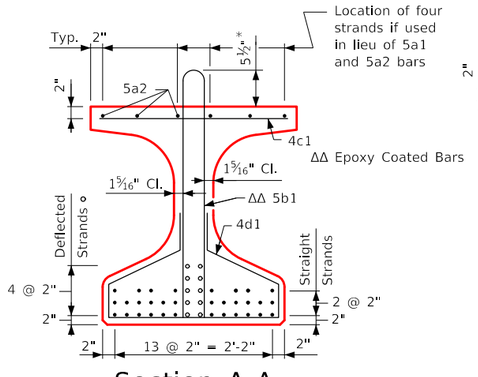
Note: Stirrup Extension

* The standard 5" projection has been increased.

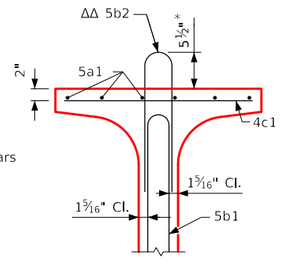


Top View

The top flange beam corners are to be chamfered 2" as shown at both ends of the beam.

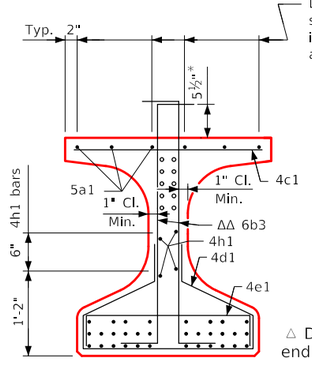


Section A-A



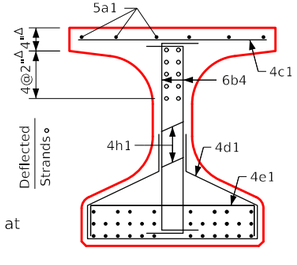
Section A-A (Alternate)

See Alternate Bar Note on Design Sheet 20



Section B-B

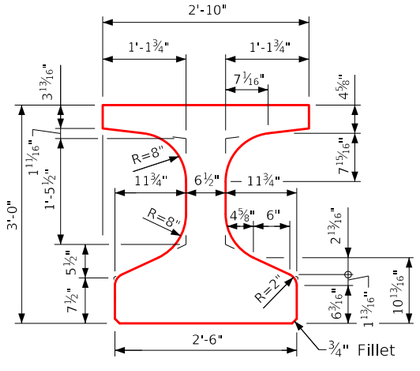
△ Dimensions at end of beam



Section C-C

Area = 631.7 in²
ȳb = 17.14 in
I = 99,980 in⁴

Beam Section Properties



BTB Beam Cross Section

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

BTB95 Beam Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

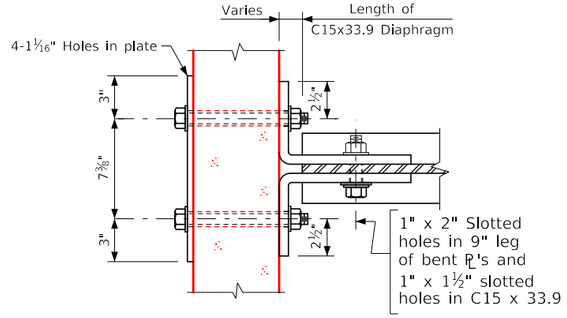
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 23 of 35 — FHWA No. 041981

REVISED 08-09 - ADDED STRANDS TO SECTIONS A-A, B-B, & C-C.
REVISED 05-11 - CHANGED TO THE 3rd DEFLECTED STRAND AT THE TOP TO BE BENT DOWN AT THE BEAM END.
ENGLISHBEAMS.DGN - 4764 - THIS SHEET ISSUED 02-08.

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/CJL/MJS	Bulb Tee "B" Beam - 95'-0" Span	Standard Sheet 4764 (Modified)	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.23

4:24:24 PM 4/19/2024 ESORENS pw:\\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5_Final_Bridge\6.0_CAD_BIM\6.2_WIP\Drafting\PPCB Design No. 624 - I-80WB over Four Mile Creek



Section C-C

Structural Steel	
Weight	6,737 Lbs.

Note: Structural steel weight is included on the Summary Quantities Sheet.

Notes;

All diaphragm materials, including bolts, nuts and washers shall be galvanized.

Shop drawings of the steel diaphragms showing layout and details of the diaphragms shall be submitted for approval.

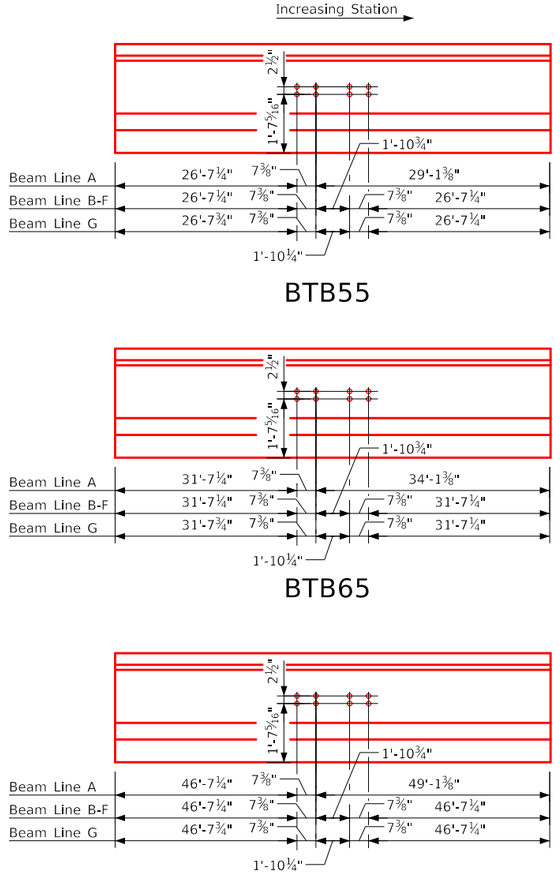
All costs for furnishing and installing steel intermediate diaphragms shall be included in the price bid for "Structural Steel".

The 1½"∅ holes for the ⅞"∅ H.S. bolts shall be cast into the web. Drilling is not allowed.

The ⅞"∅ H.S. bolts through the web shall have a thread length of 3" min. and 4" max. and shall meet the requirements of ASTM A449.

All bolts are to be tightened prior to placing bridge floor concrete.

For location of Section C-C, see Design Sheet 25.



BTB55

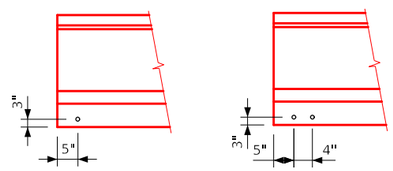
BTB65

BTB95

Bulb Tee "B" Beam Intermediate Diaphragm Structural Steel

One Beam Connection (Detail "F")			Weight
		No. of Beam Connections	
4 - ⅞"∅ x 9¼" H.S. Bolts with nuts & washers = 9.6 Lbs.		36	346
One Detail "F"	1 - Backing PL 5" x ⅜" x 1'-1⅜" = 7.1 Lbs.	36	256
	2 - Bent PL 9" x 6" x ½" x 0'-11" = 46.8 Lbs.	36	1,685
One Diaphragm			
		Number of Diaphragms	
6 - ⅞"∅ x 3" H.S. Bolts with nuts & washers = 7.8 Lbs.		18	140
	Length of Member		
1 - C15 x 33.9 = 33.9 Lbs./Ft.	7'-0¾"	18	4,310
Intermediate Diaphragm Structural Steel - Total (Lbs.)			6,737

Intermediate Diaphragm Bolt Hole Locations



Integral Abut. Fixed Pier

Beam Coil Tie Locations

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans 97'-0" Interior Span

Steel Diaphragm Details

STA. 5174+26.60 (℄ I-80 Ultimate) Turn-in Date: May, 2024

Polk County

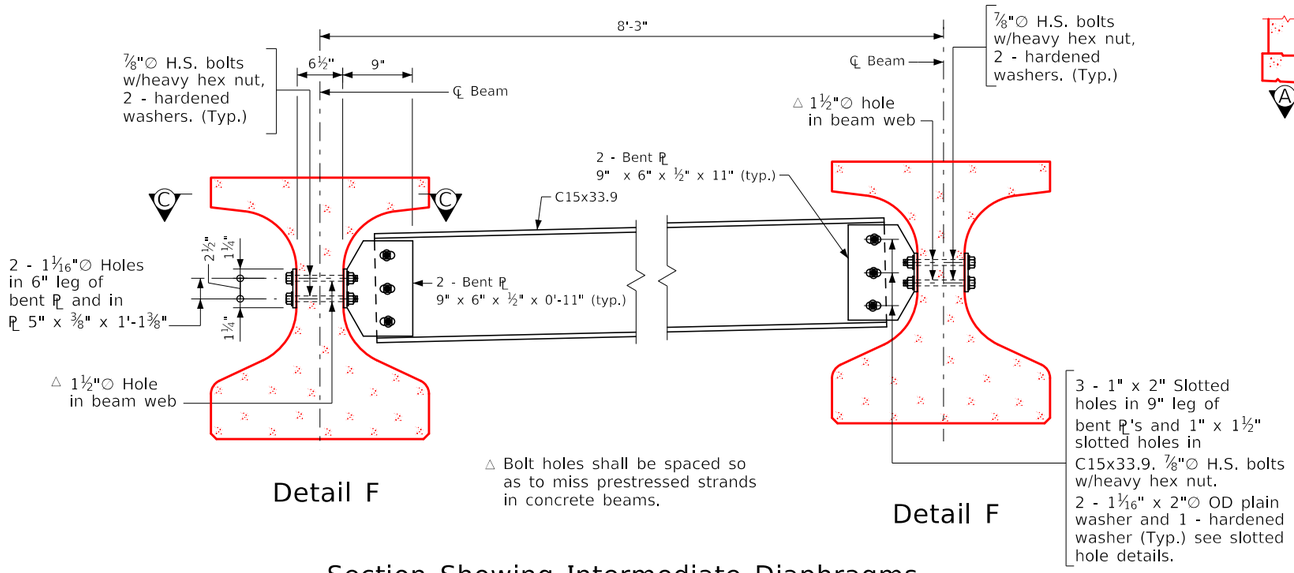
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 Design Sheet No. 24 of 35 FHWA No. 041981

ENGLISHBEAMS.DGN - 1036-1-BTB - THIS SHEET ISSUED 06-14. SHEET 1 OF 2.

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS\CJL\MJS	Steel Interm. Diaphs. For "BTB" Beam Bridges - Sht. 1 of 2	Standard Sheet 1036-1-BTB (Modified)	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.24

4:24:25 PM 4/19/2024 ESORENS pw:\\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5_Final_Bridge\6.0_CAD_BIM\6.2_WIP\Drafting\PPCB Design No. 624 - I-80WB over Four Mile Creek

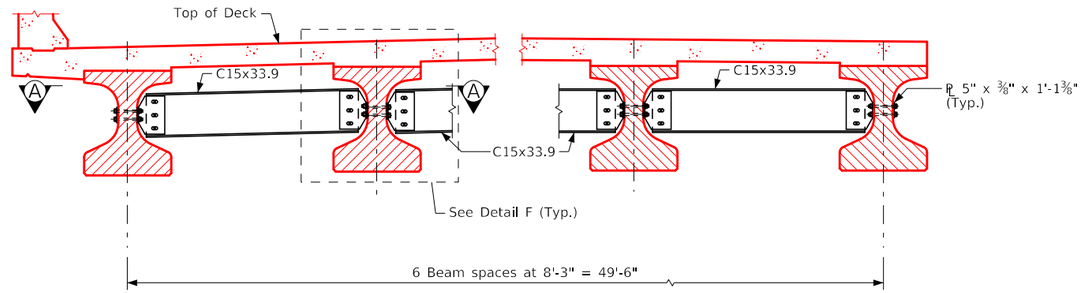


Detail F

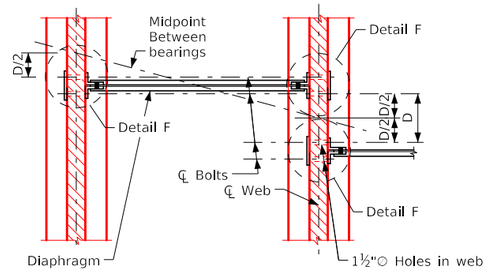
Detail F

Section Showing Intermediate Diaphragms

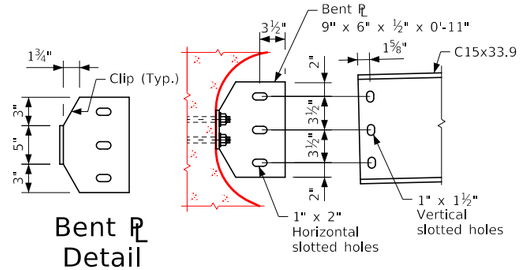
Note:
For Section C-C, see Design Sheet 24.



Section Showing Intermediate Diaphragms



Part Section A-A



Bent PL Detail

Slotted Hole Details

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Steel Diaphragm Details

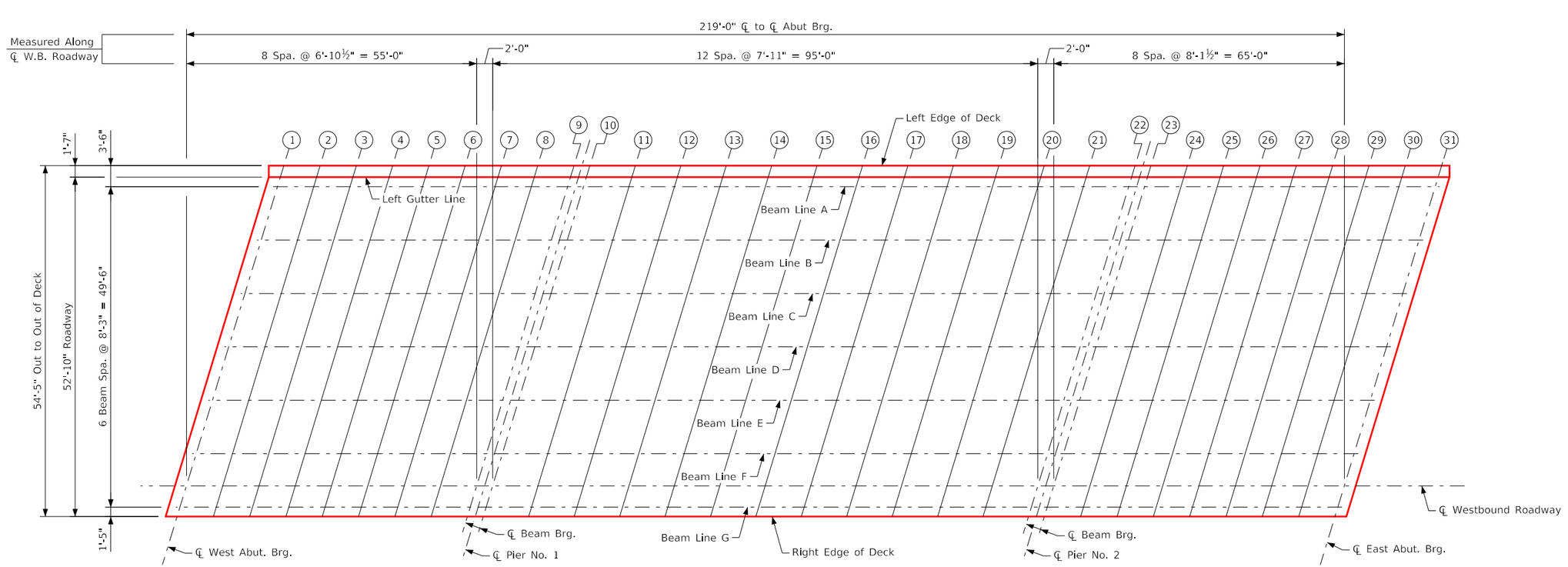
STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 25 of 35 — FHWA No. 041981

Bench Mark No. Feno200, 1-Meter Rod Monument, Sta. 1183+18.58, 845.82' Rt., Elev. 851.56



Top of Deck Elevations & Haunch Locations

Table of Top of Deck Elevations

Line \ Point	℄ West Abut. Brg. (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	℄ Pier No. 1 Bearings (9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Left Edge of Deck	842.59	842.60	842.61	842.61	842.62	842.62	842.63	842.63	842.64	842.64	842.64	842.64	842.64	842.64	842.64	842.64	842.64	842.63
Left Gutter Line	842.59	842.60	842.61	842.61	842.62	842.62	842.63	842.63	842.64	842.64	842.64	842.64	842.64	842.64	842.64	842.64	842.64	842.63
Beam Line A	842.64	842.64	842.65	842.66	842.67	842.67	842.68	842.68	842.68	842.69	842.69	842.69	842.69	842.69	842.69	842.69	842.69	842.68
Beam Line B	842.84	842.85	842.86	842.86	842.87	842.88	842.88	842.89	842.89	842.89	842.89	842.90	842.90	842.90	842.90	842.90	842.89	842.89
Beam Line C	843.04	843.05	843.06	843.07	843.07	843.08	843.09	843.09	843.09	843.10	843.10	843.10	843.10	843.10	843.10	843.10	843.10	843.10
Beam Line D	843.25	843.25	843.26	843.27	843.28	843.28	843.29	843.29	843.30	843.30	843.30	843.31	843.31	843.31	843.31	843.31	843.31	843.30
Beam Line E	843.45	843.46	843.47	843.47	843.48	843.49	843.49	843.50	843.50	843.51	843.51	843.51	843.51	843.52	843.52	843.52	843.51	843.51
Beam Line F	843.61	843.62	843.63	843.64	843.65	843.66	843.66	843.67	843.67	843.67	843.68	843.68	843.68	843.69	843.69	843.69	843.69	843.68
℄ W.B. Roadway	843.68	843.69	843.70	843.71	843.71	843.72	843.73	843.73	843.74	843.74	843.74	843.75	843.75	843.75	843.75	843.75	843.75	843.75
Beam Line G	843.64	843.65	843.66	843.67	843.67	843.68	843.69	843.69	843.70	843.70	843.71	843.71	843.71	843.71	843.71	843.71	843.71	843.71
Right Edge of Deck	843.61	843.62	843.63	843.64	843.65	843.65	843.66	843.67	843.67	843.67	843.68	843.68	843.68	843.69	843.69	843.69	843.69	843.68

Line \ Point	(19)	(20)	(21)	℄ Pier No. 2 Bearings (22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	℄ East Abut. Brg. (31)
Left Edge of Deck	842.63	842.62	842.62	842.61	842.61	842.60	842.59	842.58	842.57	842.55	842.54	842.52	842.51
Left Gutter Line	842.63	842.62	842.62	842.61	842.61	842.60	842.59	842.58	842.57	842.55	842.54	842.52	842.51
Beam Line A	842.68	842.67	842.67	842.66	842.66	842.65	842.64	842.63	842.61	842.60	842.59	842.57	842.56
Beam Line B	842.89	842.88	842.87	842.87	842.86	842.86	842.85	842.84	842.82	842.81	842.80	842.78	842.77
Beam Line C	843.09	843.09	843.08	843.08	843.07	843.07	843.06	843.05	843.03	843.02	843.01	843.00	842.98
Beam Line D	843.30	843.30	843.29	843.28	843.28	843.27	843.27	843.26	843.24	843.23	843.22	843.21	843.19
Beam Line E	843.51	843.50	843.50	843.49	843.49	843.48	843.47	843.46	843.45	843.44	843.43	843.42	843.40
Beam Line F	843.68	843.68	843.67	843.66	843.66	843.66	843.65	843.64	843.63	843.62	843.60	843.59	843.58
℄ W.B. Roadway	843.75	843.74	843.74	843.73	843.73	843.72	843.72	843.71	843.70	843.69	843.67	843.66	843.65
Beam Line G	843.71	843.71	843.70	843.70	843.69	843.69	843.68	843.67	843.66	843.65	843.64	843.62	843.61
Right Edge of Deck	843.68	843.68	843.67	843.67	843.67	843.66	843.65	843.64	843.63	843.62	843.61	843.60	843.58

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Top of Deck Elevations

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 26 of 35 — FHWA No. 041981

HDR

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/CJL/MJS	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.26

4:24:26 PM 4/19/2024 ESORENS pw:\\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5_Final_Bridge\6.0_CAD_BIM\6.2_WIP\Drafting\PPCB Design No. 624 - I-80WB over Four Mile Creek

Bench Mark No. Feno200, 1-Meter Rod Monument, Sta. 1183+18.58, 845.82' Rt., Elev. 851.56

Table of Beam Line Haunch Elevations

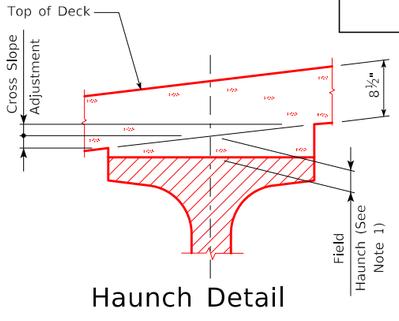
	℄ West Abut. Brg.								℄ Pier No. 1 Bearings								
Beam Line	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱
A	841.93	841.95	841.97	841.99	842.00	842.00	842.00	841.99	841.98	841.98	842.05	842.11	842.17	842.21	842.24	842.24	842.23	842.20
B	842.13	842.16	842.18	842.19	842.20	842.21	842.20	842.19	842.18	842.18	842.25	842.32	842.38	842.42	842.44	842.45	842.44	842.41
C	842.33	842.36	842.38	842.40	842.41	842.41	842.41	842.40	842.39	842.39	842.46	842.53	842.58	842.62	842.65	842.66	842.65	842.62
D	842.54	842.56	842.59	842.60	842.61	842.62	842.61	842.60	842.59	842.59	842.67	842.73	842.79	842.83	842.86	842.86	842.85	842.82
E	842.74	842.77	842.79	842.81	842.82	842.82	842.82	842.81	842.80	842.80	842.87	842.94	842.99	843.04	843.06	843.07	843.06	843.03
F	842.91	842.93	842.96	842.97	842.98	842.99	842.98	842.98	842.96	842.97	843.04	843.11	843.16	843.21	843.23	843.24	843.23	843.20
G	842.93	842.95	842.97	842.99	843.00	843.00	843.00	843.00	842.99	842.99	843.05	843.09	843.13	843.16	843.18	843.19	843.18	843.16

				℄ Pier No. 2 Bearings									℄ East Abut. Brg.
Beam Line	⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛
A	842.16	842.10	842.03	841.95	841.95	841.97	841.99	842.00	841.99	841.97	841.94	841.90	841.85
B	842.36	842.31	842.23	842.16	842.16	842.18	842.20	842.20	842.20	842.18	842.15	842.11	842.06
C	842.57	842.51	842.44	842.37	842.37	842.39	842.41	842.41	842.41	842.39	842.36	842.32	842.27
D	842.78	842.72	842.65	842.58	842.57	842.60	842.62	842.62	842.62	842.60	842.57	842.53	842.48
E	842.99	842.93	842.86	842.78	842.78	842.81	842.83	842.83	842.83	842.81	842.78	842.74	842.69
F	843.16	843.10	843.03	842.96	842.95	842.98	843.00	843.01	843.00	842.99	842.96	842.92	842.87
G	843.13	843.09	843.04	842.99	842.99	843.00	843.01	843.01	843.01	842.99	842.97	842.94	842.90

Miscellaneous Data Table

	Beam Line		℄ West Abut. Brg.								℄ Pier No. 1 Bearings								
			①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱
Anticipated Deflection Due to Deck (in.)	A-F		0	3/16	3/8	1/2	1/2	1/2	3/8	3/16	0	0	1 3/16	1 3/8	2 1/4	2 3/4	3 3/16	3 3/16	3 3/16	2 3/4
	G		0	1/8	1/4	5/16	3/8	5/16	1/4	1/8	0	0	9/16	1 1/8	1 9/16	1 15/16	2 1/8	2 3/16	2 1/8	1 15/16
Cross Slope Adjustments (in.)	A-E		7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
	F & G		5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
Allowable Field Haunch (in. & ft.)	Max.	A-F	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)
		G	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	4 (0.333)	4 (0.333)	4 (0.333)	4 (0.333)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)
	Min.	A-F	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.006)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)
		G	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)

	Beam Line					℄ Pier No. 2 Bearings									℄ East Abut. Brg.
			⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛
Anticipated Deflection Due to Deck (in.)	A-F		2 1/4	1 5/8	1 3/16	0	0	3/8	1 1/16	1 5/16	1	1 5/16	1 1/16	3/8	0
	G		1 9/16	1 1/8	9/16	0	0	1/4	1/2	5/8	1 1/16	5/8	1/2	1/4	0
Cross Slope Adjustments (in.)	A-E		7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
	F & G		5/16	5/19	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
Allowable Field Haunch (in. & ft.)	Max.	A-F	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)
		G	3 (0.25)	3 (0.25)	4 (0.333)	4 (0.333)	4 (0.333)	4 (0.333)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)	3 (0.25)
	Min.	A-F	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)	- 1/16 (-0.005)
		G	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)	- 3/16 (-0.016)



Haunch Detail

Note:
Haunch locations are at the same location as the encircled numbers shown on the Top of Deck Elevations Sheet.

Note:
Bridge seat elevations are set based on theoretical camber and beam deflections. These bridge seats will provide a theoretical beam haunch within design parameters. Field haunches are determined using surveyed top of beam elevations and "Beam Line Haunch Elevation" data. Allowable maximum and minimum "Field Haunch" values are given in inches and decimals of feet in the "Miscellaneous Data Table". "Cross Slope Adjustment" values will aid the Contractor in determining actual formed haunch dimensions at the edges of the top flange.

Note 1:
To calculate field haunch required at each location, survey the beam tops consistent with the spacings shown on the "Top of Deck Elevations Layout". Subtract the surveyed beam shot from the "Beam Line Haunch Elevation". This value will be the haunch needed (see "Field Haunch" in Haunch Detail). The "Beam Line Haunch Elevation" includes adjustments for deck thicknesses and anticipated deflections. No additional calculations are required. If the field haunch exceeds the maximums and minimums shown in inches and decimals of feet in the Miscellaneous Data Table, adjustments to the grade or additional haunch reinforcement will be required.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans 97'-0" Interior Span

Haunch Data Details

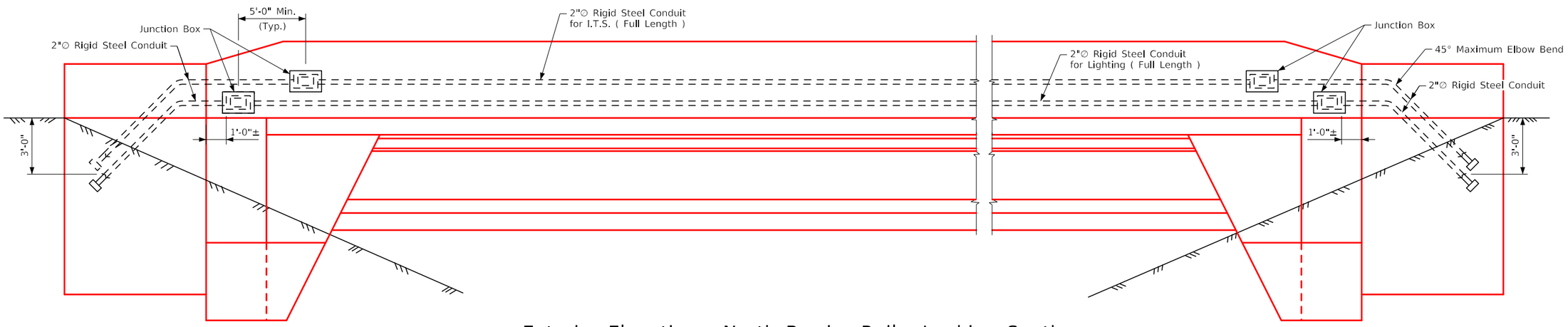
STA. 5174+26.60 (℄ I-80 Ultimate) Turn-in Date: May, 2024

Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 Design Sheet No. 27 of 35 FHWA No. 041981

REVISED 06-12 - THE ALLOWABLE FIELD HAUNCH MAX. & MIN. WAS CHANGED TO INCHES & DECIMALS OF FEET. NOTE & NOTE 1 WERE CHANGED. THE SLAB HAUNCH LOCATIONS EXAMPLE WAS REPLACED WITH A NOTE.
REVISED 07-2019: CHANGED ALL REFERENCES OF "SLAB" TO "DECK".
ENGLISH\MISCELLANEOUSBRIDGES.DGN - 1066 - THIS SHEET ISSUED 02-08.



Exterior Elevation - North Barrier Rail - Looking South

Lighting Notes:

See LI-104 standard road plan for additional information on junction boxes.

Construction shall conform to the current Iowa D.O.T. Standard and Supplemental Specifications and Special Provisions.

Conduit installation shall be in accordance with Article 2523.03, N, of the Standard Specifications.

All "C" entrance holes in junction boxes shall be drilled and tapped for the specified conduit size. All other holes shall have a concrete - tight slip fit.

Conduit ends shall not protrude into junction box more than ¼". Drain pipe end shall be flush with inside surface of box. Grounding buttons shall be located approximately 3" from the inside surface of the box wall, and not closer than 3" to the edge of any hole in the box floor. Holes for drain pipe shall be placed in the low corner of the box, with a minimum clearance of 1" between the edge of the hole and the inside surface of the box wall. Typical details are shown on this sheet.

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.

Stainless-steel reinforcement shall not be allowed to be in contact with the uncoated reinforcement, bare metal forming hardware, or to galvanized attachments or galvanized conduit.

I.T.S. Conduit Notes:

See LI-104 standard road plan for additional informational information on junction boxes.

I.T.S. conduit shall be limited to six 45° elbow bends for a cable pull from handhole to handhole.

Rigid steel conduit for I.T.S. applications shall be installed and prepared to facilitate installation of fiber optic cable.

The minimum inside bend radius for rigid steel conduit used for I.T.S. applications shall be 18".

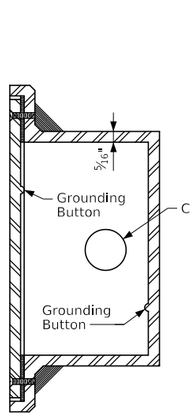
Rigid steel conduit for I.T.S. applications shall be cut and threaded to eliminate exposed threads after completing the connections; all couplings shall be tightened until the conduit ends meet to allow a continuous inner surface throughout the entire length of the conduit run. Nipples should be used to eliminate cutting and threading short lengths of conduit.

All burrs and roughened surfaces shall be removed from conduits and fittings. All conduit runs shall be reamed, cleaned and swabbed for installation of fiber optic cable.

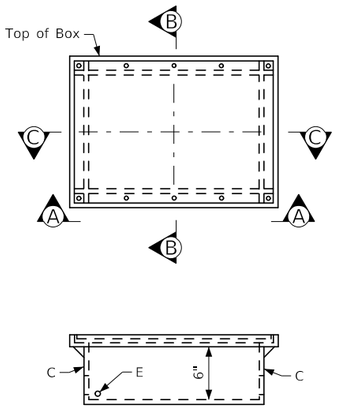
Only galvanized fittings shall be used with rigid steel conduit. Damaged galvanized surfaces of rigid steel conduit or fittings shall be painted with an acceptable zinc-rich paint.

I.T.S. conduit shall include a polypropylene pull rope between handholes with a minimum 600 pound tensile strength.

I.T.S. rigid steel conduit, pull ropes and fittings, including labor and any additional work for installation is considered incidental to the cost of the railing.



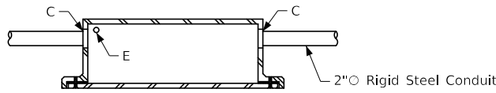
Section B-B



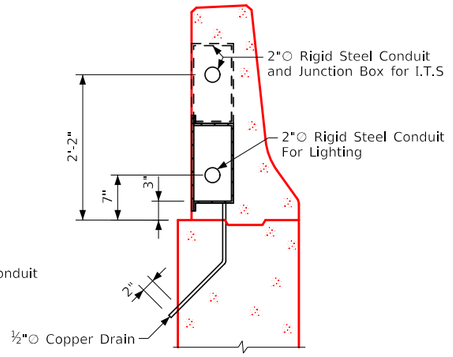
View A-A

Bossed For	Hole	For Conduit Size
5 Threads	C	2"∅ Rigid Steel
None	E	½"∅ Copper Pipe

NOTE:
The grounding buttons are to be blind drilled and tapped for 3/8"∅ x 0'-0¾" bolts.



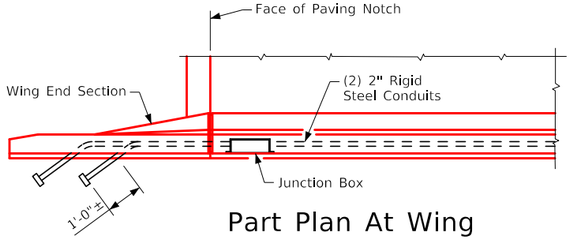
Section C-C



Section Thru Junction Box

LI-104 Junction Box

Watertight, Cast Iron - Flush Mount



Part Plan At Wing

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Conduit Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

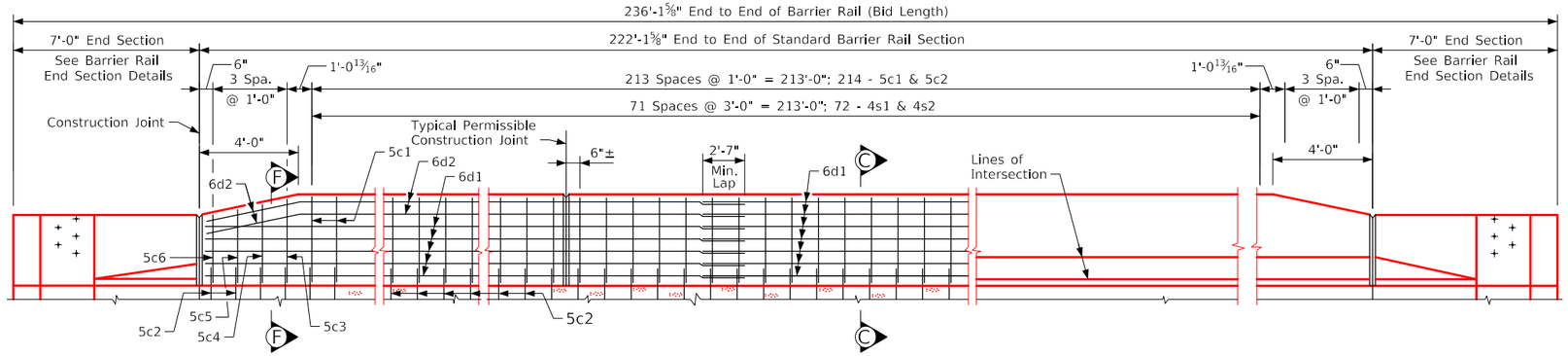
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 28 of 35 — FHWA No. 041981

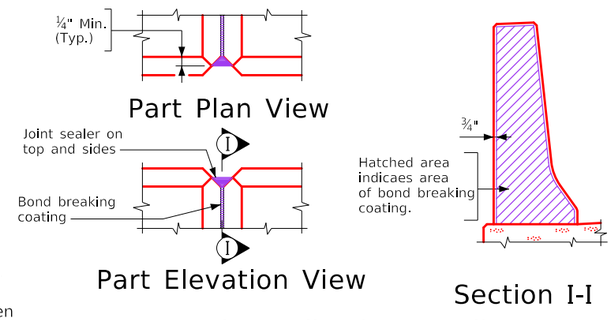
FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/CJL/MJS	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.28

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Elevation of North Barrier Rail

Note:
Reinforcing steel quantities are included on the Summary Quantities sheet.



Barrier Rail Joint Details

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 either epoxy coated or stainless steel as shown. The stainless steel reinforcing steel shall be deformed bar Grade 60 meeting the requirements of materials I.M. 452.

The concrete barrier rail is to be bid on a lineal foot basis. The number of lineal 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, 3'-8"" 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. 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.

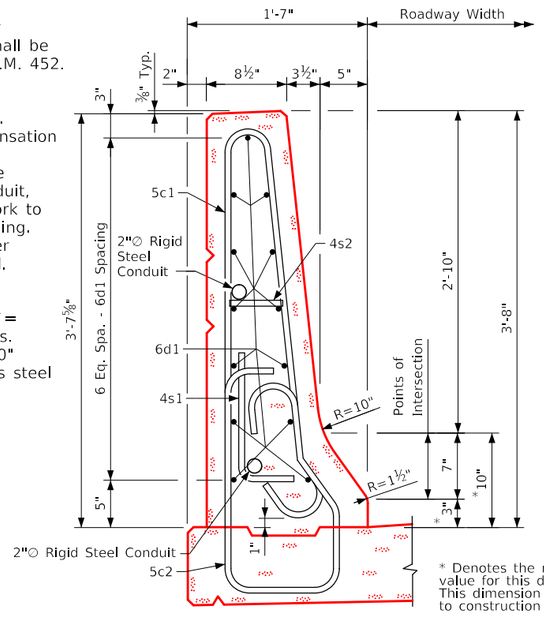
The joint sealer shall be light gray nonsag latex caulking sealer marketed for outdoor use. No testing or certification is required.

Top of the barrier rail is to be parallel to the theoretical ℄ grade, except at the special sections.

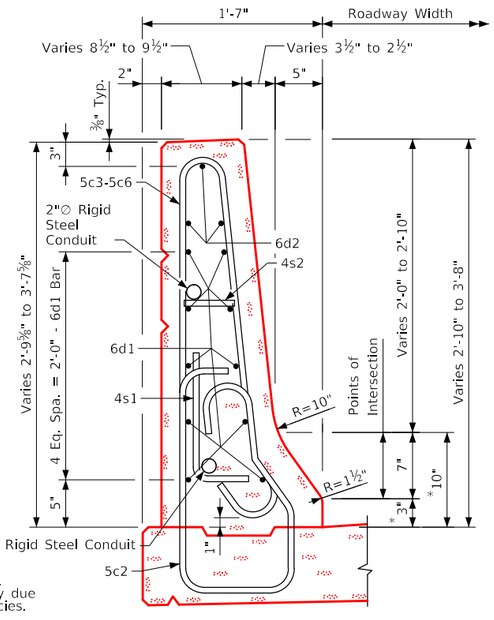
Cross sectional area of the standard section of the barrier rail` = 3.46 square feet except the 4'-0 sloped ends at the end sections.

The galvanized steel conduit shall be securely tied at every 3'-0" intersection with the 4s1 bars to avoid contact with the stainless steel reinforcing.

Note:
See Barrier Rail Rustication Details on Design Sheet 31.



Part Section C-C



Part Section F-F

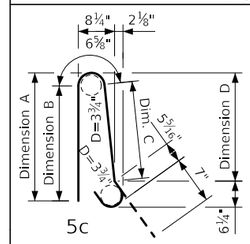
Epoxy Coated Reinf. Steel - One Rail

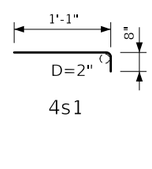
Section	Bar	Location	Shape	No.	Length	Weight
Standard Sections	5c1	Rail, Vertical		214	7'-5"	1,655
	5c3	Rail, Vertical, Sloped Ends		2	7'-3"	15
	5c4	Rail, Vertical, Sloped Ends		2	6'-10"	14
	5c5	Rail, Vertical, Sloped Ends		2	6'-5"	13
	5c6	Rail, Vertical, Sloped Ends		2	6'-0"	13
	6d1	Rail, Longitudinal		72	39'-2"	4,236
	6d2	Rail, Longitudinal, Top Sloped Ends		6	39'-3"	354
	4s1	Rail, Conduit		72	1'-9"	84
	4s2	Rail, Conduit		72	0'-6"	24
					Epoxy Steel Total Weight (lbs.)	6,408

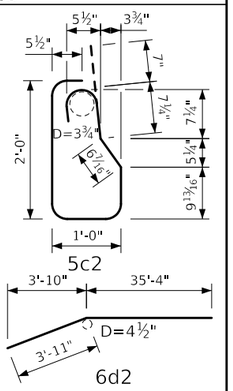
Stainless Steel Reinf. Steel - One Rail

Section	Bar	Location	Shape	No.	Length	Weight
Standard Sections	5c2	Rail, Vertical		222	6'-0"	1,389
					Stainless Steel Total Weight (lbs.)	1,389

Bent Bar Details







5c Bars

Bar	Dim. A	Dim. B	Dim. C	Dim. D
5c1	3'-3 13/16"	3'-1 5/16"	2'-8½"	2'-10 9/16"
5c3	3'-2 9/16"	3'-0"	2'-7¼"	2'-9 5/16"
5c4	3'-0 1/16"	2'-9 9/16"	2'-4¾"	2'-6⅞"
5c5	2'-9 9/16"	2'-7 1/16"	2'-2¼"	2'-4⅜"
5c6	2'-7 1/16"	2'-4 9/16"	1'-11⅞"	2'-1⅞"

Notes:
All dimensions are out to out.
D = Pin Diameter

Concrete Placement Summary

	Section	Total
Δ	Standard Section 222'-1⅝" @ 0.1281 Cu. Yd. Per Ft.	28.4
	Total (Cu. Yd.)	28.4

Concrete Barrier Rail Quantities

Item	Unit	Quantity
Concrete Barrier Railing, 3'-8"	L.F.	236.1

Δ Deduct 0.044 cu. yd. for one sloped end.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

North Barrier Rail Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

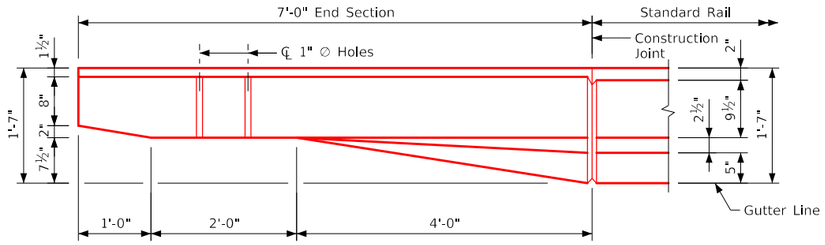
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 29 of 35 — FHWA No. 041981

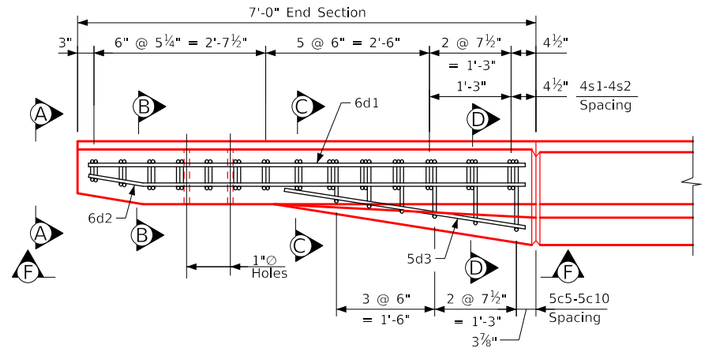
ENGLISHDECKRAILBRIDGES.DGN 1020SD - THIS SHEET ISSUED 04-14 - ADDED STAINLESS STEEL REINFORCING BAR LIST AND CHANGED 5c2 BARS TO STAINLESS STEEL.

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/CJL/MJS	3'-8" Barrier Rail -- Integral Abutments	Standard Sheet 1020SD (Modified)	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.29

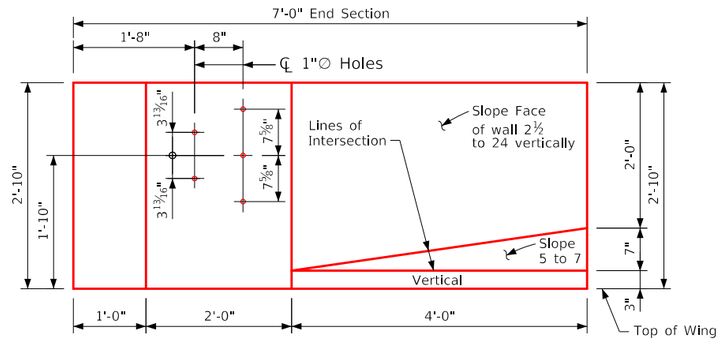
4:24:29 PM 4/19/2024 ESORENS pw:\\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5_Final_Bridge\6.0_CAD_BIM\6.2_WIP\Drafting\PPCB Design No. 624 - I-80WB over Four Mile Creek



Part Plan View

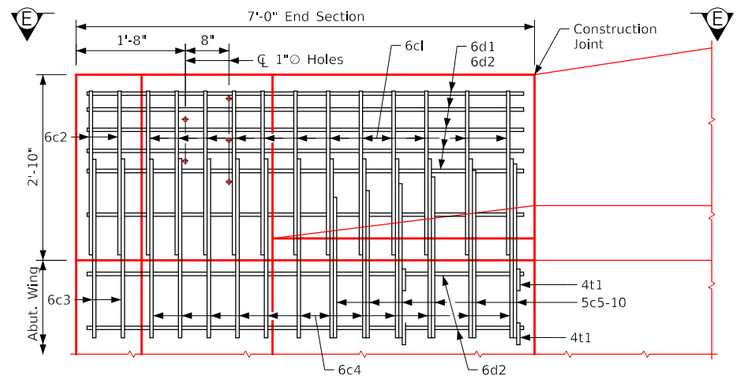


Part View E-E

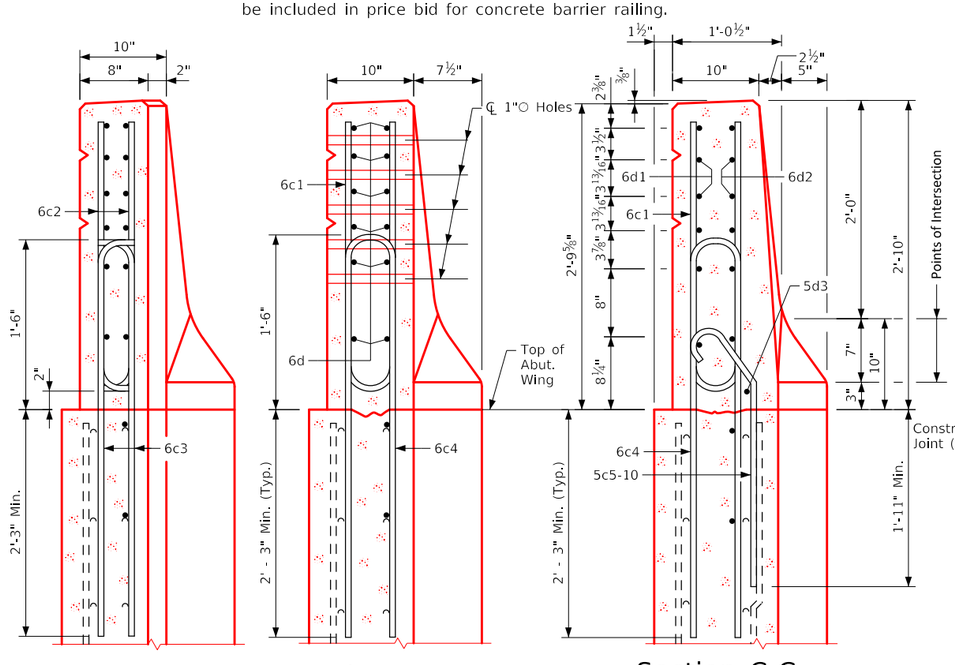


Part Elevation View

Provide 5 holes formed with 1"∅ plastic conduit. Cost to be included in price bid for concrete barrier railing.



Part View F-F



Note:
4t1 placement- 2 bars each level of 6d2 in wing footing.

Note:
Construction joint between top of wing and barrier rail is roughened concrete.

Note:
The 10" radius and 1½" radius are typical and shall be used when constructing the corners for View A-A, Section B-B, Section C-C and Section D-D.

Note:
The 6c4, 6c3, 5c5-10, 2-6d2 and 4t1 bars are to be placed with the abutment wing. The details for placement are shown on the wing abutment sheet.

Note:
Dashed lines below the top of wing are the abutment wing reinforcing steel. See Abutment Wing Details sheet for placement.

Note:
See Barrier Rail Rustication Details on Design Sheet 31.

Epoxy Coated Reinf. Steel - One End Sect.

Bar	Location	Shape	No.	Length	Weight
6c1	Rail, Vertical	⊓	12	5'-6"	99
6c2	Rail, Vertical	⌐	4	2'-10"	17
6d1	Rail, Horizontal	—	6	6'-8"	60
6d2	Rail, Horizontal	—	8	6'-9"	81
5d3	Rail, Horizontal	—	1	3'-9"	4
4s1	Rail, Conduit	⌐	2	1'-9"	2
4s2	Rail, Conduit	—	2	0'-6"	1
4t1	Rail, Abutment Wing Tie Bars	⌐	4	VARIES	5
				Epoxy Steel Total Weight (Lbs.)	269

Stainless Steel Reinf. Steel - One End Sect.

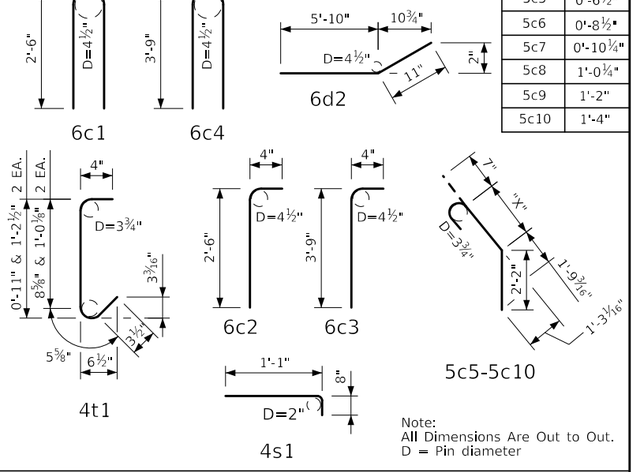
Bar	Location	Shape	No.	Length	Weight
6c3	Rail, Vertical	⌐	4	4'-1"	25
6c4	Rail, Vertical	⊓	12	8'-0"	144
5c5-10	Rail, Vertical	⌐	6	Varies	23
				Stainless Steel Total Weight (Lbs.)	192

Note:
Reinforcing steel quantities are included on the summary quantities sheet.

Concrete Placement Summary

Section	Total
Barrier Rail One End Section	0.65 CU. YD.

Bent Bar Details



Bar	"X"
5c5	0'-6½"
5c6	0'-8½"
5c7	0'-10¼"
5c8	1'-0¼"
5c9	1'-2"
5c10	1'-4"

Note:
All Dimensions Are Out to Out.
D = Pin diameter

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Barrier Rail End Section Details

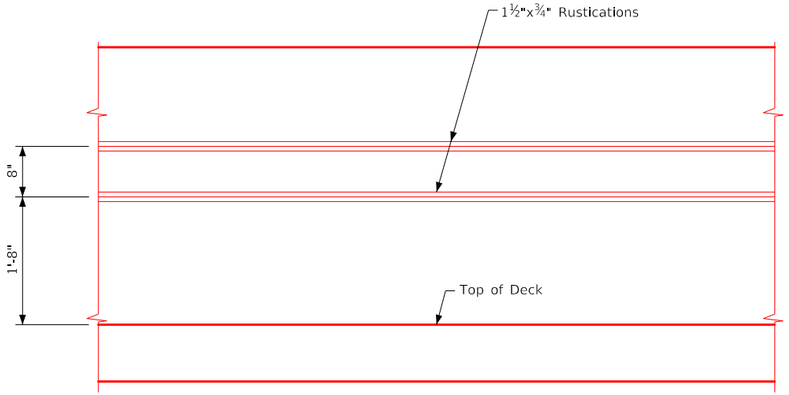
STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

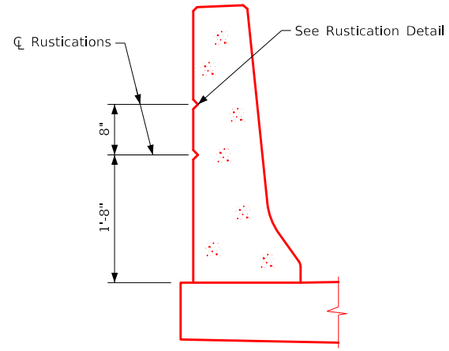
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 30 of 35 — FHWA No. 041981

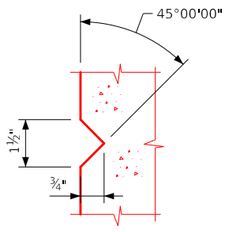
ENGLISHDECKRAILBRIDGES.DGN 1017S - THIS SHEET ISSUED 04-14 - ADDED STAINLESS STEEL REINFORCING BAR LIST AND CHANGED 6c3, 6c4 & 5c5-10 BARS TO STAINLESS STEEL.



Part Outside Elevation of Standard Barrier Rail



Part Section Through Standard Barrier Rail



Rustication Detail

Note:
For Concrete Rustication notes, see Design Sheet 4. Rustications extend the full length of bridge barrier, including barrier end section.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans 97'-0" Interior Span

Barrier Rail Rustication Details

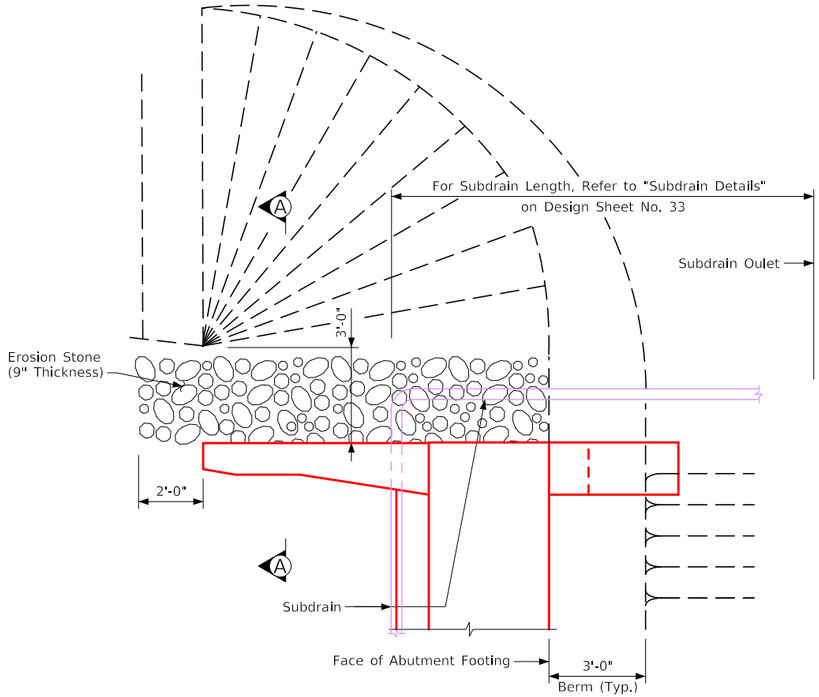
STA. 5174+26.60 (℄ I-80 Ultimate) Turn-in Date: May, 2024

Polk County

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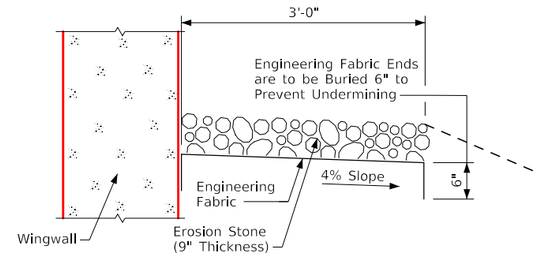
Design No. 624 Design Sheet No. 31 of 35 FHWA No. 041981

HDR

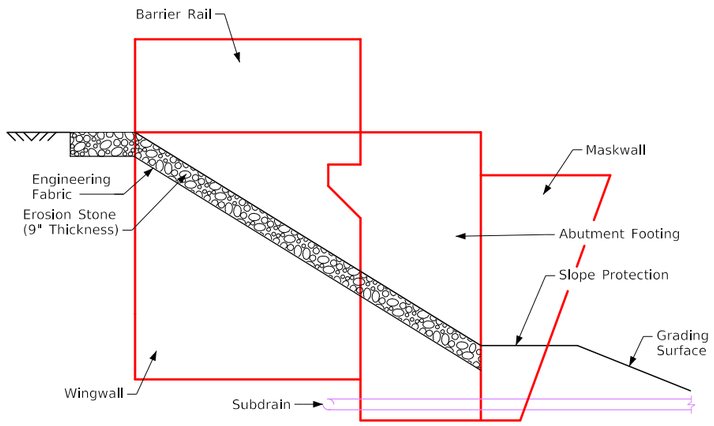


Top View of Wing Armoring

A Check Shall be Made at the Subdrain Outlet to Insure that it is Draining Properly During the Backfill Flooding Process.



Section A-A



Profile View of Wing Armoring

General Notes:

Erosion Stone shall be placed along the sides of the wings and abutment footing as shown in Section A-A. This is typical at the Northwest and Northeast corners 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 screeen 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 inch 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".

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans 97'-0" Interior Span

Bridge Wing Armoring

STA. 5174+26.60 (℄ I-80 Ultimate) Turn-in Date: May, 2024

Polk County

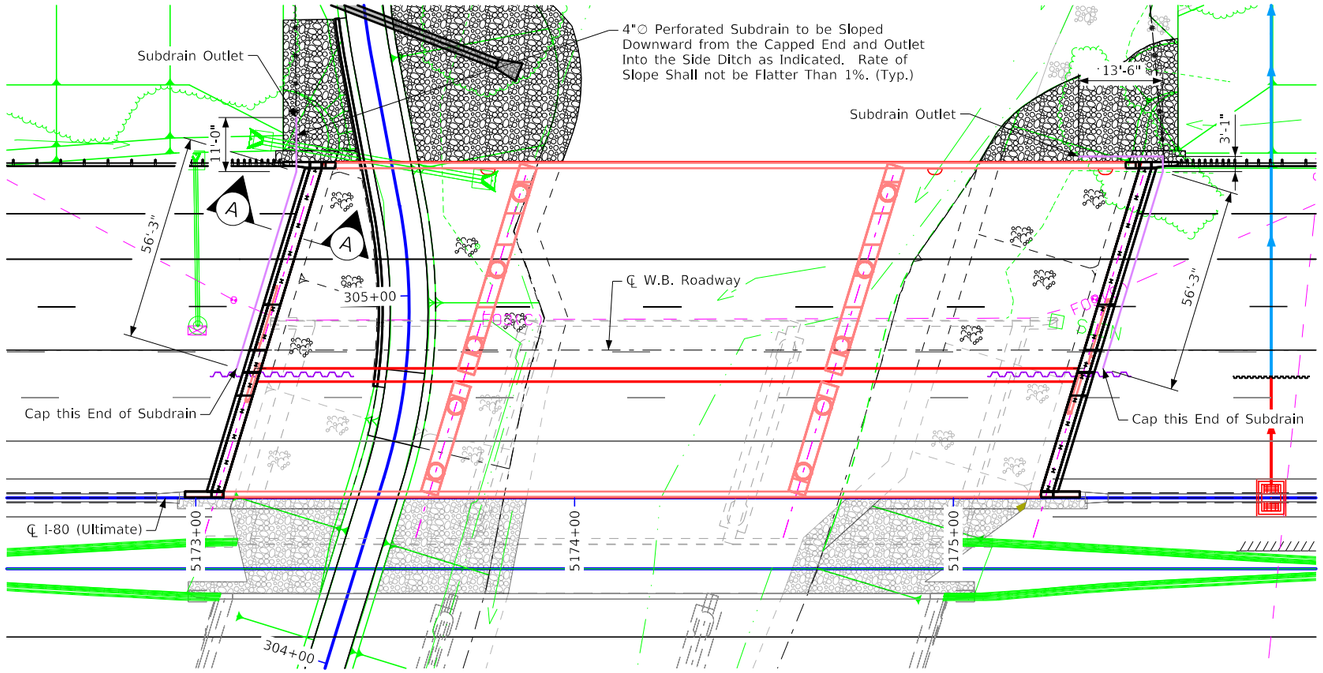
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 Design Sheet No. 32 of 35 FHWA No. 041981

Revised 06-14 - Added 2 Feet of Length of Erosion Stone in Front of the Bridge Wing.
ForeSlopeProtectionBridges.dgn - 1005A - This Sheet Issued 06-02.
Revised 09-2023: Changed direction of Section Director Arrows "A-A" to match what section
ForeSlopeProtectionBridges.dgn - 1005A - This Sheet Issued 07-23.

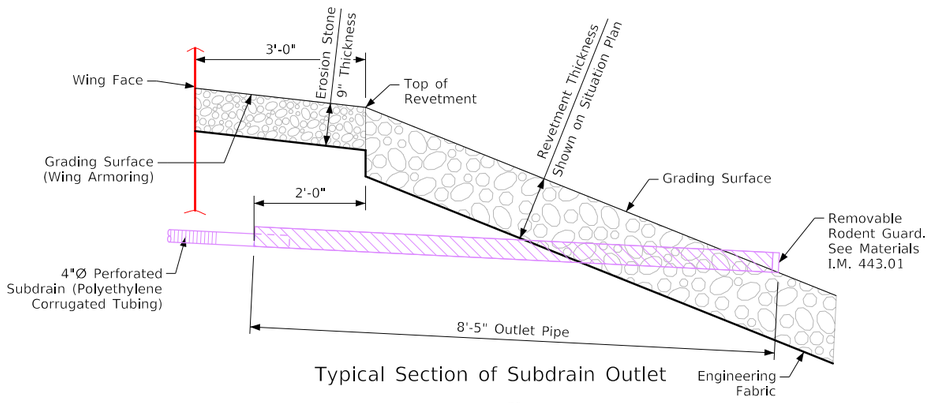
Note: Section A-A is shown on Abutment Backfill Details Sheet on Design Sheet No. 34.

Bench Mark No. Feno200, 1-Meter Rod Monument, Sta. 1183+18.58, 845.82' Rt., Elev. 851.56

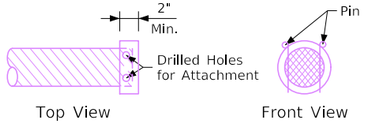


Situation Plan

Showing Subdrain Locations

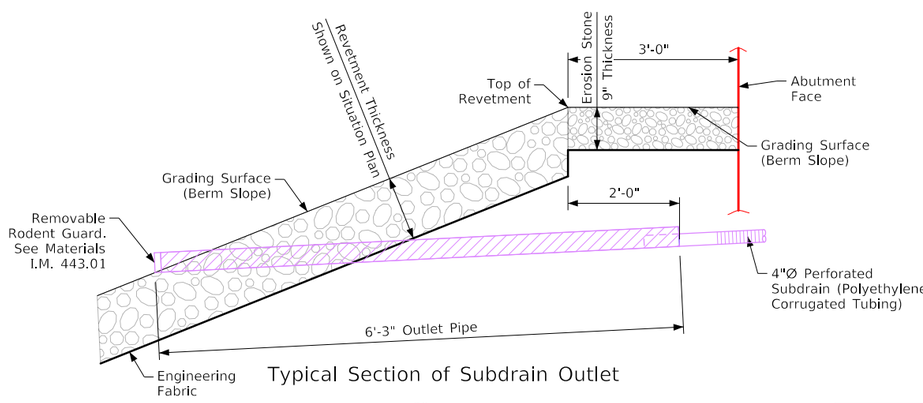


Typical Section of Subdrain Outlet

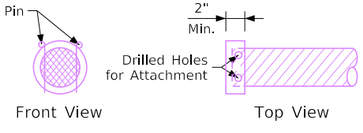


Removable Rodent Guard Details

Revetment Stone (Embedded) Outlet Details at West Abutment



Typical Section of Subdrain Outlet



Removable Rodent Guard Details

Revetment Stone (Embedded) Outlet Details at East Abutment

Subdrain Notes:

This plan sheet shows details for placing all subdrains and subdrain outlets required for this structure.

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 "High Performance Structural Concrete". 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.

Subdrain Outlet Elevations

Location	Elevation
West Abutment	839.06
East Abutment	834.68

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Subdrain Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

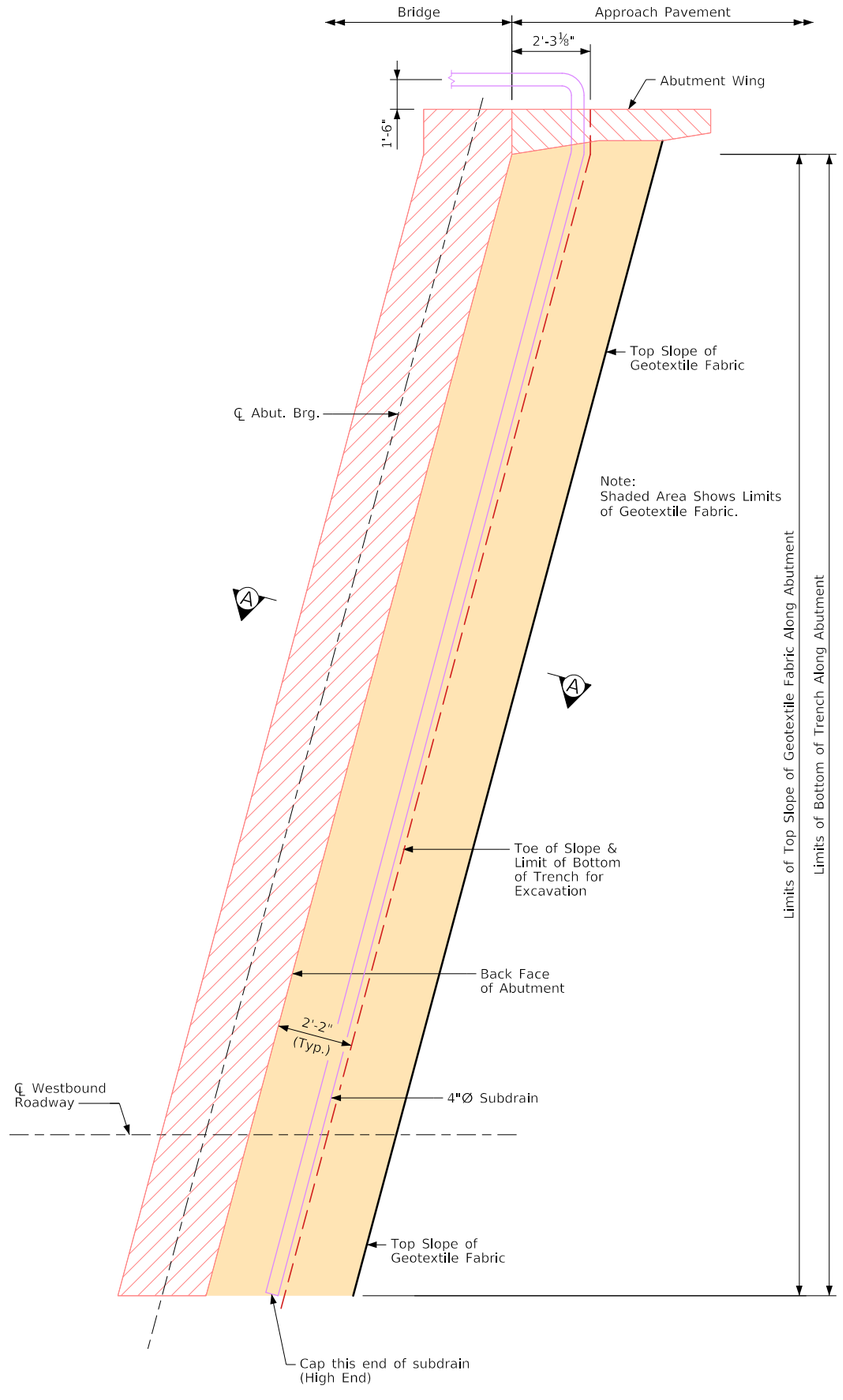
IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 — Design Sheet No. 33 of 35 — FHWA No. 041981

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/JAP/EES	Subdrain Details for Water Crossings	Standard Sheet 1007C	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.33	

Revised 10-14 - Two Additional Foreslope Protection Details were Added Outside of the Border to Show Revetment up to Back of Abutment Footing.
ForeSlopeProtectionBridges.dgn - 1007C - This Sheet Issued 06-02 for Water Crossings.
ForeSlopeProtectionBridges.dgn - 1007C - This Sheet Redrawn 07-23.

4:25:14 PM 4/19/2024 ESORENS pw:\\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5_Final_Bridge\6.0_CAD_BIM\6.2_WIP\Drafting\PPCB Design No. 624 - I-80WB over Four Mile Creek



Abutment Plan without Wing Extensions

(East abutment shown, West abutment 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 ft 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 ft 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 ft 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"Ø hose should be sprayed in successive 6 ft to 8 ft increments for 5 minutes within each increment.

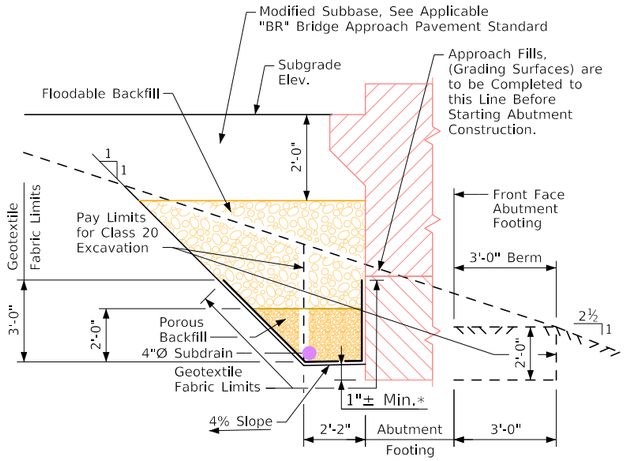
Floodable backfill lift placement, flooding, and compaction shall progress until the required full thickness of the abutment backfill has been completed.

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 "High Performance Structural Concrete".

Notes:

Subdrain shall slope downward 2% from high end.
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 1 ft in length, shingle fashion with up slope lap piece on top and stapled for continuity.



Section A-A

Backfill Details

Note: Geotextile Fabric will be Attached to Face of Abutment Footing and Wings.

* Dimension Varies Due to 2% Subdrain Slope.

Note:
For Details not Shown on this Sheet which are Pertinent to this Structure, See Subdrain Details Sheet on Design Sheet No. 33.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans — 97'-0" Interior Span

Abutment Backfill Details

STA. 5174+26.60 (℄ I-80 Ultimate) — Turn-in Date: May, 2024

Polk County

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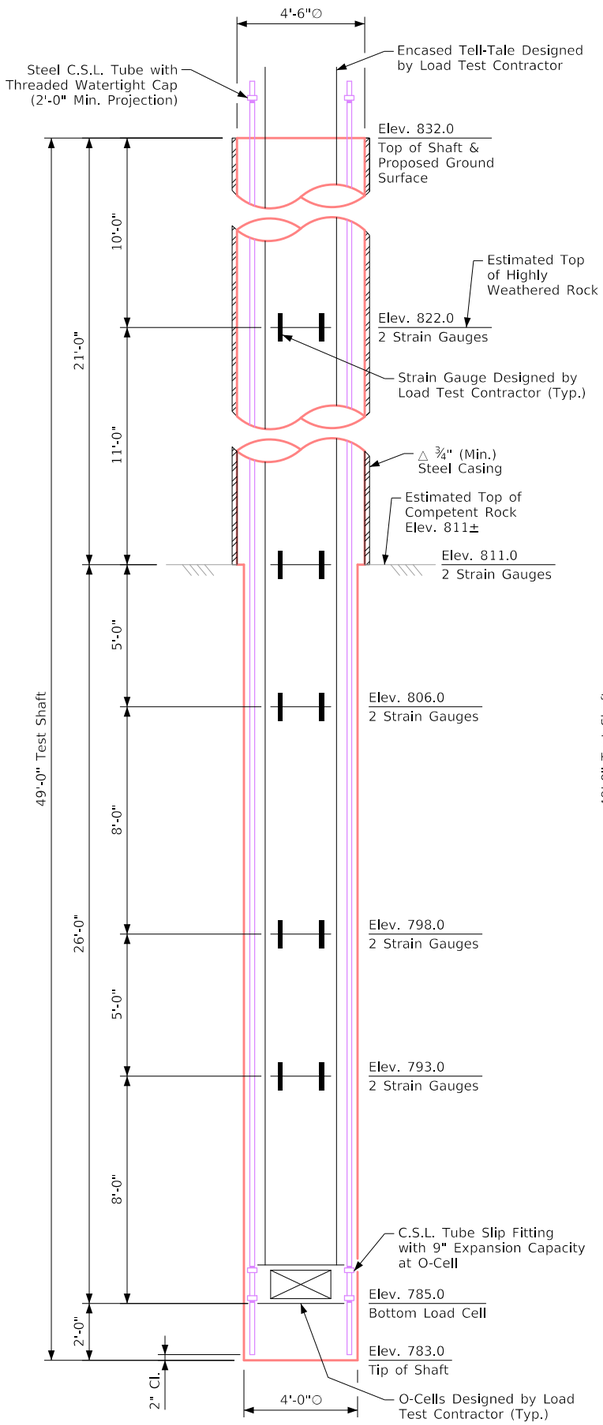
Design No. 624 — Design Sheet No. 34 of 35 — FHWA No. 041981

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS\CJL\MJS	Granular Backfill Details for Non-wing Extension Bridges	Standard Sheet 1007D (Modified)	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.34	

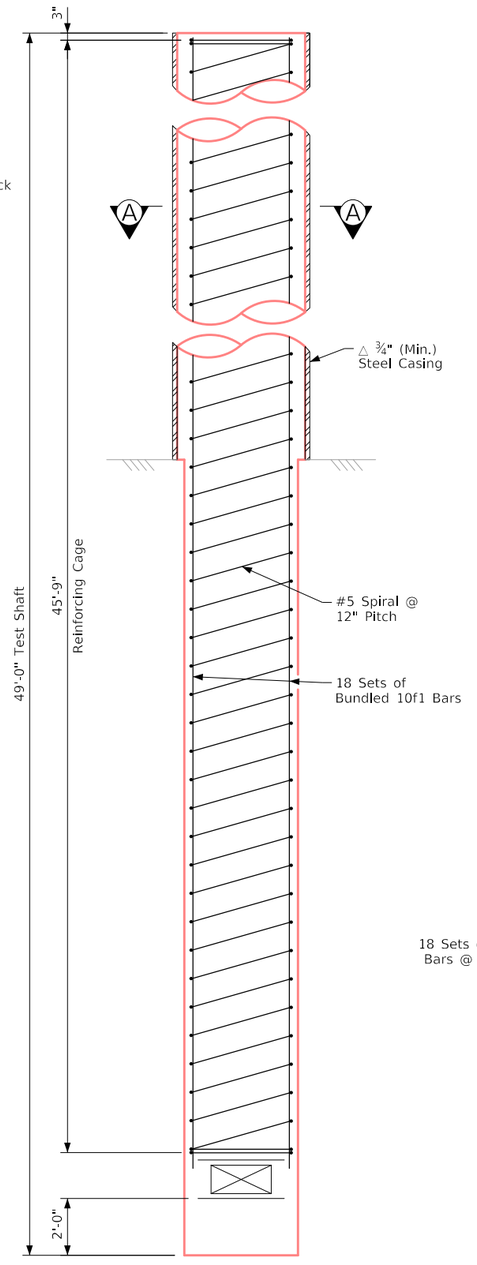
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Revised 09-14 - The Technical Data Information Table was Removed and is Located in the Standard Specifications. Changed Surface Flooding Time to 5 Minute Increments.
Revised 09-16 - Changed the Bridge Approach Pavement Standard to "BR" (was "RK").
ForeSlopeProtectionBridges.dgn - 1007D - This Sheet Issued 08-07.
ForeSlopeProtectionBridges.dgn - 1007D - This Sheet Redrawn 07-23.

Bench Mark No. Feno200, 1-Meter Rod Monument, Sta. 1183+18.58, 845.82' Rt., Elev. 851.56



Test Shaft Instrumentation Details



Test Shaft Reinforcing Details

Test Shaft Notes:

The test shaft shall be used as the demonstration shaft. The demonstration shaft shall be located at approximately Sta. 5175+71, 135' Lt. as shown on Design Sheet No. 6.

The test shaft shall be constructed using the methods intended for construction of the production shaft and in accordance with the Special Provisions for Concrete Drilled Shafts.

After testing is completed and approval is given by the Engineer, the Contractor shall remove the top portion of the shaft to 3'-0" below finished grade and cover with earth.

Spiral reinforcing is to be No. 5 bar with 3'-6" outside diameter and 12" pitch with 4 equally spaced L⅞"x⅞"x⅛" spacers punched to hold spirals. Spirals are to have 1½ extra turns top and bottom of shaft.

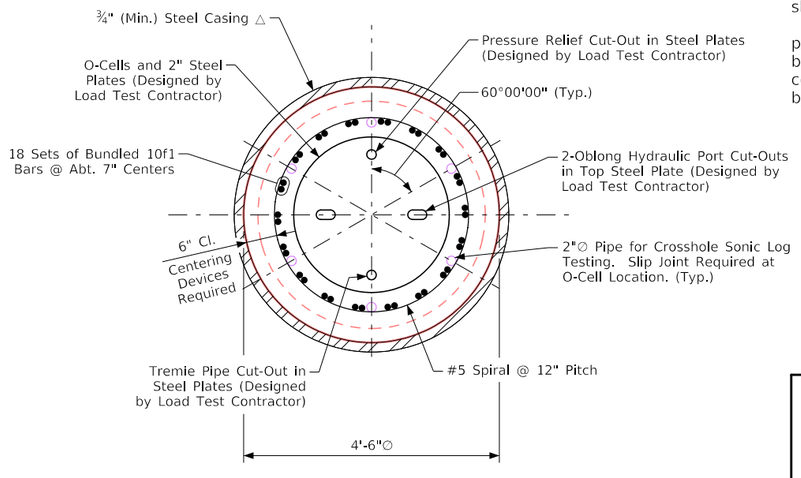
The spiral reinforcing may be spliced by lapping 32". The length of the spiral shown does not include the lapped length of the splices.

Ties spaced at 12" centers may be substituted for the spiral reinforcement. The spiral/ties used for the test shaft shall match the type used for the production shaft.

◪ Bottom of shaft elevations and shaft lengths are based on 28'-0" embedment below rock elevations from the boring logs. Final bottom of shaft elevations and shaft lengths are dependent on rock elevations determined in the field.

Drilled shaft rock sockets shall be brushed but shall not be grooved.

△ The permanent steel casing shall have a minimum wall thickness of ¾" and any additional thickness needed shall be determined by the Contractor depending on the selected methods of transporting, handling and installing the casing. No additional payment will be made for an increased casing thickness.

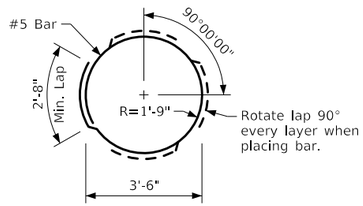


Section A-A

Reinforcing Bar List - One Test Shaft

	Bar	Location	Shape	No.	Length	Weight
Non-Coated	10f1	Shaft, Longitudinal	——	36	45'-9"	7,087
	#5	Shaft Spiral	⌀	1	530'-5"	553
		Shaft Spiral Spacers L⅞"x⅞"x⅛"	——	4	45'-9"	128
					Reinforcing Steel - Total (LB)	7,768

Bent Bar Details



Alternate Shaft Tie

Note:
All dimensions are out to out.
D = pin diameter.

Load Test Notes:

One confirmation boring shall be required at the center of the test shaft location prior to installation of the test shaft. The confirmation boring shall extend to a depth of 15'-0" below the design tip elevation of the test shaft. A complete copy of currently available boring logs and soil test results are available upon written request to the contracting authority.

Each of the three osterberg cells shall have a minimum capacity of 1,500 tons for a total of 4,500 tons and a minimum stroke of 9 inches. Strain gauges and encased tell-tales are required to monitor the performance of the load test. The osterberg cell, strain gauges and tell-tales shall be designed by the approved load test Contractor.

The load test details provided on this sheet are preliminary and shall be subject to revision by the Engineer based on the subsurface conditions encountered at the confirmation boring and based on recommendations provided by the approved load test Contractor.

Design For 16°54'00" Skew (LA)

219'-0" x 52'-10" Preten. Prestressed Concrete Beam Bridge - Stage 1

56'-0" & 66'-0" End Spans 97'-0" Interior Span

Test Shaft Details

STA. 5174+26.60 (℄ I-80 Ultimate) Turn-in Date: May, 2024

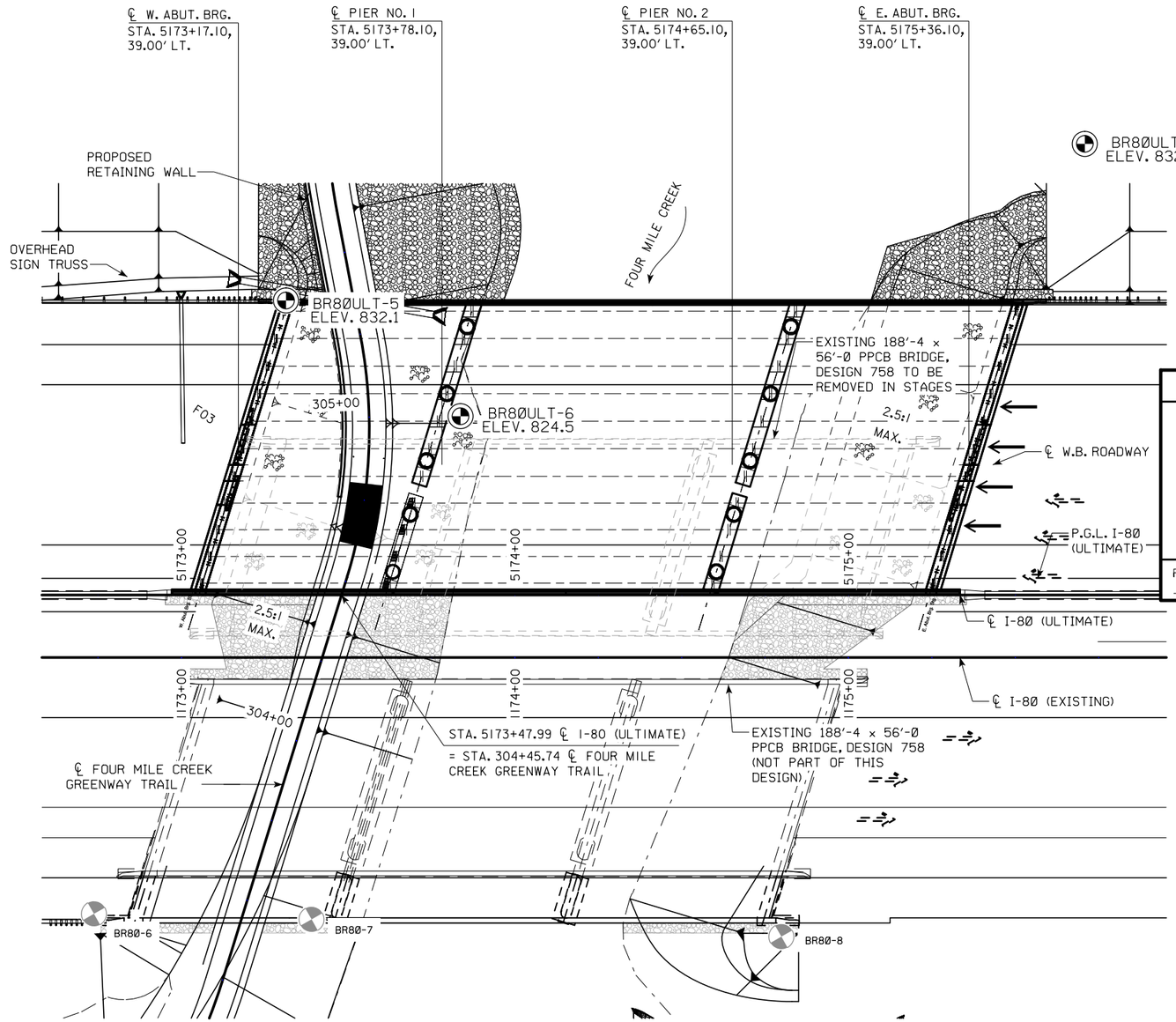
Polk County

IOWA DEPARTMENT OF TRANSPORTATION

Design No. 624 Design Sheet No. 35 of 35 FHWA No. 041981

FILE NO. 32061	ENGLISH	DESIGN TEAM GMS/MEW/EES	POLK COUNTY	PROJECT NUMBER IM-NHS-080-4(082)139--03-77	SHEET NUMBER V.35

4:25:16 PM 4/19/2024 ESORENS pw:\\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5_Final_Bridge\6.0_CAD_BIM\6.2_WIP\Drafting\PPCB Design No. 624 - I-80WB over Four Mile Creek



LEGEND

CURRENT BORING

SEPARATE PROJECT BORING

THIS SHEET SHOWS BORINGS BR80-6, BR80-7, AND BR80-8, WHICH ARE PROVIDED AS ADDITIONAL INFORMATION

GEOTECHNICAL DESIGN

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Brian T. Havens — 5/30/24
Signature — Date

BRIAN HAVENS
Printed or Typed Name

My license renewal date is December 31, 2024

Pages or sheets covered by this seal: SPS.1 AND SPS.2

LICENSED PROFESSIONAL ENGINEER — BRIAN T. HAVENS 13863 — IOWA

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

N

LOCATION

I-80 W.B. OVER FOUR MILE CREEK
T-79N R-23W
SECTION 17
DELAWARE TOWNSHIP
POLK COUNTY
FHWA NO. 041981
BRIDGE MAINT. NO. 7739.4L080
LATITUDE 41.656652°
LONGITUDE -93.545866°

0 ENGLISH 40
SCALE IN FEET

DESIGN FOR 16°54'00" SKEW (LA)

219'-0 X 85'-4 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE

61'-0 AND 71'-0 END SPANS — 87'-0 INTERIOR SPAN

SOIL PROFILE SHEET

STATION 5174+26.60 (℄ I-80 ULTIMATE) — NOVEMBER 2021

POLK COUNTY

DESIGN SHEET NO. 1 OF 2 FILE NO. 32061 DESIGN NO. 624

FILE NO. 32061	ENGLISH	DESIGN TEAM HDR	POLK COUNTY	PROJECT NUMBER IM-NHS-4(82)139--03-77	SHEET NUMBER SPS.1

10:14:54 AM 5/29/2024 DKOZAK pw:\\pwhdruscen01:HDR_US_Central_01\Documents\IADOT\IDOT-NEMM_Stage_5_Final_Geo\6.0_CAD_BIM\6.2_WIP\WorkSet\Dgn\BRPrelim\Drilled shaft

SHELBY TUBE CORE DATA

CORE NO.	BR80ULT-5-C1
DEPTH IN FEET	4.0'-6.0'
CLASSIFICATION (AASHTO)	A-6(4)
COEFF.CONSOL. (SQ.FT /DAY)	-
TRIAXIAL COMPRESSION	UU
COHESION - PSF	2460
FRICTION COEFF.	-
MOISTURE CONTENT %	16
DRY DENSITY - PCF	110

CU-CONSOLIDATED UNDRAINED
UU-UNCONSOLIDATED UNDRAINED
UC-UNCONFINED COMPRESSION (c=1/2 Qu)

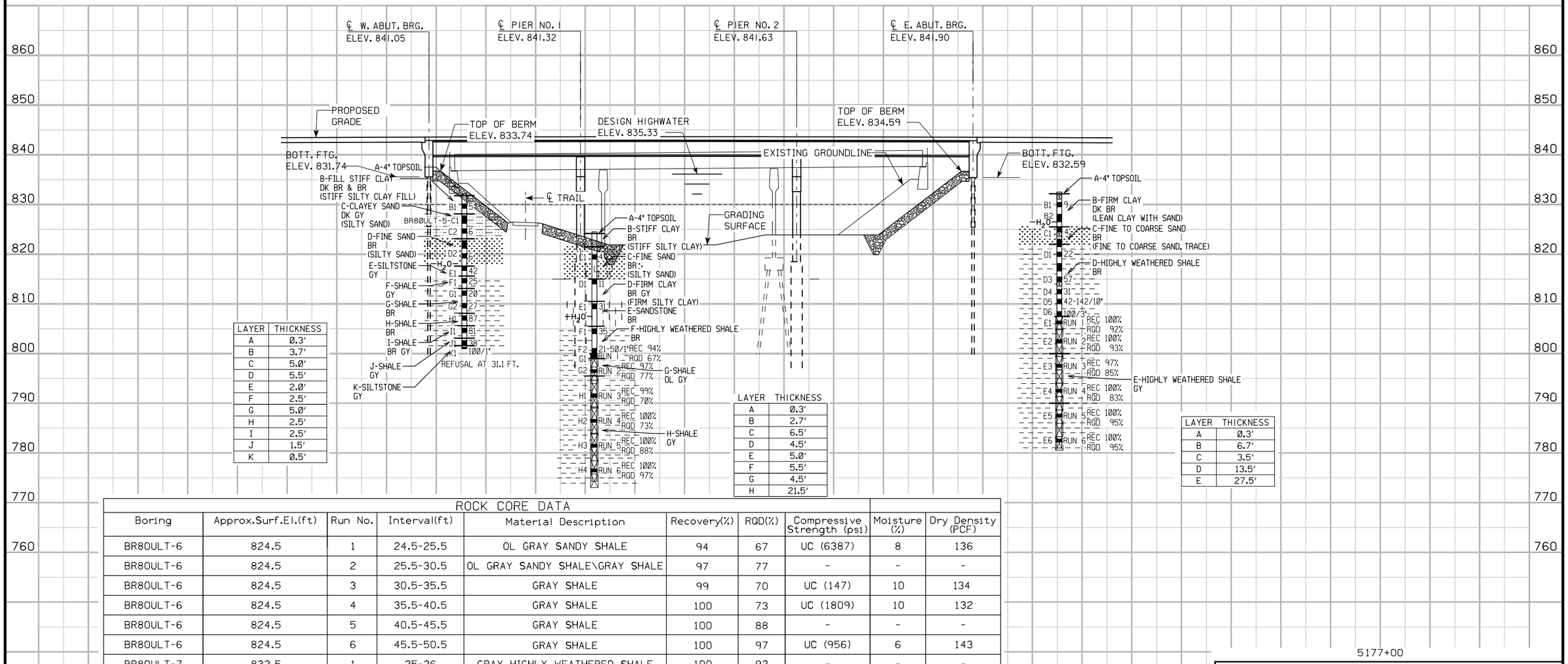
Water Level Observations (Ft.)

Boring No.	Date Drilled	While Drilling	End of Drilling	After 24 Hours
BR80ULT-5	08/12/2021	14.0'	-	10.5'
BR80ULT-6	01/13/2022	17.0'	-	-
BR80ULT-7	01/13/2022	6.0'	-	-

THIS SHEET IS INCLUDED TO SHOW SOIL INFORMATION.
DETAILS AND NOTES SHOWN ELSEWHERE IN THESE PLANS SHALL BE USED FOR STRUCTURE CONSTRUCTION.

LEGEND

WATER, DRY, PLUGGED, MOISTURE, SHELBY, BLOW COUNT, DENS. CORE, SAMPLE
BLOW COUNT: LAYER - NO. BLOWS (e.g. B2 5)
DIAMOND CORE, SAND, GRAVELLY SAND, BOULDERS
SOILS BOOK NO. _____
SOIL REMEDIATION AREA, LIMESTONE (LS.), BROKEN & WEATHERED LS., SANDSTONE, SHALE, SANDY SOIL



LAYER	THICKNESS
A	0.3'
B	3.7'
C	5.0'
D	5.5'
E	2.0'
F	2.5'
G	5.0'
H	2.5'
I	2.5'
J	1.5'
K	0.5'

LAYER	THICKNESS
A	0.3'
B	2.7'
C	6.5'
D	4.5'
E	5.0'
F	5.5'
G	4.5'
H	21.5'

LAYER	THICKNESS
A	0.3'
B	6.7'
C	3.5'
D	13.5'
E	27.5'

ROCK CORE DATA

Boring	Approx.Surf.El.(ft)	Run No.	Interval(ft)	Material Description	Recovery(%)	RQD(%)	Compressive Strength (psi)	Moisture (%)	Dry Density (PCF)
BR80ULT-6	824.5	1	24.5-25.5	OL GRAY SANDY SHALE	94	67	UC (6387)	8	136
BR80ULT-6	824.5	2	25.5-30.5	OL GRAY SANDY SHALE\GRAY SHALE	97	77	-	-	-
BR80ULT-6	824.5	3	30.5-35.5	GRAY SHALE	99	70	UC (147)	10	134
BR80ULT-6	824.5	4	35.5-40.5	GRAY SHALE	100	73	UC (1809)	10	132
BR80ULT-6	824.5	5	40.5-45.5	GRAY SHALE	100	88	-	-	-
BR80ULT-6	824.5	6	45.5-50.5	GRAY SHALE	100	97	UC (956)	6	143
BR80ULT-7	832.5	1	25-26	GRAY HIGHLY WEATHERED SHALE	100	92	-	-	-
BR80ULT-7	832.5	2	27.5-31.5	GRAY HIGHLY WEATHERED SHALE	100	93	UC (1166)	7	140
BR80ULT-7	832.5	3	31.5-36.5	GRAY HIGHLY WEATHERED SHALE	97	85	-	-	-
BR80ULT-7	832.5	4	36.5-41.5	GRAY HIGHLY WEATHERED SHALE	100	83	UC (63)	7	138
BR80ULT-7	832.5	5	41.5-46.5	GRAY HIGHLY WEATHERED SHALE	100	95	-	-	-
BR80ULT-7	832.5	6	46.5-51.5	GRAY HIGHLY WEATHERED SHALE	100	95	UC (1591)	6	143

BR80ULT-5 Rt. 88'
BR80ULT-6 Rt. 54'
BR80ULT-7 Rt. 135'

DESIGN FOR 16°54'00" SKEW (LA)

219'-0 X 85'-4 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE

61'-0 AND 71'-0 END SPANS — 87'-0 INTERIOR SPAN

SOIL PROFILE SHEET

STATION 5174+26.60 (℄ I-80 ULTIMATE) NOVEMBER 2021

POLK COUNTY

DESIGN SHEET NO. 2 OF 2 FILE NO. 32061 DESIGN NO. 624

FILE NO. 32061	ENGLISH	DESIGN TEAM HDR	POLK COUNTY	PROJECT NUMBER IM-NHS-4(82)139--03-77	SHEET NUMBER SPS.2

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INDEX OF SHEETS

No.	DESCRIPTION
A Sheets	**Title Sheets**
A.3	Title Sheet
C Sheets	**Quantities and General Information**
C.1	Project Description
C.1	Estimated Project Quantities and Reference Notes
C.1	Standard Road Plans
C.1	Index of Tabulations
C.1	General Notes
C.2	Tabulations
J Sheets	**Traffic Control and Staging Sheets**
J.1	Traffic Control Plan
U Sheets	**500 Series, Mod.Stds. and Detail Sheets**
U.1	Bridge Approach Detail
	* Color Plan Sheets

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ROADWAY DESIGN

LICENSED PROFESSIONAL ENGINEER
Sean L. Ranney
26408
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Signature — Date: 4/11/2024

Sean L. Ranney
Printed or Typed Name

My license renewal date is December 31, 2025

Pages or sheets covered by this seal: A.3, C.1-2, J.1, U.1

100-1D
10-18-05

PROJECT DESCRIPTION

The bridge is located on proposed I-80 over Four Mile Creek Northeast of Des Moines.
The project involves constructing the north half of the bridge, both bridge appoaches (partial), and longitudinal grooving.

100-0A
10-28-97

ESTIMATED ROADWAY QUANTITIES
(1 DIVISION PROJECT)

Item No.	Item Code	Item	Unit	Total	As Built Qty.
1	2301-0690203	BRIDGE APPROACH, BR-203	SY	862.7	
2	2412-0000100	LONGITUDINAL GROOVING IN CONCRETE	SY	2010	
3	2503-0500402	BRIDGE END DRAIN, DR-402	EACH	2	
4	2528-2518000	SAFETY CLOSURE	EACH	2	
5	2528-8445110	TRAFFIC CONTROL	LS	1	

100-4A
10-29-02

ESTIMATE REFERENCE INFORMATION

Item No.	Item Code	Description
1	2301-0690203	BRIDGE APPROACH, BR-203
		Refer to Tab. 112-6 in C Sheets and U Sheets for details.
-	-	-
2	2412-0000100	LONGITUDINAL GROOVING IN CONCRETE
		Refer to Tab. 100-28 in C Sheets.
-	-	-
3	2503-0500402	BRIDGE END DRAIN, DR-402
		Refer to Tab. 104-8A in C Sheets.
-	-	-
4	2528-2518000	SAFETY CLOSURE
		Refer to Tab. 108-13A in C Sheets.
-	-	-
5	2528-8445110	TRAFFIC CONTROL
		Refer to Traffic Control Plan in the J Sheets.
-	-	-

111-25
10-18-11

INDEX OF TABULATIONS

Tabulation	Tabulation Title	Sheet No.
C Sheets		
100-0A	ESTIMATED ROADWAY QUANTITIES (1 DIVISION PROJECT)	C.1
100-1D	PROJECT DESCRIPTION	C.1
100-4A	ESTIMATE REFERENCE INFORMATION	C.1
100-28	LONGITUDINAL GROOVING	C.2
104-8A	SCOUR PROTECTION OR ROCK FLUME FOR BRIDGE END DRAIN	C.2
105-4	STANDARD ROAD PLANS	C.1
108-13A	SAFETY CLOSURES	C.2
111-25	INDEX OF TABULATIONS	C.1
112-6	BRIDGE APPROACH SECTION	C.2

105-4
10-18-11

STANDARD ROAD PLANS

The following Standard Road Plans apply to construction work on this project.

Number	Date	Title
BR-203	04-16-24	Double Reinforced 12" Approach
BR-231	10-18-22	Bridge Approach (Multi-Lane, Curbed Roadway)
DR-306	10-17-23	Precast Concrete Headwall for Subdrain Outlets
DR-402	04-16-24	Rock Flume for Bridge End Drain
LI-104	10-21-14	Junction box (cast Iron)
PV-101	04-19-22	Joints
TC-1	10-15-19	Work Not Affecting Traffic (Two-Lane or Multi-Lane)

Note: This Bridge Plan is tied to the (80) Grade and New Plan. Refer to the Grade and New Plan for requirements and restrictions applicable to this plan, including the following:

-Traffic Control Plan
-Staging Notes
-Contractor Access
-Coordinated Operations
-Road Closure Details and Requirements
-Staging/Traffic Control Sheets
-Survey Sheets
-Pollution Prevention Plan
-Geometrics and Staking
-Plan and Profile
-Storm Sewer

100-28
10-19-10

LONGITUDINAL GROOVING

Location	Total SY	Remarks
W. Approach	408.0	
Bridge Deck	1249.0	
E. Approach	353.0	
Total:	2010.0	

108-13A
08-01-08

SAFETY CLOSURES

Refer to Section 2518 of the Standard Specifications

Station	Closure Type		Remarks
	Road Qty.	Hazard Qty.	
5172+00.00		1	West Approach
5177+00.00		1	East Approach
Total:		2	

104-8A
04-19-22

SCOUR PROTECTION OR ROCK FLUME FOR BRIDGE END DRAIN

Refer to Standard Road Plan DR-401 and DR-402

Location			Bid Items	Scour Protection (DR-401)			Rock Flume (DR-402)			Remarks
Bridge Station	Bridge Corner	Distance DI-1 or DI-2	Bridge End Drain	Special Ditch Control, Wood Excelsior Mat	Turf Reinforced Mat (TRM), Type 2	Transition Mat	Macadam Stone Base	Engineering Fabric	Erosion Stone	
				EC-101	EC-104	EC-105				
		FT	TYPE	SQ	SQ	SF	TONS	SY	TONS	
5174+26.60	NW	82.3	DR-402				1.500	83.0	56.000	
5174+26.60	NE	56.4	DR-402				1.500	78.0	53.000	
						Totals:	3.000	161.0	109.000	

112-6
04-18-17

BRIDGE APPROACH SECTION

Refer to the BR Series.

* Not a bid item

Location				Approach Pavement					Standard Road Plans BR Series			Subdrain					* Modified Subbase	* Polymer Grid	* Special Backfill	Remarks
Bridge Station	End	Skew Ahead Degrees LEFT	Skew Ahead Degrees RIGHT	(T) Thickness	Pay Length	Non-Reinf. Pavement Area	Single-Reinf. Pavement Area	Double-Reinf. Pavement Area	Approach	Fixed or Movable Abutment	Abutting Pavement	* Perforated Subdrain 4"	* Subdrain Outlet		* Porous Backfill	* Class 'A' Crushed Stone Backfill				
												LF	STA	Side	CY	CY	TON	SY	TON	
		LEFT	RIGHT	Inches	FT	SY	SY	SY												
5174+26.60	West	16.9		12.0	84.1	165.3	110.2	188.4	BR-203	Movable	BR-231	63.0	5172+48.70	North	3.2		455.000	525.0		Subdrain includes 3' of extra length on the south side of each approach for connection to future project.
5174+26.60	East	16.9		12.0	72.8	165.3	110.2	123.3	BR-203	Movable	BR-231	63.0	5176+07.73	North	3.2		389.000	455.0		
				Subtotals:		330.6	220.4	311.7												
				Totals:		862.7						126.0			6.4		844.000	980.0		

TRAFFIC CONTROL PLAN

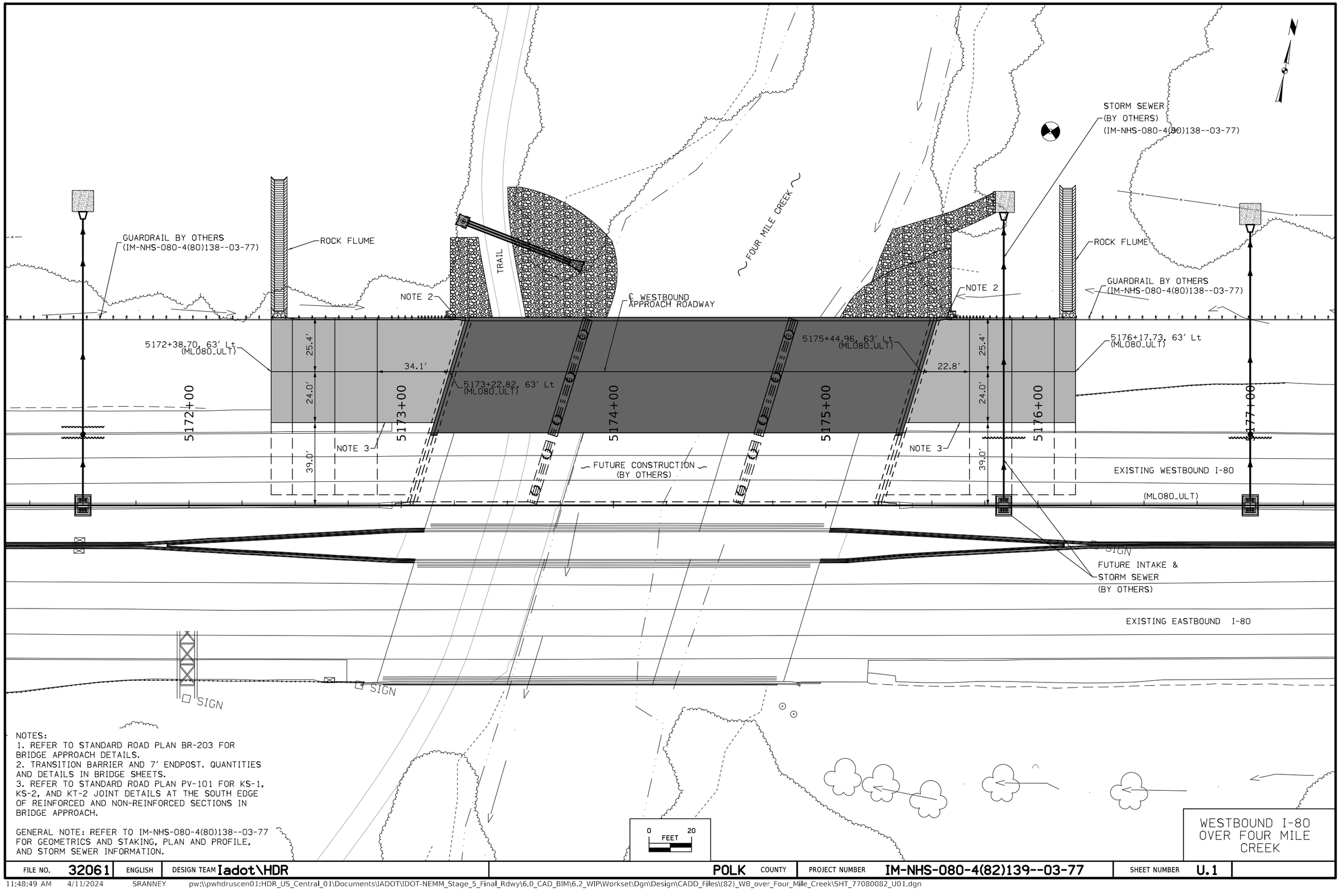
Refer to IM-NHS-080-4(80)138--03-77 Grading and New Plan for the Traffic Control Plan.

Traffic Control Notes:

The following projects are tied:

IM-NHS-080-4(80)138--03-77 Grade and New
IM-NHS-080-4(81)139--03-77 Bridge Design No. 524
IM-NHS-080-4(82)139--03-77 Bridge Design No. 624

The Project Traffic Control Plan and Staging Notes are included in the (80) Grade and New Plan and will involve all traffic control as detailed in the Traffic Control Plan, Staging Notes and traffic control sheets.
Traffic Control responsibilities may be delegated between projects. Each Contractor will be responsible for complying with all the requirements outlined in the Traffic Control Plan, and coordinating activities to insure compliance.



NOTES:
1. REFER TO STANDARD ROAD PLAN BR-203 FOR BRIDGE APPROACH DETAILS.
2. TRANSITION BARRIER AND 7' ENDPOST. QUANTITIES AND DETAILS IN BRIDGE SHEETS.
3. REFER TO STANDARD ROAD PLAN PV-101 FOR KS-1, KS-2, AND KT-2 JOINT DETAILS AT THE SOUTH EDGE OF REINFORCED AND NON-REINFORCED SECTIONS IN BRIDGE APPROACH.

GENERAL NOTE: REFER TO IM-NHS-080-4(80)138--03-77 FOR GEOMETRICS AND STAKING, PLAN AND PROFILE, AND STORM SEWER INFORMATION.

WESTBOUND I-80 OVER FOUR MILE CREEK

FILE NO.	ENGLISH	DESIGN TEAM	COUNTY	PROJECT NUMBER	SHEET NUMBER
32061		Iadot\HDR	POLK	IM-NHS-080-4(82)139--03-77	U.1